

# **APPENDIX 'F'**

# **GEOTECHNICAL REPORT**



Quality Engineering | Valued Relationships

Morrison Hershfield

## **2016 Local Streets Package 16-R-01 Sub-Surface Investigation**

**Prepared for:**

Morrison Hershfield  
25 Scurfield Blvd, Unit 1  
Winnipeg, MB R3Y 1G4  
Attention: Ron Bruce

**Distribution:**

Ron Bruce, P.Eng.

**Project Number:**

0035-031-00

**Date:**

March 02, 2016  
Final Report



March 02, 2016

Our File No. 0035-031-00

Ron Bruce, P.Eng.  
Morrison Hershfield  
59 Scurfield Blvd, Unit 1  
Winnipeg, MB R3Y 1V2

**RE: 2016 Local Streets Package 16-R-01  
Sub-Surface Investigation Report**

---

TREK Geotechnical Inc. is pleased to submit our report for the sub-surface investigations for the 2016 Local Streets Package 16-R-01.

Please contact the undersigned if you have any questions. Thank you for the opportunity to serve you on this assignment.

Sincerely,

**TREK Geotechnical Inc.**  
**Per:**

A handwritten signature in blue ink, appearing to read "N. Ferreira", written over a light blue horizontal line.

Nelson John Ferreira, M. Sc., P. Eng.  
Geotechnical Engineer, Principal  
Tel: 204.975.9433 ext. 103

cc: Paul Bevel, B.Sc., (TREK Geotechnical)

## Revision History

Revision No.	Author	Issue Date	Description
0	PB	March 02, 2016	Final Report

## Authorization Signatures

Prepared By:

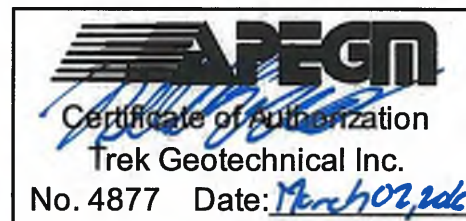


Paul Bevel, B.Sc.



Reviewed By:

Nelson John Ferreira, M. Sc., P.Eng.  
Geotechnical Engineer



## Table of Contents

Letter of Transmittal

Revision History and Authorization Signatures

1.0	Introduction .....	1
2.0	Sub-Surface Investigation and Laboratory Program .....	1
3.0	Closure.....	1

## List of Figures

Figure 01 Test Hole Location Plan – Saulteax Crescent

Figure 02 Test Hole Location Plan – De Baets Street

List of Appendices

Appendix A Test Hole Logs, Summary Table & Lab Data – Saulteax Crescent

Appendix B Test Hole Logs, Summary Table & Lab Data – De Baets Street

## **1.0 Introduction**

This report summarizes the results of the sub-surface investigation completed for the 2016 Local Streets Package 16-R-01 for Saulteaux Crescent and De Baets Avenue. Information describing the pavement structure of the existing road as well as the soil stratigraphy beneath the pavement structure is provided.

## **2.0 Sub-Surface Investigation and Laboratory Program**

A total of 8 test holes were drilled on each street at the locations shown on Figure 01 and Figure 02. The test holes were drilled in order to determine sub-surface conditions for the reconstruction of the road segment.

The sub-surface investigation was conducted on February 8, 2016 at Saulteaux Crescent, and February 10, 2016 at De Baets Avenue. The test holes were drilled to a depth of 3.1 m below road surface by Paddock Drilling Ltd. using their BRAT 22-R truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt or concrete) was cored by Paul Bevel, B.Sc. of TREK Geotechnical Inc. (TREK) using a portable coring press equipped with a hollow 150 mm diameter diamond core drill bit. The sub-surface conditions were observed during drilling and visually classified by Jodi Neumann, C.E.T. of TREK. Other pertinent information such as groundwater and drilling conditions were also recorded during the drilling investigation. Disturbed (auger cuttings) samples retrieved during the sub-surface investigation were transported to TREK's material testing laboratory for further testing. Core samples were also retrieved and logged at TREK's material testing laboratory.

The laboratory testing program consisted of moisture content determination, Atterberg limits, and grain size analysis (mechanical sieve and hydrometer methods). Information gathered for each street is included in separate appendices (Appendix A and B). The information provided in the Appendices includes test hole logs, laboratory testing summary tables and results, and photos of the concrete cores.

Test hole locations noted on the test hole logs and shown on Figure 01 and Figure 02 are based on measured distances from the nearest address and/or edge of pavement.

## **3.0 Closure**

The information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation, laboratory testing, geometries). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work, or a mutually executed standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be

promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of Morrison Hershfield (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

## Figures

---



8 1/2" x 11"

PLOT: 3/2/2016 11:59:37 AM

FILE NAME: FIG 005 2016-03-02 Site Plan 0\_B\_HA 0035 031 00.dwg



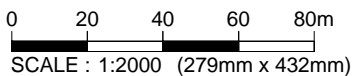
**NOTES :**

1. AERIAL IMAGE FROM GOOGLE EARTH AUGUST 24, 2015



**KEY PLAN**

SCALE: N.T.S.



SCALE : 1:2000 (279mm x 432mm)

**LEGEND :**

- TEST HOLE (TREK, FEBRUARY 8, 2016)

Figure 01

8 1/2" x 11"

PLOT: 2016-03-02 4:08:19 PM

FILE NAME: FIG 005 2016-03-02 Site Plan 0\_B\_HA 0035 031 00.dwg



NOTES :

1. AERIAL IMAGE FROM GOOGLE EARTH AUGUST 24, 2015

LEGEND :

⊕ TEST HOLE (TREK, FEBRUARY 10, 2016)

Figure 02

## **Appendix A**

### **Test Hole Logs, Summary Table & Lab Data – Sauteaux Crescent**

---

## GENERAL NOTES

- Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions	USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria		Particle Size			
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent..... GW, GP, SW, SP More than 12 percent..... GM, GC, SM, SC 6 to 12 percent..... Borderline cases requiring dual symbols*	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	ASTM Sieve sizes #10 to #4 #40 to #10 #200 to #40 < #200			
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW				
		GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols			
		GC	Clayey gravels, gravel-sand-silt mixtures		Atterberg limits above "A" line or P.I. greater than 7				
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	mm 2.00 to 4.75 0.425 to 2.00 0.075 to 0.425 < 0.075		
			SP		Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW			
		Sands with fines (Appreciable amount of fines)	SM		Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols		
			SC		Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7			
			Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)		Sils and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity		Particle Size ASTM Sieve Sizes mm > 300 75 to 300 19 to 75 4.75 to 19 3 in. to 12 in. 3/4 in. to 3 in. #4 to 3/4 in.
						CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
OL	Organic silts and organic silty clays of low plasticity								
Sils and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts		Material Sand Coarse Medium Fine Silt or Clay					
	CH	Inorganic clays of high plasticity, fat clays							
	OH	Organic clays of medium to high plasticity, organic silts							
	Pt	Peat and other highly organic soils							
Highly Organic Soils				Von Post Classification Limit	Strong colour or odour, and often fibrous texture				

\* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

## Other Symbol Types

	Asphalt		Bedrock (undifferentiated)		Cobbles
	Concrete		Limestone Bedrock		Boulders and Cobbles
	Fill		Cemented Shale		Silt Till
			Non-Cemented Shale		Clay Till

## LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)	▽ Water Level at Time of Drilling
PL - Plastic Limit (%)	▼ Water Level at End of Drilling
PI - Plasticity Index (%)	▽ Water Level After Drilling as Indicated on Test Hole Logs
MC - Moisture Content (%)	
SPT - Standard Penetration Test	
RQD- Rock Quality Designation	
Qu - Unconfined Compression	
Su - Undrained Shear Strength	
VW - Vibrating Wire Piezometer	
SI - Slope Incliner	

## FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent

## TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>Undrained Shear Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200



# Sub-Surface Log

Test Hole TH16-01

1 of 1

Client: Morrison Hershfield Project Number: 0035-031-00  
 Project Name: 2016 Local Streets Package 16-R-01, Saulteaux Crescent Location: Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
 Contractor: Paddock Drilling Ltd. Ground Elevation: Existing Ground  
 Method: 125mm Solid Stem Auger, Brat 22 Truck Mount Date Drilled: 8 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.1		CONCRETE - (206mm thick)														
0.1 - 0.3		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, some sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular		G70	●											
0.3 - 0.5		CLAY - silty, trace oxidation, trace organics, trace roots - mottled black and brown - frozen, moist and soft when thawed - high plasticity		G71		●										
0.5 - 1.1		CLAY - some silt, trace silt inclusions (<5mm dia.) - dark brown - frozen, moist and firm when thawed - high plasticity - firm below 1.1m		G72			●									
1.1 - 1.5		CLAY - some silt, trace silt inclusions (<5mm dia.) - dark brown - frozen, moist and firm when thawed - high plasticity		G73			●						⊕			
1.5 - 1.8		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.8m, moist and stiff when thawed - intermediate to high plasticity - firm below 1.8m		G74			●							⊕		
1.8 - 2.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.8m, moist and stiff when thawed - intermediate to high plasticity		G75			●							⊕		
2.0 - 2.3		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.8m, moist and stiff when thawed - intermediate to high plasticity		G76			●							⊕		
2.3 - 2.5		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.8m, moist and stiff when thawed - intermediate to high plasticity		G77			●							⊕		
2.5 - 2.8		- <15mm dia. gravel		G78			●							⊕		
2.8 - 3.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.8m, moist and stiff when thawed - intermediate to high plasticity		G79			●							⊕		

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.3m at completion of drilling.
- 4) Test hole located at 55 Murry Park Rd., 3.0m east of west curb. U14 (5528396m N, 624688m E).

Logged By: Jodi Neumann Reviewed By: \_\_\_\_\_ Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA \_JN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-02

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Sauleteaux Crescent **Location:** Sauleteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )						Undrained Shear Strength (kPa)				
					16	17	18	19	20	21	Test Type				
					Particle Size (%)										
					0	20	40	60	80	100					
					PL  -----  MC  -----  LL 0 20 40 60 80 100										
					0 20 40 60 80 100						0 50 100 150 200 250				
0.0		CONCRETE - (175mm thick)													
0.1		GRAVEL (FILL) - <20mm dia. gravel, some clay, some sand, trace silt, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular	Grab (G)	G59											
0.2		CLAY - some silt, trace organics, trace rootlets - mottled black and brown - frozen, moist and stiff when thawed - high plasticity	Grab (G)	G60											
0.5		CLAY - some silt - dark brown - frozen, moist and stiff when thawed - high plasticity	Grab (G)	G61											
0.6			Grab (G)	G62											
1.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), trace silt inclusions (<10mm dia.), trace oxidation - brown - frozen to 1.5m, moist and stiff when thawed - intermediate to high plasticity	Grab (G)	G63											
1.2			Grab (G)	G64											
1.5			Grab (G)	G65											
2.0			Grab (G)	G66											
2.2			Grab (G)	G67											
2.5		- firm to stiff below 2.4m	Grab (G)	G68											
3.0		- firm below 2.9m	Grab (G)	G69											

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.1m at completion of drilling.
- 4) Test hole located at 352 Sauleteaux Cres., 3.0m west of east curb. U14 (5528479m N, 624697m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA \_IN.GPJ TREK GEOTECHNICAL.GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-03

1 of 1

Client: Morrison Hershfield Project Number: 0035-031-00  
 Project Name: 2016 Local Streets Package 16-R-01, Saulteaux Crescent Location: Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
 Contractor: Paddock Drilling Ltd. Ground Elevation: Existing Ground  
 Method: 125mm Solid Stem Auger, Brat 22 Truck Mount Date Drilled: 8 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0 50 100 150 200 250						△ Torvane △ ⊕ Pocket Pen. ⊕ ⊠ Qu ⊠ ○ Field Vane ○					
0.0 - 0.1		CONCRETE - (205mm thick)														
0.1 - 0.6		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, some sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular CLAY - silty, trace sand, trace gravel (<10mm dia.), trace organics, trace roots - mottled black and dark brown - frozen, moist and firm when thawed - high plasticity - no gravel below 0.6m		G49	●											
0.6 - 0.9		CLAY - silty, trace silt inclusions (<5mm dia.) - dark brown - frozen to 1.5m, moist and stiff when thawed - high plasticity - stiff below 0.9m		G50	●											
0.9 - 1.5		CLAY - silty, trace silt inclusions (<5mm dia.) - dark brown - frozen to 1.5m, moist and stiff when thawed - high plasticity		G51	●							⊕				
1.5 - 1.8		CLAY - silty, trace silt inclusions (<5mm dia.) - dark brown - frozen to 1.5m, moist and stiff when thawed - high plasticity		G52	●							⊕				
1.8 - 2.1		CLAY - silty, trace silt inclusions (<5mm dia.) - dark brown - frozen to 1.5m, moist and stiff when thawed - high plasticity		G53	●							⊕				
2.1 - 2.5		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), some silt inclusions (<10mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity - firm below 2.1m		G54	●							△	⊕			
2.5 - 2.9		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), some silt inclusions (<10mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity - firm below 2.1m		G55	●							△	⊕			
2.9 - 3.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), some silt inclusions (<10mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity - firm below 2.1m - mottled grey and brown, firm to stiff below 2.9m		G56	●							⊕	△			
3.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), some silt inclusions (<10mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity - firm below 2.1m - mottled grey and brown, firm to stiff below 2.9m		G57	●							⊕	△			
3.0		CLAY (TILL) - silty, trace sand, trace gravel (<5mm dia.), some silt inclusions (<10mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity - firm below 2.1m - mottled grey and brown, firm to stiff below 2.9m		G58	●							⊕	△			

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.1m at completion of drilling.
- 4) Test hole located at 340 Saulteaux Cres., 2.1m west of east curb. U14 (5528544m N, 624697m E).

