GEOTECHNICAL/GEOLOGICAL INVESTIGATION OF SELECTED GRANULAR RESOURCE PROSPECTS: BEAUFORT SEA

0101-94-11413

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GEOTECHNICAL/GEOLOGICAL INVESTIGATION OF SELECTED GRANULAR RESOURCE PROSPECTS: BEAUFORT SEA

Part of the Northern Oil and Gas Action Program (NOGAP)
Project A4 - Granular Resources Inventory

SUBMITTED TO:

Indian and Northern Affairs Canada
Hull, Quebec

PREPARED BY:

EBA Engineering Consultants Ltd.
Edmonton, Alberta

0101-94-11413

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EXECUTIVE SUMMARY

The discovery of petroleum reserves north of the Mackenzie Delta has led the Government of Canada to anticipate possible future demands for granular resources in the region to support oil and gas development. As a result, Indian and Northern Affairs Canada (INAC) has compiled a comprehensive granular resource inventory as part of the Northern Oil and Gas Action Program (NOGAP) Project A4. Geological models have been developed in an attempt to explain known offshore borrow areas and to predict other possible similar occurrences.

An offshore geotechnical investigation was completed during March of 1994 for INAC at specific geological and granular resource targets within a south-central region of the Beaufort Sea, just north of Richards Island. The intent of the investigation was to obtain geotechnical data for use in ground truthing geophysical interpretations and in evaluating the suitability of the derived geological models for prospective granular resource sites. The investigation comprised 19 boreholes that were sampled to a maximum penetration of 14.5 m.

This report describes the investigation that was conducted and presents a summary of the geotechnical data that was collected.

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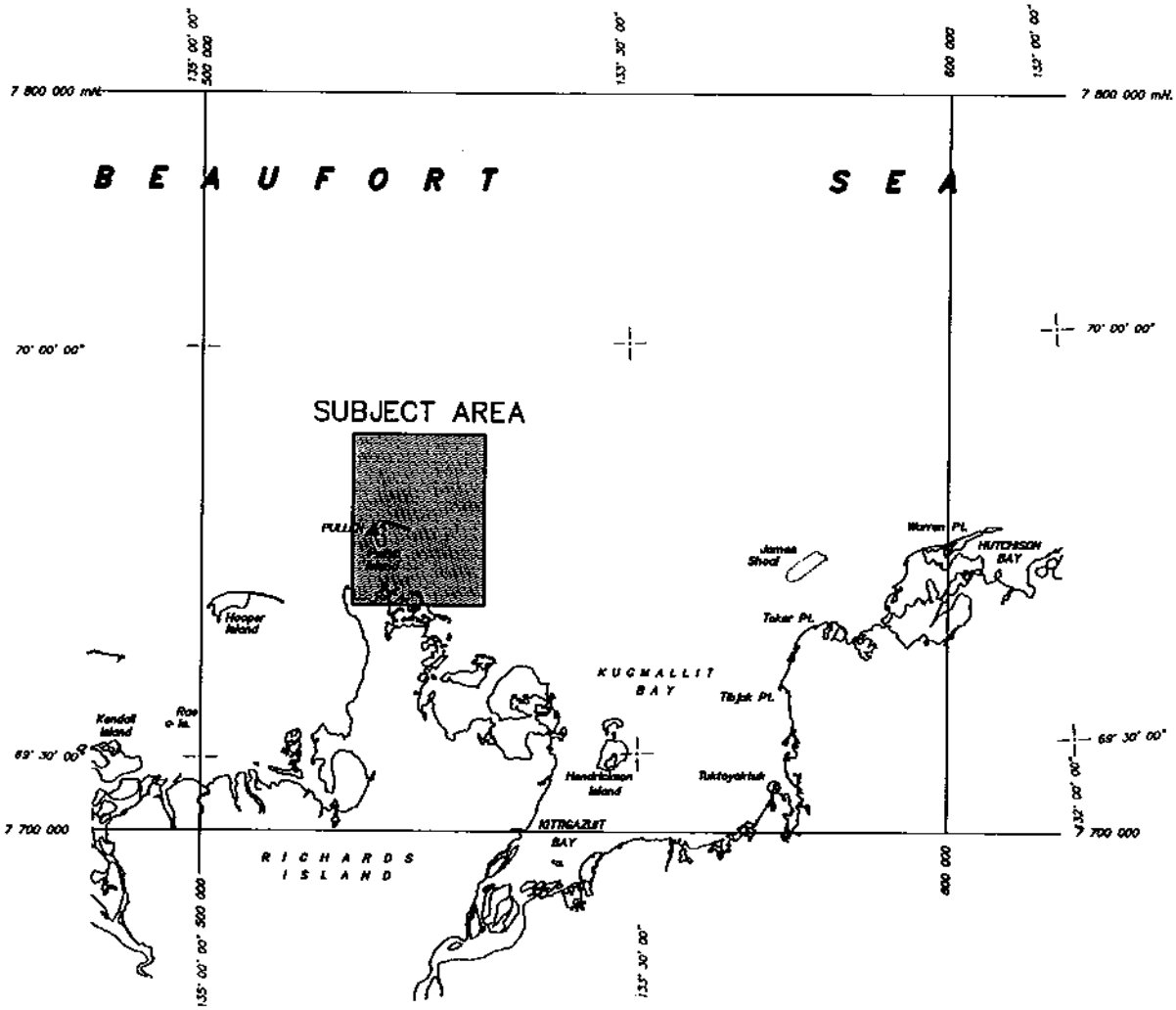
1.0 INTRODUCTION

Indian and Northern Affairs Canada (INAC) has compiled a comprehensive granular resource inventory of the MacKenzie Delta in order to prepare for anticipated oil and gas development in the region. The compilation work has been carried out as part of the Northern Oil and Gas Action Program (NOGAP) Project A4. The inventory currently includes both proven and prospective borrow sources. The NOGAP granular resource program has used existing bathymetric, geophysical, geological and geotechnical data collected by both industry and government. The Geological Survey of Canada, Atlantic Geoscience Centre (GSC-AGC) has developed preliminary geological models in an attempt to explain the known offshore borrow areas and to predict other possible similar occurrences.

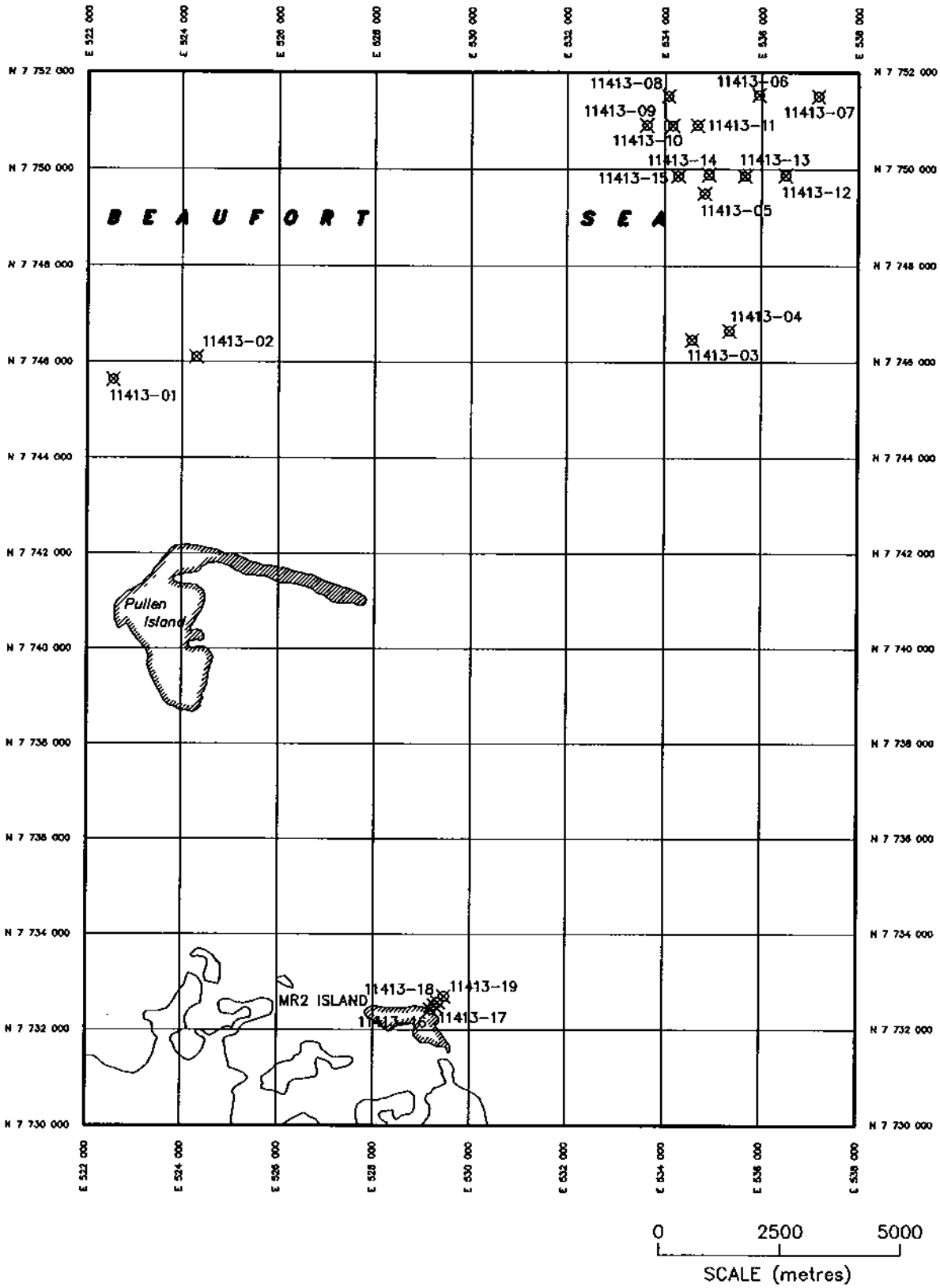
EBA Engineering Consultants Ltd. (EBA) was retained by INAC to carry out a geotechnical investigation to obtain data for use in ground truthing geophysical interpretations and in evaluating the suitability of the derived geological models for prospective granular resource sites. EBA's work was authorized by Contract No. A7134-3-0048/01-ST. Mr. R.J. Gowan, P.Geol., Geotechnical Advisor for the Natural Resources and Environment Branch of INAC, served as the designated Scientific Authority for the project.

This report describes the geotechnical investigation that was carried out in the south-central Beaufort Sea, north of Richards Island, during the 1994 winter field season and presents a summary of geotechnical data collected. The investigation reported herein is one component of the 1994 project conducted on behalf of INAC; two other components of this project are each reported under separate cover (EBA, 1994a; 1994b). The investigation was conducted to provide ground truthing at specific geological and granular resource targets that had been identified by an earlier separate study completed by Lewis Geophysical Consulting (1994).

The field work, for the offshore portion of this study, was conducted between March 8 and 21, 1994. A brief summary of daily operations is presented in Appendix A. Figure 1 presents a map showing the subject area investigated during the 1994 field season. Borehole locations are presented in Figure 2. A total of 19 boreholes were completed during the offshore portion of the 1994 field program. The boreholes are numbered 11413-01 through 11413-19.



EBA Engineering Consultants Ltd.				PROJECT	GRANULAR RESOURCES INVESTIGATION NORTHERN RICHARDS ISLAND, N.W.T.
CLIENT	INDIAN AND NORTHERN AFFAIRS CANADA			TITLE	GENERAL LOCATION PLAN
DATE 95-01-27	DWN. WMG	CHKD. MAV		FILE NO. 11413M20A	FIGURE 1



EBA Engineering Consultants Ltd.				PROJECT	GRANULAR RESOURCES INVESTIGATION NORTHERN RICHARDS ISLAND, N.W.T.
CLIENT INDIAN AND NORTHERN AFFAIRS CANADA				TITLE	LOCATION PLAN AND BOREHOLE LOCATIONS
DATE 95-01-27	DWN. WMG	CHKD. MAV		FILE NO. 11413M21B	FIGURE 2

2.0 FIELD INVESTIGATION

2.1 EXECUTION OF THE INVESTIGATION

The successful completion of the project required not only familiarity with anticipated geotechnical conditions, but also both extensive and recent, relevant experience in planning and conducting winter offshore geotechnical programs. EBA and Midnight Sun Drilling Co. Ltd. provided technical expertise for planning the winter arctic geotechnical program on behalf of INAC.

Logistical options were limited due to the lack of exploration activity in the Beaufort - MacKenzie Region, so a self-contained skid camp was used as the base of operations. The camp facility comprised four sleds which included a fuel sloop, a generator trailer, a kitchen/washroom facility and an accommodations trailer. Ancillary equipment required to clear and maintain ice roads included a Cat 966 rubber-tire loader, and a D-6 Cat.

The equipment and camp was mobilized from Inuvik to the remote camp location at the North Head of Richards Island. The camp was assembled on the MacKenzie River at Inuvik and subsequently moved along the Tuktoyaktuk ice road to Kittigazuit Bay. The camp departed the existing ice road moving northwards, passing along the west side of Hendrickson Island, then proceeded northwest past Hansen Harbour to the North Head of Richards Island. The Cat 966 rubber-tire loader was used to clear an access trail, while the D-6 Cat pulled the skid camp.

Several companies, each under individual government contracts, were involved in conducting the site investigation. The companies and their respective responsibilities were as follows:

- INAC provided the location of individual borings.

- EBA planned the field program, directed and logged the borings, conducted laboratory testing of the soil samples, and prepared this report.

- Midnight Sun Drilling Co. Ltd. (MSD) provided and operated the drilling equipment, soil sampling tools, camp, ancillary support equipment required to clear and maintain ice roads and a scout/bear monitor.

- Challenger Survey and Services Ltd. (CSS) provided locations as determined during a post-mission survey using differential GPS techniques.

2.2 DRILLING AND SAMPLING

Drilling and sampling operations were conducted using MSD's CME 750, top drive, rotary drill rig mounted on an all-terrain rubber tire carrier. The drill rig was enclosed in a tarpaulin-covered frame for protection from arctic weather. Drilling was conducted "open hole" (i.e. without the use of downhole conductor casing). Seawater was used as a flushing medium in all boreholes. The only drilling additive was sodium chloride (NaCl), which was used to further depress the freezing point of the circulated seawater.

Selection of an appropriate sampler for encountered ground conditions was made by EBA's on-site representative, Mr. M.A. Valeriote, R.E.T. Samples were generally obtained at 0.6 m intervals. Soils were generally sampled with a thin-walled shelby tube, advanced by a single stroke of the rig hydraulics. Occasionally, a Standard Penetration Test (SPT) drive sampler was used in noncohesive soils. In Borehole 11413-05, well-bonded permafrost samples were obtained using a standard Longyear NQ core barrel, which provided a 47 mm diameter core. In Boreholes 11413-16 through 11413-19, which were drilled on behalf of Geological Survey Canada, Terrain Sciences Division (GSC-TSD), a CRREL core barrel was also used to obtain permafrost samples. Borehole logs are presented in Appendix B. The borehole locations and completion depths are summarized in Table 1.

At the conclusion of the field program, all soil samples, except those retained by GSC-TSD, were shipped to EBA's Edmonton laboratory for index and classification testing. Results of these tests are presented on the borehole logs, where appropriate, and on laboratory test summary sheets in Appendix C. Particle size distribution curves are presented in Appendix D.

2.3 SAMPLE HANDLING

2.3.1 Geological Target Samples for GSC-AGC

Sampling tubes containing geological target samples for GSC-AGC were fully extruded upon receipt at surface. The samples were wrapped in cellophane to ensure minimal moisture loss and then encased in a split-tube, heavy-wall plastic liner. In an attempt to minimize possible disturbance, these samples were not visually logged

at the drill rig. The samples were sent to the Inuvik Research Centre where awaiting GSC-AGC personnel visually logged the samples and prepared subsamples, split from the main working sample, for laboratory testing.

In Inuvik, each sample was split in half longitudinally allowing one portion to be used as a working sample and the remaining portion to be saved for archive purposes. The working samples were then shipped to EBA's Edmonton laboratory for index and classification testing. Upon completion of the laboratory test program, these samples were forwarded to GSC-AGC in Dartmouth, N.S.

2.3.2 Geological Target Samples for GSC-TSD

All unfrozen samples were fully extruded and visually logged while attempting to minimize disturbance. The samples were wrapped in cellophane and aluminum foil to effect minimal moisture loss and then encased in a split-tube, heavy wall plastic liner. Well-bonded frozen soils were fully extruded upon recovery and visually logged. These samples were then sealed in a polyethylene sleeve. All samples, irrespective of lithology, were placed in cardboard core boxes and initially forwarded to the Inuvik Research Centre. Subsequently, GSC-TSD forwarded these samples to their laboratory facility in Ottawa.

2.3.3 Granular Resource Target Samples

All granular resource target samples were fully extruded and visually logged upon immediate recovery at surface. Representative subsamples for moisture content, particle size distribution analysis, and porewater salinity determination were selected, wherever possible, from the mid-point of the sample length to avoid disturbed zones. These samples were sealed in labelled polyethylene bags and forwarded to EBA's Edmonton laboratory.

3.0 LABORATORY TESTING PROGRAM

A laboratory testing program was carried out for samples that were retained by EBA for testing in EBA's Edmonton facility. The testing program included moisture content, Atterberg limits, particle size distribution, and porewater salinity determinations. Test results are presented on the borehole logs, were appropriate, and on summary tables in Appendix C. Particle size distribution curves are presented in Appendix D.

TABLE 1
BOREHOLE LOCATION SUMMARY

EBA Borehole Number	Target Type	Target Designation	Requested by	UTM Coordinates (Zone 8) Northing (m)	UTM Coordinates (Zone 8) Easting (m)	Seabed Penetration (m)	Water Depth (m)	Date Drilled
11413-01	Geologic	GS6-4-S	INAC	7 745 632.1	522 548.7	10.5	7.2	1994 03 09
11413-02	Geologic	GS6-3-S	INAC	7 746 098.6	524 298.4	11.0	7.2	1994 03 10
11413-03	Geologic	PS2-1-S	INAC	7 746 466.5	534 579.8	13.0	6.3	1994 03 11
11413-04	Geologic	PS2-5-S	INAC	7 746 653.3	535 344.9	11.5	6.3	1994 03 12
11413-05	Geologic	Permafrost	GSC-TSD	7 749 497.0	534 832.7	14.5	8.3	1994 03 14
11413-06	Geologic	Non-Permafrost	GSC-TSD	7 751 537.4	535 938.2	11.5	9.2	1994 03 15
11413-07	Granular	C1-9-S	INAC	7 751 507.8	537 165.4	4.7	9.2	1994 03 16
11413-08	Granular	C1-10-S	INAC	7 751 507.6	534 082.7	5.5	9.3	1994 03 16
11413-09	Granular	C1-7-S	INAC	7 750 910.6	533 631.4	5.0	8.9	1994 03 17
11413-10	Granular	C1-6-S	INAC	7 750 899.2	534 164.8	5.3	9.1	1994 03 17
11413-11	Granular	C1-5-S	INAC	7 750 906.0	534 679.3	4.1	8.9	1994 03 18
11413-12	Granular	C1-4-S	INAC	7 749 873.9	536 489.3	4.7	8.2	1994 03 18
11413-13	Granular	C1-3-S	INAC	7 749 858.4	535 654.7	4.6	8.3	1994 03 19
11413-14	Granular	C1-2-S	INAC	7 749 883.3	534 913.2	4.1	8.3	1994 03 19
11413-15	Granular	C1-1-S	INAC	7 749 856.8	534 276.7	5.9	8.5	1994 03 19
11413-16	Geologic	Nearshore MR2 Island	GSC-TSD	7 732 423.8	529 201.3	11.0	0.4	1994 03 20
11413-17	Geologic	Nearshore MR2 Island	GSC-TSD	7 732 509.4	529 272.6	3.4	1.1	1994 03 21
11413-18	Geologic	Nearshore MR2 Island	GSC-TSD	7 732 576.3	529 347.6	7.0	0.9	1994 03 21
11413-19	Geologic	Nearshore MR2 Island	GSC-TSD	7 732 701.8	529 470.0	12.2	2.3	1994 03 21

NOTE:
1. INAC: Indian and Northern Affairs Canada
2. GSC-TSD: Geological Survey of Canada, Terrain Sciences Division
3. All coordinates supplied by Challenger Survey and Services Ltd.
4. Coordinates provided are based on the North American 1927 (NAD27) datum.

4.0 GEOLOGY

4.1 GENERAL GEOLOGICAL HISTORY

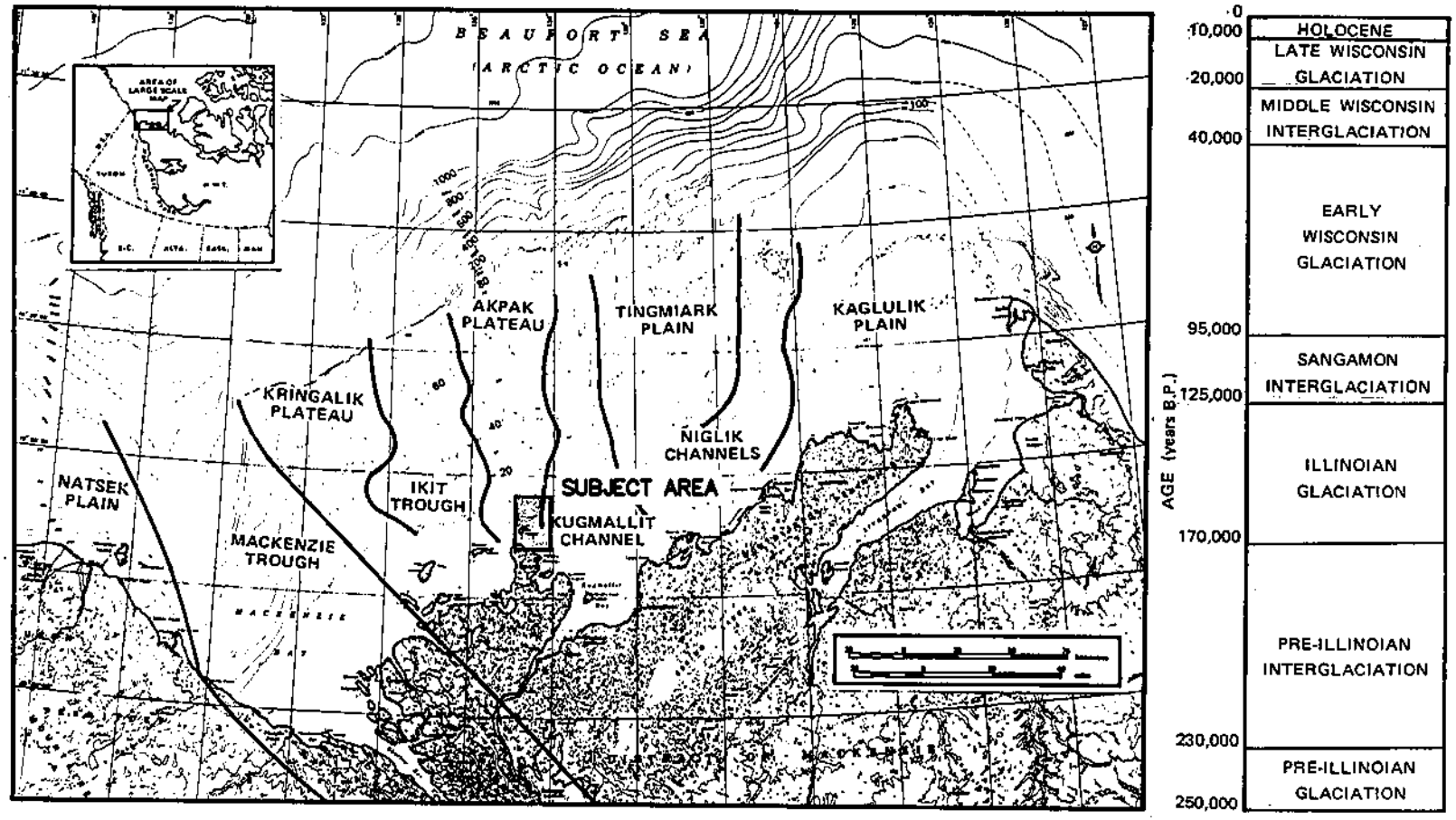
The following discussion of regional surficial geology is based on a synthesis that was prepared by EBA for inclusion in a report by Swan Wooster Engineering Co. Ltd. (1982), which was submitted as a support document for a 1982 joint-industry Environmental Impact Statement (EIS) for Hydrocarbon Development in the Beaufort Sea - MacKenzie Delta Region. It is consistent with the regional geologic model proposed by M.J. O'Connor (1982), which has been adopted by the Geological Survey of Canada as a general model for this region.

Figure 3 presents the major physiographic regions within the Canadian Beaufort Sea Continental Shelf as identified in the EIS. The figure also presents a geologic time scale that is pertinent to seabed sediment deposition.

The area that was investigated during the 1994 winter field program is within the physiographic region known as the Akpak Plateau. The soils that were encountered below the surficial Holocene sediments are thought to be of Wisconsinan age. The overall distribution of the sediments across the area has been largely influenced by two major sea-level fluctuations during the Wisconsin Stage. Depression of the sea-level by as much as 140 m below present levels has been suggested, coincident with the maximum Mid-Wisconsinan ice advance. The furthest advance for the ice sheet at that time is thought to have been to a line extending approximately from near Herschel Island to the Tuktoyaktuk Peninsula.

During the Middle Wisconsin Stage (prior to about 35,000 years ago), a large fluvio-deltaic or glaciofluvial plain developed that extended over most of the western Canadian Beaufort Sea. The precise age and extent of the deltaic plain is not certain, but is thought to be at least as old as the Middle Wisconsinan glacial retreat. Detritus released during the retreat of the ice sheet is the probable source of the deltaic sediments on the plain.

The late Wisconsin Stage was marked by a final glacial advance, during which sea-levels were depressed by as much as 100 m below present levels (about 20,000 years ago). Most of the area exposed by the depression in sea-level experienced a periglacial climate similar to that prevailing in the High Arctic Islands today.



EBA Engineering Consultants Ltd.				PROJECT	GRANULAR RESOURCES INVESTIGATION NORTHERN RICHARDS ISLAND, N.W.T.
CLIENT INDIAN AND NORTHERN AFFAIRS CANADA				TITLE	PHYSIOGRAPHIC REGIONS OF THE BEAUFORT SEA AND GEOLOGIC TIME SCALE
DATE 95-01-27	DWN. WMG	CHKD. MAV		FILE NO. 0101-11413	FIGURE 3

Permafrost aggradation accompanied the cooler climate, and development of sparse vegetation also occurred.

The exposure of the shelf also allowed subaerial erosion and deposition to take place. There is evidence in seismic records of the development of shallow thermokarst lakes on the exposed surface. A thick layer of uniform fine-grained sand deposited across the Akpak Plateau, and Tingmiark and Kaglulik Plains during this period appears to be of fluvio-deltaic origin. This deposit lies unconformably on the older, partially eroded, deltaic sequence.

During this period of sea level depression, a significant distributary of the prehistoric MacKenzie River cut a deep channel (the Kugmallit Channel) through the fine-grained sands, establishing a route for drainage and imposing deposition control that remains active to the present.

The Late Wisconsinan ice front is thought to have begun its retreat about 20,000 years ago. The Kugmallit Channel, as one of the three main distributaries of the MacKenzie River system, is likely to have undergone further modification. Complex cycles of erosion and deposition would have been experienced locally as a result of increased volumes of sediment-laden meltwater.

As the sea-level rose during the Late Wisconsinan marine transgression, the relatively warm, shallow water thawed parts of the frozen land surface. Extensive reworking of the deltaic plain by glacial meltwater, wave and current action resulted in re-deposition of the surface material in sequences reflecting the uneven advance of the sea over the land surface. Finer-grained sediments (silts and clays) were deposited in the deep water of the local drainage channels and over areas of low current activity. This process, combined with sideslope instability and a sustained influx of fine-grained material from the MacKenzie River, contributed to the substantial infilling of the Kugmallit Channel. This infill material consists predominantly of normally consolidated silts and clays, although in some areas, thick sand deposits are present.

4.2 SURFICIAL GEOLOGY OF THE SOUTHERN BEAUFORT SHELF

A general stratigraphic model of the surficial geology of the upper 100 m of the Beaufort Shelf has been proposed for the area north of Richards Island (Blasco et al., 1990, as referenced in Blasco and Lewis, 1990). The sediments of Units A to E are probably less than 25,000 years old, and Units A, B and the upper part of C may be

largely Holocene in age (less than 10,000 years old). A brief summary of each of the five units is presented in the following:

Unit A

Marine clays deposited on the shelf under the less dynamic wave and current conditions of the offshore, generally in water depths greater than 10 m. Unit A is soft and less than half a metre to a few metres thick. Unit A is disrupted and reworked by ice keels. The contact with the underlying Unit B complex is usually gradational (increasing silt content), and where present may be destroyed by ice scouring.

Unit B

Complex sequence of transgressive sediments related to deposition under the high energy wave and current conditions of shallow water regimes during the last sea-level rise across the shelf. Sediment type is coarser grained than Unit A and is usually composed of interbedded and layered silts and clays. Basal strata of Unit B may contain interbedded sands and sands and gravels related to the reworking of underlying Unit C sediments during transgression. Depositional environments represented by Unit B include barrier islands, relict beaches, lagoons, tidal inlets etc.

Unit C

Sediments that were in situ prior to the last transgression and were deposited during the last regressive cycle form Unit C strata. In this area, Unit C represents a broad coastal outwash plain of possible glaciofluvial origin. The unit is primarily a fine-grained sand with minor silt-clay interbeds. Depressions in the irregular upper surface of Unit C may represent relict thaw lakes or channels of the old coastal plain. The thickness of Unit C varies but is usually about 20 to 40 m thick. Discontinuous ice-bearing sediments are present.

Unit D

Unit D forms a thick (possibly 20 to 40 m) stiff silt to clayey silt layer underlying Unit C in the area and may represent sediments of an earlier transgressive cycle. These sediments may be discontinuously ice-bearing and well-bonded at the contact with the underlying sands of Unit E.

Unit E

Unit E is a widespread sand layer found approximately 60 m below the seabed under Unit D in this area. The sands are well-bonded and form the top of the main permafrost body.

4.3 SURFICIAL SEDIMENTS OF THE AKPAK PLATEAU

The sediment sequence of the Akpak Plateau is complex, varying both laterally and with depth. The Akpak Plateau is underlain by Unit C sands (and localized gravels) that outcrop on the seabed adjacent to the Kugmallit Channel. Shoreward towards the southwest, Unit C sands dip under a complex sequence of Unit B strata that consist of interbedded layered silts and clayey silts. These Unit B transgressive sediments achieve a thickness of 14 m on the above section and may thicken and become more spatially variable in shallower water.

The distribution of ice-rich permafrost within the surficial sediments of the Akpak Plateau is laterally and vertically discontinuous, but appears to be confined to Unit C sediments.

5.0 SITE STRATIGRAPHY

5.1 GENERAL SUBSURFACE CONDITIONS

The stratigraphy encountered during this investigation varied due to the aerial extent covered. The geological model for the inland portion of Akpak Plateau describes a complex sediment sequence comprising a layer of marine clays (Unit A); overlying a set of transgressive, shallow-water sediments (Unit B); overlying a stratum of coastal outwash plain deposits (Unit C). Prior to the last transgression, the Unit C deposits formed an irregular palaeo-surface that was subjected to extensive modification by fluvial, glacial, thermokarst, lacustrine, aeolian, and littoral processes.

