Baffinland Iron Mines Corporation
Mary River Project

Milne Ore Dock Geotechnical Investigation Factual Report

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			HATCH			**CLIENT**

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Disclaimer

This report was prepared by Hatch Ltd. (Hatch) for the sole and exclusive use of Baffinland Iron Mines Corporation (the 'Client') The report summarizes the results of a geotechnical site investigation performed at the Milne Ore Dock site at Milne Inlet Nunavut, with the objective to provide information on the soil and rock conditions at the site to support the design of the Milne Ore Dock and associated infrastructure. The report shall not (a) be used for any other purpose, or (b) be provided to or relied on by any third party.

The report is divided into three main parts. The first part, Sections 1 and 2, summarize background information, some of which is from various public domain sources. The information contained in these sections is general and approximate in nature and should be treated as such. The second part (Section 3) summarizes the investigation methodology. This section is a factual description of the equipment used and the procedures followed during the field work. The final part (Section 4) provides a factual summary of the soil data collected during the program comprising soil descriptions, laboratory test results and in situ test results. The tests and procedures used to compile the data were performed in accordance with applicable ASTM and CSA standards.

It is noted that a limited number of boreholes were advanced at the site; and as such, the information collected applies to the borehole locations only. The subsurface conditions between boreholes can change and accordingly any use of the data contained herein should take into consideration the nature of the material and potential variation between boreholes.

Finally, this report contains opinions conclusions and recommendations made by Hatch and others using professional judgement and reasonable care. Use of or reliance on this report by the Client is subject to the following conditions:

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1. Introduction

Hatch Ltd. (Hatch) was retained by Baffinland Iron Mines Corporation (BIM) to conduct geotechnical investigations for the design of a port facility including a fixed dock structure located at Milne Inlet in the Qikqtani Region of northern Baffin Island, Nunavut, Canada. The Milne Ore Dock will be used to load ships for export of iron ore mined at the Mary River Mine located 100 km to the south.

Geotechnical investigations for the Milne Ore Dock consisted of:

- A geotechnical drilling program which included in situ testing, Dynamic Cone Penetormeter Tests (DCPT), and installation of thermistors.
- A geophysics survey consisting of seismic reflection, seismic refraction, seismic resonance and Multichannel Analysis of Surface Waves (MASW).

The drilling program was carried out in two phases; the first phase was executed in December 2013, while the second phase was executed in January 2014.

2. Background Information

In August, 2013, Hatch undertook a preliminary review of available geotechnical information for the proposed Milne Ore Dock. This information included an AMEC Inc. (AMEC) report specific to the current proposed Milne Ore Dock location, and a Thurber Engineering Ltd. (Thurber) report prepared for a separate, nearby proposed dock location, as follows:

- AMEC report dated October 4, 2010, “Geotechnical Design Parameters for Ore Dock #1” This report includes Borehole PMSD-0001, completed by Knight Piesold in the area of the ore dock. This borehole is a rotary borehole with SPT samples. Recommendations for preliminary design are provided in this report.
- Thurber report dated November 9, 2011, “Steensby Inlet and Milne Inlet Port Offshore Geotechnical Investigation”. This report includes Thurber drill holes MMFD-A through MMFD-I, completed in the area of the freight dock. Drill hole C is borehole with SPT only, drill holes D and E are borehole with SPT combined with a dynamic cone penetration test (DCPT), and remaining holes are DCPT only.

From the review, Hatch concluded that the preliminary design of the Milne Ore Dock could proceed based on the recommendations in the AMEC report, but recommended that a detailed, site specific marine geotechnical investigations be completed in support of the final design.

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3. Field Investigations

3.1 Geotechnical Drilling Program

The drilling program for the Milne Ore Dock was completed in two phases: Phase 1 was undertaken between November 29, 2013 and December 16, 2013; Phase 2 was undertaken between January 12, 2014 and January 19, 2014. The borehole investigations and testing is summarized in Table 3-1 with the borehole locations and geophysical survey lines presented in Figure 1.

Table 3-1: Summary of Boreholes

Phase	BH ID	Location	Method	In Situ Test[1]	Lab Testing[2]	Thermistors
Phase 1	BH13-01	Onshore	Rotary – No Mud	SPT	PSD, Hydrometer	2
	BH13-01B	Onshore		SPT	None	0
	BH13-02	Onshore		SPT	PSD	5
	BH13-03	Offshore		SPT, DCPT	PSD, Hydrometer	1
	BH13-05	Offshore		SPT	PSD, Hydrometer	0
	BH13-05B	Offshore	Mud[3]	SPT, DCPT	PSD, Hydrometer	0
	BH13-07	Offshore	Rotary – No Mud	SPT, DCPT	PSD, Hydrometer	0
	BH13-08	Offshore		SPT, DCPT	PSD	0
	BH13-09	Offshore		SPT, DCPT	PSD	0
	BH13-11	Offshore		SPT, DCPT	PSD	4**
	BH13-11B	Offshore		DCPT	None	0
Phase 2	BH14-05C	Offshore	Rotary – With Mud[4]	SPT	PSD, Hydrometer	4**
	BH14-06	Offshore		SPT	PSD, Hydrometer	0
	BH14-07B	Offshore		SPT	PSD, Hydrometer	4*
	BH14-12	Offshore		SPT	PSD	4
	BH14-13	Offshore		SPT	PSD, Hydrometer	4

[1] Standard Penetration Test (SPT); Dynamic Cone Penetrometer Test (DCPT)
[2] Particle Size Distribution (PSD); Atterberg tests pending
[3] New Zam D Mud Only
[4] New Zam D Mud and Bentonite
*Thermistors installed but lost under ice when pulling casing
**Readings indicate all BH13-11 and one BH14-5C thermistor(s) are non-functional

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Borehole investigations were advanced using a modified skid-mounted CME 55 drilling rig operated by Logan Drilling Group with field supervision carried out by Hatch. The drilling rig arrangement is shown in PHOTOGRAPH 1A and PHOTOGRAPH 2B. Onshore boreholes were advanced using a HQ 'wire line' coring method which allowed for continuous sampling of material. Offshore boreholes were advanced using H-casing, with a plug which was removed to conduct Standard Penetration Testing (SPT). With this arrangement cuttings from the drilling were not recoverable and sampling was only possible where SPTs were conducted.



PHOTOGRAPH 1A: Drilling rig arrangement



PHOTOGRAPH 2B: Interior of drilling shed

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Soil samples were collected using a 50 mm (2 in.) OD split tube sampler, driven in accordance with the Standard Penetration Test (SPT) procedure (ASTM D-1586). In addition to facilitating the recovery of soil samples for examination and testing, the Standard Penetration Testing allowed an empirical determination of the density or consistency of the soil being penetrated. All soil samples were examined and logged in the field. On completion of the logging, all soil samples collected were stored in plastic bags to retain their natural moisture content.

The field supervisor recorded the materials encountered and determined in situ testing and sampling requirements. The description of soils as detailed in the geotechnical borehole reports are based on field visual classification and confirmatory laboratory testing in accordance with the explanatory notes included with these reports.

Investigation locations were staked by the project surveyors using accurate GPS survey equipment, the exact location of the as-drilled boreholes were subsequently surveyed. The elevation of the offshore investigations was corrected to account for the position of the tide at the time of the completion of the drilling for each borehole. Elevations were recorded in the local chart datum.

The detailed geotechnical borehole reports of boreholes, including DCPT results and photographs of select samples, are contained in the attached Appendix A and these should be referred to for a complete description of materials and the in situ testing and sampling performed. Appendix A also contains a set of explanatory notes detailing terminology used in the borehole reports.

3.1.1 Thermistor Installation

During the course of the drilling investigation thermistors were installed at select borehole locations in order to record the ground temperature at specific depths. PHOTOGRAPH 3A shows a thermistor string being installed and a completed thermistor installation is shown in PHOTOGRAPH 4B. The summary of the thermistor locations and depths is presented in Table 3-2. Temperature records from these thermistors are presented in Appendix C.



PHOTOGRAPH 3A: Installation of thermistor

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PHOTOGRAPH 4B: PVC pipe with thermistors installed

Table 3-2: Thermistor Installation Details

Borehole ID	Depth of Thermistors
BH13-01	1.00 m, 2.50 m
BH13-02	0.50 m, 4.38 m, 9.38 m, 14.38 m, 19.37 m
BH13-03	10.00 m
BH13-11	2.50 m, 10.00 m, 20.00 m, 30.00 m
BH14-05C	7.50 m, 17.50 m, 27.50 m, 37.50 m
BH14-07B	Thermistors lost under ice.
BH14-12	2.40 m, 3.90 m, 13.90 m, 18.89 m
BH14-13	5.00 m, 10.00 m, 20.00 m, 30.00 m

3.2 Geophysics Survey

The geophysics survey for the Milne Ore Dock was undertaken by Geophysics GPR International Inc. (GPR). Five seismic profile lines, each 352.5 m in length, were surveyed during the investigation, three roughly parallel to the shoreline and two lines extending from the shore into Milne Inlet. The location of the geophysics survey lines are shown on Figure 1. PHOTOGRAPH 5A shows the geophysics technician setting off a seismic shot and in PHOTOGRAPH 6B the geophone line at Survey Line A is shown.

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PHOTOGRAPH 5A: Setting of seismic shot



PHOTOGRAPH 6B: Geophone setup

The geophysics survey consisted of using a series of “shots” to create a seismic wave which propagated through the water and underlying soil. A series of 48 geophones spaced 7.5 m apart along the survey line picked up the initial seismic wave and the echoes of the wave which had been reflected at stratigraphic boundaries and refracted by the soil. Four separate techniques were used to interpret the response from the geophones including:

- Seismic reflection.
- Seismic refraction.
- Seismic resonance.
- MASW.

For a detailed description of the methodology and analyses from the geophysics survey please refer to the GPR report attached as Appendix D.

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4. Results of Field Investigation

The 2013 drilling program (Phase 1) encountered two significant challenges, both of which impacted drilling production as well as data quality. Prior to mobilization, the team was advised that, due to environmental permitting restrictions, the use of drilling mud was not allowed, and holes would need to be drilled using sea water as the drilling fluid. Throughout the drilling program, problems with extreme cold weather resulted in equipment freezing, delaying drilling and impacting the quality of the drilling. Despite the best efforts of the drill crew, the cold temperatures resulted in casing binding, loss of holes and heave into the casing. These drilling difficulties are common when drilling in a sandy, marine environment without drilling mud. This in turn resulted in several SPT sample locations where much lower than expected SPT blow counts were recorded. When these drilling difficulties arose, the restriction on drill mud was revisited and the restriction lifted, however by the time mud was mobilized to site, it was generally too late to make a significant difference in the program (i.e., New Zam D mud used at BH13-5B only in Phase 1).

In the case of very low blow counts where heave was suspected, the data was discounted. In other cases, low blow count data was considered suspect, but there was not sufficient basis to discount the data. Where practical, DCPT tests were used to supplement SPT data and to extend holes beyond the point where drilling could not advance. This data is useful; however blow counts within the first few meters below the point where the hole could not advance are suspect due to potential drilling disturbance or heave. In addition, in many cases the length of the DCPT drive is beyond the 10 m limit generally considered reliable for DCPT, and therefore some of the high blow counts or refusals are considered suspect.

Due to the difficulties in the drilling, and the slower than planned progress, drilling was completed at only eight (8) of the 11 proposed locations in Phase 1.

Following the completion of the 2013 drill program, the decision was made to undertake a second phase of drilling in early 2014. The intent of the 2014 drill program (Phase 2) was to complete some of the remaining drill holes (in particular Borehole 6), and to undertake further investigation of the identified problem, low SPT blow count zones from the 2013 program. The entire 2014 program was executed using drill mud (New Zam D and bentonite), and issues with heave, casing binding and loss of holes were minimised. Further, the SPT blow counts in the 2014 holes were found to be consistently better quality and higher than the corresponding 2013 boreholes. On this basis, the decision was made to re-drill at the borehole five (5) and borehole seven (7) locations. In both cases, the new SPT data obtained using mud as the drilling fluid confirmed that earlier low to very low SPT blow counts were the result of heave/loosening from the drilling. This, in turn, provided confirmation that the site did not include extensive zones of loose to very loose zones as indicated by the 2013 program.

