



**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
**Public Works Government Services Canada- Bid**  
**Receiving / Réception des soumissions**  
**189 Prince William Street**  
**Room 405**  
**Saint John**  
**New Brunswick**  
**E2L 2B9**

## SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

### Comments - Commentaires

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du**  
**fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
**Public Works Government Services Canada- Bid**  
**Receiving / Réception des soumissions**  
**189 Prince William Street**  
**Room 405**  
**Saint John**  
**New Bruns**  
**E2L 2B9**

<b>Title - Sujet</b> Multipurpose Bldg, South Esk,NB	
<b>Solicitation No. - N° de l'invitation</b> EC015-170349/A	<b>Amendment No. - N° modif.</b> 007
<b>Client Reference No. - N° de référence du client</b> R.077932.001	<b>Date</b> 2016-07-06
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$PWB-004-3897	
<b>File No. - N° de dossier</b> PWB-6-39023 (004)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2016-07-08</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Atlantic Daylight Saving Time ADT
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Doucet, Gisele PWB	<b>Buyer Id - Id de l'acheteur</b> pwb004
<b>Telephone No. - N° de téléphone</b> (506) 636-4541 ( )	<b>FAX No. - N° de FAX</b> (506) 636-4376
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Solicitation No. - N° de l'invitation

EC015-170349 /A

Client Ref. No. - N° de réf. du client

R.077932.001

Amd. No. - N° de la modif.

007

File No. - N° du dossier

PWB-6-39023

Buyer ID - Id de l'acheteur

pwb004

CCC No./N° CCC - FMS No./N° VME

Cette modification à l'invitation numéro sept (7) est soumise pour inclure l'addenda numéro 7 suivant.

La modification qui suit apportée aux documents de soumission entre en vigueur dès maintenant. L'addenda fera partie des documents de contrat.

Toutes autres conditions ne changent pas.

Addenda numéro 7.

## **1. SPECIFICATION**

**DELETE:** Section 01 00 01, 1.16 Hazardous Material Assessment Report.

## **QUESTIONS AND ANSWERS**

Q1 We assume that the site work portion of the work can be distributed in either "Lump Sum price for all work associated to the Construction of a Multi Function Building in accordance with the Plans and Specifications" or "Lump Sum price for all work associated with the Reconstruction of the Existing Building in accordance with the Plans and Specifications". Please advise if otherwise.

A1 The site work portion of the work is to be included in the "Lump Sum price for all work associated to the Construction of a Multi Function Building in accordance with the Plans and Specifications"

Q2 We assume that the "Alternate Bid Items" shown on the drawings are not to be included in this bid submission and are not to be included in either "Lump Sum price for all work associated to the Construction of a Multi Function Building in accordance with the Plans and Specifications" or "Lump Sum price for all work associated with the Reconstruction of the Existing Building in accordance with the Plans and Specifications". Please advise if otherwise.

A2 "Alternate Bid Items" shown on the drawings are to be included in the "Lump Sum price for all work associated to the Construction of a Multi Function Building in accordance with the Plans and Specifications"

Q3 The Hazardous Material Assessment Report as indicated in Section 01 00 01 Item 1.16. Could you please forward that to us?

A3 See item 1 of this addendum no. 7.

Solicitation No. - N° de l'invitation

EC015-170349 /A

Client Ref. No. - N° de réf. du client

R.077932.001

Amd. No. - N° de la modif.

007

File No. - N° du dossier

PWB-6-39023

Buyer ID - Id de l'acheteur

pwb004

CCC No./N° CCC - FMS No./N° VME

Q4 Item 4 on drawing C001 – Soils Report, could you please forward that to us as well?

A4 See attached Geotechnical Report.



**Factual Report  
Geotechnical Investigation  
Proposed New Construction**

South Esk, New Brunswick  
September 30, 2015

Prepared for Public Works and Government Services  
Canada  
**Project No. 4735.78 – R01**



30 September 2015

File: 4735.78 – R01

Public Works and Government Services Canada  
1045 Main Street  
Moncton, NB  
E1C 1H1

Attention: Nathalie Sears, P.Eng.

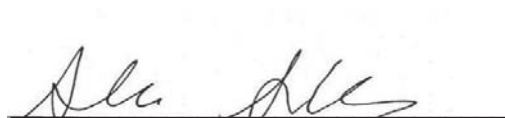
**Re: Factual Report, Geotechnical Investigation**  
**South Esk Science Station, South Esk, New Brunswick**

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Please find enclosed our factual report for the geotechnical investigation at the South Esk Science Station in the community of South Esk, New Brunswick.

This report was prepared by Ashlee Allison, PhD, EIT and reviewed by David J. Purdue, P.Eng.

Sincerely,



Ashlee Allison, PhD, E.I.T.



David J. Purdue, P.Eng.

AA/aa

**Enclosures**

n:\files\4700\4735.78\report\2015aa0826r01(factual report, geotechnical investigation - south esk science station).docx



**Factual Report, Geotechnical Investigation  
Proposed New Warehouse Construction, Science Station  
South Esk, New Brunswick**

**Table of Contents**

Table of Contents.....	ii
Appendices .....	iii
List of Figures .....	iii
List of Tables .....	iii
1.0 Introduction .....	1
2.0 Site Description .....	2
3.0 Subsurface Soil Description.....	4
3.1 Topsoil .....	4
3.2 Sand.....	4
3.3 Glacial Till.....	4
3.4 Bedrock.....	4
3.5 Groundwater .....	5
4.0 Closure.....	6
5.0 References.....	7

**Factual Report, Geotechnical Investigation  
Proposed New Warehouse Construction, Science Station  
South Esk, New Brunswick**

**Appendices**

- A Borehole Location Plan
- B Descriptive Terms and Borehole Logs
- C Soil Moisture Contents
- D Soil Sieve Analyses

**List of Figures**

Figure 1	Borehole advancement in clearing on site .....	3
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**List of Tables**

Table 1	Summary of Subsurface Soil Conditions .....	5
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**Factual Report, Geotechnical Investigation  
Proposed New Warehouse Construction, Science Station  
South Esk, New Brunswick**

## **1.0 Introduction**

Public Works and Government Services Canada (PWGSC) retained GEMTEC Limited to conduct a geotechnical investigation for the proposed new warehouse construction at the South Esk Science Station in South Esk, New Brunswick. This investigation was conducted according to the requirements of the Standing Offer Contract (EC373-152028/A) between PWGSC and GEMTEC Limited.