Logged By: Jodi Neumann Reviewed By: \_\_\_\_\_ Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA \_IN.GPJ TREK GEOTECHNICAL.GDT 2/3/16





# Sub-Surface Log

Test Hole TH16-04

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Saulteaux Crescent **Location:** Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)  
**Particle Size Legend:** Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )					Undrained Shear Strength (kPa)						
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.1		CONCRETE - (215mm thick)														
0.1 - 0.3		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, some sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular	<input checked="" type="checkbox"/>	G40												
0.3 - 0.6		CLAY - silty, trace sand, trace gravel (<5mm dia.), trace oxidation, trace organics, trace rootlets, mottled black and dark brown - frozen, moist and stiff when thawed - high plasticity	<input checked="" type="checkbox"/>	G41												
0.6 - 1.0		CLAY - some silt, trace sand, trace roots - dark brown - frozen to 1.5m, moist and firm to stiff when thawed - high plasticity	<input checked="" type="checkbox"/>	G42												
1.0 - 1.5		CLAY - some silt, trace sand, trace roots - dark brown - frozen to 1.5m, moist and firm to stiff when thawed - high plasticity	<input checked="" type="checkbox"/>	G43												
1.5 - 2.0		CLAY (TILL) - silty, trace coarse sand, some silt inclusions (<10mm dia.) - brown - moist, stiff - intermediate to high plasticity	<input checked="" type="checkbox"/>	G44												
2.0 - 2.4		- firm to stiff below 2.1m	<input checked="" type="checkbox"/>	G45												
2.4 - 2.9		- stiff to very stiff below 2.4m	<input checked="" type="checkbox"/>	G46												
2.9 - 3.0		- firm to stiff below 2.9m	<input checked="" type="checkbox"/>	G47												
3.0		End of Hole at 3.0m in CLAY (TILL)	<input checked="" type="checkbox"/>	G48												

Notes:  
 1) No sloughing or seepage.  
 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.  
 3) Test hole open to 2.4m at completion of drilling.  
 4) Test hole located at 328 Saulteaux Cres., 2.3m east of west curb. U14 (5528606m N, 624695m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA \_IN.GPJ TREK GEOTECHNICAL.GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-05

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Saulteaux Crescent **Location:** Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
											0	50	100	150	200	250
0.0 - 0.1		CONCRETE - (182mm thick)														
0.1 - 0.3		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, some sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular		G31												
0.3 - 0.5		CLAY - silty, trace silt inclusions (<5mm dia.), trace sand, trace oxidation, trace organics, trace roots - mottled black and dark brown - frozen, moist and firm when thawed - high plasticity		G32												
0.5 - 0.7		CLAY - silty, trace sand, dark brown, moist, very stiff, high plasticity		G33												
0.7 - 1.3		CLAY (TILL) - silty, trace silt inclusions (<10mm dia.), trace coarse sand, trace oxidation - brown - moist, stiff - intermediate to high plasticity		G34												
1.3 - 1.5		CLAY - silty, trace sand, dark brown, moist, very stiff, high plasticity		G35												
1.5 - 2.1		CLAY (TILL) - silty, trace silt inclusions (<10mm dia.), trace coarse sand, trace oxidation - brown - moist, stiff - intermediate to high plasticity		G36												
2.1 - 2.3		- firm below 2.1m		G37												
2.3 - 2.5		- firm below 2.1m		G38												
2.5 - 3.0		- firm below 2.1m		G39												

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.3m at completion of drilling.
- 4) Test hole located 16.5m north of rail road crossing, 3.8m west of east curb. U14 (5528680m N, 624700m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-06

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Saulteaux Crescent **Location:** Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
		CONCRETE - (239mm thick)														
		GRAVEL (FILL) - <20mm dia. gravel, some clay, some sand, trace silt, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular		G21												
		CLAY - some silt, trace oxidation, trace organics, trace rootlets - mottled black and dark brown - frozen, moist and stiff when thawed, high plasticity		G22												
		CLAY - some silt, trace silt inclusions (<6mm dia.) - dark brown - frozen, moist and firm to stiff when thawed - high plasticity		G23												
				G24												
		CLAY (TILL) - silty, some silt inclusions (<30mm dia.), trace to some sand, trace gravel (<20mm dia.), trace oxidation - brown - frozen to 1.5m, moist and stiff when thawed - intermediate to high plasticity		G25												
				G26												
				G27												
		- stiff below 2.1m		G28												
				G29												
		CLAY AND SILT (TILL) - trace sand, trace to some gravel (<15mm dia.) - brown - moist, stiff - intermediate to high plasticity		G30												

End of Hole at 3.0m in CLAY AND SILT (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.8m at completion of drilling.
- 4) Test hole located south of 300 Saulteaux Cres., 2.0m east of west curb. U14 (5528751m N, 624700m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-07

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Saulteaux Crescent **Location:** Saulteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)  
**Particle Size Legend:** Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		CONCRETE - (184mm thick)															
0.1 - 0.4		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, trace sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular		G11													
0.4 - 1.0		CLAY - some silt, trace sand, trace organics, trace rootlets - mottled black and dark brown - frozen, moist and firm to stiff when thawed - high plasticity		G12													
1.0 - 1.5		CLAY - some silt, trace sand - dark brown - frozen to 1.5m, moist and stiff when thawed - high plasticity  - brown below 1.4m		G13													
1.5 - 2.0		CLAY (TILL) - silty, trace to some silt inclusions (<5mm dia.), trace to some sand, trace gravel (<5mm dia.), trace oxidation - brown - moist, stiff - intermediate to high plasticity		G14													
2.0 - 2.5				G15													
2.5 - 3.0				G16													
3.0 - 3.5				G17													
3.5 - 4.0				G18													
4.0 - 4.5				G19													
4.5 - 5.0				G20													

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.4m at completion of drilling.
- 4) Test hole located at 251 Saulteaux Cres., 3.2m north of south curb. U14 (5528770m N, 624772m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-08

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, Sauleteaux Crescent **Location:** Sauleteaux Cres. - Between Murray Park Rd. and Moray St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 8 February 2016

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

**Particle Size Legend:** Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)									
					16	17	18	19	20	21	0	50	100	150	200	250		
0.0		CONCRETE - (189mm thick)																
0.1		GRAVEL (FILL) - <20mm dia. gravel, some clay, trace silt, trace sand, brown, moist, compact, intermediate plasticity, well graded, sub angular to angular	<input checked="" type="checkbox"/>	G01														
0.2		CLAY - silty, trace silt inclusions (<5mm dia.), trace sand, trace organics, trace rootlets - mottled black and dark brown - frozen, moist and firm to stiff when thawed - high plasticity	<input checked="" type="checkbox"/>	G02														
0.4			<input checked="" type="checkbox"/>	G03														
0.9		CLAY - silty, trace oxidaton - dark brown - frozen, moist and stiff when thawed - high plasticity	<input checked="" type="checkbox"/>	G04														
1.4		CLAY (TILL) - silty, trace silt inclusions (<10mm dia.), trace sand, trace gravel (<5mm dia.), trace oxidation - brown - frozen to 1.5 m, moist and stiff when thawed - intermediate to high plasticity	<input checked="" type="checkbox"/>	G05														
1.7			<input checked="" type="checkbox"/>	G06														
2.1			<input checked="" type="checkbox"/>	G07														
2.4			<input checked="" type="checkbox"/>	G08														
2.7			<input checked="" type="checkbox"/>	G09														
3.0		- firm below 2.7m	<input checked="" type="checkbox"/>	G10														

End of Hole at 3.0m in CLAY (TILL)

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.3m at completion of drilling.
- 4) Test hole located at 250 Sauleteaux Cres., 3.8m south of north curb. U14 (5528772m N, 624853m E).

**Logged By:** Jodi Neumann **Reviewed By:** \_\_\_\_\_ **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-19 LOCAL STREETS PKG. 16-R-01 SAULTEAUX 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL.GDT 2/3/16











www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent  
  
**Sample Date** 08-Feb-16  
**Test Date** 11-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-01	TH16-01	TH16-01	TH16-01	TH16-01	TH16-01
Depth (m)	0.2 - 0.3	0.3 - 0.5	0.6 - 0.8	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5
Sample #	G70	G71	G72	G73	G74	G75
Tare ID	AB68	P08	E36	Z06	E18	H55
Mass of tare	6.6	8.4	8.7	8.4	8.4	8.6
Mass wet + tare	235.5	252.1	253.6	261.0	262.1	251.7
Mass dry + tare	215.6	188.4	182.7	189.7	194.3	187.7
Mass water	19.9	63.7	70.9	71.3	67.8	63.9
Mass dry soil	208.9	180.0	174.0	181.3	185.9	179.2
Moisture %	9.5%	35.4%	40.7%	39.3%	36.5%	35.7%

Test Pit	TH16-01	TH16-01	TH16-01	TH16-01	TH16-02	TH16-02
Depth (m)	1.7 - 1.8	1.8 - 2.0	2.1 - 2.3	2.6 - 2.7	0.2 - 0.3	0.3 - 0.5
Sample #	G76	G77	G78	G79	G59	G60
Tare ID	F111	E91	K7	W06	F125	D33
Mass of tare	8.2	9.0	8.6	8.4	8.8	8.3
Mass wet + tare	274.373	291.175	270.394	267.05	198.36	250.386
Mass dry + tare	208.2	233.2	202.7	198.9	181.3	188.2
Mass water	66.1	58.0	67.7	68.1	17.1	62.2
Mass dry soil	200.0	224.2	194.1	190.5	172.5	179.9
Moisture %	33.1%	25.9%	34.8%	35.8%	9.9%	34.5%

Test Pit	TH16-02	TH16-02	TH16-02	TH16-02	TH16-02	TH16-02
Depth (m)	0.6 - 0.8	0.8 - 0.9	0.9 - 1.1	1.2 - 1.4	1.5 - 1.7	1.8 - 2.0
Sample #	G61	G62	G63	G64	G65	G66
Tare ID	Z77	Z89	Z104	F69	W09	H72
Mass of tare	8.3	8.3	8.6	8.5	8.6	8.4
Mass wet + tare	252.6	251.1	276.6	262.6	283.8	244.9
Mass dry + tare	188.0	193.1	217.1	203.7	218.7	188.9
Mass water	64.6	58.0	59.5	58.9	65.1	56.0
Mass dry soil	179.7	184.8	208.5	195.2	210.1	180.5
Moisture %	35.9%	31.4%	28.5%	30.2%	31.0%	31.0%



**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent  
  
**Sample Date** 08-Feb-16  
**Test Date** 11-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-02	TH16-02	TH16-02	TH16-03	TH16-03	TH16-03
Depth (m)	2.1 - 2.3	2.4 - 2.6	2.9 - 3.0	0.2 - 0.3	0.3 - 0.5	0.6 - 0.8
Sample #	G67	G68	G69	G49	G50	G51
Tare ID	D23	C21	E22	F42	AB44	H15
Mass of tare	9.0	8.4	8.6	8.3	6.7	8.5
Mass wet + tare	272.6	273.9	261.5	179.3	252.9	253.8
Mass dry + tare	209.1	202.4	190.2	162.8	188.5	183.5
Mass water	63.5	71.5	71.3	16.5	64.4	70.3
Mass dry soil	200.1	194.0	181.6	154.5	181.8	175.0
Moisture %	31.7%	36.8%	39.3%	10.7%	35.5%	40.2%

Test Pit	TH16-03	TH16-03	TH16-03	TH16-03	TH16-03	TH16-03
Depth (m)	0.9 - 1.1	1.2 - 1.4	1.7 - 1.8	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6
Sample #	G52	G53	G54	G55	G56	G57
Tare ID	Z131	E46	F81	E99	Z95	Z771
Mass of tare	8.4	8.5	8.6	8.5	8.6	8.5
Mass wet + tare	237.0	250.6	281.1	272.2	296.9	267.7
Mass dry + tare	171.6	187.6	211.8	206.0	227.0	220.2
Mass water	65.4	63.0	69.3	66.3	69.9	47.4
Mass dry soil	163.2	179.1	203.2	197.4	218.4	211.7
Moisture %	40.1%	35.2%	34.1%	33.6%	32.0%	22.4%

Test Pit	TH16-03	TH16-04	TH16-04	TH16-04	TH16-04	TH16-04
Depth (m)	2.9 - 3.0	0.2 - 0.2	0.3 - 0.5	0.6 - 0.8	0.9 - 1.1	1.2 - 1.7
Sample #	G58	G40	G41	G42	G43	G44
Tare ID	W40	W66	W77	F98	H16	W27
Mass of tare	8.4	8.5	8.4	8.4	8.3	8.4
Mass wet + tare	290.5	120.3	256.0	255.0	250.0	251.3
Mass dry + tare	236.7	104.8	194.3	194.7	189.6	189.8
Mass water	53.8	15.5	61.7	60.3	60.4	61.5
Mass dry soil	228.4	96.3	185.9	186.3	181.3	181.5
Moisture %	23.6%	16.1%	33.2%	32.4%	33.3%	33.9%



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent  
  
**Sample Date** 08-Feb-16  
**Test Date** 11-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-04	TH16-04	TH16-04	TH16-04	TH16-05	TH16-05
Depth (m)	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	2.9 - 3.0	0.2 - 0.3	0.3 - 0.5
Sample #	G45	G46	G47	G48	G31	G32
Tare ID	C17	C25	AB25	D6	D9	AA10
Mass of tare	8.3	8.3	6.6	8.3	8.5	6.6
Mass wet + tare	345.0	280.6	268.6	279.6	203.2	253.4
Mass dry + tare	282.4	220.2	210.7	221.4	180.7	184.4
Mass water	62.6	60.4	57.9	58.2	22.5	69.0
Mass dry soil	274.1	211.9	204.1	213.1	172.2	177.8
Moisture %	22.8%	28.5%	28.3%	27.3%	13.1%	38.8%

