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Our File No.: 1004979

November 24, 2005

VIA FACSIMILE: (613) 998-7528

Mr. David Patterson
Royal Canadian Mounted Police
Mobile Communications Branch
CPIC Building, 2-048
1200 Vanier Parkway
Ottawa, ON K1A

Dear Mr. Patterson:

Re: Geotechnical investigation
Proposed Ptarmigan Repeater Tower Site
Yellowknife, Northwest Territories

Acting at the request of Mr. Brad W. Herriot of the Royal Canadian Mounted Police (RCMP), Jacques Whitford Limited (Jacques Whitford) has performed a geotechnical investigation at the proposed Ptarmigan Repeater Tower site to be located at the Junction of the Ingraham Trail and Detah Road, north of the City of Yellowknife, Northwest Territories.

This report has been prepared specifically and solely for the project described above.

SCOPE OF WORK

The scope of this investigation consisted of the following:

- A site investigation limited to completing four (4) test pits at the towers proposed foundation and guy wire locations;
- Examination of the geotechnical conditions of the site; and
- Preparation of a geotechnical report providing the information required, as outlined in CSA S37-01 Appendix L, p.105.

SITE DESCRIPTION AND GEOLOGY

The subject site is located on Ingraham Trail at the turn off to Dettah, approximately 10 km north of the City of Yellowknife. The site includes a gated gravel access road leading from Ingraham Trail to a transmitter building. There are currently two existing communications towers at the site. The topography of the site and surrounding area are relatively flat and ground cover primarily includes grass, small trees and other low-growth vegetation.

FIELD PROCEDURES

The field work was completed on November 14, 2005, and consisted of excavating four (4) test pits; one (1) at the proposed foundation location and three (3) at each proposed guy wire anchor location. The test pits were excavated using a track mounted excavator. Test pits were excavated to depths ranging from approximately 2.8 m to 4.5 m below the ground surface and were backfilled with excavated material upon completion.

The field work was supervised by an engineer from Jacques Whitford who kept detailed records of subsurface conditions and who recovered representative samples of the materials encountered. Soil samples were collected directly from the test pit walls or from the excavator bucket. Details of the subsurface conditions encountered in the test pits are presented on the Test Pit Records, TP-1 to TP-4, attached.

All soil samples were stored in moisture proof containers and returned to our laboratory for classification and testing. The results of soil laboratory tests on selected soil samples are reported on the Test Pit Records, where appropriate, or discussed within this report. Samples remaining after testing will be stored for a period of three months, at which time they will be discarded unless instructions to the contrary are received.

SUBSURFACE CONDITIONS

The subsurface conditions observed at the test pit locations are summarized within this report and presented in detail on the Test Pit Records, attached. An explanation of the symbols and terms used for Test Pits and Borehole Records is also attached.

4.1 Topsoil

A surficial layer of topsoil material consisting of rootmat and humus material was encountered at all of the test pit locations. The topsoil material extended from the ground surface to depths ranging from 0.1 m to 0.2 m.

4.2 Sandy Silt

A layer of greenish grey sandy silt material was encountered at each of the test pit locations beneath the surficial layer of topsoil. The thickness of this material ranged from approximately 0.2 m to 1.3 m. A gradation analysis completed on a representative sample from this stratum returned the following group percentages: 8% sand and 92% silt/clay. Moisture contents ranged from 14.4% to 19.5%. The water soluble sulphate content was 0.10%. Based on direct inspection in the test pits and excavator performance, the relative density/constancy of the sandy silt material is interpreted to be loose to compact.

4.3 Silty Clay

A layer of light brown silty clay was encountered beneath the sandy silt material at all of the test pit locations, except Test Pit TP-4. Within the limits of this investigation the thickness of the silty clay layer ranged from approximately 1.3 m to 1.9 m. Test Pit TP-3 was terminated within this layer. The results of two Atterberg Limits tests indicated that the clay was high plastic (average Liquid Limit of 52, Plastic Limit of 24, and Plasticity Index of 28). The moisture content of the samples ranged from 23.7% to 31.7%. In terms of consistency, based on direct inspection of the test pit and the excavator performance, the clay is classed as firm to stiff.