Detailed descriptions of textural variations, consistency, and colour are provided on the borehole logs presented in Appendix B. These descriptions, which are generally based on both field descriptions and laboratory test data, except as noted below, are used to compile a generalized stratigraphy for the target areas.

The borehole logs for the holes drilled on behalf of the Geological Survey of Canada, Terrain Sciences Division (GSC-TSD) are included in Appendix B for presentation

purposes. All samples obtained from these boreholes were retained by GSC-TSD. No discussion regarding the soil conditions at these latter locations has been included in this report.

5.2 STRATIGRAPHY OF GEOLOGICAL TARGETS (GSC-AGC)

Four boreholes were drilled to obtain information for use in ground truthing geophysical interpretations and in evaluating the suitability of the derived geologic models. (This evaluation will be undertaken later by INAC and GSC-AGC.) Accordingly, it is not the intent of this study to summarize the stratigraphic conditions nor assign unit designations per the proposed geologic model outlined in Section 4.2. Boreholes 11413-01 and 11413-02 were drilled approximately 2 km north of Pullen Island in an area that has been named "New Prospect". Boreholes 11413-03 and 11413-04 were drilled approximately 6 km northeast of Pullen Island in an area that is known as "Breaker's Shoal".

Figure 4 presents diagnostic profiles of measured moisture contents and percentages of clay, silt, sand, and gravel from samples recovered from the New Prospect area. Figure 5 presents similar diagnostic profiles for the Breaker's Shoal area.

5.3 STRATIGRAPHY OF GRANULAR RESOURCE PROSPECT

Based upon samples recovered from Boreholes 11413-06 through 11413-15, drilled at or adjacent to the Granular Resource Prospect, the following presents a simplified stratigraphic description of the soils encountered.

SOIL STRATIGRAPHIC UNIT	DEPTH BELOW SEABED (m)
Clay (CL) - silty, trace of sand, very thin laminae, low plastic, dark olive grey	0 to 1.5*
Sand (SM) - some silt to silty, trace to some clay, fine-grained, dark olive grey	0 to >5.9**

Note: * Except for BH 11413-06, which penetrated a 9.3 m layer of surficial clay.
** Determination limited by maximum depth of borehole penetration.

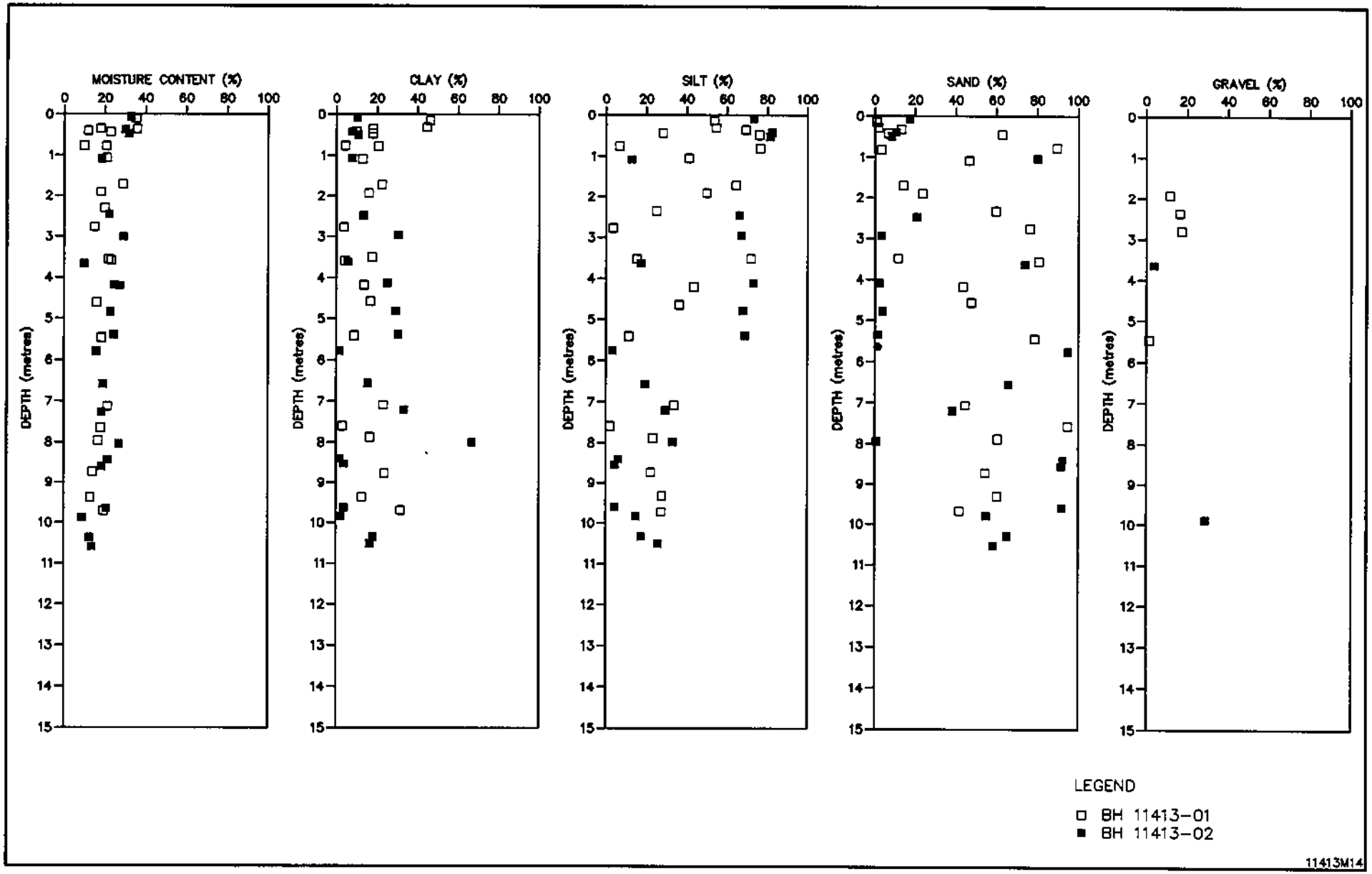


FIGURE 4 NEW PROSPECT DIAGNOSTIC PROFILES
PERCENTAGES MOISTURE, CLAY, SILT, SAND,
AND CLAY VS. DEPTH

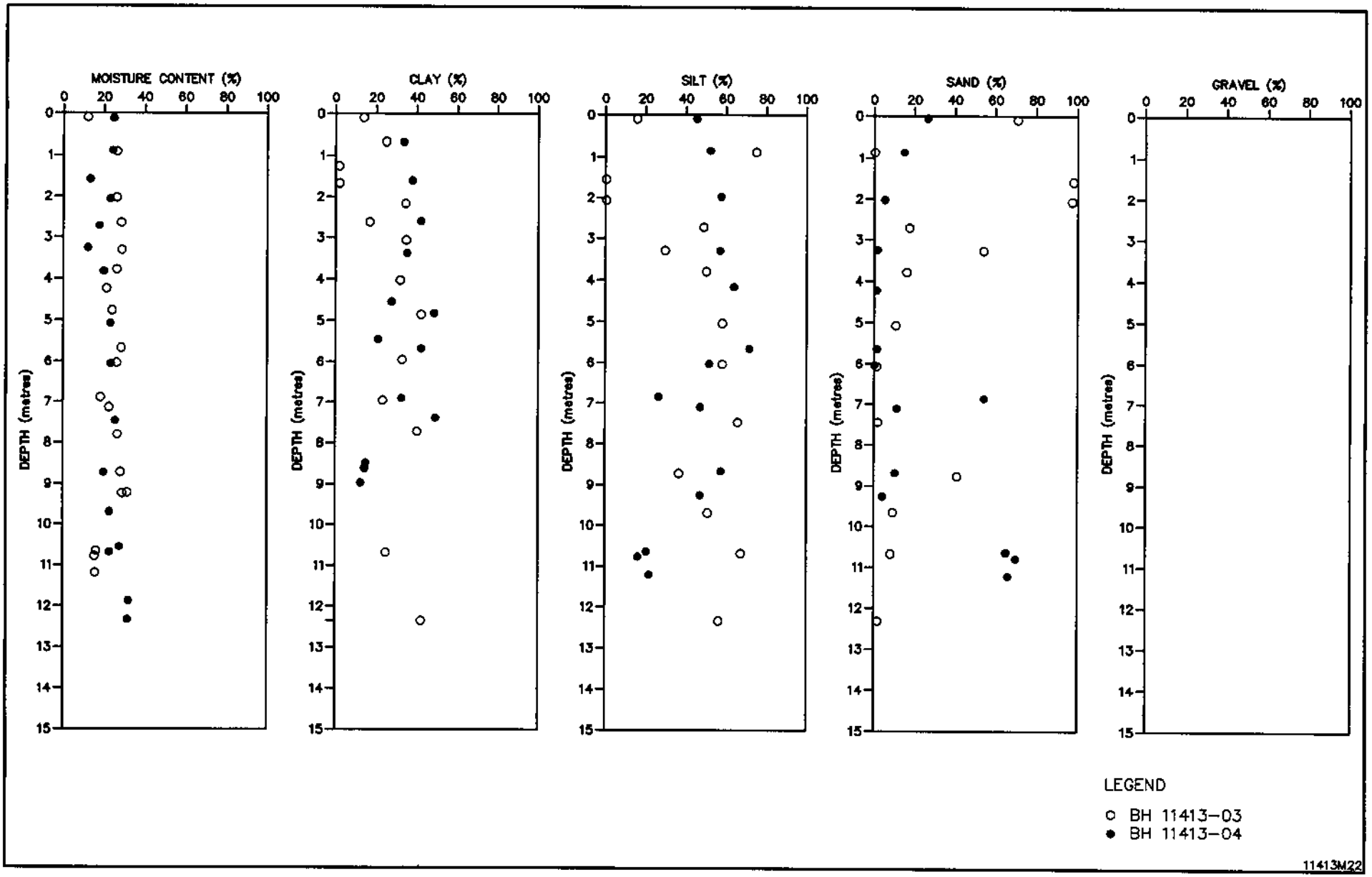


FIGURE 5 BREAKER'S SHOAL DIAGNOSTIC PROFILES
PERCENTAGES MOISTURE, CLAY, SILT, SAND,
AND CLAY VS. DEPTH

The uppermost unit sampled was the "Clay"; however, this unit was not encountered at all borehole locations. This material was described as being low plastic, thinly laminated, and thinly interbedded with silt or silty fine-grained sand. This unit was not encountered at three of the ten boreholes drilled. The surficial cohesive layer was less than 1.5 m thick in all but one of the seven boreholes were encountered. At Borehole 11413-06, the surficial cohesive layer extended to 9.3 m below seabed.

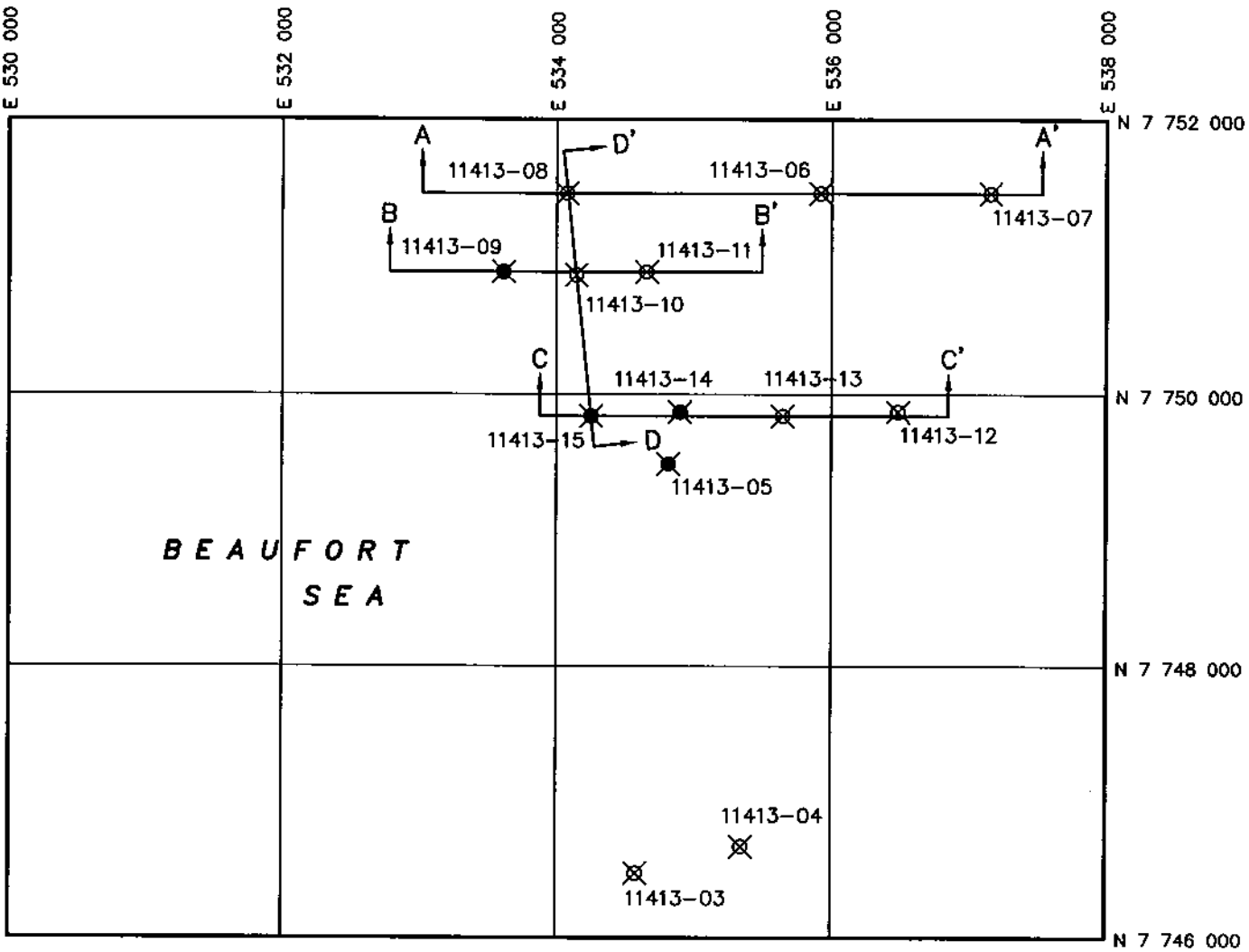
The underlying "Sand" unit was observed to be fine-grained containing varying contents of both silt and clay. Thin interbeds of silt and clay were observed within the sand unit. The presence of disseminated organics and shell fragments was noted in several samples.

Four stratigraphic cross-sections have been prepared at the locations shown in Figure 6. The four stratigraphic cross-sections are shown in Figures 7 and 8. Results of selected soil properties from the classification and index tests conducted are presented in the form of a diagnostic profile in Figure 9.

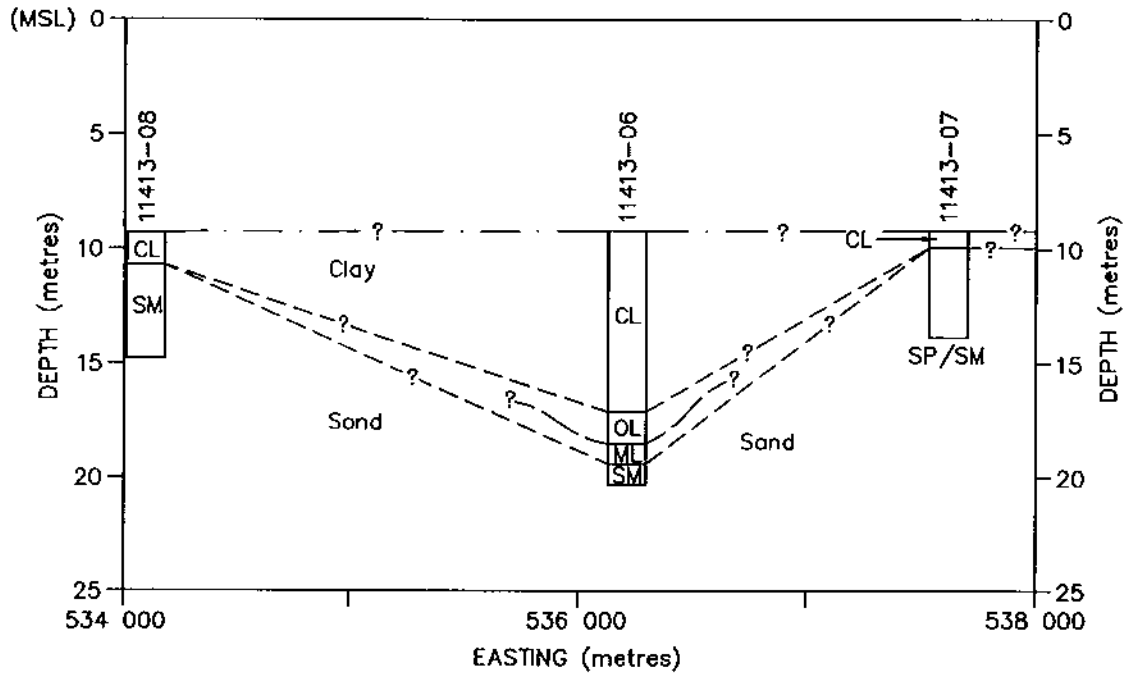
5.4 PERMAFROST AND GROUND ICE

Permafrost is defined as the thermal condition under which any earth materials such as rock and soil, that has existed below 0°C for at least two consecutive years, without regard to the phase composition of moisture present in the pore spaces. Marine sediments encountered at depths of up to 50 m beneath the Beaufort Sea have porewater salinities that range between 20 and 40 ppt, resulting in a freezing point depression that averages at least 1.5 C°. As a result, these soils can exist at temperatures below 0°C but exhibit no significant ice bonding or segregated ice. Because fine-grained seabed soils in the Beaufort Sea display similar mineralogical compositions, it is anticipated that unfrozen water contents will not be significantly affected by variations in mineralogy. For the purposes of this investigation, soil has been designated "frozen" only if visible ice and/or ice bonding was encountered.

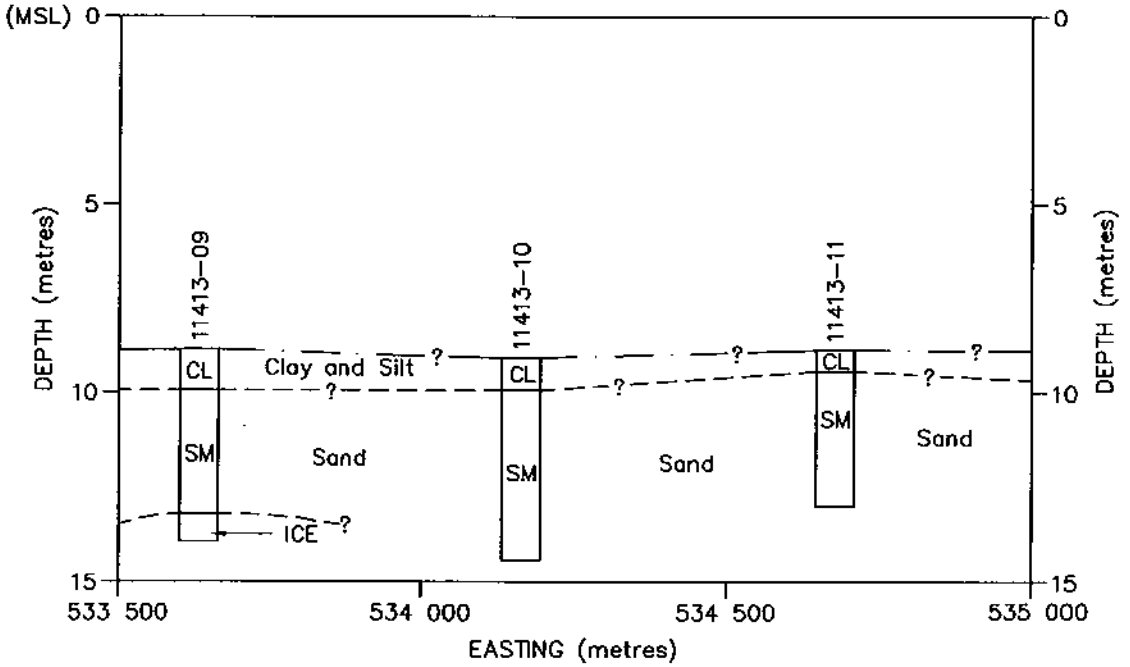
In the vicinity of the Granular Resource Prospect, visible ice and/or well-bonded soil was encountered in samples obtained from within the sand unit in Boreholes 11413-05, 11413-09, 11413-13, and 11413-14. The borehole locations where visible ice and/or well-bonded soil were encountered are presented in Figure 6.



EBA Engineering Consultants Ltd.				PROJECT	GRANULAR RESOURCES INVESTIGATION NORTHERN RICHARDS ISLAND, N.W.T.
CLIENT INDIAN AND NORTHERN AFFAIRS CANADA				TITLE	GRANULAR RESOURCES TARGET STRATIGRAPHIC CROSS–SECTION LOCATIONS
DATE 95–01–27	DWN. WMG	CHKD. MAV		FILE NO. 11413M25B	FIGURE 6



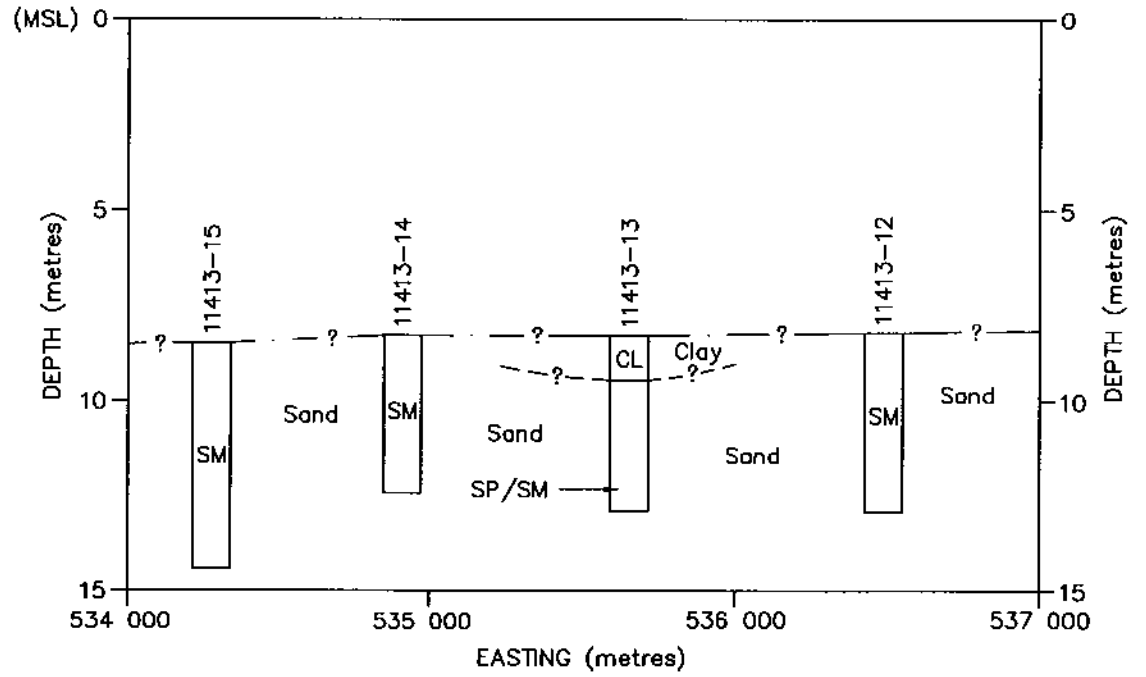
CROSS-SECTION A-A'



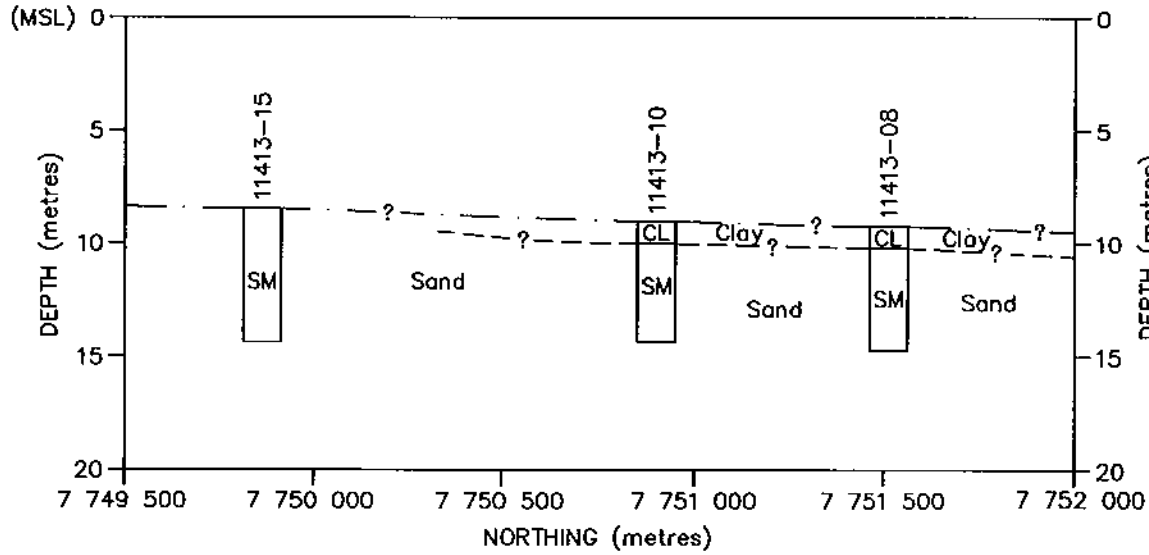
CROSS-SECTION B-B'

11413M06B

FIGURE 7 GRANULAR RESOURCE TARGET STRATIGRAPHIC CROSS-SECTIONS



CROSS-SECTION C-C'



CROSS-SECTION D-D'

11413M07B

FIGURE 8 GRANULAR RESOURCE TARGET
STRATIGRAPHIC CROSS-SECTIONS

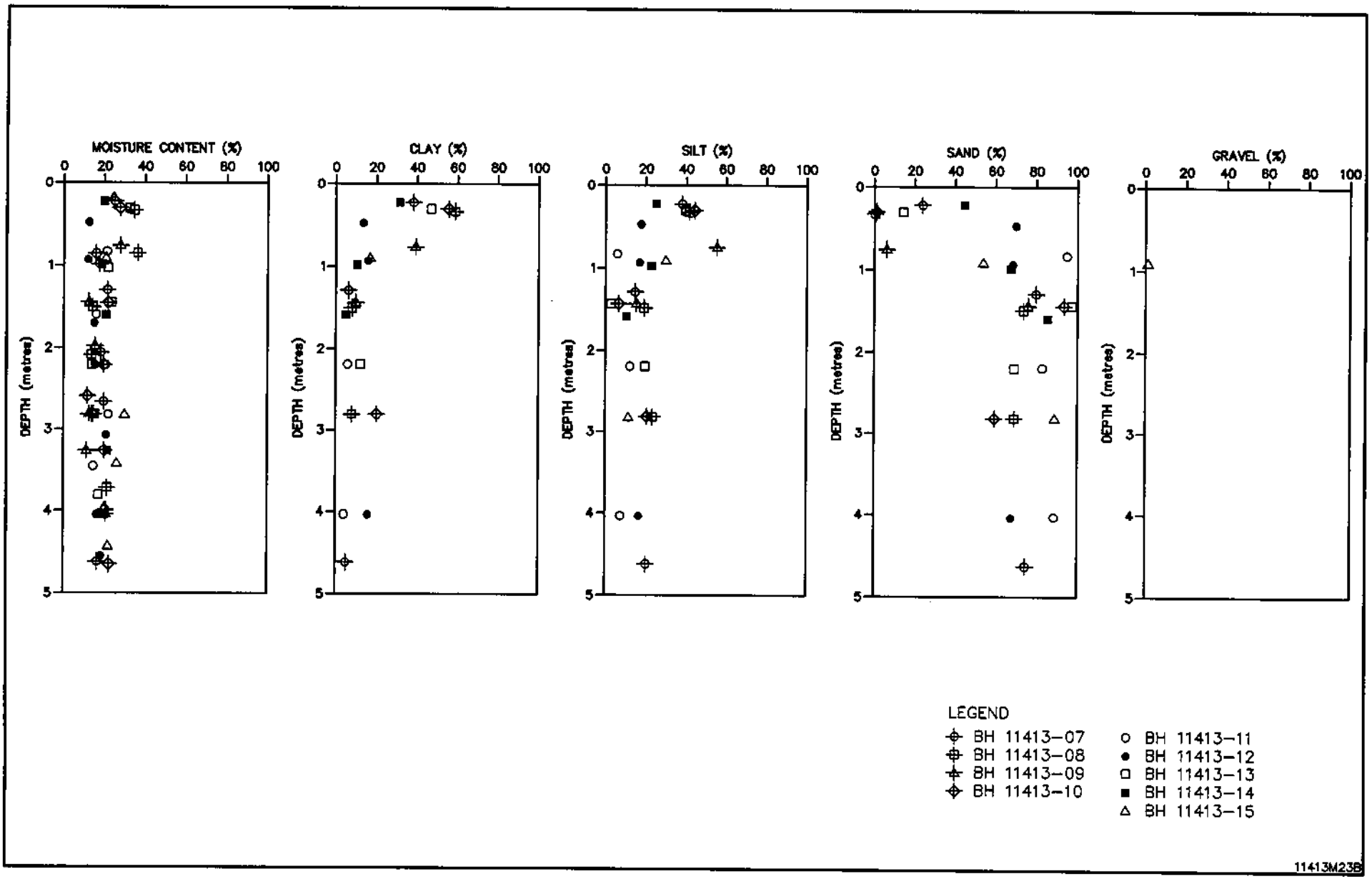


FIGURE 9 GRANULAR RESOURCE TARGET
PERCENTAGE MOISTURE, CLAY, SILT, SAND, AND GRAVEL VS. DEPTH

6.0 DISCUSSION

6.1 GRANULAR RESOURCE PROSPECT EVALUATION

The seabed soils penetrated have been assigned to two broad units, as previously outlined in Section 5.3, on the basis of engineering properties. The particle size distribution curves obtained are presented in Appendix D, and a composite grading envelope from the sand samples tested from the Granular Resource Prospect (Borehole No. 11413-07 to 11413-15 inclusive) are presented in Figure 10.

Only six samples, on which a gradation analysis was conducted, contained a total fines content (material less than 80 microns) that was less than 15%, and a D50 averaging approximately 180 microns. Composite gradation curves derived from the sand samples tested having a total fines content of less than 15% and greater than 15% are presented in Figures 11 and 12, respectively.

Due to the seabed clay encountered at a number of locations and the fines content determined for the underlying stratum, in association with environmental concerns (i.e. turbidity), the area evaluated is not considered a favourable granular resource prospect.