Test Pit	TH16-05	TH16-05	TH16-05	TH16-05	TH16-05	TH16-05
Depth (m)	0.6 - 0.8	1.1 - 1.2	1.4 - 1.5	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6
Sample #	G33	G34	G35	G36	G37	G38
Tare ID	H9	W101	N38	W69	F112	W48
Mass of tare	8.5	8.5	8.3	8.5	8.1	8.4
Mass wet + tare	309.5	309.5	304.2	322.0	351.7	305.2
Mass dry + tare	225.2	225.2	226.2	241.7	280.1	231.0
Mass water	84.3	84.3	78.0	80.3	71.6	74.2
Mass dry soil	216.7	216.7	217.9	233.2	272.0	222.6
Moisture %	38.9%	38.9%	35.8%	34.4%	26.3%	33.4%

Test Pit	TH16-05	TH16-06	TH16-06	TH16-06	TH16-06	TH16-06
Depth (m)	2.9 - 3.0	0.2 - 0.3	0.3 - 0.5	0.6 - 0.7	0.9 - 1.1	1.2 - 1.4
Sample #	G39	G21	G22	G23	G24	G25
Tare ID	W24	F47	Z93	H29	E47	H38
Mass of tare	8.3	8.4	8.4	8.4	8.6	8.5
Mass wet + tare	322.4	229.8	303.4	303.4	312.2	311.9
Mass dry + tare	236.8	205.8	229.0	229.0	229.6	234.9
Mass water	85.6	24.0	74.4	74.4	82.6	77.0
Mass dry soil	228.5	197.4	220.6	220.6	221.0	226.4
Moisture %	37.5%	12.2%	33.7%	33.7%	37.4%	34.0%



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent  
  
**Sample Date** 08-Feb-16  
**Test Date** 11-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-06	TH16-06	TH16-06	TH16-06	TH16-06	TH16-07
Depth (m)	1.4 - 1.5	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	2.9 - 3.0	0.2 - 0.2
Sample #	G26	G27	G28	G29	G30	G11
Tare ID	C7	Z36	F134	AB87	AB64	W95
Mass of tare	8.4	8.5	8.4	6.6	6.6	8.3
Mass wet + tare	342.5	343.3	339.2	324.3	336.1	78.3
Mass dry + tare	263.8	298.2	293.3	288.1	303.2	71.4
Mass water	78.7	45.1	45.9	36.2	32.9	6.9
Mass dry soil	255.4	289.7	284.9	281.5	296.6	63.1
Moisture %	30.8%	15.6%	16.1%	12.9%	11.1%	11.0%

Test Pit	TH16-07	TH16-07	TH16-07	TH16-07	TH16-07	TH16-07
Depth (m)	0.3 - 0.5	0.6 - 0.8	0.9 - 1.1	1.2 - 1.4	1.5 - 1.7	1.8 - 2.0
Sample #	G12	G13	G14	G15	G16	G17
Tare ID	E143	E75	F26	P01	W63	N107
Mass of tare	8.5	8.5	8.3	8.9	8.4	8.4
Mass wet + tare	294.0	239.5	332.7	338.4	375.4	352.6
Mass dry + tare	220.9	179.2	249.7	254.3	292.4	270.5
Mass water	73.1	60.3	83.0	84.1	83.0	82.1
Mass dry soil	212.4	170.7	241.4	245.4	284.0	262.1
Moisture %	34.4%	35.3%	34.4%	34.3%	29.2%	31.3%

Test Pit	TH16-07	TH16-07	TH16-07	TH16-08	TH16-08	TH16-08
Depth (m)	2.1 - 2.3	2.4 - 2.6	2.9 - 3.0	0.2 - 0.3	0.3 - 0.4	0.6 - 0.8
Sample #	G18	G19	G20	G01	G02	G03
Tare ID	E113	K31	W80	Z64	W56	N24
Mass of tare	8.6	8.4	8.4	8.3	8.5	8.5
Mass wet + tare	348.0	347.0	324.6	182.5	324.0	257.6
Mass dry + tare	255.4	261.7	246.2	151.4	240.4	195.6
Mass water	92.6	85.3	78.4	31.1	83.6	62.0
Mass dry soil	246.8	253.3	237.8	143.1	231.9	187.1
Moisture %	37.5%	33.7%	33.0%	21.7%	36.1%	33.2%



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent  
  
**Sample Date** 08-Feb-16  
**Test Date** 11-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-08	TH16-08	TH16-08	TH16-08	TH16-08	TH16-08
Depth (m)	0.9 - 1.1	1.2 - 1.4	1.5 - 1.7	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6
Sample #	G04	G05	G06	G07	G08	G09
Tare ID	H2	E76	A101	E2	Z45	N27
Mass of tare	8.4	8.4	8.7	8.5	8.4	8.5
Mass wet + tare	272.0	307.4	306.1	352.2	355.3	319.0
Mass dry + tare	196.7	228.5	235.2	263.7	259.2	228.9
Mass water	75.3	78.9	70.9	88.5	96.1	90.1
Mass dry soil	188.3	220.1	226.5	255.2	250.8	220.4
Moisture %	40.0%	35.8%	31.3%	34.7%	38.3%	40.9%

Test Pit	TH16-08					
Depth (m)	2.7 - 2.9					
Sample #	G10					
Tare ID	Z119					
Mass of tare	8.6					
Mass wet + tare	342.4					
Mass dry + tare	241.8					
Mass water	100.6					
Mass dry soil	233.2					
Moisture %	43.1%					

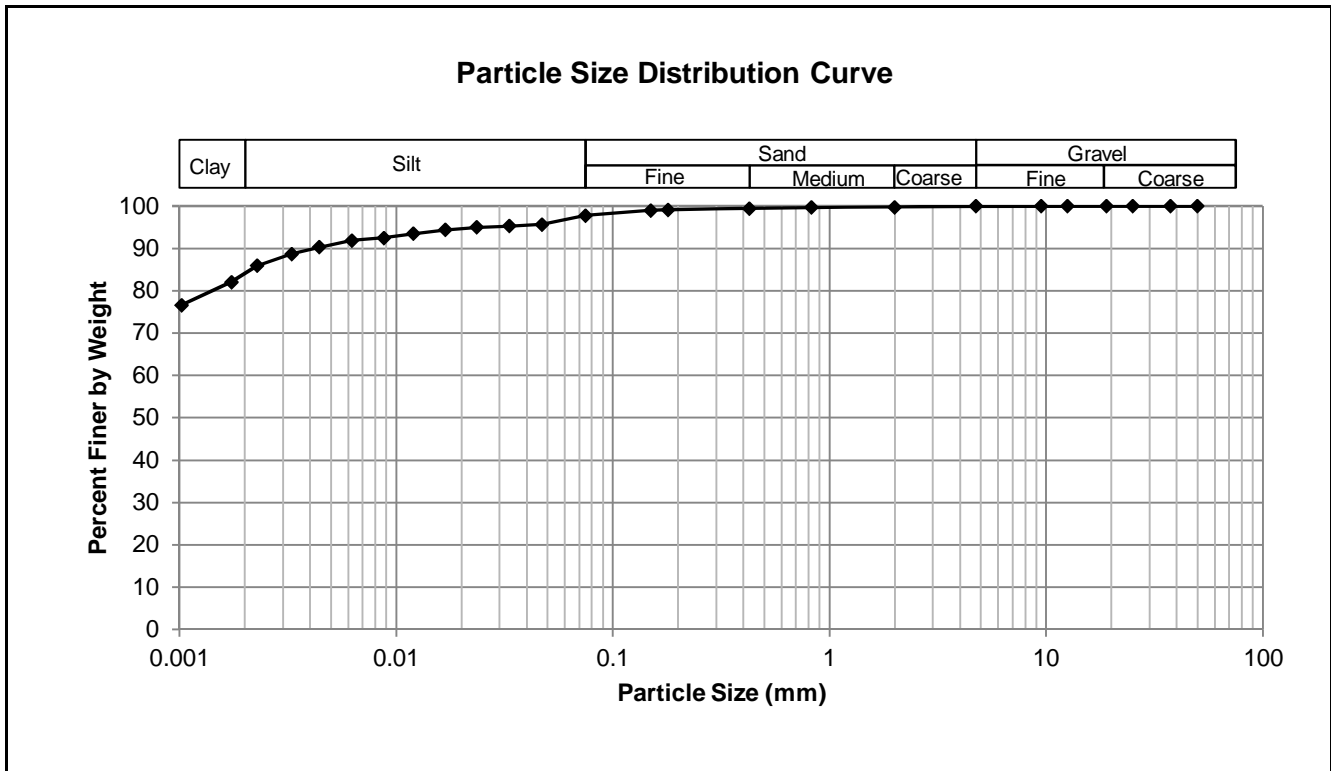
Test Pit						
Depth (m)						
Sample #						
Tare ID						
Mass of tare						
Mass wet + tare						
Mass dry + tare						
Mass water						
Mass dry soil						
Moisture %						



**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent

**Test Hole** TH16-02  
**Sample #** G61  
**Depth (m)** 0.6 - 0.8  
**Sample Date** 8-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.0%
<b>Sand</b>	2.2%
<b>Silt</b>	13.8%
<b>Clay</b>	83.9%



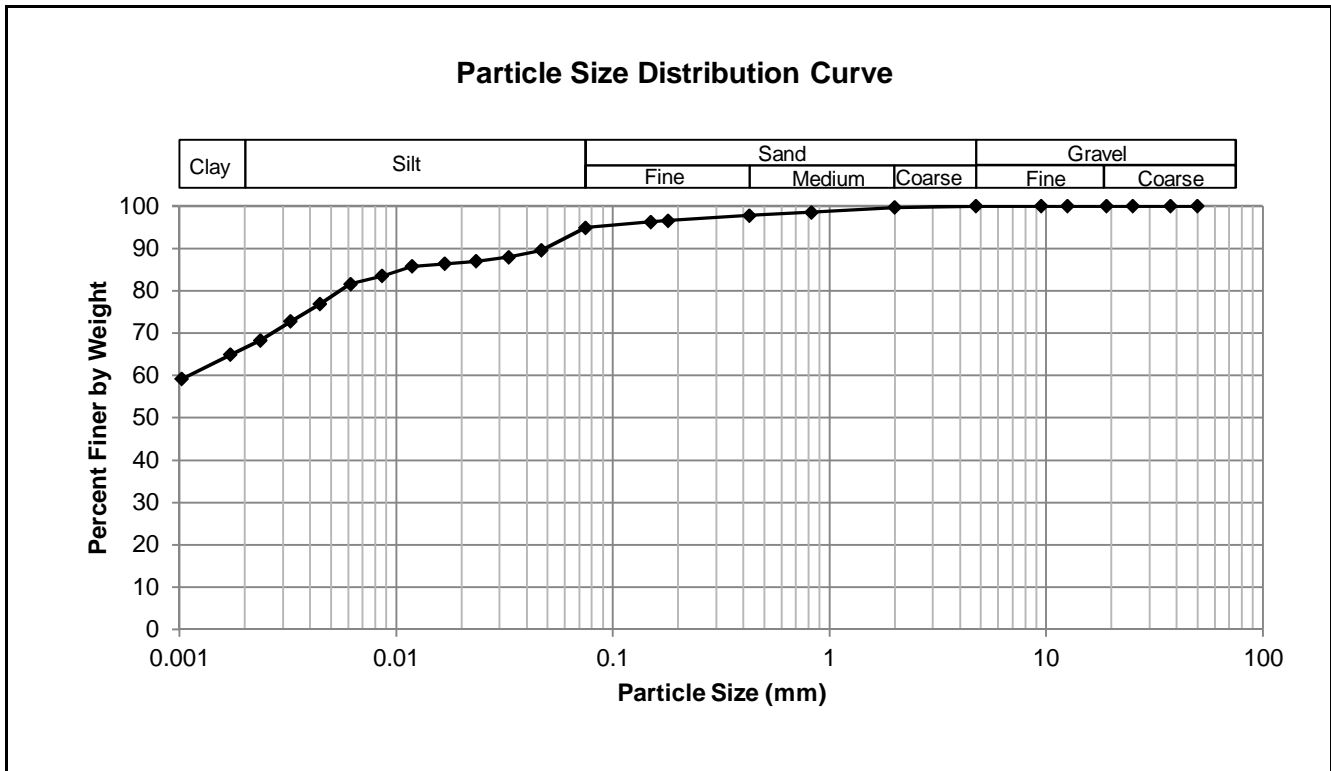
Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	97.77
37.5	100.00	2.00	99.75	0.0471	95.63
25.0	100.00	0.825	99.63	0.0333	95.32
19.0	100.00	0.425	99.45	0.0236	95.00
12.5	100.00	0.180	99.11	0.0168	94.37
9.50	100.00	0.150	99.00	0.0120	93.44
4.75	100.00	0.075	97.77	0.0088	92.49
				0.0062	91.86
				0.0044	90.27
				0.0033	88.69
				0.0023	85.88
				0.0017	82.08
				0.0010	76.62



**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent

**Test Hole** TH16-02  
**Sample #** G63  
**Depth (m)** 0.9 - 1.1  
**Sample Date** 8-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.0%
<b>Sand</b>	5.1%
<b>Silt</b>	28.5%
<b>Clay</b>	66.4%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	94.90
37.5	100.00	2.00	99.66	0.0468	89.54
25.0	100.00	0.825	98.57	0.0331	87.96
19.0	100.00	0.425	97.80	0.0234	87.01
12.5	100.00	0.180	96.56	0.0167	86.38
9.50	100.00	0.150	96.24	0.0118	85.74
4.75	100.00	0.075	94.90	0.0086	83.53
				0.0062	81.63
				0.0044	76.88
				0.0033	72.75
				0.0024	68.32
				0.0017	64.88
				0.0010	59.14