4.4 Clay

A layer of brown clay was encountered beneath the sand and silt material or silty clay material at all test pit locations, except Test Pit TP-2. The thickness of the brown clay material was not determined since, where encountered, the test pits were terminated within this layer. The results of an Atterberg Limits test indicated the following average soil properties: Liquid Limit of 35; Plastic Limit of 21; and Plasticity Index of 14. The results indicate that the soil may be classified as sandy clay (CL) of low to medium plasticity. The moisture content of the samples was between 28.8% and 30.9%. In terms of consistency, based on direct inspection of the test pit and the excavator performance, the clay is classed as stiff to very stiff.

4.5 Groundwater

Groundwater seepage was not encountered at any of the test pit locations within the limits of this investigation. All of the test pit locations were dry upon completion on October 14, 2005. Groundwater depths may vary seasonally and in response to precipitation events.

4.6 Permafrost

Permafrost or ice conditions were not noted in any of the test pits to the limit of their excavation.

DESIGN AND CONSTRUCTION CRITERIA

The comments and recommendations presented herein are in accordance with CSA Standard S37-01, Appendix L (Site Soils Investigations) for Antennas, Towers, and Antenna Supporting Structures. It is understood that the proposed development is to consist of a 91.5 m (300 ft) high tower founded on a reinforced concrete pad with three guy wires attached to anchor piles. No additional details have been provided to Jacques Whitford at the time of this report; therefore, only factual information and

general comments regarding construction requirements are provided. We would be pleased to provide additional geotechnical consultation to the project as the design proceeds.

5.1 Site Preparation

Site preparation in the foundation area should include the excavation of all vegetation, topsoil and any deleterious materials. Prior to any subgrade preparation within the outline of proposed tower foundations, the exposed subgrade surface should be proof-rolled using heavy equipment such as a large roller or loaded tandem dump truck. All soft or loose areas revealed during the proof-roll must be repaired by removal and replaced with compacted Structural Fill, as detailed below.

For unheated structures, footings should be placed at a minimum of 3.0 m below final grade. Should construction proceed during winter months, all elements of the foundations, as well as the floor slab areas, should be protected from freezing. Furthermore, fill materials used should be free from snow, ice, and frozen particles. Construction performed during winter months will require special provisions and precautions. We would be pleased to provide further recommendations if required.

5.2 Soil Conditions

At the request of the RCMP, this site investigation consisted of only test pits. Therefore no in-situ testing was completed on the site soils. Soil parameters provided in this report are based on laboratory testing and correlations with existing research and literature.

Allowable Bearing Pressure - Footings

Footings may be placed on the native, competent clay, or structural fill. Footings may be designed for bearing pressures as shown in Table 1, below.

Table 1 – Allowable Bearing Capacities for Shallow Footings

Soil	Allowable Bearing Capacity (kPa)
Sand	75 kPa
Light Brown Clay	150 kPa
Brown to Grey Clay	200 kPa

The specification for structural fill will depend upon the site details and the proposed fill thickness. In general, structural fill should consist of approved, well-graded granular material such as pit-run sand and gravel. If readily available, well-graded blasted rockfill may also be used. Maximum particle size for the structural fill should not exceed 150 mm and the fines content should not exceed 8%. Use of rockfill is recommended in areas such as excavation bases if wet conditions are encountered.

Structural fill should be placed in lifts and compacted to 100% of Standard Proctor Maximum Dry Density as defined by ASTM D698. In general, lift thickness must be compatible with the compaction equipment used to assure required density is achieved throughout. For rockfill, due to the particle size distribution, verification of the field density by visual inspection during proof rolling by experienced geotechnical personnel is required. As a general guide structural fill should be placed in 300 mm lifts and suitably compacted with a minimum 10 tonne vibratory roller.

Footings may also be founded on structural fill as described above, and footing widths proportioned for a maximum net allowable bearing pressure of 150 kPa.