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4.1 Site Geology and Subsurface Conditions

As outlined in the Final Environmental Impact Statement (2012) by BIM, much of the physiographic terrain in the surrounding areas of Milne Inlet is typically a result of glacial activity. Surficial deposits are comprised of glacial marine sediments ranging from fines to coarse gravels.

Topographic features are dominated by marine features such as terraces and strands. Also present are sharp gullies along waterways likely formed by the action of surface water. It is likely that permafrost can account for some of the mechanically formed features.

The bedrock could not be confirmed during the investigations. The map of geology of Nunavut indicates that the bedrock is comprised of undivided gneiss of Archean age.

4.2 Laboratory Testing Results

Soil samples collected during the drilling program were sent to Hatch's geotechnical laboratory in Niagara Falls, Ontario for testing. The schedule of lab tests is presented in Table 4-1 and the results of the laboratory testing program are summarized in Table 4-2**.** In the case of salinity testing the equipment required for the ASTM standard test was not available; testing was carried out using a YSI Environmental Model 556 multi-probe/data logger by measuring conductivity of a solution of water and soil sample, as detailed in Appendix B. For complete testing results and laboratory testing reports please refer to Appendix B.

Table 4-1: Summary of Lab Testing

Test Type	Number of Tests	Standard
Grain Size Distribution	54	ASTM D-421
Hydrometer	16	ASTM D-422
Moisture Content	217	ASTM D-2216
Atterberg Limits	2	ASTM D-4318
Salinity	33	See Appendix B

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Table 4-2: Summary of Select Laboratory Test Results

BH ID	Depth (m)	Sample	Water Content (%)	Grain Size (%)				Atterberg Limits	
				Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index
BH13-01	8.00	AS8	-	58	42	0	-		
	9.50	AS9	6.6	3	45	40	12		
	11.00	AS10	14.7	17	80	3	-		
BH13-02	6.10	AS4	17.8	3	90	7	-		
BH13-03	3.81	AS4	15.7	3	91	6	-		
	6.10	AS7	16.5	5	60	34	9		
	12.19	AS11	-	31	54	15	-		
	14.48	AS13	-	18	81	2	-		
BH13-05	1.52	AS2	-	6	57	30	8		
	4.57	AS4	17.0	7	86	7	-		
	6.10	AS5	-	0	38	54	8		
	12.19	AS9	-	1	75	24	-		
	13.72	AS10	0.0	2	91	7	-		
	20.72	AS13	-	11	89	1	-		
BH13-05B	20.11	AS3	-	0	92	5	3		
	33.53	AS6	22.5	0	95	5			
	39.62	AS8	-	0	93	7			
BH13-07	1.83	AS2	-	7	55	27	12		
	3.35	AS3	-	0	97	3	-		
	4.88	AS4	-	46	53	1	-		
	9.75	AS7	-	5	45	50	1		
	10.47	AS8	-	16	73	11	-		
	11.27	AS(	-	7	69	24	-		
	14.63	AS11	-	2	97	1	-		

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BH ID	Depth (m)	Sample	Water Content (%)	Grain Size (%)				Atterberg Limits	
				Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index
BH13-08	0.76	AS2	14.5	0	40	60	-		
	2.43	AS4	12.0	4	93	4	-		
	10.66	AS9	-	13	73	11	-		
	19.81	AS15	13.5	8	90	2	-		
	21.34	AS16	-	6	88	6	-		
BH13-09	0.30	AS1	17.0	9	53	38	-		
	9.14	AS4	-	2	91	7	-		
	9.75	Core	-	3	48	49	-		
BH13-11	2.13	AS2	9.4	10	88	2	-		
	3.66	AS3	-	5	79	16	-		
	8.22	AS6	-	6	92	3	-		
	12.80	AS9	-	50	48	2	-		
	14.32	AS10	-	13	61	26	-		
	18.75	AS13	17.7	3	84	13	-		
	27.13	AS17	9.3	8	90	2	-		
BH14-05C	36.88	AS15		0	83	14	3		
BH14-06	0.15	AS1	12.3	9	67	24	-		
	3.05	AS3		5	23	62	10		
	13.72	AS10		4	47	39	10		
	32.92	AS42		0	16	56	30	25	9
BH14-07B	0.91	AS1		22	53	20	5-		
	8.84	AS6	-	1	33	66			
	25.60	AS17		5	50	35	10		
	32.61	AS21	21.5	3	41	42	14	20	6
	40.84	AS26		0	32	52	16		

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BH ID	Depth (m)	Sample	Water Content (%)	Grain Size (%)				Atterberg Limits	
				Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index
BH14-12	4.57	AS4	10.0	50	48	2	-		
	6.10	AS5	17.8	7	83	10	-		
	14.48	AS11	17.0	0	91	9	-		
BH14-13	5.49	AS4	15.8	6	55	32	7		
	13.10	AS9	13.1	35	63	2	-		

*Where clay has been recorded this column represents silt content
**Indicates clay size particle where not confirmed by Atterberg Limits

4.3 Borehole Results

The results of the drilling investigation are presented below in general terms, for a complete description of materials encountered and information on in situ testing please refer to geotechnical borehole reports in the attached Appendix A. The results of laboratory testing for the drilling investigation are presented in the attached Appendix B. Please note that where clay particles are recorded in hydrometer results this reflects the particle size only, Atterberg Limits testing was carried out on selected samples to determine clay properties.

During the drilling program thermistors were installed in several of the boreholes as detailed in Table 3-1; results from the thermistors are presented in Appendix C. Salinity testing results are presented with the thermistor results where applicable.

4.3.1 Materials Encountered

4.3.1.1 Onshore

Borehole BH13-01, BH13- 02 and BH13-1B were advanced in the onshore locations. The majority of the material intersected during onshore investigations consisted of glaciofluvial outwash deposit, which essentially comprised of coarse beach sediments (sand and gravel to sand). In general, the sand varied from medium to coarse grained for all the onshore borehole locations. Investigation in BH13- 01 encountered approximately 0.5 m of material with a significant silt content at an elevation of -5.17 m. Whereas the soil in the onshore borehole locations was in frozen state for BH13-01 and BH13-01B throughout the depth of boreholes, it was in partially frozen state in BH13-02 and BH14-12 (nearshore).

All onshore investigations encountered varying degree of permafrost. Permafrost was encountered in BH13-01 and BH13-01B up to the full drilling depth whereas it was encountered partially BH2013-02 and BH14-12. Continuous frozen soil samples were retrieved wherever frozen soil conditions were encountered for the onshore boreholes.

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4.3.1.2 *Offshore*

Offshore drilling encountered loose to compact silty sand underlain by sand containing varying amount of gravel and possibly cobbles. Without exception, silt containing soil was encountered in the upper sediments of the seabed. In several cases, silt containing soil layers were encountered at depth.

Generally dense to very dense sand was found at depth in BH14-5C, BH14-6 and BH14-7B. Please see detailed information in the borehole reports, Appendix A.

4.3.2 *Material Properties*

4.3.2.1 *Clay*

Clay was intersected in a minority of offshore investigations, when encountered it was found to be interbedded with soils that are primarily sand or silt. Where testing occurred, Atterberg Limit testing indicates that clays were of low plasticity.

4.3.2.2 *Silt and Sand*

Offshore investigations intersected soil layers comprised of silt and sand. Where encountered this soil was noted to vary in composition from silty sand to sandy silt, with sand and silt interbedding observed in some samples. Where encountered with silt as a major component sand was generally found to have fine or fine to medium grain size.

SPT testing indicated that this material was generally of a loose to compact density for sand or the equivalent of a firm to stiff silt, but in general density was found to increase with depth. Please refer to individual borehole logs for the density at a given depth and location.

4.3.2.3 *Sand*

Sand was encountered in all investigations, where intersected, sand was found to vary in grain size distribution between fine to coarse.

In offshore investigations the inferred density from the SPT testing was generally loose to compact at shallow depths with dense to very dense sand encountered in lower portions of boreholes. For density data at a specific location please refer to the borehole reports in Appendix A.

Based on SPT blow counts, all onshore locations indicated the presence of very dense sand. However, the high SPT blow counts observed for the onshore locations could be due to the frozen soil conditions. In general, the sand was medium to coarse grained for the onshore borehole locations.

4.3.2.4 *Sand and Gravel*

Strata of gravelly sand to sandy gravel were encountered in approximately half of the offshore boreholes. In general, the sand was found to be medium to coarse when encountered with gravel. Gravel was generally fine when encountered in layers with sand as the secondary or primary component; Gravel was noted to be subangular to subrounded with some rounded material encountered.

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In some instances where sand and gravel were intersected samples contained some angular gravel or gravel with some angular and some subrounded/subangular facets. Based on these observations it was inferred that cobble or cobbles *may* be present in the soil which were fragmented by the drilling process.

Similar to the sand, where encountered in offshore investigations, the sand and gravel soil was found to generally increase in density from loose to compact at shallow depths to dense at greater depths. For density data at a specific location please refer to the borehole reports in Appendix A.

Deposits of gravelly sand to sandy gravel were intersected in all onshore investigations. Based on the SPT blow counts, the gravelly sand to sandy gravel deposit was in very dense state, similar to the sand this may be a reflection of the frozen nature of the material rather than the actual density (e.g., see BH14-12)

4.3.2.5 Gravel

Material which was predominantly gravel was only intersected in a few locations, namely BH13-02, BH13-08, BH13-11, BH14-7B and BH14-12. Gravel was generally noted to be subangular to subrounded with some rounded gravel encountered and ranging in grain size from fine to coarse. Where the rock type of gravel was noted, it was primarily identified visually as granite or limestone.

In some samples angular gravels were noted but it was inferred that these facets had been fragmented by the drilling process.

4.4 Geophysics Survey Results

The primary objective of the geophysics survey was to identify the top of bedrock with interpretation of readings indicating that the soil/rock interface lies approximately 90 to 140 m below sea level. Shear wave velocities in the bedrock layer were found to be in the order of 3900 to 5100 m/s indicating that the bedrock is competent.

Based upon the interpretation of seismic reflection data taken in conjunction with the results from borehole investigations GPR has identified six (6) layers within the overburden:

- Layer 1: Loose silty sand; shear velocities between 175 to 250 m/s
- Layer 2: Compact sand with silt and gravel layers; shear velocities between 175 to 275 m/s
- Layer 3: Dense to very dense sand with some silt and gravel; shear velocities between 250 to 375 m/s
- Layer 4: Dense to very dense sand; shear velocities between 400 to 460 m/s
- Layer 5: Dense sand; shear velocities between 460 to 600 m/s
- Layer 6: Dense sediments; shear velocities between 525 to 760 m/s

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Detailed descriptions of the identified overburden layers can be found in the GPR report found in Appendix D.

5. Summary of Geotechnical Findings

The field component of the 2013/2014 drilling program was completed on January 19, 2014. Hatch's primary findings from this investigation are as follows:

- The marine sediments at the dock location predominantly consist of layered sandy silts, sands and sands and gravels. Soil containing some clay was encountered as thin layers in the minority of boreholes.
- In offshore investigations the inferred density from the SPT testing was generally loose to compact at shallow depths with dense to very dense soil encountered in lower portions of boreholes.
- SPT testing indicated that permafrost was present in all onshore investigations, while occasional zones of permafrost may be present in offshore investigation locations.
- No bedrock or other "hard bottom" was encountered in the marine sediments during drilling investigations. This is consistent with the depth to bedrock interpreted from the geophysical investigation.
- Geophysics survey indicates competent bedrock is present 90 to 140 m below the seabed.

6. References

AMEC Inc., October 4 2010. Geotechnical Design Parameters for Ore Dock #1. Prepared for Baffinland Iron Mines Corporation.

Thurber Engineering Ltd., November 9, 2011. Steensby Inlet and Milne Inlet Port Offshore Geotechnical Investigation. Prepared for Baffinland Iron Mines Corporation.

