

# **APPENDIX 'A'**

# **GEOTECHNICAL REPORT**

July 21, 2020  
File: 123314925

**Attention: Mr. David Wiebe**  
Dillon Consulting Limited  
1558 Wilson Place  
Winnipeg, Manitoba R3T 0Y4

Dear David,

**Reference: Geotechnical Investigation for 2020 Street Renewals for Dunkirk Drive, Pembina Highway, and Jubilee Avenue**

Between June 22 and July 2, 2020, a total of 42 concrete cores were obtained and 39 testholes were drilled to depths ranging from 0.5 m to 2.5 m on Dunkirk Drive, Pembina Highway and Jubilee Avenue. Testholes TH01, TH02 and TH03 on Pembina Highway were canceled due to obstruction caused by nearby underground utilities. The initial testhole locations were selected by Dillon Consulting Limited, and some adjustments were made when obstruction with underground utilities were encountered. The final core and testhole locations are shown on the Testhole Location Plans provided in **Appendix A**.

Upon completion of coring and drilling, the testholes were backfilled with bentonite and soil cuttings, and surfaces of the holes were topped with existing crushed limestone and cold patch asphalt. Tabulated data summarizing the pavement thickness is provided in **Appendix B**, and the detailed testhole records are provided in **Appendix C**. In addition, core photos are provided in **Appendix D**.

A laboratory testing program was performed on select soil and concrete core samples. The following tests were conducted:

- ASTM D422            - *Particle-Size Analysis of Soils*
- ASTM D698           - *Laboratory Compaction Characteristics of Soil Using Standard Effort (Proctor)*
- ASTM D1883         - *California Bearing Ratio (CBR) of Laboratory-Compacted Soils*
- ASTM D2216         - *Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*
- ASTM D4318         - *Liquid Limit, Plastic Limit, and Plasticity Index of Soils*
- CSA A23.2-14C      - *Obtaining and Testing Drilled Cores for Compressive Strength*

The resulting test data is attached, and the laboratory test reports are provided in **Appendix E**.

July 21, 2020  
Mr. David Wiebe  
Page 2 of 5

**Reference: Geotechnical Investigation for 2020 Street Renewals for Dunkirk Drive, Pembina Highway, and Jubilee Avenue**

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding our report.

Regards,

**Stantec Consulting Ltd.**



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**Guillaume Beauce** P.Eng.  
Associate – Materials Testing Services  
Phone: 204-928-7618  
guillaume.beauce@stantec.com

Attachments: Table 1 – Particle Size Analysis Test Data  
Table 2 – Water Content Test Data  
Table 3 – Atterberg Limits Test Data  
Table 4 – Compressive Strength Test Data

Appendix A – Testhole Location Plan  
Appendix B – Pavement Thickness Tabulated Data  
Appendix C – Testhole Records  
Appendix D – Core Photos  
Appendix E – Laboratory Test Reports :

- 2 x Particle-Size Analysis Reports
- 2 x Proctor Reports
- 2 x CBR Reports
- 2 x Atterberg Limits Reports

Reference: Geotechnical Investigation for 2020 Street Renewals for Dunkirk Drive, Pembina Highway, and Jubilee Avenue

**TABLE 1 – PARTICLE-SIZE ANALYSIS TEST DATA**

Testhole No.	Field Sample No.	Particle-Size Distribution (%)						
		Gravel	Sand			Silt	Clay	Colloids
			Coarse	Medium	Fine			
75.0 - 4.75 mm	< 4.75 - 2.0 mm	< 2.0 - 0.425 mm	< 0.425 - 0.075 mm	< 0.075 - 0.002 mm	< 0.002 mm	< 0.001 mm		
TH04 (Jubilee Ave)	4'	0.0	0.0	0.3	2.7	75.7	21.3	16.6
TH11 (Jubilee Ave)	4'	0.0	0.0	1.0	0.6	51.1	47.3	36.4

**TABLE 2 - WATER CONTENT TEST DATA**

Testhole No.	Field Sample No.	Water Content (%)	Test Hole No.	Field Sample No.	Water Content (%)
TH07 (Dunkirk Dr)	0.6 m	5.1	TH01 (Jubilee Ave)	2.1 m	40.4
	0.9 m	4.8		2.4 m	44.2
	1.2 m	25.2	TH02 (Jubilee Ave)	0.6 m	54.0
	1.5 m	30.1		0.9 m	37.3
TH04 (Pembina Hwy)	0.6 m	45.0	TH04 (Jubilee Ave)	1.2 m	23.1
	0.9 m	51.1		1.5 m	40.1
	1.2 m	66.0	TH04 (Jubilee Ave)	0.6 m	37.6
	1.5 m	64.5		0.9 m	37.3
TH01 (Jubilee Ave)	0.6 m	32.4	TH04 (Jubilee Ave)	1.2 m	25.8
	0.9 m	24.9		1.5 m	25.5
	1.2 m	29.1		1.8 m	26.9
	1.5 m	42.0			

Reference: Geotechnical Investigation for 2020 Street Renewals for Dunkirk Drive, Pembina Highway, and Jubilee Avenue

**TABLE 2 - WATER CONTENT TEST DATA (CONTINUED)**

Testhole No.	Field Sample No.	Water Content (%)	Test Hole No.	Field Sample No.	Water Content (%)
TH06 (Jubilee Ave)	0.6	29.5	TH11 (Jubilee Ave)	0.9	36.3
	0.9	26.4		1.2	40.2
	1.2	31.1		1.5	43.9
	1.5	37.7		1.8	43.8
	1.8	38.3		2.1	46.5
	2.1	42.3		2.4	47.8
	2.4	38.4		TH12 (Jubilee Ave)	0.6
TH08 (Jubilee Ave)	0.6	19.9	0.9		33.5
	0.9	29.2	1.2		40.0
	1.2	22.5	1.4		42.4
	1.5	23.0	1.8		45.5
	1.8	32.4	2.1		46.3
TH11 (Jubilee Ave)	0.6	29.0	2.4		46.5

**TABLE 3 – ATTERBERG LIMITS TEST DATA**

Testhole No.	Field Sample No.	Liquid Limit	Plastic Limit	Plasticity Index	As Rec'd Water Content (%)
TH04 (Jubilee Ave)	4'	41	16	25	25.8
TH11 (Jubilee Ave)	4'	87	24	63	40.2

Reference: Geotechnical Investigation for 2020 Street Renewals for Dunkirk Drive, Pembina Highway, and Jubilee Avenue

**TABLE 4 – COMPRESSIVE STRENGTH TEST DATA**

Core No.	Street	Diameter (mm)	Length (mm)	L/D Ratio	Correction Factor	Peak Load (kN)	Compressive Strength (MPa)	
							Measured	Corrected
TH02	Dunkirk Dr	160	219	1.37	0.980	834.13	41.5	40.7
TH19	Dunkirk Dr	160	203	1.27	0.930	940.49	46.8	43.5
TH03	Pembina Hwy	142	185	1.30	0.970	956.45	60.4	58.6
TH10	Pembina Hwy	142	194	1.37	0.980	758.87	47.9	47.0

# **APPENDIX A**

## **Testhole Location Plans**

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2020/07/08 7:13 AM By: Boughton, Lee



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2020-07-08  
123314925

**Stantec**  
 Stantec Consulting Ltd.  
 Suite 500, 311 Portage Avenue  
 Winnipeg MB Canada R3B 2B9  
 Tel. 204.489.5900 Fax. 204.453.9012  
 www.stantec.com

Legend

 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 DUNKIRK DRIVE FROM FERMOR AVE TO  
 ST. MARY'S ST, WINNIPEG, MANITOBA  
 Figure No.  
 1  
 Title  
 TESTHOLE LOCATION PLAN





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 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 DUNKIRK DRIVE FROM FERMOR AVE TO  
 ST. MARY'S ST, WINNIPEG, MANITOBA  
 Figure No.  
 2  
 Title  
 TESTHOLE LOCATION PLAN



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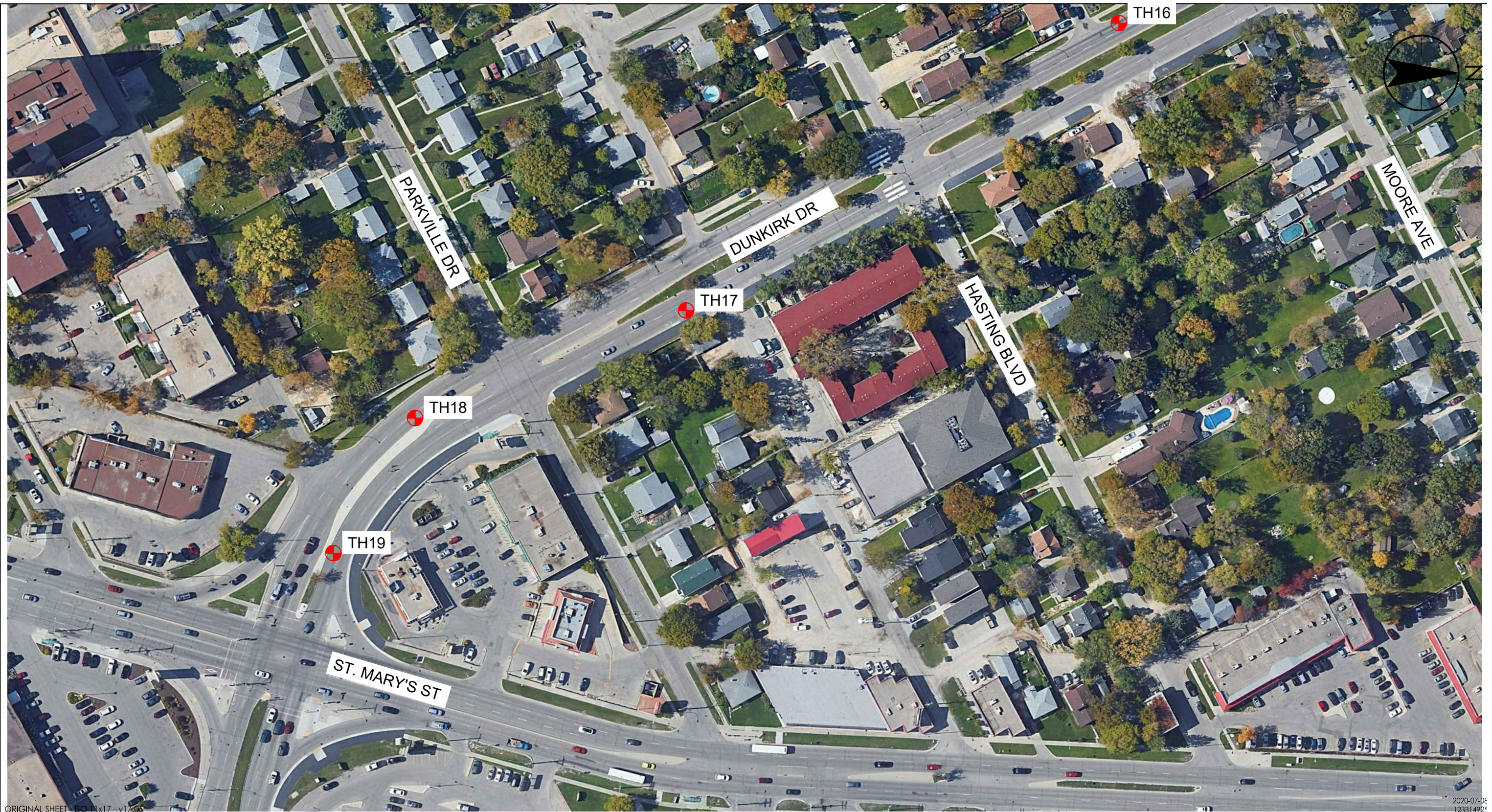

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Legend

 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 DUNKIRK DRIVE FROM FERMOR AVE TO  
 ST. MARY'S ST, WINNIPEG, MANITOBA  
 Figure No.  
3  
 Title  
 TESTHOLE LOCATION PLAN



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 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 DUNKIRK DRIVE FROM FERMOR AVE TO  
 ST. MARY'S ST, WINNIPEG, MANITOBA  
 Figure No.  
 4  
 Title  
 TESTHOLE LOCATION PLAN



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Legend

 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 PEMBINA HIGHWAY FROM MCGILLIVRAY BLVD  
 CHEVRIER BLVD, WINNIPEG, MANITOBA  
 Figure No.  
 1  
 Title  
**TESTHOLE LOCATION PLAN**



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 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 PEMBINA HIGHWAY FROM MCGILLIVRAY BLVD  
 CHEVRIER BLVD, WINNIPEG, MANITOBA  


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 Figure No.  
 2  


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 Title  
 TESTHOLE LOCATION PLAN



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 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 PEMBINA HIGHWAY FROM MCGILLIVRAY BLVD  
 CHEVRIER BLVD, WINNIPEG, MANITOBA  
 Figure No.  
 3  
 Title  
 TESTHOLE LOCATION PLAN



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2020/07/08 6:48 AM By: Boughton, Lee

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APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 JUBILEE AVENUE FROM PEMBINA HWY TO  
 OSBOURNE STREET, WINNIPEG, MANITOBA

Figure No.  
 1

Title  
 TESTHOLE LOCATION PLAN



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 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
 DILLON CONSULTING LTD.  
 JUBILEE AVENUE FROM PEMBINA HWY TO  
 OSBOURNE STREET, WINNIPEG, MANITOBA  
 Figure No.  
 2  
 Title  
 TESTHOLE LOCATION PLAN