The purpose of this investigation was to characterize the soil and bedrock conditions in the area of the proposed new warehouse construction. It is our understanding that a new warehouse is to be constructed at the science station property, east of the existing building. An additional access road will also be developed in the area east of the proposed warehouse. Six boreholes were advanced in the area of the proposed development; four boreholes were advanced under the corners of the proposed building, one borehole in the centre of the proposed building, and one borehole in the new access road. See Appendix A for approximate borehole locations; see Appendix B for descriptive terms and borehole logs.

On August 27, 2015 the boreholes were advanced at the site using a track-mounted drill rig. GEMTEC geotechnical personnel supervised the advancement of all boreholes on the site.

During borehole advancement, SPT N<sup>1</sup>-values were recorded throughout soil sampling and soil samples were collected for laboratory testing. Moisture content measurements and sieve analyses of soil particle sizes were carried out on the subgrade soils, see Appendices C and D, respectively. All boreholes were terminated in dense glacial till at depths of 3.7 m to 6.1 m.

The subgrade soils at the site generally consist of a thin veneer of topsoil, underlain by dense silty sand (glacial till).

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<sup>1</sup> The number of blows of a 475 Joule free fall hammer required to advance a 50 mm ø split spoon sampler a distance of 300 mm

## 2.0 Site Description

The South Esk Science Station, operated by the Department of Fisheries and Oceans, is located in the community of South Esk, New Brunswick, approximately 20 km west of the city of Miramichi. The Science Station is on the south side of Route 420, across from the Miramichi River. The property is bordered by the Miramichi Salmon Conservation Centre to the west, Route 420 to the north, and undeveloped forested land to the east and south.

At the time of our site visit, the area of the proposed warehouse development had been cleared and a portion of the access road had also been cleared. The warehouse is to be located on the Science Station property, east of the existing building; the new access road will be east of the warehouse location, joining onto Route 420.

As noted previously, boreholes were advanced in the four corners of the clearing for the proposed warehouse, one borehole was advanced near the centre of the clearing, and one borehole was advanced in the area cleared for the proposed access road. At the time of our site visit, the corners of the building were not staked out; thus the boreholes were situated relative to the clearing (see Figure 1 for photo of borehole advancement in clearing). See Appendix A for approximate borehole locations; see Appendix B for descriptive terms and borehole logs; and see Appendices C and D for laboratory results.

The boreholes were advanced in the following locations:

- BH1 – south-west corner of clearing
- BH2 – north-west corner of clearing
- BH3 – north-east corner of clearing
- BH4 – south-east corner of clearing
- BH5 – centre of clearing
- BH6 – access road clearing east of building location



**Figure 1 Borehole advancement in clearing on site**

### **3.0 Subsurface Soil Description**

The subsurface soil conditions at the site generally consist of a thin layer of silty sand and organic matter underlain by silty sand (glacial till). At the surface of BH3 (north-east corner of clearing), 1.5 m of sand was encountered. The soil conditions encountered throughout the boreholes were very consistent, indicating that this soil is likely undisturbed native soils.

Surficial geology mapping of the area (Rampton, V.N., 1984) indicates that the surficial geology in this area is a veneer (generally less than 0.5 m thick) of marine sediments (sand, some gravel and silt, rare clay). This is consistent with the borehole observations; little to no soft sediment was observed overlying the glacial till.

#### **3.1 Topsoil**

At the surfaces of five of the six boreholes (BH 1, BH 2, BH 4, BH 5, and BH 6) approximately 0.6 m of silty sand with some organic matter was encountered. The SPT N-values in this layer range from 6 – 11, averaging 8 which indicates that this is a loose-compactness soil. Considering the composition of the underlying glacial till, the topsoil appears to be disturbed glacial till with organic matter. The moisture content in this layer is approximately 17%.

#### **3.2 Sand**

At the surface of BH 3, 1.52 m of sand with some organic matter was encountered. The sand layer is underlain by glacial till. An auger was advanced through the sand until glacial till was encountered.

#### **3.3 Glacial Till**

Each of the boreholes was terminated in glacial at depths of 3.7 to 6.1 m. The undisturbed glacial till was encountered at depths of 1.5 to 0.6 m below the ground's surface. The glacial till soil is composed predominantly of brown silty sand with trace gravel. The proportions of sand, silt, and gravel are, on average; 50% sand, 33% silt/clay, and 17% gravel. The moisture content in this layer is approximately 10%.

Within the glacial till layer, the SPT N-values ranged from 19 – 68, averaging 40, which indicates that this is a dense to very dense soil layer. Several of the boreholes were augered when spoon refusal was encountered; thus, the SPT N-values would be higher if spoon sampling had continued.

#### **3.4 Bedrock**

Bedrock was not encountered in the boreholes. However, geological mapping in the area of the proposed development (New Brunswick Department of Natural Resources and Energy, 2000) indicates that the bedrock in this region is composed of Late Carboniferous (terrestrial sediments) bedrock from the Pictou Group.

### 3.5 Groundwater

The elevation of the groundwater table, although not identified in any of the boreholes, should be expected to fluctuate seasonally and in response to precipitation events, water levels in the Miramichi River, and nearby construction activity.