The base of all footing excavations must be inspected by geotechnical personnel prior to placing concrete in order to confirm the above design pressures and to ensure there are no disturbances. Any disturbed material identified during the inspection will need to be removed and wasted. Footing subgrades must be protected from freezing, wetting or drying, both prior to and following footing placement.

Angle of Internal Friction

The following values are based on empirical correlation and should only be used for preliminary planning and design purposes. For final design we recommend that Direct Shear Tests be completed on representative samples in order to verify the parameters.

Table 2 – Typical Values for Angle of Internal Friction

Soil	(ϕ'))
Structural fill (pit run sand and gravel)	36° - 38°
Rockfill	38° - 40°
Silty Sand	29° - 32°
Well Graded Sand	33° - 35°
Clay (Drained Analysis)	28°
Clay (Undrained Analysis)	ϕ_u = 0° and C_U = 40 kPa

Coefficient of Active and Passive Soil Pressures:

The coefficients of active (K_A) and passive (K_P) soil pressures are a direct function of the angle of internal friction of the material. The following equations are used for determining the soil pressure coefficients:

$$K_A = (1-\sin \phi')/(1+\sin \phi')$$
$$K_P = (1+\sin \phi')/(1-\sin \phi')$$
$$K_0 = 1-\sin \phi' \text{ (Normally Consolidated soils)}$$

Soil Density

The following are typical values based on our experience and empirical correlations. For final design we recommend that Proctor density tests be completed on representative samples in order to verify the parameters. Typical values for the bulk, dry, and submerged density of the soils are as follows:

Table 3 – Typical Values for Total Unit Weight

Soil	Bulk Density (kg/m^3)	Dry Density (kg/m^3)	Submerged Density (kg/m^3)
Structural fill (pit run sand and gravel)	2040	N/A*	1040
Rockfill	2140	N/A*	1140
Silty Sand	1600 to 1800		600 to 800
Well Graded Sand	1800 to 1900		800 to 900
Clay	1900 to 2000		900 to 1000

* Dry Density for fill materials will depend upon the moisture content of the imported soil

Depth of Frost Penetration

Exterior foundations should have a minimum soil cover of 3.0 m or equivalent for frost protection. Footings should not be placed on frozen ground, and temporary frost protection should be provided after construction of footings during winter or freezing conditions.

Drainage

The requirements for long term or permanent drainage control around and below the proposed structure will depend on the details of the site development and the foundation design. A perforated pipe (weeping tile) surrounded with clear stone and leading to a positive outlet is recommended around the exterior of all foundations.

Soil Resistivity and Corrosive Nature of the Soil

The corrosive nature of the soil was assessed through laboratory testing and the results are provided in Table 4, below.

Table 4 – Summary of pH, Resistivity, and Soluble Sulphate Tests

Test Pit #	Sample	Depth (m)	pH	Resistivity (ohm-m)	Soluble Sulphate (%)
TP-2	BS-3	2.0	8.2	227	0.10
TP-4	BS-2	1.0	7.7	112	0.07

Based on these sulphate test results, the degree of exposure is negligible to moderate (CSA A23.1-04, Table 3). High sulphate-resistant Type HS or HSb hydraulic cement with a 56-day compressive strength of 32 MPa and maximum water/cement ratio of 0.45 should be used in all concrete in contact with the existing site soils. Air entrainment to the requirements CSA A23.1 should be specified for all concrete in contact with freezing temperatures.

Pile Capacities

The tower may also consider the use of either bored, cast-in-place concrete piles or driven steel piles. Adfreeze piles are not recommended since permafrost was not encountered. Since the tower is an exposed structure, the frictional resistance of the upper 3 m of the piles should be neglected. A minimum pile length of 7 m is recommended. The piles should be reinforced full length (i.e., steel extending into the pile tip). Based on these depths, it is anticipated that the piles will be founded entirely within the clay.

Piles installed in the clay may be designed for an allowable shaft friction of 15 kPa and an allowable end bearing of 300 kPa. For uplift loads, the piles may be designed for an allowable shaft friction of 10 kPa.