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APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project  
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 JUBILEE AVENUE FROM PEMBINA HWY TO  
 OSBOURNE STREET, WINNIPEG, MANITOBA  
 Figure No.  
 3  
 Title  
 TESTHOLE LOCATION PLAN

# **APPENDIX B**

## **Pavement Thickness Tabulated Data**

**TABLE 5 – PAVEMENT THICKNESS TABULATED DATA**

<b>Street</b>	<b>Testhole ID</b>	<b>Asphalt Thickness (mm)</b>	<b>Concrete Thickness (mm)</b>	<b>Total Pavement Structure (mm)</b>
Dunkirk Drive	1	55	235	290
	2	80	210	290
	3	90	200	290
	4	50	160	210
	5	70	200	270
	6	35	205	240
	7	100	190	290
	8	40	190	230
	9A	55	180	235
	9B	40	190	230
	10	50	200	250
	11	80	200	280
	12	60	195	255
	13	65	205	270
	14	60	200	260
	15	45	205	250
	16	30	210	240
	17	65	175	240
	18	120	185	305
19	120	185	305	
Pembina Highway	1	125	175	300
	2	40	230	270
	3	90	180	270
	4	50	200	250
	5	50	200	250
	6	70	210	280
	7	70	200	270
	8	75	205	280
	9	45	195	240
	10	110	195	305
	11	110	210	320
	12	60	190	250
Jubilee Ave	1	70	180	250
	2	105	205	310
	3	25	230	255
	4	65	180	245
	5	100	245	345

**TABLE 5 – PAVEMENT THICKNESS TABULATED DATA (CONTINUED)**

Jubilee Ave	6	140	210	350
	7	120	280	300
	8	125	225	350
	9	135	225	360
	10	100	185	285
	11	100	185	285
	12	85	190	275

# **APPENDIX C**

## **Testhole Records**

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TC% %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m
0		Asphalt																	
		Concrete																	
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>																	
1																			

BACKFILL SYMBOL	[Symbol] ASPHALT	[Symbol] GROUT	[Symbol] CONCRETE
[Symbol] BENTONITE	[Symbol] DRILL CUTTINGS	[Symbol] SAND	[Symbol] SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.6 m	Page 1 of 1

Printed Jul 13 2020 12:44:42 STANTEC GEO 2016 LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS					
										LABORATORY TEST ▲      FIELD VANE TEST ◆ POCKET PEN. ★              POCKET SHEAR VANE ◻		SPT (N-value) BLOWS/0.3m 10    20                      30    40                      50    60                      70    80		W <sub>p</sub> W    W <sub>L</sub> 				
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																
1																		

BACKFILL SYMBOL    ASPHALT                      GROUT                      CONCRETE  
 BENTONITE                      DRILL CUTTINGS                      SAND                      SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.                      Logged By: L.B.  
 Drilling Method: 125 mm SSA                      Reviewed By: G.B.  
 Completion Depth: 0.75 m                      Page 1 of 1

Printed Jul 13 2020 12:44:58 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>												

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.75 m Page 1 of 1

Printed Jul 13 2020 12:45:9 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20



CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS			
0		Asphalt																
		Concrete																
1																		

Printed Jul 13 2020 12:45:19 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS					
									LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻ SPT (N-value) BLOWS/0.3m				W <sub>p</sub> — W — W <sub>L</sub> ●					
									Water Content (%) and Blow Count 10 20 30 40 50 60 70 80									
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																
1																		

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 1.5 m | Page 1 of 1

Printed Jul 13 2020 12:45:43 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		Soft tan SILT (ML) - trace clay, trace sand												
		Stiff brown fat CLAY (CH) - some silt, trace sand												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 1.5 m | Page 1 of 1

Printed Jul 13 2020 12:45:54 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST ▲	FIELD VANE TEST ◆	POCKET PEN. ★	POCKET SHEAR VANE ◻			
0		Asphalt																	
		Concrete																	
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																	

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

Printed Jul 13 2020 12:46:7 STANTEC GEO 2016 LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ■					
0		Asphalt							WATER CONTENT & ATTERBERG LIMITS $W_p$ $W$ $W_L$ SPT (N-value) BLOWS/0.3m									
		Concrete							Water Content (%) and Blow Count 10 20 30 40 50 60 70 80									
		CRUSHED LIMESTONE: 19 mm maximum aggregate size							Water Content (%) and Blow Count 10 20 30 40 50 60 70 80									
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>							Water Content (%) and Blow Count 10 20 30 40 50 60 70 80									
1									Water Content (%) and Blow Count 10 20 30 40 50 60 70 80									

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BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.

 PROJECT NO. : 123314925

 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]

 BH ELEVATION: N/A

 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St

 DATUM: N/A

 DATE BORED: 07/02/2020

 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>												

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

Printed Jul 13 2020 12:46:29 STANTEC GEO 201 &amp; LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m
0		Asphalt																	
		Concrete																	
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																	
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																	
1																			

	BACKFILL SYMBOL		ASPHALT		GROUT		CONCRETE
	BENTONITE		DRILL CUTTINGS		SAND		SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1



CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)						
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m					
0		Asphalt																						
		Concrete																						
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																						
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																						
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																						

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BACKFILL SYMBOL BENTONITE                     ASPHALT DRILL CUTTINGS                     GROUT SAND                     CONCRETE SLOUGH	Drilling Contractor: Maple Leaf Drilling Ltd. Drilling Method: 125 mm SSA Completion Depth: 0.75 m	Logged By: L.B. Reviewed By: G.B. Page 1 of 1
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CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m
0		Asphalt																	
		Concrete																	
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																	
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																	
1																			

BENTONITE	ASPHALT	GROUT	CONCRETE
DRILL CUTTINGS	SAND	SLOUGH	

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

Printed Jul 13 2020 12:47:4 STANTEC GEO 2016 LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS						
										LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻ SPT (N-value) BLOWS/0.3m				W <sub>p</sub> — W — W <sub>L</sub> Water Content (%) and Blow Count					
										10	20	30	40	50	60	70	80		
0		Asphalt	[Symbol]																
		Concrete	[Symbol]																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size	[Symbol]																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																	
1																			

BACKFILL SYMBOL: [Symbol] ASPHALT, [Symbol] GROUT, [Symbol] CONCRETE  
 [Symbol] BENTONITE, [Symbol] DRILL CUTTINGS, [Symbol] SAND, [Symbol] SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.      Logged By: L.B.  
 Drilling Method: 125 mm SSA      Reviewed By: G.B.  
 Completion Depth: 0.75 m      Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)					BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TC% %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE	50 kPa			100 kPa
0		Asphalt														
		Concrete														
		CRUSHED LIMESTONE: 19 mm maximum aggregate size														
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>														

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.75 m | Page 1 of 1

Printed Jul 13 2020 12:47:26 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TC% %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>												

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.75 m Page 1 of 1

Printed Jul 13 2020 12:47:38 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.75 m | Page 1 of 1

Printed Jul 13 2020 12:47:49 STANTEC GEO 2016 LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS					
										LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻		SPT (N-value) BLOWS/0.3m 10 20 30 40 50 60 70 80		Water Content (%) and Blow Count W <sub>p</sub> W W <sub>L</sub>				
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>																
1																		

Printed Jul 13 2020 12:47:59 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

	BENTONITE		ASPHALT		GROUT		CONCRETE
	DRILL CUTTINGS		SAND		SLOUGH		

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.75 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 07/02/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)					BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)		
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE	50 kPa			100 kPa	150 kPa
0		Asphalt															
		Concrete															
		CRUSHED LIMESTONE: 19 mm maximum aggregate size															
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel															
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>															

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.75 m Page 1 of 1

Printed Jul 13 2020 12:48:11 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20



CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Dunkirk Dr between Fermor Ave and St. Mary's St  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)					BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)		
				TYPE	NUMBER	RECOVERY (mm) or TC% %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE	50 kPa			100 kPa	150 kPa
0		Asphalt															
		Concrete															
		CRUSHED LIMESTONE: 19 mm maximum aggregate size															
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.75 m.</li> </ul>															

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.75 m | Page 1 of 1

Printed Jul 13 2020 12:48:23 STANTEC GEO 201 & LINES 12314925\_DILLON\_DUNKIRK.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		• The core hole was terminated at a depth of 0.30 m.												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.3 m | Page 1 of 1

Printed Jul 13 2020 12:36:5 STANTEC GEO 2016 LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/29/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS						
										LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻ SPT (N-value) BLOWS/0.3m				W <sub>p</sub> — W — W <sub>L</sub> Water Content (%) and Blow Count					
										10	20	30	40	50	60	70	80		
0		Asphalt																	
		Concrete																	
		<ul style="list-style-type: none"> <li>The core hole was terminated at a depth of 0.27 m.</li> </ul>																	
1																			

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.27 m Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m
0		Asphalt																	
		Concrete																	
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																	
		FILL: black fat clay, silty, trace fine to coarse sand trace organic materials and trace gravel																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>																	
1																			

BACKFILL SYMBOL: ASPHALT    GROUT    CONCRETE  
 BENTONITE    DRILL CUTTINGS    SAND    SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.    Logged By: L.B.  
 Drilling Method: 125 mm SSA    Reviewed By: G.B.  
 Completion Depth: 0.6 m    Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size		GS										
		Stiff brown fat CLAY (CH) - some silt, trace sand												
				GS										
		Soft tan SILT (ML) - trace clay, trace sand												
				GS										
				GS										
				GS										
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>												

- BACKFILL SYMBOL
- ASPHALT
- GROUT
- CONCRETE
- BENTONITE
- DRILL CUTTINGS
- SAND
- SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.      Logged By: L.B.  
 Drilling Method: 125 mm SSA      Reviewed By: G.B.  
 Completion Depth: 1.5 m      Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)	
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS				SPT (N-value) BLOWS/0.3m
0		Asphalt																	
		Concrete																	
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																	
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6m.</li> </ul>																	
1																			

BACKFILL SYMBOL: ASPHALT    GROUT    CONCRETE  
 BENTONITE    DRILL CUTTINGS    SAND    SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.    Logged By: L.B.  
 Drilling Method: 125 mm SSA    Reviewed By: G.B.  
 Completion Depth: 0.6 m    Page 1 of 1

Printed Jul 13 2020 12:36:56 STANTEC GEO 201 & LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS					
									LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻ SPT (N-value) BLOWS/0.3m				W <sub>p</sub> — W — W <sub>L</sub> Water Content (%) and Blow Count					
									10	20	30	40	50	60	70	80		
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>																
1																		

BACKFILL SYMBOL: ASPHALT    GROUT    CONCRETE  
 BENTONITE    DRILL CUTTINGS    SAND    SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.    Logged By: L.B.  
 Drilling Method: 125 mm SSA    Reviewed By: G.B.  
 Completion Depth: 0.6 m    Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		Soft tan SILT (ML) - trace clay, trace sand												
		Stiff brown fat CLAY (CH) - some silt, trace sand												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 1.5 m | Page 1 of 1



CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.6 m | Page 1 of 1

Printed Jul 13 2020 12:37:31 STANTEC GEO 2016 LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>												

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.6 m Page 1 of 1

Printed Jul 13 2020 12:37:42 STANTEC GEO 201 & LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS			
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		Stiff brown fat CLAY (CH) - some silt, trace sand																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>																

Printed Jul 13 2020 12:37:52 STANTEC GEO 201 & LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd  
 DATE BORED: 06/30/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	WATER CONTENT & ATTERBERG LIMITS					
									LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ◻ SPT (N-value) BLOWS/0.3m				W <sub>p</sub> — W — W <sub>L</sub> Water Content (%) and Blow Count					
									10	20	30	40	50	60	70	80		
0		Asphalt																
		Concrete																
		CRUSHED LIMESTONE: 19 mm maximum aggregate size																
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.6 m.</li> </ul>																
1																		

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: L.B.  
 Drilling Method: 125 mm SSA Reviewed By: G.B.  
 Completion Depth: 0.6 m Page 1 of 1



# BOREHOLE RECORD

TH12

CLIENT: Stantec Consulting Ltd.