**Table 1 Summary of Subsurface Soil Conditions**

<b>Borehole</b>	<b>Topsoil Thickness (m)</b>	<b>Sand Thickness (m)</b>	<b>Glacial Till Drilled (m)</b>
BH 1	0.61	N.E.	5.49
BH 2	0.61	N.E.	3.96
BH 3	N.E.	1.52	3.20
BH 4	0.61	N.E.	3.05
BH 5	0.61	N.E.	3.05
BH 6	0.61	N.E.	3.05

N.E. Not Encountered

## **4.0 Closure**

The boreholes put down at this site are widely scattered and soil and bedrock conditions may vary from those determined at the borehole locations. Although representative samples were taken, GEMTEC Limited personnel should be contacted immediately if the soils encountered during excavations are different than those encountered in our geotechnical investigation.

The investigation outlined in this report is strictly geotechnical in nature and should not be viewed as an environmental assessment of this site.

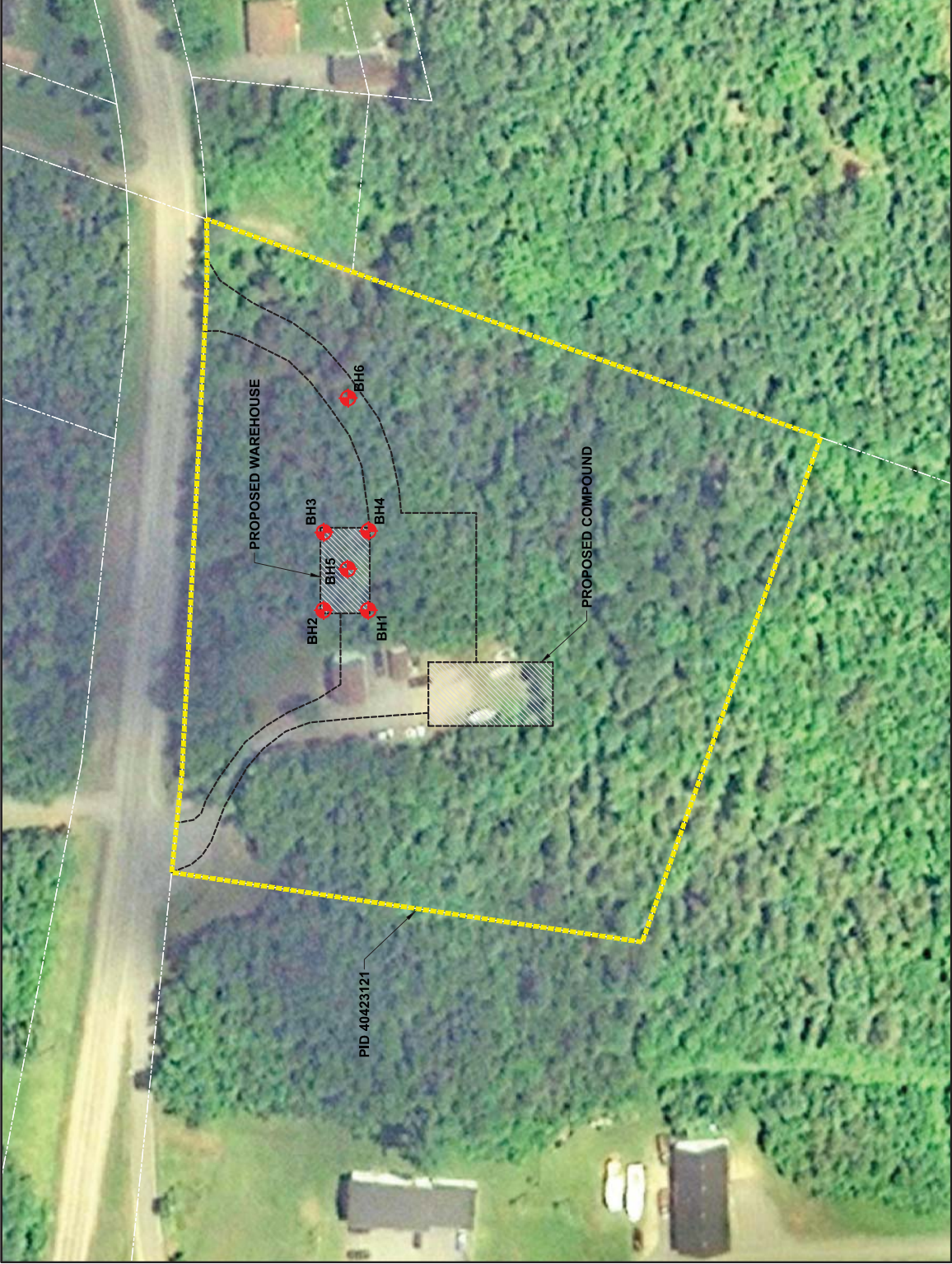
## 5.0 References

Rampton, V.N. 1984. Generalized surficial geology map of New Brunswick Department of Natural Resources and Energy Minerals, 1: 500,000

New Brunswick Department of Natural Resources and Energy, 2000. Bedrock Geology of New Brunswick. Minerals and Energy Division. Map NR-1 (2000 Edition). Scale 1:500 000.

## **Appendix A**

### Borehole Location Plan



**LEGEND**

BOREHOLE LOCATION (APPROX.)

Drawn By	AGSD	Checked By	AA
Calculations By		Checked By	
Date	SEPT, 2015		
Project	GEOTECHNICAL SERVICES, SOUTH ESK, NB (EC373-152028/001/PWB)		
Drawing	SITE PLAN SHOWING BOREHOLE LOCATIONS		

Scale

1:1000 (APPROX.)