For design, the uplift forces from adfreeze may be calculated based on an assumed 75 kPa uplift acting on the upper 3.0 m of the circumference of the pile shaft, for piles no smaller than 400 mm. Because of the climatic conditions and anticipated depth of frost, it may be uneconomical to design the piles to resist uplift due to seasonal adfreeze. To avoid this, consideration should be given to providing a bond-breaker within the depth of seasonal frost. This bond breaker could consist of an applied coating of bitumen, placement of the upper portion of the pile within a sleeve, or placement of a non-frost susceptible material such as pea gravel or Styrofoam pellets around the top of driven piles. This zone could be created by pre-drilling an oversize pile hole for driven piles and backfilling the annulus with the bond-breaker.

To achieve the above skin friction and end bearing, the sides and base of the pile must be free of water and loose or remoulded material prior to placing concrete. Inspection of the pile cavities by qualified geotechnical personnel prior to placing concrete will be required during this phase of construction.

Bedrock Conditions

Bedrock was not encountered at any of the test pit locations, within the limits of this investigation.

CLOSURE

This report has been prepared for the sole benefit of the Royal Canadian Mounted Police and their agents and may not be used by any third party without the express written consent of Jacques Whitford Limited and the client. Any use which a third party makes of this report is the responsibility of such third party.

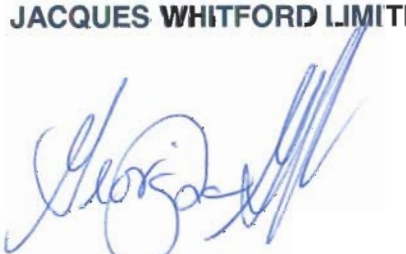
The comments and recommendations made within this report are in accordance with our present understanding of your project. It is recommended that the information presented herein be reviewed when the site development details, final drawings and specifications are complete.

A subsurface investigation is a limited sampling of a site. The conclusions given herein are based on information gathered at specific sampling locations and can only be extrapolated to an undefined limited area around these locations. Variations throughout the site may differ significantly from data collected at the sample locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. Should any conditions at the site be encountered which differ from those at the test locations, we require that we be notified immediately in order to permit reassessment of our comments and recommendations.

We trust this information meets your present requirements. Should any additional information be required, please do not hesitate to contact our office at your convenience.

Yours truly,

JACQUES WHITFORD LIMITED



Georgina D. Griffin, M.Eng.
Senior Geotechnical Reviewer

Stephen Bourn, P. Eng.
Project Manager

GDG:SB/km

Attachments: Drawing Nos. 1 & 2
Symbols and Terms – Test Pit Records
Test Pit Records

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Jacques Whitford

5 2.5 0 5 km

SCALE 1 : 250 000

*IMAGE REFERENCE: NTS MAP 85J

**THIS DRAWING WAS ORIGINALLY CREATED IN COLOUR.

Jacques Whitford	SCALE: 1 : 250 000 DATE: 17/11/05 DRAWN BY: LDP APPROVED BY:	CLIENT : ROYAL CANADIAN MOUNTED POLICE TITLE : GEOTECHNICAL INVESTIGATION SITE LOCATION PLAN PROPOSED PTARMIGAN REPEATER TOWER SITE YELLOWKNIFE, NORTHWEST TERRITORIES	DRAWING NO. 1