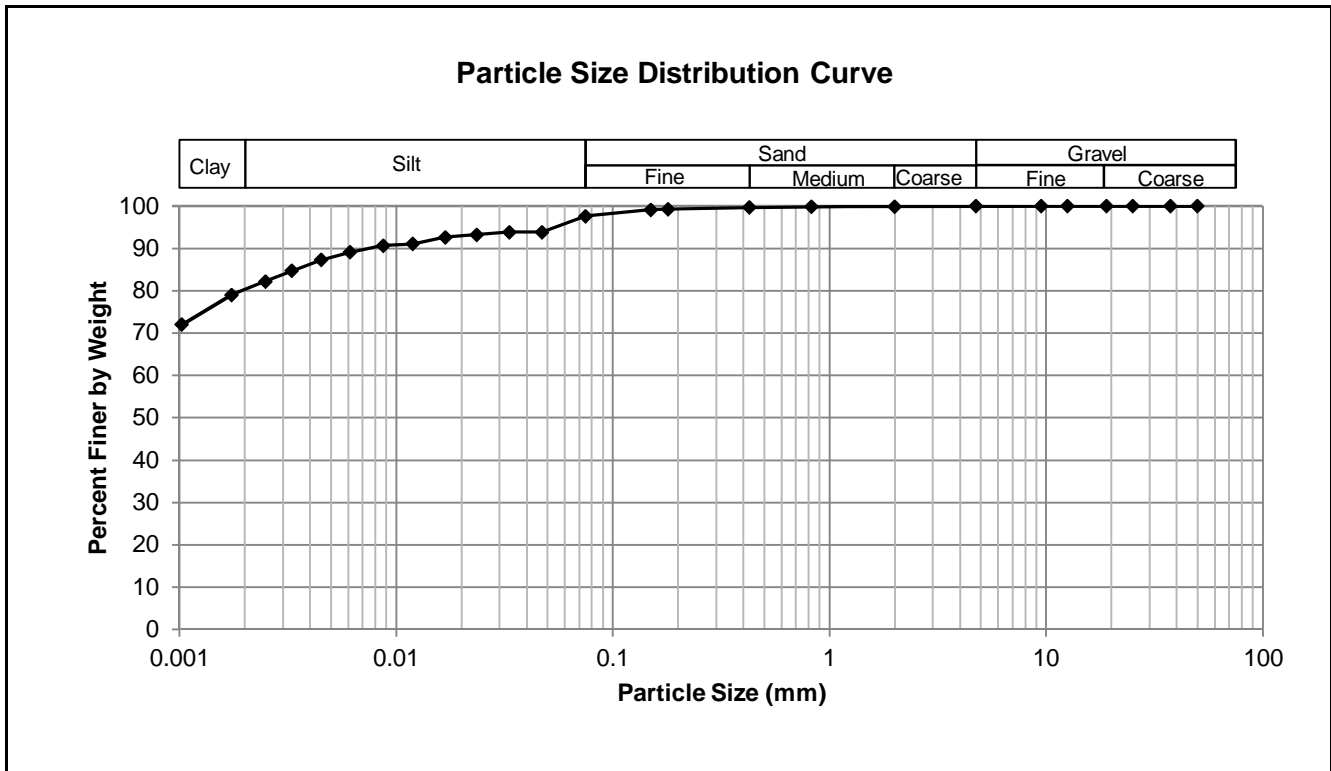
www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Grain Size Analysis (Hydrometer Method)**  
**ASTM D422**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent

**Test Hole** TH16-07  
**Sample #** G12  
**Depth (m)** 0.3 - 0.5  
**Sample Date** 8-Feb-16  
**Test Date** 25-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.0%
<b>Sand</b>	2.4%
<b>Silt</b>	17.5%
<b>Clay</b>	80.1%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	97.64
37.5	100.00	2.00	99.91	0.0471	93.88
25.0	100.00	0.825	99.84	0.0333	93.88
19.0	100.00	0.425	99.70	0.0236	93.25
12.5	100.00	0.180	99.28	0.0168	92.61
9.50	100.00	0.150	99.14	0.0119	91.02
4.75	100.00	0.075	97.64	0.0087	90.71
				0.0061	89.12
				0.0045	87.24
				0.0033	84.71
				0.0025	82.21
				0.0017	79.04
				0.0010	71.98





www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

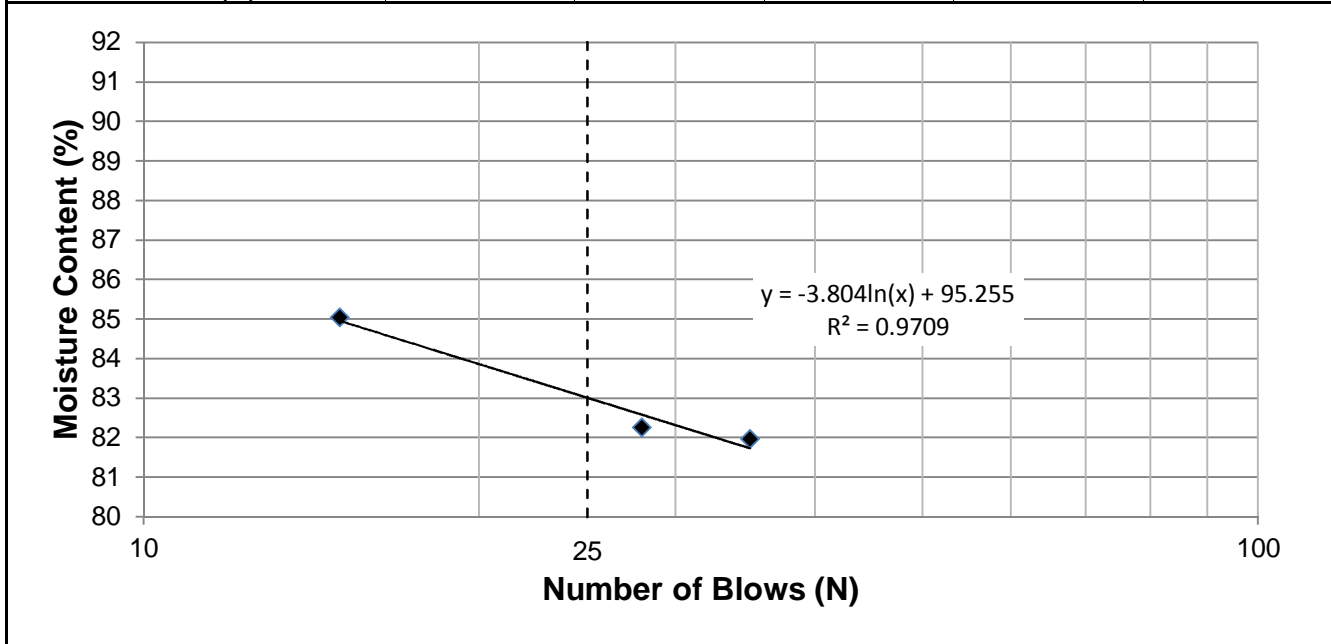
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Sauleaux Crescent

**Test Hole** TH16-02  
**Sample #** G61  
**Depth (m)** 0.60 - 0.76  
**Sample Date** 08-Feb-16  
**Test Date** 25-Feb-16  
**Technician** LI

<b>Liquid Limit</b>	83
<b>Plastic Limit</b>	23
<b>Plasticity Index</b>	60

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	28	15	35		
<b>Mass Wet Soil + Tare (g)</b>	23.599	26.550	24.667		
<b>Mass Dry Soil + Tare (g)</b>	19.306	20.872	19.926		
<b>Mass Tare (g)</b>	14.087	14.195	14.142		
<b>Mass Water (g)</b>	4.293	5.678	4.741		
<b>Mass Dry Soil (g)</b>	5.219	6.677	5.784		
<b>Moisture Content (%)</b>	82.257	85.038	81.967		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	17.218	18.260			
<b>Mass Dry Soil + Tare (g)</b>	16.612	17.491			
<b>Mass Tare (g)</b>	13.994	14.160			
<b>Mass Water (g)</b>	0.606	0.769			
<b>Mass Dry Soil (g)</b>	2.618	3.331			
<b>Moisture Content (%)</b>	23.147	23.086			



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

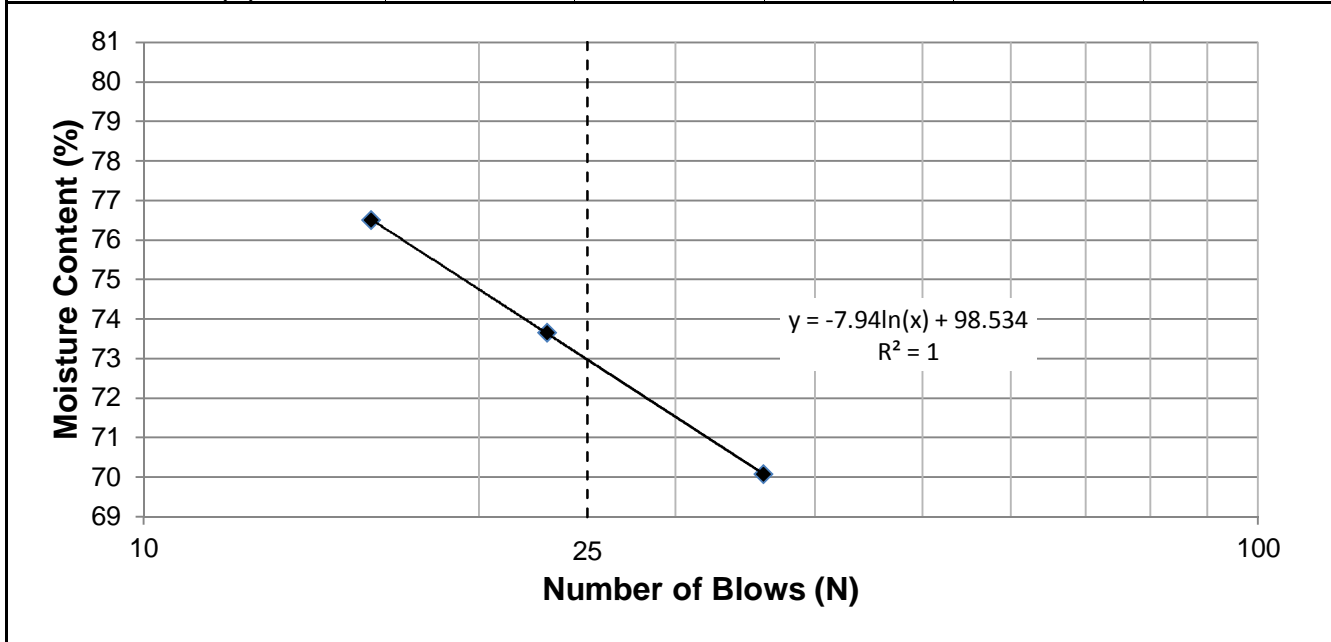
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent

**Test Hole** TH16-02  
**Sample #** G63  
**Depth (m)** 0.9 - 1.1  
**Sample Date** 08-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI/JB

<b>Liquid Limit</b>	73
<b>Plastic Limit</b>	18
<b>Plasticity Index</b>	55

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	36	23	16		
<b>Mass Wet Soil + Tare (g)</b>	26.059	25.552	26.532		
<b>Mass Dry Soil + Tare (g)</b>	21.128	20.659	21.197		
<b>Mass Tare (g)</b>	14.091	14.016	14.224		
<b>Mass Water (g)</b>	4.931	4.893	5.335		
<b>Mass Dry Soil (g)</b>	7.037	6.643	6.973		
<b>Moisture Content (%)</b>	70.072	73.656	76.509		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	21.664	18.420	21.866		
<b>Mass Dry Soil + Tare (g)</b>	20.516	17.704	20.684		
<b>Mass Tare (g)</b>	14.010	14.054	14.167		
<b>Mass Water (g)</b>	1.148	0.716	1.182		
<b>Mass Dry Soil (g)</b>	6.506	3.650	6.517		
<b>Moisture Content (%)</b>	17.645	19.616	18.137		



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

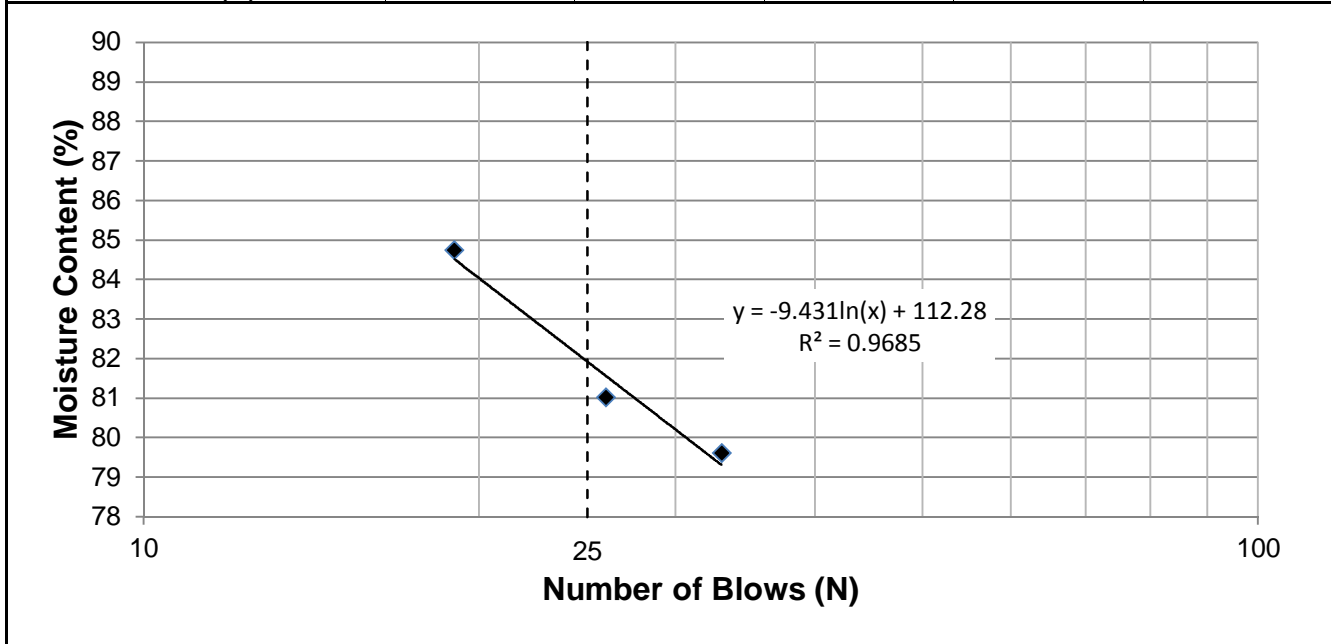
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, Saulteaux Crescent