PROJECT NO. : 123314925

PROJECT: Dunkirk/Pembina/Jubilee Street Renewal

[UTM]

BH ELEVATION: N/A

LOCATION: Pembina Hwy between McGillivray Blvd and Chevrier Blvd

DATUM: N/A

DATE BORED: 06/30/2020

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, $C_u$ (kPa)					BACKFILL/ MONITOR WELL/ PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or $TCR$ %	N-VALUE or $RQD$ %		LABORATORY TEST	FIELD VANE TEST					
									POCKET PEN.	POCKET SHEAR VANE					
								50 kPa	100 kPa	150 kPa	200 kPa				
								WATER CONTENT & ATTERBERG LIMITS							
								SPT (N-value) BLOWS/0.3m							
								Water Content (%) and Blow Count							
0		Asphalt													
		Concrete													
1															

Printed Jul 13 2020 12:38:14 STANTEC GEO 201 & LINES 12314925\_DILLON\_PEMBINA.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/13/20

BACKFILL SYMBOL ASPHALT GROUT CONCRETE  
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 0.25 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		Soft tan SILT (ML) - trace clay, trace sand		GS										
1		Stiff brown fat CLAY (CH) - some silt, trace sand		GS										
				GS										
				GS										
2				GS										
				GS										
				GS										
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.5 m.</li> </ul>												

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

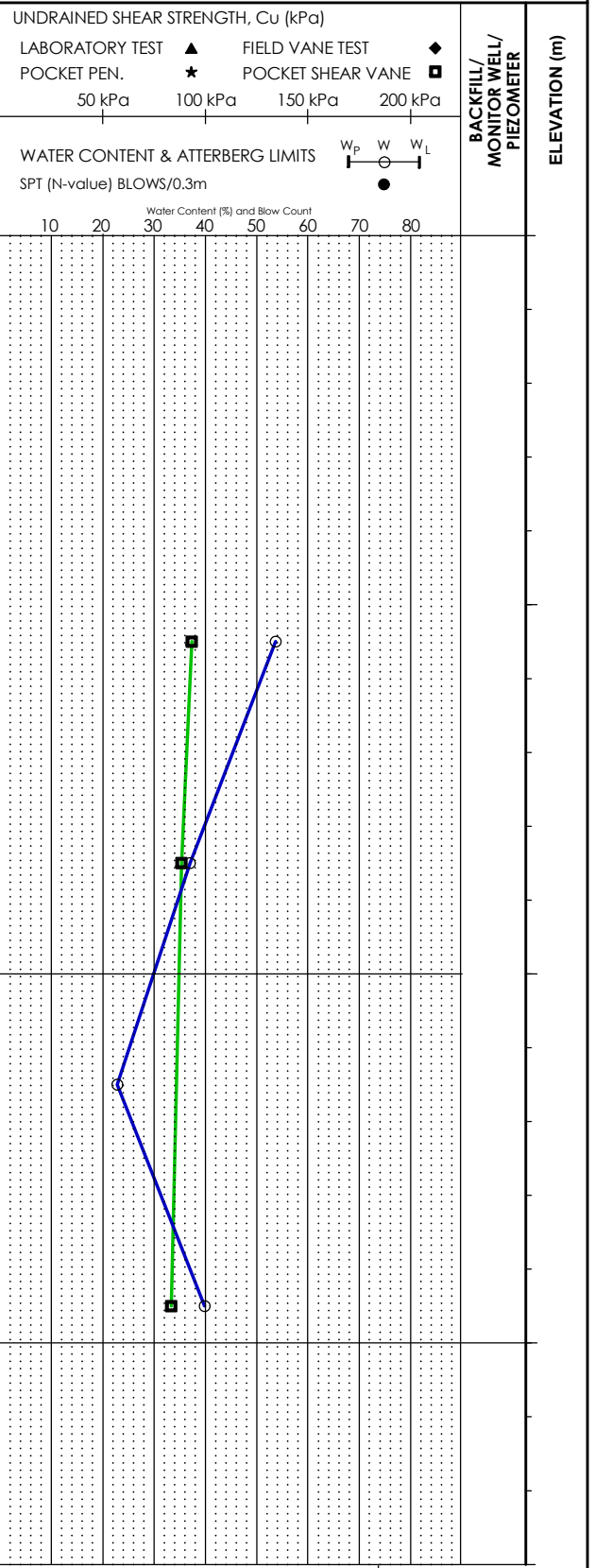
Drilling Contractor: Maple Leaf Drilling Ltd.      Logged By: L.B.  
 Drilling Method: 125 mm SSA      Reviewed By: G.B.  
 Completion Depth: 2.5 m      Page 1 of 1

Printed Jul 9 2020 7:19:35 STANTEC GEO 201 & LINES 12314925\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
				GS										
				GS										
		Soft tan SILT (ML) - trace clay, trace sand												
				GS										
		Stiff brown fat CLAY (CH) - some silt, trace sand												
				GS										
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>												



Printed Jul 9 2020 7:19:46 STANTEC GEO 201 & LINES 12314925\_JDILLON\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST POCKET PEN.	FIELD VANE TEST POCKET SHEAR VANE	WATER CONTENT & ATTERBERG LIMITS			
0		Asphalt Concrete	▲															
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel	▲															
		Soft tan SILT (ML) - trace clay, trace sand	▲															
		Stiff brown fat CLAY (CH) - some silt, trace sand	▲															
		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.5 m.</li> </ul>																

Printed Jul 9 2020 7:19:58 STANTEC GEO 201 & LINES 12314925\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

BACKFILL SYMBOL: ASPHALT    GROUT    CONCRETE  
 BENTONITE    DRILL CUTTINGS    SAND    SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.    Logged By: L.B.  
 Drilling Method: 125 mm SSA    Reviewed By: G.B.  
 Completion Depth: 1.5 m    Page 1 of 1



CLIENT: Stantec Consulting Ltd.

 PROJECT NO.: 123314925

 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]

 BH ELEVATION: N/A

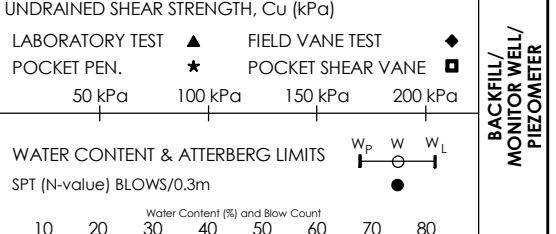
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St

 DATUM: N/A

 DATE BORED: 06/29/2020

 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		Soft tan SILT (ML) - trace clay, trace sand												
2		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.8 m.</li> </ul>												



BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 1.8 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		Soft tan SILT (ML) - trace clay, trace sand												
1		Stiff brown fat CLAY (CH) - some silt, trace sand												
2		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.8 m.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 1.8 m | Page 1 of 1

STANTEC GEO 201 & LINES 12314925\_DILLON\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20  
 Printed Jul 9 2020 7:20:22

# BOREHOLE RECORD

TH06

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST		FIELD VANE TEST			
									POCKET PEN.	50 kPa	100 kPa	POCKET SHEAR VANE		
0		Asphalt	[Asphalt Symbol]											
		Concrete	[Concrete Symbol]											
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel	[Fill Symbol]											
		Soft tan SILT (ML) - trace clay, trace sand	[Silt Symbol]	GS										
			[Silt Symbol]											
1			[Silt Symbol]											
		Stiff brown fat CLAY (CH) - some silt, trace sand	[Clay Symbol]											
			[Clay Symbol]	GS										
			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
2			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
			[Clay Symbol]											
		• No soil sloughing or groundwater seepage was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.5 m.												

Printed Jul 9 2020 7:20:33 STANTEC GEO 201 6 LINES 12314925\_DILLON\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

BACKFILL SYMBOL	[Asphalt Symbol] ASPHALT	[Grout Symbol] GROUT	[Concrete Symbol] CONCRETE
[Bentonite Symbol] BENTONITE	[Drill Cuttings Symbol] DRILL CUTTINGS	[Sand Symbol] SAND	[Slough Symbol] SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 2.5 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)								BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)					
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		50 kPa	100 kPa	150 kPa	200 kPa	LABORATORY TEST ▲ FIELD VANE TEST ◆ POCKET PEN. ★ POCKET SHEAR VANE ■										
0		Asphalt							<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>WATER CONTENT &amp; ATTERBERG LIMITS</p> <p>SPT (N-value) BLOWS/0.3m</p> <p style="text-align: center;">Water Content (%) and Blow Count</p> <p style="text-align: center;">10 20 30 40 50 60 70 80</p> </div> <div style="width: 45%; text-align: right;"> <p>W<sub>p</sub>    W    W<sub>L</sub></p> <p style="text-align: center;">●</p> </div> </div>														
		Concrete																					
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel																					
		Soft tan SILT (ML) - trace clay, trace sand																					
		Stiff brown fat CLAY (CH) - some silt, trace sand																					
2		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.8 m.</li> </ul>																					

BACKFILL SYMBOL    ASPHALT    GROUT    CONCRETE  
 BENTONITE    DRILL CUTTINGS    SAND    SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.    Logged By: L.B.  
 Drilling Method: 125 mm SSA    Reviewed By: G.B.  
 Completion Depth: 1.8 m    Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)		WATER CONTENT & ATTERBERG LIMITS SPT (N-value) BLOWS/0.3m	BACKFILL/ MONITOR WELL/ PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST POCKET PEN. 50 kPa	FIELD VANE TEST POCKET SHEAR VANE 100 kPa 150 kPa 200 kPa			
0		Asphalt											
		Concrete											
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel		GS									
				GS									
1		Soft tan SILT (ML) - trace clay, trace sand		GS									
				GS									
		Stiff brown fat CLAY (CH) - some silt, trace sand		GS									
2		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.8 m.</li> </ul>											

Printed Jul 9 2020 7:20:55 STANTEC GEO 201 & LINES 12314925\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 1.8 m	Page 1 of 1

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO. : 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		FILL: black fat clay, silty, trace fine to coarse sand - trace organic materials and trace gravel												
		Stiff brown fat CLAY (CH) - some silt, trace sand												
		Soft tan SILT (ML) - trace clay, trace sand												
		Stiff brown fat CLAY (CH) - some silt, trace sand												
2		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 1.8 m.</li> </ul>												

BACKFILL SYMBOL	ASPHALT	GROUT	CONCRETE
BENTONITE	DRILL CUTTINGS	SAND	SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 1.8 m	Page 1 of 1

Printed Jul 9 2020 7:21:16 STANTEC GEO 201 6 LINES 12314925\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A  
 WATER LEVEL: N/A

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES				OTHER TESTS / REMARKS	UNDRAINED SHEAR STRENGTH, Cu (kPa)				BACKFILL / MONITOR WELL / PIEZOMETER	ELEVATION (m)
				TYPE	NUMBER	RECOVERY (mm) or TCR %	N-VALUE or RQD %		LABORATORY TEST	FIELD VANE TEST	POCKET PEN.	POCKET SHEAR VANE		
0		Asphalt												
		Concrete												
		CRUSHED LIMESTONE: 19 mm maximum aggregate size												
1		<ul style="list-style-type: none"> <li>No soil sloughing or groundwater seepage was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 0.9 m, due to suspected underground utility.</li> </ul>												

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE  
 BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.  
 Drilling Method: 125 mm SSA | Reviewed By: G.B.  
 Completion Depth: 0.9 m | Page 1 of 1

STANTEC GEO 2016 LINES 12314925\_DILLON\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20  
 Printed Jul 9 2020 7:21:17



# BOREHOLE RECORD

**TH11**

CLIENT: Stantec Consulting Ltd.

PROJECT NO.: 123314925

PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]

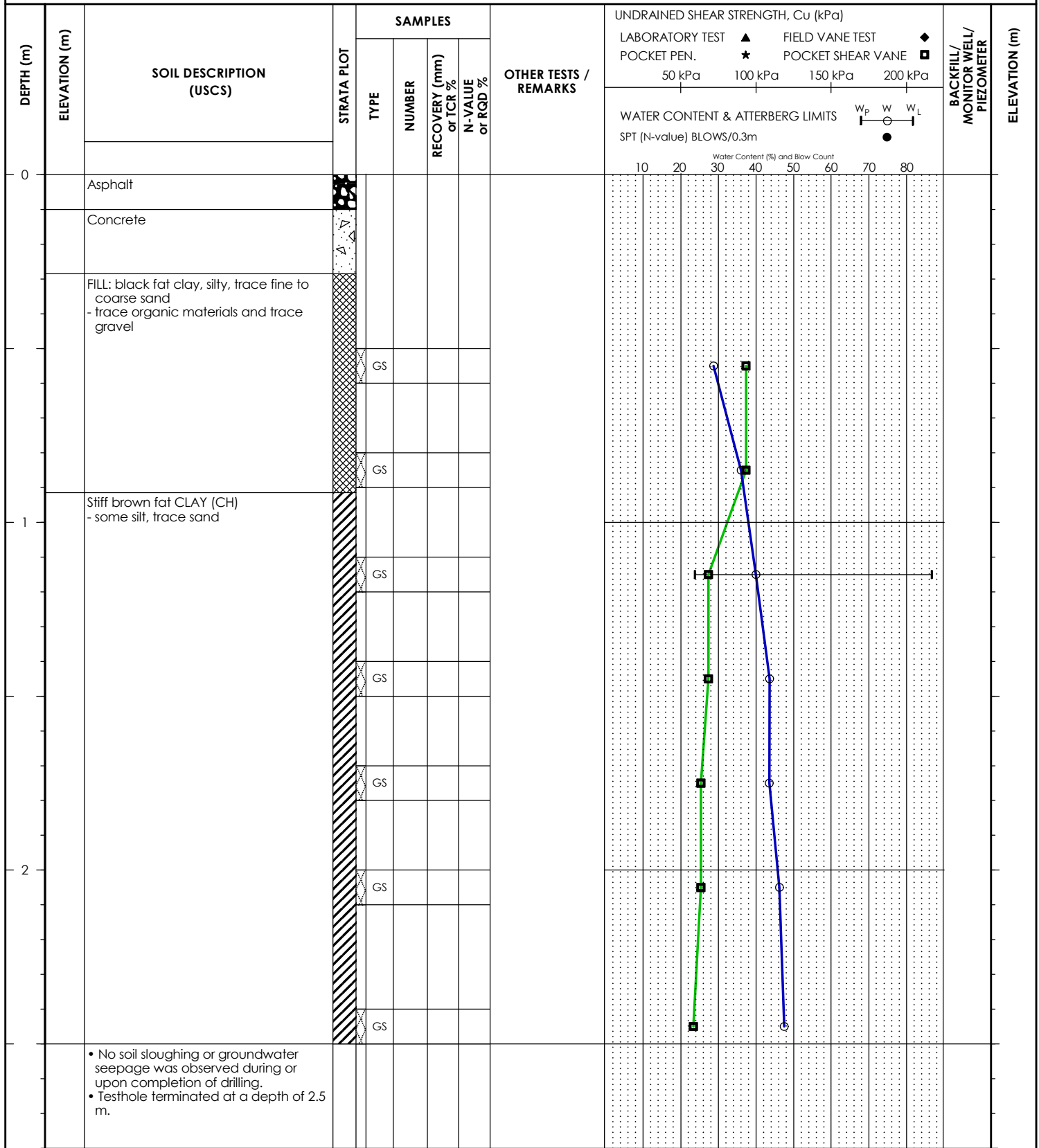
BH ELEVATION: N/A

LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St

DATUM: N/A

DATE BORED: 06/29/2020

WATER LEVEL: N/A



Printed Jul 9 2020 7:21:28 STANTEC GEO 201 6 LINES 12314925\_JUBILEE.GPJ GINT\_1233\_SOIL\_2018\_DATA\_TEMP\_REV2.GDT 7/9/20