16/11/05

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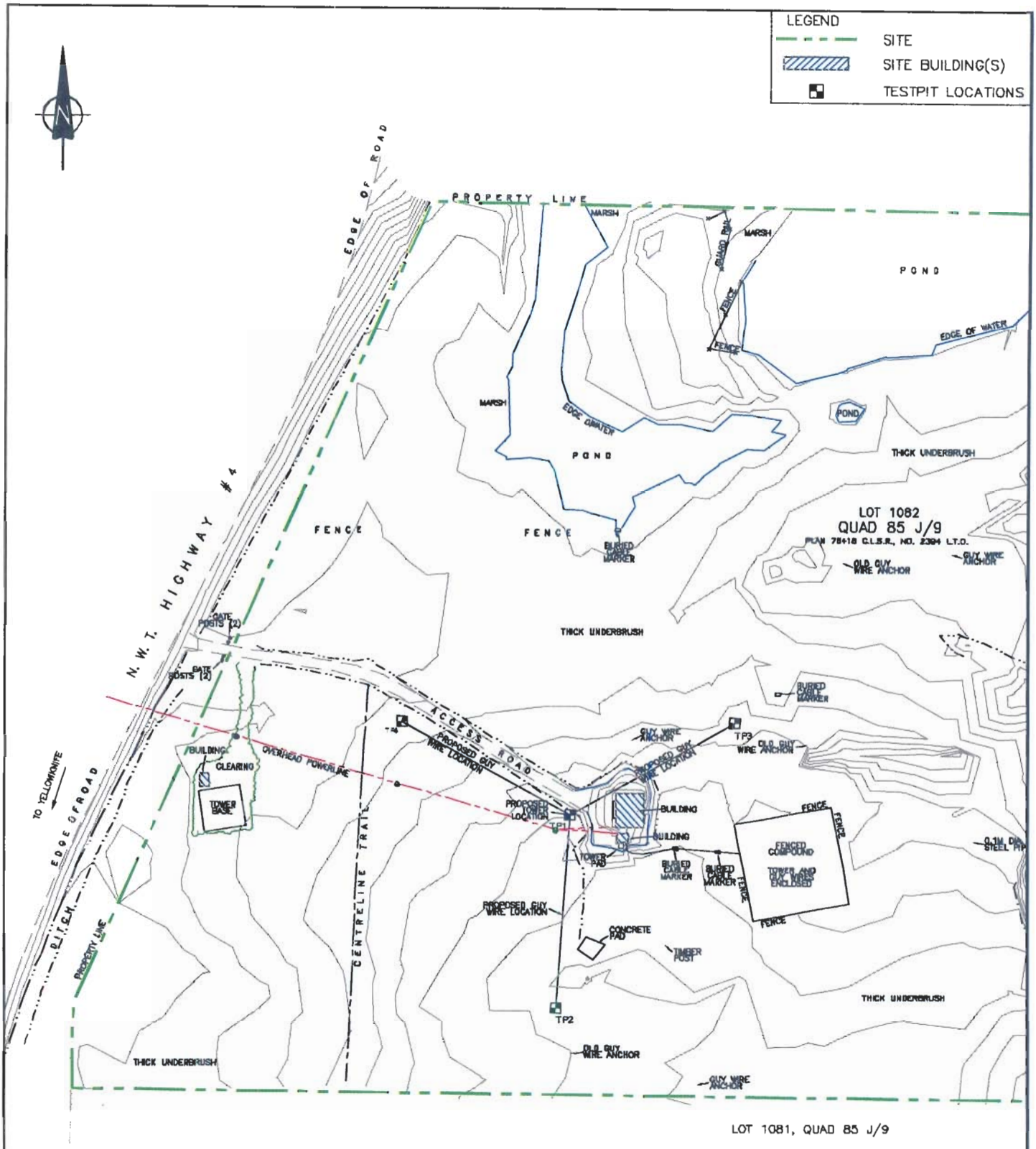

**THIS DRAWING WAS ORIGINALLY CREATED IN COLOUR.

SCALE: 1 : 2000	CLIENT :	ROYAL CANADIAN MOUNTED POLICE	DRAWING NO.
DATE: 17/11/05	TITLE :	GEOTECHNICAL INVESTIGATION	2
DRAWN BY: LDP		**SITE PLAN**	
APPROVED BY:		PROPOSED PTARMIGAN REPEATER TOWER SITE	
		YELLOWKNIFE, NORTHWEST TERRITORIES	

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SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

Soil Description

Terminology Describing Common Soil Genesis

Rootmat	vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	mixture of soil and humus capable of supporting good vegetative growth
Peat	fibrous aggregate of visible and invisible fragments of decayed organic matter
Loam	silty sand or sand with silt mixed with organics
Till	unstratified glacial deposit which may range from clay to boulders
Fill	any materials below the surface identified as placed by humans (excluding buried services)

