



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
Bid Fax: (506) 636-4376

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

All enquiries are to be submitted in writing to the Contracting Officer, Email address: gisele.doucet@pwgsc.gc.ca.

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

Title - Sujet Chignecto Multipurpose Bldg, Alma	
Solicitation No. - N° de l'invitation EC015-180661/A	Amendment No. - N° modif. 001
Client Reference No. - N° de référence du client EC015-180661	Date 2017-07-24
GETS Reference No. - N° de référence de SEAG PW-\$PWB-004-4157	
File No. - N° de dossier PWB-7-40042 (004)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2017-08-03	
Time Zone Fuseau horaire Atlantic Daylight Saving Time ADT	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Doucet, Gisele PWB	Buyer Id - Id de l'acheteur pwb004
Telephone No. - N° de téléphone (506) 636-4541 ()	FAX No. - N° de FAX (506) 636-4376
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

Instructions: Voir aux présentes

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

Cette modification à l'invitation numéro un (1) est soumise pour inclure l'addenda numéro 1 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 1.

1. LISTE DES PARTICIPANTS

Vous trouverez ci-attachée la Liste des participants qui étaient à la visite de chantier qui a eu lieu le 21 de juillet 2017.

2. RAPPORT GÉOTECHNIQUE

Vous trouverez ci-attaché le Rapport d'enquête géotechnique pour le Terrain de camping sud, Parc National Fundy, Alma (N.-B.).

3. QUESTION / RÉPONSE

Q1. My question is concerning the Windows. In the section 08-05-00/ Materials are listed as Fiber Glass sash and frame. When I view the A07 drawing the windows are listed as Anodized clear which I believe to be Aluminum. There is a curtain wall section D5 which is also listed as Anodized. Can you help provide clarification as to what W1-W6 should be, Fiber.

R1. All windows are curtainwall - 50 mm x 100 mm section with 19 mm cap.

4. DEVIS

Veillez **ENLEVER** Section 08 50 00 Fenêtres dans le Devis.

LIST OF ATTENDEES

Solicitation No. EC015-180661/A

"Chignecto South Campground, Multi-Purpose Building, Fundy National Park, Alma, N.B."

Site Visit: 10:00 a.m., July 21, 2017

Name	Company / Organization	Email Address / Telephone no.
Jason MacLeod (Print) (Signature)	Rod MacLeod Construction	macleodr@nb.aibn.com
Patrick Cunningham (Print) (Signature)	ES Cunningham Ltd.	Pcunningham@nb.aibn.com
Dan Baxter (Print) (Signature)	Lasting Image Landscaping Ltd	dane@lastingimage.ca
André Arsenault (Print) (Signature)	Bay Construction + Management	info@baycm.ca (506) 852-4000
Josh Arbeau (Print) (Signature)	AI's Electric	info@aiselectr.ca
Rennier Webb (Print) (Signature)	RS Webb Elect.	cei@nbnet.nb.ca
(Print) (Signature)		
(Print) (Signature)		
(Print) (Signature)		
(Print) (Signature)		

RSFC representatives
Nathalie Sears
Michael Dement



**Geotechnical Investigation Report
Chignecto South Campground**

Fundy National Park, Alma, New Brunswick
March 31, 2016

Prepared for Public Works & Government Services
Canada
Project No. 10456.05





GEMTEC

CONSULTING ENGINEERS
AND SCIENTISTS

GEMTEC Limited tel: 506.453.1025
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E3C 2E6 www.gemtec.ca

31 March 2016

File: 10456.05 – R01

Public Works & Government Services Canada
189 Prince William Street
Saint John, NB
E2L 2B9

Attention: Nathalie Sears, P.Eng.

Re: Geotechnical Investigation Report
Chignecto South Campground, Fundy National Park, Alma, NB

Please find enclosed our report for the geotechnical investigation at Chignecto South Campground in Fundy National Park in Alma, New Brunswick.

This report was prepared by Ashlee Allison and reviewed by Corey Keats.

Sincerely,

Ashlee Allison, PhD, EIT

Corey Keats, M.Sc.E., P.Eng.

AA

Enclosures

2016aa0309R01(Geotechnical Investigation – Chignecto South Campground)



**Geotechnical Investigation Report
Chignecto South Campground
Fundy National Park, Alma, NB**

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**Geotechnical Investigation Report
Chignecto South Campground
Fundy National Park, Alma, NB**

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**Geotechnical Investigation Report
Chignecto South Campground
Fundy National Park, Alma, NB**

1.0 Introduction

Public Works & Government Services Canada (PWGSC) retained GEMTEC Limited to conduct a geotechnical investigation for the proposed building to be constructed at the Chignecto South Campground in Fundy National Park. The geotechnical investigation was conducted in accordance with the requirements of the Standing Offer Contract (EC373-152028/A) between PWGSC and GEMTEC Limited.

The purpose of this geotechnical investigation was to characterize the soil and bedrock conditions in the area of the parking lot and the proposed building and provide geotechnical recommendations for the design and construction of the building's foundation. Five boreholes were advanced in the area of the proposed building; one borehole was advanced near each corner of the proposed building and one borehole near the centre. Two boreholes were advanced in the existing gravel parking lot. See Appendix A for borehole location plan; see Appendix B for descriptive terms and borehole logs.