File No.	Drawing	Figure	Revision No.
47357801	FIGURE 1	0	0

**GEMTEC**  
CONSULTING ENGINEERS  
AND SCIENTISTS

## **Appendix B**

### Descriptive Terms and Borehole Logs



**GEMTEC**

CONSULTING ENGINEERS  
AND SCIENTISTS

FREDERICTON, MONCTON, BATHURST, GRAND FALLS, SAINT JOHN, NB

## DESCRIPTIVE TERMS- BOREHOLE/TEST PIT LOG

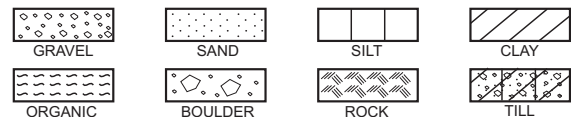
SOILS	GRAIN SIZE																
	DESCRIPTIVE TERMINOLOGY	<table><tr><td>TRACE</td><td>SOME</td><td>ADJECTIVE</td><td colspan="2">and &gt; 35% noun &gt; 35% and main fraction</td></tr><tr><td>trace clay, etc.</td><td>some gravel, etc.</td><td>silty, etc.</td><td colspan="2">sand and gravel, etc.</td></tr></table>					TRACE	SOME	ADJECTIVE	and > 35% noun > 35% and main fraction		trace clay, etc.	some gravel, etc.	silty, etc.	sand and gravel, etc.		
	TRACE	SOME	ADJECTIVE	and > 35% noun > 35% and main fraction													
	trace clay, etc.	some gravel, etc.	silty, etc.	sand and gravel, etc.													
COMPACTNESS gravels, sands, tills	<table><tr><td>N, RANGE</td><td>0 - 4</td><td>4 - 10</td><td>10 - 30</td><td>30 - 50</td><td>&gt; 50</td></tr><tr><td>DENSITY</td><td>V. LOOSE</td><td>LOOSE</td><td>MEDIUM</td><td>DENSE</td><td>V. DENSE</td></tr></table>					N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50	DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE
N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50												
DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE												
CONSISTENCY silt, clay	<table><tr><td>S, KPa</td><td>&lt; 12.5</td><td>12.5 - 25</td><td>25 - 50</td><td>50 - 100</td><td>100 - 200</td></tr><tr><td>CONSISTENCY</td><td>V. SOFT</td><td>SOFT</td><td>MEDIUM</td><td>STIFF</td><td>V. STIFF</td></tr></table>					S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200	CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF
S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200												
CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF												

ROCK	RQD	OVERALL QUALITY			FRACTURE SPACING												
	0 - 25	VERY POOR			VERY CLOSE 20 - 60 mm												
	25 - 50	POOR			CLOSE 60 - 200 mm												
	50 - 75	FAIR			MODERATE 200 - 600 mm												
	75 - 90	GOOD			WIDE 600 - 2000 mm												
	90 - 100	EXCELLENT			VERY WIDE 2 - 6 m												
	<table><tr><td>COMP. STR. MPa</td><td>1 - 5</td><td>5 - 25</td><td>25 - 50</td><td>50 - 100</td><td>100 - 250</td></tr><tr><td>DESCRIPTION</td><td>V. WEAK</td><td>WEAK</td><td>MODERATE</td><td>STRONG</td><td>V. STRONG</td></tr></table>						COMP. STR. MPa	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250	DESCRIPTION	V. WEAK	WEAK	MODERATE	STRONG
COMP. STR. MPa	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250												
DESCRIPTION	V. WEAK	WEAK	MODERATE	STRONG	V. STRONG												

### SAMPLE TYPES (location to scale on log)

S SPLIT TUBE      G SHOVEL  
 T SHELBY TUBE    H CARVED BLOCK  
 P PISTON            K SLOTTED  
 F AUGER            V IN SITU VANE  
 W WASH            NR NO RECOVERY

