

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

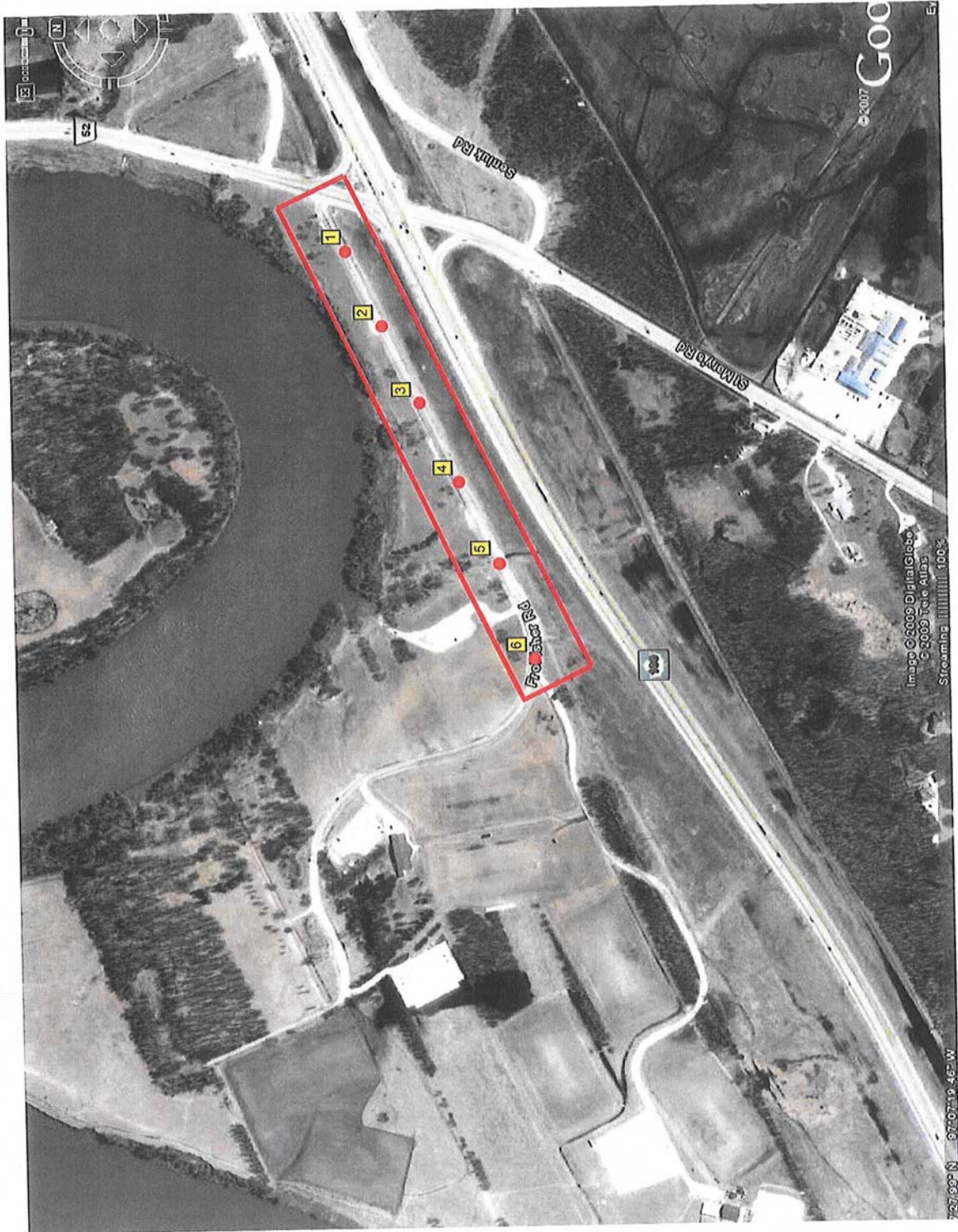
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The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

Geotechnical Report for Frobisher Road

Test Hole Locations



Test Hole Log #1 for Frobisher Road

LOG OF BOREHOLE 1

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba					SURFACE ELEV.: metres EQUIPMENT: SS Auger DIAMETER: 125 mm DATE: 2010 January 6 DRILL COMPANY: Active Drilling							
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	DEPTH SCALE	CPT (kPa)		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W _L	REMARKS
DEPTH ELEV.	DESCRIPTION	STRAT. PLOT	% RECOVERY	TYPE			FIELD SHEAR (kPa) SPT (N)	Lab Shear (kPa) DCPT				
1	CLAY & GRAVEL - black CLAY - black - dark brown		AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
			AS	AS								
End of Borehole @ 2.5 m.												
3												
4												

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SAMPLE TYPE LEGEND

AS Auger Sample	RC Rock Core
SS Split Spoon Sample	PS Ponar Sample
TW 70mm Thin Wall Tube	SD Side Sample
CC Concrete/Asphalt Core	

ENCLOSURE 1

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Test Hole Log #2 for Frobisher Road

LOG OF BOREHOLE 2

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba						SURFACE ELEV.: metres EQUIPMENT: HS Auger DIAMETER: 80mm ID DATE: 2010 January 6 DRILL COMPANY: Active Drilling					
SOIL PROFILE			SAMPLES		CPT (kPa)	FLUID LIMIT	NATURAL MOISTURE CONTENT (%)	LIQUID LIMIT	REMARKS		
DEPTH	ELEV.	DESCRIPTION	STRAT. PLOT	% RECOVERY						TYPE	"N" VALUES
1		CLAY & GRAVEL - black		AS						0 5 46 49	
		CLAY - black		AS							
		- dark greyish-black		AS							
		- grey/brown		AS							
				AS							
2		CLAY & SILT - mottled		AS							
		CLAY - Silty, dark brown		AS							
				AS							
3		End of Borehole @ 2.5 m.									
4											

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SAMPLE TYPE LEGEND

AS	Auger Sample	RC	Rock Core
SS	Split Spoon Sample	PS	Ponar Sample
TW	70mm Thin Wall Tube	SD	Side Sample
CC	Concrete/Asphalt Core		

ENCLOSURE 2

PAGE 1 OF 1

Test Hole Log #3 for Frobisher Road

LOG OF BOREHOLE 3

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba										SURFACE ELEV.: metres EQUIPMENT: HS Auger DIAMETER: 80mm ID DATE: 2010 January 6 DRILL COMPANY: Active Drilling									
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	DEPTH SCALE	CPT (kPa)				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	REMARKS					
DEPTH	ELEV.	DESCRIPTION	STRAT. PLOT	% RECOVERY			FIELD SHEAR (kPa)	SPT (N)	Lab Shear (kPa)	DCPT					WATER CONTENT (%)	GRAIN SIZE DISTRIBUTION (%)			
1		CLAY & GRAVEL - dark brown		AS															
		CLAY - dark grey/brown		AS															
		- dark brown		AS															
		CLAY - Silty, brown		AS															
2		- mottled		AS															
		CLAY - dark brown		AS															
		End of Borehole @ 2.5 m.		AS															
3																			
4																			

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SAMPLE TYPE LEGEND

AS Auger Sample	RC Rock Core
SS Split Spoon Sample	PS Ponar Sample
TW 70mm Thin Wall Tube	SD Side Sample
CC Concrete/Asphalt Core	

ENCLOSURE 3

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Test Hole Log #4 for Frobisher Road

LOG OF BOREHOLE 4

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba					SURFACE ELEV.: metres EQUIPMENT: HS Auger DIAMETER: 80mm ID DATE: 2010 January 6 DRILL COMPANY: Active Drilling					
DEPTH ELEV.	SOIL PROFILE DESCRIPTION	STRAT PLOT % RECOVERY	SAMPLES		GROUND WATER CONDITIONS	CPT (kPa) 300 600 900 1200 1500 X FIELD SHEAR (kPa) Lab Shear (kPa) SPT (N) DCPT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W _L	REMARKS GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			TYPE	N° VALUES						
1	CLAY & GRAVEL - black		AS							0 5 17 78
	CLAY - trace organics, black		AS							
	CLAY - dark grey		AS							
	- dark greyish brown		AS							
	- trace silt, dark grey									
2	SILT - Clayey, brown		AS							
	CLAY - brown		AS							
			AS							
3	End of Borehole @ 2.5 m.									
4										

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SAMPLE TYPE LEGEND

AS Auger Sample	RC Rock Core
SS Split Spoon Sample	PS Ponar Sample
TW 70mm Thin Wall Tube	SD Side Sample
CC Concrete/Asphalt Core	

ENCLOSURE 4


PAGE 1 OF 1

W TBT BOREHOLE 09-637 FROBISHER RD GPJ TBT GDT 10/2/11

Test Hole Log #5 for Frobisher Road

LOG OF BOREHOLE 5

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba					SURFACE ELEV.: metres EQUIPMENT: HS Auger DIAMETER: 80mm ID DATE: 2010 January 6 DRILL COMPANY: Active Drilling					
SOIL PROFILE		SAMPLES		GROUND WATER CONDITIONS	DEPTH SCALE	CPT (kPa) 300 600 900 1200 1500 X FIELD SHEAR (kPa) Lab Shear (kPa) SPT (N) DCPT	PLASTIC LIMIT (W _p) NATURAL MOISTURE CONTENT (W) LIQUID LIMIT (W _L)	WATER CONTENT (%)	REMARKS	
DEPTH	ELEV.	DESCRIPTION	STRAT. PLCT % RECOVERY							TYPE
1		CLAY & CRUSHED Limestone - black FILL - GRAVEL								
										AS
										AS
										AS
										AS
2		FILL - CLAY - trace gravel, brown								
										AS
										AS
3		End of Borehole @ 2.5 m.								
										AS
										AS
4										
										AS
										AS



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SAMPLE TYPE LEGEND

AS Auger Sample	RC Rock Core
SS Split Spoon Sample	PS Ponar Sample
TW 70mm Thin Wall Tube	SD Side Sample
CC Concrete/Asphalt Core	

ENCLOSURE 5

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Test Hole Log #6 for Frobisher Road

LOG OF BOREHOLE 6

TBT REF. No.: 09-637 CLIENT: Dillon PROJECT: Geotechnical Investigation - Street Reconstruction LOCATION: Frobisher Road - St Mary's Road to ~ 600 m West Winnipeg, Manitoba				SURFACE ELEV.: metres EQUIPMENT: HS Auger DIAMETER: 80mm ID DATE: 2010 January 6 DRILL COMPANY: Active Drilling			
SOIL PROFILE		SAMPLES		GROUND WATER CONDITIONS	CPT (kPa) 300 600 900 1200 1500 (kPa) X FIELD SHEAR (kPa) Lab Shear (kPa) SPT (N) DCPT	PLASTIC LIMIT NATURAL MOISTURE CONTENT W _p W _L WATER CONTENT (%)	REMARKS
DEPTH ELEV.	DESCRIPTION	STRAT. PLOT % RECOVERY	TYPE "N" VALUES				
1	FILL - GRAVEL		AS	1			
	CLAY - black		AS				
			AS				
			AS				
			AS				
			AS				
2	SILT - brown		AS	2			
	CLAY - dark brown		AS				
	End of Borehole @ 2.5 m.		AS				
3				3			
4				4			

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SAMPLE TYPE LEGEND

AS Auger Sample	RC Rock Core
SS Split Spoon Sample	PS Ponar Sample
TW 70mm Thin Wall Tube	SD Side Sample
CC Concrete/Asphalt Core	

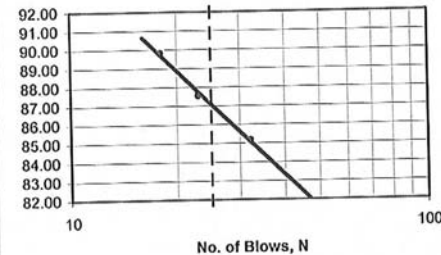
ENCLOSURE 6

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Atterberg Limits for Frobisher Road



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Atterberg Limits					
To: Dillon Consulting Limited 895 Waverly Street, Suite 200 Winnipeg, Manitoba R3T 5P4 Attn: Jeff Short, EIT Project: Geotechnical Investigation - Street Reconstruction Frobisher Street, Winnipeg, Manitoba			TBT Project No.: 09-637 Lab Sample No.: 10-03 Date: 17-Feb-10		
Liquid Limit Determination					
Dish No.:	14	17	31		Liquid Limit 25 Blows
Wet Soil + Dish:	29.42	30.33	29.25		
Dry Soil + Dish:	22.06	22.32	21.66		
Moisture:	7.36	8.01	7.59		
Dish:	13.42	13.17	13.21		
Dry Soil:	8.64	9.15	8.45		
% Moisture:	85.19	87.54	89.82		
No. of Blows:	32	23	18		87
Liquid Limit 				Material Identification: Date Received: 06-Jan-10 Date Tested: 15-Feb-10 B.H./T.P. No.: TH 6 Sample No.: N/A Depth: 4 ft Liquid Limit, %: 87 Plastic Limit, %: 28 Plasticity Index: 59	
Plastic Limit Determination					
Dish No.:	24	6			
Wet Soil + Dish:	30.37	28.59			
Dry Soil + Dish:	29.29	27.8			
Moisture:	1.08	0.79			
Dish:	25.47	24.97			
Dry Soil:	3.82	2.83			
% Moisture:	28.27	27.92			
Average:					28
Test Method : ASTM: D4318, D2216 TBTE Technician: Elena Oberez Remarks: CL, Medium plastic clay					
				REVIEWED BY: <i>Hermie Manalo</i> Hermie Manalo	

Particle Size Analysis for Frobisher Road



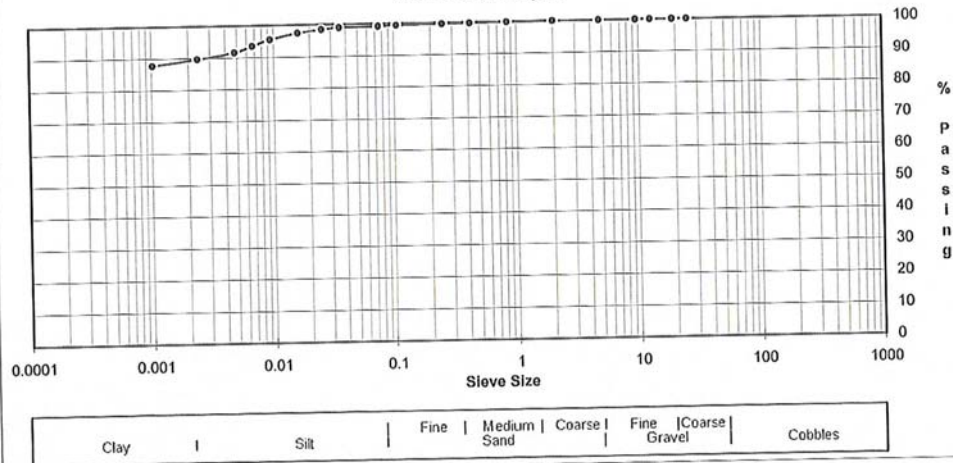
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 CONSULTING GROUP

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Particle Size Analysis of Soils Test Report

To: Dillon Consulting Limited 895 Waverly Street, Suite 200 Winnipeg, Manitoba R3T 5P4 Attention: Jeff Short, EIT Project: Geotechnical Investigation - Street Reconstruction Frobisher Street, Winnipeg, Manitoba		TBTE Project No.: 09-637 Lab Sample No. 10-03																																																	
Date Sampled: - Sampled By: EO-TBTE	Date Received: 06-Jan-10 Date Tested: 15-Feb-10	<table border="1"> <thead> <tr> <th colspan="2">Sieve Analysis</th> <th colspan="2">Hydrometer Analysis</th> </tr> <tr> <th>Sieve(mm)</th> <th>% Passing</th> <th>Diameter</th> <th>% Finer</th> </tr> </thead> <tbody> <tr><td>37.5</td><td>100.0</td><td>0.106</td><td>99.4</td></tr> <tr><td>25</td><td>100.0</td><td>0.075</td><td>99.2</td></tr> <tr><td>19</td><td>100.0</td><td>0.0355219</td><td>99.0</td></tr> <tr><td>12.5</td><td>100.0</td><td>0.0251973</td><td>98.4</td></tr> <tr><td>9.5</td><td>100.0</td><td>0.0160196</td><td>97.4</td></tr> <tr><td>4.75</td><td>100.0</td><td>0.009397</td><td>95.5</td></tr> <tr><td>2</td><td>100.0</td><td>0.006712</td><td>93.5</td></tr> <tr><td>0.841</td><td>99.9</td><td>0.0047932</td><td>91.6</td></tr> <tr><td>0.42</td><td>99.7</td><td>0.0023844</td><td>89.6</td></tr> <tr><td>0.25</td><td>99.6</td><td>0.0010204</td><td>87.7</td></tr> </tbody> </table>		Sieve Analysis		Hydrometer Analysis		Sieve(mm)	% Passing	Diameter	% Finer	37.5	100.0	0.106	99.4	25	100.0	0.075	99.2	19	100.0	0.0355219	99.0	12.5	100.0	0.0251973	98.4	9.5	100.0	0.0160196	97.4	4.75	100.0	0.009397	95.5	2	100.0	0.006712	93.5	0.841	99.9	0.0047932	91.6	0.42	99.7	0.0023844	89.6	0.25	99.6	0.0010204	87.7
Sieve Analysis		Hydrometer Analysis																																																	
Sieve(mm)	% Passing	Diameter	% Finer																																																
37.5	100.0	0.106	99.4																																																
25	100.0	0.075	99.2																																																
19	100.0	0.0355219	99.0																																																
12.5	100.0	0.0251973	98.4																																																
9.5	100.0	0.0160196	97.4																																																
4.75	100.0	0.009397	95.5																																																
2	100.0	0.006712	93.5																																																
0.841	99.9	0.0047932	91.6																																																
0.42	99.7	0.0023844	89.6																																																
0.25	99.6	0.0010204	87.7																																																
Material Identification B.H./T.H. No. TH 6 Sample No. 5 Depth 1.2m Specific Gravity of Material: 2.65																																																			

Grain Size Analysis



Soil Classification	% Composition		D10	-
		Gravel	D30	-
	0.8	Sand	D60	-
	10.2	Silt	Cu	-
Clay	89.0	Clay	Cc	-
Test Method: ASTM D422, D2216, D4318, D2487 TBT Technician: Elena Oberez REVIEWED BY: <i>Hermanalo</i> Hermie Manalo				