BACKFILL SYMBOL		ASPHALT		GROUT		CONCRETE
		BENTONITE		SAND		SLOUGH

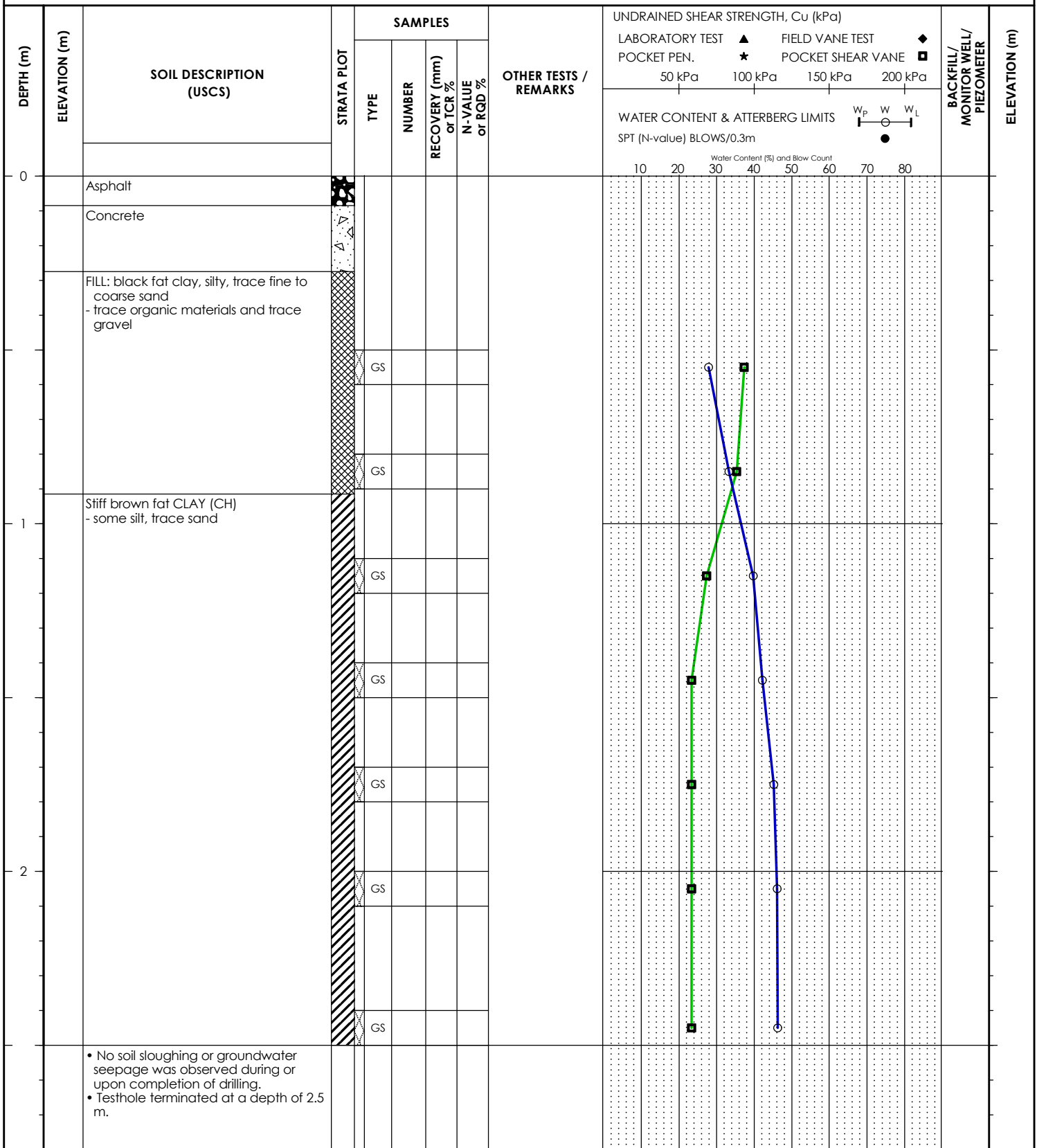
Drilling Contractor: Maple Leaf Drilling Ltd.	Logged By: L.B.
Drilling Method: 125 mm SSA	Reviewed By: G.B.
Completion Depth: 2.5 m	Page 1 of 1



CLIENT: Stantec Consulting Ltd.  
 PROJECT: Dunkirk/Pembina/Jubilee Street Renewal [UTM]  
 LOCATION: Jubilee Ave between Pembina Hwy and Osbourne St  
 DATE BORED: 06/29/2020

PROJECT NO.: 123314925  
 BH ELEVATION: N/A  
 DATUM: N/A

WATER LEVEL: N/A



- No soil sloughing or groundwater seepage was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.5 m.

Drilling Contractor: Maple Leaf Drilling Ltd.

Logged By: L.B.

Drilling Method: 125 mm SSA

Reviewed By: G.B.