### LOG SYMBOLS



### ROCK CORES A(30mm); B(41mm); N(54mm)



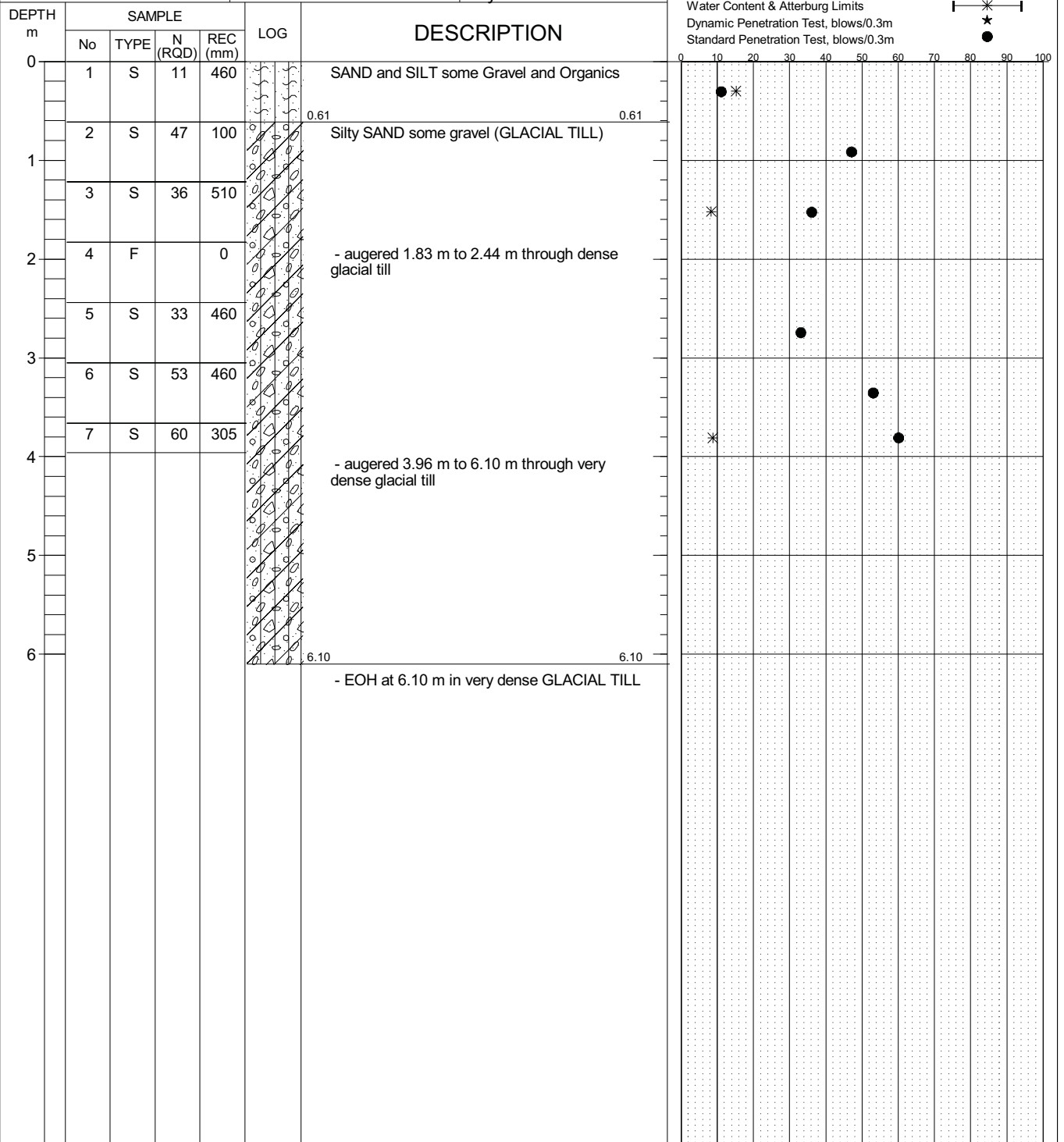
N - standard penetration test; blows by 475 J drop hammer to advance Std. 50mm O.D. split tube sampler 0.3m  
 RQD - percent of core consisting of hard, sound pieces in excess of 100mm long (excluding machine breaks)  
 RECOVERY - sample recovery expressed as percent or length  
 S - shear strength, kPa; vane  $\oplus$ ; penetrometer  $\blacksquare$ ; unconfined  $\circ$ ;  $U_c$  unconfined compressive strength  
 $S_r$  - shear strength, remoulded; vane  $\otimes$ ; penetrometer  $\square$   
 Dd - dry density;  $t/m^3$   
 W - natural moisture content, percent \*  
 PL - plastic limit, percent  $\text{—}$   
 LL - liquid limit, percent  $\text{—}$   
 ND - non detect, total petroleum hydrocarbons (TPH) not detected in soil  
 Groundwater Level  $\nabla$  ; Seepage  $\nabla$

# BOREHOLE LOGS

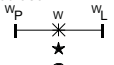
Client	Public Works & Government Services Canada	Proj No.	4735.78	BOREHOLE
Project	South Esk Science Station Proposed Warehouse	Date Drilled	2015/08/27	1 Page 1 of 1

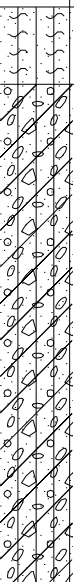
Location South Esk, NB

Ground Level, m Datum: Logged By AA



**BOREHOLE LOGS**

Client				Public Works & Government Services Canada				Proj No.		4735.78		BOREHOLE	
Project				South Esk Science Station Proposed Warehouse				Date Drilled		2015/08/27		2 Page 1 of 1	
Location				South Esk, NB				<div style="display: flex; justify-content: space-between;"> <div>             0      25      50      75      100              Undrained Shear Strength - kPa           </div> <div>             0      10      20      30      40      50      60      70      80      90      100              Water Content &amp; Atterburg Limits              Dynamic Penetration Test, blows/0.3m              Standard Penetration Test, blows/0.3m           </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>             ○ Unconfined Compression              ⊕ Field Vane Test           </div> <div>             ■ Pocket Penetrometer              ⊗ Remoulded           </div> </div> <div style="text-align: center; margin-top: 5px;"> <math>w_p</math>      <math>w</math>      <math>w_L</math>   </div>					
Ground Level, m		Datum:		Logged By		AA							

DEPTH m	SAMPLE				LOG	DESCRIPTION
	No	TYPE	N (RQD)	REC (mm)		
0	1	S	6	510		Silty SAND some Organics
1						Silty SAND some Gravel (GLACIAL TILL) - augered from 0.61 m to 1.52 m through glacial till
2	2	S	50	460		- augered from 1.98 m to 3.05 m through dense glacial till
3	3	S	19	506		- augered from 3.66 m to 4.57 m through glacial till
4						- EOH at 4.57 m in dense GLACIAL TILL

# BOREHOLE LOGS

Client Public Works & Government Services Canada

Project South Esk Science Station Proposed Warehouse

Location South Esk, NB

Proj No. 4735.78

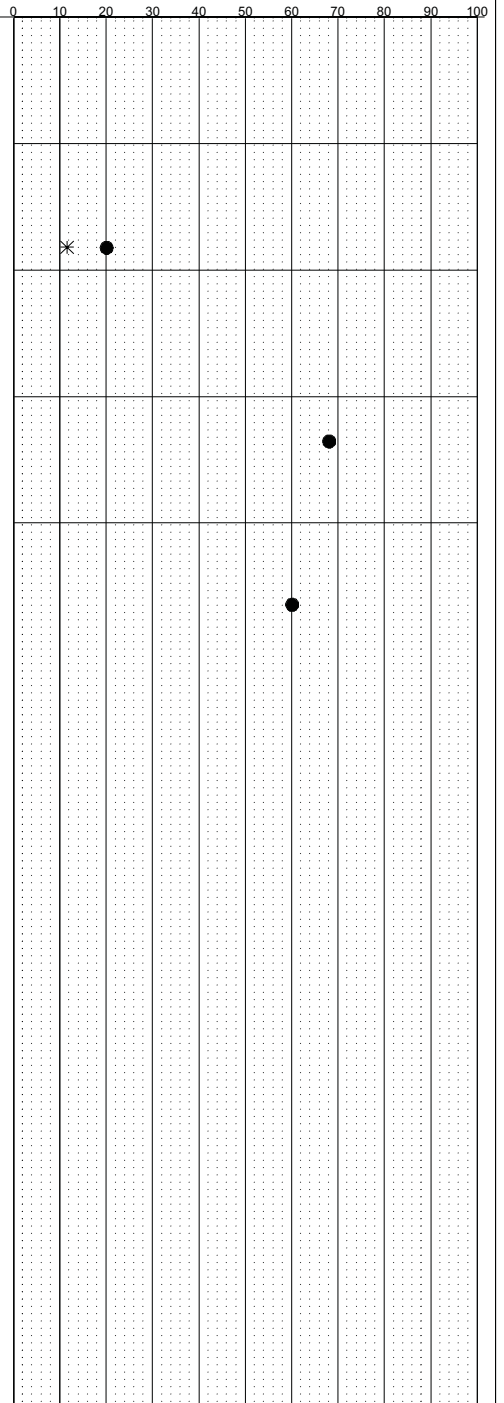
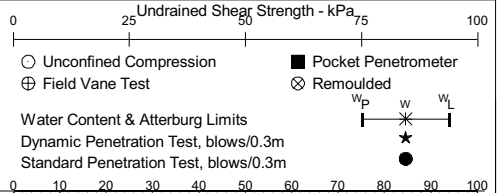
Date Drilled 2015/08/27

BOREHOLE 3

Page 1 of 1

Ground Level, m Datum: Logged By AA

DEPTH m	SAMPLE				LOG	DESCRIPTION
	No	TYPE	N (RQD)	REC (mm)		
0						SAND some Organics - augered through 1.52 m of SAND some Organics prior to sampling
1						
2	1	S	20	510	1.52	Silty SAND some Gravel (GLACIAL TILL) - augered from 2.13 m to 3.05 m through glacial till
3	2	S	68	510		
4						- augered from 3.66 m to 4.57 m through very dense glacial till
	3	S	60	150	4.72	- EOH at 4.72 m in GLACIAL TILL

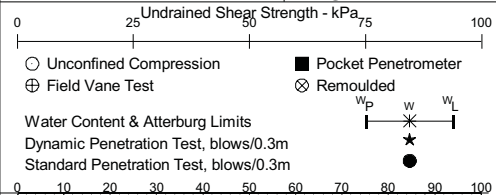


# BOREHOLE LOGS

Client	Public Works & Government Services Canada	Proj No.	4735.78	BOREHOLE
Project	South Esk Science Station Proposed Warehouse	Date Drilled	2015/08/27	4
Location	South Esk, NB			Page 1 of 1

Ground Level, m	Datum:	Logged By	AA
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DEPTH m	SAMPLE				LOG	DESCRIPTION										
	No	TYPE	N (RQD)	REC (mm)												
0						Silty SAND some Organics										
	1	S	7	460												
						0.61										
1						Silty SAND some Gravel (GLACIAL TILL) - augered from 0.61 m to 1.52 m through glacial till										
	2	S	23	510												
2						- augered from 2.13 m to 3.05 m through glacial till										
3																
	3	S	50	510												
						3.66										
						- EOH at 3.66 m in very dense GLACIAL TILL										

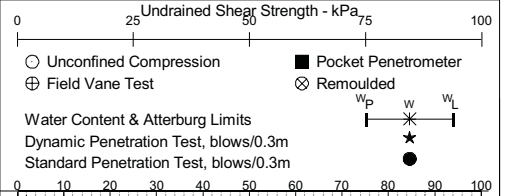


# BOREHOLE LOGS

Client	Public Works & Government Services Canada	Proj No.	4735.78	BOREHOLE
Project	South Esk Science Station Proposed Warehouse	Date Drilled	2015/08/27	5
Location	South Esk, NB			Page 1 of 1

Ground Level, m	Datum:	Logged By	AA
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DEPTH m	SAMPLE				LOG	DESCRIPTION										
	No	TYPE	N (RQD)	REC (mm)												
0						Silty SAND some Organics										
	1	S	8	510												
						0.61										
1						Silty SAND some Gravel (GLACIAL TILL) - augered from 0.61 m to 1.52 m through glacial till										
	2	S	25	380												
2						- augered from 2.13 m to 3.05 m through glacial till										
3																
	3	S	36	610												
						3.66										
						- EOH at 3.66 m in dense GLACIAL TILL										





Proj No.	4735.78	BOREHOLE 6 Page 1 of 1
Date Drilled	2015/08/27	


Ground Level, m	Datum:	Logged By	AA
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Figure 1 is a graph showing the relationship between Undrained Shear Strength (kPa) and Water Content & Atterburg Limits. The x-axis represents Undrained Shear Strength in kPa, ranging from 0 to 100. The y-axis represents Water Content & Atterburg Limits. The graph includes data points for four different test methods: Unconfined Compression (open circles), Field Vane Test (plus signs), Pocket Penetrometer (solid squares), and Remoulded (crosses). A legend at the top right defines the symbols. A diagram at the top right shows the relationship between Water Content (w) and Liquid Limit (wL) for a given Plasticity Index (wP).

Test Method	Undrained Shear Strength (kPa)	Water Content & Atterburg Limits
Unconfined Compression	~10	~15
Field Vane Test	~20	~15
Pocket Penetrometer	~25	~25
Remoulded	~10	~35
Pocket Penetrometer	~40	~45

## **Appendix C**

### Soil Moisture Contents

 <b>GEMTEC</b> CONSULTING ENGINEERS AND SCIENTISTS	Client	Public Works & Government Services Canada	Moisture Content and Density
	Project:	Geotechnical Services, South Esk, NB (EC373-152028/001/PWB)	
	Project #:	0473578	

Borehole / Testpit	Depth	Sample	Description	Date/Time Sampled	Moisture Content, %	Sample Volume, mm <sup>3</sup>	Wet Density, kg/m <sup>3</sup>	Dry Density, kg/m <sup>3</sup>
BH 1	0-0.61m	1		15/09/09 12:03:00 PM	15.10			
BH 1	1.22-1.83m	3		15/09/09 12:03:47 PM	8.23			
BH 1	3.66-3.96m	6		15/09/09 12:03:47 PM	8.66			
BH 2	1.52-1.98m	2		15/09/09 12:03:47 PM	10.94			
BH 3	1.52-2.13m	1		15/09/09 12:03:47 PM	11.47			
BH 4	1.52-2.13m	2		15/09/09 12:03:47 PM	9.54			
BH 4	3.05-3.66m	3		15/09/09 12:03:47 PM	10.08			
BH 5	1.52-2.13m	2		15/09/09 12:03:47 PM	10.39			
BH 5	3.05-3.66m	3		15/09/09 12:03:47 PM	7.56			
BH 6	0-0.61m	1		15/09/09 12:03:47 PM	19.64			
BH 6	1.52-2.13m	2		15/09/09 12:03:47 PM	9.35			

## **Appendix D**

### Soil Sieve Analyses



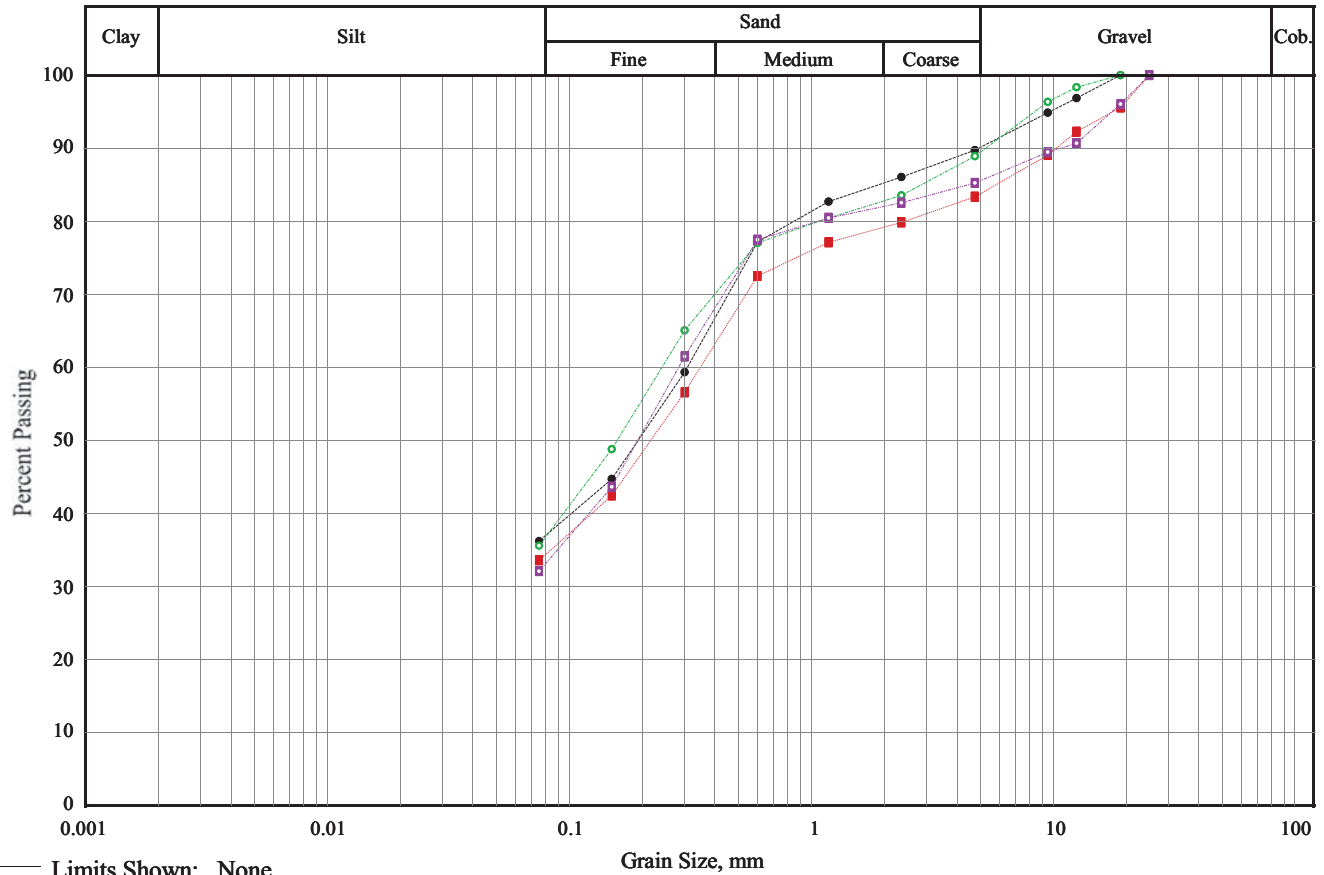
**GEMTEC**  
CONSULTING ENGINEERS  
AND SCIENTISTS

Client: Public Works & Government Services Canada

Project: Geotechnical Services, South Esk, NB (EC373-152028/0)