Terminology Describing Soil Stucture

Homogeneous	same colour and appearance throughout
Stratified	composed of alternating successions of different soil types, e.g., silt and sand
Lensed	inclusion of small pockets of different soils
Laminated	alternating layers of varying material or colour with the layers less than 6 mm thick
Layer	thickness > 75 mm
Seam	thickness between 2 mm and 75 mm
Parting	thickness < 2 mm

Grain Size and Plasticity

Terminology describing soils on the basis of grain size and plasticity is based on the Unified Soil Classification System (USCS) (ASTM D-2487). The classification excludes particles larger than 76 mm (3 inches). This system provides a ground symbol (e.g., SM) and group name (e.g., silty SAND) for identification. Note: terminology describing materials in the absence of laboratory analysis is based on the ASTM D-2488 visual method.

Terminology describing materials outside the USCS (e.g., particles larger than 76 mm, visible organic matter, construction debris) is based on the (visually estimated) proportion of these materials present:

Trace or occasional	Less than approximately 10%
Some	approximately 10-20%
Frequent	Greater than approximately 20%

Standard Penetration Test 'N-Value'

The performance of the Standard Penetration Test provides an 'N-value'; the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (51 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration is achieved and 'N' values cannot be determined, the number of blows is reported over sampler penetration in millimeters (e.g., 50/75).

Density of Cohesionless Soils

The standard terminology to describe cohesionless soils includes the compactness (former "relative density"), as determined by laboratory test or by the Standard Penetration Test 'N-Value'.

Density	N-Value	Compactness %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

Consistency of Cohesive Soils

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by in situ vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength		N-Value
	ksf	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25-0.5	12.5-25	2-4
Firm	0.5-1.0	25-50	4-8
Stiff	1.0-2.0	50-100	8-15
Very Stiff	2.0-4.0	100-200	15-30
Hard	>4.0	>200	>30

Rock Description

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be applied to NW core; however, it can be used on different core sizes if most of the fractures caused by drilling stresses are easily distinguishable from *in-situ* fractures.

RQD %	Rock Quality		
90-100	Excellent	-	intact, very sound
75-90	Good	-	moderately jointed, massive, sound
50-75	Fair	-	fractured, blocky and seamy
25-50	Poor	-	severely fractured, shattered and very seamy or blocky
0-25	Very poor	-	very severely fractured, crushed

Rock Quality Designation (RQD)

Total core recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

Weathering State

Term	Description
Slight	Weathering limited to the surface of major discontinuities. Typically iron stained.
Moderate	Weathering extends throughout rock mass. Rock is not friable.
High	Weathering extends throughout rock mass. Rock is friable (crumbles naturally or broken between fingers).

Terminology Describing Rock Mass

Spacing (mm)	Bedding, Laminations, Bands	Discontinuities
2000-6000	Very Thick	Very Wide
600-2000	Thick	Wide
200-600	Medium	Moderately close
60-200	Thin	Close
20-60	Very Thin	Very close
<20	Laminated	Extremely close
<6	Thinly Laminated	

RECORD SYMBOLS AND ABBREVIATIONS

Sample Types

SS	*Split spoon sample (obtained by performing the Standard Penetration Test)*	*WS*	*Wash sample*
ST	*Shelby tube or thin wall tube*	*BS*	*Bulk sample*
HQ, NQ, BQ, etc.	*Rock core samples obtained using standard size diamond drilling bits.*	*RC*	*Rock chip sample*

Laboratory Tests

S Sieve analysis H Hydrometer analysis A Atterberg limits

Water Level Measurement

Indicates recorded water level in a borehole, test pit or standpipe.

Strata Plot

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:

Solid lines between strata indicate the boundary between different strata. Dashed lines between strata indicate the boundary between strata is inferred.