**Test Hole** TH16-07  
**Sample #** G12  
**Depth (m)** 0.30 - 0.46  
**Sample Date** 08-Feb-16  
**Test Date** 26-Feb-16  
**Technician** JB

<b>Liquid Limit</b>	82
<b>Plastic Limit</b>	23
<b>Plasticity Index</b>	59

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	33	19	26		
<b>Mass Wet Soil + Tare (g)</b>	26.658	25.409	26.815		
<b>Mass Dry Soil + Tare (g)</b>	21.057	20.230	21.050		
<b>Mass Tare (g)</b>	14.022	14.119	13.934		
<b>Mass Water (g)</b>	5.601	5.179	5.765		
<b>Mass Dry Soil (g)</b>	7.035	6.111	7.116		
<b>Moisture Content (%)</b>	79.616	84.749	81.015		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	18.080	20.418			
<b>Mass Dry Soil + Tare (g)</b>	17.324	19.184			
<b>Mass Tare (g)</b>	14.116	13.916			
<b>Mass Water (g)</b>	0.756	1.234			
<b>Mass Dry Soil (g)</b>	3.208	5.268			
<b>Moisture Content (%)</b>	23.566	23.424			



Photo 1: Pavement Core Sample at Test Hole TH16-01



Photo 2: Pavement Core Sample at Test Hole TH16-02

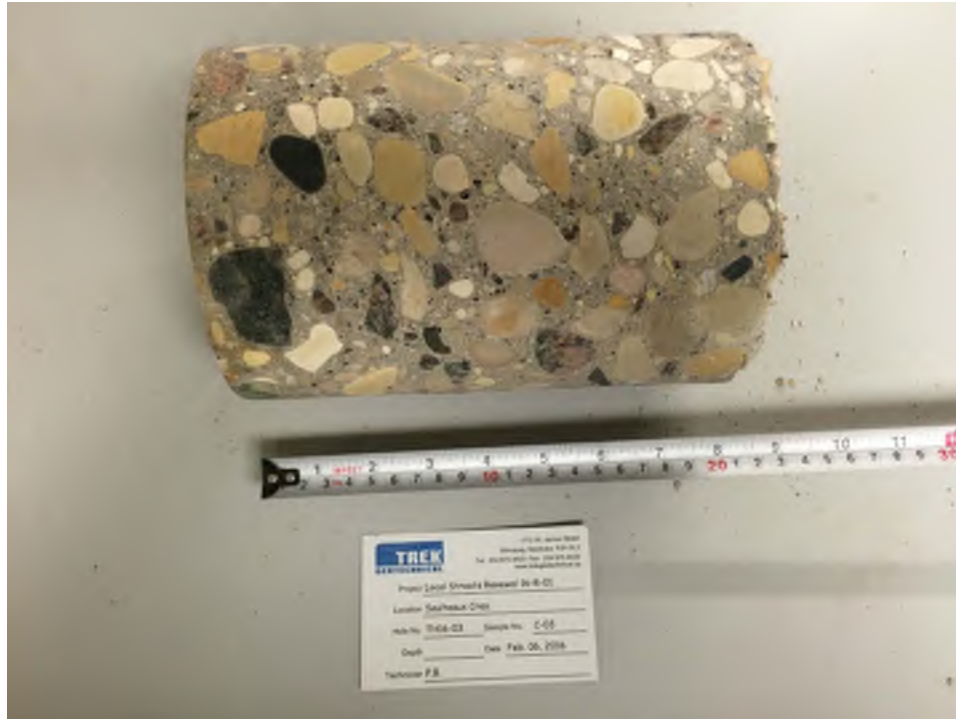


Photo 3: Pavement Core Sample at Test Hole TH16-03



Photo 4: Pavement Core Sample at Test Hole TH16-04



Photo 5: Pavement Core Sample at Test Hole TH16-05



Photo 6: Pavement Core Sample at Test Hole TH16-06



Photo 7: Pavement Core Sample at Test Hole TH16-07



Photo 8: Pavement Core Sample at Test Hole TH16-08

## **Appendix B**

### **Test Hole Logs, Summary Table & Lab Data – De Baets Street**

---



## GENERAL NOTES

- Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions	USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria		Particle Size					
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:  Less than 5 percent..... GW, GP, SW, SP More than 12 percent..... GM, GC, SM, SC 6 to 12 percent..... Borderline cases requiring dual symbols*	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	ASTM Sieve sizes #10 to #4 #40 to #10 #200 to #40 < #200					
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW						
		GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4		Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols				
		GC	Clayey gravels, gravel-sand-silt mixtures		Atterberg limits above "A" line or P.I. greater than 7						
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	mm 2.00 to 4.75 0.425 to 2.00 0.075 to 0.425 < 0.075				
			SP		Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW					
		Sands with fines (Appreciable amount of fines)	SM		Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4		Material Sand Coarse Medium Fine Silt or Clay			
			SC		Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7					
			Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)		Sils and Clays (Liquid limit less than 50)	ML			Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity		Particle Size ASTM Sieve Sizes mm > 300 75 to 300 19 to 75 4.75 to 19 3 in. to 12 in. 3/4 in. to 3 in. #4 to 3/4 in.
						CL			Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
OL	Organic silts and organic silty clays of low plasticity										
Sils and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts		Material Boulders Cobbles Gravel Coarse Fine							
	CH	Inorganic clays of high plasticity, fat clays									
	OH	Organic clays of medium to high plasticity, organic silts									
	Pt	Peat and other highly organic soils									
Highly Organic Soils				Von Post Classification Limit	Strong colour or odour, and often fibrous texture						

\* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

## Other Symbol Types

	Asphalt		Bedrock (undifferentiated)		Cobbles
	Concrete		Limestone Bedrock		Boulders and Cobbles
	Fill		Cemented Shale		Silt Till
			Non-Cemented Shale		Clay Till

### LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)	▽ Water Level at Time of Drilling
PL - Plastic Limit (%)	▼ Water Level at End of Drilling
PI - Plasticity Index (%)	▽ Water Level After Drilling as Indicated on Test Hole Logs
MC - Moisture Content (%)	
SPT - Standard Penetration Test	
RQD- Rock Quality Designation	
Qu - Unconfined Compression	
Su - Undrained Shear Strength	
VW - Vibrating Wire Piezometer	
SI - Slope Inclinometer	

### FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent

### TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>Undrained Shear Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200



# Sub-Surface Log

Test Hole TH16-01

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, De Baets Street **Location:** De Baets Street - Between Paquin Rd. and Camiel Sys St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		CONCRETE - (179mm thick)															
0.1 - 0.4		CLAY AND GRAVEL (FILL) - <10mm dia. gravel, silty, trace sand, brown, frozen, moist and firm when thawed, intermediate plasticity	G01														
0.4 - 0.6		CLAY - silty, some sand - mottled black and brown - frozen to 1.5m, moist and firm when thawed - high plasticity	G02														
0.6 - 1.0		- trace sand below 0.6m	G03														
1.0 - 1.4			G04														
1.4 - 1.6		- stiff below 1.4m	G05														
1.6 - 2.0			G06														
2.0 - 2.4		- trace silt inclusions (<10mm dia.), brown, firm below 1.6m	G07														
2.4 - 2.8			G08														
2.8 - 3.0			G09														
3.0			G10														

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 1.7m at completion of drilling.
- 4) Test hole located at 410 De Baets St., 2.5m east of west curb. U14 (5526798m N, 641384m E).

**Logged By:** Jodi Neumann **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA \_JN.GPJ TREK GEOTECHNICAL GDT. 2/3/16



# Sub-Surface Log

Test Hole TH16-02

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, De Baets Street **Location:** De Baets Street - Between Paquin Rd. and Camiel Sys St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 10 February 2016

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

**Particle Size Legend:** Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		CONCRETE - (197mm thick)															
0.1 - 1.0		CLAY - silty, trace sand inclusions (<5mm dia.), trace gravel (<10mm dia.), some sand - brown - frozen, moist and firm when thawed - high plasticity - trace sand, no gravel, no sand inclusions, dark brown, stiff below 0.3m		G11													
				G12													
				G13													
				G14													
1.0 - 1.7		SILT - clayey, trace sand, trace oxidation - brown - frozen to 1.5m, moist and dense when thawed - low plasticity		G15													
1.7 - 2.0		CLAY - silty, trace silt inclusions (<10mm dia.) - brown - moist, firm to stiff - high plasticity		G16													
2.0 - 2.5				G17													
2.5 - 2.8				G18													
2.8 - 3.0				G19													

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 1.7m at completion of drilling.
- 4) Test hole located at 385 De Baets St., 2.5m west of east curb. U14 (5526885m N, 641344m E).

**Logged By:** Jodi Neumann **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT. 2/3/16



# Sub-Surface Log

Test Hole TH16-03

1 of 1

Client: Morrison Hershfield Project Number: 0035-031-00  
 Project Name: 2016 Local Streets Package 16-R-01, De Baets Street Location: De Baets Street - Between Paquin Rd. and Camiel Sys St.  
 Contractor: Paddock Drilling Ltd. Ground Elevation: Existing Ground  
 Method: 125mm Solid Stem Auger, Brat 22 Truck Mount Date Drilled: 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Undrained Shear Strength (kPa)	
					16	17	18	19
0.0		CONCRETE - (190mm thick)						
0.0 - 0.7		CLAY - silty, trace sand, trace oxidation - mottled black and dark brown - frozen, moist and firm to stiff when thawed - high plasticity	<input type="checkbox"/>	G20				<input checked="" type="checkbox"/> <input type="checkbox"/>
0.7 - 1.0		- firm below 0.7m trace silt inclusions (<15mm dia.), dark brown	<input type="checkbox"/>	G21				<input checked="" type="checkbox"/> <input type="checkbox"/>
1.0 - 1.5		SILT - some clay, trace oxidation - mottled grey and brown - moist, compact, low plasticity	<input type="checkbox"/>	G22				<input checked="" type="checkbox"/> <input type="checkbox"/>
1.5 - 2.3		CLAY - silty, trace silt inclusions (<10mm dia.), trace oxidaton - brown - frozen to 1.5m, moist and stiff to very stiff when thawed - high plasticity	<input type="checkbox"/>	G23				<input checked="" type="checkbox"/> <input type="checkbox"/>
2.3 - 2.5		- stiff below 1.8m	<input type="checkbox"/>	G24				<input checked="" type="checkbox"/> <input type="checkbox"/>
2.5 - 3.0		- firm to stiff below 2.3m	<input type="checkbox"/>	G25				<input checked="" type="checkbox"/> <input type="checkbox"/>
			<input type="checkbox"/>	G26				<input checked="" type="checkbox"/> <input type="checkbox"/>
			<input type="checkbox"/>	G27				<input checked="" type="checkbox"/> <input type="checkbox"/>
			<input type="checkbox"/>	G28				<input checked="" type="checkbox"/> <input type="checkbox"/>

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.3m at completion of drilling.
- 4) Test hole located at 365 De Baets St., 2.5m east of west curb. U14 (5526970m N, 641298m E).

Logged By: Jodi Neumann Reviewed By: Nelson Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT. 2/3/16



# Sub-Surface Log

Test Hole TH16-04

1 of 1

Client: Morrison Hershfield Project Number: 0035-031-00  
 Project Name: 2016 Local Streets Package 16-R-01, De Baets Street Location: De Baets Street - Between Paquin Rd. and Camiel Sys St.  
 Contractor: Paddock Drilling Ltd. Ground Elevation: Existing Ground  
 Method: 125mm Solid Stem Auger, Brat 22 Truck Mount Date Drilled: 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0		CONCRETE - (192mm thick)															
0.0		CLAY AND GRAVEL (FILL) - <15mm dia. gravel, silty, trace sand, brown, frozen, moist and firm when thawed, intermediate plasticity		G29													
0.2		CLAY - silty, trace coarse sand - dark brown - frozen to 1.5m, moist and firm to stiff when thawed - high plasticity		G30													
0.4		- brown		G31													
0.8		- trace silt inclusions (<20mm dia.) below 0.8m		G32													
1.0				G33													
1.5		- SILT seam (<25mm thick) at 1.5m - trace silt inclusions (<10mm dia.), trace oxidaton below 1.5m															
2.0				G34													
2.2				G35													
2.4				G36													
3.0				G37													

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.3m at completion of drilling.
- 4) Test hole located at 345 De Baets St., 2.5m west of east curb. U14 (5527070m N, 641256m E).

Logged By: Jodi Neumann Reviewed By: Nelson Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-05

1 of 1

Client: Morrison Hershfield Project Number: 0035-031-00  
 Project Name: 2016 Local Streets Package 16-R-01, De Baets Street Location: De Baets Street - Between Paquin Rd. and Camiel Sys St.  
 Contractor: Paddock Drilling Ltd. Ground Elevation: Existing Ground  
 Method: 125mm Solid Stem Auger, Brat 22 Truck Mount Date Drilled: 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0		CONCRETE - (190mm thick)															
0.0		CLAY AND GRAVEL (FILL) - <10mm dia. gravel, silty, trace sand, brown, frozen, moist and firm when thawed, intermediate plasticity		G38													
0.0		CLAY - silty, trace gravel (<10mm dia.), trace to some sand, trace oxidation - mottled brown and black - frozen to 1.5m, moist and stiff when thawed - high plasticity		G39													
0.5		trace sand, dark brown, firm to stiff		G40													
0.5				G41													
0.5				G42													
1.5		- brown, trace silt inclusions (<10mm dia.) below 1.5m		G43													
2.0		- stiff below 1.8m		G44													
2.5		- firm to stiff below 2.4m		G45													
2.5				G46													
2.5				G47													

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.4m at completion of drilling.
- 4) Test hole located at 310 De Baets St., 2.5m east of west curb. U14 (5527152m N, 641208m E).