Project #: 0473578

# Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
—●—		BH 1	1	0-0.61m	10.3	53.5	36.2		15/09/09
—■—		BH 1	3	1.22-1.83m	16.6	49.8	33.6		15/09/09
—○—		BH 1	6	3.66-3.96m	11.1	53.3	35.6		15/09/09
—□—		BH 2	2	1.52-1.98m	14.8	53.1	32.1		15/09/09

Line Symbol	Sample Description	AASHTO	D <sub>10</sub>	D <sub>15</sub>	D <sub>50</sub>	D <sub>85</sub>	% 5-75µm
—●—	Sand and silt , some gravel	A-4 to A-7	---	---	0.19	1.90	---
—■—	Silty sand , some gravel	A-2-4	---	---	0.22	5.80	---
—○—	Sand and silt , some gravel	A-4 to A-7	---	---	0.16	2.86	---
—□—	Silty sand , some gravel	A-2-4	---	---	0.19	4.46	---



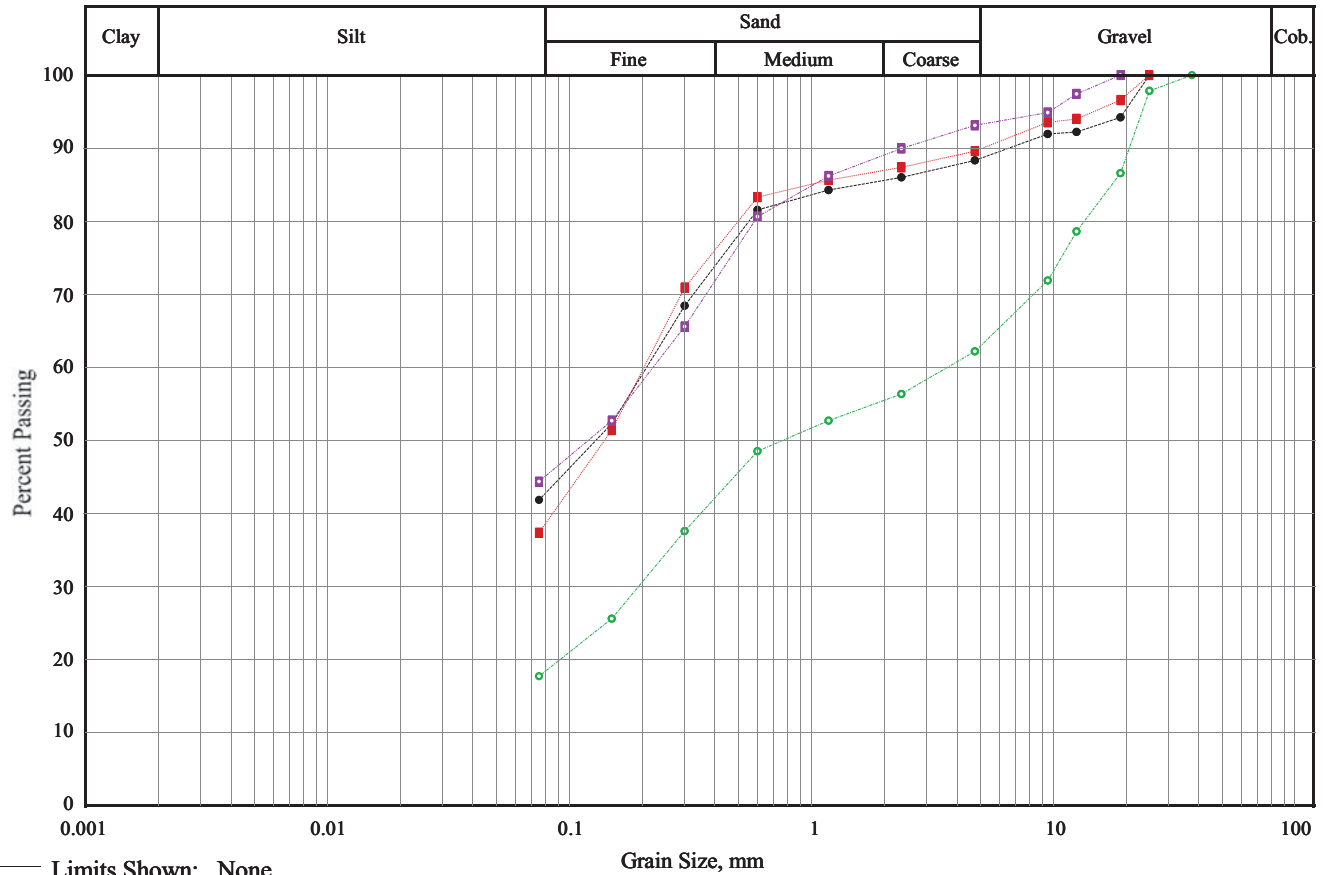
**GEMTEC**  
CONSULTING ENGINEERS  
AND SCIENTISTS

Client: Public Works & Government Services Canada

Project: Geotechnical Services, South Esk, NB (EC373-152028/0)

Project #: 0473578

# Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
—●—		BH 3	1	1.52-2.13m	11.7	46.5	41.9		15/09/09
—■—		BH 4	2	1.52-2.13m	10.4	52.2	37.4		15/09/09
—○—		BH 5	3	3.05-3.66m	37.8	44.5	17.7		15/09/09
—□—		BH 6	1	0-0.61m	6.9	48.8	44.4		15/09/09

Line Symbol	Sample Description	AASHTO	D <sub>10</sub>	D <sub>15</sub>	D <sub>50</sub>	D <sub>85</sub>	% 5-75µm
—●—	Sand and silt , some gravel	A-4 to A-7	---	---	0.13	1.58	---
—■—	Sand and silt , some gravel	A-4 to A-7	---	---	0.14	0.98	---
—○—	Sand and gravel , some silt	A-1-b	---	---	0.76	17.49	---
—□—	Sand and silt , trace gravel	A-4 to A-7	---	---	0.12	1.02	---