Completion Depth: 2.5 m

Page 1 of 1

# **APPENDIX D**

## **Core Photos**

Dunkirk Core Photos



*Dunkirk Core No. 1*



*Dunkirk Core No. 2*



*Dunkirk Core No. 3*



*Dunkirk Core No. 4*



*Dunkirk Core No. 5*



*Dunkirk Core No. 6*



*Dunkirk Core No. 7*



*Dunkirk Core No. 8*



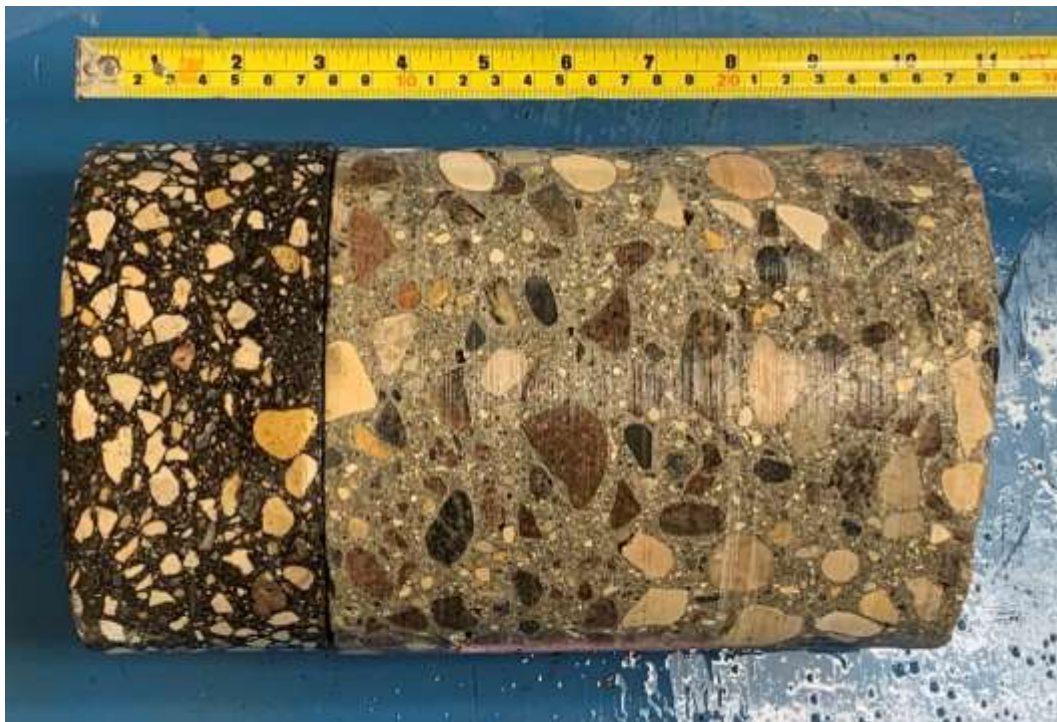
*Dunkirk Core No. 9a*



*Dunkirk Core No. 9b*



*Dunkirk Core No. 10*



*Dunkirk Core No. 11*





*Dunkirk Core No. 12*



*Dunkirk Core No. 13*



*Dunkirk Core No. 14*



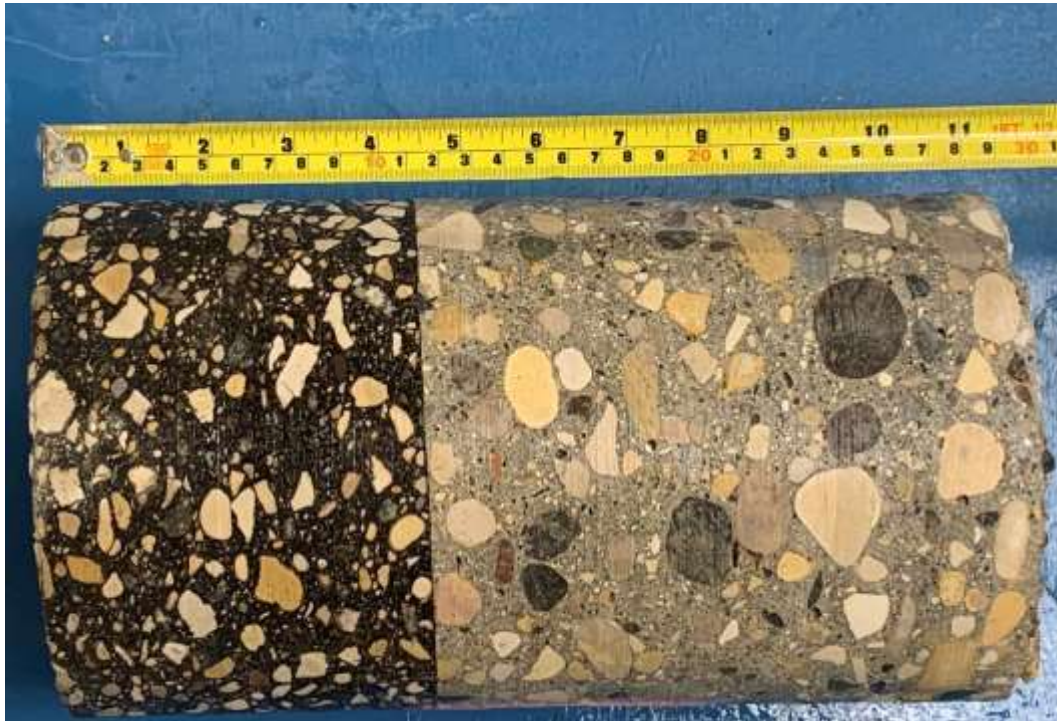
*Dunkirk Core No. 15*



*Dunkirk Core No. 16*



*Dunkirk Core No. 17*

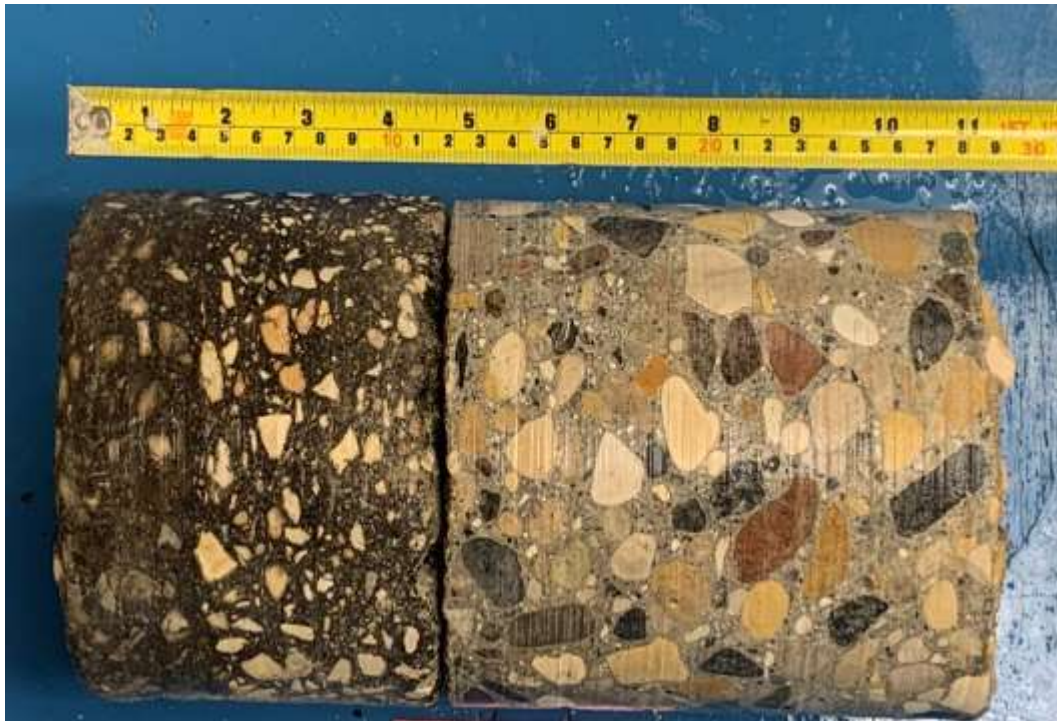


*Dunkirk Core No. 18*



*Dunkirk Core No. 19*

**Pembina Core Photos**



*Pembina Core No. 1*



*Pembina Core No. 2*



*Pembina Core No. 3*



*Pembina Core No. 4*



*Pembina Core No. 5*



*Pembina Core No. 6*



*Pembina Core No. 7*

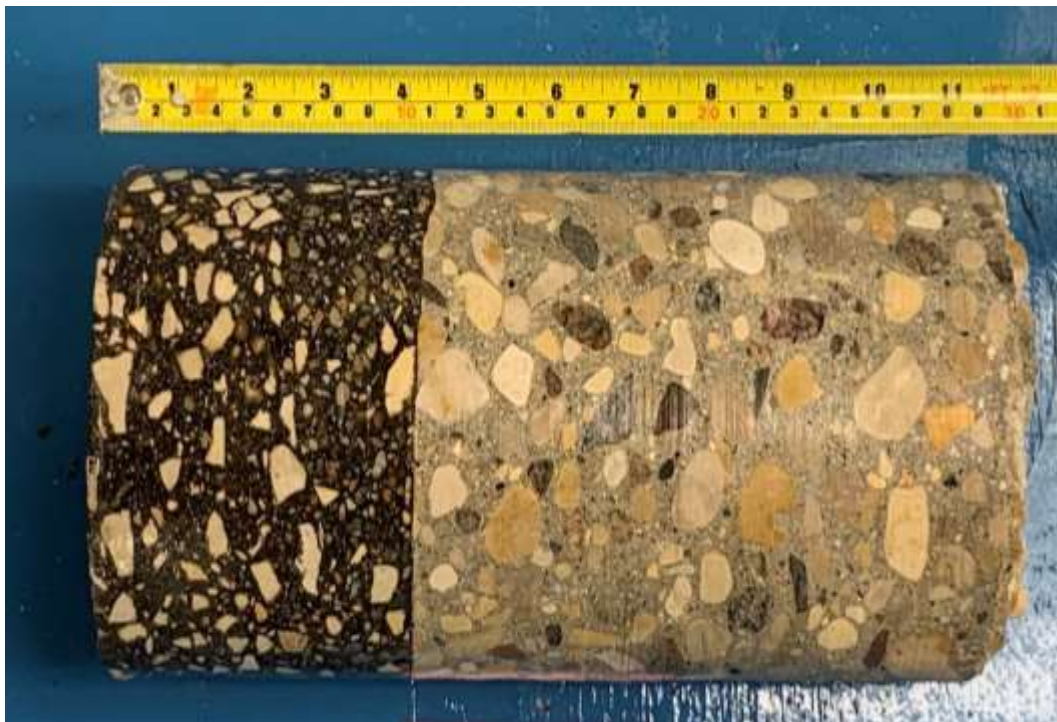


*Pembina Core No. 8*

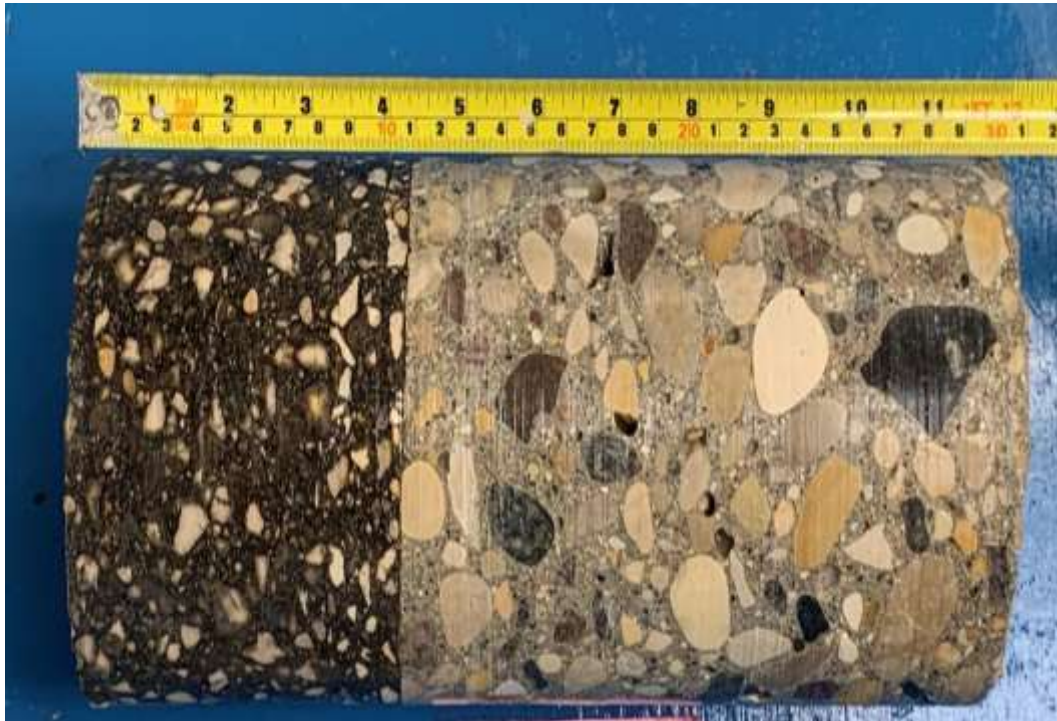




*Pembina Core No. 9*



*Pembina Core No. 10*



*Pembina Core No. 11*

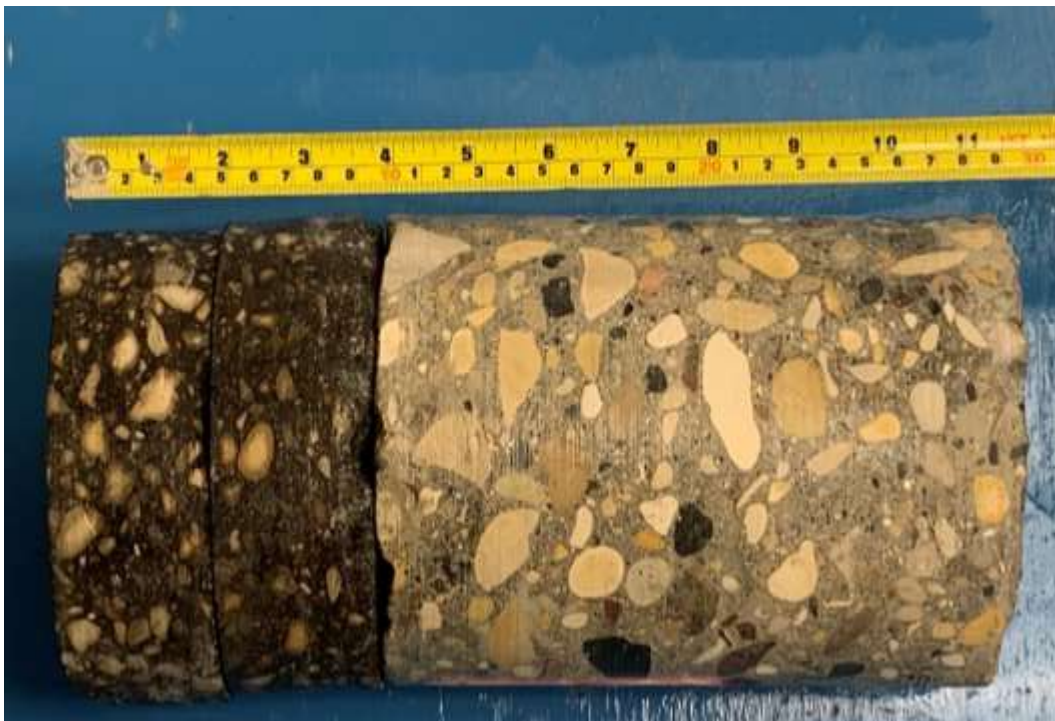


*Pembina Core No. 12*

**Jubilee Core Photos**



*Jubilee Core No. 1*



*Jubilee Core No. 2*



*Jubilee Core No. 3*



*Jubilee Core No. 4*



*Jubilee Core No. 5*



*Jubilee Core No. 6*



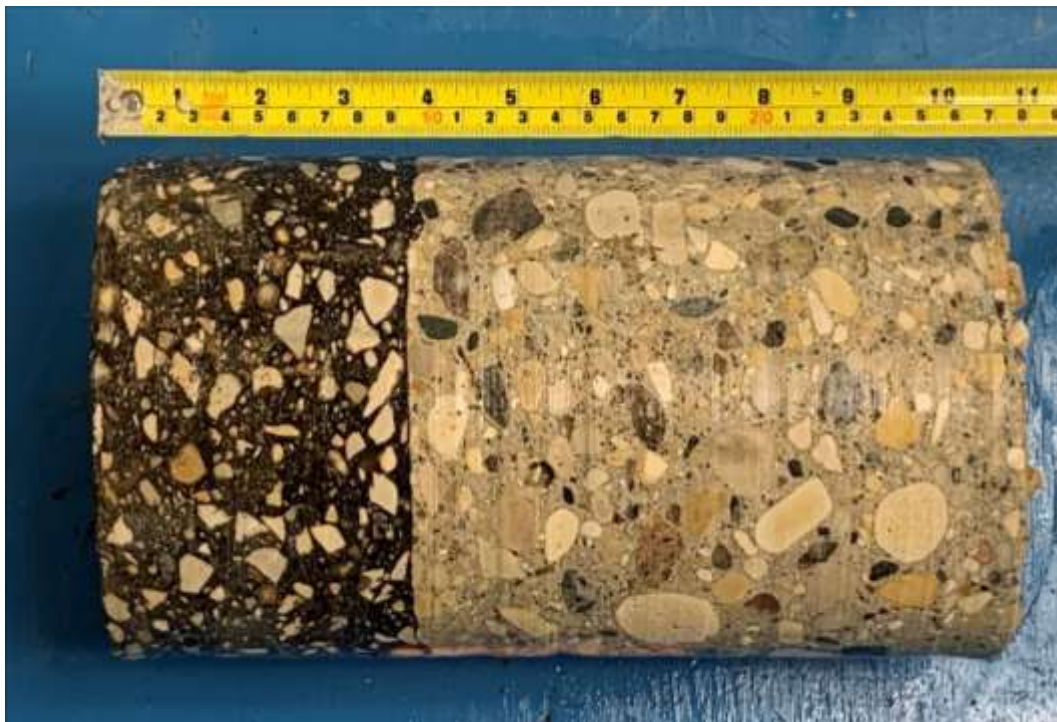
*Jubilee Core No. 7*



*Jubilee Core No. 8*



*Jubilee Core No. 9*



*Jubilee Core No. 10*



*Jubilee Core No. 11*



*Jubilee Core No. 12*



# **APPENDIX E**

## **Laboratory Test Reports**



**Stantec Consulting Ltd.**  
 199 Henlow Bay, Winnipeg, MB R3Y 1G4  
 Tel: (204) 488-6999



## AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.  
 500-311 Portage Avenue  
 Winnipeg, Manitoba  
 R2B 2B9

PROJECT Geotechnical Investigation  
 for 2020 Street Renewals

PROJECT NO. 123314925

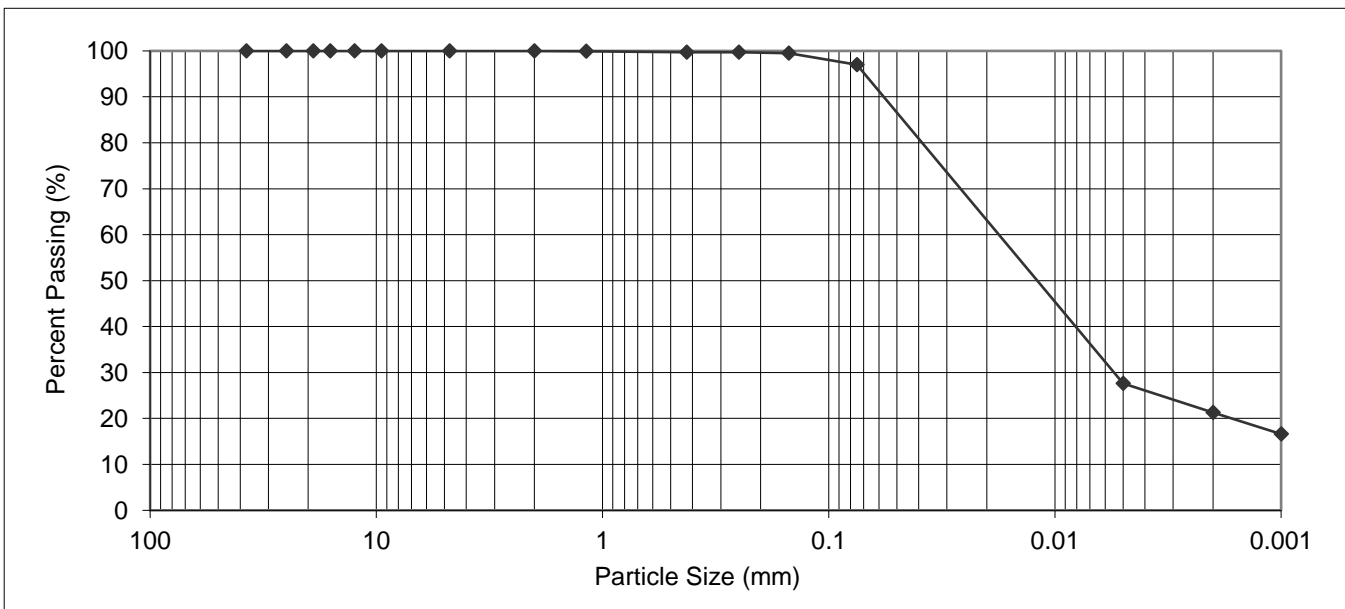
ATTN: Guillaume Beauce

REPORT NO. 1

DATE SAMPLED: 2020.Jun.29  
 SAMPLED BY: Lee Boughton

DATE RECEIVED: 2020.Jun.29  
 SAMPLE ID: TH4 @ 4' (Jubilee Ave)