Logged By: Jodi Neumann Reviewed By: Nelson Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT 2/3/16



# Sub-Surface Log

Test Hole TH16-06

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, De Baets Street **Location:** De Baets Street - Between Paquin Rd. and Camiel Sys St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )					Undrained Shear Strength (kPa)							
					16	17	18	19	20	21	Test Type						
					Particle Size (%)												
					0	20	40	60	80	100							
					PL   MC   LL 0 20 40 60 80 100												
					0 50 100 150 200 250												
0.0 - 0.1		CONCRETE - (210mm thick)															
0.1 - 0.5		CLAY - silty, trace to some sand, some gravel (<20mm dia.), trace clay - brown - frozen to 1.5m, moist and soft to firm when thawed - intermediate plasticity - no gravel, dark brown, high plasticity below 0.5m		G48													
0.5 - 1.0		- trace silt inclusions (<3mm dia.), trace oxidaton, below 0.8m		G49													
1.0 - 1.5				G50													
1.5 - 2.0				G51													
2.0 - 2.5		- brown, stiff to very stiff below 1.8m		G52													
2.5 - 3.0		- firm to stiff below 2.1m		G53													
				G54													
				G55													
				G56													

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 1.7m at completion of drilling.
- 4) Test hole located at 275 De Baets St., 2.5m west of east curb. U14 (5527230m N, 641164m E).

**Logged By:** Jodi Neumann **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA \_JN.GPJ TREK GEOTECHNICAL GDT 2/3/16





# Sub-Surface Log

Test Hole TH16-07

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, De Baets Street **Location:** De Baets Street - Between Paquin Rd. and Camiel Sys St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		CONCRETE - (160mm thick)															
0.1 - 0.5		SAND AND GRAVEL (FILL) - <20mm dia. gravel, silty - brown - frozen, moist and compact when thawed - well graded		G57													
0.5 - 1.4		CLAY - silty, trace silt inclusions (<5mm dia.), trace oxidation - mottled black and brown - frozen, moist and soft to firm when thawed - high plasticity		G58													
				G59													
				G60													
1.4 - 2.1		- firm to stiff below 1.4m		G61													
				G62													
2.1 - 3.0		- brown below 2.1m		G63													
				G64													
				G65													

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.1m at completion of drilling.
- 4) Test hole located at 275 De Baets St., 2.5m east of west curb. U14 (5527290m N, 641082m E).

**Logged By:** Jodi Neumann **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA \_JN.GPJ TREK GEOTECHNICAL GDT. 2/3/16



# Sub-Surface Log

Test Hole TH16-08

1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035-031-00  
**Project Name:** 2016 Local Streets Package 16-R-01, De Baets Street **Location:** De Baets Street - Between Paquin Rd. and Camiel Sys St.  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** Existing Ground  
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount **Date Drilled:** 10 February 2016

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS)  Split Barrel (SB)  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m <sup>3</sup> )		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		CONCRETE - (175mm thick)															
0.1 - 0.2		GRAVEL (FILL) - <20mm dia. gravel, some sand, trace silt, brown, frozen, moist and compact when thawed, well graded, sub angular to angular	<input checked="" type="checkbox"/>	G66													
0.2 - 0.3		CLAY - silty, trace sand - dark brown - frozen to 1.5m, moist and firm when thawed - high plasticity	<input checked="" type="checkbox"/>	G67													
0.3 - 0.4		- trace oxidation, brown below 0.6m	<input checked="" type="checkbox"/>	G68													
0.4 - 0.5			<input checked="" type="checkbox"/>	G69													
0.5 - 0.6			<input checked="" type="checkbox"/>	G70													
0.6 - 0.7		- stiff below 1.2m	<input checked="" type="checkbox"/>	G71													
0.7 - 0.8		- trace silt inclusions (<10mm dia.), light brown below 1.5m	<input checked="" type="checkbox"/>	G72													
0.8 - 0.9			<input checked="" type="checkbox"/>	G73													
0.9 - 1.0		- SILT seam (<50mm thick) at 1.7m - stiff to very stiff below 1.8m	<input checked="" type="checkbox"/>	G74													
1.0 - 1.1			<input checked="" type="checkbox"/>														
1.1 - 1.2			<input checked="" type="checkbox"/>														
1.2 - 1.3			<input checked="" type="checkbox"/>														
1.3 - 1.4			<input checked="" type="checkbox"/>														
1.4 - 1.5			<input checked="" type="checkbox"/>														
1.5 - 1.6			<input checked="" type="checkbox"/>														
1.6 - 1.7			<input checked="" type="checkbox"/>														
1.7 - 1.8			<input checked="" type="checkbox"/>														
1.8 - 1.9			<input checked="" type="checkbox"/>														
1.9 - 2.0			<input checked="" type="checkbox"/>														
2.0 - 2.1			<input checked="" type="checkbox"/>														
2.1 - 2.2			<input checked="" type="checkbox"/>														
2.2 - 2.3			<input checked="" type="checkbox"/>														
2.3 - 2.4			<input checked="" type="checkbox"/>														
2.4 - 2.5			<input checked="" type="checkbox"/>														
2.5 - 2.6			<input checked="" type="checkbox"/>														
2.6 - 2.7			<input checked="" type="checkbox"/>														
2.7 - 2.8			<input checked="" type="checkbox"/>														
2.8 - 2.9			<input checked="" type="checkbox"/>														
2.9 - 3.0			<input checked="" type="checkbox"/>														

End of Hole at 3.0m in CLAY

Notes:

- 1) No sloughing or seepage.
- 2) Test hole backfilled with auger cuttings, bentonite, sand and cold patch asphalt.
- 3) Test hole open to 2.1m at completion of drilling.
- 4) Test hole located at 235 De Baets St., 2.5m west of east curb. U14 (5527341m N, 641003m E).

**Logged By:** Jodi Neumann **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2016-02-24 LOCAL STREETS PKG. 16-R-01 DE BAETS 0035-031-00 REVA\_IN.GPJ TREK GEOTECHNICAL GDT. 2/3/16



**2016 Local Streets Package 16-R-01**  
**Sub-Surface Investigation**  
**De Baets Street**

Test Hole No.	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)		Moisture Content (%)	Grain Size Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)		Top (m)	Bottom (m)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic	Liquid	Plasticity Index	
TH16-01	UTM: 14U 5526798 N, 641384 E 2.5m east of west curb of De Baets St. At building with street address 410 De Baets St.	N/A		CONCRETE													
						CLAY AND GRAVEL (FILL)	0.2	0.2	18								
						CLAY	0.3	0.5	35	0	14	28	58	19	70	51	
						CLAY	0.6	0.8	42								
						CLAY	0.8	0.9	34								
						CLAY	1.1	1.2	33								
						CLAY	1.4	1.5	34								
						CLAY	1.8	2.0	48								
						CLAY	2.1	2.3	45								
TH16-02	UTM: 14U 5526885 N, 641344 E 2.5m west of east curb of De Baets St. At building with street address 385 De Baets St.	N/A		CONCRETE	197												
						CLAY	0.2	0.3	29								
						CLAY	0.3	0.5	37								
						CLAY	0.5	0.6	32								
						CLAY	0.8	0.9	30								
						SILT	1.1	1.4	19	0	4	75	21	15	30	15	
						SILT	1.7	1.8	24								
						CLAY	2.1	2.3	51								
						CLAY	2.4	2.6	53								
TH16-03	UTM: 14U 5526970 N, 641298 E 2.5m east of west curb of De Baets St. At building with street address 365 De Baets St.	N/A		CONCRETE	190												
						CLAY (FILL)	0.3	0.5	34								
						CLAY	0.5	0.6	32								
						CLAY	0.8	0.9	37								
						CLAY	0.9	1.1	33	0	7	30	63	24	71	47	
						SILT	1.2	1.4	22								
						CLAY	1.5	1.7	45								
						CLAY	1.8	2.0	50								
						CLAY	2.3	2.4	52								
				CLAY	2.9	3.0	47										







**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Sample Date** 11-Feb-16  
**Test Date** 17-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-01	TH16-01	TH16-01	TH16-01	TH16-01	TH16-01
Depth (m)	0.2 - 0.2	0.3 - 0.5	0.6 - 0.8	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5
Sample #	G1	G2	G3	G4	G5	G6
Tare ID	AB23	P37	AB16	AB29	AB28	AB37
Mass of tare	6.5	8.4	6.8	6.7	6.9	6.7
Mass wet + tare	180.2	305.6	278.7	276.0	277.1	288.4
Mass dry + tare	153.2	229.2	198.9	207.8	210.4	217.5
Mass water	27.0	76.4	79.8	68.2	66.7	70.9
Mass dry soil	146.7	220.8	192.1	201.1	203.5	210.8
Moisture %	18.4%	34.6%	41.5%	33.9%	32.8%	33.6%

Test Pit	TH16-01	TH16-01	TH16-01	TH16-01	TH16-02	TH16-02
Depth (m)	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	2.7 - 2.9	0.2 - 0.3	0.3 - 0.5
Sample #	G7	G8	G9	G10	G11	G12
Tare ID	AB35	AB22	AB33	AB36	Z123	AC19
Mass of tare	6.8	6.7	6.7	6.7	8.5	6.7
Mass wet + tare	325.455	275.3	277.5	288.6	181	254.2
Mass dry + tare	222.2	192.0	191.5	192.9	142.4	187.2
Mass water	103.3	83.3	86.0	95.7	38.6	67.0
Mass dry soil	215.4	185.3	184.8	186.2	133.9	180.5
Moisture %	47.9%	45.0%	46.5%	51.4%	28.8%	37.1%

Test Pit	TH16-02	TH16-02	TH16-02	TH16-02	TH16-02	TH16-02
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.4	1.7 - 1.8	2.1 - 2.3	2.4 - 2.6
Sample #	G13	G14	G15	G16	G17	G18
Tare ID	AB24	AA07	AA95	AB95	AA04	AA27
Mass of tare	6.9	6.7	6.7	6.8	7.0	6.8
Mass wet + tare	256.7	297.4	316.3	333.5	274.3	289.3
Mass dry + tare	195.7	229.7	267.8	269.6	183.6	191.1
Mass water	61.0	67.7	48.5	63.9	90.7	98.2
Mass dry soil	188.8	223.0	261.1	262.8	176.6	184.3
Moisture %	32.3%	30.4%	18.6%	24.3%	51.4%	53.3%



**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Sample Date** 11-Feb-16  
**Test Date** 17-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-02	TH16-03	TH16-03	TH16-03	TH16-03	TH16-03
Depth (m)	2.7 - 2.9	0.3 - 0.5	0.5 - 0.6	0.8 - 0.9	0.9 - 1.1	1.2 - 1.4
Sample #	G19	G20	G21	G22	G23	G24
Tare ID	AA08	E90	F73	AB07	AC15	AC12
Mass of tare	6.7	9.0	8.8	6.9	7.0	6.7
Mass wet + tare	267.3	280.0	266.4	254.4	282.3	284.5
Mass dry + tare	175.8	211.3	204.4	187.7	213.6	235.4
Mass water	91.5	68.7	62.0	66.7	68.7	49.1
Mass dry soil	169.1	202.3	195.6	180.8	206.6	228.7
Moisture %	54.1%	34.0%	31.7%	36.9%	33.3%	21.5%

Test Pit	TH16-03	TH16-03	TH16-03	TH16-03	TH16-04	TH16-04
Depth (m)	1.5 - 1.7	1.8 - 2.0	2.3 - 2.4	2.9 - 3.0	0.2 - 0.2	0.3 - 0.5
Sample #	G25	G26	G27	G28	G29	G30
Tare ID	AC13	AC09	Z47	D38	AC10	AC08
Mass of tare	6.8	6.8	8.9	8.8	6.7	6.8
Mass wet + tare	262.7	290.3	257.2	274.3	243.3	261.4
Mass dry + tare	182.9	195.6	172.2	189.9	209.0	198.5
Mass water	79.8	94.7	85.0	84.4	34.3	62.9
Mass dry soil	176.1	188.8	163.3	181.1	202.3	191.7
Moisture %	45.3%	50.2%	52.1%	46.6%	17.0%	32.8%

Test Pit	TH16-04	TH16-04	TH16-04	TH16-04	TH16-04	TH16-04
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6
Sample #	G31	G32	G33	G34	G35	G36
Tare ID	AB11	AC39	AC29	Z35	AB99	AB93
Mass of tare	6.8	6.8	6.7	8.7	7.0	6.9
Mass wet + tare	268.3	296.2	267.9	301.9	287.9	281.8
Mass dry + tare	206.9	221.0	200.5	210.5	195.1	190.0
Mass water	61.4	75.2	67.4	91.4	92.8	91.8
Mass dry soil	200.1	214.2	193.8	201.8	188.1	183.1
Moisture %	30.7%	35.1%	34.8%	45.3%	49.3%	50.1%



**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Sample Date** 11-Feb-16  
**Test Date** 17-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-04	TH16-05	TH16-05	TH16-05	TH16-05	TH16-05
Depth (m)	2.9 - 3.0	0.2 - 0.2	0.3 - 0.5	0.6 - 0.8	0.8 - 0.9	0.9 - 1.1
Sample #	G37	G38	G39	G40	G41	G42
Tare ID	AA05	AA19	F48	Z60	N16	A13
Mass of tare	6.8	6.7	8.8	8.6	8.9	8.5
Mass wet + tare	272.5	204.3	270.8	283.6	254.9	291.0
Mass dry + tare	179.5	176.2	215.6	216.0	185.4	215.3
Mass water	93.0	28.1	55.2	67.6	69.5	75.7
Mass dry soil	172.7	169.5	206.8	207.4	176.5	206.8
Moisture %	53.9%	16.6%	26.7%	32.6%	39.4%	36.6%

Test Pit	TH16-05	TH16-05	TH16-05	TH16-05	TH16-05	TH16-06
Depth (m)	1.4 - 1.5	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	2.7 - 2.9	0.2 - 0.3
Sample #	G43	G44	G45	G46	G47	G48
Tare ID	AC02	AC01	AA18	E31	F145	C15
Mass of tare	6.9	6.9	7.0	8.7	9.0	8.7
Mass wet + tare	295.3	263.5	271.0	276.0	275.0	289.9
Mass dry + tare	210.9	185.6	186.4	183.7	179.1	254.9
Mass water	84.4	77.9	84.6	92.3	95.9	35.0
Mass dry soil	204.0	178.7	179.4	175.0	170.1	246.2
Moisture %	41.4%	43.6%	47.2%	52.7%	56.4%	14.2%

Test Pit	TH16-06	TH16-06	TH16-06	TH16-06	TH16-06	TH16-06
Depth (m)	0.3 - 0.5	0.6 - 0.8	0.8 - 0.9	1.2 - 1.4	1.8 - 2.0	2.1 - 2.3
Sample #	G49	G50	G51	G52	G53	G54
Tare ID	W50	Z22	P40	H45	F132	K23
Mass of tare	8.4	8.4	8.8	8.9	8.9	8.5
Mass wet + tare	316.0	276.0	253.9	271.9	273.4	281.7
Mass dry + tare	275.8	197.2	185.7	208.5	189.5	184.7
Mass water	40.2	78.8	68.2	63.4	83.9	97.0
Mass dry soil	267.4	188.8	176.9	199.6	180.6	176.2
Moisture %	15.0%	41.7%	38.6%	31.8%	46.5%	55.1%





www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street  
  
**Sample Date** 11-Feb-16  
**Test Date** 17-Feb-16  
**Technician** L.I. / J.B.

Test Pit	TH16-06	TH16-06	TH16-07	TH16-07	TH16-07	TH16-07
Depth (m)	2.4 - 2.6	2.7 - 2.9	0.2 - 0.5	0.5 - 0.6	0.6 - 0.8	0.9 - 1.1
Sample #	G55	G56	G57	G58	G59	G60
Tare ID	C10	P18	F116	N74	N76	W20
Mass of tare	8.5	8.4	8.4	8.6	8.5	8.3
Mass wet + tare	280.1	291.7	278.9	276.1	305.2	302.2
Mass dry + tare	185.0	196.4	266.0	204.3	225.9	210.4
Mass water	95.1	95.3	12.9	71.8	79.3	91.8
Mass dry soil	176.5	188.0	257.6	195.7	217.4	202.1
Moisture %	53.9%	50.7%	5.0%	36.7%	36.5%	45.4%

Test Pit	TH16-07	TH16-07	TH16-07	TH16-07	TH16-07	TH16-08
Depth (m)	1.4 - 1.5	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	2.7 - 2.9	0.2 - 0.2
Sample #	G61	G62	G63	G64	G65	G66
Tare ID	AA24	Z126	Z32	AA22	AC06	F3
Mass of tare	6.6	8.4	8.9	6.6	6.6	8.4
Mass wet + tare	349.0	314.3	304.9	315.7	303.8	70.7
Mass dry + tare	258.5	216.5	200.5	206.9	203.2	60.7
Mass water	90.5	97.8	104.4	108.8	100.6	10.0
Mass dry soil	251.9	208.1	191.6	200.3	196.6	52.3
Moisture %	35.9%	47.0%	54.5%	54.3%	51.2%	19.1%

Test Pit	TH16-08	TH16-08	TH16-08	TH16-08	TH16-08	TH16-08
Depth (m)	0.3 - 0.5	0.5 - 0.6	0.7 - 0.9	1.2 - 1.4	1.8 - 2.0	2.1 - 2.3
Sample #	G67	G68	G69	G70	G71	G72
Tare ID	Z63	W13	F64	N44	N89	AB63
Mass of tare	8.4	8.4	8.5	8.5	8.3	6.9
Mass wet + tare	279.5	273.4	284.3	297.8	289.3	330.0
Mass dry + tare	206.2	209.0	213.2	218.5	196.9	219.7
Mass water	73.3	64.4	71.1	79.3	92.4	110.3
Mass dry soil	197.8	200.6	204.7	210.0	188.6	212.8
Moisture %	37.1%	32.1%	34.7%	37.8%	49.0%	51.8%



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report  
 ASTM D2216-98**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Sample Date** 11-Feb-16  
**Test Date** 17-Feb-16  
**Technician** L.I. / J.B.

<b>Test Pit</b>	TH16-08	TH16-08				
<b>Depth (m)</b>	2.4 - 2.6	2.7 - 2.9				
<b>Sample #</b>	G73	G74				
<b>Tare ID</b>	D39	D43				
<b>Mass of tare</b>	8.3	8.5				
<b>Mass wet + tare</b>	285.9	279.4				
<b>Mass dry + tare</b>	192.4	186.4				
<b>Mass water</b>	93.5	93.0				
<b>Mass dry soil</b>	184.1	177.9				
<b>Moisture %</b>	50.8%	52.3%				

<b>Test Pit</b>						
<b>Depth (m)</b>						
<b>Sample #</b>						
<b>Tare ID</b>						
<b>Mass of tare</b>						
<b>Mass wet + tare</b>						
<b>Mass dry + tare</b>						
<b>Mass water</b>						
<b>Mass dry soil</b>						
<b>Moisture %</b>						

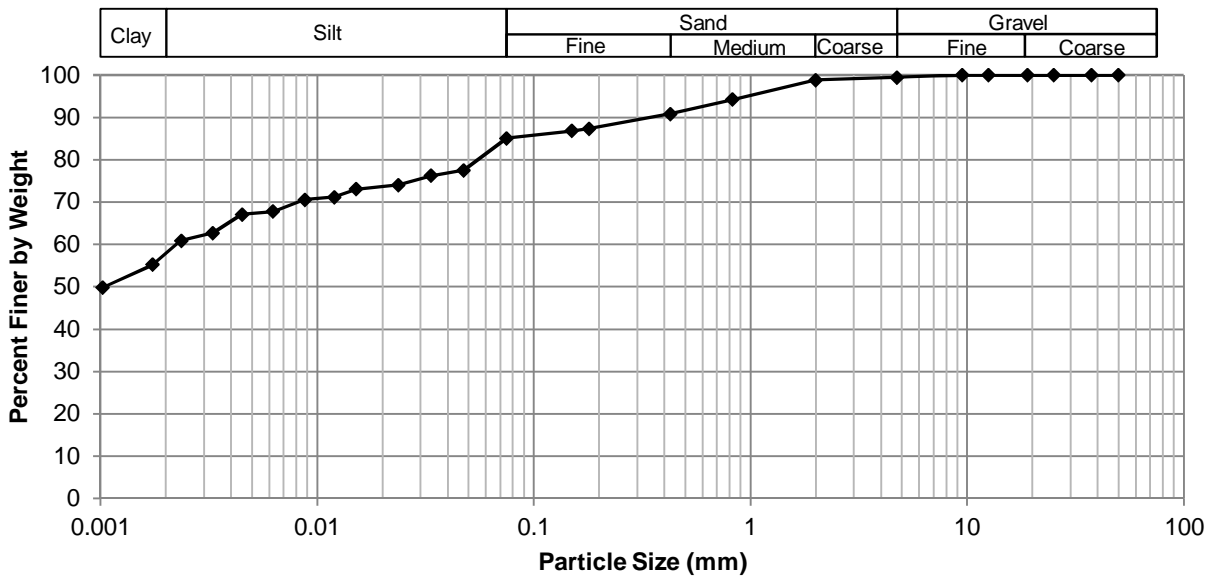


**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-01  
**Sample #** G02  
**Depth (m)** 0.3 - 0.5  
**Sample Date** 11-Feb-16  
**Test Date** 25-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.6%
<b>Sand</b>	14.3%
<b>Silt</b>	27.5%
<b>Clay</b>	57.7%

**Particle Size Distribution Curve**



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	99.44	0.0750	85.08
37.5	100.00	2.00	98.80	0.0475	77.49
25.0	100.00	0.825	94.25	0.0336	76.24
19.0	100.00	0.425	90.82	0.0237	74.04
12.5	100.00	0.180	87.33	0.0152	73.10
9.50	100.00	0.150	86.83	0.0120	71.22
4.75	99.44	0.075	85.08	0.0088	70.59
				0.0062	67.77
				0.0045	67.14
				0.0033	62.75
				0.0024	60.91
				0.0017	55.26
				0.0010	49.85



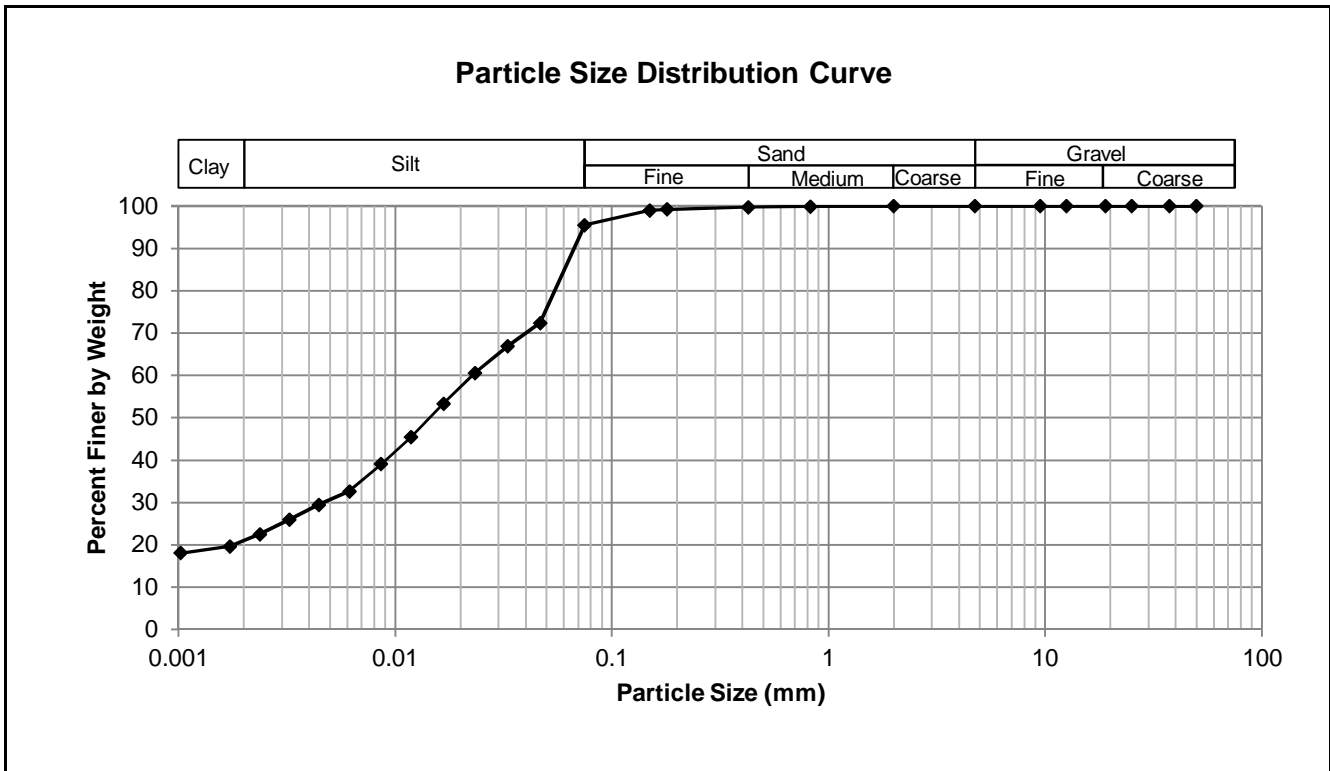
www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Grain Size Analysis (Hydrometer Method)**  
**ASTM D422**

**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-02  
**Sample #** G15  
**Depth (m)** 1.1 - 1.4  
**Sample Date** 11-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.0%
<b>Sand</b>	4.5%
<b>Silt</b>	74.6%
<b>Clay</b>	20.9%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	95.52
37.5	100.00	2.00	100.00	0.0468	72.38
25.0	100.00	0.825	99.89	0.0331	66.98
19.0	100.00	0.425	99.73	0.0234	60.63
12.5	100.00	0.180	99.19	0.0167	53.32
9.50	100.00	0.150	99.01	0.0118	45.38
4.75	100.00	0.075	95.52	0.0086	39.03
				0.0062	32.68
				0.0044	29.51
				0.0033	26.00
				0.0024	22.51
				0.0017	19.68
				0.0010	18.06

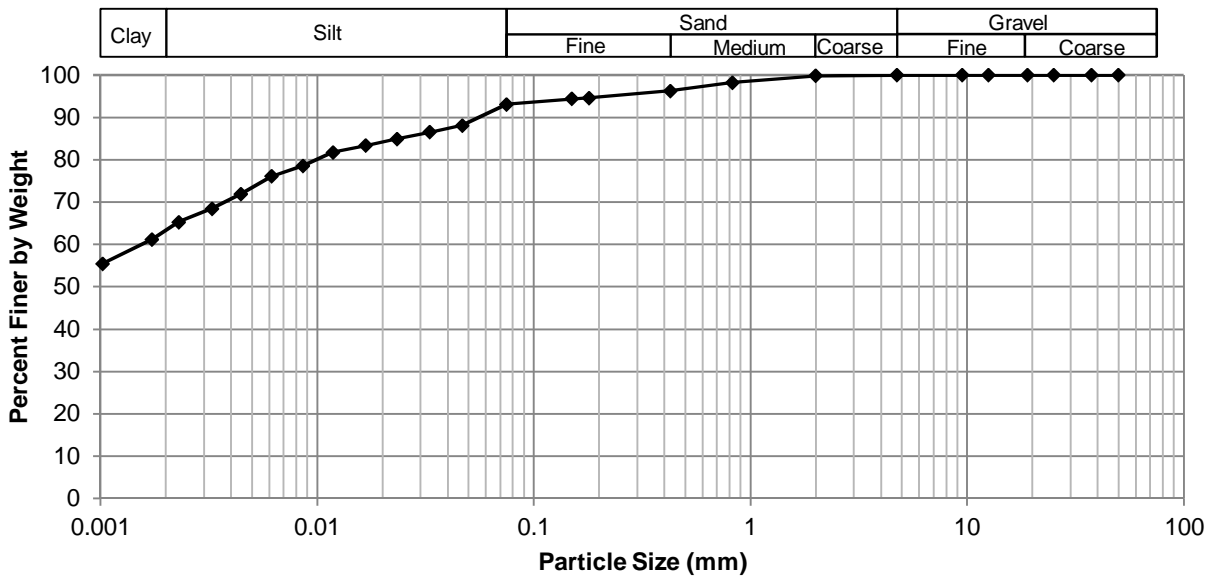


**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-03  
**Sample #** G23  
**Depth (m)** 0.9 - 1.1  
**Sample Date** 11-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI JB

<b>Gravel</b>	0.0%
<b>Sand</b>	6.9%
<b>Silt</b>	30.0%
<b>Clay</b>	63.2%

**Particle Size Distribution Curve**



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	93.12
37.5	100.00	2.00	99.85	0.0468	88.13
25.0	100.00	0.825	98.26	0.0331	86.54
19.0	100.00	0.425	96.24	0.0234	84.96
12.5	100.00	0.180	94.63	0.0167	83.37
9.50	100.00	0.150	94.41	0.0118	81.78
4.75	100.00	0.075	93.12	0.0086	78.61
				0.0062	76.08
				0.0044	71.94
				0.0033	68.46
				0.0023	65.29
				0.0017	61.19
				0.0010	55.45



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

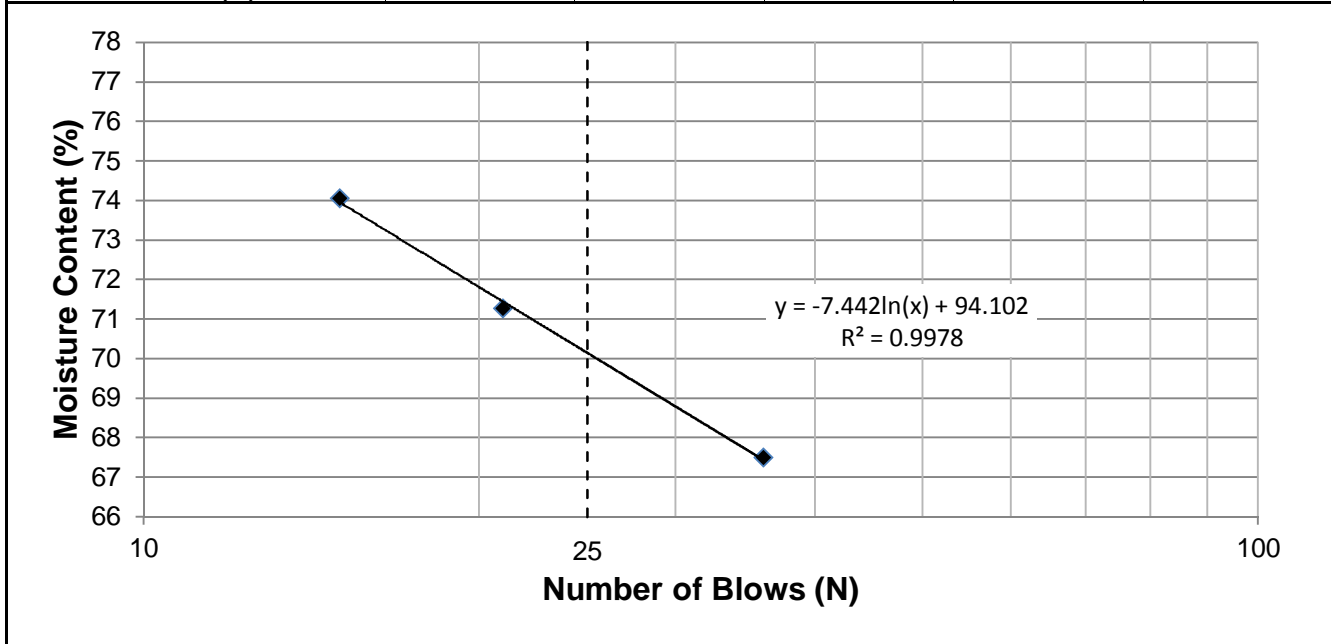
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-02  
**Sample #** G02  
**Depth (m)** 0.304 - 0.457  
**Sample Date** 10-Feb-16  
**Test Date** 25-Feb-16  
**Technician** LI

<b>Liquid Limit</b>	70
<b>Plastic Limit</b>	19
<b>Plasticity Index</b>	51

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	36	21	15		
<b>Mass Wet Soil + Tare (g)</b>	25.890	23.714	26.926		
<b>Mass Dry Soil + Tare (g)</b>	21.090	19.676	21.485		
<b>Mass Tare (g)</b>	13.979	14.010	14.138		
<b>Mass Water (g)</b>	4.800	4.038	5.441		
<b>Mass Dry Soil (g)</b>	7.111	5.666	7.347		
<b>Moisture Content (%)</b>	67.501	71.267	74.057		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	16.922	17.704			
<b>Mass Dry Soil + Tare (g)</b>	16.486	17.100			
<b>Mass Tare (g)</b>	14.114	13.959			
<b>Mass Water (g)</b>	0.436	0.604			
<b>Mass Dry Soil (g)</b>	2.372	3.141			
<b>Moisture Content (%)</b>	18.381	19.230			



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

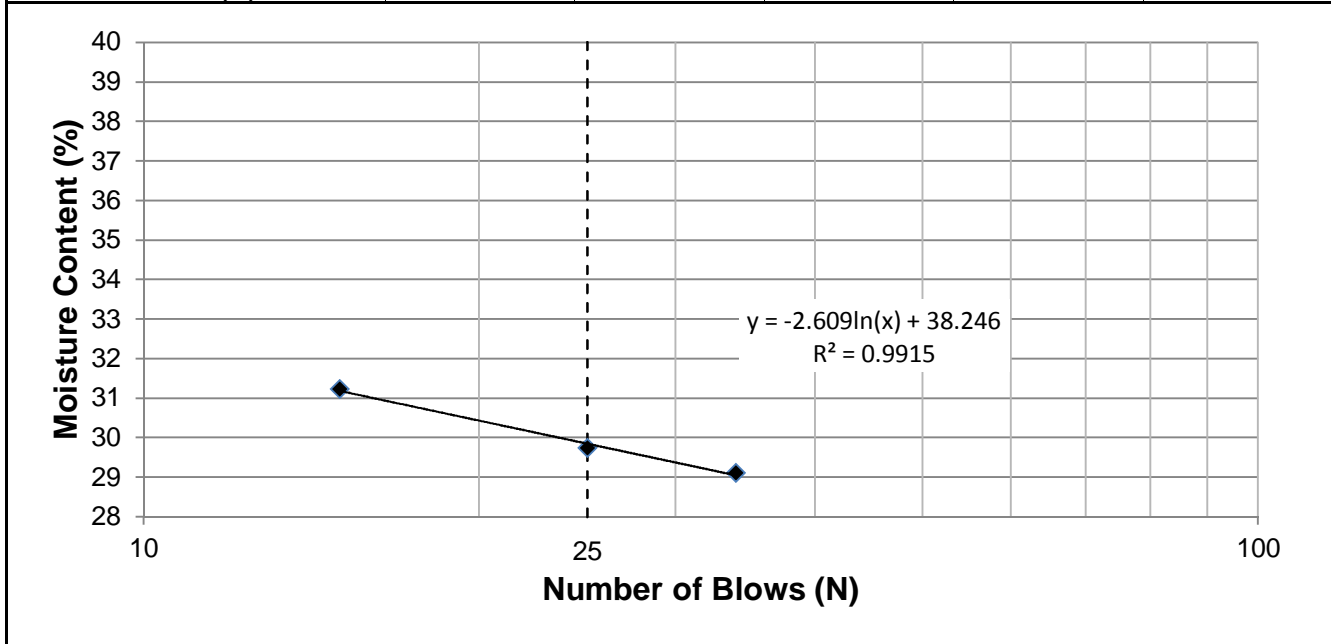
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-02  
**Sample #** G15  
**Depth (m)** 1.1 - 1.4  
**Sample Date** 10-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI/JB

<b>Liquid Limit</b>	30
<b>Plastic Limit</b>	15
<b>Plasticity Index</b>	15

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	15	25	34		
<b>Mass Wet Soil + Tare (g)</b>	29.424	28.984	26.856		
<b>Mass Dry Soil + Tare (g)</b>	25.779	25.578	23.986		
<b>Mass Tare (g)</b>	14.105	14.123	14.129		
<b>Mass Water (g)</b>	3.645	3.406	2.870		
<b>Mass Dry Soil (g)</b>	11.674	11.455	9.857		
<b>Moisture Content (%)</b>	31.223	29.734	29.116		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	17.903	16.197	23.373		
<b>Mass Dry Soil + Tare (g)</b>	17.410	15.922	22.104		
<b>Mass Tare (g)</b>	14.019	14.146	14.079		
<b>Mass Water (g)</b>	0.493	0.275	1.269		
<b>Mass Dry Soil (g)</b>	3.391	1.776	8.025		
<b>Moisture Content (%)</b>	14.538	15.484	15.813		



www.trekgeotechnical.ca  
 1712 St. James Street  
 Winnipeg, MB R3H 0L3  
 Tel: 204.975.9433 Fax: 204.975.9435

**Atterberg Limits  
 ASTM D4318**

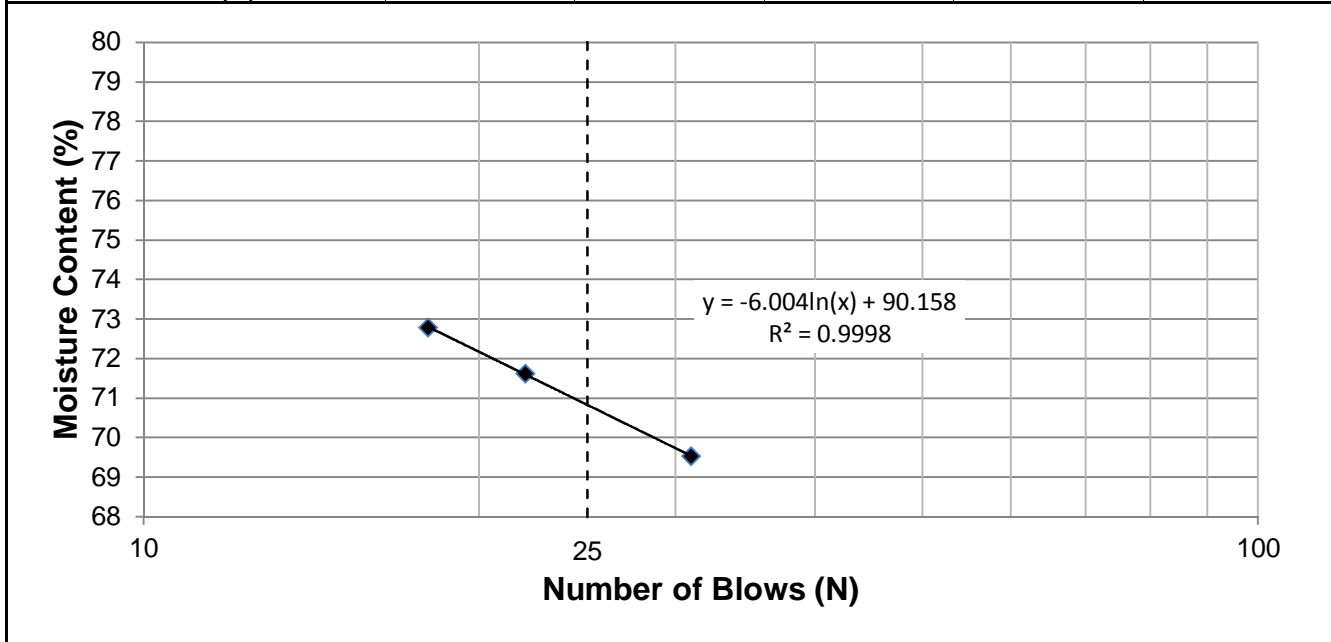
**Project No.** 0035-031-00  
**Client** Morrison Hershfield  
**Project** 2016 Local Streets Package 16-R-01, De Baets Street

**Test Hole** TH16-03  
**Sample #** G23  
**Depth (m)** 0.9 - 1.1  
**Sample Date** 10-Feb-16  
**Test Date** 22-Feb-16  
**Technician** LI/JB

<b>Liquid Limit</b>	71
<b>Plastic Limit</b>	24
<b>Plasticity Index</b>	47

**Liquid Limit**

Trial #	1	2	3	4	5
<b>Number of Blows (N)</b>	18	22	31		
<b>Mass Wet Soil + Tare (g)</b>	26.310	26.776	27.235		
<b>Mass Dry Soil + Tare (g)</b>	21.129	21.413	21.916		
<b>Mass Tare (g)</b>	14.011	13.925	14.266		
<b>Mass Water (g)</b>	5.181	5.363	5.319		
<b>Mass Dry Soil (g)</b>	7.118	7.488	7.650		
<b>Moisture Content (%)</b>	72.787	71.621	69.529		



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Wet Soil + Tare (g)</b>	22.316	20.896			
<b>Mass Dry Soil + Tare (g)</b>	20.839	19.649			
<b>Mass Tare (g)</b>	14.336	14.589			
<b>Mass Water (g)</b>	1.477	1.247			
<b>Mass Dry Soil (g)</b>	6.503	5.060			
<b>Moisture Content (%)</b>	22.713	24.644			





Photo 1: Pavement Core Sample at Test Hole TH16-01



Photo 2: Pavement Core Sample at Test Hole TH16-02



Photo 3: Pavement Core Sample at Test Hole TH16-03



Photo 4: Pavement Core Sample at Test Hole TH16-04



Photo 5: Pavement Core Sample at Test Hole TH16-05



Photo 6: Pavement Core Sample at Test Hole TH16-06



Photo 7: Pavement Core Sample at Test Hole TH16-07



Photo 8: Pavement Core Sample at Test Hole TH16-08  
(core had to be broken off during coring)