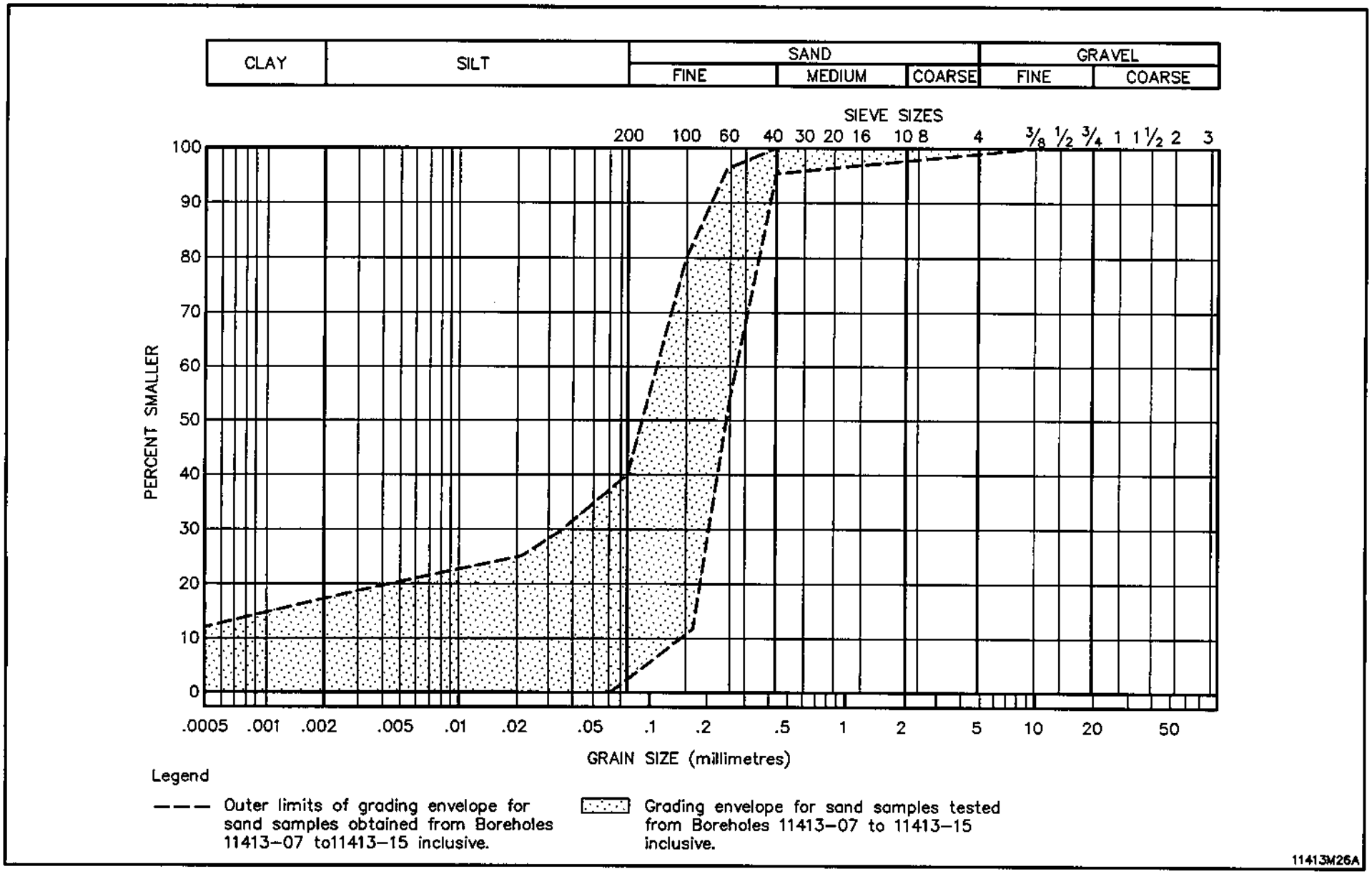
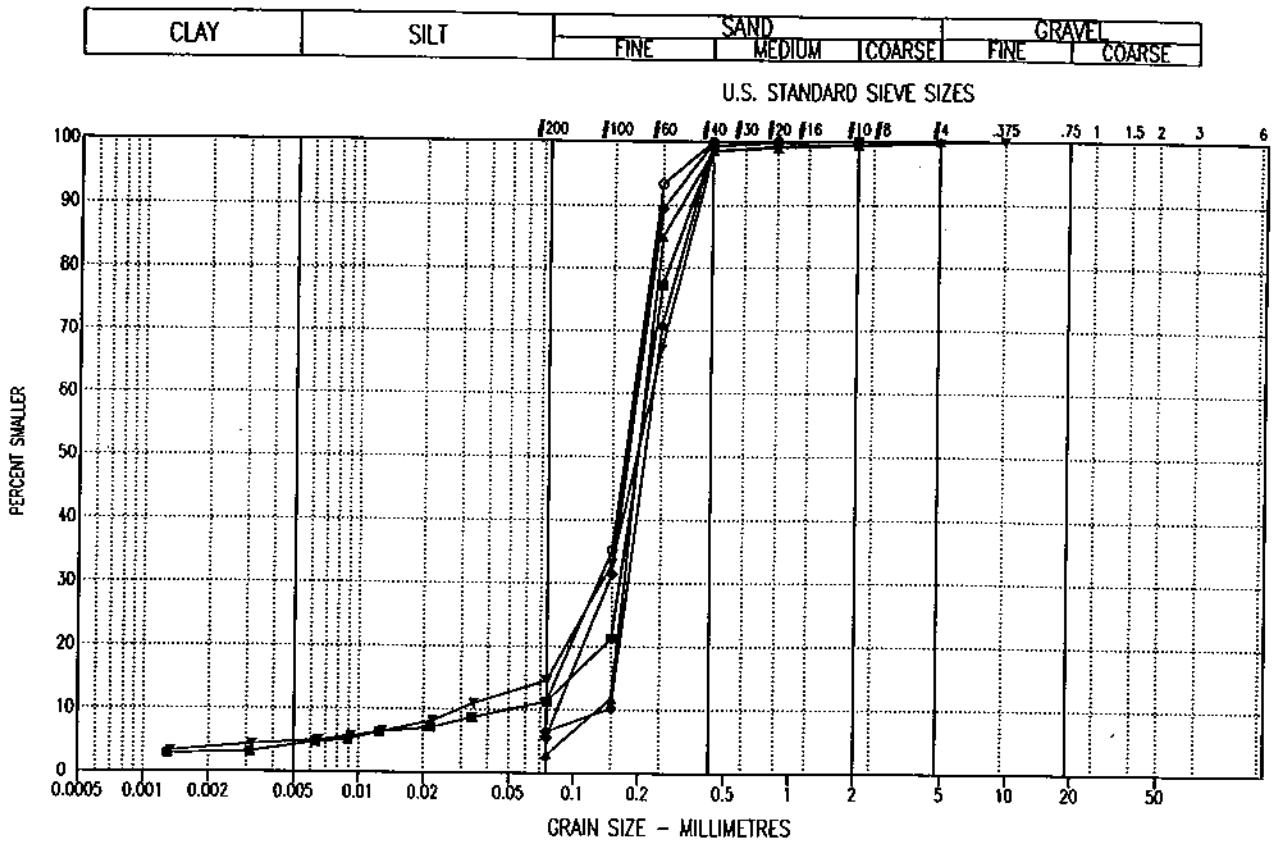


FIGURE 10 COMPOSITE GRADING ENVELOPE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●	10	1.40 - 1.50	6.5	93.5	0.0	1.6	1.0	SP-SM
◆	11	0.80 - 0.90	5.6	94.4	0.0	2.3	1.2	SP-SM
■	11	4.00 - 4.10	4.1 7.1	88.8	0.0	4.1	2.3	SP-SM
▲	13	1.40 - 1.50	2.8	97.2	0.0	1.6	1.1	SP
▼	14	1.50 - 1.70	4.7 9.9	85.1	0.3	7.7	2.8	SM
⊖	15	2.70 - 2.90	11.2	88.8	0.0	2.7	1.3	SP-SM

Project: 0101-11413 Date Tested: 94/04/11 BY: MH

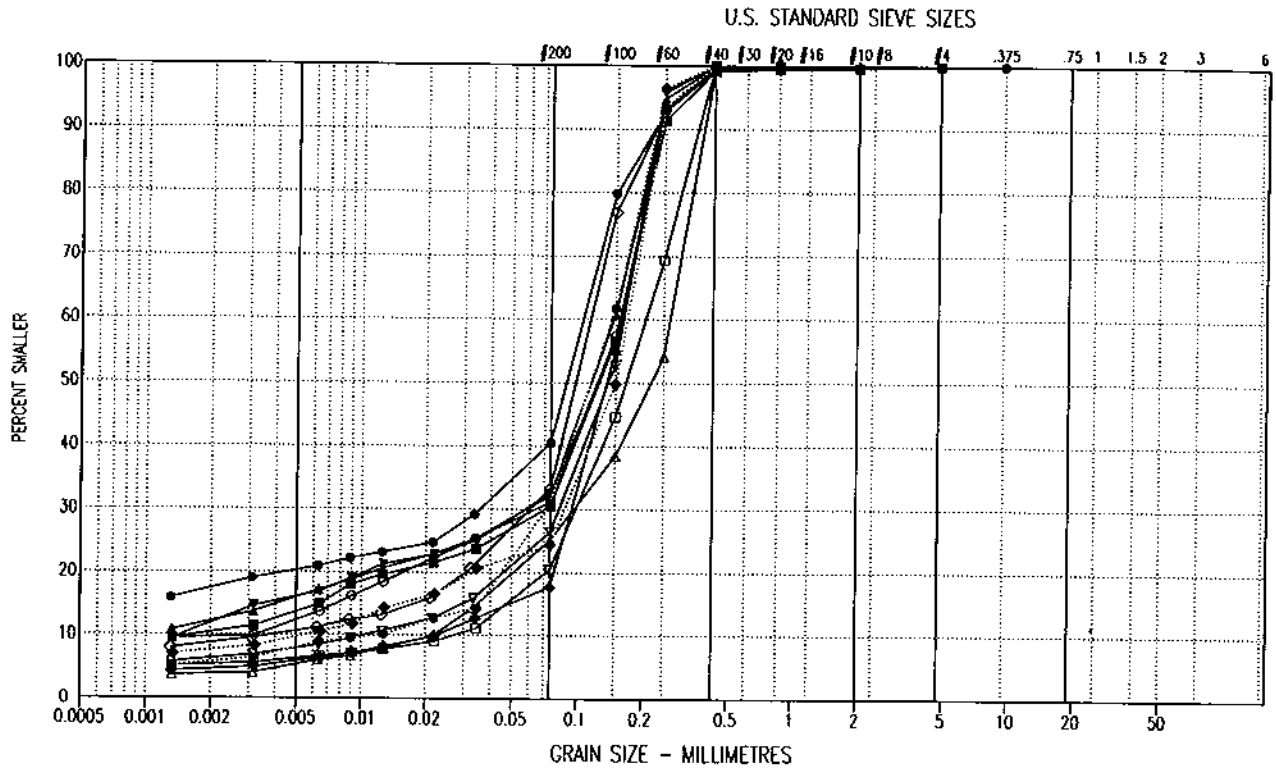
Tested in accordance with ASTM D422 unless otherwise noted.

0101-11413

FIGURE 11 GRADATION ANALYSIS FOR SAMPLES CONTAINING LESS THAN 15% FINES

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●	10	2.70 – 2.90	20.1	20.4	59.3	0.2	–	–	
◆	11	2.10 – 2.30	5.7	11.9	82.4	0.0	7.2	2.7	SM
■	12	0.40 – 0.60	13.3	17.2	69.5	0.0	88.1	17.9	SM
▲	12	0.90 – 1.00	15.6	16.5	67.9	0.0	–	–	
▼	12	4.00 – 4.10	15.8	16.7	67.5	0.0	106.0	15.3	SM
○	13	2.10 – 2.30	11.9	19.2	68.9	0.0	47.5	8.5	SM
◇	14	0.90 – 1.10	10.4	22.9	66.7	0.0	30.0	8.4	SM
⊡	7	1.20 – 1.40	6.1	14.4	79.5	0.0	7.7	1.9	SM
△	7	4.50 – 4.70	5.1	20.1	74.8	0.0	12.5	1.7	SM
▽	8	1.40 – 1.60	7.7	18.8	73.5	0.0	15.9	4.1	SM
●	8	2.70 – 2.90	7.8	23.2	69.0	0.0	12.4	3.1	SM
◆	9	1.40 – 1.50	9.4	15.0	75.6	0.0	30.0	8.4	SM

Project: 0101-11413 Date Tested: 94/04/11 BY: MH

Tested in accordance with ASTM D422 unless otherwise noted.

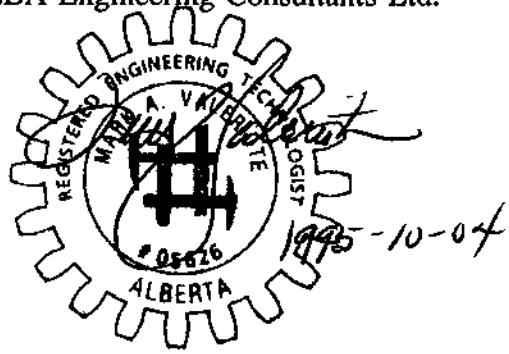
0101-11413

FIGURE 12 GRADATION ANALYSIS FOR SAMPLES CONTAINING GREATER THAN 15% FINES

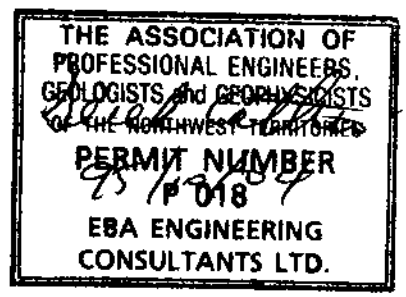
7.0 CLOSURE

The geotechnical information contained in this report was obtained from samples collected during the 1994 winter program carried out for INAC. EBA Engineering Consultants Ltd. has appreciated the opportunity to work on this project and would like to acknowledge the cooperation and guidance provided by Mr. R. Gowan of INAC, Mr. S. Blasco of the GSC-AGC, Mr. S. Dallimore of the GSC-TSD, and Midnight Sun Drilling Co. Ltd.

Respectfully submitted,
EBA Engineering Consultants Ltd.



M.A. Valeriote, R.E.T.



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Chief Engineer,
Frontier Division

MAV/DCC/tr

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APPENDIX A

OPERATIONAL CALENDAR

OPERATIONAL CALENDAR
GEOTECHNICAL INVESTIGATIONS
BEAUFORT SEA, RICHARDS ISLAND AND CARIBOU CREEK, NWT

Friday March 4, 1994

08:00	• Scheduled departure from Edmonton to Inuvik; plane delayed.
10:15	• Depart Edmonton.
14:30	• Arrive Inuvik. • Pick-up rental truck. • Check into Finto Motor Inn • Pick-up freight at Points North and transfer to field camp located at Arctic Tire.
16:00	• Contact Continental Helicopters regarding possible March 5 charter. • Fuel rental truck. • Arctic Tire continue to prepare camp.

Saturday, March 5, 1994

08:00	• Awaiting call from Continental Helicopters regarding weather conditions.
10:00	• Pick-up supplies from various local stores.
11:45	• Received message from Continental Helicopters; unable to fly today due to weather.
12:15	• Drive to Source 222 located south of Inuvik.
14:30	• Camp has been moved to the Tuk ice road.
Evening	• Phone conversation with R.J. Gowan (DIAND) • Telephone call from S. Blasco (GSC) • Telephone call from D. Jamieson (MSD)

Sunday March 6, 1994

07:30	• Meet D. Jamieson (MSD) at camp; preparations on-going.
10:40	• Camp begins moving north on Tuk ice road (loader, with fuel sloop, flat deck, kitchen, utility and sleeper trailers in tow).
10:45	• Arrange reconnaissance flight to Pullen Island, North Head of Richards Island and Source 222 at Caribou Creek with Continental Helicopters.
11:45	• Depart from Continental Helicopter's hangar.
12:40	• Arrive at Pullen Island.
12:45	• Monitor Pullen #4 monument with GPS receiver.
13:05	• Airborne, reconnaissance 6C-1, 6C-2, 4B-1 and Source 222.
15:15	• Return to Continental's hangar.
16:00	• Fuel rental truck. • Check material availability at the Northern Store as requested by MSD.
17:30	• Telephone call from D. Jamieson (MSD), camp presently at Bar-C. Recent snowfall makes going slow. Plan to camp overnight south of Kittigazuit.

Monday, March 7, 1994

08:00	• Make project logistic arrangements in Inuvik.
09:15	• Phone call from D. Jamieson (MSD); plane coming from Whitehorse with MSD freight on-board delayed in Whitehorse. Began clearing ice road to North Head at 08:30.
10:30	• Unable to start rental truck.
13:15	• R.J. Gowan (DIAND) arrives Inuvik.

14:00 • Pick-up air cargo for MSD.

14:30 • Meet R.J. Gowan at Inuvik DIAND office.

16:00 • Meet with S. Blasco at Inuvik Research Centre.

17:15 • Pick-up repaired rental truck.

19:00 • Depart Inuvik for camp.

20:45 • Turn off Tuk ice road; heading to North Head.

23:30 • Camp stops in position; loader still on route with fuel sloop.

March 8, 1994

08:00 • Making final camp arrangements.
• Loader and D6 cat widening ice road between camp and the Tuk ice road.

10:00 • Meeting with R.J. Gowan (DIAND) to discuss offshore borehole locations, and program planning.
• Prepare field equipment.

13:00 • Depart camp to layout "New Prospect" boreholes located approx. 4 km north of Pullen Island. D6 cat clearing access road to "New Prospect" location.

18:30 • Access cleared to two borehole locations at "New Prospect" site, return to camp.

19:05 • Arrive camp, loader still working on ice road.
• MSD drill rig and drill container in camp.

20:45 • Loader returns to camp.

21:30 • D6 returns to camp.

March 9, 1994

08:00	• Leave camp; haul rig on low boy pulling drill shack behind.
09:30	• Rig on-site at BH 11413-02 ("New Prospect" GS6-3-S).
10:30	• Rig off-loaded; move to BH 11413-01 ("New Prospect" GS6-4-S).
11:30	• Rig on location BH 11413-01. Auger ice hole to draw water. Auger ice hole at borehole location prepare to drill.
14:00	• Trip in HW casing.
20:30	• Recover last sample; trip out.
21:30	• HW casing out of hole, rig down. Move all equipment to BH 11413-02 ("New Prospect" GS6-3-S).
21:45	• On location; prepare equipment to overnight on location.
22:00	• Leave for camp.
22:30	• Arrive at camp.

March 10, 1994

08:00	• Meeting to review MSD daily bills to date.
09:15	• Leave camp.
09:45	• On location BH 11413-02 ("New Prospect" GS6-3-S). Preparation prior to drilling on-going.
11:45	• Trip in HW casing.
12:20	• Recover sample #1
18:40	• Final sample recovered.

19:30 • All casing out of hole rig down, load drill rig on to low boy trailer. Prepare equipment to overnight on location.

20:00 • Depart for camp.

20:30 • Arrive camp.

March 11, 1994

08:00 • Depart camp, travel to BH 11413-02 ("New Prospect" GS6-3-S).

09:00 • Move rig on low boy, pull drill shack with loader to BH 11413-03 ("Breaker's Shoal PS2-1-S).

10:30 • Drill rig and drill shack on site. Set up and prepare to drill.

12:15 • Recover sample #1.

20:45 • Recover final sample; trip out.

21:15 • Drill secure, depart for camp.

21:45 • Arrive camp.

March 12, 1994

08:15 • Depart from camp.

08:35 • On site at "Breaker's Shoal" BH 11413-03.

09:00 • Move drill rig and ancillary equipment to BH 11413-04.

09:15 • On location; set up to drill.

11:30 • Recover sample #1.

20:30 • Recover final sample, trip out.

21:00 • Leave for camp.

21:30 • Arrive at camp.

March 13, 1994

08:15 • Depart camp.

08:45 • On site at BH 11413-04. Rig move.

09:45 • Move to BH 11413-05 "Permafrost" GSC-TSD.

10:45 • On location set up to drill.

12:15 • Recover sample #1.

19:00 • Recover sample #16, trip out.

20:15 • Depart for camp.

20:45 • Arrive camp.

March 14, 1994

08:00 • High winds from the west; decide to attempt to travel to rig.

08:30 • On-site BH 11413-05.
• Too windy to attempt rig move, decision made to extend hole in permafrost with NQ coring.

11:45 • HW casing set to 9.7 m.

12:45 • NQ core run #1; trial run to clear material in HW casing.

15:15 • End of borehole at 14.4 m after nine core runs. Trip out; secure rig.

16:30 • Depart for camp.

17:00
- Arrive camp.
- Meeting with R.J. Gowan, discuss progress to date and schedule.

March 15, 1994

08:00
- Depart camp.

08:35
- Arrive at rig located at BH 11413-05.

09:15
- Begin rig move.

09:45
- On location BH 11413-06 "Non Permafrost", set up to drill.

11:00
- Auger hole through ice, trip in HW casing.

11:25
- Recover first sample.

18:30
- Recover final sample; trip out.

19:20
- Depart from drill site.

19:55
- Arrive at camp.

March 16, 1994

08:00
- Depart camp.

08:45
- Arrive at drill rig. Unable to start D6, tarp in and heat with master heaters, repair blade on loader.

11:15
- Begin move from BH 11413-06 to BH 11413-07.

11:45
- On location, set up.

12:50
- Auger ice hole, trip in.

14:45
- Recover final sample, trip out.

16:20 • Begin move to BH 11413-08.

17:15 • On location.

17:50 • Trip in HW casing.

20:15 • BH 11413-08 complete, trip out.

20:50 • Depart for camp.

21:30 • Arrive camp.

March 17, 1994

08:00 • Depart from camp.

08:45 • Arrive at drill rig located at BH 11413-08. Service drill rig. D6 clearing access to BH 11413-09.

09:15 • Prepare to move drill rig.

09:30 • Begin rig move.

10:15 • Rig on location BH 11413-09.

10:45 • Recover sample #1.

13:30 • Recover final sample, trip out.

14:45 • Begin rig move to BH 11413-10.

15:00 • Rig on location.

15:45 • Recover first sample.

18:15 • Borehole 11413-10 complete, trip out.

18:45 • Move rig to BH 11413-11.

19:00 • Rig on location, prepare equipment to overnight on site.

19:15 • Depart for camp.

20:00 • Arrive camp.

March 18, 1994

08:00 • Depart from camp. High winds overnight created snow drifts along ice road between camp and BH 11413-11. Loader clearing road with MSD and EBA personnel following behind.

09:30 • Arrive at drill rig.

10:15 • Auger ice hole, trip in HW casing.

13:00 • Recover final sample trip out.

13:45 • Begin rig move to BH 11413-12.

14:15 • On location, set up to drill.

15:25 • Recover first sample.

17:15 • Recover final sample, trip out.

17:55 • Begin rig move to BH 11413-13.

18:30 • On location, pad cleared, set up.

19:15 • Depart drill site for camp.

20:00 • Arrive camp.

March 19, 1994

08:00	• Depart camp.
08:35	• Arrive at drill rig which is set up on BH 11413-13, auger ice hole and trip in HW casing.
09:15	• Obtain first sample.
10:50	• Recover final sample, trip out.
11:30	• Begin rig move to BH 11413-14.
12:15	• On location BH 11413-14, set up to drill.
15:10	• Borehole 11413-14 complete, trip out casing.
15:45	• Begin rig move to BH 11413-15.
16:00	• Rig on location.
16:45	• Trip in HW casing.
19:20	• Recover final sample trip out.
20:15	• Move drill rig to the location where low-boy trailer will pick it up.
20:30	• Leave site for camp.
21:00	• Arrive camp.

March 20, 1994

08:00	• Crew departs camp with low-boy trailer to pick up drill rig.
10:45	• Drill rig arrives on site at MR2 Island location, off load drill rig.
12:00	• Begin drilling BH 11413-16.

16:00 • Borehole complete, move to BH 11413-17.

17:15 • Begin drilling.

20:00 • Trip out hollow steam augers.

20:15 • Depart drill site for camp.

20:30 • Arrive camp.

March 21, 1994

08:00 • Depart from camp.

08:15 • Arrive at drilling located at BH 11413-17.

08:45 • Begin drilling with solid augers to advance borehole to 13.7 m below top of ice.

10:15 • Thermistor string installed in BH 11413-17, move drill rig to next location.

11:15 • Begin drilling BH 11413-18 using solid augers.

12:00 • Borehole complete; trip out.

12:30 • Rig move.

13:15 • On location and set up at BH 11413-19.

14:00 • Begin drilling.

18:30 • Borehole terminated due to heaving sand; trip out.

19:30 • Thermistor string installed, depart for camp.

19:50 • Arrive camp.

March 22, 1994

08:00 • Depart camp for drill rig located at BH 11413-19. Move drill to low bed trailer and load; travel to Target 6C-2.

12:00 • Rig arrives at Target 6C-2, off load.

13:15 • D6 cat arrives at Target 6C-2, clear snow drift to access shoreline.

14:00 • Begin rig move.

14:45 • On site BH 11413-20, set up.

15:15 • Begin drilling.

18:00 • End of borehole 11413-20.

18:30 • Begin rig move.

19:00 • Set up and ready to drill BH 11413-21.

20:00 • End of shift; depart for camp.

20:30 • Arrive camp.

March 23, 1994

08:00 • Depart camp for drill rig.

08:30 • Arrive at drill rig, continue drilling and sampling BH 11413-21.

12:15 • Complete BH 11413-21, trip out and move rig.

13:00 • Begin drilling and sampling BH 11413-22.

14:15 • Complete BH 11413-22.

15:30 • On location BH 11413-23, begin drilling and sampling.

17:00 • Borehole complete; move equipment to Target 6C-1.

19:30 • On location Target 6C-1.

20:00 • Arrive at camp.

March 24, 1994

08:00 • Depart camp.

08:30 • Arrive at Target 6C-1, drill rig and ancillary equipment parked on ice road. Move to Borehole 11413-24.

09:30 • Begin drilling BH 11413-24.

11:30 • Borehole complete, move rig to BH 11413-25.

13:30 • Borehole 11413-25 complete, move rig to BH 11413-26.

14:30 • Begin drilling BH 11413-26.

16:45 • Borehole 11413-26 complete, move equipment to ice road.

17:30 • Depart from ice road to camp.

18:15 • Depart camp with truck & trailer to haul D6 cat back to camp.

March 25, 1994

08:00 • Prepare for camp move.

08:45 • D6 departs pulling camp.

17:30 • On location at Skiff Point.

18:15 • Travel via snowmobile to conduct site reconnaissance.

20:15 • Arrive back at camp.

March 26, 1994

08:00 • Depart from camp via snowmobile to select access route to travel to Target 4B-1.

09:30 • Return to camp, prepare drill rig and D6.

11:00 • Depart from camp.

13:45 • Arrive on location BH 11413-27.

15:30 • BH 11413-27 complete, move rig to BH 11413-28.

16:15 • "White out" conditions, depart drill site for camp.

17:30 • Arrive at camp.

March 27, 1994

08:00 • Travel from camp on snowmobiles to the drill rig and D6 which were left overnight on location.

09:00 • Return to camp to drop off snowmobile to geophysicist.

09:30 • Return to drill rig.

10:00 • Arrive at drill rig, rig is moving to camp due to cold temperature and blowing snow. Drill shack (shelter) was not moved to drill location.

12:00 • Arrive at camp; prepare to demob camp to Inuvik.

14:45 • Begin camp move.

15:45 • Camp on Tuk ice road at approx km 140. Depart for Inuvik.

17:30 • Arrive Inuvik.

March 28, 1994

08:00 • Demob EBA equipment from camp located on the ice road at Inuvik.

10:00 • Make arrangements with Challenger to conduct post-mission survey. Arrange with Continental Helicopters to conduct post mission survey.

11:45 Depart Inuvik for Caribou Creek. (Source 222).

12:45 • Off load drill rig and D6 at Caribou Creek, move to borehole location.

14:15 • Begin drilling BH 11413-28.

15:45 • Complete drilling BH 11413-28.

16:00 • Begin drilling BH 11413-29.

17:00 • Complete drilling BH 11413-29.

17:15 • Begin drilling BH 11413-30.

18:15 • Complete drilling BH 11413-30.

18:30 • Depart Caribou Creek.

19:15 • Arrive Inuvik.

March 29, 1994

08:00 • Depart Inuvik.

08:45 • Arrive at Caribou Creek site, move drill rig to BH 11413-31.

10:00 • Begin drilling.

11:00 • BH 11413-31 complete.

11:15 • Begin drilling BH 11413-32.

12:15 • BH 11413-32 complete. Move rig to low bed trailer.

12:30 • DIAND Land Use Officers on-site.

13:15 • Depart Caribou Creek.

14:00 • Brief meeting with M. Collie at DIAND office.

15:00 • Finalize bills with MSD.

March 30, 1994

08:00 • Deliver soil samples and EBA equipment to Points North Transport.

13:00 • Vic Hut (Challenger Surveys) arrives Inuvik.

14:00 • Locate survey control movements in Inuvik, conduct post mission survey at Caribou Creek site.

19:30 • Survey complete, arrive Inuvik.

March 31, 1994

07:45 • Depart Inuvik for Continental Helicopter's hangar.

08:45 • Depart Continental hangar to conduct post-mission survey.

19:50 • Depart Target 6C-2 (Wallace Bay), return to Inuvik.

20:45 • Arrive at Continental hangar, unload helicopter.

21:15 • Arrive Inuvik.

April 1, 1994

09:00	• Depart Inuvik for Continental Helicopter's hangar.
09:30	• Depart hangar to complete post-mission survey at Target 6C-1, 6C-2 and 4B-1.
15:50	• Post-mission survey complete, depart Target 4B-1 for Inuvik.
16:35	• Arrive Inuvik airport.
18:30	• Depart Inuvik on AC Flight #8958.
22:00	• Arrive Edmonton International Airport.

APPENDIX B

BOREHOLE LOGS

EBA ENGINEERING CONSULTANTS LTD.

GEOTECHNICAL REPORT
GENERAL CONDITIONS

A.1 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site and development. It is not applicable to adjacent sites nor is it valid for types of development other than that to which it refers. Any variation from the site, or development, necessitates a geotechnical review in order to determine the validity of the design concepts evolved herein.

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A.2 NATURE AND EXACTNESS OF SOIL DESCRIPTION

Classification and identification of soils are based upon commonly accepted methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system prevail, they are specifically mentioned.

Classification and identification of soil and geologic units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

A.3 LOGS OF BORINGS

The boring logs are a compilation of conditions and classification of soils as obtained from field observations and laboratory testing of selected samples. Soil zones have been interpreted. Change from one geologic zone to the other, indicated on the logs as a distinct line, is in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil zone transition elevations may require special evaluation.

A.4 STRATIGRAPHIC AND GEOLOGIC SECTIONS

The stratigraphic and geologic sections indicated on drawings contained in this report are evolved from logs of borings. Stratigraphy is known precisely only at the locations of the borings. Actual geology and stratigraphy between borings may vary from that shown on these drawings. Natural variations in geologic conditions are inherent and a function of historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of exact locations of geologic units is necessary, it is cautioned that such determination requires special attention.

A.5 GROUNDWATER CONDITIONS

Groundwater conditions represented in this report refer only to those observed at the times recorded on logs of borings, and/or within the text of this report. These conditions vary with geologic detail between borings; annual, seasonal and special meteorologic conditions; and with construction activity. Where instruments have been established to record groundwater variations on an ongoing basis, the records will be specifically referred to. Interpretation of groundwater conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and construction activity. Deviations from these observations, may occur. No other warranty, express, or implied, is made by EBA.

A.6 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geologic materials to meteorological elements. Many geologic materials deteriorate rapidly upon exposure to climatic elements. Severe deterioration of materials may be caused by precipitation and/or the action of frost on exposures. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from elements, particularly all forms of moisture, desiccation from arid conditions and frost action.

SYSTEM INTERNATIONAL UNITS

QUANTITY	NAME	SYMBOL	EXPRESSED IN TERMS OF OTHER SI UNITS	EXPRESSED IN TERMS OF BASE AND SUPPLEMENTARY UNITS
SI UNITS				
length	metre	m		
mass	kilogram	kg		
time	second	s		
electric current	ampere	A		
thermodynamic temperature	kelvin	K		
amount of substance	mole	mol		
luminous intensity	candela	cd		
SI SUPPLEMENTARY UNITS				
plane angle	radian	rad		
solid angle	steradian	sr		
EXAMPLES OF SI DERIVED UNITS WITH SPECIAL NAMES				
frequency	hertz	Hz	1/s	s^{-1}
force	newton	N	$m \cdot kg/s^2$	$m \cdot kg \cdot s^{-2}$
pressure, stress	pascal	Pa	N/m^2	$m^{-1} \cdot kg \cdot s^{-2}$
energy, work, quantity of heat	joule	J	$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
power, radiant flux	watt	W	J/s	$m^2 \cdot kg \cdot s^{-3}$
EXAMPLES OF SI DERIVED UNITS WITHOUT SPECIAL NAMES				
velocity - linear	metre per second		m/s	$m \cdot s^{-1}$
- angular	(radian per second)		rad/s	$rad \cdot s^{-1}$
acceleration - linear	(metre per second) per second		m/s^2	$m \cdot s^{-2}$
- angular	(radian per second) per second		rad/s^2	$rad \cdot s^{-2}$
concentration (of amount of substance)	mole per cubic metre		mol/m^3	$mol \cdot m^{-3}$
dynamic viscosity	pascal second		$Pa \cdot s$	$m^{-1} \cdot kg \cdot s^{-1}$
moment of force	newton metre		$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
surface tension	newton per metre		N/m	$kg \cdot s^{-2}$
heat flux density, irradiance	watt per square metre		W/m^2	$kg \cdot s^{-3}$
heat capacity, entropy	joule per kelvin		J/K	$m^2 \cdot s^{-2} \cdot K^{-1}$
specific heat capacity, specific entropy	joule per kilogram kelvin		$J/(kg \cdot K)$	$m^2 \cdot s^{-2} \cdot K^{-1}$
specific energy	joule per kilogram		J/kg	$m^2 \cdot s^{-2}$
thermal conductivity	watt per metre kelvin		$W/(m \cdot K)$	$m \cdot kg \cdot s^{-3} \cdot K^{-1}$

OTHER UNITS PERMITTED FOR USE WITH SI

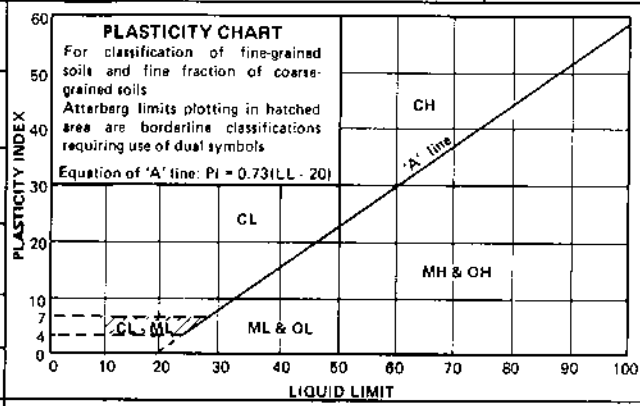
QUANTITY	NAME	SYMBOL	DEFINITION
time	minute	min	1 min = 60 s
	hour	h	1 h = 3,600 s
	day	d	1 d = 86,400 s
	year	a	
plane angle	degree	°	$1° = (\pi/180)$ rad
	minute	′	$1′ = (\pi/10{,}800)$ rad
	second	″	$1″ = (\pi/648{,}000)$ rad
area	hectare	ha	1 ha = 10,000 m^2
volume	litre	L	1,000 L = 1 m^3
temperature	degree Celsius	°C	0° C = 273.15° K
			temperature interval 1 C° = 1 K
mass	tonne	t	1 t = 1,000 kg = 1 Mg

MULTIPLYING FACTOR	PREFIX	SYMBOL	MULTIPLYING FACTOR	PREFIX	SYMBOL
$1{,}000{,}000{,}000{,}000{,}000{,}000 = 10^{18}$	exa	E	$0.1 = 10^{-1}$	deci*	d
$1{,}000{,}000{,}000{,}000{,}000 = 10^{15}$	peta	P	$0.01 = 10^{-2}$	centi*	c
$1{,}000{,}000{,}000{,}000 = 10^{12}$	tetra	T	$0.001 = 10^{-3}$	milli	m
$1{,}000{,}000{,}000 = 10^{9}$	giga	G	$0.000{,}001 = 10^{-6}$	micro	μ
$1{,}000{,}000 = 10^{6}$	mega	M	$0.000{,}000{,}001 = 10^{-9}$	nano	n
$1{,}000 = 10^{3}$	kilo	k	$0.000{,}000{,}000{,}001 = 10^{-12}$	pico	p
$100 = 10^{2}$	hecto*	h	$0.000{,}000{,}000{,}000{,}001 = 10^{-15}$	femto	f
$10 = 10^{1}$	deca*	da	$0.000{,}000{,}000{,}000{,}000{,}001 = 10^{-18}$	atto	a

* *to be avoided where possible*

UNIFIED SOIL CLASSIFICATION†

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines Less than 5% pass No. 200 sieve GW, GP, SW, SP More than 12% pass No. 200 sieve GM, GC, SM, SC 5% to 12% pass No. 200 sieve Borderline classification requiring use of dual symbols	$C_U = D_{60}\ D_{10}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below 'A' line or plasticity index less than 4 / Atterberg limits plot above 'A' line and plasticity index greater than 7 — Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand clay mixtures		
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_U = D_{60}/D_{10}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			SP	Poorly-graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below 'A' line or plasticity index less than 4 / Atterberg limits plot above 'A' line and plasticity index greater than 7 — Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts		
			CH	Inorganic clay of high plasticity, fat clays		
			OH	Organic clays of medium to high plasticity		
HIGHLY ORGANIC SOILS			PT	Peat, muck and other highly organic soils		



*Based on the material passing the 3 in. (75 mm) sieve
†ASTM Designation D 2487, for identification procedure see D 2488

GROUND ICE DESCRIPTION

ICE NOT VISIBLE

GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
N	Nf	Poorly-bonded or friable	
	Nbn	No excess ice, well-bonded	
	Nbe	Excess ice, well-bonded	

VISIBLE ICE LESS THAN 50% BY VOLUME

GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
V	Vx	Individual ice crystals or inclusions	
	Vc	Ice coatings on particles	
	Vr	Random or irregularly oriented ice formations	
	Vs	Stratified or distinctly oriented ice formations	

VISIBLE ICE GREATER THAN 50% BY VOLUME

ICE	ICE + Soil Type	Ice with soil inclusions	
	ICE	Ice without soil inclusions (greater than 25 mm (1 in.) thick)	

NOTE:

1. *Dual symbols are used to indicate borderline or mixed ice classifications*
2. *Visual estimates of ice contents indicated on borehole logs ± 5%*
3. *This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes*

LEGEND

Soil Ice

GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-01
TARGET "GS6-4-S NEW PROSPECT"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 7.2m	UTM ZONE: 8 N7745632.1 E522548.7	ELEVATION: -7.20 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) - silty, trace of sand, trace of shell fragments, homogeneous, moist to wet, dark olive grey (5Y 3/2)	Not frozen			1		0.0
	- low plastic, very dark grey (5Y 3/1)		-1.2		2		2.0
1.0					3		
					4		4.0
2.0					5		6.0
	SAND (SM) - silty, trace of shell fragments and coal fragments, fine grained, massive, wet to saturated, non plastic, dark olive grey(5Y 3/2)				6		8.0
	- some rounded gravel				7		10.0
3.0	- 5mm thick black organic lense						
	- with interbedded clay lenses				8		12.0
	- organic wood fragments						
	- very dark grey (5Y 2.5/1)						
4.0			-0.21		9		14.0
	SAND (SM) AND SILT - some clay, trace of gravel and organics, with interbedded lenses of silty clay, moist, non plastic, very dark grey (5Y 3/1)				10		16.0
5.0							
	- shell fragments				11		18.0
6.0					12		

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	Fig. No: 11413-01	Page 1 of 2

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-01
TARGET "GS6-4-S NEW PROSPECT"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 7.2m	UTM ZONE: 8 N7745632.1 E522548.7	ELEVATION: -7.20 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▯ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	SAND (SM) AND SILT – (continued)		~0.81		12		20.0
					13		22.0
7.0	– 15mm thick organic lense				14		24.0
					15		
8.0	CLAY (CL) – silty, with interbedded lenses of silty sand, moist, low plastic, very dark grey to black clay, olive grey sand				16		26.0
					17		28.0
9.0	– 200mm thick sand lense				18		30.0
					19		32.0
10.0					20		34.0
	END OF BOREHOLE (10.5 metres)						
	Note: Logged by Geological Survey of Canada, Atlantic Geoscience Centre personnel.						36.0
11.0							38.0
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: SEE NOTE	COMPLETION DEPTH: 10.5 m
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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-02
TARGET "GS6-3-S NEW PROSPECT"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 7.2m	UTM ZONE: 8 N7746098.6 E524298.4	ELEVATION: -7.20 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SILT (ML) - some sand, trace of clay, fine grained, uniform, with thin interbedded silty clay lenses, wet to saturated, non plastic, dark olive grey (5Y 3/2)	Not frozen			1		0.0
					2		2.0
1.0	- trace of coarse grained rounded gravel, trace of shell fragments				3		4.0
	- organics and coal fragments disseminated throughout				4		6.0
2.0	CLAY (CL) - silty, trace of sand, trace of organics disseminated throughout, with interbedded lenses of clayey silt and silty sand, moist to wet, low plastic, very dark grey (5Y 3/1)				5		8.0
3.0					6		10.0
					7		12.0
4.0	- shell fragments disseminated throughout				8		14.0
			0.08		9		16.0
5.0	- massive				10		18.0
	- with interbedded lenses of silty sand, dark grey				11		
6.0							

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-02
TARGET "GS6-3-S NEW PROSPECT"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 7.2m	UTM ZONE: 8 N7746098.6 E524298.4	ELEVATION: -7.20 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	CLAY (CL) - (continued)				11		20.0
					12		22.0
7.0	- dark grey to black				13		24.0
8.0					14		26.0
	SAND (SP/SM) - trace of silt, clay, shell fragments and rounded gravel, black organics throughout, with interbedded lenses of silty clay, non plastic, dark grey (5Y 4/1)		-0.04		15		28.0
	- fine fibrous organics disseminated throughout, massive				16		
9.0							30.0
	- inclined 30mm lense of coarse fibrous organics, 20mm long wood fragment				17		32.0
10.0	- some silt, some clay				18		34.0
					19		
11.0	END OF BOREHOLE (11.0 metres)						36.0
	Note: Logged by Geological Survey of Canada, Atlantic Geoscience Centre personnel.						38.0
12.0							

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-03
TARGET "PS2-1-S BREAKER'S SHOAL"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 6.3m	UTM ZONE: 8 N7746466.5 E534579.8	ELEVATION: -6.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SM) – some silt, some clay, trace of gravel and shell fragments, fine grained, uniform, wet to saturated, non plastic, dark olive grey(5Y 3/2)	Not frozen		■	1	●	0.0
	CLAY (CL) – silty, trace of sand, black orgonic pockets throughout, with thin interbedded sand lenses, low plastic, dark olive grey (5Y 3/1)						2.0
1.0					2	●	4.0
					3	●	
2.0					4	●	6.0
					5	●	8.0
3.0					6	●	10.0
	– massive				7	●	12.0
4.0							14.0
	– trace of shell fragments				8		
							16.0
5.0	– very dark grey to black				9	●	
					10		18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: SEE NOTE	COMPLETION DEPTH: 13.0 m
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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-03
TARGET "PS2-1-S BREAKER'S SHOAL"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 6.3m	UTM ZONE: 8 N7746466.5 E534579.8	ELEVATION: -6.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ◧ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	CLAY (CL) - (continued)						20.0
	- massive				11		
7.0							22.0
					12		
							24.0
					13		
8.0							26.0
	- 15mm thick lense of fine grained silty sand, dark olive grey				14		
							28.0
					15		
9.0							30.0
					16		
							32.0
10.0					17		
							34.0
					18		
							36.0
11.0					19		
							38.0
					20		
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: SEE NOTE	COMPLETION DEPTH: 13.0 m
	REVIEWED BY: MAV	COMPLETE: 94/03/11
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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-03
TARGET "PS2-1-S BREAKER'S SHOAL"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 6.3m	UTM ZONE: 8 N7746466.5 E534579.8	ELEVATION: -6.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
12.0	CLAY (CL) - (continued)						40.0
					21		42.0
					22		
13.0	END OF BOREHOLE (13.0 metres)						44.0
	Note: Logged by Geological Survey of Canada, Atlantic Geoscience Centre personnel.						46.0
14.0							48.0
15.0							50.0
16.0							52.0
							54.0
17.0							56.0
							58.0
18.0							

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-04
TARGET "PS2-5-S BREAKER'S SHOAL"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 6.3m	UTM ZONE: 8 N7746653.3 E535344.9	ELEVATION: -6.50 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ≡ A-CASING ▯ SHELBY TUBE ▯ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) - silty, trace of sand, trace of black organics disseminated throughout, with interbedded silty sand lenses and stringers, low plastic, dark olive grey (5Y 3/2) to black (5Y 2.5/1)	Not frozen			1		0.0
	- with clay silt and silt sand stringers, very dark grey (5Y 3/1) to black (5Y 2.5/1)				2		2.0
1.0	- black organic coal fragments				3		4.0
2.0	- massive, very dark grey to black				4		6.0
					5		8.0
3.0	- 2mm thick black organic lense				6		10.0
					7		12.0
4.0					8		14.0
					9		16.0
5.0	- homogeneous				10		18.0
6.0							

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LOGGED BY: SEE NOTE	COMPLETION DEPTH: 11.5 m
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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-04
TARGET "PS2-5-S BREAKER'S SHOAL"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 6.3m	UTM ZONE: 8 N7746653.3 E535344.9	ELEVATION: -6.50 (m)

SAMPLE TYPE ■ DISTURBED ⧄ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	CLAY (CL) - (continued)						20.0
	- 10mm thick fine grained silty sand lense, very dark grey (5Y 3/1)				11		
							22.0
7.0					12		
	- trace of shell fragments						24.0
					13		
8.0							26.0
	- 50mm thick fine grained silt sand lense				14		
							28.0
					15		
9.0							30.0
					16		
							32.0
10.0	SAND (SM) - silty, some clay, trace of coarse grained sand particles disseminated throughout, predominately fine grained, uniform, moist, non plastic, very dark olive grey (5Y 3/2)				17		
							34.0
					18		
11.0							36.0
					19		
	END OF BOREHOLE (11.5 metres)						38.0
	Note: Logged by Geological Survey of Canada, Atlantic Geoscience Centre personnel.						
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: SEE NOTE	COMPLETION DEPTH: 11.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/12
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95/02/14 03:24PM

GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-05
TARGET "PERMAFROST"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.3m	UTM ZONE: 8 N7749497 E534832.7	ELEVATION: -8.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SILT (ML) – clayey, massive, moist, low plastic, grey	Not frozen			1		0.0
	SAND (SP/SM) – trace of silt and organics, fine grained, uniform, non plastic, greyish brown				2		2.0
1.0					3		4.0
							6.0
2.0	– trace of fibrous organics, with thin silt laminae				4		8.0
					5		10.0
3.0					6		12.0
	– trace to some silt, trace of fine gravel, with very thin interbedded silt				7		14.0
4.0							
	– trace of coarse grained gravel				8		16.0
5.0					9		18.0
	CLAY (CL) – silty, trace of black organic pockets disseminated throughout, moist to wet, low plastic, dark olive grey				10		
6.0							

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EDMONTON, ALBERTA

LOGGED BY: MAV	COMPLETION DEPTH: 14.5 m
REVIEWED BY: MAV	COMPLETE: 94/03/14
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95/02/14 03:26PM

GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-05
TARGET "PERMAFROST"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.3m	UTM ZONE: 8 N7749497 E534832.7	ELEVATION: -8.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	CLAY (CL) - (continued)						20.0
	SAND (SP/SM) - trace of some silt, fine grained, uniform, non plastic				11		22.0
7.0					12		24.0
	- 300mm thick interbedded clay lense				13		
8.0					14		26.0
		Frozen, Nbn, well bonded	-1.21		15		28.0
9.0	- with interbedded clay lenses				16		30.0
					17		32.0
10.0							34.0
	- some silt, fine to medium grained sand, predominately fine grained	Nbn			18		
11.0					19		36.0
					20		38.0
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 14.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/14
	Fig. No: 11413-05	Page 2 of 3

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-05
TARGET "PERMAFROST"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.3m	UTM ZONE: 8 N7749497 E534832.7	ELEVATION: -8.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
12.0	SAND (SP/SM) - (continued)			N	20		40.0
					21		42.0
13.0	- some silt to silty, medium grained sand particles disseminated throughout	Nbn			22		44.0
					23		46.0
14.0					24		48.0
	END OF BOREHOLE (14.5 metres)						
15.0	Note: Geological Survey of Canada, Terrain Sciences Division, Target "Permafrost". Borehole #94GSCBH01.						50.0
	All samples retained by GSC-TSD.						52.0
16.0							54.0
17.0							56.0
18.0							58.0

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 14.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/14
	Fig. No: 11413-05	Page 3 of 3

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-06
TARGET "NONPERMAFROST"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 9.2m	UTM ZONE: 8 N7751537.4 E535938.2	ELEVATION: -9.20 (m)

SAMPLE TYPE ■ DISTURBED ☒ NO RECOVERY ☒ SPT ☰ A-CASING ▯ SHELBY TUBE ▯ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) – silty, with very thin fine grained sand laminae, black organic pockets disseminated throughout, moist, low plastic, olive grey	Not frozen			1		0.0
					2		2.0
1.0							4.0
	– stiff (est.), dark olive grey				3		
							6.0
2.0					4		
	– silt content increasing, consistency decreasing, becoming firm (est.)						8.0
					5		
3.0							10.0
					6		
							12.0
4.0					7		
							14.0
					8		
							16.0
5.0					9		
	– very thin laminae, even, nonparallel						18.0
					10		
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 11.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/15
	Fig. No: 11413-06	Page 1 of 2

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-06
TARGET "NONPERMAFROST"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 9.2m	UTM ZONE: 8 N7751537.4 E535938.2	ELEVATION: -9.20 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	CLAY (CL) - (continued)						
	- thin lense of fine grained sand, some silt, trace of black organics				11		20.0
7.0	- black organics disseminated throughout				12		22.0
	- with very thin interbedded silty sand lenses				13		24.0
8.0	ORGANIC SILT (OL) - trace to some clay, fibrous/organics throughout, moist, firm to stiff (est.), low plastic, dark grey				14		26.0
9.0					15		28.0
	SILT (ML) - sandy, trace to some clay, fine grained sand, moist to wet, non to low plastic, light grey				16		30.0
10.0	- trace of clay, sand content increasing with depth				17		32.0
	SAND (SM) AND SILT - trace of clay, fine grained, uniform, wet, non plastic, olive grey	Note: Geological Survey of Canada, Terrain Sciences Division, Target "NonPermafrost". Borehole #94GSCBH2.			18		34.0
11.0	- trace of coarse grained sand particles						36.0
	SILT (ML) - sandy, trace of shell fragments, homogeneous, non plastic, dark olive grey	All samples retained by GSC-TSD.			19		38.0
	END OF BOREHOLE (11.5 metres)						
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 11.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/15
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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-07
TARGET "C1-9-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 9.2m	UTM ZONE: 8 N7751507.8 E537165.4	ELEVATION: -9.20 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▯ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	CLAY (CL) - silty, (60mm thick)	Not frozen
	SAND (SP) - trace of silt, (40mm thick)	
	CLAY (CL) - silty, sandy, black organic pockets disseminated throughout, very thin laminae, even, non parallel, moist to wet, firm (est.), non to low plastic, dark olive grey	
1.0	SAND (SP) - trace of silt, homogeneous, fine grained, uniform, wet, non plastic, olive grey	
	SILT (ML) - trace to some clay, black organic pockets disseminated throughout, very thin laminae, even, non parallel, moist to wet, firm (est.), non to low plastic, dark olive grey	
2.0	SAND (SM) - some silt, trace of clay, trace of coarse grained subrounded gravel particles disseminated throughout, shell fragments - homogeneous, massive, olive	
3.0		
4.0		
	END OF BOREHOLE (4.7 metres)	
5.0		
6.0		

TEMPERATURE (C) | SAMPLE TYPE | SAMPLE NO

■ SALINITY (ppt) ■
10 20 30 40
PLASTIC M.C. LIQUID
20 40 60 80

DEPTH(ft)
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 4.7 m
	REVIEWED BY: MAV	COMPLETE: 94/03/16
	Fig. No: 11413-07	Page 1 of 1

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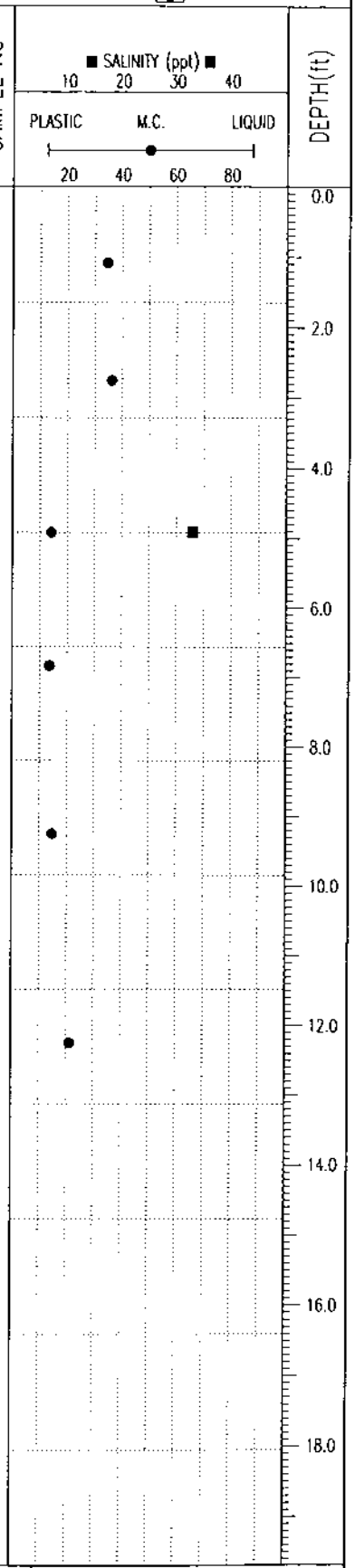
GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-08
TARGET "C1-10-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 9.3m	UTM ZONE: 8 N7751507.6 E534082.7	ELEVATION: -9.30 (m)

SAMPLE TYPE ■ DISTURBED ⧄ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	CLAY (CL) - silty, with very thin interbedded sand lenses 2mm thick, wet to saturated, low plastic, grey	Not frozen
	- clay content decreasing with depth, black organic pockets disseminated throughout, very thin laminae, even, non parallel	
1.0		
	SAND (SM) - silty to some silt, trace of clay and fine grained gravel, fine grained, uniform, moist, compact (est.), non plastic, olive brown	
2.0		
	- organic pockets, shell fragments	
3.0		
	- trace of coarse grained sand particles, wet, loose (est.)	
4.0		
5.0		
	END OF BOREHOLE (5.5 metres)	
6.0		

TEMPERATURE (C) | SAMPLE TYPE | SAMPLE NO



DEPTH(ft)
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 5.5 m
	REVIEWED BY: MAV	COMPLETE: 94/03/16
	Fig. No: 11413-08	Page 1 of 1

95/02/14 03:33PM

GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-09
TARGET "C1-7-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.9m	UTM ZONE: 8 N7750910.7 E533631.4	ELEVATION: -8.90 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) – silty, trace of sand, very thin laminae, even, non parallel, wet, stiff (est.), low plastic, dark olive grey	Not frozen					0.0
					1		2.0
1.0	SAND (SM) – some silt, trace of clay, fine grained, uniform, medium laminae, even, non parallel, moist, compact (est.), non plastic, dark olive brown						4.0
					2		6.0
2.0					3		
	– silty						8.0
					4		
3.0							10.0
					5		
	– interbedded silt and clay lenses, wet						12.0
4.0					6		
	ICE – massive	Frozen					14.0
5.0	END OF BOREHOLE (5.0 metres)						16.0
							18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 5.0 m
	REVIEWED BY: MAV	COMPLETE: 94/03/17
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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-10
TARGET "C1-6-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 9.1m	UTM ZONE: 8 N7750899.2 E534164.8	ELEVATION: -9.10 (m)

SAMPLE TYPE ■ DISTURBED ⧄ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) - silty, black organic pockets disseminated throughout, shell fragments, thin laminae, even, non parallel, saturated becoming moist, stiff (est.), low plastic, dark olive grey	Not frozen			1		0.0
1.0	SAND (SP/SM) - trace of silt and shell fragments, fine grained, uniform, moist, compact (est.), non plastic, olive grey				2		2.0
	CLAY (CL) - silty, very thin laminae, wavy, non parallel, moist to wet, firm (est.), low plastic, very dark grey to black				3		4.0
2.0	SAND (SP/SM) - trace of silt, fine grained, uniform, moist to wet, compact (est.), non plastic, very dark grey to black - olive grey				4		6.0
	SILT (ML) - some clay, trace of sand, shell fragments and coarse fibrous organics, moist, very dark grey to black				5		8.0
3.0	SAND (SM) - silty, clayey, fine grained, uniform, moist to wet, non plastic, olive brown		-0.27		6		10.0
			-0.26		7		12.0
4.0					8		14.0
	- trace of coarse grained sand particles disseminated throughout, dilatant, wet				9		16.0
5.0					10		18.0
	END OF BOREHOLE (5.3 metres)						
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV REVIEWED BY: MAV Fig. No: 11413-10	COMPLETION DEPTH: 5.3 m COMPLETE: 94/03/17 Page 1 of 1

95/02/14 03:36PM

GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-11
TARGET "C1-5-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.9m	UTM ZONE: 8 N7750906 E534679.3	ELEVATION: -8.90 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ☰ A-CASING ▥ SHELBY TUBE ▯ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	CLAY (CL) - silty, trace of shell fragments, wet, firm (est.), low plastic, dark olive grey	Not frozen					0.0
	SAND (SP/SM) - trace of silt and shell fragments, fine grained, uniform, dilatant, saturated, non plastic, olive grey			■	1	●	
1.0	- thin interbedded clay lense - some silt, trace of clay, wet		-0.25	■	2	●	2.0
							4.0
2.0	SAND (SM) - silty, trace of clay		-0.45	■	3	● ■	6.0
	- mica platelets disseminated throughout						8.0
	- with thin horizontally bedded silt lenses, 3 to 5mm thick, spaced 150mm apart		-0.17	■	4	●	10.0
3.0							
				■	5	●	12.0
	SILT (ML) - sandy, trace of clay, moist, dark grey						
4.0	SAND (SM) - trace to some silt, trace of clay, fine grained, uniform, wet, non plastic, olive grey		-0.11	■	6	● ■	14.0
	END OF BOREHOLE (4.1 metres)						
							16.0
5.0							
							18.0
6.0							

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EDMONTON, ALBERTA

LOGGED BY: MAV	COMPLETION DEPTH: 4.1 m
REVIEWED BY: MAV	COMPLETE: 94/03/18
Fig. No. 11413-11	Page 1 of 1

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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-12
TARGET "C1-4-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.2m	UTM ZONE: 8 N7749873.9 E536489.3	ELEVATION: -8.20 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ◧ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SM) - some silt, some clay, homogeneous, with thin horizontal interbedded clayey silt lense 5mm thick, fine grained, uniform, moist, non plastic, dark olive grey	Not frozen					0.0
	- coarse grained gravel particles, subrounded, smooth, 25mm diameter				1		2.0
1.0	- inclined bedding planes, moist to wet, non plastic, dark olive grey		-0.32		2		4.0
			-0.45		3		6.0
2.0			-0.52		4		8.0
					5		
3.0	- wet				6		10.0
							12.0
4.0			-0.23		7		14.0
			-0.25		8		16.0
5.0	END OF BOREHOLE (4.7 metres)						18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 4.7 m
	REVIEWED BY: MAV	COMPLETE: 94/03/18
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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-13
TARGET "C1-3-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.3m	UTM ZONE: 8 N7749858.4 E535654.7	ELEVATION: -8.30 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ▩ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	CLAY (CL) - silty, some sand, fine grained, uniform, very thin interbedded horizontal sand lenses	Not frozen
1.0	SAND (SP) - trace of silt and shell fragments, fine grained, uniform, wet, non plastic - 100mm thick interbedded silt lense - 75mm thick interbedded sandy silt lense	
2.0	SAND (SM) - some silt, some clay, homogeneous, fine grained, uniform, inclined bedding planes, slightly dilatant, moist to wet, non plastic, dark olive grey - silty, dilatant, wet	
3.0		
4.0	ICE - trace of silt - coarse grained gravel particles, smooth, subrounded - becomes clear ice	Frozen
	END OF BOREHOLE (4.6 metres)	
5.0		
6.0		

TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO
	■	1
	■	2
	■	3
-0.08	■	4
-0.1	■	5
0.07	■	6
	■	7

■ SALINITY (ppt) ■
10 20 30 40

PLASTIC M.C. LIQUID
20 40 60 80

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0

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EDMONTON, ALBERTA

LOGGED BY: MAV	COMPLETION DEPTH: 4.6 m
REVIEWED BY: MAV	COMPLETE: 94/03/19
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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-14
TARGET "C1-2-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.3m	UTM ZONE: 8 N7749883.3 E534913.2	ELEVATION: -8.30 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SM) - clayey, silty, trace of black orgonic pockets, moist, low plastic, dark grey	Not frozen	-0.64		1		0.0
	SAND (SM) - silty, some clay, fine grained, uniform, moist to wet, non plastic, dark olive grey		-0.38		2		2.0
1.0							4.0
	SAND (SM) - trace to some silt, trace of clay, fine grained, uniform, dilatant, wet, non plastic, olive grey		-0.41		3		6.0
2.0					4		8.0
					5		
3.0	- some silt to silty	Frozen 60mm thick ice lense			6		10.0
							12.0
4.0	- some silt		-0.3		7		14.0
	END OF BOREHOLE (4.1 metres)						16.0
5.0							18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 4.1 m
	REVIEWED BY: MAV	COMPLETE: 94/03/19
	Fig. No: 11413-14	Page 1 of 1

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GRANULAR RESOURCE EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-15
TARGET "C1-1-S"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
BEAUFORT SEA WATER DEPTH: 8.5m	UTM ZONE: 8 N7749856.8 E534276.7	ELEVATION: -8.50 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▥ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SILT (ML) – trace to some sand, homogeneous, fine grained, uniform, wet, non plastic, dark olive grey, (250mm thick)	Not frozen	-0.71		1		0.0
	SAND (SM) – silty, some clay, trace of smooth subrounded gravel, shell fragment disseminated throughout, fine grained, uniform, wet, non plastic, dark olive grey		-0.68		2		2.0
1.0	– very thin interbedded silt lense 5mm thick				3		4.0
2.0					4		6.0
	– some silt – very small wood fragment, mica platelets throughout		0.09		5		8.0
3.0							10.0
			0.02		6		12.0
4.0	CLAY (CL) – silty, trace of sand, trace of gravel disseminated throughout, black organic pockets, moist, low plastic, dark olive grey		0.06		7		14.0
	SAND (SM) – silty, homogeneous, fine grained, uniform, wet, non plastic, olive grey		0.06		8		16.0
5.0					9		18.0
					10		
6.0	END OF BOREHOLE (5.9 metres)	Ice particle recovered in sampler					

EBA ENGINEERING CONSULTANTS LTD.	LOGGED BY: MAV	COMPLETION DEPTH: 5.9 m
EDMONTON, ALBERTA	REVIEWED BY: MAV	COMPLETE: 94/03/19
	Fig. No: 11413-15	Page 1 of 1

95/02/14 03:43PM

GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-16
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w CRREL CORE BARREL	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732423.8 E529201.3	ELEVATION: -0.86 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SP) - trace of silt, fine grained, uniform, brown	Frozen, Nbn			1		0.0
					2		2.0
	- some silt				3		
1.0							4.0
	ORGANIC SILT (OL) AND PEAT - black				4		
	- becoming fine grained peat, strong organic odour						6.0
2.0	ICE AND ORGANIC SILT - massive, olive brown silt	Cloudy ice			5		
							8.0
					6		
3.0							10.0
	- silt content increasing with depth				7		
							12.0
4.0					8		
							14.0
	ORGANIC SILT (OL) AND PEAT - very dark brown to black				9		
5.0							16.0
	- light olive grey				10		
							18.0
					11		
	SILT (ML) - some clay, very dark grey to	Vr 10% 2-5mm thick			12		
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 11.0 m
	REVIEWED BY: MAV	COMPLETE: 94/03/20
	Fig. No: 11413-16	Page 1 of 2

95/02/14 03:44PM

GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-16
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w CRREL CORE BARREL	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732423.8 E529201.3	ELEVATION: -0.86 (m)

SAMPLE TYPE ■ DISTURBED ⊘ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	black SILT (ML) – (continued)				12		20.0
	SAND (SM) AND SILT – with very thin black organic lenses, fine grained, uniform	Nbn			13		22.0
7.0	– iron oxide stained lenses				14		24.0
	– coarse grained sand particles disseminated throughout	Nbn, trace of visible ice			15		26.0
8.0	– thin interbedded horizontal silt lenses 2-5mm thick	Vr 2mm thick			16		28.0
9.0					17		30.0
	SILT (TILL) (ML) – trace to some sand, trace of gravel and clay, iron oxide staining evident, low plastic, dark olive grey	Vr<5%			18		32.0
10.0							34.0
	SAND (SM) – silty, fine grained, uniform, grey	Nbn			19		36.0
11.0	END OF BOREHOLE (11.0 metres) Note: Geological Survey of Canada, Terrain Sciences Division, Target "Near Shore". Borehole #94GSCMR2-01 All samples retained by GSC. GSC thermistor string installed.						38.0
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 11.0 m
	REVIEWED BY: MAV	COMPLETE: 94/03/20
	Fig. No: 11413-16	Page 2 of 2

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-17
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w CRREL & HOLLOW AUGERS	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732509.4 E529272.6	ELEVATION: -1.40 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SP/SM) - trace to some silt, fine grained, uniform, light brownish grey	Frozen (seasonal) Nbn			1		0.0
	ORGANIC SILT (OL) - black becoming grey with depth	Vs/Vr 30% Vs 5-10%			2		2.0
	SAND (SP/SM) - trace to some silt, fine grained, uniform, olive brown						
1.0							4.0
	ORGANIC SILT (OL) - clayey, with fibrous organics throughout, saturated, black	Not frozen			3		
2.0		Frozen			4		6.0
							8.0
3.0							10.0
	ORGANIC SILT (OL) AND PEAT - strong organic odour, brown				5		
	END OF BOREHOLE (3.4 metres)						12.0
	Note: Geological Survey of Canada, Terrain Sciences Divisions, Target "Near Shore". Borehole #94GSCMR2-02						
4.0	All samples retained by GSC.						14.0
	Borehole advanced to 12.3 metres using solid augers to facilitate the installation of a GSC thermistor string. No samples were obtained between 3.4 and 12.3 metres.						16.0
5.0							
							18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 3.4 m
	REVIEWED BY: MAV	COMPLETE: 94/03/21
	Fig. No: 11413-17	Page 1 of 1

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-18
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w SOLID FLIGHT AUGERS	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732576.3 E529347.6	ELEVATION: -1.10 (m)

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SP) - trace of silt, fine grained, uniform, olive brown	Frozen (seasonal)					0.0
1.0	Note: Stratigraphy other than that at seabed was not determined	Not frozen					2.0 / 4.0
2.0							6.0 / 8.0
3.0							10.0
4.0							12.0 / 14.0
5.0	Note: Geological Survey of Canada, Terrain Sciences Division, Target "Near Shore". Borehole #94GSCMR2-03 No Samples were retained by GSC. Borehole was advanced using solid augers to determine depth to permafrost.						16.0
6.0	END OF BOREHOLE (7.0 metres)	Frozen at 6.6 metres					18.0

EBA ENGINEERING CONSULTANTS LTD.
EDMONTON, ALBERTA

LOGGED BY: MAV	COMPLETION DEPTH: 7.0 m
REVIEWED BY: MAV	COMPLETE: 94/03/21
Fig. No: 11413-18	Page 1 of 2

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-19
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732701.8 E529470	ELEVATION: -2.30 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ▩ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
0.0	SAND (SP) – trace of silt, fine grained, uniform, wet, compact (est.), non plastic, olive grey	Not frozen			1		0.0
	– some silt, trace of gravel, very thin inclined organic lenses 1–2mm thick				2		2.0
1.0							4.0
					3		6.0
2.0	– very thin horizontal organic lenses, black				4		8.0
	– 150mm thick lense of sandy gravel, trace of shell fragments				5		10.0
	– coarse fibrous organics and wood fragments						
3.0					6		12.0
4.0					7		14.0
	ORGANIC SILT (OL) – black				8		16.0
	SAND (SM) – silty, with very thin interbedded organic lenses, fine grained, uniform, moist, olive grey						
5.0	SILT (TILL) (ML) – some clay, trace to some sand, trace of fine grained gravel, organic pockets, moist, very stiff (est.), low plastic, olive brown				9		18.0
6.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 12.2 m
	REVIEWED BY: MAV	COMPLETE: 94/03/21
	Fig. No: 11413-19	Page 1 of 3

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-19
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732701.8 E529470	ELEVATION: -2.30 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	SALINITY (ppt) 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
6.0	SILT (TILL) (ML) - (continued) - dark olive grey						20.0
					10		22.0
7.0							24.0
	SAND (TILL) (SM) - silty, trace to some gravel, trace of clay				11		26.0
8.0							28.0
9.0	- 200mm thick lense of fine grained sand, moist, olive grey				12		30.0
	- trace to some coarse grained gravel						32.0
10.0	SAND (SP) - trace of silt, fine grained						34.0
	- Note: Sand heaving inside casing when drilling was stopped to attempt to sample.				13		36.0
11.0							38.0
12.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 12.2 m
	REVIEWED BY: MAV	COMPLETE: 94/03/21
	Fig. No: 11413-19	Page 2 of 3

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GEOLOGICAL EVALUATION	INDIAN AND NORTHERN AFFAIRS CANADA	BOREHOLE NO: 11413-19
TARGET "NEARSHORE MR2 ISLAND"	DRILL: CME750 c/w HW CASING	PROJECT NO: 0101-11413
NORTH POINT RICHARDS ISLAND, N.W.T.	UTM ZONE: 8 N7732701.8 E529470	ELEVATION: -2.30 (m)

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ⊠ SPT ☰ A-CASING ▯ SHELBY TUBE ▮ CORE

DEPTH(m)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	TEMPERATURE (C)	SAMPLE TYPE	SAMPLE NO	■ SALINITY (ppt) ■ 10 20 30 40 / PLASTIC M.C. LIQUID 20 40 60 80	DEPTH(ft)
12.0	SAND (SP) - (continued)						40.0
	END OF BOREHOLE (12.2 metres)						
	Borehole terminated due to heaving sand						42.0
13.0	Note: Geological Survey of Canada, Terrain Sciences Division, Target "Near Shore". Borehole #94GSCMR2-04						44.0
	All samples were retained by GSC.						
	GSC thermistor string installed to 8 metres below mudline.						46.0
14.0							48.0
15.0							50.0
16.0							52.0
							54.0
17.0							56.0
							58.0
18.0							

EBA ENGINEERING CONSULTANTS LTD. EDMONTON, ALBERTA	LOGGED BY: MAV	COMPLETION DEPTH: 12.2 m
	REVIEWED BY: MAV	COMPLETE: 94/03/21
	Fig. No: 11413-19	Page 3 of 3

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APPENDIX C

SUMMARY OF LABORATORY TESTING

LABORATORY TEST RESULT SUMMARY

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-01	1	0.00	0.30	35.0						45.7	53.4	0.9	0.0
11413-01	2	0.30	0.33	35.6						44.2	54.2	1.6	0.0
11413-01	2	0.34	0.40	17.9						17.8	69.2	13.0	0.0
11413-01	2	0.40	0.45	11.8						9.4	28.0	62.6	0.0
11413-01	2	0.30	0.61	22.8						17.6	75.9	6.5	0.0
11413-01	3	0.61	0.91										
11413-01	3	0.72	0.77	10.3						4.1	6.6	89.3	0.0
11413-01	3	0.78	0.83	20.8						20.5	76.6	2.9	0.0
11413-01	4	0.91	1.37										
11413-01	4	1.05	1.10	20.8						13.0	40.5	46.5	0.0
11413-01	5	1.52	1.98	29.0						22.2	64.2	13.6	0.0
11413-01	5	1.90	1.95	17.8						15.6	49.6	23.6	11.2
11413-01	6	2.13	2.59	20.0						-	24.5	59.5	16.0
11413-01	7	2.74	3.20										
11413-01	7	2.75	2.80	15.0						3.6	3.3	76.4	16.7
11413-01	8	3.35	3.81	23.1						4.4	14.9	80.7	0.0
11413-01	8	3.50	3.55	21.9						17.2	71.6	11.2	0.0
11413-01	9	3.96	4.52	23.8						13.4	43.3	43.3	0.0
11413-01	10	4.57	5.08										
11413-01	10	4.60	4.65	16.1						16.6	36.0	47.4	0.0
11413-01	11	5.18	5.74	18.4						8.7	10.9	79.1	1.3
11413-01	12	5.79	6.35										
11413-01	13	6.40	6.86										
11413-01	14	6.86	6.96										
11413-01	15	7.01	7.62										
11413-01	15	7.10	7.15	21.6						22.5	33.3	44.2	0.0
11413-01	16	7.62	8.23	16.9						16.6	23.1	60.3	0.0
11413-01	16	7.60	7.65	17.9						3.0	2.1	94.9	0.0
11413-01	17	8.23	8.84										
11413-01	18	8.75	8.80	14.2						23.4	22.1	54.5	0.0
11413-01	18	8.84	9.45										
11413-01	19	9.35	9.40	13.0						12.4	27.6	60.0	0.0
11413-01	19	9.45	10.01	19.6						31.3	27.4	41.3	0.0
11413-01	20	10.06	10.52										

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-02	1	0.00	0.15	32.6						9.9	73.1	16.9	0.1
11413-02	2	0.31	0.51	30.1						7.7	82.1	10.2	0.0
11413-02	2	0.30	0.68	31.9						10.5	81.3	8.2	0.0
11413-02	3	0.76	1.37	18.4					SM	7.5	12.3	80.0	0.2
11413-02	4	1.52	2.01										
11413-02	5	2.13	2.62										
11413-02	5	2.45	2.50	22.0						13.3	66.1	20.6	0.0
11413-02	6	2.74	3.23	29.1						30.1	66.9	3.0	0.0
11413-02	7	3.35	3.84										
11413-02	7	3.61	3.66	10.3						5.3	17.3	74.0	3.4
11413-02	8	3.96	4.45	24.9									
11413-02	8	4.10	4.20	27.4		32	21	11	CL	24.8	73.0	2.2	0.0
11413-02	9	4.57	5.06										
11413-02	9	4.80	4.85	22.9						28.9	67.6	3.5	0.0
11413-02	10	5.18	5.66	24.4						30.2	68.6	1.2	0.0
11413-02	11	5.79	6.10										
11413-02	11	5.78	5.82	15.7						1.5	3.0	94.9	0.6
11413-02	12	6.40	6.76	19.2						15.3	19.1	65.6	0.0
11413-02	13	7.01	7.57										
11413-02	13	7.20	7.25	18.6						32.8	29.2	38.0	0.0
11413-02	14	7.62	8.10										
11413-02	15	8.00	8.05	27.3						66.6	32.6	0.8	0.0
11413-02	15	8.23	8.64	21.4					SP/SM	1.5	5.9	92.6	0.0
11413-02	16	8.55	8.60	18.6						3.7	4.3	92.0	0.0
11413-02	16	8.84	9.02										
11413-02	17	9.45	9.81	20.8						3.7	4.3	92.0	0.0
11413-02	18	9.84	9.87	9.3						2.2	14.6	54.6	28.6
11413-02	18	10.06	10.62	12.8						17.8	17.2	65.0	0.0
11413-02	19	10.50	10.55	13.7						16.3	25.4	58.3	0.0
11413-02	19	10.67	11.02										

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-03	1	0.00	0.15	24.8						13.6	15.5	70.7	0.2
11413-03	2	0.61	1.09	24.6						24.8	74.7	0.5	0.0
11413-03	3	1.22	1.70										
11413-03	3	1.55	1.58	13.4						1.9	0.3	97.8	0.0
11413-03	4	1.83	2.31	23.4						1.9	0.5	97.6	0.0
11413-03	5	2.44	2.90										
11413-03	5	2.70	2.75	17.6						34.2	48.6	17.2	0.0
11413-03	6	3.05	3.51	12.3						16.7	29.6	53.7	0.0
11413-03	7	3.66	4.06										
11413-03	7	3.80	3.85	19.9						34.4	50.0	15.6	0.0
11413-03	8	4.27	4.67										
11413-03	9	4.88	5.23	23.2						31.5	57.9	10.6	0.0
11413-03	10	5.49	5.79										
11413-03	11	6.10	6.43										
11413-03	11	6.05	6.10	23.7						41.8	57.2	1.0	0.0
11413-03	12	6.71	7.04										
11413-03	13	7.32	7.62	26.0						32.5	65.6	1.9	0.0
11413-03	14	7.93	8.20										
11413-03	15	8.54	8.94	20.1						23.1	36.4	40.5	0.0
11413-03	16	9.14	9.30										
11413-03	17	9.75	10.11										
11413-03	17	9.65	9.70	23.0						39.9	51.1	9.0	0.0
11413-03	18	10.36	10.67	27.9		36	20	16	CL				
11413-03	19	10.97	11.25										
11413-03	19	10.65	10.70	23.0						24.7	67.3	8.0	0.0
11413-03	20	11.58	11.84										
11413-03	21	11.80	11.85	32.2									
11413-03	21	12.19	12.50	31.9		42	23	19	CL	42.1	56.1	1.8	0.0
11413-03	22	12.80	12.95										

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-04	1	0.00	0.51										
11413-04	1	0.05	0.10	12.0						58.7	45.1	26.2	0.0
11413-04	2	0.61	1.09	26.5						33.4	52.1	14.5	0.0
11413-04	3	1.22	1.70										
11413-04	4	1.83	2.19										
11413-04	4	2.00	2.05	26.6						37.6	57.4	5.0	0.0
11413-04	5	2.44	2.90	28.8		39	21	18	CL				
11413-04	6	3.05	3.51	29.1						41.8	56.7	1.5	0.0
11413-04	7	3.66	3.99										
11413-04	7	3.75	3.80	26.6		37	23	14	CL				
11413-04	8	4.27	4.67										
11413-04	8	4.20	4.25	21.5						34.7	63.8	1.5	0.0
11413-04	9	4.88	5.18										
11413-04	9	4.75	4.80	24.3		36	23	13	CL				
11413-04	10	5.49	5.89	28.9						27.3	71.5	1.2	0.0
11413-04	11	6.10	6.48										
11413-04	11	6.00	6.05	26.6						48.3	51.4	0.3	0.0
11413-04	12	6.71	7.01	18.6						20.5	25.6	53.9	0.0
11413-04	13	7.32	7.75										
11413-04	13	7.10	7.15	22.6						42.0	47.1	10.9	0.0
11413-04	14	7.75	7.80	26.9		29	22	7	CL-ML				
11413-04	14	7.93	8.28										
11413-04	15	8.54	8.89	28.6						32.3	57.5	10.2	0.0
11413-04	16	9.14	9.40	31.7		50	24	26	CL	48.9	46.9	4.2	0.0
11413-04	16	9.14	9.40	29.3									
11413-04	17	9.75	9.96										
11413-04	18	10.36	10.92	16.4						14.8	20.3	64.9	0.0
11413-04	18	10.75	10.80	15.9						14.4	16.1	69.5	0.0
11413-04	19	10.97	11.46	16.1						12.4	21.8	65.8	0.0

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-05	1	0.00	0.56	NOTE: All samples obtained from Borehole #11413 -05									
11413-05	2	0.61	1.17	were retained by Geological Survey of Canada, Terrain Sciences Division									
11413-05	3	1.22	1.78										
11413-05	4	1.83	2.39										
11413-05	5	2.44	2.85										
11413-05	6	3.05	3.40										
11413-05	7	3.66	4.22										
11413-05	8	4.27	4.88										
11413-05	9	4.88	5.26										
11413-05	10	5.49	5.74										
11413-05	11	6.10	6.71										
11413-05	12	6.71	7.24										
11413-05	13	7.32	7.80										
11413-05	14	7.93	8.18										
11413-05	15	8.54	8.84										
11413-05	16	9.14	9.30										
11413-05	17	9.65	10.19										
11413-05	18	10.31	10.82										
11413-05	19	10.97	11.43										
11413-05	20	11.43	12.04										
11413-05	21	12.12	12.65										
11413-05	22	12.65	13.26										
11413-05	23	13.26	13.87										
11413-05	24	13.87	14.48										

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-06	1	0.00	0.38	NOTE: All samples obtained from Borehole #11413 -06									
11413-06	2	0.61	1.04	were retained by Geological Survey of Canada, Terrain Sciences Division									
11413-06	3	1.22	1.55										
11413-06	4	1.83	2.24										
11413-06	5	2.44	2.85										
11413-06	6	3.05	3.53										
11413-06	7	3.66	3.96										
11413-06	8	4.27	4.60										
11413-06	9	4.88	5.33										
11413-06	10	5.49	5.89										
11413-06	11	6.10	6.50										
11413-06	12	6.71	7.24										
11413-06	13	7.32	7.70										
11413-06	14	7.93	8.46										
11413-06	15	8.54	9.09										
11413-06	16	9.14	9.53										
11413-06	17	9.75	10.31										
11413-06	18	10.36	10.77										
11413-06	19	10.97	11.53										
11413-07	1	0.15	0.31	24.9						38.1	37.7	23.8	0.4
11413-07	2	0.91	1.07	17.5									
11413-07	3	1.22	1.37	21.3	27				SM	6.1	14.4	79.5	0.0
11413-07	4	1.98	2.13	18.3									
11413-07	5	2.59	2.74	19.8									
11413-07	6	3.05	3.66										
11413-07	7	3.91	4.06	20.6									
11413-07	8	4.55	4.70	16.5					SM	5.1	20.1	74.8	0.0
11413-08	1	0.25	0.41	34.6						58.4	41.1	0.5	0.0
11413-08	2	0.76	0.91	36.2									
11413-08	3	1.42	1.58	14.2	33					7.7	18.8	73.5	0.0
11413-08	4	2.03	2.13	13.6									
11413-08	5	2.74	2.90	14.7						7.8	23.2	69.0	0.0
11413-08	6	3.05	3.66										
11413-08	7	3.66	3.81	21.3									
11413-08	8	4.27	4.88										
11413-08	9	4.88	5.49										

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-09	1	0.61	0.91	27.8		39	22	17	CL	39.1	55.0	5.9	0.0
11413-09	2	1.37	1.52	12.4					SM	9.4	15.0	75.6	0.0
11413-09	3	1.83	2.13	15.4	25								
11413-09	4	2.74	2.90	12.7									
11413-09	5	3.20	3.35	11.5									
11413-09	6	3.96	4.12	20.8									
11413-10	1	0.23	0.38	27.6						55.3	43.7	1.0	0.0
11413-10	2	0.76	0.97	15.9									
11413-10	3	1.37	1.52	21.8	21				SP/SM	-	6.5	93.5	0.0
11413-10	4	2.13	2.29	19.7									
11413-10	5	2.52	2.67	11.8									
11413-10	6	2.74	2.90	14.0	20					20.1	20.4	59.3	0.2
11413-10	7	3.20	3.35	20.0									
11413-10	8	3.66	4.27										
11413-10	9	4.57	4.72	22.3									
11413-10	10	4.88	5.33										
11413-11	1	0.76	0.91	21.1					SP/SM	-	5.6	94.4	0.0
11413-11	2	1.52	1.68	15.8									
11413-11	3	2.13	2.29	20.4	28				SM	5.7	11.9	82.4	0.0
11413-11	4	2.74	2.90	22.0									
11413-11	5	3.43	3.51	14.6									
11413-11	6	3.96	4.12	20.7	26				SM	4.1	7.1	88.8	0.0
11413-12	1	0.41	0.56	12.3						13.3	17.2	69.5	0.0
11413-12	2	0.86	1.02	11.9						15.6	16.5	67.9	0.0
11413-12	3	1.63	1.78	15.1	38								
11413-12	4	2.13	2.29	15.6	29								
11413-12	5	2.44	3.05										
11413-12	6	3.05	3.12	21.0									
11413-12	7	3.96	4.12	16.4	24					15.8	16.7	67.5	0.0
11413-12	8	4.47	4.62	18.3									

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-13	1	0.23	0.38	32.2						46.6	39.4	14.0	0.0
11413-13	2	0.97	1.12	21.6									
11413-13	3	1.37	1.52	23.3					SP	-	2.8	97.2	0.0
11413-13	4	2.13	2.29	14.0						11.9	19.2	68.9	0.0
11413-13	5	2.74	2.90	15.3	16								
11413-13	6	3.35	3.51	15.7									
11413-13	7	3.71	3.91	17.2									
11413-14	1	0.15	0.31	20.0						31.0	25.0	44.0	0.0
11413-14	2	0.91	1.07	18.6	22					10.4	22.9	66.7	0.0
11413-14	3	1.52	1.68	20.6					SM	4.7	9.9	85.1	0.3
11413-14	4	1.83	2.44										
11413-14	5	2.44	3.05										
11413-14	6	3.20	3.35	21.7									
11413-14	7	3.96	4.12	19.8	19								
11413-15	1	0.10	0.25	24.4									
11413-15	2	0.76	1.07	20.6	27					16.1	29.4	53.4	1.1
11413-15	3	1.22	1.83										
11413-15	4	1.83	2.44										
11413-15	5	2.74	2.90	30.1	24				SP/SM	-	11.2	88.8	0.0
11413-15	6	3.35	3.51	26.3									
11413-15	7	3.89	4.04	20.2									
11413-15	8	4.27	4.57	21.8									
11413-15	9	4.88	5.49										
11413-15	10	5.49	5.94										

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-16	1	0.00	0.20	NOTE: All samples obtained from Borehole #11413 -16									
11413-16	2	0.20	0.37	were retained by Geological Survey of Canada, Terrain Sciences Division									
11413-16	3	0.37	0.97										
11413-16	4	0.97	1.50										
11413-16	5	1.50	2.19										
11413-16	6	2.19	2.95										
11413-16	7	2.95	3.48										
11413-16	8	3.48	4.17										
11413-16	9	4.17	4.93										
11413-16	10	4.93	5.36										
11413-16	11	5.36	5.82										
11413-16	12	5.82	6.48										
11413-16	13	6.48	7.06										
11413-16	14	7.06	7.59										
11413-16	15	7.59	8.08										
11413-16	16	8.09	8.97										
11413-16	17	8.97	9.65										
11413-16	18	9.65	10.49										
11413-16	19	10.49	10.97										
11413-17	1	0.00	0.41	NOTE: All samples obtained from Borehole #11413 -17									
11413-17	2	0.41	0.86	were retained by Geological Survey of Canada, Terrain Sciences Division									
11413-17	3	0.86	1.78										
11413-17	4	1.68	2.21										
11413-17	5	3.20	3.35										
11413-18	1			NOTE: No samples were retained by Geological Survey of Canada, Terrain Sciences Division.									

LABORATORY TEST SUMMARY

Borehole	Sample Number	Sample Interval from (m)	to (m)	Moisture Content (%)	Salinity (ppt)	Liquid Limit	Plastic Limit	Plasticity Index	USC Classification	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
11413-19	1	0.00	0.46	NOTE: All samples obtained from Borehole #11413 -19									
11413-19	2	0.61	1.07	were retained by Geological Survey of Canada, Terrain Sciences Division									
11413-19	3	1.22	1.68										
11413-19	4	1.83	2.34										
11413-19	5	2.44	2.85										
11413-19	6	3.05	3.66										
11413-19	7	3.66	4.12										
11413-19	8	4.27	5.03										
11413-19	9	5.49	5.79										
11413-19	10	6.10	6.55										
11413-19	11	7.62	8.08										
11413-19	12	9.14	9.60										
11413-19	13	10.67	10.82										

PARTICLE SIZE DISTRIBUTION ANALYSIS SUMMARY

PARTICLE SIZE DISTRIBUTION ANALYSIS SUMMARY

Borehole Number	Depth		Percent Passing															
	from (m)	to (m)	20 mm (%)	12.5 mm (%)	9.5 mm (%)	4.75 mm (%)	2 mm (%)	0.85 mm (%)	0.425 mm (%)	0.25 mm (%)	0.15 mm (%)	0.75 mm (%)	0.03 mm (%)	0.02 mm (%)	0.01 mm (%)	0.009 mm (%)	0.006 mm (%)	0.003 mm (%)	0.001 mm (%)
11413-01	0.00	0.30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.1	92.4	83.9	68.5	58.2	49.6	34.2	25.7
11413-01	0.30	0.33	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	98.6	98.4	92.1	84.2	68.0	57.2	47.6	33.4	22.2
11413-01	0.34	0.40	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	96.0	87.0	71.5	54.0	32.7	23.8	19.7	14.9	11.1
11413-01	0.40	0.45	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.8	75.0	37.4	33.4	26.4	16.5	12.7	10.2	8.6	6.4
11413-01	0.50	0.60	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.4	93.6	78.1	60.0	37.5	27.6	21.3	12.7	9.5
11413-01	0.72	0.75	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.3	44.7	10.7	10.6	9.1	6.1	5.5	4.6	3.6	3.0
11413-01	0.78	0.83	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.2	79.4	60.4	36.5	28.6	22.9	16.5	12.1
11413-01	1.05	1.10	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.2	87.0	53.6	46.1	33.4	20.0	16.5	14.3	11.1	9.5
11413-01	1.60	1.65	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.0	86.4	68.3	57.2	41.3	31.8	24.8	17.5	12.1
11413-01	1.90	1.95	100.0	100.0	96.3	88.8	86.8	86.4	86.1	84.8	72.7	65.3	56.9	48.6	31.5	24.2	17.7	12.4	8.8
11413-01	2.25	2.30	100.0	100.0	98.1	84.0	71.8	70.3	69.7	56.4	29.6	24.5							
11413-01	2.75	2.80	100.0	100.0	96.0	83.3	77.5	77.3	77.1	76.7	37.4	6.9							
11413-01	3.30	3.35	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	95.3	19.3	11.1	8.7	6.4	5.6	4.8	4.0	3.5
11413-01	3.50	3.55	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.2	88.8	69.9	52.4	31.8	22.9	19.1	14.3	11.1
11413-01	4.00	4.05	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	98.0	56.8	41.3	36.5	27.0	20.3	15.9	9.5	6.0
11413-01	4.60	4.65	100.0	100.0	100.0	100.0	100.0	99.8	99.4	99.0	96.4	52.6	34.9	30.2	24.8	21.3	18.1	14.3	11.1
11413-01	5.60	5.65	100.0	100.0	100.0	98.8	98.4	98.2	98.2	97.6	38.0	19.7	16.2	15.0	12.5	10.9	9.4	7.8	6.2
11413-01	7.10	7.15	100.0	100.0	100.0	100.0	100.0	100.0	99.6	99.0	84.6	55.8	50.8	46.1	34.3	29.2	24.8	18.4	14.3
11413-01	7.60	7.65	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.6	43.1	5.2	4.4	4.1	3.8	3.5	3.2	2.9	2.6
11413-01	8.20	8.30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.2	78.2	39.8	27.0	24.1	22.6	20.0	18.7	14.0	9.5
11413-01	8.75	8.80	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.2	72.0	45.6	35.6	34.0	30.2	28.6	25.4	19.7	15.9
11413-01	9.35	9.40	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.6	66.0	40.0	19.1	17.5	14.3	13.3	12.7	12.1	10.2
11413-01	9.55	9.60	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.0	78.0	58.8	49.2	46.1	41.9	38.1	33.4	26.4	19.7

PARTICLE SIZE DISTRIBUTION ANALYSIS SUMMARY

Borehole Number	Depth		Percent Passing															
	from (m)	to (m)	20 mm (%)	12.5 mm (%)	9.5 mm (%)	4.75 mm (%)	2 mm (%)	0.85 mm (%)	0.425 mm (%)	0.25 mm (%)	0.15 mm (%)	0.75 mm (%)	0.03 mm (%)	0.02 mm (%)	0.01 mm (%)	0.009 mm (%)	0.006 mm (%)	0.003 mm (%)	0.001 mm (%)
11413-02	0.00	0.15	100.0	100.0	100.0	99.9	99.9	99.7	99.5	98.9	86.5	83.1	66.6	38.7	19.0	14.9	12.1	7.6	6.3
11413-02	0.30	0.68	100.0	100.0	100.0	100.0	100.0	99.8	99.6	99.4	93.8	91.8	68.3	40.3	19.7	15.2	11.8	8.9	6.4
11413-02	0.30	0.68	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	91.8	89.8	82.6	34.9	25.4	10.2	8.9	6.0	3.5
11413-02	0.70	1.30	100.0	100.0	100.0	99.8	99.7	99.4	99.3	99.0	51.2	19.8	18.4	15.7	12.5	10.6	8.7	6.2	4.8
11413-02	2.45	2.50	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.3	79.5	67.4	51.7	31.5	21.7	15.7	10.1	8.2
11413-02	3.05	3.10	100.0	100.0	100.0	100.0	100.0	100.0	99.6	99.2	98.8	97.0	81.0	67.3	51.5	41.3	32.4	24.8	17.5
11413-02	3.61	3.66	100.0	100.0	98.3	96.7	94.8	91.6	87.1	77.5	32.7	22.7	19.6	14.8	8.9	6.5	6.1	4.5	3.0
11413-02	4.80	4.85	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.2	96.6	85.8	68.3	46.1	39.1	32.4	22.2	16.5
11413-02	5.30	5.35	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.8	82.6	69.9	50.8	40.7	33.4	22.9	16.5
11413-02	5.78	5.82	100.0	100.0	100.0	99.5	99.2	99.0	98.3	69.1	14.7	4.6							
11413-02	6.30	6.35	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	78.4	34.4	28.6	25.4	20.6	18.4	16.5	13.3	10.2
11413-02	7.20	7.25	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	93.0	62.0	55.6	53.0	44.5	41.3	35.6	27.0	19.1
11413-02	8.00	8.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	92.9	88.8	82.4	79.4	70.6	57.6	44.1
11413-02	8.25	8.30	100.0	100.0	100.0	100.0	100.0	99.9	99.4	91.1	41.3	7.4	4.7	3.5	2.8	2.4	2.1	0.7	0.2
11413-02	8.55	8.60	100.0	100.0	100.0	100.0	99.7	99.5	99.0	96.9	52.5	8.0	6.6	5.0	4.4	4.0	3.8	3.6	3.4
11413-02	9.40	9.45	100.0	100.0	100.0	100.0	100.0	99.6	98.0	87.0	33.0	8.0	5.6	5.4	4.8	4.3	4.0	3.5	3.2
11413-02	9.84	9.87	100.0	92.8	82.7	71.4	62.6	54.4	50.4	40.1	31.3	16.8	9.9	8.0	6.5	5.1	3.4	0.9	0.6
11413-02	10.05	10.10	100.0	100.0	100.0	100.0	100.0	100.0	99.8	96.6	68.2	35.0	25.4	24.8	22.9	20.6	19.1	15.9	12.7
11413-02	10.50	10.55	100.0	100.0	100.0	100.0	100.0	100.0	99.8	97.0	72.4	41.8	28.6	26.0	22.9	22.2	18.4	13.3	8.9

PARTICLE SIZE DISTRIBUTION ANALYSIS SUMMARY

Borehole Number	Depth		Percent Passing															
	from (m)	to (m)	20 mm (%)	12.5 mm (%)	9.5 mm (%)	4.75 mm (%)	2 mm (%)	0.85 mm (%)	0.425 mm (%)	0.25 mm (%)	0.15 mm (%)	0.75 mm (%)	0.03 mm (%)	0.02 mm (%)	0.01 mm (%)	0.009 mm (%)	0.006 mm (%)	0.003 mm (%)	0.001 mm (%)
11413-03	0.00	0.15	100.0	100.0	100.0	99.8	99.7	99.5	99.1	87.4	36.8	29.1	25.5	22.6	19.0	16.5	14.4	12.4	7.9
11413-03	1.00	1.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	88.4	78.6	49.1	37.0	28.5	17.4	10.5
11413-03	1.55	1.58	100.0	100.0	100.0	100.0	99.3	98.9	98.2	87.3	14.1	2.3							
11413-03	2.02	2.07	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	26.8	2.4							
11413-03	2.70	2.75	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.6	82.8	74.6	68.3	54.6	46.7	38.1	25.4	17.5
11413-03	3.22	3.27	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.6	48.4	46.4	41.3	36.5	27.6	22.9	19.1	12.7	9.5
11413-03	3.80	3.85	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	85.2	84.4	76.2	67.7	52.4	45.1	38.1	26.0	18.4
11413-03	4.84	4.88	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	94.3	89.5	81.2	77.6	56.4	45.1	36.1	22.6	13.5
11413-03	6.05	6.10	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.0	90.5	78.5	60.4	54.0	45.4	31.8	22.9
11413-03	7.15	7.20	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.8	98.2	70.5	61.0	50.2	41.9	35.6	24.8	18.4
11413-03	8.50	8.60	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	73.0	59.6	56.2	48.0	35.9	30.5	26.0	18.7	12.7
11413-03	9.65	9.70	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.4	91.0	82.6	69.9	56.5	49.2	42.9	32.4	23.8
11413-03	10.65	10.70	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	92.0	81.6	63.5	41.9	34.0	27.6	19.7	15.2
11413-03	11.95	12.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.3	94.3	77.2	59.0	52.1	44.9	33.6	21.3
11413-04	0.05	0.10	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	97.2	73.8	64.2	54.6	44.5	38.1	31.8	22.9	16.5
11413-04	1.00	1.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.2	85.6	73.7	66.7	54.6	44.5	36.5	25.4	16.8
11413-04	2.00	2.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	96.4	95.0	88.3	76.2	61.9	51.8	41.3	28.6	20.6
11413-04	3.00	3.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.6	92.6	86.1	65.0	53.3	45.1	31.2	19.8
11413-04	4.20	4.25	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	98.6	90.1	75.7	57.5	47.3	38.3	26.5	19.2
11413-04	5.50	5.55	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	98.8	93.7	82.6	53.4	40.3	31.1	19.1	11.4
11413-04	6.00	6.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	93.0	79.7	68.7	59.3	51.9	36.6	27.6
11413-04	6.50	6.55	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	80.4	46.2	40.7	36.5	28.6	24.5	22.2	17.5	13.3
11413-04	7.10	7.15	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	98.8	89.2	82.6	71.8	58.8	51.5	45.1	33.4	24.5
11413-04	8.30	8.35	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.2	89.8	71.5	61.9	50.8	41.3	34.9	26.0	19.1
11413-04	9.00	9.05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.6	95.8	87.4	84.2	67.7	60.4	51.1	39.1	26.0
11413-04	10.30	10.35	100.0	100.0	100.0	100.0	100.0	99.8	99.4	94.0	75.8	35.2	20.6	19.1	16.5	15.9	15.2	14.3	11.1
11413-04	10.75	10.80	100.0	100.0	100.0	100.0	100.0	99.8	99.6	94.2	64.8	30.6	22.2	20.0	18.1	15.9	15.2	13.3	11.1
11413-04	10.95	11.00	100.0	100.0	100.0	100.0	100.0	99.8	99.4	94.2	73.8	34.2	22.2	18.4	17.2	15.6	13.3	11.1	7.9

PARTICLE SIZE DISTRIBUTION ANALYSIS SUMMARY

Borehole Number	Depth		Percent Passing															
	from (m)	to (m)	20 mm (%)	12.5 mm (%)	9.5 mm (%)	4.75 mm (%)	2 mm (%)	0.85 mm (%)	0.425 mm (%)	0.25 mm (%)	0.15 mm (%)	0.75 mm (%)	0.03 mm (%)	0.02 mm (%)	0.01 mm (%)	0.009 mm (%)	0.006 mm (%)	0.003 mm (%)	0.001 mm (%)
11413-07	0.15	0.30	100.0	100.0	100.0	99.7	99.5	99.3	98.7	93.5	83.4	75.8	69.5	61.6	55.3	45.8	41.1	30.0	19.0
11413-07	1.20	1.40	100.0	100.0	100.0	100.0	100.0	100.0	99.9	69.4	44.6	20.5	11.1	9.1	7.8	7.1	6.7	5.6	5.1
11413-07	4.50	4.70	100.0	100.0	100.0	100.0	100.0	99.9	99.2	54.1	38.4	25.2	14.3	9.8	7.9	6.7	6.0	4.0	3.7
11413-08	0.25	0.41	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	93.1	89.9	80.4	72.7	62.3	41.9	27.0
11413-08	1.40	1.60	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.7	52.8	26.5	15.9	12.7	10.6	9.5	8.4	6.8	5.7
11413-08	2.70	2.90	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.4	61.8	31.0	14.3	12.7	10.2	9.5	8.9	6.4	5.1
11413-09	0.60	0.90	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	96.6	94.2	82.6	76.2	62.3	51.8	43.2	29.5	19.7
11413-09	1.40	1.50	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.4	49.8	24.4	20.6	16.5	14.3	11.8	10.5	8.3	7.0
11413-10	0.20	0.40	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	99.0	94.7	88.9	75.9	66.7	58.8	42.6	28.6
11413-10	1.40	1.50	100.0	100.0	100.0	100.0	100.0	100.0	100.0	70.7	10.3	6.5							
11413-10	2.70	2.90	100.0	100.0	100.0	99.9	99.8	99.6	99.2	92.8	79.8	40.5	29.2	24.7	23.1	22.2	20.9	19.0	15.8
11413-11	0.80	0.90	100.0	100.0	100.0	100.0	100.0	99.9	99.8	89.4	31.5	5.7							
11413-11	2.10	2.30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.2	54.9	17.7	12.7	9.8	8.1	7.1	6.4	4.9	4.3
11413-11	4.00	4.10	100.0	100.0	100.0	100.0	100.0	99.7	99.3	77.2	21.3	11.3	8.7	7.1	6.4	5.1	4.8	3.2	2.9
11413-12	0.40	0.60	100.0	100.0	100.0	100.0	99.7	99.5	99.1	91.3	56.6	30.5	23.7	21.5	19.6	18.0	14.9	11.4	9.5
11413-12	0.90	1.00	100.0	100.0	100.0	100.0	100.0	100.0	99.8	94.8	60.8	32.2	25.4	22.9	20.6	18.7	17.2	13.7	10.8
11413-12	4.00	4.10	100.0	100.0	100.0	100.0	100.0	100.0	99.8	93.4	56.2	32.6	25.1	22.9	21.3	19.1	16.8	14.6	9.5
11413-13	0.20	0.40	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6	96.8	86.0	76.9	74.0	64.8	58.1	50.8	35.3	25.4
11413-13	1.40	1.50	100.0	100.0	100.0	100.0	99.5	99.0	98.5	85.0	11.9	2.9							
11413-13	2.10	2.30	100.0	100.0	100.0	100.0	100.0	100.0	99.8	93.2	57.4	31.2	25.4	22.2	18.4	16.2	13.7	9.8	9.5
11413-14	0.15	0.30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.4	73.8	56.0	52.7	47.6	43.5	38.8	34.6	24.8	15.9
11413-14	0.90	1.10	100.0	100.0	100.0	100.0	100.0	100.0	99.5	92.9	76.9	33.3	20.6	15.9	13.2	12.4	11.1	9.5	7.9
11413-14	1.50	1.70	100.0	100.0	100.0	99.7	99.4	99.3	98.5	67.1	33.1	14.6	11.1	8.2	6.5	5.7	5.1	4.4	3.3
11413-15	0.80	0.90	100.0	100.0	100.0	99.0	98.2	96.9	95.7	91.9	70.8	45.6	30.9	23.1	20.4	18.4	17.0	14.5	11.4
11413-15	2.70	2.90	100.0	100.0	100.0	100.0	100.0	100.0	99.9	93.3	35.2	11.3							

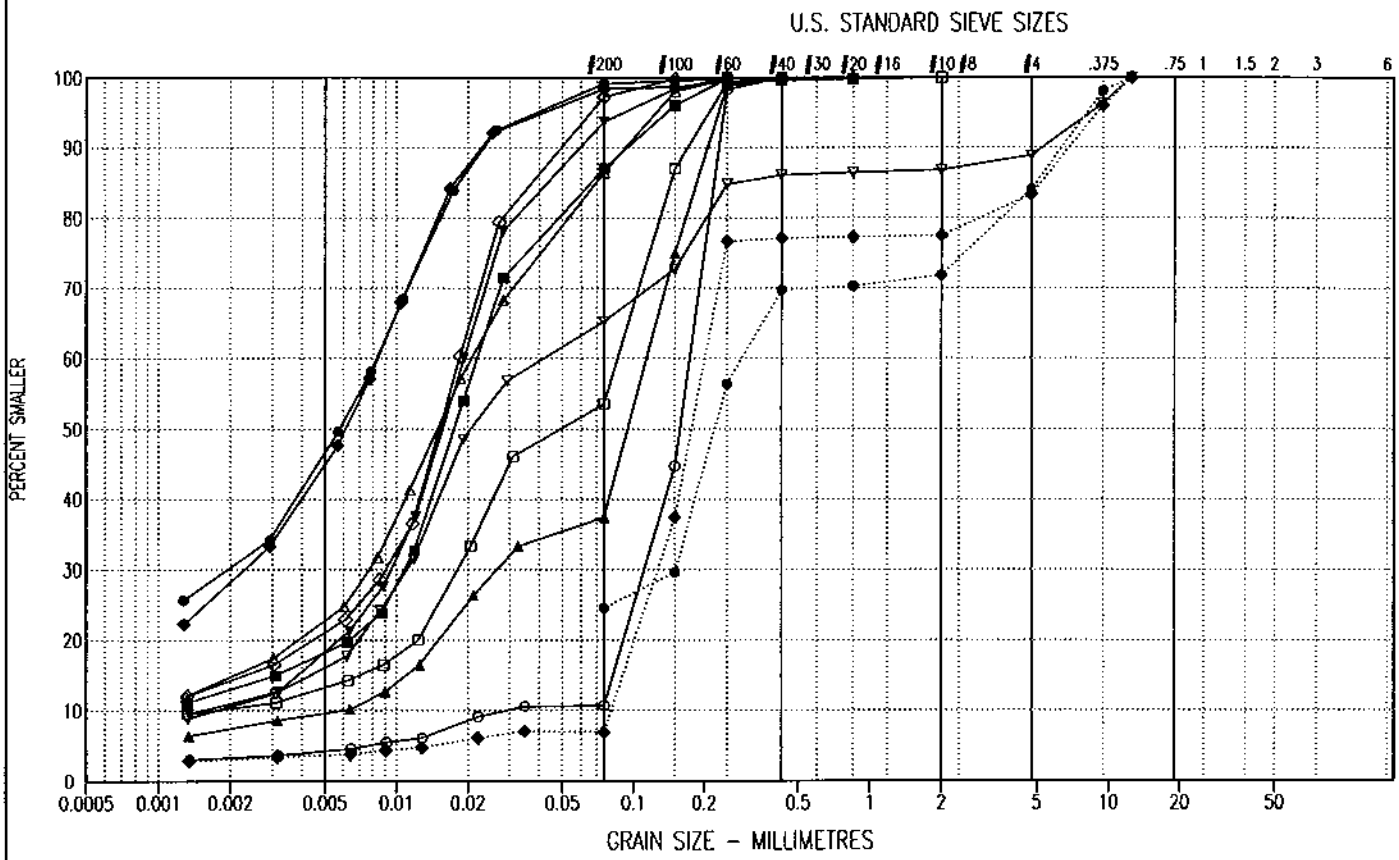
APPENDIX D

PARTICLE SIZE ANALYSIS

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●—●	1	0.00 – 0.30	45.7	53.4	0.9	0.0	–	–	
◆—◆	1	0.30 – 0.33	44.2	54.2	1.6	0.0	–	–	
■—■	1	0.34 – 0.40	17.8	69.2	13.0	0.0	–	–	
▲—▲	1	0.40 – 0.45	9.4	28.0	62.6	0.0	19.8	1.0	SM
▼—▼	1	0.50 – 0.60	17.6	75.9	6.5	0.0	11.9	3.0	
⊙—⊙	1	0.72 – 0.75	4.1	6.6	89.3	0.0	6.1	2.6	SW–SM
◇—◇	1	0.78 – 0.83	20.5	76.6	2.9	0.0	–	–	
⊡—⊡	1	1.05 – 1.10	13.0	40.5	46.5	0.0	48.2	2.1	
△—△	1	1.60 – 1.65	22.2	64.2	13.6	0.0	–	–	
▽—▽	1	1.90 – 1.95	15.6	49.6	23.6	11.2	24.3	1.4	
●·····●	1	2.25 – 2.30	24.5		59.5	16.0	6.2	1.6	SM
◆·····◆	1	2.75 – 2.80	3.6	3.3	76.4	16.7	2.5	1.0	SP–SC

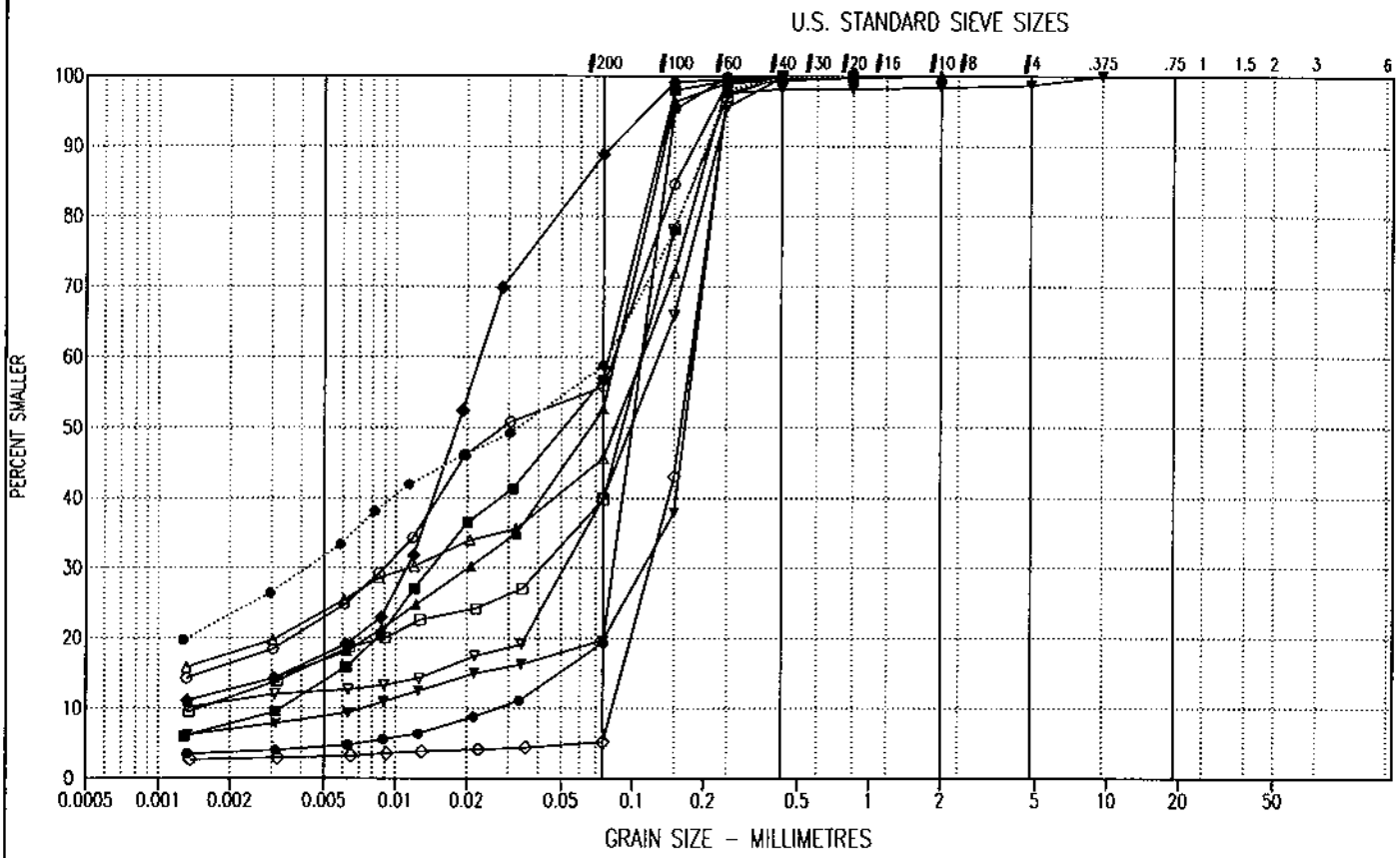
Project: 0101-11413 Date Tested: 94/07/29 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE - ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●—●	1	3.30 - 3.35	4.4	14.9	80.7	0.0	4.2	2.3	SM
◆—◆	1	3.50 - 3.55	17.2	71.6	11.2	0.0	-	-	
■—■	1	4.00 - 4.05	13.4	43.3	43.3	0.0	24.4	0.8	
▲—▲	1	4.60 - 4.65	16.6	36.0	47.4	0.0	-	-	
▼—▼	1	5.60 - 5.65	8.7	10.9	79.1	1.3	25.5	10.0	SM
⊙—⊙	1	7.10 - 7.15	22.5	33.3	44.2	0.0	-	-	
◇—◇	1	7.60 - 7.65	3.0	2.1	94.9	0.0	2.1	1.0	SP-SC
□—□	1	8.20 - 8.30	16.6	23.1	60.3	0.0	74.5	10.9	SM
△—△	1	8.75 - 8.80	23.4	22.1	54.5	0.0	-	-	
▽—▽	1	9.35 - 9.40	12.4	27.6	60.0	0.0	-	-	
●·····●	1	9.55 - 9.60	31.3	27.4	41.3	0.0	-	-	

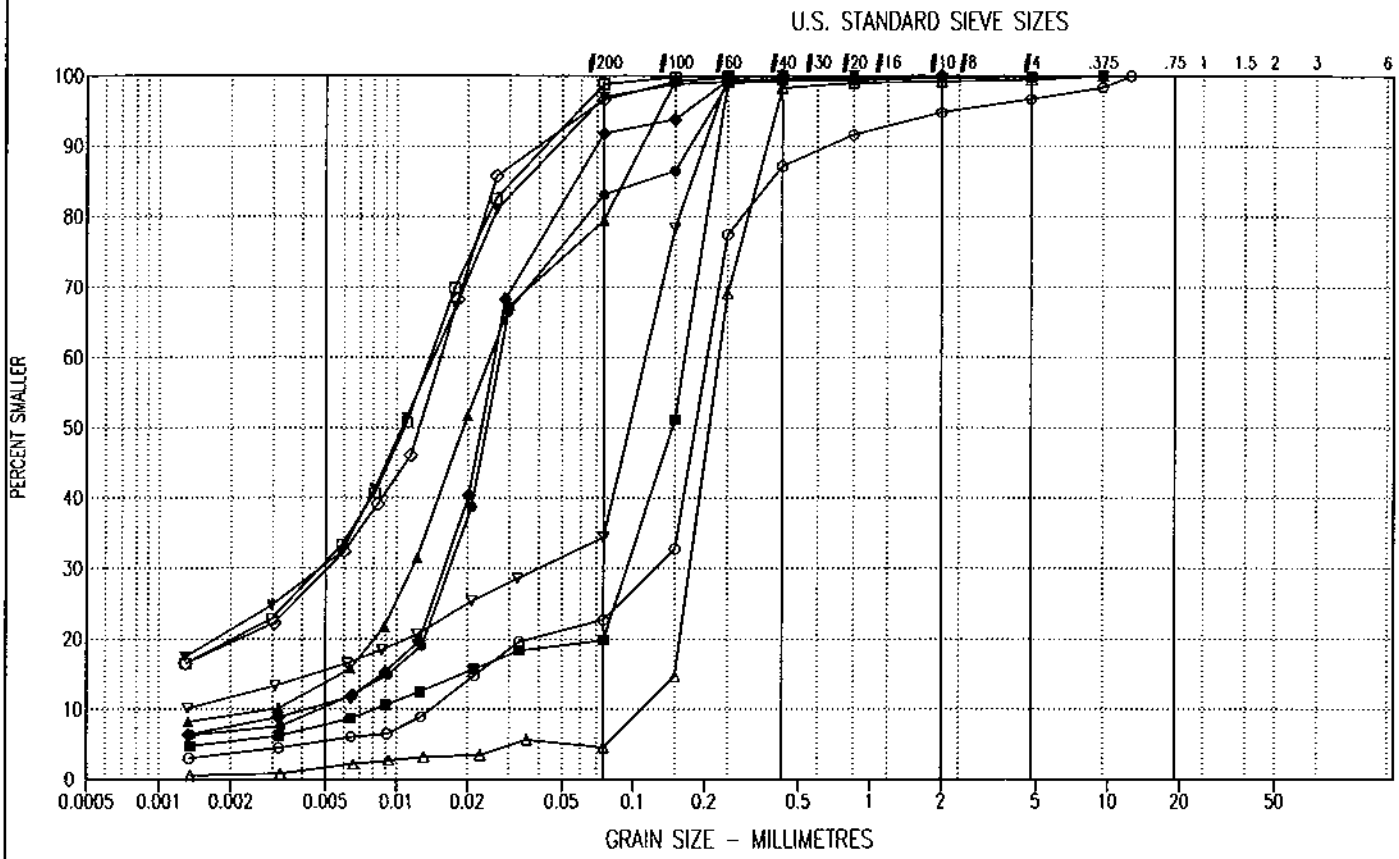
Project: 0101-11413 Date Tested: 94/08/12 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●—●	2	0.00 – 0.15	9.9	73.1	16.9	0.1	5.5	2.2	
◆—◆	2	0.30 – 0.68	10.5	81.3	8.2	0.0	5.9	2.3	
■—■	2	0.70 – 1.30	7.5	12.3	80.0	0.2	20.7	7.2	SM
▲—▲	2	2.45 – 2.50	13.3	66.1	20.6	0.0	8.3	1.8	
▼—▼	2	3.05 – 3.10	30.1	66.9	3.0	0.0	–	–	
⊙—⊙	2	3.61 – 3.66	5.3	17.3	74.0	3.4	14.7	5.6	SM
◇—◇	2	4.80 – 4.85	28.9	67.6	3.5	0.0	–	–	
□—□	2	5.30 – 5.35	30.2	68.6	1.2	0.0	–	–	
△—△	2	5.78 – 5.82	1.5	3.0	94.9	0.6	2.0	1.2	SP
▽—▽	2	6.30 – 6.35	15.3	19.1	65.6	0.0	–	–	

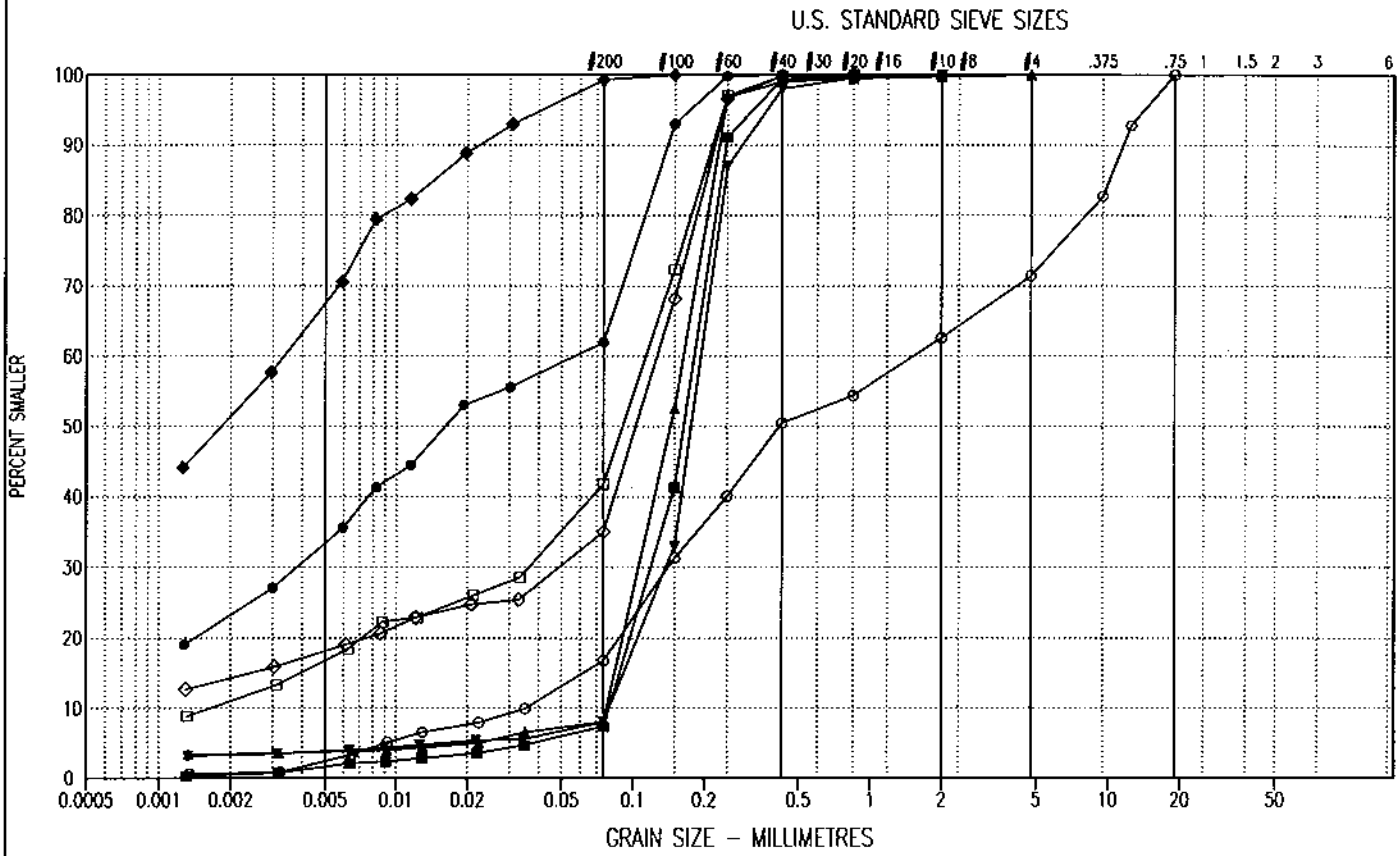
Project: 0101-11413 Date Tested: 94/05/05 BY: IS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●	2	7.20 – 7.25	32.8	29.2	38.0	0.0	–	–	
◆	2	8.00 – 8.05	66.6	32.6	0.8	0.0	–	–	
■	2	8.25 – 8.30	1.5	5.9	92.6	0.0	2.3	1.0	SP–SM
▲	2	8.55 – 8.60	3.7	4.3	92.0	0.0	2.1	1.0	SP–SM
▼	2	9.40 – 9.45	3.7	4.3	92.0	0.0	2.5	1.2	SP–SM
⊙	2	9.84 – 9.87	2.2	14.6	54.6	28.6	46.2	0.4	SM
◇	2	10.05 – 10.10	17.8	17.2	65.0	0.0	–	–	
⊡	2	10.50 – 10.55	16.3	25.4	58.3	0.0	67.8	6.7	SM

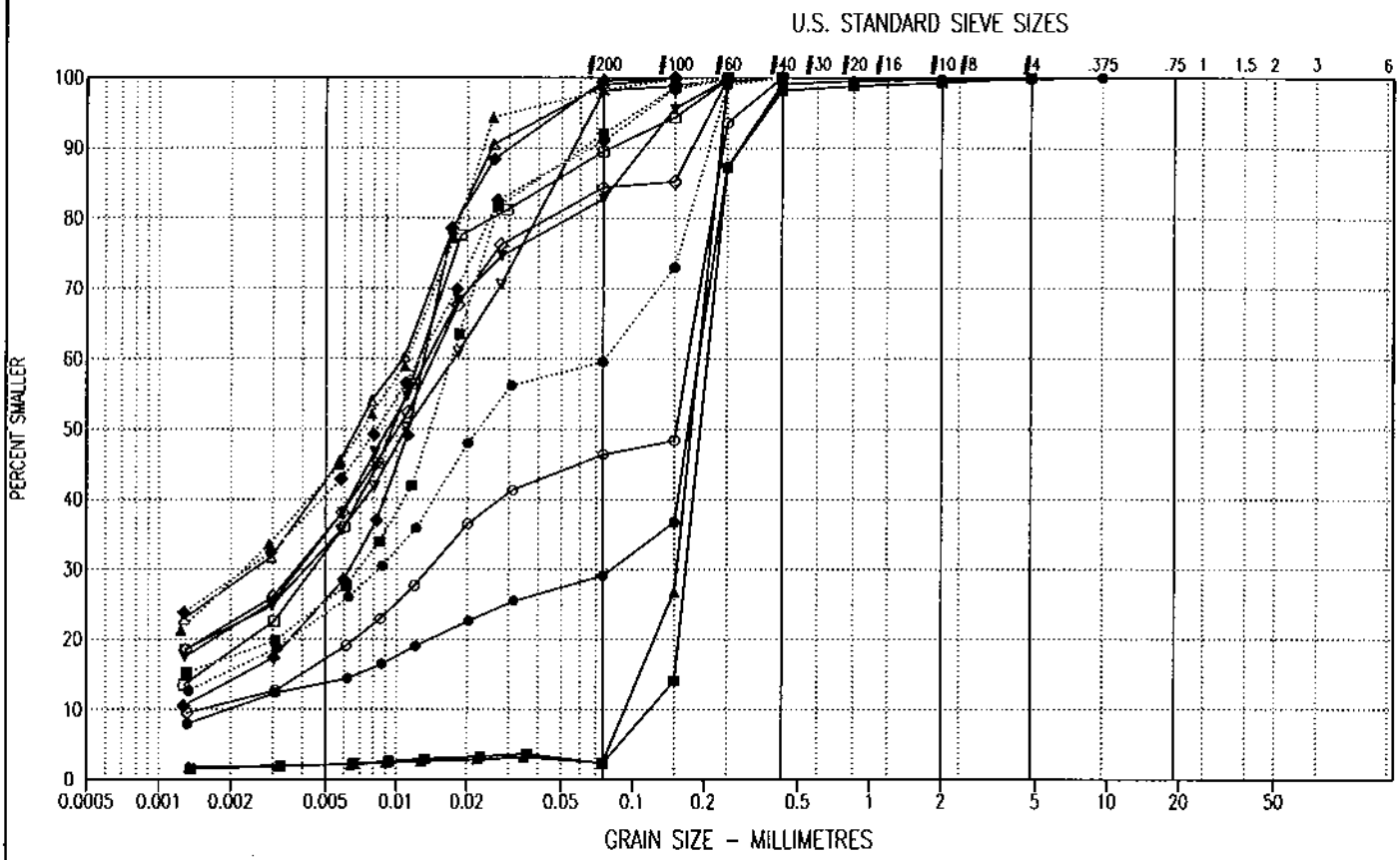
Project: 0101–11413 Date Tested: 94/08/05 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	3	0.00 – 0.15	13.6	15.5	70.7	0.2	91.4	16.7	SM
◆——◆	3	1.00 – 1.05	24.8	74.7	0.5	0.0	–	–	
■——■	3	1.55 – 1.58	1.9	0.3	97.8	0.0	1.7	1.1	SP
▲——▲	3	2.02 – 2.07	1.9	0.5	97.6	0.0	2.0	1.2	SP
▼——▼	3	2.70 – 2.75	34.2	48.6	17.2	0.0	–	–	
○——○	3	3.22 – 3.27	16.7	29.6	53.7	0.0	111.6	0.7	SM
◇——◇	3	3.80 – 3.85	34.4	50.0	15.6	0.0	–	–	
⊡——⊡	3	4.84 – 4.88	31.5	57.9	10.6	0.0	–	–	
△——△	3	6.05 – 6.10	41.8	57.2	1.0	0.0	–	–	
▽——▽	3	7.15 – 7.20	32.5	65.6	1.9	0.0	–	–	
●·····●	3	8.50 – 8.60	23.1	36.4	40.5	0.0	–	–	
◆·····◆	3	9.65 – 9.70	39.9	51.1	9.0	0.0	–	–	
■·····■	3	10.65 – 10.70	24.7	67.3	8.0	0.0	–	–	
▲·····▲	3	11.95 – 12.00	42.1	56.1	1.8	0.0	–	–	

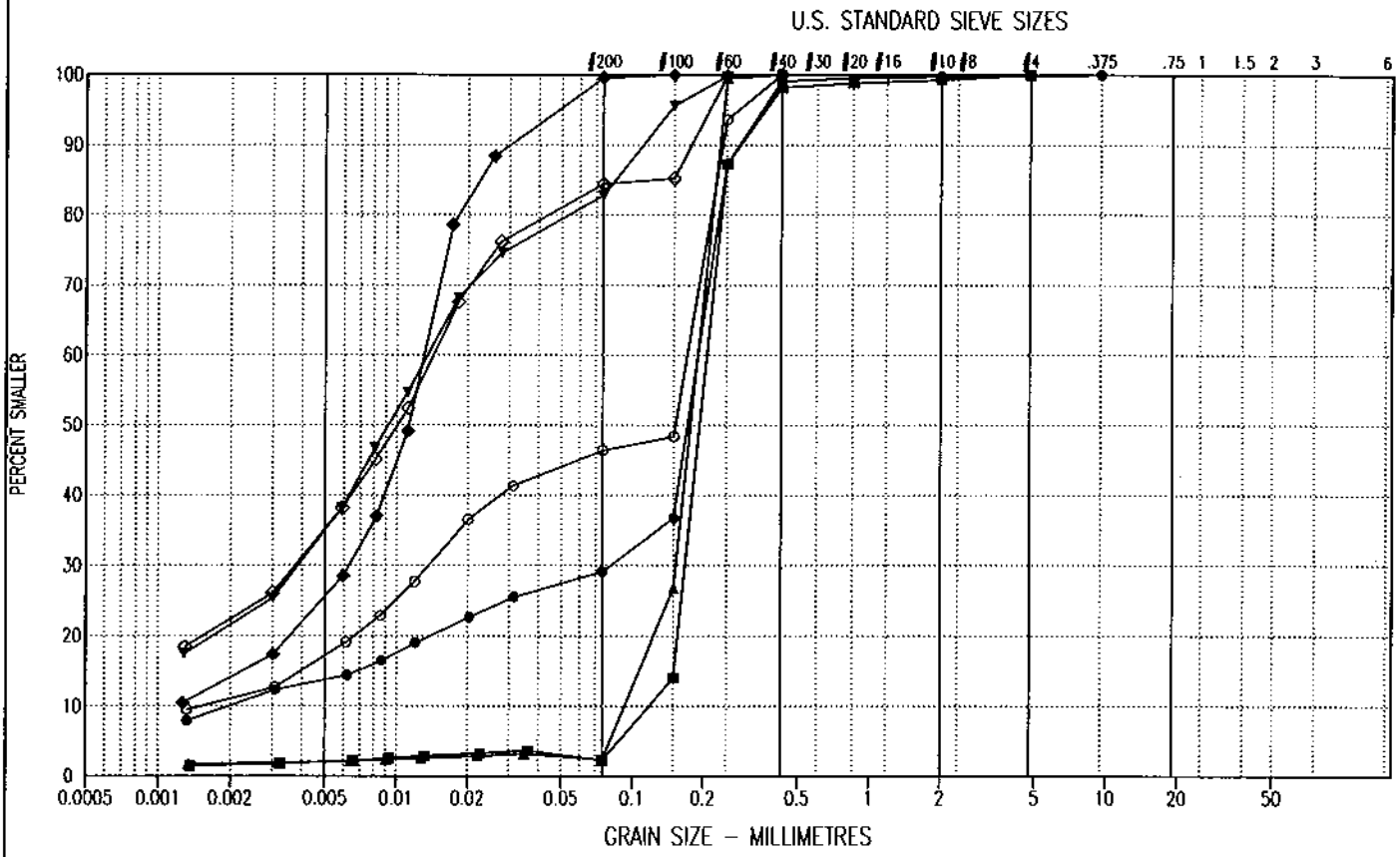
Project: 0101–11413 Date Tested: 94/05/05 BY: IS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●—●	3	0.00 – 0.15	13.6	15.5	70.7	0.2	91.4	16.7	SM
◆—◆	3	1.00 – 1.05	24.8	74.7	0.5	0.0	–	–	
■—■	3	1.55 – 1.58	1.9	0.3	97.8	0.0	1.7	1.1	SP
▲—▲	3	2.02 – 2.07	1.9	0.5	97.6	0.0	2.0	1.2	SP
▼—▼	3	2.70 – 2.75	34.2	48.6	17.2	0.0	–	–	
○—○	3	3.22 – 3.27	16.7	29.6	53.7	0.0	111.6	0.7	SM
◇—◇	3	3.80 – 3.85	34.4	50.0	15.6	0.0	–	–	

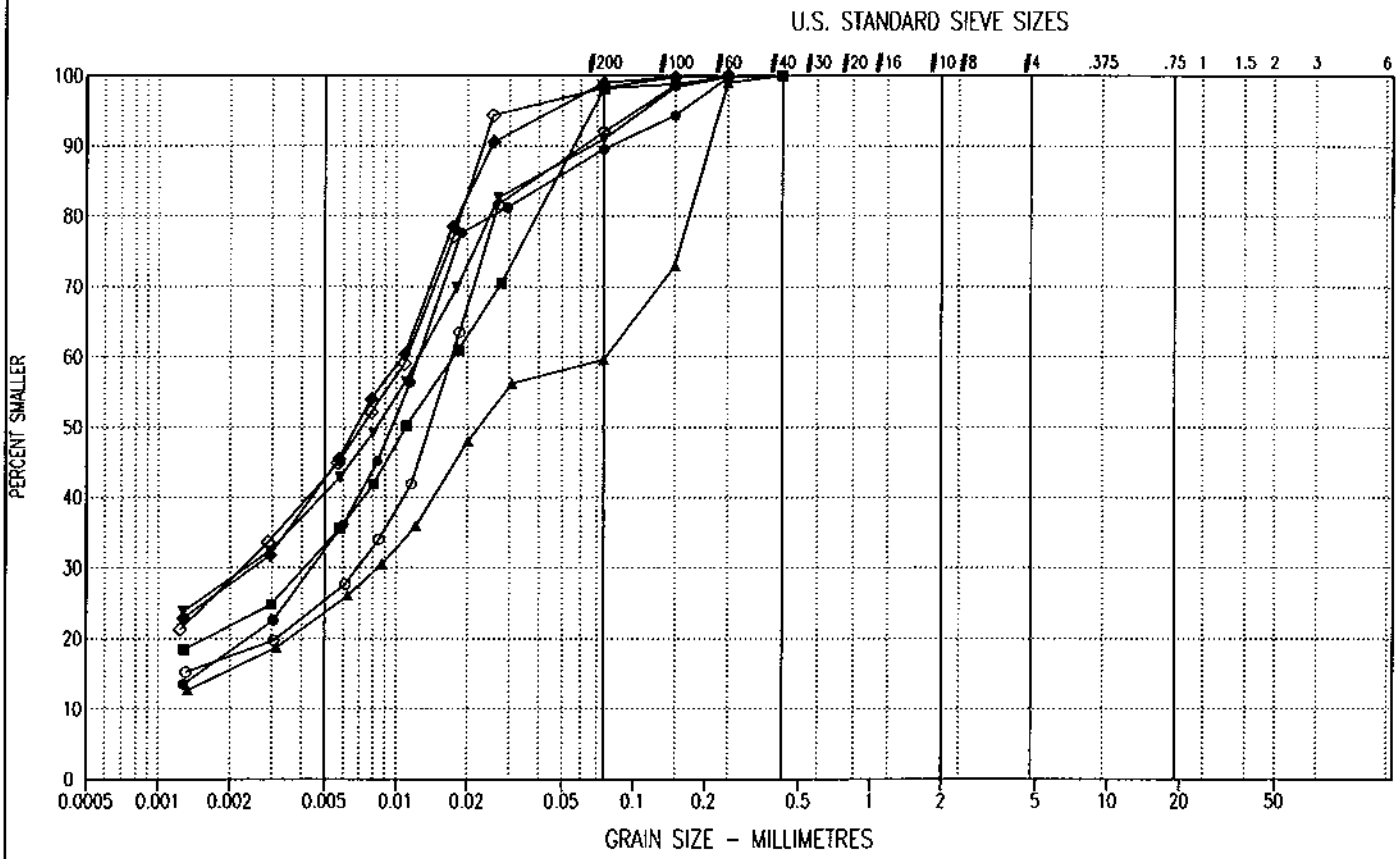
Project: 0101-11413 Date Tested: 94/05/05 BY: IS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●—●	3	4.84 – 4.88	31.5	57.9	10.6	0.0	–	–	
◆—◆	3	6.05 – 6.10	41.8	57.2	1.0	0.0	–	–	
■—■	3	7.15 – 7.20	32.5	65.6	1.9	0.0	–	–	
▲—▲	3	8.50 – 8.60	23.1	36.4	40.5	0.0	–	–	
▼—▼	3	9.65 – 9.70	39.9	51.1	9.0	0.0	–	–	
○—○	3	10.65 – 10.70	24.7	67.3	8.0	0.0	–	–	
◇—◇	3	11.95 – 12.00	42.1	56.1	1.8	0.0	–	–	

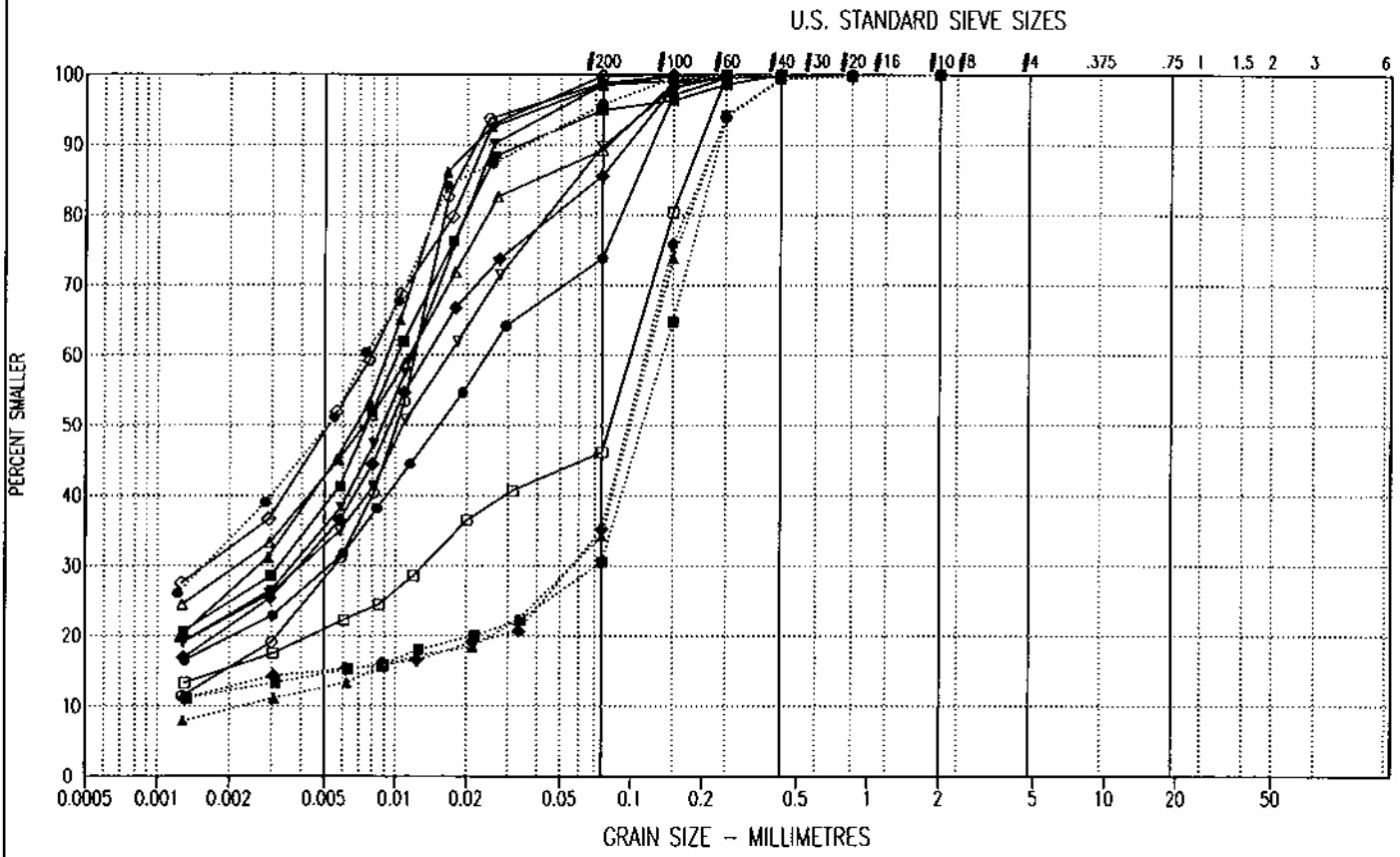
Project: 0101-11413 Date Tested: 94/04/25 BY: MH

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●—●	4	0.05 – 0.10	28.7	45.1	26.2	0.0	–	–	
◆—◆	4	1.00 – 1.05	33.4	52.1	14.5	0.0	–	–	
■—■	4	2.00 – 2.05	37.6	57.4	5.0	0.0	–	–	
▲—▲	4	3.00 – 3.05	41.8	56.7	1.5	0.0	–	–	
▼—▼	4	4.20 – 4.25	34.7	63.8	1.5	0.0	–	–	
⊙—⊙	4	5.50 – 5.55	27.3	71.5	1.2	0.0	–	–	
◇—◇	4	6.00 – 6.05	48.3	51.4	0.3	0.0	–	–	
⊡—⊡	4	6.50 – 6.55	20.5	25.6	53.9	0.0	–	–	
△—△	4	7.10 – 7.15	42.0	47.1	10.9	0.0	–	–	
▽—▽	4	8.30 – 8.35	32.3	57.5	10.2	0.0	–	–	
●·····●	4	9.00 – 9.05	48.9	46.9	4.2	0.0	–	–	
◆·····◆	4	10.30 – 10.35	14.8	20.3	64.9	0.0	–	–	
■·····■	4	10.75 – 10.80	14.4	16.1	69.5	0.0	–	–	
▲·····▲	4	10.95 – 11.00	12.4	21.8	65.8	0.0	50.8	12.0	SM

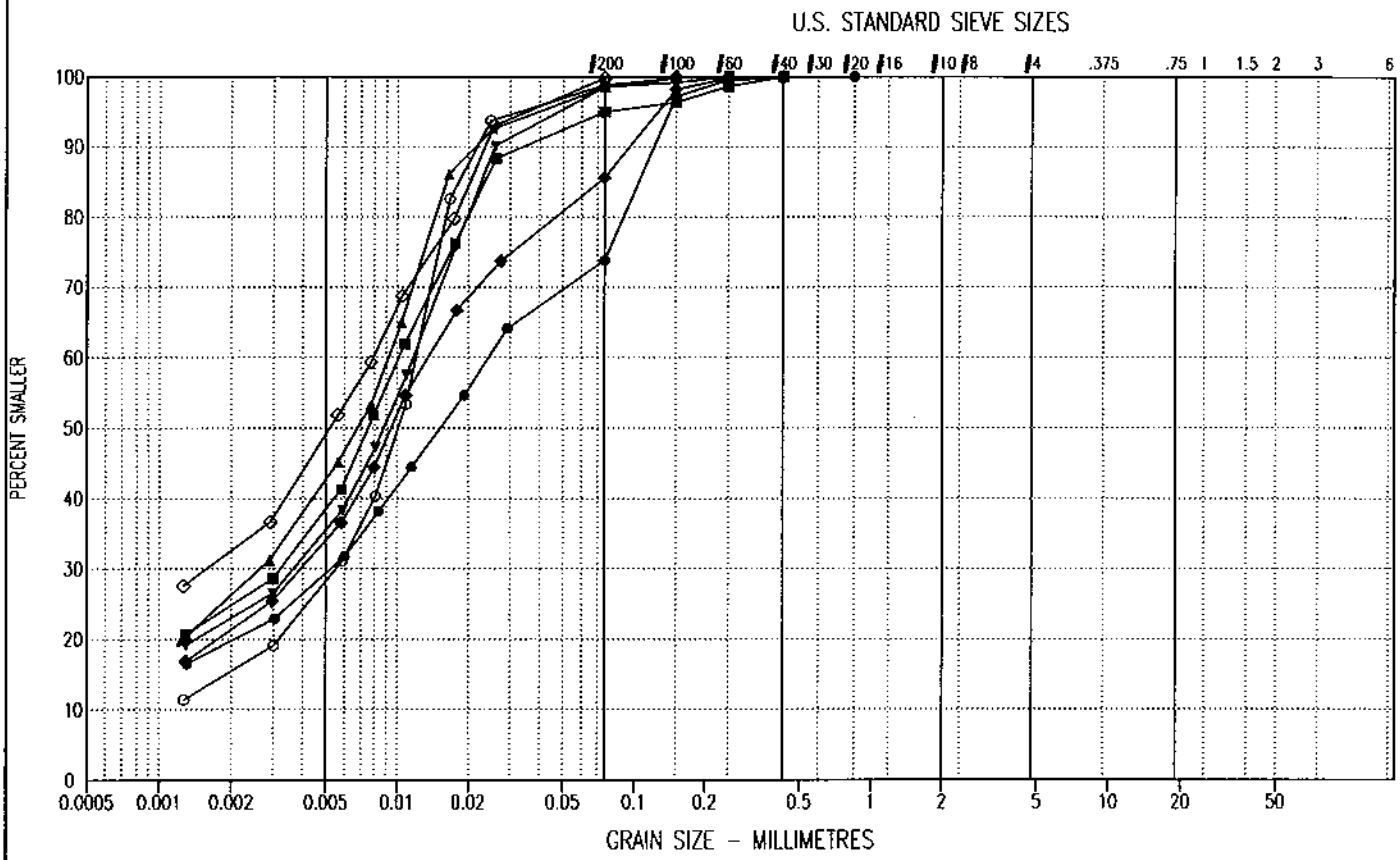
Project: 0101-11413 Date Tested: 94/08/11 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●——●	4	0.05 – 0.10	28.7	45.1	26.2	0.0	–	–	
◆——◆	4	1.00 – 1.05	33.4	52.1	14.5	0.0	–	–	
■——■	4	2.00 – 2.05	37.6	57.4	5.0	0.0	–	–	
▲——▲	4	3.00 – 3.05	41.8	56.7	1.5	0.0	–	–	
▼——▼	4	4.20 – 4.25	34.7	63.8	1.5	0.0	–	–	
○——○	4	5.50 – 5.55	27.3	71.5	1.2	0.0	–	–	
◇——◇	4	6.00 – 6.05	48.3	51.4	0.3	0.0	–	–	

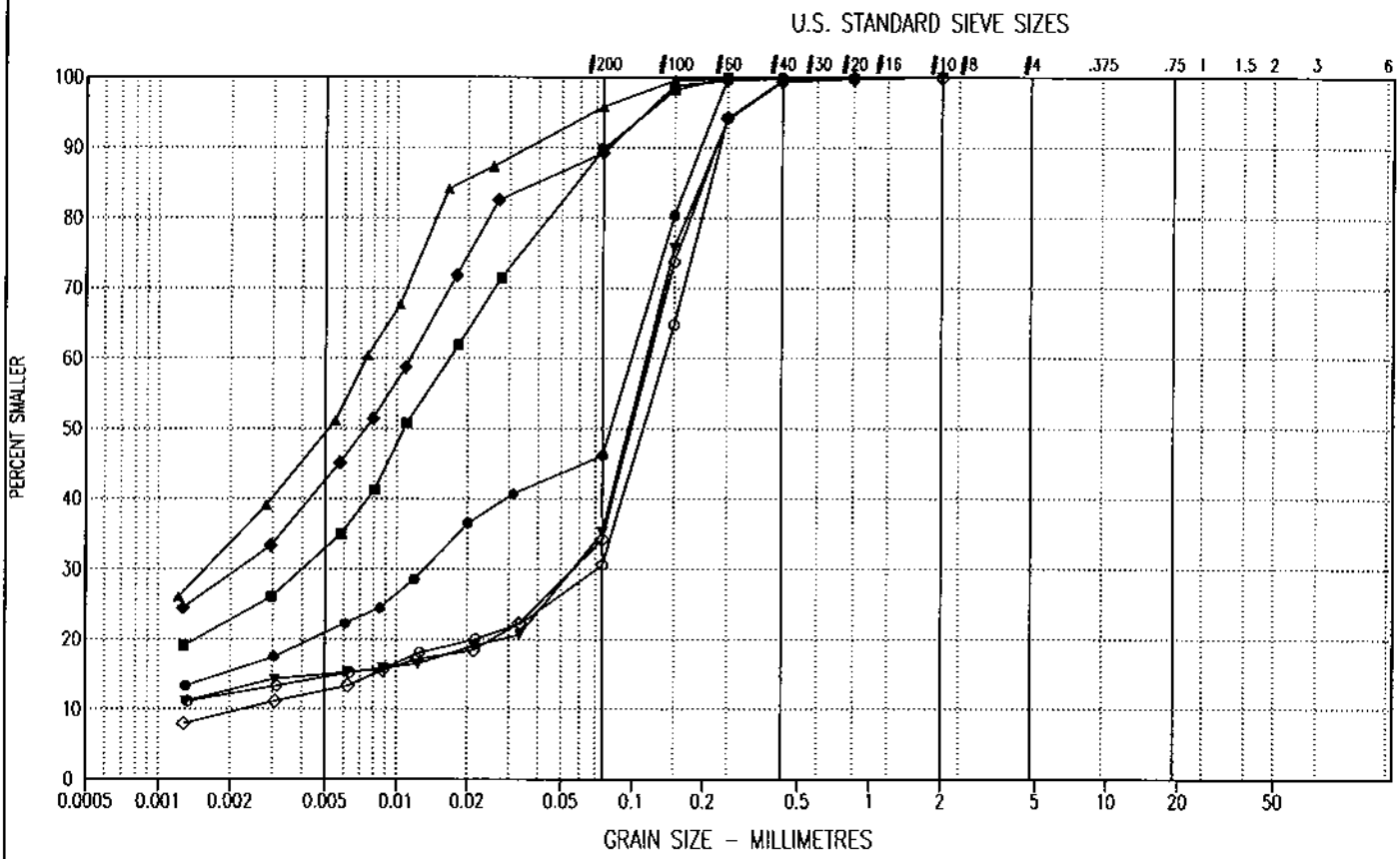
Project: 0101-11413 Date Tested: 94/08/11 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	4	6.50 – 6.55	20.5	25.6	53.9	0.0	–	–	
◆——◆	4	7.10 – 7.15	42.0	47.1	10.9	0.0	–	–	
■——■	4	8.30 – 8.35	32.3	57.5	10.2	0.0	–	–	
▲——▲	4	9.00 – 9.05	48.9	46.9	4.2	0.0	–	–	
▼——▼	4	10.30 – 10.35	14.8	20.3	64.9	0.0	–	–	
⊙——⊙	4	10.75 – 10.80	14.4	16.1	69.5	0.0	–	–	
◇——◇	4	10.95 – 11.00	12.4	21.8	65.8	0.0	50.8	12.0	SM

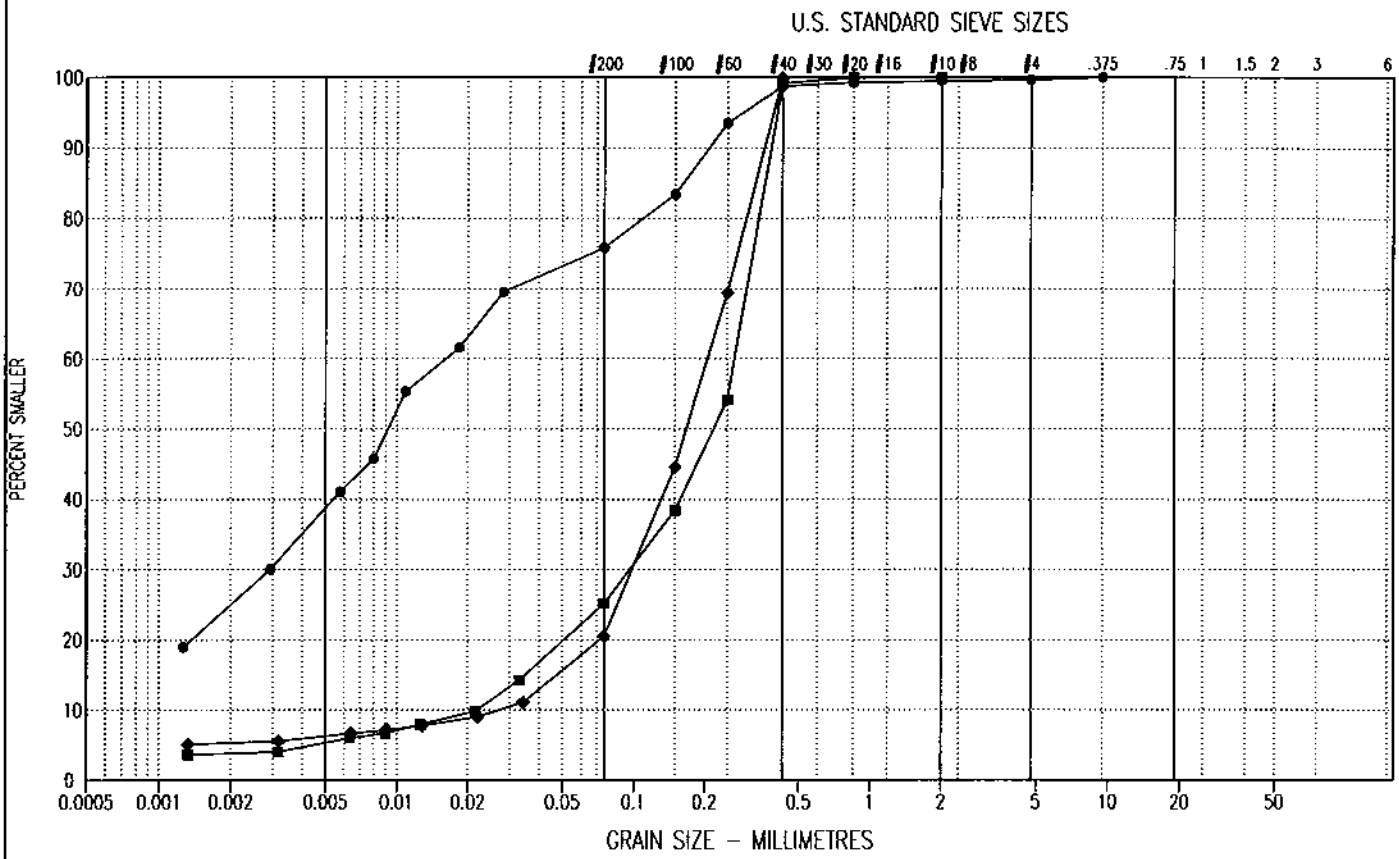
Project: 0101-11413 Date Tested: 94/08/12 BY: JR

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	7	0.15 – 0.30	38.1	37.7	23.8	0.4	–	–	
◆——◆	7	1.20 – 1.40	6.1	14.4	79.5	0.0	7.7	1.9	SM
■——■	7	4.50 – 4.70	5.1	20.1	74.8	0.0	12.5	1.7	SM

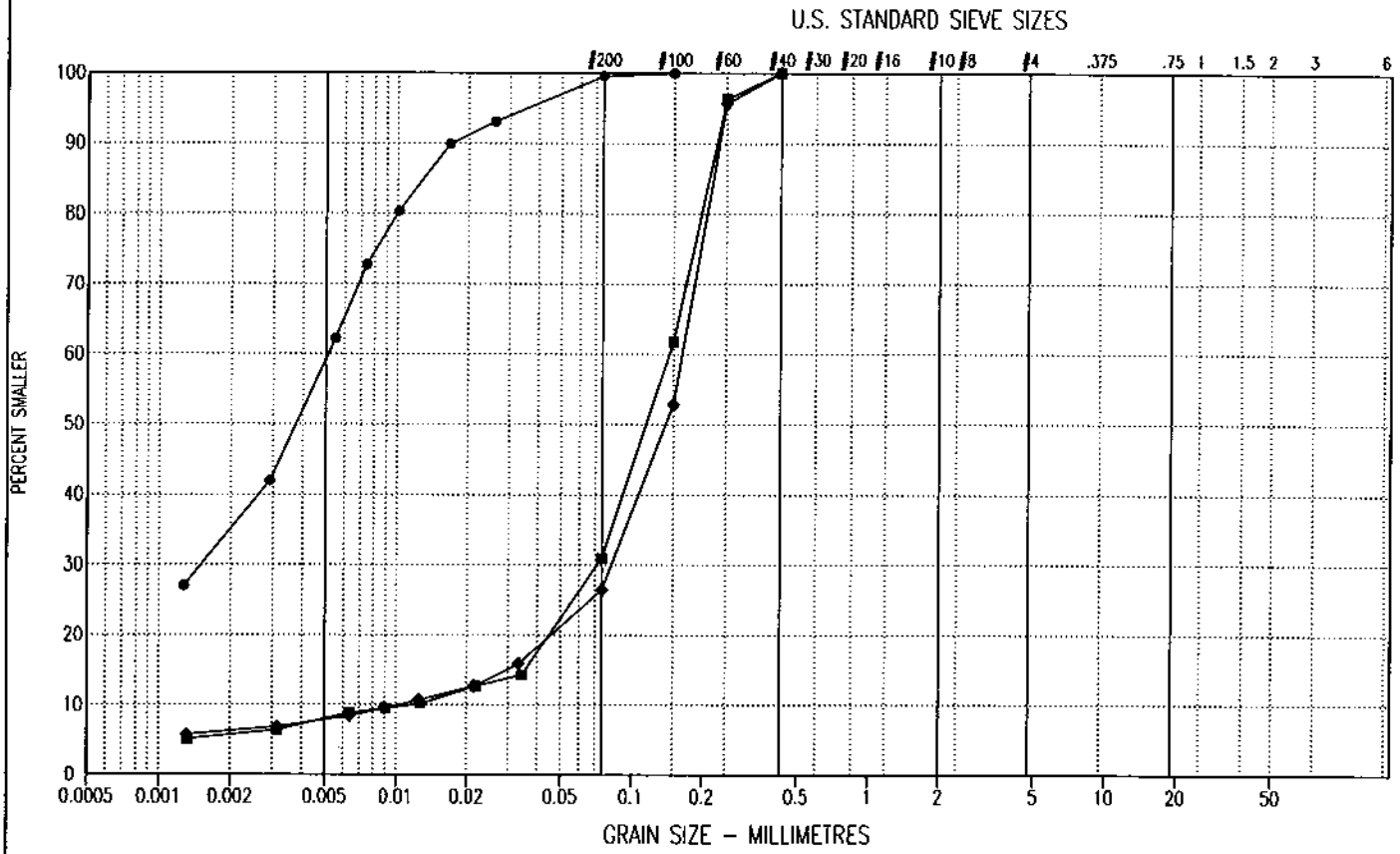
Project: 0101-11413 Date Tested: 94/05/09 BY: IS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	8	0.25 – 0.41	58.4	41.1	0.5	0.0	–	–	
◆——◆	8	1.40 – 1.60	7.7	18.8	73.5	0.0	15.9	4.1	SM
■——■	8	2.70 – 2.90	7.8	23.2	69.0	0.0	12.4	3.1	SM

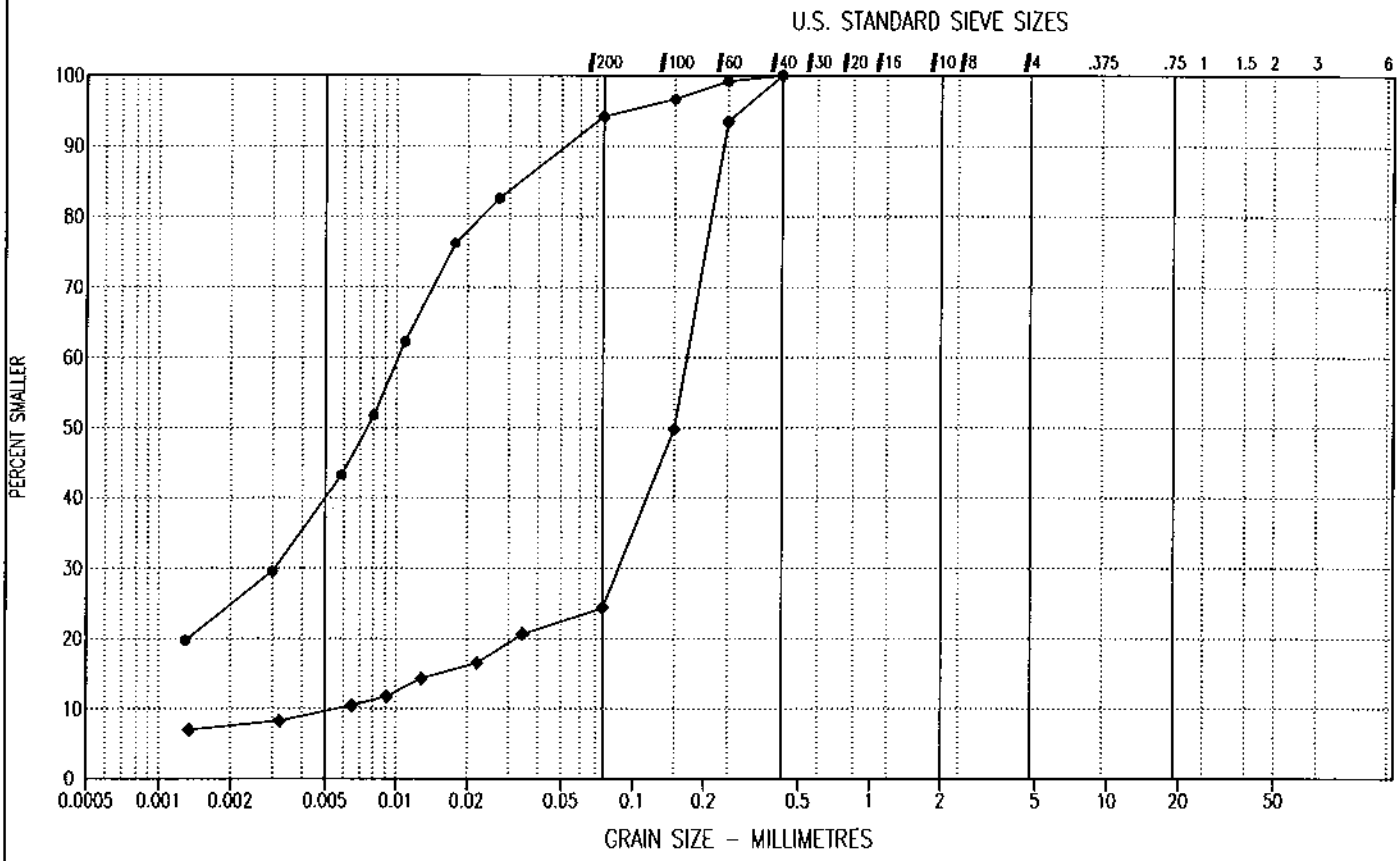
Project: 0101-11413 Date Tested: 94/05/06 BY: IS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	9	0.60 – 0.90	39.1	55.0	5.9	0.0	–	–	
◆——◆	9	1.40 – 1.50	9.4	15.0	75.6	0.0	30.0	8.4	SM

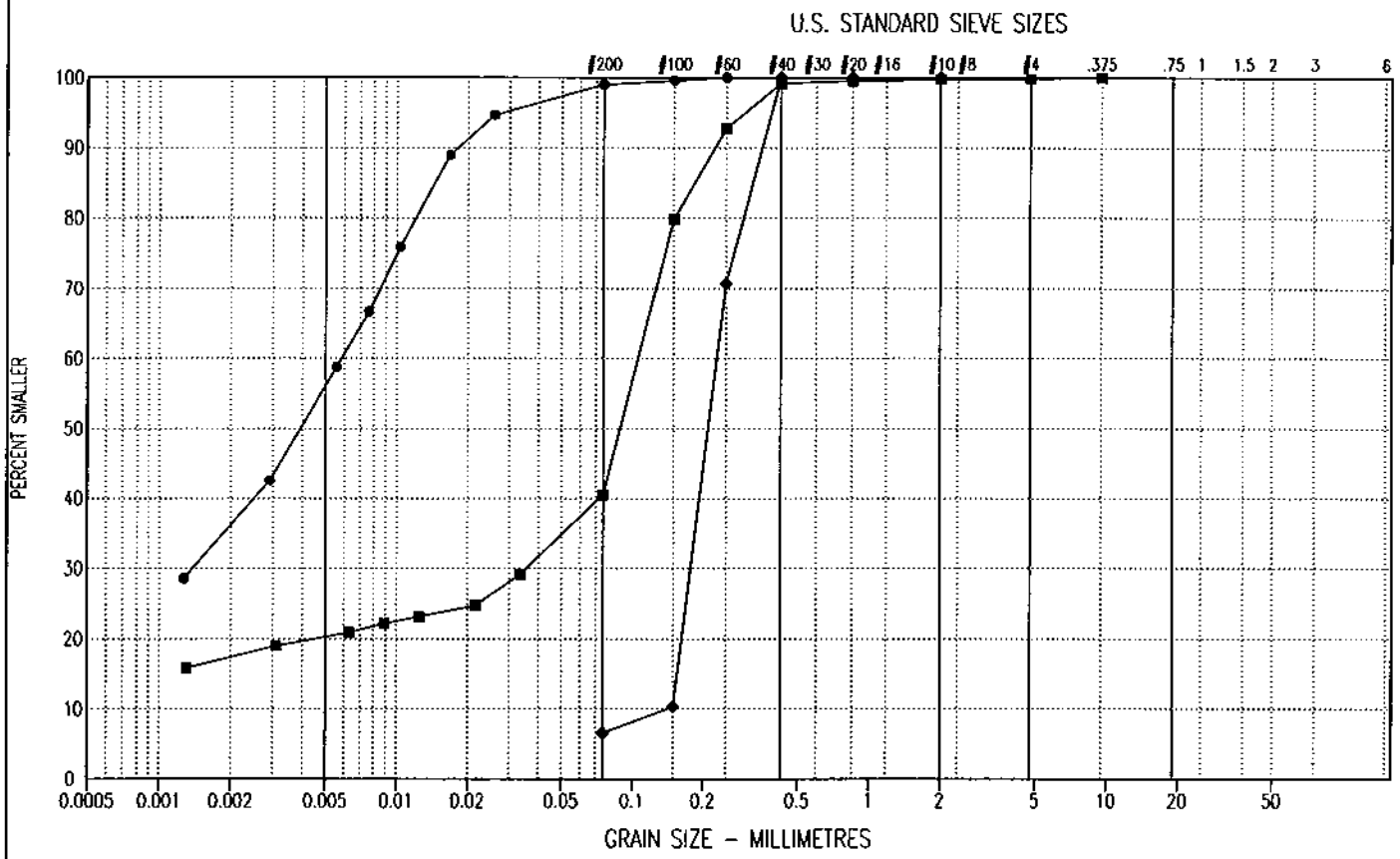
Project: 0101-11413 Date Tested: 94/04/11 BY: MH

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	10	0.20 – 0.40	55.3	43.7	1.0	0.0	–	–	
◆——◆	10	1.40 – 1.50	6.5		93.5	0.0	1.6	1.0	SP-SM
■——■	10	2.70 – 2.90	20.1	20.4	59.3	0.2	–	–	

Project: 0101-11413 Date Tested: 94/05/06 BY: IS

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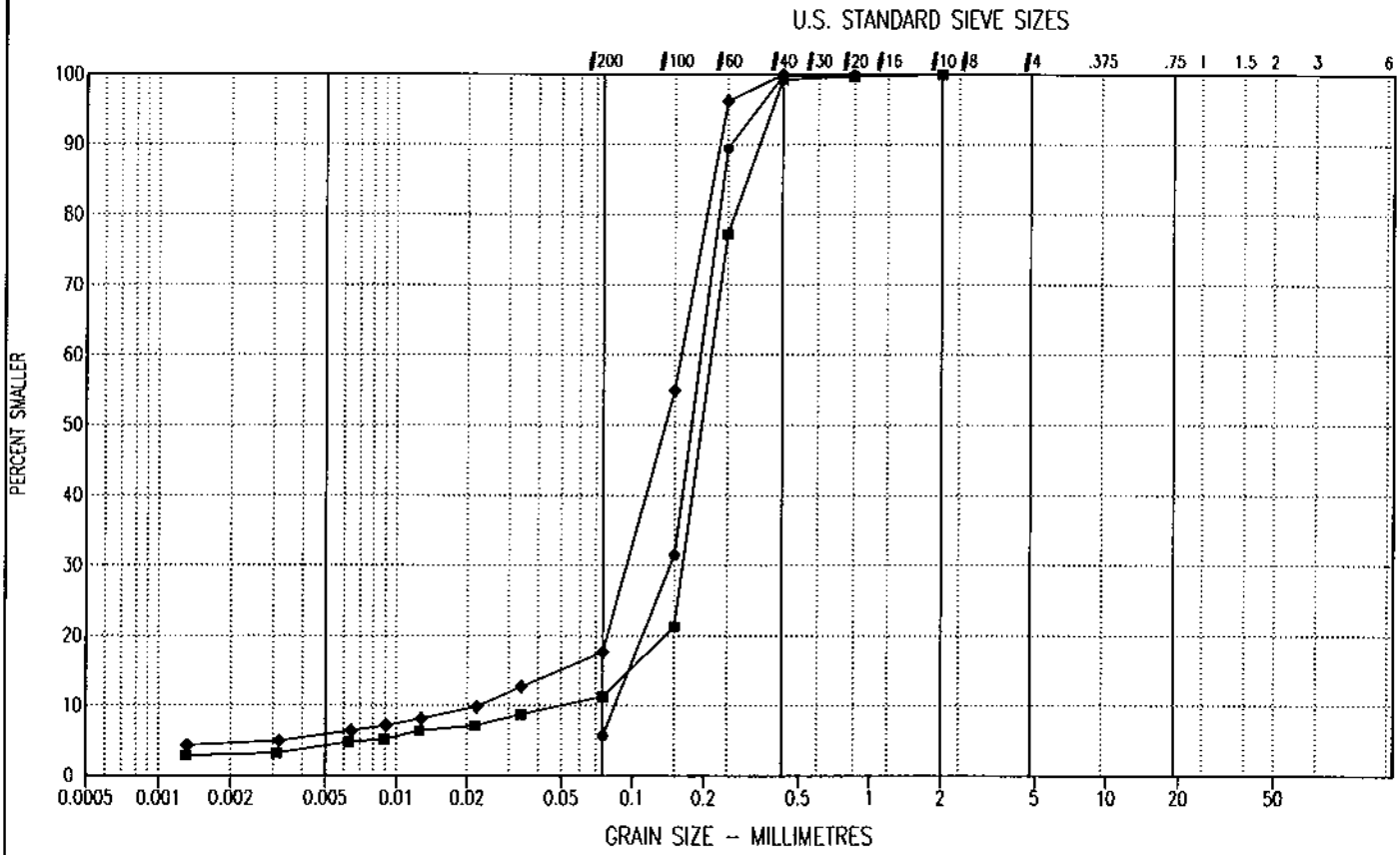
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	11	0.80 – 0.90	5.6	94.4	0.0	2.3	1.2	SP–SM
◆——◆	11	2.10 – 2.30	5.7 – 11.9	82.4	0.0	7.2	2.7	SM
■——■	11	4.00 – 4.10	4.1 – 7.1	88.8	0.0	4.1	2.3	SP–SM

Project: 0101–11413 Date Tested: 94/04/11 BY: MH

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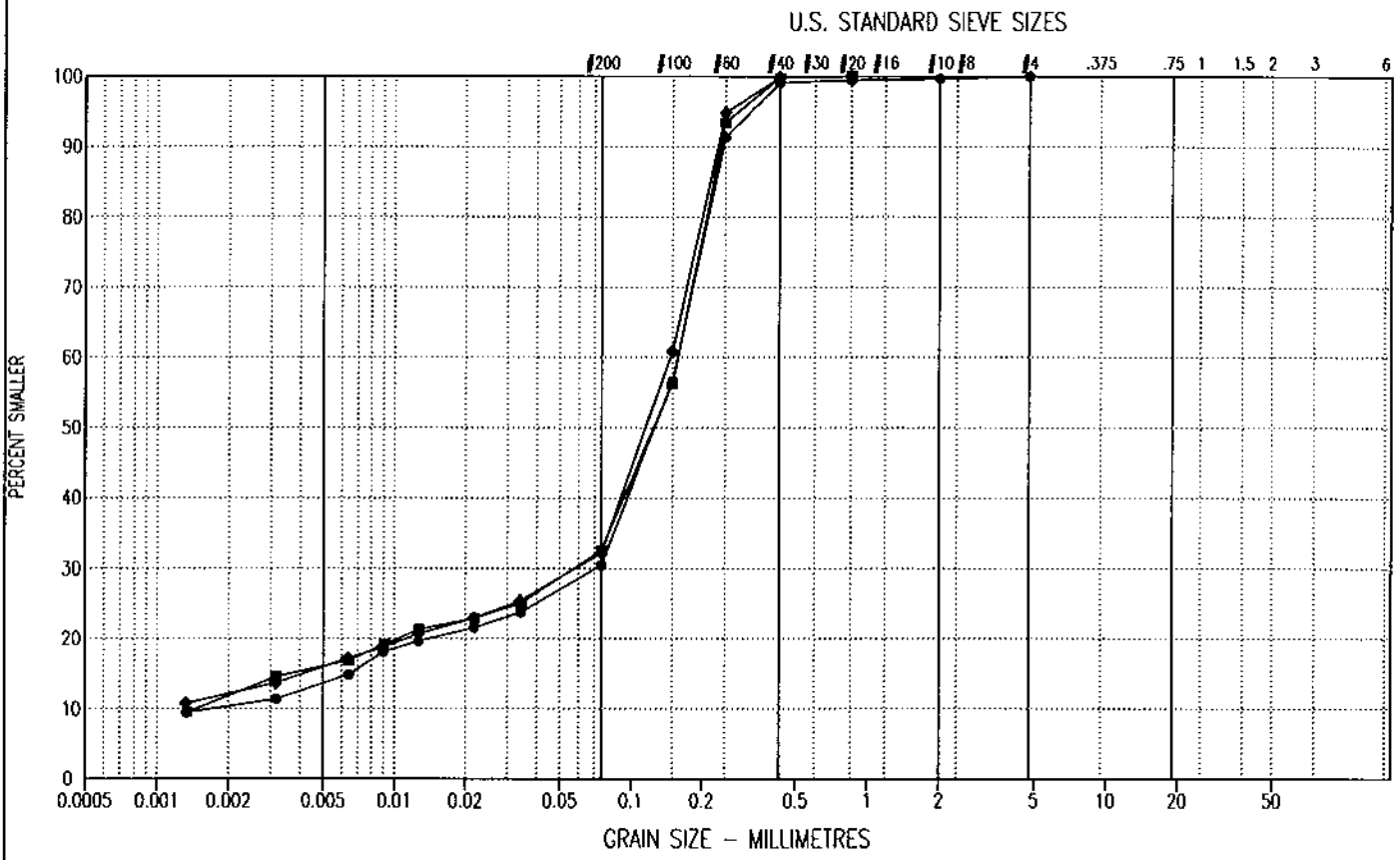
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	12	0.40 – 0.60	13.3	17.2	69.5	0.0	88.1	17.9	SM
◆	12	0.90 – 1.00	15.6	16.5	67.9	0.0	–	–	
■	12	4.00 – 4.10	15.8	16.7	67.5	0.0	106.0	15.3	SM

Project: 0101-11413 Date Tested: 94/04/11 BY: MH

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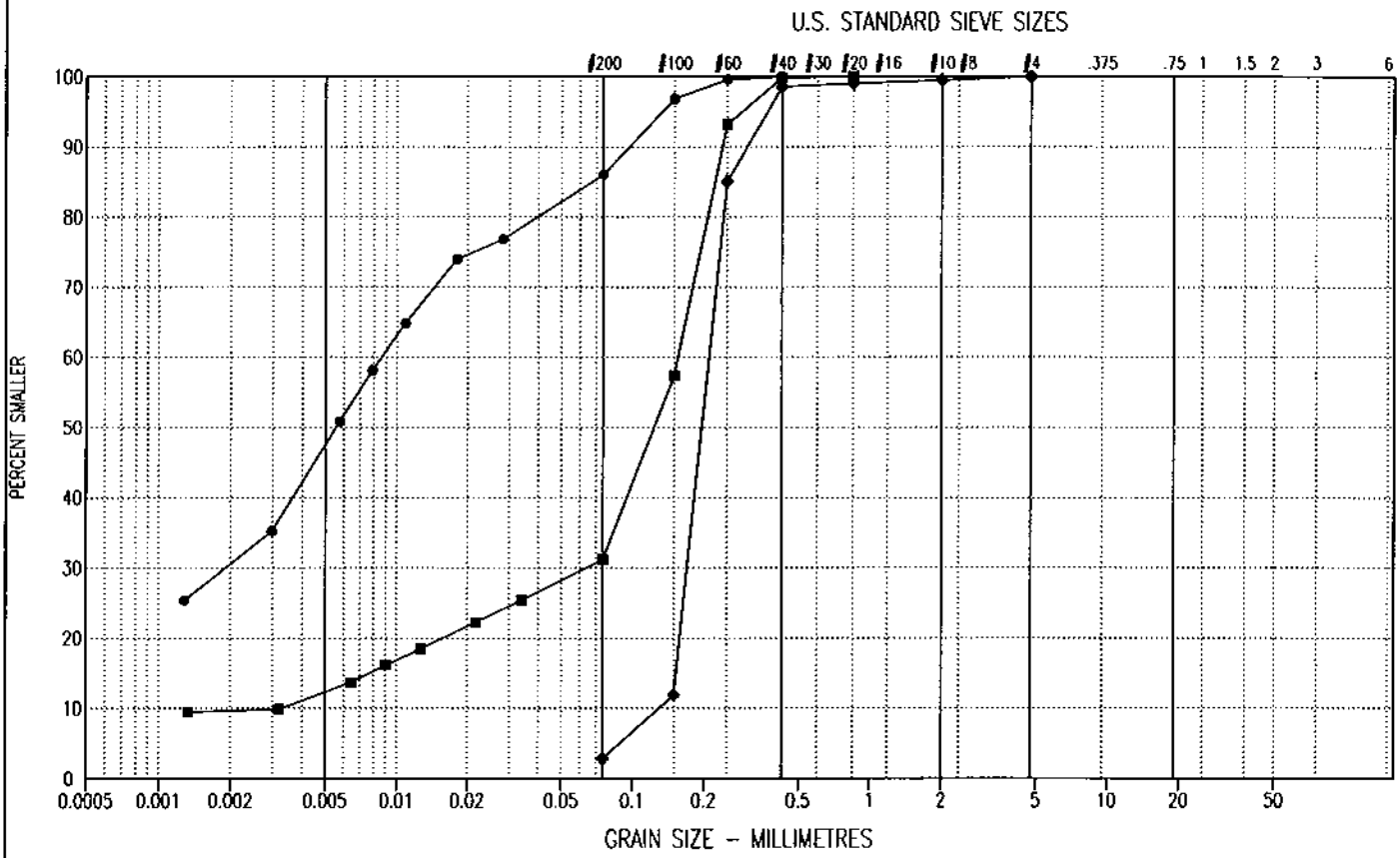
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	13	0.20 – 0.40	46.6	39.4	14.0	0.0	–	–	
◆	13	1.40 – 1.50	2.8		97.2	0.0	1.6	1.1	SP
■	13	2.10 – 2.30	11.9	19.2	68.9	0.0	47.5	8.5	SM

Project: 0101-11413 Date Tested: 94/05/06 BY: IS

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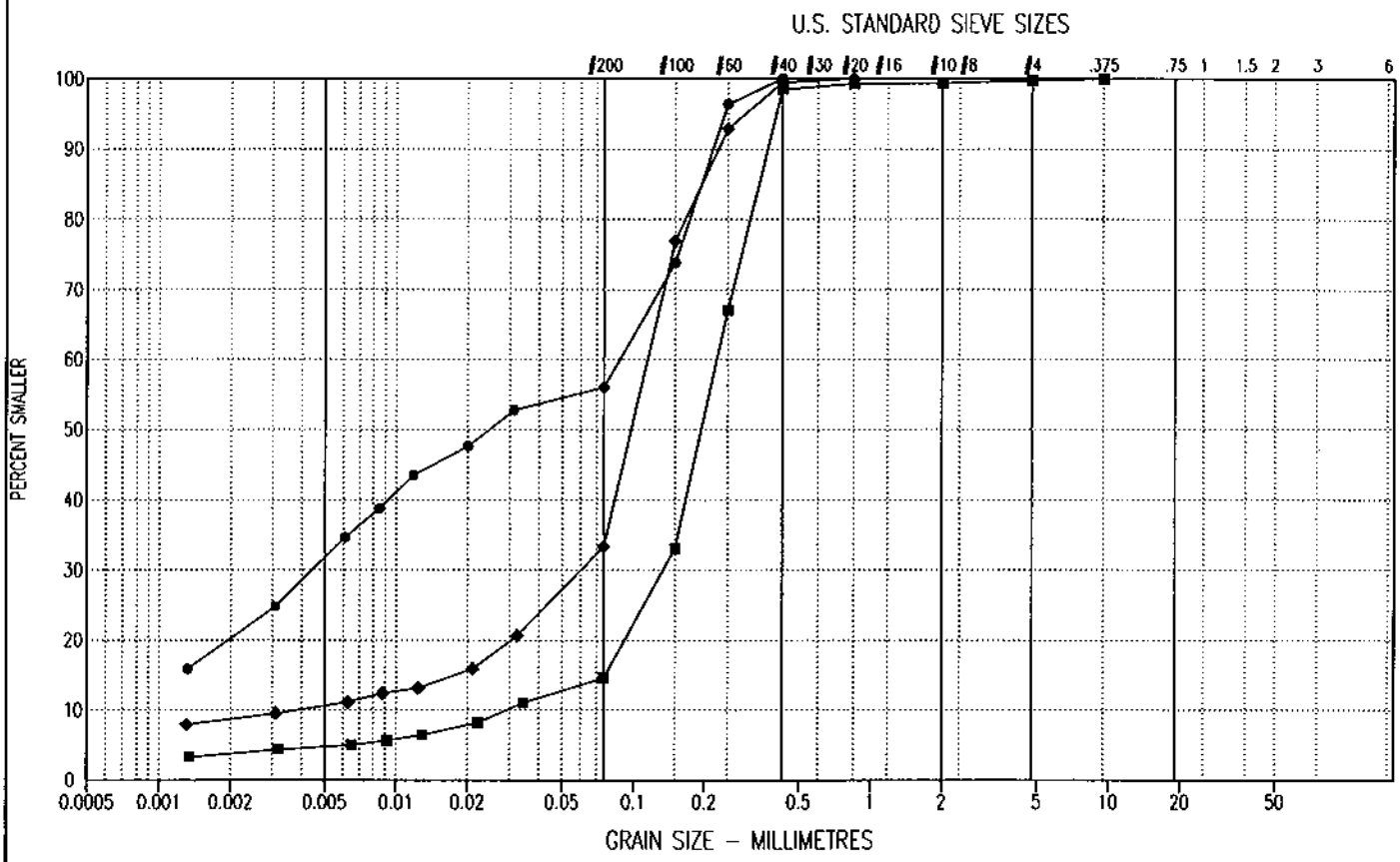
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	14	0.15 – 0.30	31.0	25.0	44.0	0.0	–	–	
◆——◆	14	0.90 – 1.10	10.4	22.9	66.7	0.0	30.0	8.4	SM
■——■	14	1.50 – 1.70	4.7	9.9	85.1	0.3	7.7	2.8	SM

Project: 0101-11413 Date Tested: 94/05/06 BY: IS

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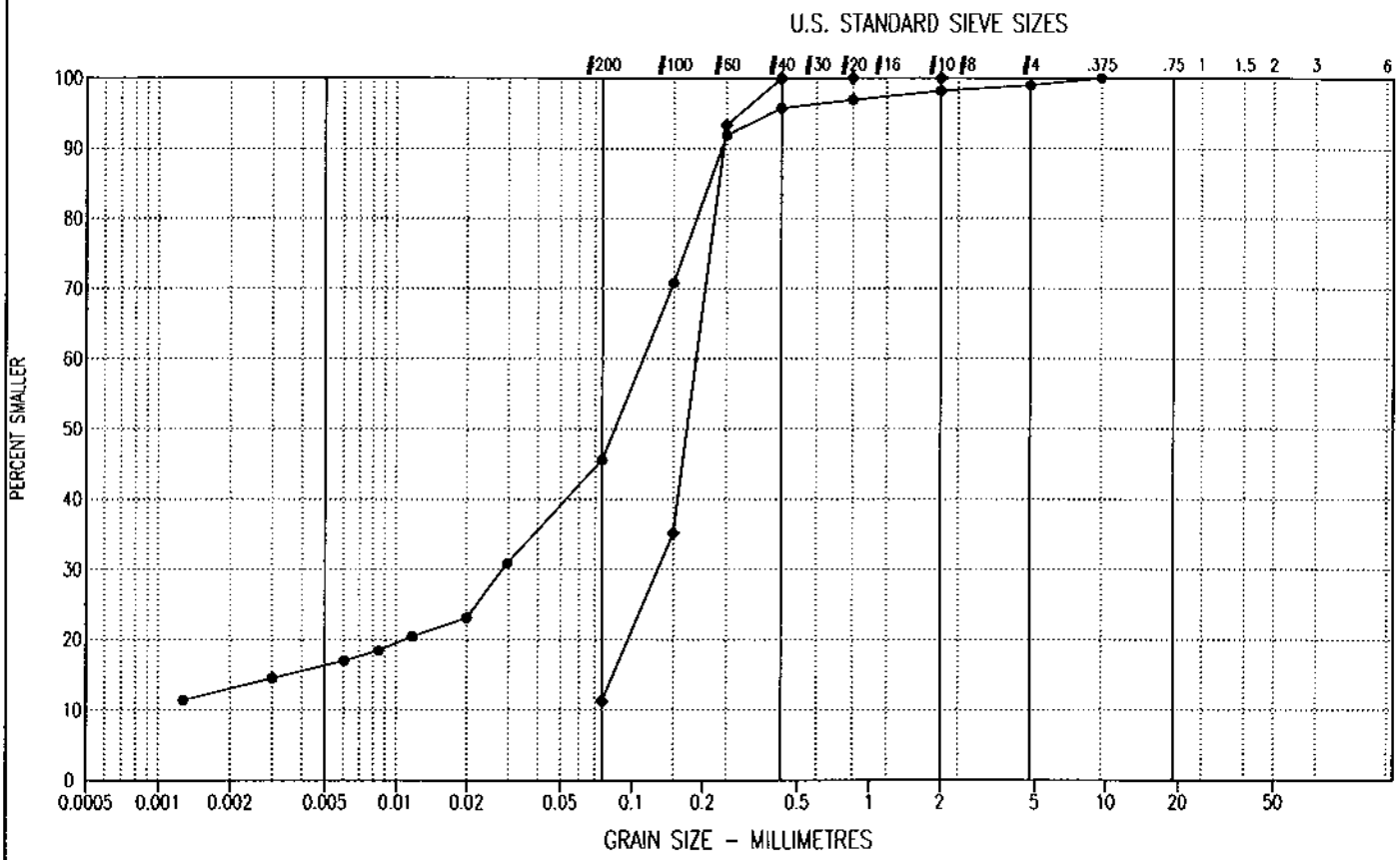
EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	15	0.80 – 0.90	16.1	29.4	53.4	1.1	–	–	
◆——◆	15	2.70 – 2.90	11.2		88.8	0.0	2.8	1.3	SP–SM

Project: 0101–11413 Date Tested: 94/04/11 BY: MH

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