TEST PIT RECORD

TP1

CLIENT Royal Canadian Mounted Police — PROJECT No. 1004979

LOCATION Ptarmigan Repeater Tower Site — BH SIZE

DATES (mm/dd/yy): BORING 10/14/05 — WATER LEVEL — DATUM

DEPTH(m)	ELEVATION(m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR-RQD %	OTHER TESTS
0		Rootmat (topsoil/humus), dry			GS	1			
		Loose, greenish grey, SANDY SILT, moist			GS	2			
1									
		Stiff, light brown, SILTY CLAY, dry, (CH)			GS	3			
2									
		Stiff, grey and brown, CLAY, moist, (CL)			GS	4			
3									
4									
		End of Test Pit (4.5 m) Test pit open and dry upon completion Test pit backfilled with excavated material							
5									
6									

UNDRAINED SHEAR STRENGTH - kPa
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

Pocket Penetrometer kPa ★

STANDARD PENETRATION TEST, BLOWS/0.3 m ●

10 20 30 40 50 60 70 80 90

App'd GG Nov 18 2005 9:2:42

TEST PIT RECORD

TP2

CLIENT Royal Canadian Mounted Police

PROJECT No. 1004979

LOCATION Ptarmigan Repeater Tower Site

BH SIZE

DATES (mm/dd/yy): BORING 10/14/05 WATER LEVEL

DATUM

DEPTH(m)	ELEVATION(m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR-RQD %	OTHER TESTS
0		Rootmat (topsoil/humus), dry			GS	1			
		Loose, greenish grey, SANDY SILT, moist			GS	2			
1		Stiff, light brown, SILTY CLAY, dry, (CH) - Sample GS3 tested 0.07% soluble sulphate			GS	3			
2									
3		End of Test Pit (3.0 m) Test pit open and dry upon completion Test pit backfilled with excavated material							
4									
5									
6									

UNDRAINED SHEAR STRENGTH - kPa
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P w W_L

Pocket Penetrometer kPa ★

STANDARD PENETRATION TEST, BLOWS/0.3 m ●
10 20 30 40 50 60 70 80 90

App'd Nov 18 2005 8:57:41

TEST PIT RECORD

TP3

CLIENT Royal Canadian Mounted Police

PROJECT No. 1004979

LOCATION Ptarmigan Repeater Tower Site

BH SIZE

DATES (mm/dd/yy): BORING 10/14/05 WATER LEVEL

DATUM

DEPTH(m)	ELEVATION(m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR-RQD %	OTHER TESTS
0		Rootmat (topsoil/humus), dry			GS	1			
		Loose, greenish grey, SANDY SILT, dry							
		Loose, light brown, SILTY CLAY, dry, (CH)			GS	2			
1									
2		Stiff, light brown, CLAY, dry, (CL)			GS	3			
3		End of Test Pit (2.9 m) Test pit open and dry upon completion Test pit backfilled with excavated material							
4									
5									
6									

UNDRAINED SHEAR STRENGTH - kPa
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P w W_L

Pocket Penetrometer kPa ★

STANDARD PENETRATION TEST, BLOWS/0.3 m ●

10 20 30 40 50 60 70 80 90

App'd Nov 18 2005 9:24:50

TEST PIT RECORD

TP4

CLIENT Royal Canadian Mounted Police

PROJECT No. 1004979

LOCATION Ptarmigan Repeater Tower Site

BH SIZE

DATES (mm/dd/yy): BORING 10/14/05 WATER LEVEL

DATUM

DEPTH(m)	ELEVATION(m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR-RQD %	OTHER TESTS
0		Rootmat (topsoil/humus), dry			GS	1			
		Very loose, greenish grey, SANDY SILT, dry - Sample GS2 tested 0.10% soluble sulphate			GS	2			
1									
		Stiff, light brown, CLAY, dry, (CL)			GS	3			
2									
		End of Test Pit (2.75 m) Test pit open and dry upon completion Test pit backfilled with excavated material							
3									
4									
5									
6									