DATE TESTED: 2020.Jul.03  
 TESTED BY: Larry Presado



PARTICLE SIZE		PERCENT PASSING
37.50	mm	100.0
25.00	mm	100.0
19.00	mm	100.0
16.00	mm	100.0
12.50	mm	100.0
9.50	mm	100.0
4.75	mm	100.0
2.00	mm	100.0

PARTICLE SIZE		PERCENT PASSING
1.18	mm	99.9
0.425	mm	99.7
0.250	mm	99.7
0.150	mm	99.5
0.075	mm	97.0
0.005	mm	27.6
0.002	mm	21.3
0.001	mm	16.6

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.3	2.7	75.7	21.3	16.6

REPORT DATE: 2020.Jul.07

REVIEWED BY:  Guillaume Beauce, P.Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



**Stantec Consulting Ltd.**  
 199 Henlow Bay, Winnipeg, MB R3Y 1G4  
 Tel: (204) 488-6999



## AASHTO T88 (ASTM D422) - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.  
 500-311 Portage Avenue  
 Winnipeg, Manitoba  
 R3B 2B9

PROJECT Geotechnical Investigation  
 for 2020 Street Renewals

PROJECT NO. 123314925

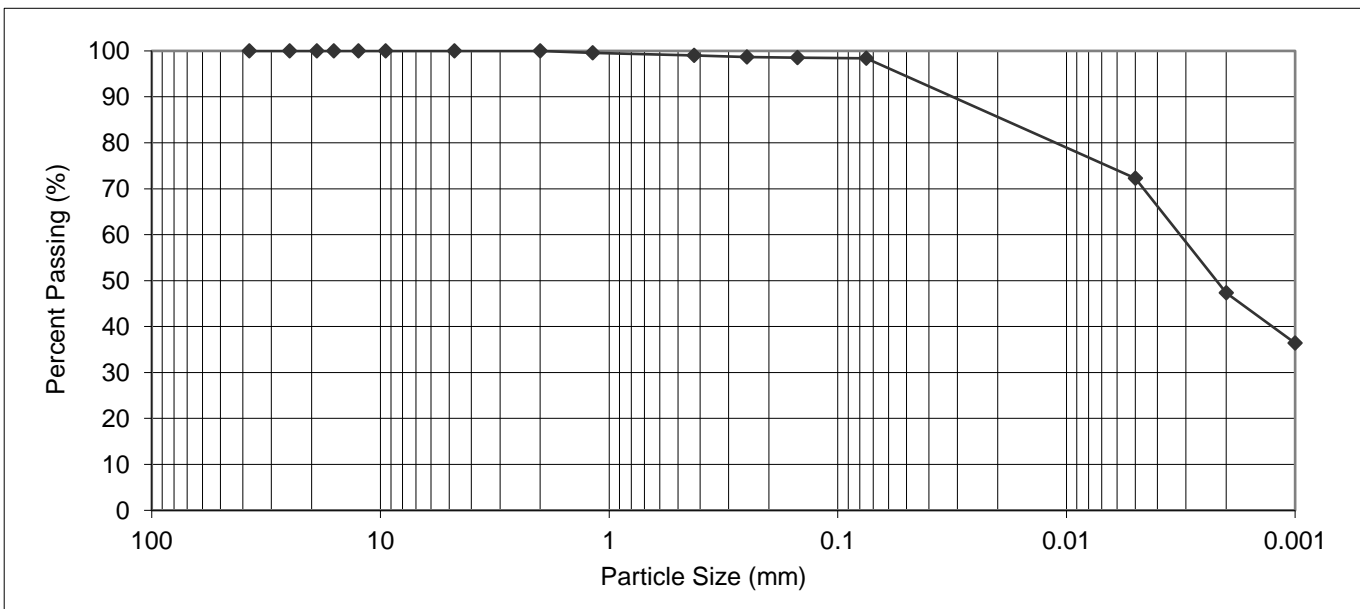
ATTN: Guillaume Beauce

REPORT NO. 2

DATE SAMPLED: 2020.Jun.29  
 SAMPLED BY: Lee Boughton

DATE RECEIVED: 2020.Jun.29  
 SAMPLE ID: TH11 @ 4' (Jubilee Ave)

DATE TESTED: 2020.Jul.03  
 TESTED BY: Larry Presado



PARTICLE SIZE		PERCENT PASSING
37.50	mm	100.0
25.00	mm	100.0
19.00	mm	100.0
16.00	mm	100.0
12.50	mm	100.0
9.50	mm	100.0
4.75	mm	100.0
2.00	mm	100.0

PARTICLE SIZE		PERCENT PASSING
1.18	mm	99.6
0.425	mm	99.0
0.250	mm	98.7
0.150	mm	98.5
0.075	mm	98.4
0.005	mm	72.3
0.002	mm	47.3
0.001	mm	36.4

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	1.0	0.6	51.1	47.3	36.4

REPORT DATE: 2020.Jul.07

REVIEWED BY: Guillaume Beauce, P.Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

# PROCTOR TEST REPORT

TO Dillon Consulting Limited  
1558 Willson Place  
Winnipeg, MB  
R3T 0Y4

CLIENT Dillon Consulting Limited  
C.C.

ATTN: David Wiebe

PROJECT Goetechnical Investigations  
2020 Street Renewals Dunkirk  
Pembina Hwy & Jubile

PROJECT NO. 123314925

PROCTOR NO. 1

DATE SAMPLED 2020.Jun.29

DATE RECEIVED 2020.Jun.29

DATE TESTED 2020.Jul.02

INSITU MOISTURE 23.2 %  
TESTED BY Donald Eliazar

COMPACTION STANDARD Standard Proctor,  
ASTM D698

MATERIAL IDENTIFICATION  
MATERIAL USE Subgrade

COMPACTION PROCEDURE A: 101.6mm Mold,  
Passing 4.75mm

MAX. NOMINAL SIZE  
MATERIAL TYPE Silt

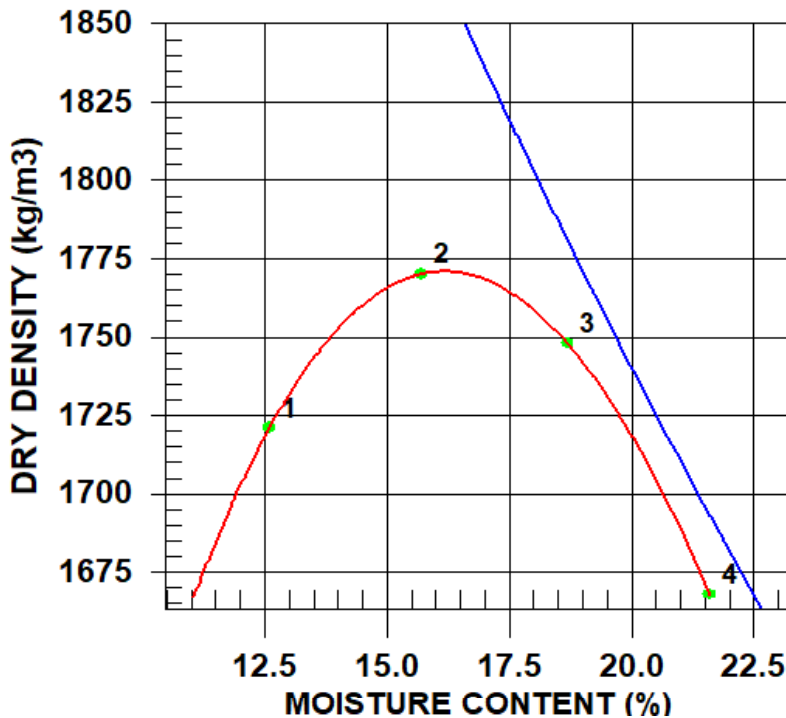
RAMMER TYPE Manual

SUPPLIER  
SOURCE Existing Material

PREPARATION Moist

OVERSIZE CORRECTION METHOD None

RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m <sup>3</sup> )	DRY DENSITY (kg/m <sup>3</sup> )	MOISTURE CONTENT (%)
1	1938	1721	12.6
2	2048	1770	15.7
3	2075	1748	18.7
4	2028	1668	21.6

	MAXIMUM DRY DENSITY (kg/m <sup>3</sup> )	OPTIMUM MOISTURE CONTENT (%)
CALCULATED OVERSIZE CORRECTED	1771	16.0

## COMMENTS

Material tested was identified by the client as Jubilee TH4 (silt)

# PROCTOR TEST REPORT

TO Dillon Consulting Limited  
1558 Willson Place  
Winnipeg, MB  
R3T 0Y4

CLIENT Dillon Consulting Limited  
C.C.

ATTN: David Wiebe

PROJECT Goetechnical Investigations  
2020 Street Renewals Dunkirk  
Pembina Hwy & Jubile

PROJECT NO. 123314925

PROCTOR NO. 2

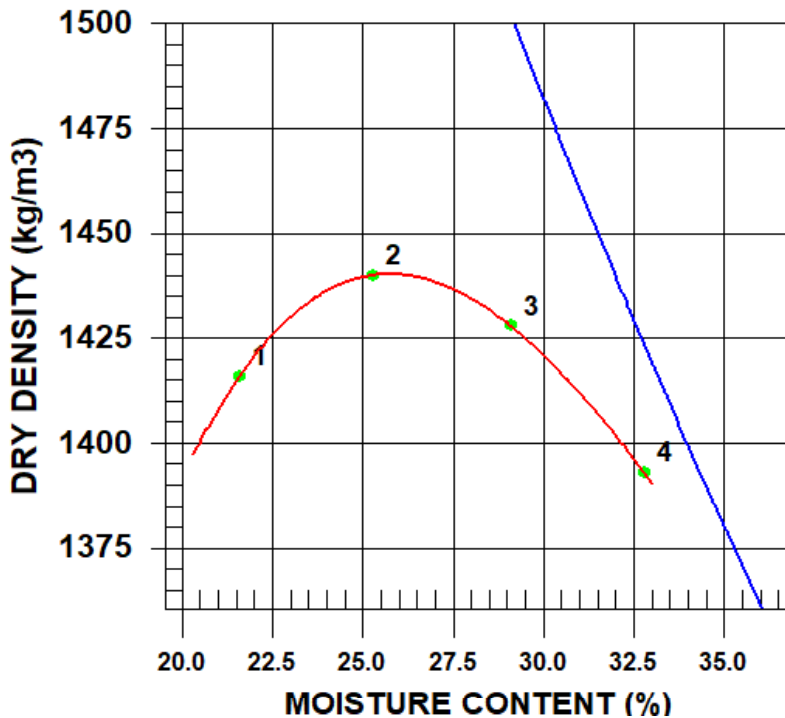
DATE SAMPLED 2020.Jun.29

DATE RECEIVED 2020.Jun.29

DATE TESTED 2020.Jul.02

INSITU MOISTURE 31.5 %  
TESTED BY Donald Eliazar  
MATERIAL IDENTIFICATION  
MATERIAL USE Subgrade  
MAX. NOMINAL SIZE  
MATERIAL TYPE Clay  
SUPPLIER  
SOURCE Existing

COMPACTION STANDARD Standard Proctor, ASTM D698  
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm  
RAMMER TYPE Manual  
PREPARATION Moist  
OVERSIZE CORRECTION METHOD None  
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m <sup>3</sup> )	DRY DENSITY (kg/m <sup>3</sup> )	MOISTURE CONTENT (%)
1	1722	1416	21.6
2	1804	1440	25.3
3	1844	1428	29.1
4	1850	1393	32.8

	MAXIMUM DRY DENSITY (kg/m <sup>3</sup> )	OPTIMUM MOISTURE CONTENT (%)
CALCULATED OVERSIZE CORRECTED	1440	26.0

COMMENTS

Material tested was identified by the client as Jubilee TH 11 (clay).

REVIEWED BY  Jason Thompson, C.E.T.



## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Limited  
 1558 Willson Place  
 Winnipeg, MB  
 R3T 0Y4

PROJECT Geotechnical Investigations  
 2020 Street Renewals - Dunkirk,  
 Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 1 (Data page - see Page 2 for Chart)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

DATE TESTED: 2020.Jul.10

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

**MATERIAL IDENTIFICATION**

MATERIAL USE	Subgrade	SUPPLIER	Existing Material
MAX. NOMINAL SIZE	< 4.75 mm	SOURCE	Jubilee Ave
MATERIAL TYPE	Silt	SAMPLE LOCATION	TH4
SPECIFICATION	Not Applicable		

IMMERSION PERIOD	96 ± 2 hr	TARGET MAX. DRY DENSITY	1771 kg/m <sup>3</sup>
CONDITION OF SAMPLE	Soaked	TARGET OPTIMUM MOISTURE	16.0 %
SURCHARGE MASS	4.54 kg	AS-COMPACTED MAX. DRY DENSITY	1796 kg/m <sup>3</sup>
SWELL OF SAMPLE	1.2%	AS-COMPACTED MOISTURE CONTENT	16.4 %
		POST-TEST MOISTURE CONTENT (TOP 25 mm)	19.7 %

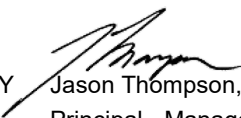
<b>CBR VALUE AT 2.54 mm PENETRATION</b>	<b>8.7</b>
<b>CBR VALUE AT 5.08 mm PENETRATION</b>	<b>8.9</b>

**COMMENTS:**

Sample prepared at the maximum dry density and optimum moisture content determined from ASTM D698.  
 As per ASTM D1883 10.2, the sample will be re-run to confirm the higher CBR value at 5.08 mm.

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding this report.

REPORT DATE 2020.Jul.13

REVIEWED BY  Jason Thompson, C.E.T.  
 Principal - Manager of Materials Testing Services

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Limited  
 1558 Willson Place  
 Winnipeg, MB  
 R3T 0Y4

PROJECT Geotechnical Investigations  
 2020 Street Renewals - Dunkirk,  
 Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 1 (Chart page - See Page 1 for Data)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

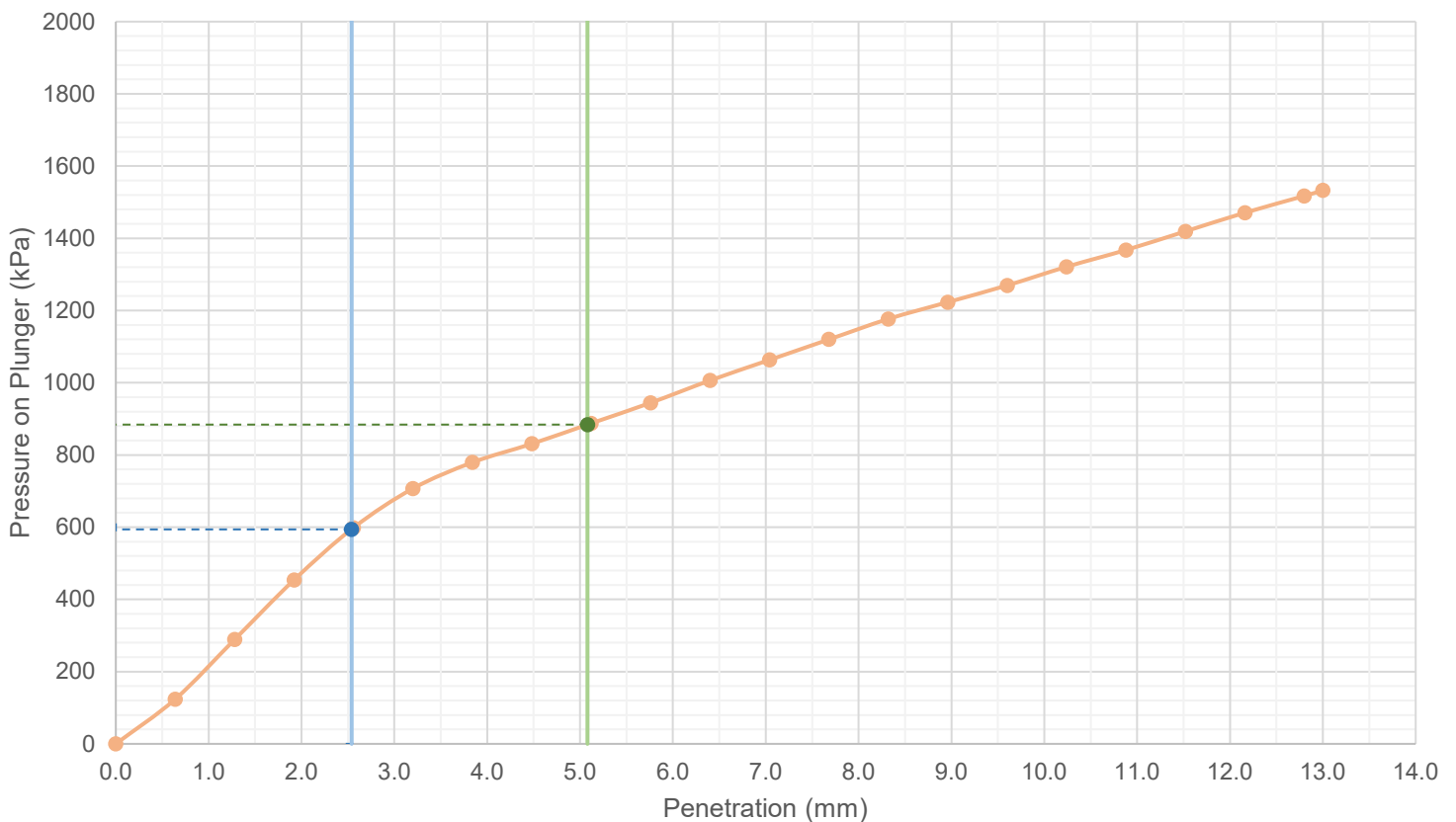
DATE TESTED: 2020.Jul.10

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

**LOAD PENETRATION CURVE**



REPORT DATE 2020.Jul.13

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## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Limited  
 1558 Willson Place  
 Winnipeg, MB  
 R3T 0Y4

PROJECT Geotechnical Investigations  
 2020 Street Renewals - Dunkirk,  
 Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 2 (Data page - see Page 2 for Chart)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

DATE TESTED: 2020.Jul.10

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

**MATERIAL IDENTIFICATION**

MATERIAL USE	Subgrade	SUPPLIER	Existing Material
MAX. NOMINAL SIZE	< 4.75 mm	SOURCE	Jubilee Ave
MATERIAL TYPE	Clay	SAMPLE LOCATION	TH11
SPECIFICATION	Not Applicable		

IMMERSION PERIOD	96 ± 2 hr	TARGET MAX. DRY DENSITY	1440 kg/m <sup>3</sup>
CONDITION OF SAMPLE	Soaked	TARGET OPTIMUM MOISTURE	26.0 %
SURCHARGE MASS	4.54 kg	AS-COMPACTED MAX. DRY DENSITY	1439 kg/m <sup>3</sup>
SWELL OF SAMPLE	4.9%	AS-COMPACTED MOISTURE CONTENT	26.5 %
		POST-TEST MOISTURE CONTENT (TOP 25 mm)	35.0 %

CBR VALUE AT <b>2.54 mm</b> PENETRATION	<b>2.9</b>
CBR VALUE AT <b>5.08 mm</b> PENETRATION	<b>2.1</b>

**COMMENTS:**

Sample prepared at the maximum dry density and optimum moisture content determined from ASTM D698.

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding this report.

REPORT DATE 2020.Jul.13

REVIEWED BY   
 Jason Thompson, C.E.T.  
 Principal - Manager of Materials Testing Services

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## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Limited  
 1558 Willson Place  
 Winnipeg, MB  
 R3T 0Y4

PROJECT Geotechnical Investigations  
 2020 Street Renewals - Dunkirk,  
 Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 2 (Chart page - See Page 1 for Data)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

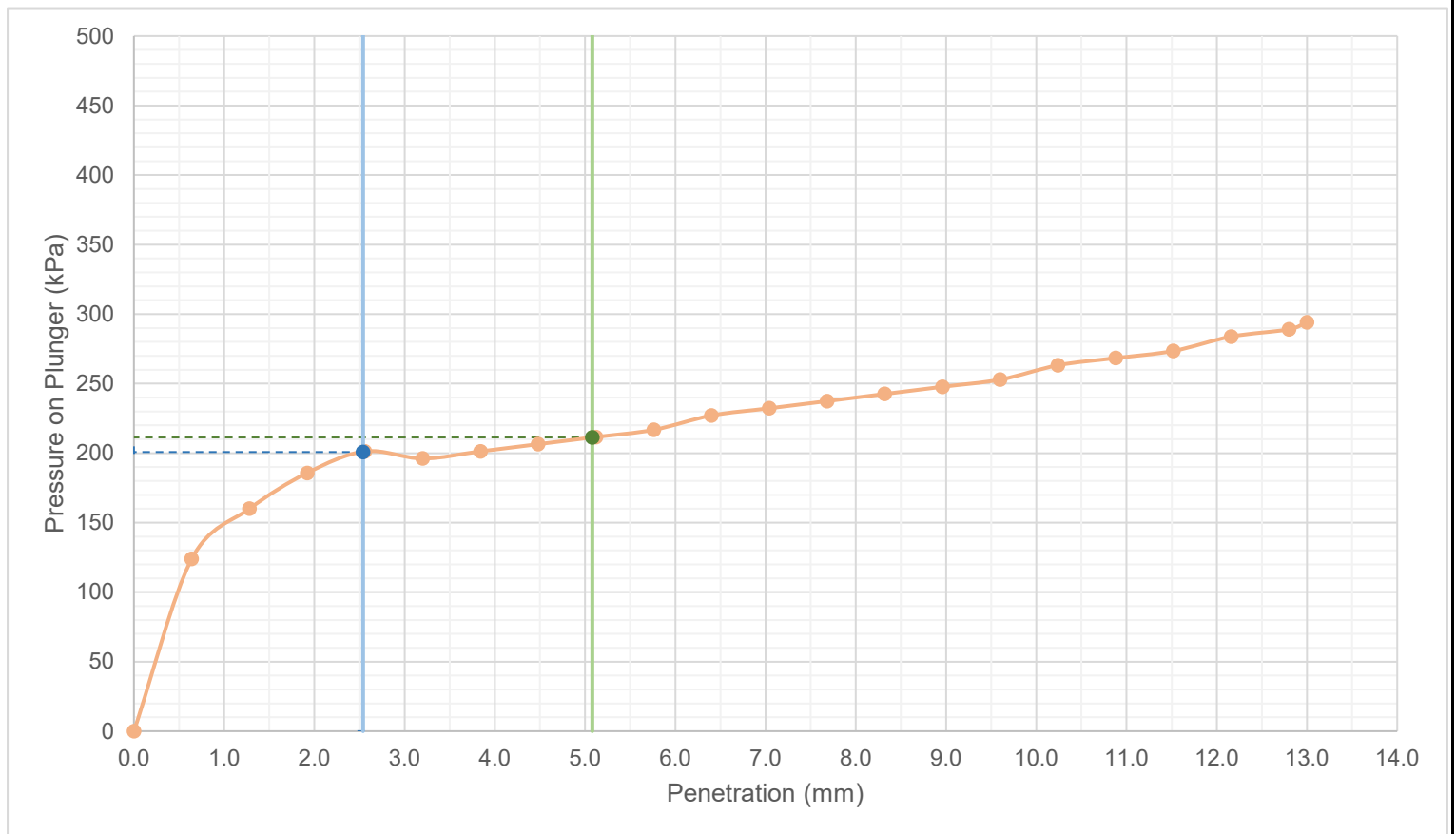
DATE TESTED: 2020.Jul.10

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

**LOAD PENETRATION CURVE**



REPORT DATE 2020.Jul.13

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Stantec Consulting Ltd.

199 Henlow Bay, Winnipeg, MB R3Y 1G4  
Tel: (204) 488-6999

## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Limited  
1558 Willson Place  
Winnipeg, MB  
R3T 0Y4

PROJECT Geotechnical Investigations  
2020 Street Renewals - Dunkirk,  
Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 3 (Data page - see Page 2 for Chart)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

DATE TESTED: 2020.Jul.20

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

### MATERIAL IDENTIFICATION

MATERIAL USE	Subgrade	SUPPLIER	Existing Material
MAX. NOMINAL SIZE	< 4.75 mm	SOURCE	Jubilee Ave
MATERIAL TYPE	Silt	SAMPLE LOCATION	TH4
SPECIFICATION	Not Applicable		

IMMERSION PERIOD	96 ± 2 hr	TARGET MAX. DRY DENSITY	1771 kg/m <sup>3</sup>
CONDITION OF SAMPLE	Soaked	TARGET OPTIMUM MOISTURE	16.0 %
SURCHARGE MASS	4.54 kg	AS-COMPACTED MAX. DRY DENSITY	1821 kg/m <sup>3</sup>
SWELL OF SAMPLE	0.9%	AS-COMPACTED MOISTURE CONTENT	15.8 %
		POST-TEST MOISTURE CONTENT (TOP 25 mm)	19.6 %

**CBR VALUE AT 2.54 mm PENETRATION 8.1**

**CBR VALUE AT 5.08 mm PENETRATION 8.6**

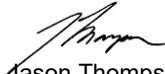
### COMMENTS:

Sample prepared at the maximum dry density and optimum moisture content determined from ASTM D698.

This test is a retest of CBR test No.1.

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding this report.

REPORT DATE 2020.Jul.21

REVIEWED BY   
Jason Thompson, C.E.T.  
Principal - Manager of Materials Testing Services

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## ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

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1558 Willson Place  
Winnipeg, MB  
R3T 0Y4

PROJECT Geotechnical Investigations  
2020 Street Renewals - Dunkirk,  
Pembina Hwy & Jubilee

PROJECT NO. 123314925

ATTN: David Wiebe

REPORT NO. 3 (Chart page - See Page 1 for Data)

DATE SAMPLED: 2020.Jun.29

DATE RECEIVED: 2020.Jun.29

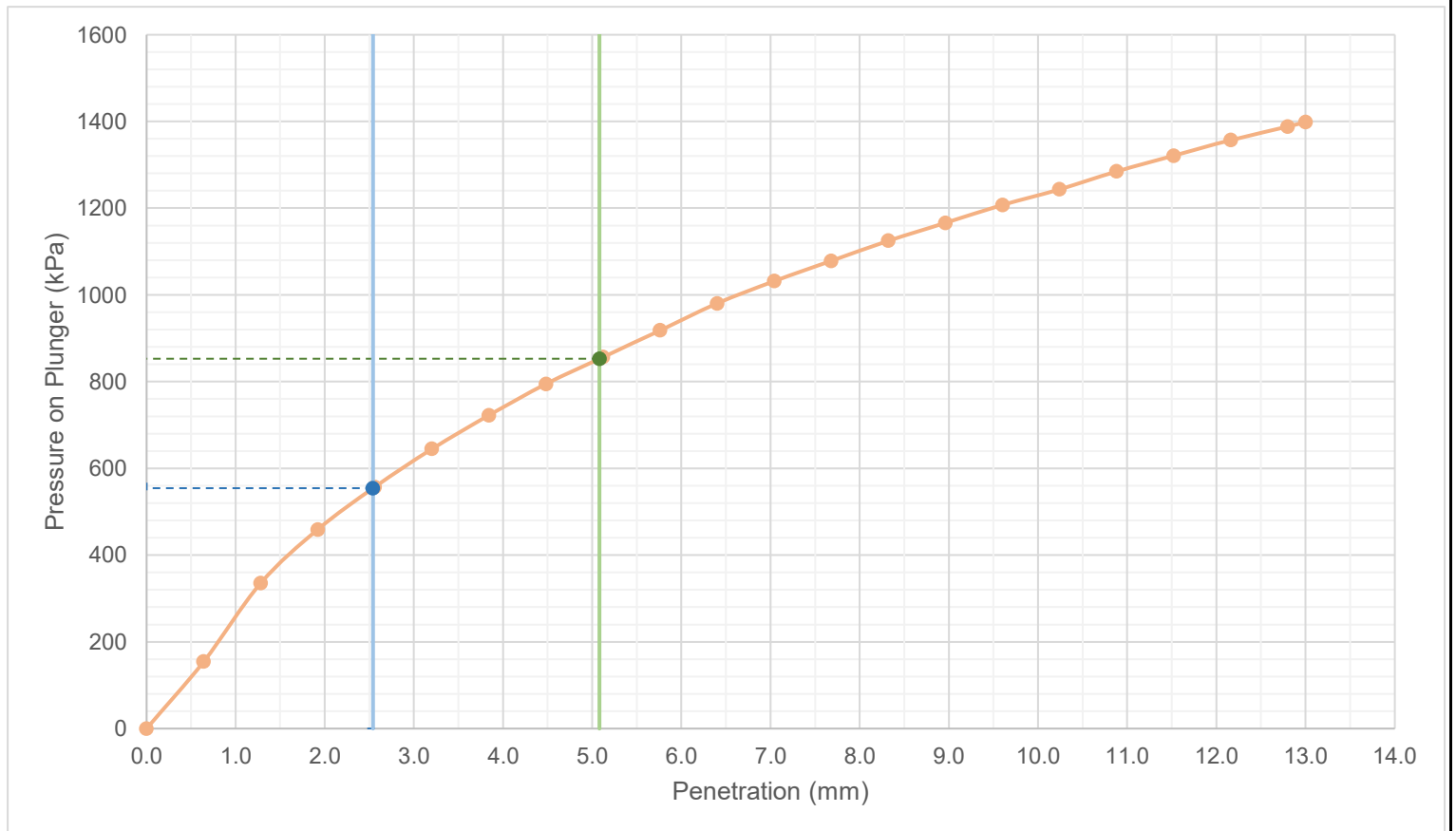
DATE TESTED: 2020.Jul.20

SAMPLED BY: Lee Boughton

SUBMITTED BY: Lee Boughton

TESTED BY: Donald Eliazar

LOAD PENETRATION CURVE



REPORT DATE 2020.Jul.21

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**Atterberg Limits**  
 ASTM D4318  
 Method A- Multi-Point

Client: Stantec Consulting Ltd  
 Project Name: Geotechnical Investigation  
 for 2020 Street Renewals  
 Project No: 123314925  
 Date Received: June 29, 2020  
 Date Tested: July 3, 2020  
 Tested By: Larry Presado

**LABORATORY**

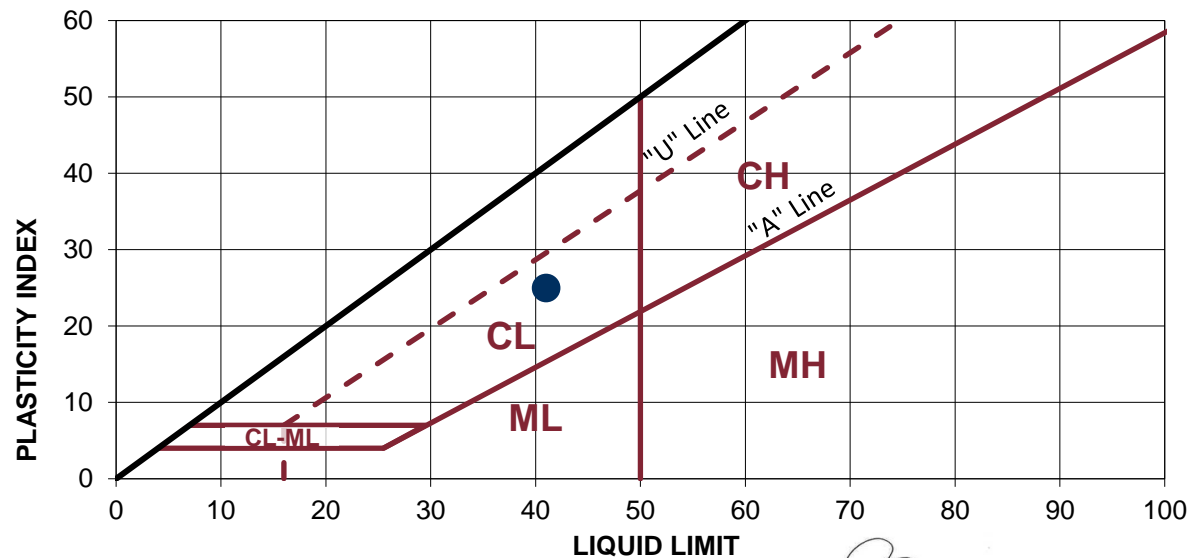
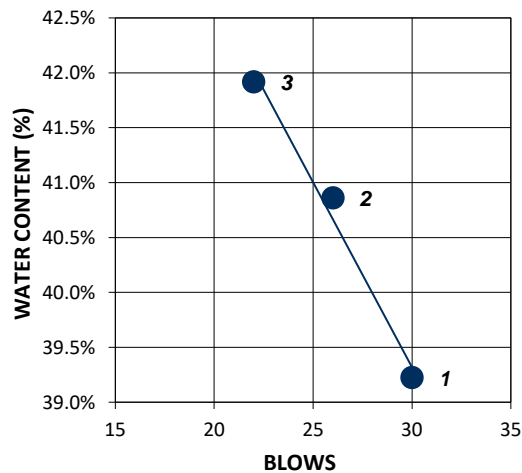
199 Henlow Bay

Winnipeg, Manitoba  
 Canada R3Y 1G4  
 Tel: (204) 488-6999

Sample : TH4 @ 4' (Jubilee Ave)

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	30	26	22	Tare No.	289	226
Tare No.	134	460	292	Wt. Sa. (wet+tare)(g)	37.87	32.04
Wt. Sa. (wet+tare)(g)	47.22	48.35	47.98	Wt. Sa. (dry+tare)(g)	35.33	30.39
Wt. Sa. (dry+tare)(g)	39.25	39.88	39.89	Wt. Tare (g)	18.90	19.82
Wt. Tare (g)	18.93	19.15	20.59	Wt. Dry Soil (g)	16.4	10.6
Wt. Dry Soil (g)	20.3	20.7	19.3	Wt. Water (g)	2.5	1.7
Wt. Water (g)	8.0	8.5	8.1	Water Content (%)	15.5%	15.6%
Water Content (%)	39.2%	40.9%	41.9%			

RESULTS	
LL	<b>41</b>
PL	<b>16</b>
PI	<b>25</b>
Natural MC (%)	
25.8%	



*Guillaume Beauce*

Reviewed By: Guillaume Beauce, P.Eng.

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**Atterberg Limits**  
 ASTM D4318  
 Method A- Multi-Point

Client: Stantec Consulting Ltd  
 Project Name: Geotechnical Investigation  
 for 2020 Street Renewals  
 Project No: 123314925  
 Date Received: June 29, 2020  
 Date Tested: July 3, 2020  
 Tested By: Larry Presado

**LABORATORY**

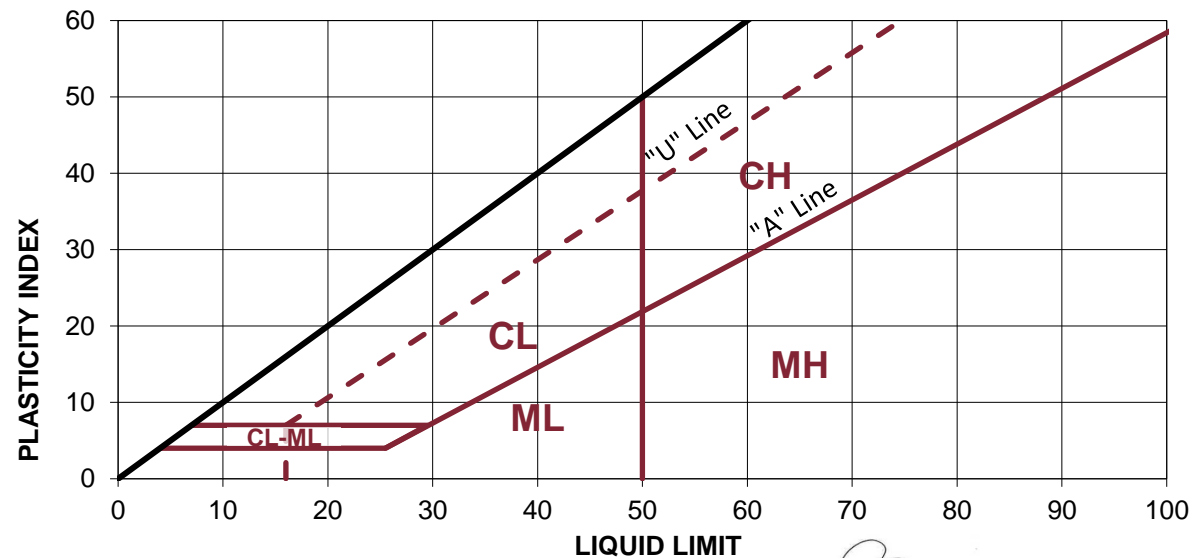
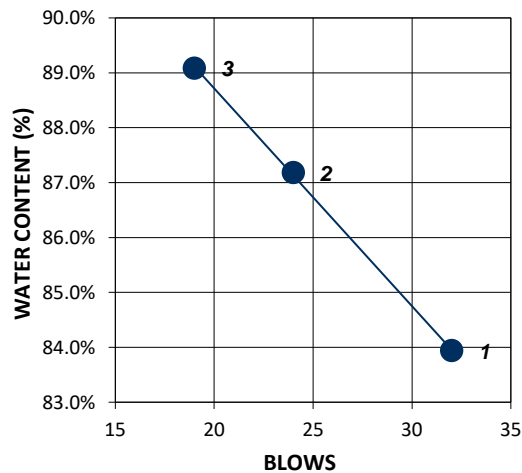
199 Henlow Bay

Winnipeg, Manitoba  
 Canada R3Y 1G4  
 Tel: (204) 488-6999

Sample : TH11 @ 4' (Jubilee Ave)

LIQUID LIMIT			PLASTIC LIMIT			
Trial	1	2	3	Trial	1	2
No. of Blows	32	24	19	Tare No.	204	235
Tare No.	152	216	267	Wt. Sa. (wet+tare)(g)	26.73	29.4
Wt. Sa. (wet+tare)(g)	40.66	43.06	48.36	Wt. Sa. (dry+tare)(g)	25.14	27.68
Wt. Sa. (dry+tare)(g)	30.94	31.84	34.98	Wt. Tare (g)	18.47	20.52
Wt. Tare (g)	19.36	18.97	19.96	Wt. Dry Soil (g)	6.7	7.2
Wt. Dry Soil (g)	11.6	12.9	15.0	Wt. Water (g)	1.6	1.7
Wt. Water (g)	9.7	11.2	13.4	Water Content (%)	23.8%	24.0%
Water Content (%)	83.9%	87.2%	89.1%			

RESULTS	
LL	<b>87</b>
PL	<b>24</b>
PI	<b>63</b>
Natural MC (%)	
40.2%	



*Guillaume Beauce*

Reviewed By: Guillaume Beauce, P.Eng.

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