On March 16, 2016 the boreholes were advanced at the site using a track-mounted drill rig. Borehole advancement was supervised by GEMTEC geotechnical personnel.

During borehole advancement, SPT N^1 -values and RQD² values were recorded throughout soil and bedrock sampling. Soil and bedrock samples were collected for laboratory testing. Moisture content measurements and soil sieve analyses of particle size distributions were carried out; see Appendices C and D. Due to the very poor overall bedrock quality, compressive strength testing was not possible. Four boreholes were terminated within the bedrock at depths of 4.6 – 7.0 m; the other three boreholes were terminated upon spoon/auger refusal in inferred bedrock at depths of 2.7 – 4.6 m. See Appendix E for photographs of core barrel samples.

The subgrade soils at the site generally consist of a thin layer of organic material underlain by dense to very dense sand and gravel with some cobbles. Slate bedrock was encountered at depth. In the parking lot area 0.7 – 1.5 m of silty sand and gravel (fill material) was encountered at the surface. The fill material is underlain by silty sand and gravel and bedrock at depth.

¹ The number of blows of a 475-Joule free-fall hammer required to advance a 50 mm \varnothing split spoon sampler a distance of 300 mm

² Percent of core consisting of hard, sound pieces in excess of 100 mm long (excluding machine breaks)

2.0 Site Description

The site is located in the Chignecto South Campground in Fundy National Park in Alma, New Brunswick. The location of the proposed building is south of the Chignecto South Campground access road, near an existing gravel parking area. The proposed building location is approximately 300 metres from the intersection of Route 114 and the campground access road; see Appendix A for site location and borehole layout on site; see Appendix F for site photos.

Presently, the proposed building location is undeveloped land. Prior to our geotechnical investigation the area was fully treed; see Appendix F. The surrounding property is treed land with some campsite and hiking facilities including a washroom building at the northern side of the gravel parking lot.

3.0 Subsurface Soil Description

The subsurface soil conditions at the proposed building location generally consist of a thin layer of topsoil and organic matter, underlain by sand and gravel with some cobbles and silt, with grey slate bedrock at depth. Within the parking lot area (BH 6 and BH 7) approximately 0.7 – 1.5 m of fill material was encountered; the fill is underlain by sand and gravel with bedrock at depth; it is similar to the subgrade encountered in the other boreholes.

Surficial geology mapping of the area (Rampton, 1984) indicates that the surficial soils in this area originated during Wisconsinan and/or Pre-Wisconsinan time and they are composed of:

MORAINAL AND COLLUVIAL SEDIMENTS: loamy till and colluvium, regolith and weathered bedrock, and isolated boulder fields, undifferentiated; mixture of deposits formed directly from ice of unknown age and materials produced by weathering processes; generally greater than 1 m thick. Mainly stony deposits (more than 35% of clasts pebble-sized and larger).

This soil description is consistent with the borehole observations. See Table 1 for a summary of subsurface soil conditions encountered in the boreholes. See Appendices C and D for laboratory results.

3.1 Topsoil and Organic Matter

At the surfaces of each of the boreholes in the proposed building area (BH 1 – BH 5), approximately 250 – 350 mm of root matter, silty sand and organic material was encountered. The moisture content in this soil layer is approximately 30 – 40% which is indicative of a high organic material content. This material is underlain by a thin (approximately 300 mm) layer of loose sand, gravel, and cobbles. The SPT N-values encountered in this surface layer ranged from approximately 4 – 11. The compactness of this soil can generally be described as very loose to loose-compactness. This soil is likely native material, disturbed at the surface by plant growth, frost, or other natural processes. This material is not a suitable bearing material; it shall be removed from the building location prior to building construction.

The topsoil and organic matter was not encountered in the parking lot boreholes (BH 6, BH 7).

3.2 Silty Sand and Gravel (Fill)

At the surfaces of each of the parking lot boreholes (BH 6 and BH 7) a layer of silty sand and gravel was encountered. The thickness of this layer varies from 1.5 m in BH 6 to 0.7 m in BH 7. The moisture content in this layer is approximately 5%. This is likely fill material placed during the construction of the parking lot.

The SPT N-values encountered in this layer range from approximately 26 – 100+, indicating that the compactness of this soil can be described as medium to very dense. The greater SPT N-

values may be attributed to frozen soils at the surface or cobbles impeding the split spoon sampler.

In BH 7, approximately 200 mm of silty to clayey sand was encountered under the fill soils. The moisture content in the silty to clayey sand is approximately 8%. The fill soil was likely placed directly over the native in-situ silty to clayey sand during construction of the parking lot.

3.3 Silty Sand and Gravel with some Cobbles

Underlying the topsoil and organic matter (building area) and the fill soils (parking lot), silty sand and gravel with cobbles was encountered at each of the borehole locations. In the building area, the dense silty sand, gravel, and cobbles was encountered at a depth of approximately 300 – 600 mm below the ground's surface (elevation +290 m to +291 m). In the parking lot area this soil layer was encountered at a depth of approximately 0.9 – 1.5 m below the ground's surface (elevation +291 m to +292 m). The thickness of this soil layer ranges from approximately 2.1 – 4.0 m before transitioning to weathered bedrock.

The SPT N-values encountered in the top several metres of this soil range from 47 – 100+, indicating that this soil can be described as a medium- to very dense-compactness soil. In each of the boreholes, split spoon sampler refusal was encountered at depths of 0.6 – 3.0 m (elevation +288 m to +291 m). Where split spoon sampler refusal was encountered, the boreholes were augered. BH 6 and BH 7 were augered to depths of 4.6 m (elevation +287 m to +288 m); they were terminated at this depth. The remaining boreholes were augered until auger refusal was encountered at depths of 2.7 – 4.6 m (elevation +286 m to +288 m) in inferred bedrock.

The soil sieve analyses (see Appendix C) indicate that this soil is composed of approximately 40 – 50% sand, 30 – 50% cobbles and gravel, and 10 – 25% silt- and clay-sized particles. The moisture content in this soil layer is approximately 4 - 10%; see Appendix D.

3.4 Bedrock

Highly fractured bedrock was encountered beneath the silty sand and gravel in boreholes 1, 3, 5, and 7; the other boreholes were terminated upon spoon or auger refusal in probable bedrock. Rock cores measuring 1.7 – 2.7 m were extracted from BH 1, BH 3 and BH 5 (see Appendix E for photos of rock cores). The bedrock is a grey slate bedrock.

The RQD values in the bedrock range from 0 – 22, averaging 6 which indicates that the overall rock quality is very poor. Due to the very close spacing of fractures, none of the bedrock pieces extracted from the boreholes were large enough for compressive strength testing.

Geological mapping of the area around the site (New Brunswick Department of Natural Resources and Energy, 2000) indicates that the bedrock in this region is composed of mafic plutonic rock from the Alma Group, Middle Neoproterozoic formation.

3.5 Groundwater

Groundwater seepage was encountered at depths of 3.0 m and 0.8 m (elevation +287.1 m and +291.7 m) in BH 4 and BH 7, respectively. Groundwater seepage was not encountered in the other five boreholes. However, the elevation of the groundwater table should be expected to fluctuate seasonally and in response to precipitation events and nearby construction activity.

Table 1 Summary of Subsurface Soil Conditions

Borehole	Surface Elevation (m)	Topsoil Thickness (m)	Fill Thickness (m)	Sand, Gravel & Cobble Thickness (m)	Bedrock Elevation (m)	Groundwater Seepage Elevation (m)
BH1	291.3	0.7	N.E.	3.0	287.6	N.E.
BH2	290.8	0.6	N.E.	2.1	288.0	N.E.
BH3	290.8	0.6	N.E.	4.0	286.3	N.E.
BH4	290.2	0.3	N.E.	2.7	287.1	287.1
BH5	289.8	0.2	N.E.	4.0	285.6	N.E.
BH6	292.0	N.E.	1.5	3.1	N.E.	N.E.
BH7	292.4	N.E.	0.7	2.1	289.4	291.7

N.E. Not Encountered

4.0 Discussion and Recommendations

4.1 General

This section of the report provides engineering guidelines on the geotechnical design and construction aspects of the project based on our interpretation of the borehole information and the project requirements. It is stressed that the information in the following sections is provided for the guidance of the designers and is intended for this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

4.2 Overview

It is our understanding that the proposed building location was formerly undeveloped treed land which was cleared prior to our arrival on site for borehole advancement. We understand that the proposed building will be a single-storey slab-on-grade structure which will be heated throughout the year.

Based on the soil conditions encountered at the site, we are of the opinion that the site is suitable for the proposed structure, provided that our recommendations are followed.

4.3 Foundation

- If the foundation is designed and constructed as per our recommendations it can be founded upon the undisturbed silty sand, gravel and cobbles layer, or the bedrock, or engineered fill built up from the sand and gravel or bedrock, at an allowable bearing pressure of 200 kPa for total and differential settlements not exceeding 25 and 20 mm, respectively.
- The near-surface topsoil and loose silty sand and gravel is not a suitable bearing material, it should be excavated in the area of the proposed development.
- Structural fill under footings or slabs-on-grade should be placed in lifts not exceeding 300 mm and compacted to at least 95% of the maximum dry density as determined by the latest version of the Standard Proctor test (ASTM D698).
- Minimum footing widths of 0.6 m and 1.0 m are recommended for strip and square footings, respectively.
- For protection against frost heaving, footings should be founded at least 1.5 and 1.8 metres below final grade for heated and unheated buildings, respectively.
- Exterior below-grade foundation walls should be damp-proofed or water-proofed and backfilled with a clean granular material having less than 15% fines (% passing the 0.080 mm sieve size) in order to prevent adfreezing.

- Properly installed footing drains should be incorporated into the foundation design. This will prevent water from building up within the perimeter drainage material. A build-up of water within the perimeter drainage material would provide a supply of water to the surrounding frost-susceptible glacial till.
- The finished surface adjacent to buildings should be sloped away from the buildings at a slope of no less than 2%.
- If some of the footings are to bear on sand and gravel and others on bedrock, it is our recommendation that all footings are constructed on at least 300 mm of engineered fill. This will reduce differential conditions caused by footings bearing on different materials. This will also aid with construction by providing some in-trench drainage below the footings. As noted above, the engineered fill shall be compacted to at least 95% of the maximum dry density as determined by the latest version of ASTM D698.
- Proper surface drainage shall be provided in the excavations. If groundwater is encountered, ditching and pumping techniques may be required to keep excavations free of water.
- Trenches should be excavated in accordance with the requirements of the WorkSafeNB Occupational Health and Safety Act.
- The bedrock encountered in the boreholes can generally be described as highly weathered. This bedrock could likely be excavated with a heavy excavator.
- A geotechnical engineer should inspect the bottom of foundation excavations prior to fill or footing placement to ensure that satisfactory undisturbed bearing soils are reached.
- Throughout construction a geotechnical engineer should assess the foundation conditions, engineered fill, and construction practices.
- If construction is to take place during cold weather, the subgrade shall be protected against freezing throughout construction and the engineered fill shall be placed and compacted in an unfrozen state.
- Seismic Site Class C can be used for design.

4.4 Slab-on-Grade

Typical interior concrete slabs are constructed as follows:

- Concrete slab
- Vapour barrier
- 150 mm thick layer of NBDTI 31.5 mm minus crushed rock
- Approved subgrade

5.0 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.

6.0 References

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

Rampton, V. (1984). *Surficial Geology, New Brunswick.* Geological Survey of Canada, Map 1594A, scale 1:500 000.

Appendix A

Borehole Layout on Site



Legend		<div><div><div></div></div></div> BOREHOLE LOCATION	
		+ 290.00 SPOT ELEVATION	
Note			
1. COORDINATE SYSTEM: NEW BRUNSWICK: STEREOGRAPHIC PROJECTION, NAD83 (CSRS) DATUM.			
2. THIS SURVEY WAS DONE WITH HIGH PRECISION GPS AND REFERENCED LEICA SMARTNET SYSTEM.			
Drawn By	CHG	Checked By	MB
Calculations By		Checked By	
Date	MARCH 2016		
Project	GEOTECHNICAL INVESTIGATION CHIGNECTO SOUTH CAMPGROUND		
Drawing	BOREHOLE LOCATION PLAN		
Scale	<div>1:500</div> <div><div></div><div>0102030m</div></div>		
File No.	104560501	Drawing	FIGURE 1
Revision No.			0
<div><div></div><div>GEMTEC</div><div>CONSULTING ENGINEERS AND SCIENTISTS</div></div>			

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

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

N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50
DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE

CONSISTENCY
silt, clay

S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200
CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF

ROCK

RQD

0 - 25

25 - 50

50 - 75

75 - 90

90 - 100

OVERALL QUALITY

VERY POOR

POOR

FAIR

GOOD

EXCELLENT

FRACTURE SPACING

VERY CLOSE 20 - 60 mm

CLOSE 60 - 200 mm

MODERATE 200 - 600 mm

WIDE 600 - 2000 mm

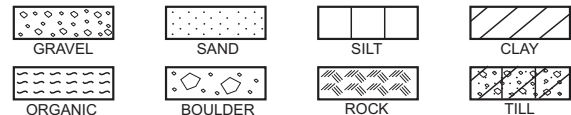
VERY WIDE 2 - 6 m

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)









WELL SYMBOLS

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 \ast
 PL - plastic limit, percent —
 LL - liquid limit, percent —
 ND - non detect, total petroleum hydrocarbons (TPH) not detected in soil
 Groundwater Level ∇ ; Seepage ∇

BOREHOLE LOGS

Client					Public Works & Government Services Canada					Proj No.		10456.05		BOREHOLE	
Project					Geotechnical Investigation, Chignecto South Campground					Date Drilled		16.March.2016		BH1	
Location					Fundy National Park, New Brunswick									Page 1 of 1	
Ground Level, m					Datum:					Logged					
291.26					Geodetic					By		MHB			

DEPTH m	SAMPLE				LOG	DESCRIPTION	
	No	TYPE	N (RQD)	REC (mm)			
0	1	S	7	420	 0.08 ROOTMAT 0.26 Brown Silty SAND and organics Grey-brown GRAVEL and COBBLES	291.18 291.00	
1	2	S	47	290	 0.70 Light grey SAND and GRAVEL with some cobbles	290.56	
2	3	S	100+	20	 - Hard, grinding augering from 1.70 to 2.44 metres		
	4	S	100+	20			
3					 - Hard, grinding augering from 2.44 to 3.35 metres		
	5	S	100+	0			
4	6	NQ	8%	860	 3.66 Grey SLATE BEDROCK	287.60	
5	7	NQ	0%	840			
6					 6.10 End of borehole at 6.10 metres below surface grade Groundwater seepage not encountered	285.16	

0 25 50 75 100

Undrained Shear Strength - kPa

○ Unconfined Compression
⊕ Field Vane Test
Water Content & Atterburg Limits
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m

■ Pocket Penetrometer
⊗ Remoulded

W_p W_L W_U

0 10 20 30 40 50 60 70 80 90 100

BOREHOLE LOGS

Client				Public Works & Government Services Canada				Proj No.		10456.05		BOREHOLE	
Project				Geotechnical Investigation, Chignecto South Campground				Date Drilled		16.March.2016		BH2	
Location				Fundy National Park, New Brunswick								Page 1 of 1	
Ground Level, m				290.76				Datum:		Geodetic		Logged By	
										MHB			

DEPTH m	SAMPLE				LOG	DESCRIPTION	
	No	TYPE	N (RQD)	REC (mm)			
0	1	S	4	400	0.07 ROOTMAT	290.69	
					0.27 Brown Silty SAND and organics	290.49	
					Grey GRAVEL and COBBLES		
					0.61	290.15	
	2	S	100+	200	Light brown-grey SAND and GRAVEL, some cobbles		
1							
	3	S	100+	100			
2							
	4	S	100+	80			
	5	S	100+	10	- Auger refusal at 2.74 metres, inferred very dense sand and gravel	288.02	
					End of borehole at 2.74 metres below surface grade		
					Groundwater seepage not encountered		

0 25 Undrained Shear Strength - kPa 75 100

○ Unconfined Compression ■ Pocket Penetrometer

⊕ Field Vane Test ⊗ Remoulded

Water Content & Atterburg Limits

Dynamic Penetration Test, blows/0.3m


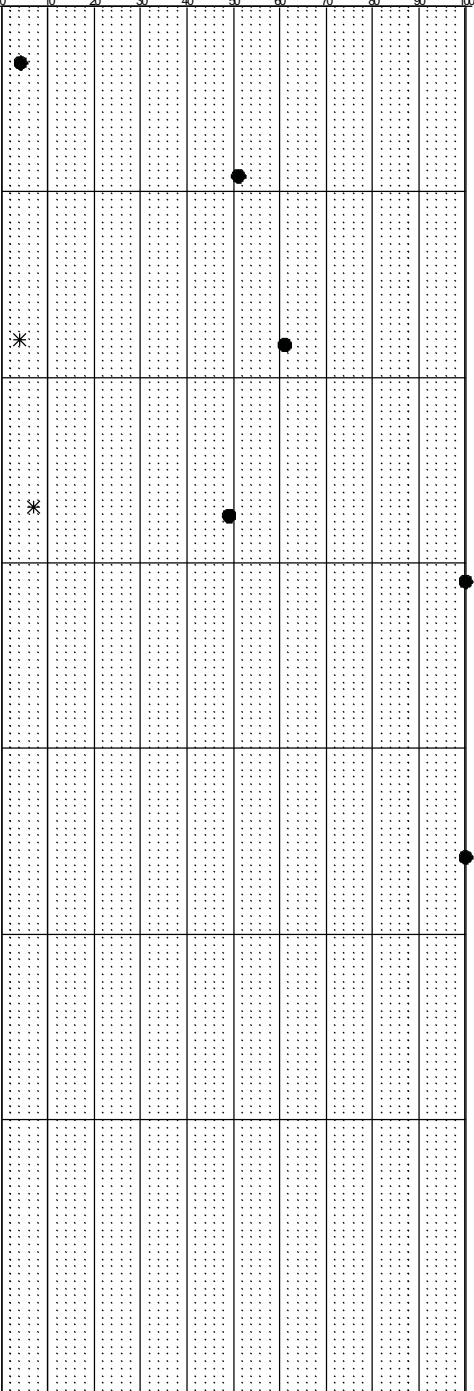
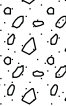


Standard Penetration Test, blows/0.3m

0 10 20 30 40 50 60 70 80 90 100

W_p W_L W_U


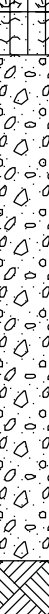
BOREHOLE LOGS

Client					Public Works & Government Services Canada					Proj No.		10456.05		BOREHOLE	
Project					Geotechnical Investigation, Chignecto South Campground					Date Drilled		16.March.2016		BH3	
Location					Fundy National Park, New Brunswick									Page 1 of 1	
Ground Level, m					Datum:					Logged					
290.82					Geodetic					By		MHB			

DEPTH m	SAMPLE				LOG	DESCRIPTION	
	No	TYPE	N (RQD)	REC (mm)			
0	1	S	4	380		0.08 ROOTMAT 290.74 Brown Silty SAND and organics 0.33 COBBLES 0.61 290.21	
	2	S	51	200		Brown-grey SAND and GRAVEL, some cobbles	
	3	S	61	330		- Gravel and sand, some silt (AASHTO A-1-a)	
	4	S	49	460		- Borehole sloughing at 2.44 metres, re-auger to 2.44 metres - Gravelly sand, some silt (AASHTO A-1-a)	
	5	S	100+	100			
	6	S	100+	20		4.57 Grey SLATE BEDROCK 286.25	
	7	NQ	22%	1300			
	8	NQ	0%	150		- Highly fractured rock, impeding core barrel 6.30 End of borehole at 6.30 metres below surface grade 284.52 Groundwater seepage not encountered	

BOREHOLE LOGS

Client				Public Works & Government Services Canada				Proj No.		10456.05		BOREHOLE	
Project				Geotechnical Investigation, Chignecto South Campground				Date Drilled		16.March.2016		BH4	
Location				Fundy National Park, New Brunswick								Page 1 of 1	
Ground Level, m				290.19				Datum:		Geodetic		Logged By	
										MHB			

DEPTH m	SAMPLE				LOG	DESCRIPTION	
	No	TYPE	N (RQD)	REC (mm)			
0	1	S	7	400	 0.09 ROOTMAT 290.10 0.32 Brown Silty SAND and organics 289.87 Brown-grey SAND and GRAVEL, some cobbles		
	2	S	61	430	- Sand and gravel, some silt (AASHTO A-1-a)		
1							
	3	S	100+	50			
2							
	4	S	100+	80			
3	5	S	100+	10	3.05 Inferred BEDROCK 287.14 3.35 - Auger refusal at 3.35 metres 286.84 End of borehole at 3.35 metres below surface grade Groundwater seepage encountered at 3.05 metres below surface grade		

0 25 50 75 100

Undrained Shear Strength - kPa

○ Unconfined Compression ■ Pocket Penetrometer
 ⊕ Field Vane Test ⊗ Remoulded

Water Content & Atterburg Limits
 Dynamic Penetration Test, blows/0.3m
 Standard Penetration Test, blows/0.3m

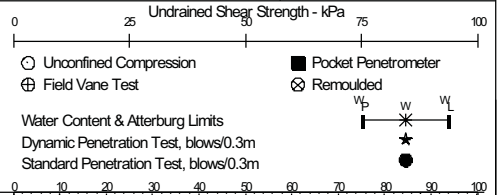
W_p W_L W_U

0 10 20 30 40 50 60 70 80 90 100

BOREHOLE LOGS

Client				Public Works & Government Services Canada		Proj No.		10456.05		BOREHOLE	
Project				Geotechnical Investigation, Chignecto South Campground		Date Drilled		16.March.2016		BH5	
Location				Fundy National Park, New Brunswick						Page 1 of 1	
Ground Level, m				289.82		Datum:		Geodetic		Logged By	
										MHB	

DEPTH m	SAMPLE				LOG	DESCRIPTION	
	No	TYPE	N (RQD)	REC (mm)			
0	1	S	11	440	0.10 ROOTMAT	289.72	
					0.24 Brown Silty SAND and GRAVEL with organics	289.58	
					Brown-grey SAND and GRAVEL, some cobbles		
	2	S	77	450			
1					- Silty sand and gravel (AASHTO A-1-b)		
	3	S	100+	20	1.52	288.30	
	4	NQ	0%	0	No recovery, inferred SAND and GRAVEL with some cobbles		
2							
	5	NQ	0%	475	2.74	287.08	
3					SLATE cobbles		
4							
	6	NQ	0%	675	4.27	285.55	
5					Grey SLATE BEDROCK		
6							
	7	NQ	8%	780			
7					7.01	282.81	
					End of borehole at 7.01 metres below surface grade		
					Groundwater seepage not encountered		



BOREHOLE LOGS

Client	Public Works & Government Services Canada
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Proj No.	10456.05
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BOREHOLE

Project	Geotechnical Investigation, Chignecto South Campground
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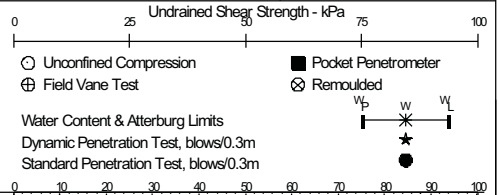
Date Drilled 17.March.2016 Page 1 of 1

Location	Fundy National Park, New Brunswick
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Ground Level, m 292.04

Datum:
Geodetic

Logged	
By	TD



DEPTH m	SAMPLE				LOG	DESCRIPTION
	No	TYPE	N (RQD)	REC (mm)		
0	1	S	62	330	F F	Brown Silty Sand and Gravel FILL
1	2	S	26	130	F F	
2	3	S	53	610	o o	Brown-grey Silty SAND and GRAVEL, some cobbles and small boulders - Gravelly silty sand (AASHTO A-1-b)
3	4	S	70	380	o o	
4	5	S	100+	50	o o	
5	6	S	100+	0	o o	
6	7	S	100+	10	o o	- Possible bedrock encountered in spoon tip End of borehole at 4.60 metres below surface grade Groundwater seepage not encountered

BOREHOLE LOGS

[illegible]

Appendix C

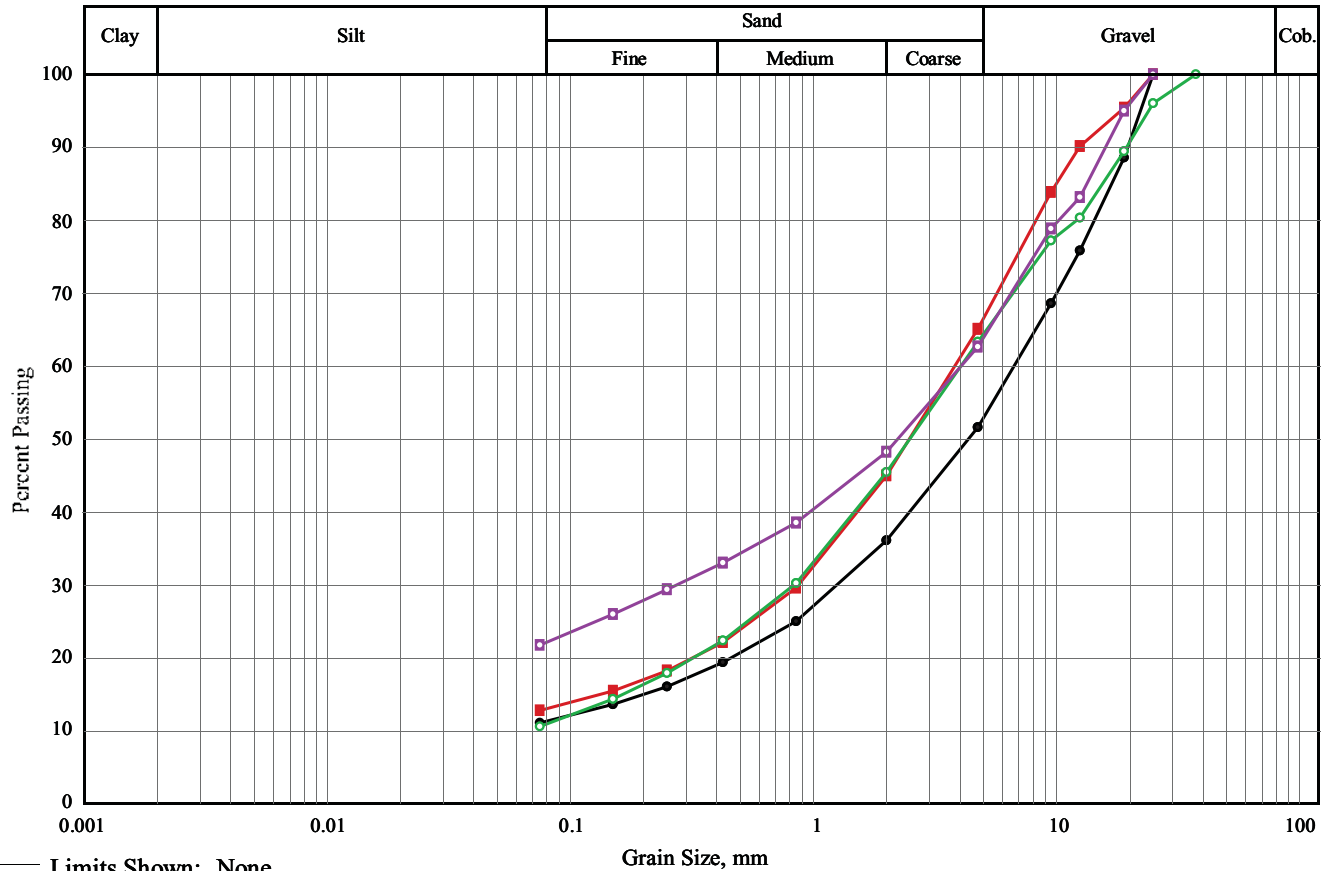
Soil Sieve Analyses



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AND SCIENTISTS

Client: Public Works and Government Services Canada
Project: Geotechnical Investigation, Chignecto South Campground
Project #: 1045605

Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
—●—		3	3		48.4	40.5	11.1		16/03/23
—■—		3	4		34.9	52.3	12.8		16/03/23
—○—		4	2		36.7	52.7	10.6		16/03/23
—□—		5	2		37.4	40.9	21.7		16/03/23

Line Symbol	Sample Description	AASHTO	D ₁₀	D ₁₅	D ₅₀	D ₈₅	% 5-75µm
—●—	Gravel and sand , some silt	A-1-a	---	0.20	4.34	16.89	---
—■—	Gravelly sand , some silt	A-1-a	---	0.13	2.48	9.99	---
—○—	Sand and gravel , some silt	A-1-a	---	0.16	2.49	15.49	---
—□—	Silty sand and gravel	A-1-b	---	---	2.22	13.35	---



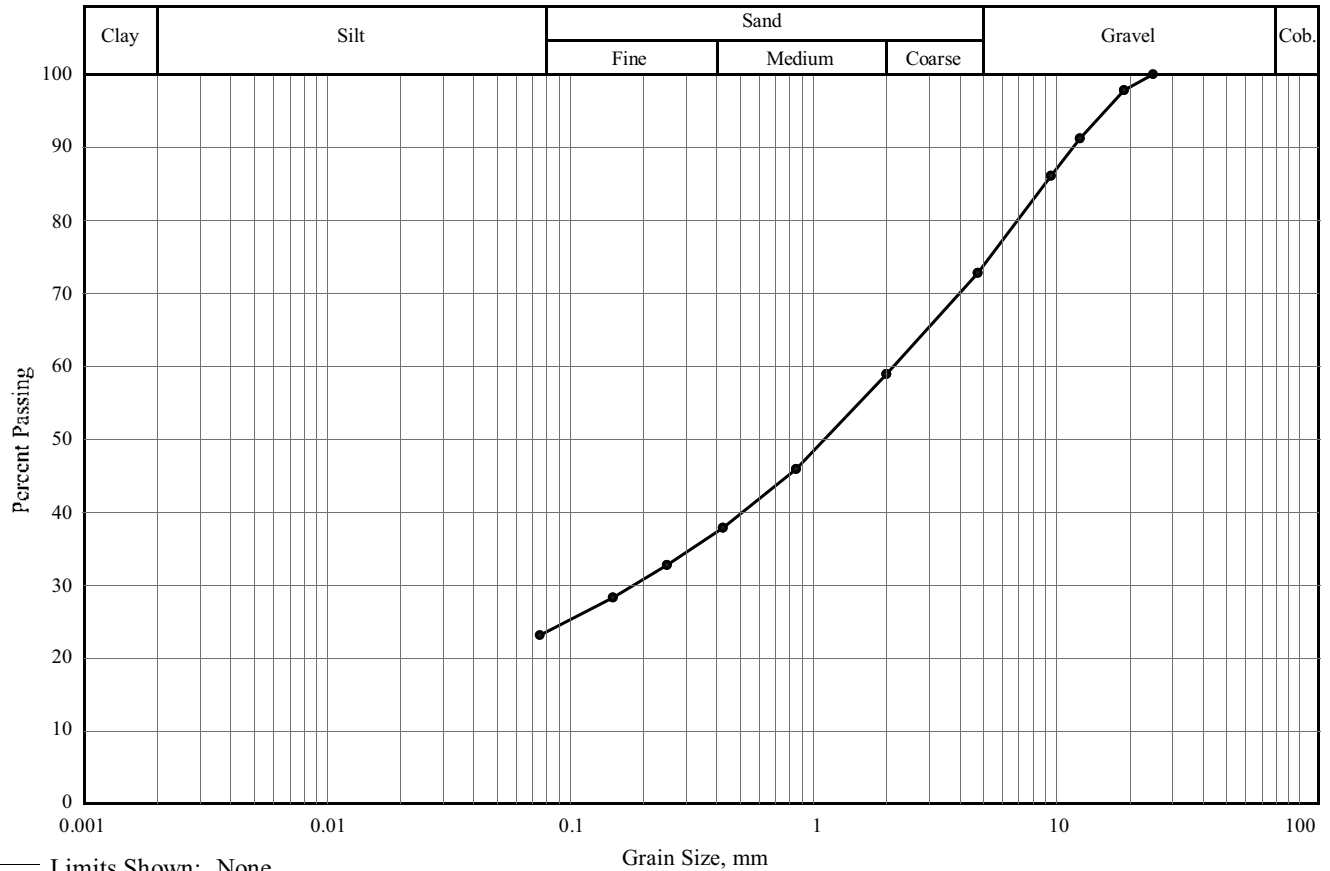
GEMTEC
CONSULTING ENGINEERS
AND SCIENTISTS

Client: Public Works and Government Services Canada

Project: Geotechnical Investigation, Chignecto South Campground

Project #: 1045605

Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
—●—		6	3		27.2	49.7	23.1		16/03/23

Line Symbol	Sample Description	AASHTO	D ₁₀	D ₁₅	D ₅₀	D ₈₅	% 5-75µm
—●—	Gravelly silty sand	A-1-b	---	---	1.12	8.98	---

Appendix D

Soil Moisture Contents



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Project #: 1045605

Moisture Content and Density

Borehole: 1	Date/Time Sampled: 16/03/22 2:51:00 PM	Mass of Cont. + Wet Soil, g:	527.18
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	427.80
Sample: 1		Mass of Container, g:	171.54
Description:		Moisture Content, %:	38.78
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 2	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	520.34
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	502.50
Sample: 2		Mass of Container, g:	164.84
Description:		Moisture Content, %:	5.28
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 3	Date/Time Sampled: 16/03/23 2:53:00 PM	Mass of Cont. + Wet Soil, g:	642.00
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	624.30
Sample: 3		Mass of Container, g:	170.14
Description:		Moisture Content, %:	3.90
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	



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Project #: 1045605

Moisture Content and Density

Borehole: 3	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	1086.50
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	1028.30
Sample: 4		Mass of Container, g:	167.55
Description:		Moisture Content, %:	6.76
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 4	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	874.00
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	803.80
Sample: 2		Mass of Container, g:	107.70
Description:		Moisture Content, %:	10.08
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 5	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	939.10
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	880.60
Sample: 2		Mass of Container, g:	165.52
Description:		Moisture Content, %:	8.18
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	



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Project #: 1045605

Moisture Content and Density

Borehole: 6	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	992.60
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	950.80
Sample: 1		Mass of Container, g:	170.20
Description:		Moisture Content, %:	5.35
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 6	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	1295.70
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	1218.90
Sample: 3		Mass of Container, g:	171.36
Description:		Moisture Content, %:	7.33
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 6	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	1132.20
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	1085.70
Sample: 4		Mass of Container, g:	162.41
Description:		Moisture Content, %:	5.04
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	



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Moisture Content and Density

Borehole: 7	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	648.60
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	608.10
Sample: 2		Mass of Container, g:	108.57
Description:		Moisture Content, %:	8.11
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	
Borehole: 7	Date/Time Sampled: 16/03/23 2:53:04 PM	Mass of Cont. + Wet Soil, g:	496.01
Depth:	Date/Time Tested: 16/03/23 2:53:04 PM	Mass of Cont. + Dry Soil, g:	476.60
Sample: 4		Mass of Container, g:	106.55
Description:		Moisture Content, %:	5.25
		Sample Length, mm:	
		Sample Diameter, mm:	
		Sample Mass, g:	
		Sample Volume, mm ³	
		Wet Density, kg/m ³	
		Dry Density, kg/m ³	

Appendix E

Photographs of Core Barrel Samples



PHOTO 1 - Slate bedrock cores from BH1 (3.3 to 6.06 metres)



PHOTO 2 - Slate bedrock cores from BH3 (4.47 to 6.30 metres)



PHOTO 3 - Slate bedrock cores from BH5 (2.74 to 7.0 metres)

Appendix F

Site Photographs



PHOTO 1 - View of Site looking east (near BH1)



PHOTO 2 - View of Site looking west (near BH3)



PHOTO 3 - View of gravel parking lot looking east



PHOTO 4 - View of gravel parking lot looking west