UNDRAINED SHEAR STRENGTH - kPa

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS w_P w w_L

Pocket Penetrometer kPa ★

STANDARD PENETRATION TEST, BLOWS/0.3 m ●

10 20 30 40 50 60 70 80 90

App'd Nov 18 2005 9:25:1

Jacques Whitford Limited
Consulting Engineers
Environmental Scientists

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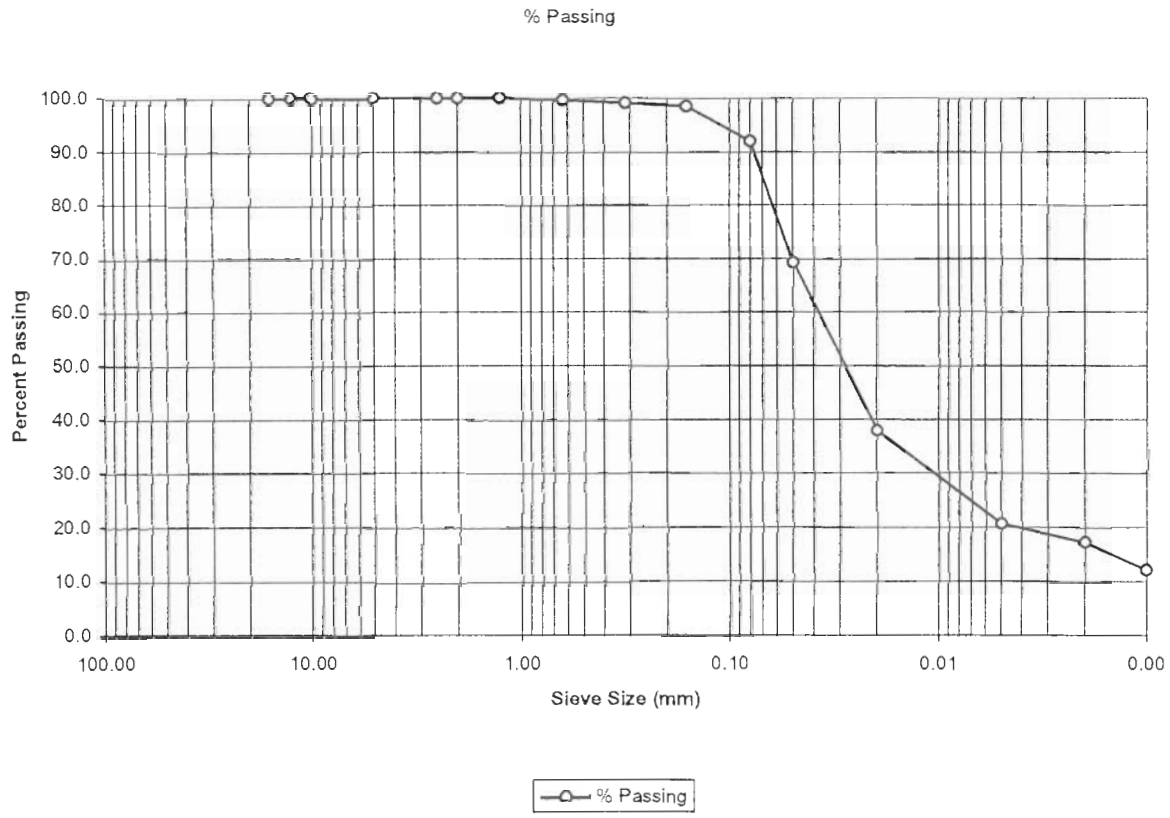
GRAIN SIZE ANALYSIS

ASTM D1140-92

PROJECT: RCMP Tower Site - Yellowknife
CLIENT: RCMP
PROJ. No: 1004979
SAMPLE DESCRIPTION:

SAMPLE No: GS2
SOURCE: TP4
SAMPLED BY: JWL/JW

DATE SAMPLED: 10/26/2005
DATE RECEIVED: 10/26/2005
DATE TESTED: 11/10/2005



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
16.00	100.0		
12.50	100.0		
10.00	100.0		
5.00	100.0		
2.50	100.0		
2.00	100.0		
1.2500	100.0		
0.6300	99.6		
0.3150	99.1		
0.1600	98.5		
0.0800	92.0		
0.0500	69.3		
0.0200	37.8		
0.0050	20.6		
0.0020	17.3		
0.0010	12.0		

COMMENTS: