

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 INVESTIGATION FOR
WAVERLEY STREET TWINNING
BISON DRIVE TO WARWICK AVENUE**

Prepared for
WARDROP ENGINEERING INC.
400-386 BROADWAY
WINNIPEG MANITOBA
R3C 4M8

Prepared by
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WINNIPEG, MANITOBA
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December 14, 2009

**Waverley Street Twinning
 Bison Drive to Warwick Avenue**

Testhole ID	Soil Type	Soil Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
					Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH4	Clay	black, firm, moist, high plasticity	0.75	35	0	1.8	19.9	78.3	91	26	65
TH6	Silty Clay	brown, firm, moist, medium plasticity	0.30	26	0	4.0	49.8	46.2	46	17	29
TH10	Clayey Silt	tan, soft, moist, low plasticity	0.75	23	0	8.6	65.1	26.3	30	17	13

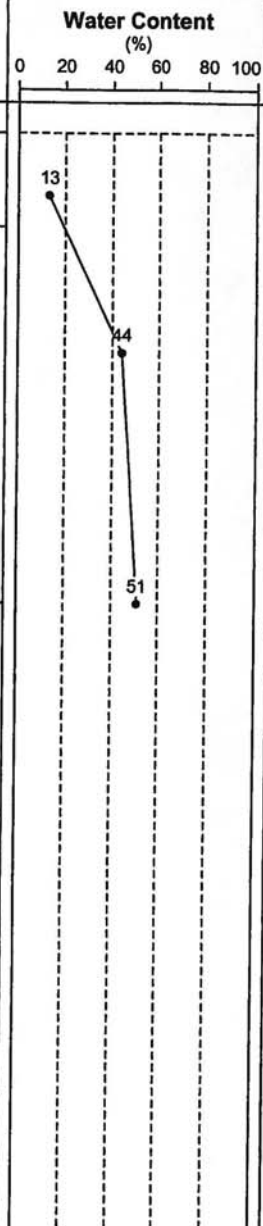
TESTHOLE TH1



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 1.5 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - brown, firm, moist, high plasticity	
1.0			
2.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 1.5 m 	
3.0			



TESTHOLE TH2



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 3.0 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - brown, firm, moist, high plasticity - trace silt below 1.8 m	
1.0			
2.0			
3.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 3.0 m 	

Water Content (%)
0 20 40 60 80 100
38
28
31
33
45

TESTHOLE TH3



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 1.5 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
1.0		Clay - brown, firm, moist, high plasticity	
2.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 1.5 m 	
3.0			

TESTHOLE TH6



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 3.0 m
Logged By: Hilario Presado
Reviewed By: Don Flatt

Subsurface Profile			Laboratory Testing					
Depth (m)	Symbol	Description	Water Content (%)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)
			PL	LL				
0.0		Ground Surface						
0.0 - 0.4		Topsoil						
0.4 - 1.0		Silty Clay - brown, firm, moist, medium plasticity	26		0	4.0	49.8	46.2
1.0 - 3.0		Clay - brown, firm, moist, high plasticity - trace silt below 1.5 m	30					
			39					
			47					
			52					
3.0 - 3.5		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 3.0 m 						

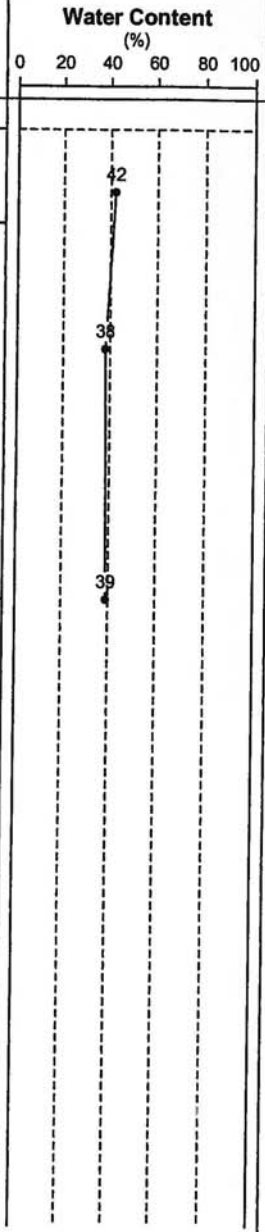
TESTHOLE TH7



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 1.5 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - black, firm, moist, high plasticity	
1.0			
2.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 1.5 m 	
3.0			



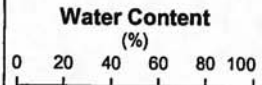
TESTHOLE TH9



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 1.5 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - brown, soft, moist, high plasticity - trace organic material	
1.0			
2.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 1.5 m 	
3.0			



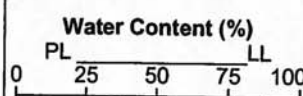
TESTHOLE TH10



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 3.0 m
Logged By: Hilario Presado
Reviewed By: Don Flatt

Subsurface Profile			Laboratory Testing					
Depth (m)	Symbol	Description	Water Content (%)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)
			PL	LL				
0.0		Ground Surface						
0.0 - 0.5		Topsoil						
0.5 - 1.0		Clayey Silt - tan, soft, moist, low plasticity	23		0	8.6	65.1	26.3
1.0 - 2.2		Clay - brown, stiff, moist, high plasticity - trace silt below 2.1 m						
2.2 - 2.5		Silty Clay - brown, soft, moist, medium plasticity						
2.5 - 3.0		Clay - brown, stiff, moist, high plasticity						
3.0 - 3.5		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 3.0 m 						



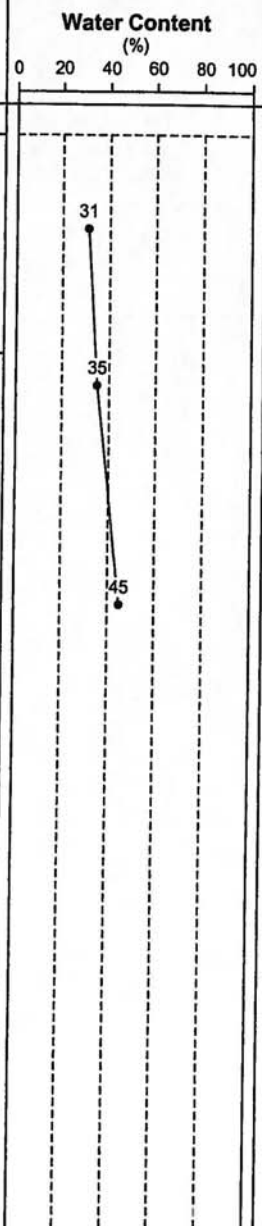
TESTHOLE TH11



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 1.5 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
1.0		Clay - brown, firm, moist, high plasticity	
2.0		<ul style="list-style-type: none"> •No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 1.5 m 	
3.0			



TESTHOLE TH12



Project Name: Waverley St. Twinning (Bison Dr. to Warwick Ave.)
Client: Wardrop Engineering Inc.
Drilling Contractor: Active Drilling Ltd.
Drilling Method: 150 mm auger

Date Drilled: Nov 24, 2009
Depth of Testhole: 3.0 m
Logged by: Hilario Presado
Reviewed by: Don Flatt

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - brown, stiff, moist, high plasticity - trace silt below 1.8 m - firm below 2.3 m	
3.0		•No soil sloughing or groundwater seepage encountered during or upon completion of drilling •Testhole terminated at 3.0 m	