Canada-Nunavut Geoscience Office, Government of Canada. Geology of Nunavut Map.

Baffinland Iron Mines Corporation, February 2012. Mary River Project – Final Environmental Impact Statement.

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Figure 1
Site Location Plan

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Job number		H349000		MARY RIVER PROJECT	BIM
Ref		0		Site Location Plan	MILNE ORE DOCK
By	JCH	JCH	14-Feb-14		FIGURE 1
Revision		A	14-Feb-14		

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Figure 2
Investigation Location Plan

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DWG. NO. H349000-2220-12-042-0001

2013/2014 BOREHOLE LOCATIONS

BH	EASTING	NORTHING	GROUND LEVEL/ TOP OF FLOATING ICE (M, GEODETIC)	TOP OF BOREHOLE: GROUND LEVEL/ SEABED ELEVATION (M, CHART DATUM)	BOTTOM OF BOREHOLE: DEPTH FROM GROUND LEVEL/ SEABED (M)	BOTTOM OF BOREHOLE: ELEVATION (M, CHART DATUM)
1	503 245	7 976 406	3.04	4.24	24.13	-19.88
1B	503 266	7 976 421	6.46	7.66	33.8	-26.14
2	503 240	7 976 492	1.14	2.34	23.99	-21.65
3	503 245	7 976 577	-0.05	-1.48	27.08	-28.61
5	503 243	7 976 627	-0.05	-15.12	23.46	-38.63
5B	503 251	7 976 628	-0.44	-15.47	46.17	-62.09
5C	503 248	7 976 629	-0.09	-15.49	37.49	-53.07
6	503 279	7 976 644	-0.64	-14.33	49.37	-64.35
7	503 315	7 976 659	0.81	-14.92	20.11	-34.22
7B	503 317	7 976 661	-0.69	-16.11	56.92	-67.72
8	503 385	7 976 664	-0.37	-11.50	28.80	-40.68
9	503 191	7 976 644	-0.01	-24.71	19.35	-44.07
11	503 344	7 976 619	-0.60	-8.68	31.31	-40.59
11B	503 340	7 976 616	-0.18	0.47	30.76	-30.47
12	503 243	7 976 537	-0.39	-8.48	10.89	-19.75
13	503 244	7 976 602	-0.65	-6.62	30.68	-37.75

SEISMIC LINE

POINT	EASTING	NORTHING
A	503 251	7 976 398
A1	503 239	7 976 727
B	503 325	7 976 422
B1	503 313	7 976 759
C	503 117	7 976 612
C1	503 389	7 976 729
D	503 138	7 976 582
D1	503 397	7 976 693
E	503 147	7 976 561
E1	503 406	7 976 672

MONITORING POINT

MONITORING POINT	EASTING	NORTHING	ELEVATION
ICE MONITORING POINT #1 - IMP1	503 271	7 976 555	1.669
NE CORNER OF PAD (00011) - MP1	503 435	7 976 727	-0.721
SE CORNER OF PAD (00021) - MP2	503 439	7 976 529	-0.720
SW CORNER OF PAD (00031) - MP3	503 148	7 976 525	-0.725
NW CORNER OF PAD (00041) - MP4	503 149	7 976 729	-0.681

PROPOSED PHASE 1 BOREHOLES - NOT COMPLETED

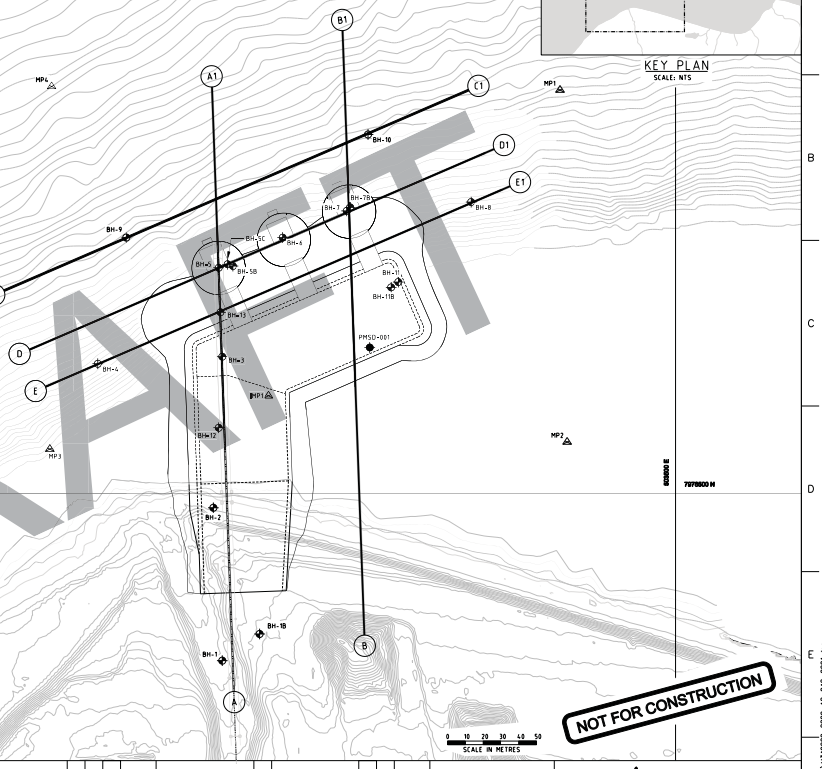
BH	EASTING	NORTHING
4	503 175	7 976 573
10	503 327	7 976 702

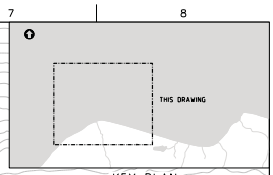
NOTES

1. CO-ORDINATE GRID IS UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. INFORMATION FOR BATHYMETRY IS A COMBINATION OF LOUISTEC STEVEDORING INC. AND M&S. THE POINTS WERE COMBINED TO CREATE THE BATHYMETRY LINES USED
3. THE CHART DATUM HAS BEEN ASSUMED TO BE 1.2 m BELOW CGVD 28 (0.0 m CD = -1.2 m CGVD).
4. ELEVATIONS ARE BASED ON CHART DATUM (CD).
5. DIMENSIONS ARE SHOWN IN MILLIMETERS AND ELEVATIONS ARE SHOWN IN METRES.
6. ELEVATIONS ARE MEASURED AT THE TIME OF BOREHOLE COMPLETION.

LEGEND:

- SEISMIC REFRACTION LINES
- 2013/2014 BOREHOLES
- PROPOSED BOREHOLES
- PREVIOUS BOREHOLES (AMEC 2010)
- MONITORING POINT





KEY PLAN
SCALE: NTS

DRAFT

NOT FOR CONSTRUCTION

SCALE IN METRES 0 10 20 30 40 50

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

REV.	DESCRIPTION	BY	CHK'D	APP'D	DATE
D	UPDATED BOREHOLE LOCATIONS	CA	CR	SR	2014-01-27
C	UPDATED BOREHOLE LOCATIONS	CA	CR	SR	2014-01-08
B	REVISED LAYOUT	AR	CR	SR	2013-12-04

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
D	ISSUE FOR REVIEW	CR	SR 2014-01-27
C	ISSUE FOR REVIEW	CR	SR 2014-01-08
B	ISSUE FOR REVIEW	CR	SR 2013-12-04

ISSUE AUTHORIZATION

HATCH

DESIGNED BY: S. SHAHF (DATE 2013-07-24)	DRAWN BY: R. ALVERO (DATE 2013-07-24)
CHECKED BY: G. QU (DATE 2013-07-24)	QA/QC: ENGR. S. REILLY (DATE 2013-07-24)
PROJ. DES. COORD.: S. HINCHBERGER (DATE 2013-07-24)	PROJ. ENGR.: W. HOYLE (DATE 2013-07-24)
PROJ. MGR.: S. PERRY (DATE 2013-07-24)	

Baffinland

MARY RIVER PROJECT

BOREHOLE LOCATIONS AND GEOPHYSICAL LINES GEOTECHNICAL INVESTIGATION FOR MILNE ORE DOCK

SCALE	REV.
1:1000 OR AS NOTED	D

Figure 2: Investigation Location Plan

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

H349000-2220-12-042-0001.dgn
January 28, 2014 8:15 PM
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Appendix A
Geotechnical Borehole Reports

© Hatch 2014/02

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-01***
PROJECT: Mary River Project
PAGE: 1 **OF:** 5

SITE: Milne Inlet Beach

COORDINATES: 7976406
503245
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Ground Surface
PLATFORM:
GROUND: 4.24
END OF HOLE: -19.89

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: HQ (Frozen Soil)

STARTED: 03/12/2013
FINISHED: 04/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
4.24													
0.0		SAND, trace to some silt, trace fine, rounded gravel.	0 – 0.23	AS01	203	100	5 50 for 75 mm					Borehole location approximately 50m from the shoreline. 75 mm gravel at the tip of spoon.	
		0.61 m: Trace to some silt, some subrounded to sub angular multicolored gravel with size up to 37.5 mm x 25 mm x 15 mm.	0.61 – 0.99	AS02	381	100	11 26 50 for 75 mm	1				Trace of free water in AS02,AS03 and AS04. Introduce sea water as drillling fluid; Advance casing to 1.21 m.	
			1.21 – 1.59	AS03	330	87	5 38 50 for 25 mm						
			2.21	AS04	100	70 for 100 mm		2				Sand in the tip of spoon; Advance core barrel to 1.98 m to retrieve frozen core.	
		2.43 m: Some gravel with size up to 25 mm x 12.5 mm x 12.5 mm.	2.43 – 2.58	AS05	152	80 for 152 mm						Casing getting jammed in frozen soil; Calcium cloride added to drilling water to supress the freezing point of water; Casing advanced to 4.87 m.	
		3.04 m: Subrounded to subangular multicolored gravel with size up to 50 mm x 25 mm x 15 mm in corebarrel indicating possible cobble(s).						3					
								4					
			4.6 – 4.83	AS06	127	55	21 50 for 76 mm						

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80)	SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4})	WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								6							
			6.53 6.66	AS07	127	70 for 127mm 98								Trace of free water observed in corebarrel sample at 6.5m depth. Advance core barrel to 6.55 m; Advance casing to 6.55 m; SPT conducted at 6.55 m, Intermittent hard drilling.	
								7							
			8 8.13	AS08	0	80 for 127mm 0		8						58 42 0	
		8.07 m: Subrounded to subangular gravel with size up to 50 mm.												Lab testing completed on the silty layer; Frozen core recovered; No recovery, Gravel at the tip of spoon sample(Refusal).	
								9							
			9.5 9.65	AS09	152	75 for 152mm 100								3 45 40 12 Some free water observed in AS09.	
								10						Advance core barrel from 9.6 m to 11.1 m; Frozen core recovered; Drive a spoon at 11.12 m.	
-5.97 10.21		SILT and SAND, grey,frozen, trace clay, trace fine, rounded gravel.													
-6.43 10.67		SAND, light brown, medium to coarse grained, some fine to medium grained, rounded to subrounded multicolored gravel.													
			11 11.1	AS10	102	80 for 102mm 100		11						17 80 3 Trace free water observed in AS10.	

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			12.6	AS11	381	100	14 38 53 for 76mm	12				
			12.98					13			Advance core barrel and casing to 14.17 m; Frozen core retreived.	
			14.2	AS12	102	100	70 for 102mm	14			Some free water observed in AS12.	
		14.30 m: Some granitic gravel.						15				
			16.18	AS13	76	95	100 for 76mm	16			Sand in the tip of spoon.	
		16.77 m: Gravel zones 300 mm thick, bedded sand.						17				
							300 for 102mm					

SAMPLING METHOD

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PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

- Constant Head Test
- Variable Head Test
- Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			~~17.9~~	AS14	102	100		18					
			19.48	AS15	0	0	50 for 76mm	19					
			20.9 21.03	AS16	130	130	50 for 127mm	20 21					
			22.4 22.53	AS17	127	98	50 for 127mm	22					
			23.9 24.13	AS17	0	50	23 50 for 76mm	23 24					
-19.89 24.13													

SAMPLING METHOD

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F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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Z - Discarded

PLASTIC LIMIT | NATURAL MOISTURE CONTENT | LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	SAMPLE or RUN: TYPE/ NUMBER	SAMPLE or RUN: REC'Y (mm)	SAMPLE or RUN: REC'Y (%)	SAMPLE or RUN: BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		24.13 m: End of borehole **END OF BOREHOLE** NOTES: 1. Thermistors installed at 1.00 m and 2.50 m below ground surface.											

SAMPLING METHOD

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
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Project: **H/349000**



BH-2013-01 Bulk Sample (16.15m - 17.83m) 1 of 2



BH-2013-01 Bulk Sample (16.15m - 17.83m) 2 of 2



BH-2013-01 Bulk Sample (17.98m - 19.35m) 1 of 2



BH-2013-01 Bulk Sample (17.98m - 19.35m) 2 of 2

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-01B***

PROJECT: Mary River Project
PAGE: 1 **OF:** 6

SITE: Milne Inlet Beach

COORDINATES: 7976420.955
503265.866
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Ground Surface
PLATFORM:
GROUND: 7.66
END OF HOLE: -26.17

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: HQ (Frozen Soil)

STARTED: 14/12/2013
FINISHED: 15/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
7.66													
0.0		SAND, some subrounded gravel, light brown, frozen, coarse to medium grained sand.	0.3	DS1	400	26		1		○		Soil samples retrieved by advancing the corebarrel in frozen soil. Calcium Cloride solution used to prevent the freezing of driling fluid.	
			1.82										
			1.82	DS2	1500	100		2		○		Trace free water observed in DS01.	
4.76													
2.90		Gravelly SAND, light brown,frozen, coarse to medium grained sand, subrounded, multicolored gravel.	3.34					3					
			3.35										
3.56				DS3	1500	100		4		○			
4.10		SAND, some gravel, light brown, frozen, coarse to medium grained sand, round to subrounded gravel.	4.87									Some free water observed in DS04.	
			4.87										

SAMPLING METHOD

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K - Slotted

SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01B***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		4.88 m: Gravel loose from washed section.		DS4	400	26		6		○			
			6.4										
			6.4	DS5	0	0		7				No recovery in the core barrel; sample thawed (likely).	
-0.26			7.92										
7.92		Gravelly SAND, light brown, frozen, medium to coarse grained sand, subrounded to subangular gravel.	7.92					8					
		8.00 m: Some gravel.		DS6	1100	60				○			
			9.44					9					
		9.45 m: Fine to medium grained sand.	9.44										
-2.14													
9.80		SAND, some gravel, some cobbles, light brown, coarse sand, rounded to subangular gravel, some cobbles (limestone) likely present due to the presence of angular gravel sized particles in otherwise round to subangular gravel.		DS7	1200	80		10		○			
			10.97										
		10.97 m: Granitic/limestone, angular rock fragments.	10.97					11				Some free water observed in DS08.	

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01B***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
				DS8	400	26		12					
		12.5 m: Medium grained sand.	12.49									Some free water observed in DS09.	
			12.49	DS9	1524	100		13					
		14.02 m: Gravel changed to round/subround	14.01					14					
			14.01	DS10	0	0		15					
			15.53										
			15.53	DS11	1524	100		16				Fine material washed out from the top 0.3 m of run.	
		17.07 m: Medium to coarse grained sand, some fine to medium grained, rounded gravel,some angular coarse gravel(cobbles likely).	17.05					17				Free water observed in DS13.	
			17.05	DS12	1524	100							

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01B***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		17.37 m: Brownish/grey, fine to medium grained sand.	18.57					18					
		18.59 m: Light brown, medium to coarse grained sand, some round, fine to medium grained gravel, some angular,coarse gravel(cobbles likely).	18.57	DS13	1524	100		19		○			
			20.09					20				Trace free water observed in DS14.	
			20.09	DS14	1524	100		21		○			
			21.61					22					
			21.61	DS15	1524	100		23		○			
		23.16 m: Gravel changed to medium to coarse grained, rounded. some angular coarse gravel(cobbles likely).	23.13					24					
			23.13	DS16	1524	100				○			

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01B***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			24.65										
		24.68 m: Medium grained sand.	24.65	DS17	1524	100		25		○		Some free water observed in DS17.	
			26.17					26					
		26.21: Medium to coarse grained sand, some fine gravel, subround to round.	26.17	DS18	1524	100		27		○			
			27.69										
			27.69	DS19	1524	100		28					
			29.21					29					
		29.26 m: Light brown sand, trace angular coarse gravel in otherwise round to subround gravel(cobbles likley).	29.21	DS20	1524	100		30		○			

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-01B***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-23.12			30.73										
30.78		SAND, trace gravel, medium to coarse grained sand, fine grained, round to subrounded gravel.	30.73	DS21	1524	100		31		○		Some free water observed in DS22.	
			32.25					32					
			32.25	DS22	0	0		33				DS21 and DS22 similar; samples collected in 1 large bag.	
-26.17			33.83										
33.83		NOTES: 1. Borehole terminated at a depth of 33.83 m as targetted drilling depth acheived. 2. Thermistors not installed.							**END OF BOREHOLE**				

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-02***
PROJECT: Mary River Project
PAGE: 1 **OF:** 5

SITE: Milne Inlet Beach

COORDINATES: 7976491.693
503240.396
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Ground Surface
PLATFORM:
GROUND: 2.34
END OF HOLE: -21.65

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 05/12/2013
FINISHED: 06/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
2.34 / 0.0		SAND, trace to some gravel, frozen, light brown, very dense, medium to coarse grained sand.						1					
		1.5 m: With gravel, interbedded sand and gravel, coarse sand.	1.38	AS1	26	32	65 for 76mm	2				Bulk Sample taken 1.5 to 3.0 m.	
		3.05 m: Medium to coarse grained sand.	3.05 / 3.33	AS2	46	16	50 / 200 for 127mm	3					
		3.38 m: Trace of fine gravel.						4				Poor recovery from core.	
			4.57	AS3	47	10	5 / 50 / 112 for 150mm					4.57 m: Some free water observed in AS03.	

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-02***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		5.03 m: Fine to medium sand, gravel layer is 100 mm thick.	5.02					6				Does not appear to be frozen.	
		6.10 m: Trace gravel and silt, wet.	6.1	AS4	70	11	12 50 135 135 for 150mm					3 90 7	
		6.7 m: Very thinly to thinly bedded.	6.71					7					
-4.67 7.01		Gravelly SAND, light brown, very dense, wet, fine grained granitic gravel.	7.01 7.16	AS5	27	18	100 for 150mm					Some free water observed in AS05. Sample does not appear to be frozen.	
								8					
			8.53 8.98	AS6	0	0	72 150 135 for 150mm	9					
								10					
		10.06 m: SAND, trace gravel, trace silt.	10.06	AS7	42	9	42 120 172 for 150mm						
		10.52 m: Gravelly SAND as above.	10.51					11					

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-02***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		11.58 m: Not frozen, medium brown, dense, wet, coarse grained sand.	11.58	AS8	60	10	26 18 28 100 for 150mm	12				
			12.19									
			13.11	AS9	10	1.6	10 29 72 100 for 150	13			Washed sample, only gravel retained.	
			13.72									
-12.29 / 14.63		SAND, some subrounded gravel, trace of silt, medium to coarse grained sand.	14.63	AS10	350	57	9 20 30 38 for 150mm	14 15				
			15.24									
		16.15 m: Trace silt, trace fine, subrounded gravel.	16.15	AS11	500	82	5 9 10 8 for 150mm	16 17			No recovery in SPT.	
			16.76									
			17.67									

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PLASTIC LIMIT | NATURAL MOISTURE CONTENT | LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-02***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION; SHEAR STRENGTH (kPa) UNCONFINED / QUICK TRIAXIAL / FIELD VANE / LAB VANE / POCKET PEN.	HYDRAULIC CONDUCTIVITY (m/s); WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			18.28	AS12	0	0	15 17 21 25 for 150mm	18					
-16.86								19					
19.20		GRAVEL, multicoloured, fine to coarse up to 50 mm, subrounded to subangular.	19.2 19.48	AS13	200		50 for 76mm 71						
-18.38								20					
20.72		SAND, some fine gravel, medium brown, wet, medium to coarse grained sand, subangular to subrounded gravel.	20.72 21.33	AS14	300	50	5 15 14 12 for 150mm	21					
-19.91								22					
22.25		Gravelly SAND, medium brown, coarse sand, multicoloured subrounded gravel up to 25 mm in size.	22.25 22.68	AS15	300	70	5 15 50 for 127mm						
-21.65			23.77 24	AS16	200	87	16 50 for 76mm	23					
23.99		NOTES:					**END OF BOREHOLE**						

SAMPLING METHOD

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PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-02***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80); SHEAR STRENGTH (kPa) UNCONFINED / QUICK TRIAXIAL / FIELD VANE / LAB VANE / POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}); WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		1. Five thermistors installed at 19.38 m, 14.38 m, 9.38 m, 4.38 m, 0.50 m below the top of borehole.											

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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Project: **H/349000**



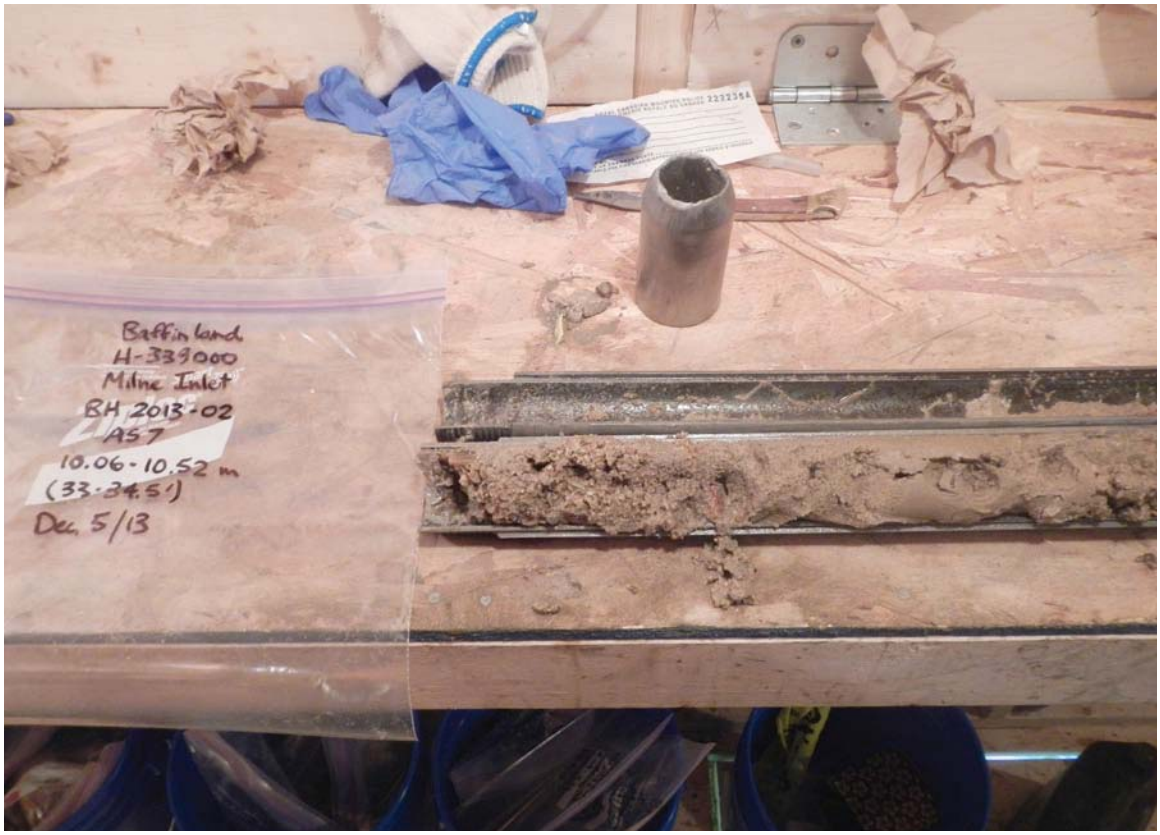
BH-2013-02 Bulk Sample (1.5m - 3.0m) 1 of 3



BH-2013-02 Bulk Sample (1.5m - 3.0m) 2 of 3



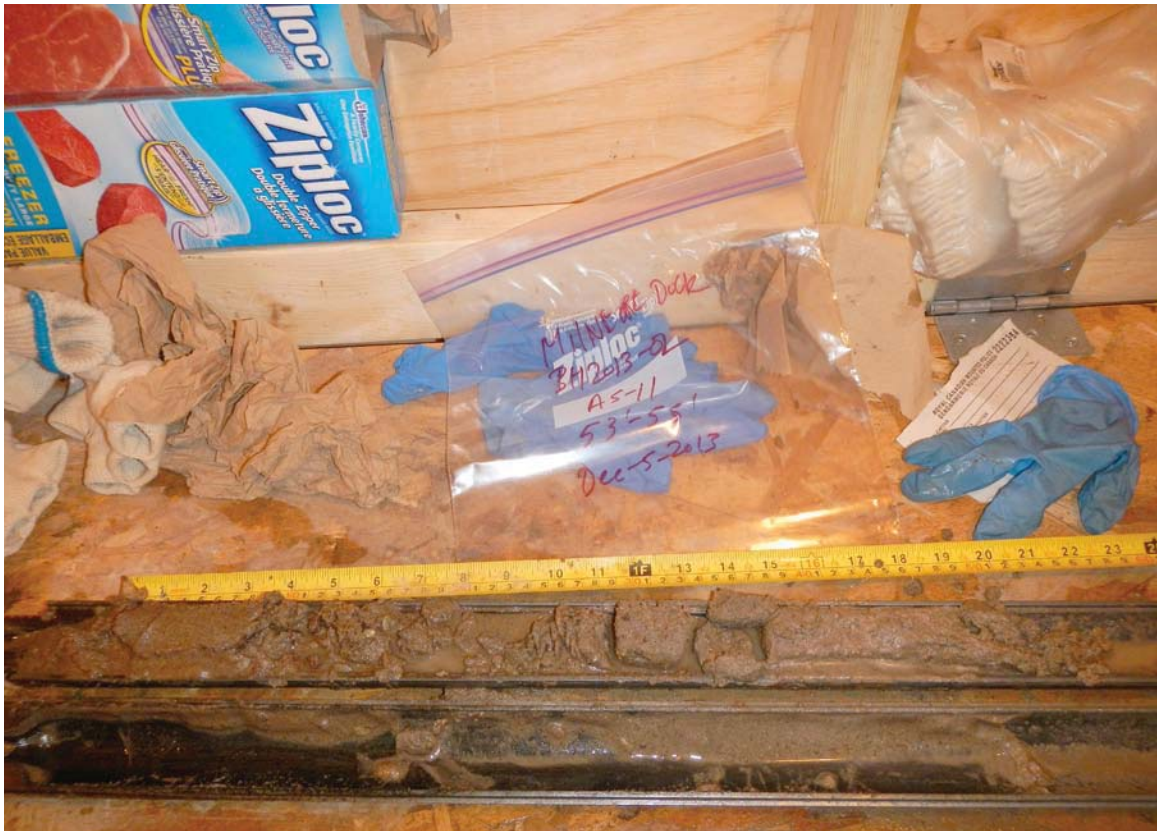
BH-2013-02 Bulk Sample (1.5m - 3.0m) 3 of 3



BH-2013-02 AS-7 (10.06m - 10.52m)



BH-2013-02 AS-10 (14.63m - 15.24m)



BH-2013-02 AS-11 (16.15m - 16.76m)



BH-2013-02 AS-13 (19.20m - 19.81m)



BH-2013-02 AS-14 (20.73m - 21.34m)



BH-2013-02 AS-16 (23.77m - 24.38m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-03***
PROJECT: Mary River Project
PAGE: 1 **OF:** 5

SITE: Milne Inlet Bay

COORDINATES: 7976576.523
503245.059
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -1.48
END OF HOLE: -28.30

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 06/12/2013
FINISHED: 07/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
-1.48									20 40 60 80 / 50 100 150 200 / 10^{-6} 10^{-5} 10^{-4} / 15 30 45 (%)		GR SA SI CL	
0.0		SAND, some silt, medium brown, loose to compact, fine to medium grained sand.	0	AS1	60	10	4 5 6 10 for 150mm				Drill set up on ice surface; casing extended to seabed; soil sampling started	
-2.08			0.61									
0.6		SAND, trec of gravel, medium brown, loose to compact, coarse grained sand.						1			Water depth measured periodically during drilling.	
			1.5	AS2	5	1	10 13 13 15 for 150mm				Poor recovery, gravel fragments only.	
			2.11					2				
								3				
-4.73			3.05									
3.25		Silty SAND, loose, very wet.		AS3	46	8	4 5 5 6 for 150mm					
-5.29			3.66									
3.81		Gravelly SAND, trace silt, brown, compact, wet, coarse grained sand, fine gravel.	3.81	AS4	60	10	8 8 12 12 for 150mm	4			3 91 6	
		Sand becoming fine with depth.	4.42									
-6.05												
4.57		Silty SAND, some gravel, some shell fragments,	4.57	AS5	10	2	3 5 2					

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-03***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
-6.66		brown, loose, wet, fine grained sand.	5.18				2 for 150mm									
5.18		SAND, some silt, some fine gravel, brown with very closely spaced dark brown bands along bedding, (possibly organics) loose, wet, medium to coarse grained sand.	5.18	AS6	65	11	2 4 4 6 for 150mm		●	○						
			5.79					6								
-7.58																
6.1		5.60 m: Coarsed grained sand, becoming gravelly.	6.1	AS7	60	10	2 4 4 2 for 150mm		●	○		5	60	34	9	
		Silty SAND, trace clay, trace of gravel, medium brown, loose to compact, wet.	6.71					7								
		7.62 m: Dark greyish brown, compact.	7.62	AS8	40	7	2 10 8 8 for 150mm	8	●							
-10.62			8.23													
9.14		SAND and GRAVEL, light brown, loose to compact, medium to coarse grained sand, fine grained gravel.	9.14	AS9	40	7	4 5 7 10 for 150mm	9	●	○						
			9.75					10								
			10.67	AS10	0	0	4 3 3 5 for 150mm	11	●							
			11.28													

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-03***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
								12							
-14.18		12.19 m: Gravel decreasing to some, brown, compact.	12.19 – 12.8	AS11	20	3	6 8 7 5 for 150mm		●			31	54	15	
12.7		SILT and SAND, dark greyish brown, loose to compact, wet to saturated, fine grained sand.						13							
			13.72 – 14.33	AS12	5	1	5 5 5 6 for 150mm	14	●						
-15.96															
14.48		SAND, some fine gravel, light brown, loose to compact, coarse grained sand, subangular to subrounded gravel.	14.48 – 15.09	AS13	46	8	4 4 6 7 for 150mm	15	●			18	81	2	
								16							
			16.76 – 17.37	AS14	0	0	5 5 7 6 for 150mm	17	●						

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-03***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4} / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18					
			18.9	AS15	0	0	3 3 5 8 for 150mm	19	●				
			19.51										
								20					
			20.42	AS16	0	0	3 7 12 10 for 150mm		●				
			21.03					21					
			21.94	AS17	0	0	7 8 8 9 for 150mm	22	●				
			22.55										
								23					
		23.46 m: Medium brown.	23.46	AS18	170	28	9 9 9 9 for 150mm		●	○			
-25.55			24.07					24					
24.07		DCPT was carried out.											

SAMPLING METHOD

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E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-03***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80); SHEAR STRENGTH (kPa) UNCONFINED / QUICK TRIAXIAL / FIELD VANE / LAB VANE / POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}); WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		24.07 m: DCPT start.						25					
								26					
-28.30 26.82		26.82 m: DCPT end. **END OF BOREHOLE**											

NOTES:

1. Single thermistor installed at 10 m below the seabed.

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
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D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH03-DCPT

Sheet 1 of 1

TEST PIT No. **BH03**

SURFACE ELEVATION **-1.48**

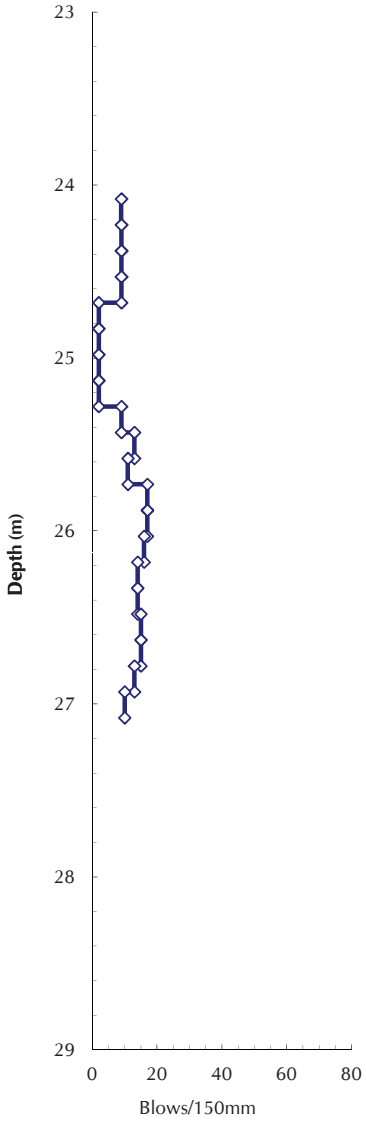
DATE: **December 6, 2013**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

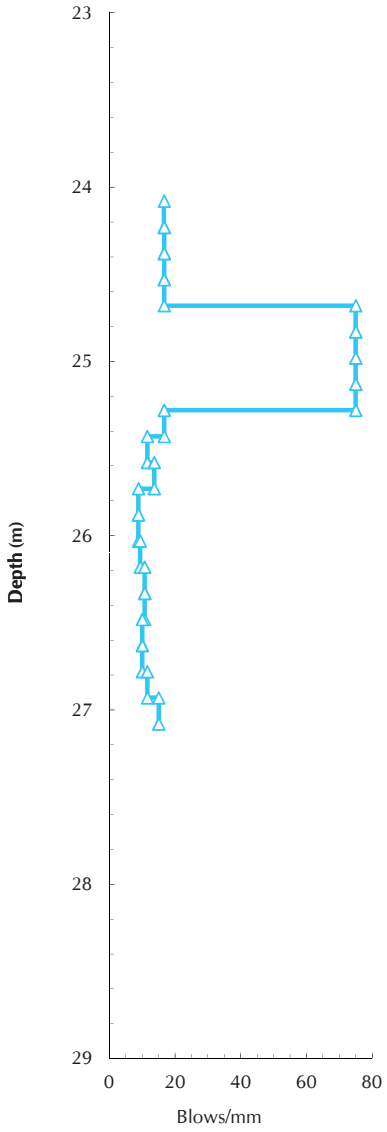
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
24.08	9	17
24.23	9	17
24.38	9	17
24.53	9	17
24.68	2	75
24.83	2	75
24.98	2	75
25.13	2	75
25.28	9	17
25.43	13	12
25.58	11	14
25.73	17	9
25.88	17	9
26.03	16	9
26.18	14	11
26.33	14	11
26.48	15	10
26.63	15	10
26.78	13	12
26.93	10	15

BLOWS PER 150mm



mm PER BLOW



Remarks:

14/02/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\Factual Report\Raw Files - not for inclusion in memo\[DCPT Logs.xlsx]BH05B



BH-2013-03 AS-1 (0.0m - 0.60m)



BH-2013-03 AS-3 (3.05m - 3.66m)



BH-2013-03 AS-4 (3.81m - 4.42m)



BH-2013-03 AS-6 (5.79m - 6.40m)



BH-2013-03 AS-7 (?m - ?m)



BH-2013-03 AS-8 (7.62m - 8.22m)



BH-2013-03 AS-18 (23.47m - 24.08m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-05***

PROJECT: Mary River Project
PAGE: 1 **OF:** 4

SITE: Milne Inlet Bay

COORDINATES: 7976626.922
503242.678
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -15.12
END OF HOLE: -38.58

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 07/12/2013
FINISHED: 08/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) (□ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		Silty SAND, trace of fine gravel, organics along bedding laminations, alternating brown and black laminations, loose to compact, wet, fine to medium grained sand.	0	AS1	65	11	7 7 8 8					Drill set up on ice surface; casing extended to seabed; soil sampling started
			0.61					1				Water depth measured periodically during drilling.
-16.69												
1.57		SAND, some silt, trace gravel, grey, loose, wet.	1.52	AS2	30	5	4 4 4 8					6 57 30 8
			2.13					2				
-18.17								3				
3.05		SAND, trace silt, trace sandstone gravel, light brown, compact, wet to saturated, fine to medium grained sand.	3.05	AS3	450	450	6 6 7 6					
			3.66					4				
		4.57 m: Medium to coarse grained sand.	4.57	AS4	56	9	6 5 77					7 86 7

SAMPLING METHOD

A - Split Tube
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F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
-20.17 5.05		SAND, with gravel, trace of silt, contains organics, dark grey to dark brown, saturated, fine grained sand.	5.18					6				Washout heaving sands in rods	
			6.1 6.71	AS5	10	2	3 5 6 6					GR SA SI CL 38 54 8	
								7					
			7.62 8.23	AS6	0	0	4 4 2 1	8					
-24.26 9.14		SAND and GRAVEL, light brown, very loose, wet, coarse to medium grained sand, fine gravel.	9.14 9.75	AS7	20	3	N.A N.A 3 4	9				SPT attempted; results not valid as the soil is likely disturbed from drilling.	
								10					
		10.67 m: Loose to complact, gravel decreasing to some.	10.67 11.28	AS8	40	7	4 5 5 7	11					

SPT N-VALUES / DYNAMIC CONE PENETRATION: 20 40 60 80

SHEAR STRENGTH (kPa): ☐ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. — 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS: 15 30 45 (%)

SAMPLING METHOD

A - Split Tube
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SHIPPING CONTAINER

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
▨ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
-27.31							
12.19		SAND, with silt, contains some organics, light to dark brown,wet, fine to medium grained.	12.19 – 12.8	AS9	18	3	4 14 14 10
-29.32		13.72 m: trace silt, light brown, compact.	13.72 – 14.33	AS10	48	8	6 7 5 6
14.20		Silty SAND, dark grey, compact, wet, fine grained.	14.32 – 14.93	AS11	0	0	3 3 4 3

DEPTH (m): 12, 13, 14, 15, 16, 17

● SPT N-VALUES
≀ DYNAMIC CONE PENETRATION 20 40 60 80
SHEAR STRENGTH (kPa)
□ UNCONFINED ■ QUICK TRIAXIAL
✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.
50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4}
WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
1	1	75	24	
2	2	91	7	

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
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F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18					
								19					
			19.2	AS12	0	0	8 6 7 8		●				
			19.81					20					
-35.84 20.72		SAND, some gravel, trace silt, light to medium brown, wet, medium to coarse grained sand, subrounded to rounded gravel.	20.72	AS13	500	82	5 6 5 8	21	●			11 89 1	
			21.33					22				Advancing the casing very difficult; sand binding with the casing. Sand heaving 1.5 m into the casing, DCPT not done as flowing sands would have affected blow counts.	
			22.25	AS14	0	0	5 6 10 10		●				
			22.86					23					
-38.58 23.46		22.86 m: Trace to some gravel, subrounded. NOTES: 1. No thermistors installed.	22.86 23.47	AS15	550	90	5 7 11 13		●	○			
									END OF BOREHOLE				

SAMPLING METHOD

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E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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P - Water Content Tin
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
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Project: H/349000



BH-2013-05 AS-1 (0.0m - 0.60m) 1 of 2



BH-2013-05 AS-1 (0.0m - 0.60m) 2 of 2



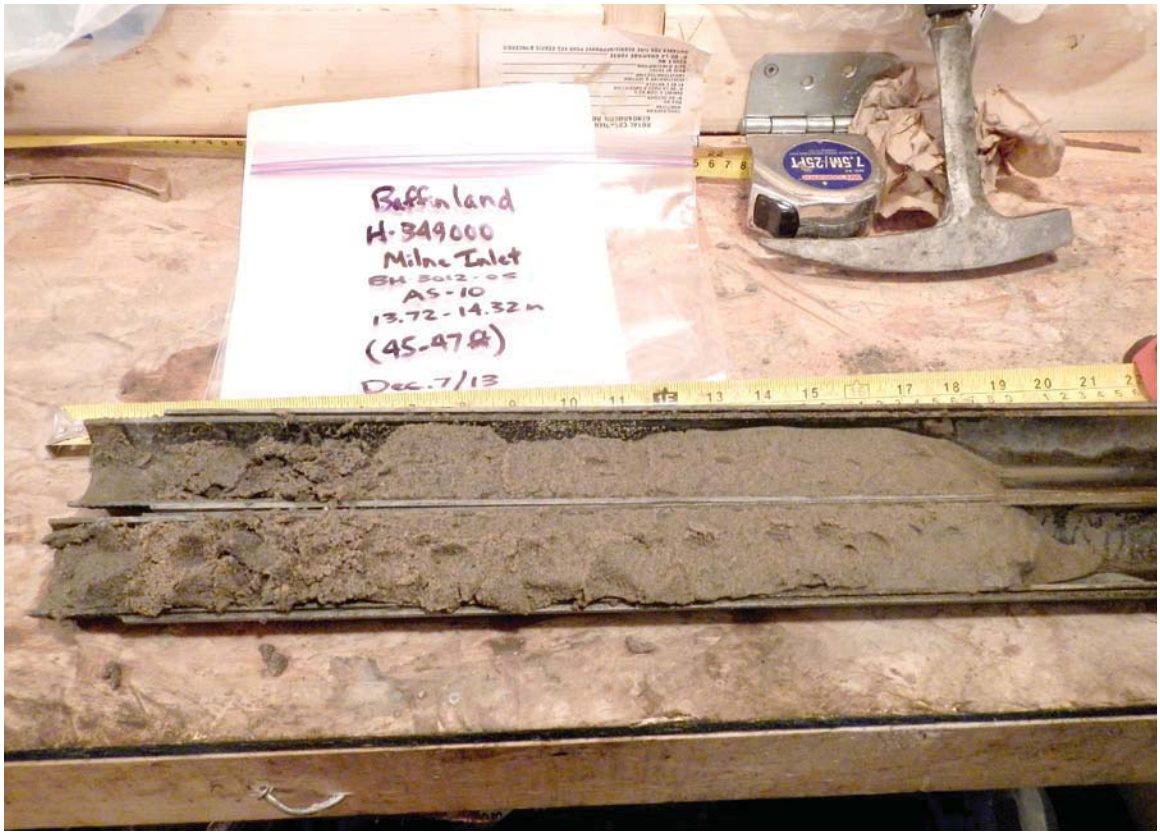
BH-2013-05 AS-4 (4.57m - 5.18m) 1 of 2



BH-2013-05 AS-4 (4.57m - 5.18m) 2 of 2



BH-2013-05 AS-8 (10.67m - 11.28m)



BH-2013-05 AS-10 (13.72m - 14.32m)



BH-2013-05 AS-13 (20.73m - 21.34m)



BH-2013-05 AS-15 (22.86m - 23.47m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-05B***
PROJECT: Mary River Project
PAGE: 1 **OF:** 8

SITE: Milne Inlet Bay

COORDINATES: 7976628.297
503250.552
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -15.47
END OF HOLE: -61.49

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 15/12/2013
FINISHED: 16/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-15.47 0.0		Borehole advanced to 17.67 m without sampling. Soil not logged untill 17.67 m depth. See BH2013-05 for lithology above this depth.						1 2 3 4				Drill set up on ice surface; casing extended to seabed; soil sampling started Water depth measured periodically during drilling.	

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
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SHIPPING CONTAINER

N - Insert
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X - Plastic & PVC Sleeve
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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P — W_N — W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								6					
								7					
								8					
								9					
								10					
								11					

SAMPLING METHOD

A - Split Tube
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C - Piston Sample
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G - Shovel Grab
K - Slotted

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PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80); SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}); WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								12					
								13					
								14					
								15					
								16					
								17				Polymer NewZam D drilling mud added to drill fluid.	
-33.14 17.67		SAND, trace of silt and	17.67										

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
		clay, some indications of bedding, light brown, very loose to compact, wet, fine to medium grained sand.	18.28	AS1	400	66	10 10 10 10
		19.20 m: Trace fine gravel, fine grained sand.	19.2 – 19.81	AS2	50	8	0 3 4 6
			20.11 – 20.72	AS3	50	8	N.A

DEPTH (m): 18, 19, 20, 21, 22, 23, 24

● SPT N-VALUES; ≀ DYNAMIC CONE PENETRATION: 20 40 60 80

SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.: 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS: 15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

0 92 5 3

SPT attempted; results not valid.

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

□ Constant Head Test
□ Variable Head Test
□ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
			27.27 – 27.88	AS4	50	8	N.A
			30.32	AS5	0	0	N.A

DEPTH (m): 25, 26, 27, 28, 29, 30

SPT N-VALUES; DYNAMIC CONE PENETRATION (20 40 60 80)

SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

PIEZOMETER INSTALLATION

SPT attempted; results not valid;sampler advanced 600mm under the weight of rods.

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			30.93					31				SPT attempted; results not valid;sampler advanced 600mm under the weight of rods.	
								32					
								33					
		33.53 m: Dense, fine to medium grained sand.	33.53	AS6	610	100	9 13 20 23		●	○		0 95 5	
		33.90 m: Fine grained sand.	34.14					34					
								35					
								36					
		36.53 m: Compact, coarse grained sand.	36.58	AS7	610	100	2 6 4 3		●	○			
-52.47 37		Sandy SILT, dark grey,						37					

SAMPLING METHOD

A - Split Tube
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 7 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		loose to dense.	37.19					38					
								39					
-55.09 39.62		SAND, trace silt, brown, dense, wet, fine grained.	39.62	AS8	400	66	15 17 28 33	40	●			0 93 7 Rods advanced 1 m into the soil under the self weight	
			40.23					41					
								42					
-58.14 42.67		DCPT was carried out. 42.67 m: DCPT start.						43					

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-05B***

PROJECT: Mary River Project **PAGE:** 8 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4} / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								44				
								45				
-61.49 / 46.02		46.02 m: DCPT end. **END OF BOREHOLE** NOTES: 1. No thermistors installed.						46				

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH05B-DCPT

Sheet 1 of 1

TEST PIT No.

BH05B

SURFACE ELEVATION:

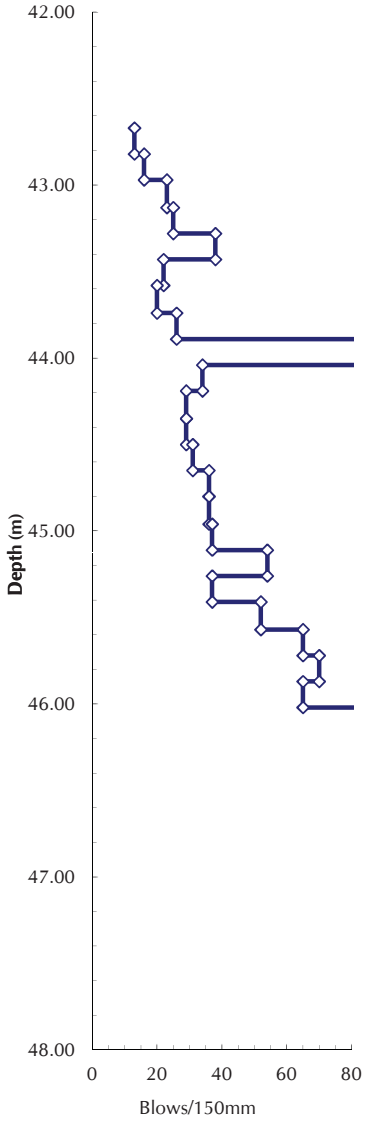
DATE:

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

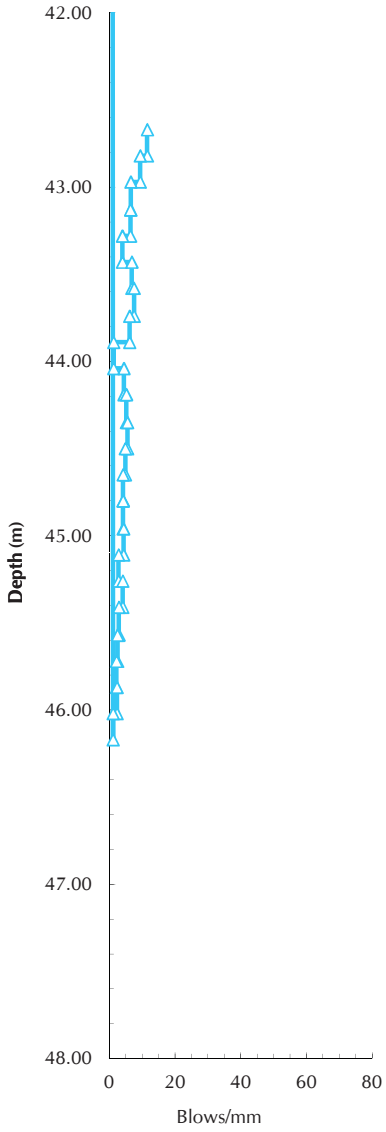
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
42.67	13	12
42.82	16	9
42.97	23	7
43.13	25	6
43.28	38	4
43.43	22	7
43.58	20	7
43.74	26	6
43.89	118	1
44.04	34	4
44.19	29	5
44.35	29	6
44.50	31	5
44.65	36	4
44.80	36	4
44.96	37	4
45.11	54	3
45.26	37	4
45.41	52	3
45.57	65	2
45.72	70	2
45.87	65	2
46.02	135	1

BLOWS PER 150mm



mm PER BLOW



Remarks:

BH05B Dynamic Cone Penetrometer Testing performed adjacent to BH05. At BH05 borehole was terminated due to heaving sand, BH05B was drilled to target depth and the DCPT was performed at the bottom of the borehole

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-07***
PROJECT: Mary River Project
PAGE: 1 **OF:** 4

SITE: Milne Inlet Bay

COORDINATES: 7976659.101, 503315.279
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -14.92
END OF HOLE: -34.88

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 09/12/2013
FINISHED: 10/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H
DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		Silty SAND, contains organics, thinly laminated bedding, brown, wet.	0.3 – 0.91	AS1	60	10	N.A	1				Drill set up on ice surface; casing extended to seabed; soil sampling started SPT attempted; results not valid;sampler advanced 800mm under the weight of rods. Water depth measured periodically during drilling.	
-18.27		1.83 m: Laminates of organics.	1.83 – 2.44	AS2	22	4	N.A	2				7 55 27 12 SPT attempted; results not valid;sampler advanced 700mm under the weight of rods.	
3.35		SAND, light brown, loose, wet, fine to medium uniform sand.	3.35 – 3.96	AS3	25	4	N.A	3				0 97 3 SPT attempted; results not valid;sampler advanced 800mm under the weight of rods.	
-19.80								4					
4.88		SAND and GRAVEL,	4.88										

SAMPLING METHOD

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SHIPPING CONTAINER

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Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-07***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
		brown, loose to compact, wet, coarse grained sand, fine, rounded to subrounded, multicolored gravel, few pieces of red angular coarse gravel indicating possible cobbles.	5.49	AS4	20	3	3 2 3 2	6				46	53	1		
-22.84		6.40 m: Light brown, medium to coarse grained sand, coarse angular red gravels indicate possible cobbles.	6.4 / 7.01	AS5	200	33	10 9 8 3	7								
7.92		SAND, some gravel, medium brown, wet, coarse, red and white rounded to angular gravel.	7.92 / 8.53	AS6	200	33	12 14 6 5	8								
-24.67								9								
9.75		SAND and SILT, trace gravel, brown, fine to coarse grained sand.	9.75 / 10.36	AS7	200	33	11 8 7 6	10				5	45	50	1	
-25.39																
10.47		SAND; some silt, some gravel, brown, fine to coarse sand.	10.47 / 11.08	AS8	300	49	7 4 6 5	11				16	73	11		
		11.27 m: Trace gravel,	11.27													

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-07***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		some silt.	11.88	AS9	140	23	7 8 6 8	12	●			7 69 24	
-27.72 / 12.8		SAND, trace of gravel, brown, wet, medium to coarse grained sand, trace of red rounded to angular gravel possibly indicating cobbles.	12.8 / 13.41	AS10	170	28	21 21 18 19	13	●	○		1 large piece of fragment indicating cobbles High resistance, flowing sands likely.	
								14					
			14.63 / 15.24	AS11	200	33	4 4 7 9	15	●			Very high resistance to drilling. 2 97 1	
								16					
								17				sand heaved into the casing; Casing pullled out by 9.1 m and readvanced to 17.67 m below seabed before driving the cone	
-32.59 / 17.67		DCPT was carried out.											

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-07***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		17.67 m: DCPT start.						18				
								19				Continuous high resistance to drilling;flowing sands likely
-34.88 / 19.96		19.96 m: DCPT end. **END OF BOREHOLE**										

NOTES:

1. No thermistors installed.

SAMPLING METHOD

A - Split Tube
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH07-DCPT

Sheet 1 of 1

TEST PIT No.

BH07

SURFACE ELEVATION:

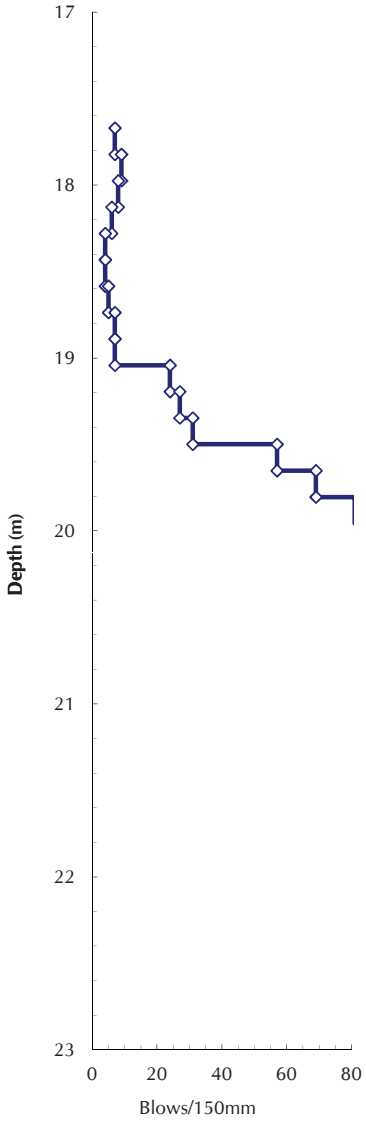
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

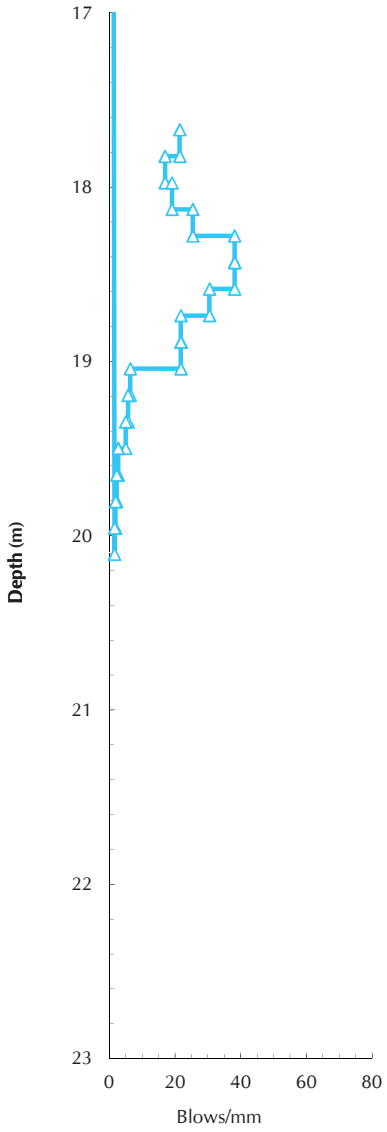
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
17.67	7	21
17.82	9	17
17.97	8	19
18.13	6	25
18.28	4	38
18.43	4	38
18.58	5	30
18.74	7	22
18.89	7	22
19.04	24	6
19.19	27	6
19.35	31	5
19.50	57	3
19.65	69	2
19.80	81	2
19.96	100	2

BLOWS PER 150mm



mm PER BLOW



Remarks:

BH07 was drilled to target depth and DCPT was performed at the bottom of the borehole.

\\nisdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07
16/01/2014



BH-2013-07 AS-2 (1.83m - 2.44m)



BH-2013-07 AS-3 (3.35m - 3.96m)



BH-2013-07 AS-5 (6.40m - 7.01m)



BH-2013-07 AS-6 (7.93m - 8.53m)



BH-2013-07 AS-8 (10.36m - 10.97m)



BH-2013-07 AS-10 (12.82m - 13.41m)



BH-2013-07 AS-11 (14.63m - 15.24m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-08***

PROJECT: Mary River Project
PAGE: 1 **OF:** 5

SITE: Milne Inlet Bay

COORDINATES: 7976663.502
503384.56
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -11.50
END OF HOLE: -40.15

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 12/12/2013
FINISHED: 13/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		SAND and SILT, trace of subrounded gravel up to 25 mm particle size, brown/grey, very loose.	0	AS1	0	0	0 0 1 2					Drill set up on ice surface; casing extended to seabed; soil sampling started	
			0.61										
			0.76	AS2	300	49	1 2 1 2	1				0 40 60	
			1.37									Water depth measured periodically during drilling.	
			1.52	AS3	400	66	2 1 0 0	2					
-13.93			2.13										
2.43		SAND, trace of subrounded gravel, medium brown, loose to compact, medium to coarse grained sand.	2.43	AS4	370	61	3 2 3 4	3				4 93 4	
			3.04										
			4.75					4					

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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Q - Jar
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Y - Core Box
Z - Discarded

PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P — W_N — W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-08***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			5.36	AS5	0	0	2 3 2 2	6					
			6.27 – 6.88	AS6	0	0	9 8 6 5	7				No recovery, some crushed angular gravel pieces in the spoon.	
-19.27													
7.77		GRAVEL, red and grey, subrounded, fine to coarse, with some angular gravels possibly fragments of cobbles broken by drilling.	7.77 – 8.38	AS7	50	8	5 4 3 4	8				Washed sample (Sand may have been removed)	
			9.29 – 9.9	AS8	0	0	13 13 7 7	9					
-22.16								10					
10.66		SAND, some gravel, some silt, brown, moist, fine to medium sand, rounded gravel, three red granite pieces (angular) up to 50 mm particle size, possible cobbles.	10.66 – 11.27	AS9	200	33	5 6 5 7	11				13 76 11	

SAMPLING METHOD

A - Split Tube
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O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-08***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-23.69 / 12.19		SAND, trace of fine rounded gravel, light brown, compact, wet, medium to coarse grained sand.	12.19 – 12.8	AS10	280	46	3 5 8 11	12					
			13.71 – 14.32	AS11	0	0	4 4 12 7	13 14					
			15.24 – 15.84	AS12	0	0	16 18 16 16	15 16					
			16.76 – 17.37	AS13	600	98	2 3 4 8	17					

SPT N-VALUES; DYNAMIC CONE PENETRATION 20 40 60 80

SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. — 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS: 15 30 45 (%)

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
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P - Water Content Tin
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Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-08***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
								18							
		18.29 m: Fine to coarse grained sand, some coarse angular gravel.	18.29 / 18.9	AS14	50	8	2 6 8 9		●						
								19							
			19.81 / 20.42	AS15	200	33	12 13 12 13	20	●	○		8	90	2	
								21							
		21.34 m: Brown, fine grained sand, trace of gravel, possible sandstone cobble(s).	21.34 / 21.95	AS16	200	33	13 13 14 17		●			6	88	6	
-34.97								22							
23.47		DCPT was carried out. 23.47 m: DCPT start.						23							
								24							

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-08***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 5

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80); SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}); WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL	PIEZOMETER INSTALLATION
								25					
								26					
								27					
								28					
-40.15 28.65		28.65 m: DCPT end.							**END OF BOREHOLE**				
		NOTES: 1. No thermistors installed.											

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
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SHIPPING CONTAINER

N - Insert
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X - Plastic & PVC Sleeve
R - Cloth Bag
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Z - Discarded

PLASTIC LIMIT | NATURAL MOISTURE CONTENT | LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH08-DCPT

Sheet 1 of 1

TEST PIT No.

BH08

SURFACE ELEVATION:

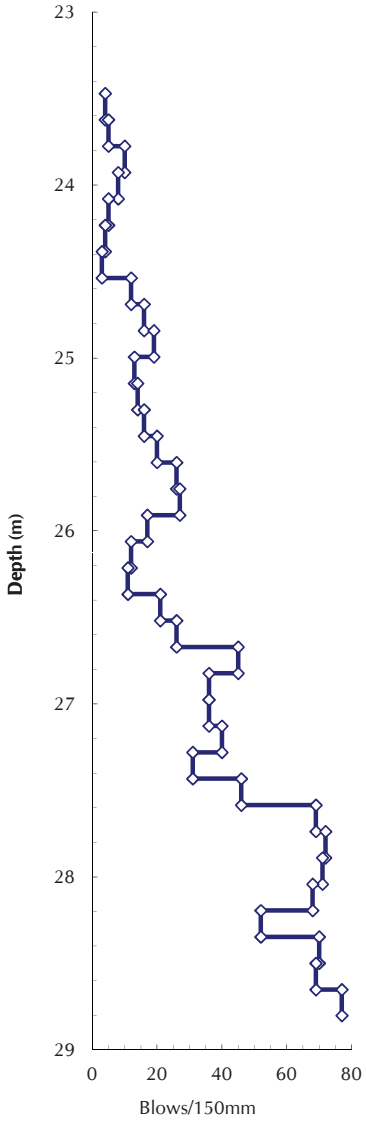
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

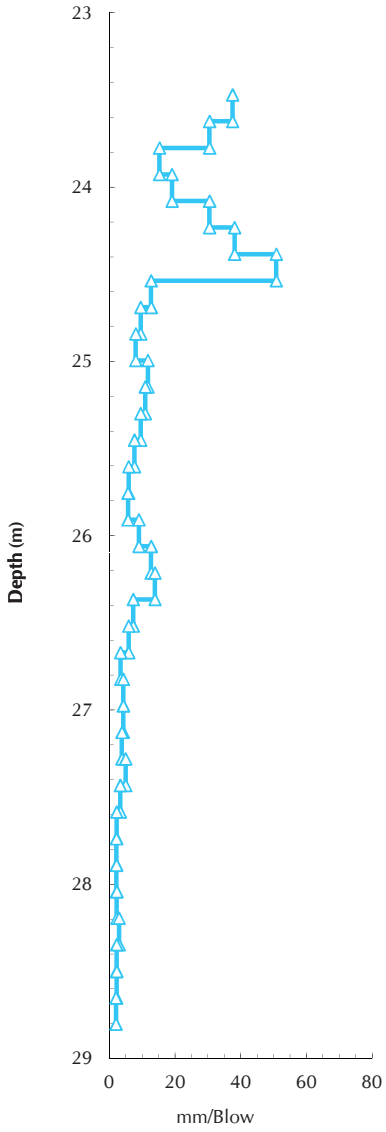
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
23.47	4	38
23.62	5	30
23.77	10	15
23.93	8	19
24.08	5	30
24.23	4	38
24.38	3	51
24.54	12	13
24.69	16	10
24.84	19	8
24.99	13	12
25.15	14	11
25.30	16	10
25.45	20	8
25.60	26	6
25.76	27	6
25.91	17	9
26.06	12	13
26.21	11	14
26.37	21	7
26.52	26	6
26.67	45	3
26.82	36	4
26.98	36	4
27.13	40	4
27.28	31	5
27.43	46	3
27.58	69	2
27.74	72	2
27.89	71	2
28.04	68	2
28.19	52	3
28.35	70	2
28.50	69	2
28.65	77	2

BLOWS PER 150mm



mm PER BLOW



Remarks:

BH08 was drilled to target depth and DCPT was performed at the bottom of the borehole.

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07



BH-2013-08 AS-2 (0.76m - 1.37m)



BH-2013-08 AS-3 (1.52m - 2.10m)



BH-2013-08 AS-4 (2.43m - 3.04m)



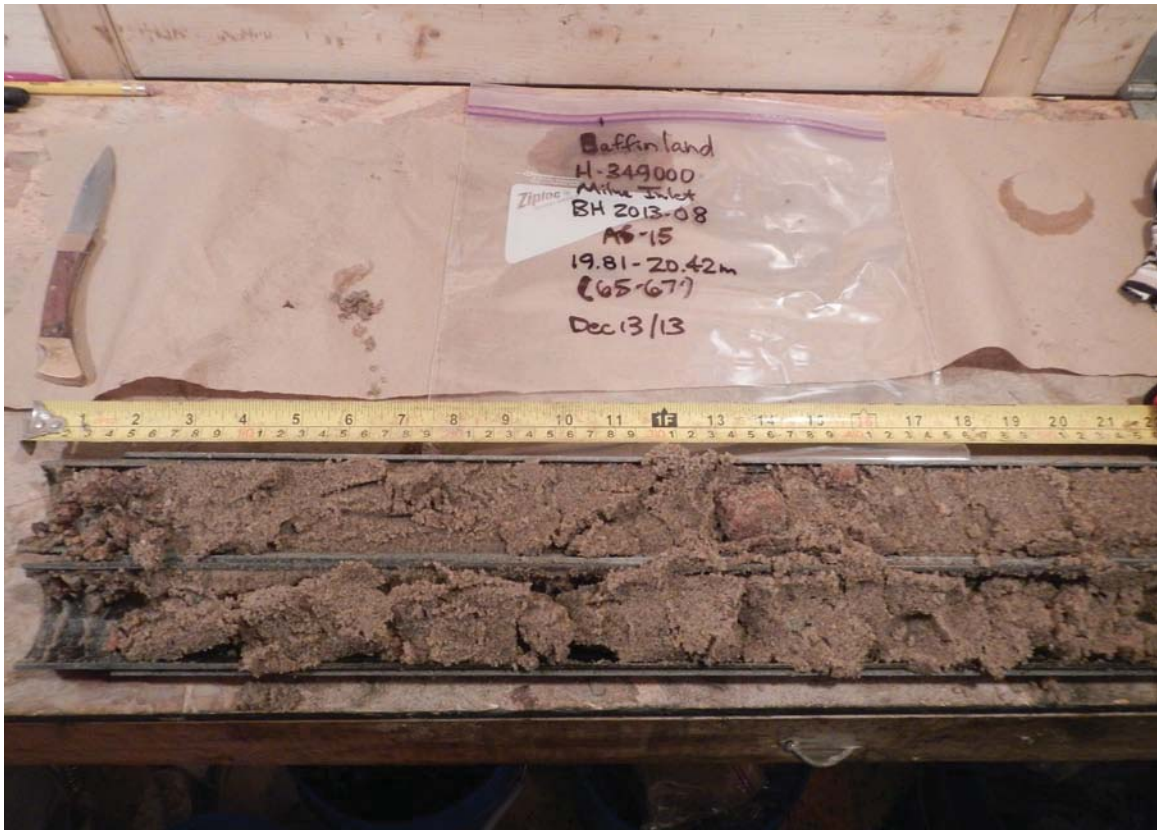
BH-2013-08 AS-9 (10.66m - 11.27m)



BH-2013-08 AS-10 (12.19m - 12.80m)



BH-2013-08 AS-13 (16.76m - 17.37m)



BH-2013-08 AS-15 (19.81m - 20.42m)



BH-2013-08 AS-16 (21.34m - 21.94m)

HATCH

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-09***

PROJECT: Mary River Project **PAGE:** 1 **OF:** 4

SITE: Milne Inlet Bay

COORDINATES: 7976644.027, 503190.859
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -24.71
END OF HOLE: -43.90

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 08/12/2013
FINISHED: 09/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H
DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		Silty SAND, trace gravel, greyish brown, very loose to loose, wet, fine grained sand, trace of shells in the upper 100 mm, trace of organics, thin silt-rich beds.	0.3 – 0.91	AS1	70	11	0 0 0 0	1	●	○		Drill set up on ice surface; casing extended to seabed; soil sampling started 9 53 38 Rods advanced under selfweight;SPT invalid. Water depth measured periodically during drilling.	
			1.83 – 2.44	AS2	10	2	5 4 5 4	2	●	○		Casing advanced under the self weight to 4.88 m below seabed	
-29.59								3					
4.88	●	4.88 m: No recovery other	4.88					4				Flowing sand in the casing, ream out with	

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-09***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		than large 40mm granitic fragments, freshly broken(likely cobble).	5.47	AS3	5	1	7 7 7 7	6				tricone;Casing flushed and advanced to 9.14 m.	
-33.85								7					
9.14								8					
-34.10		SAND, Light brown, wet, medium, trace fine and coarse angular gravel up to 38 mm.	9.14	AS4	600	98	2 1 1 1	9				2 91 7	
9.39		SILT AND SAND, trace clay, trace fine gravel, dark grey, black silt, very soft to very loose.	9.75					10				3 48 49	
			10.66	AS5	0	0	20 10 9 10	11				Drill bouncing, hard drilling.	
			11.27										

SAMPLING METHOD

A - Split Tube
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
▨ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-09***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			12.19 – 12.8	AS6	0	0	7 8 12 14	12	●				
								13					
			13.71 – 14.31	AS7	0	0	6 8 12 14	14	●			Advancing casing becoming difficult; frictional material binding to the casing likely; Drill maxing out on torque and shutting down frequently.	
								15					
			15.28 – 15.84	AS8	0	0	3 3 5 6		●				
-40.55 / 15.84		DCPT was carried out. 15.84 m: DCPT start.						16					
								17					

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
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D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
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SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-09***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18				
								19				
-43.90 19.19		19.19 m: DCPT end. **END OF BOREHOLE**										

NOTES:

1. No thermistors installed.

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
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D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
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SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH09-DCPT

Sheet 1 of 1

TEST PIT No.

BH09

SURFACE ELEVATION:

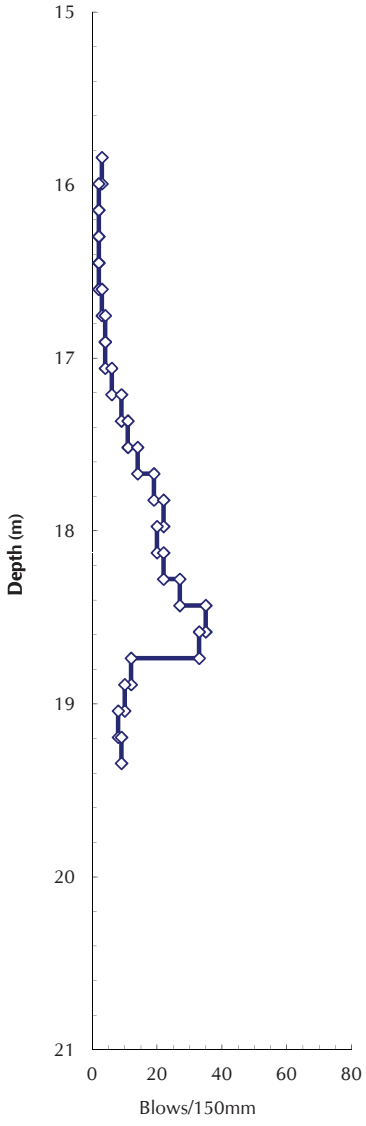
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

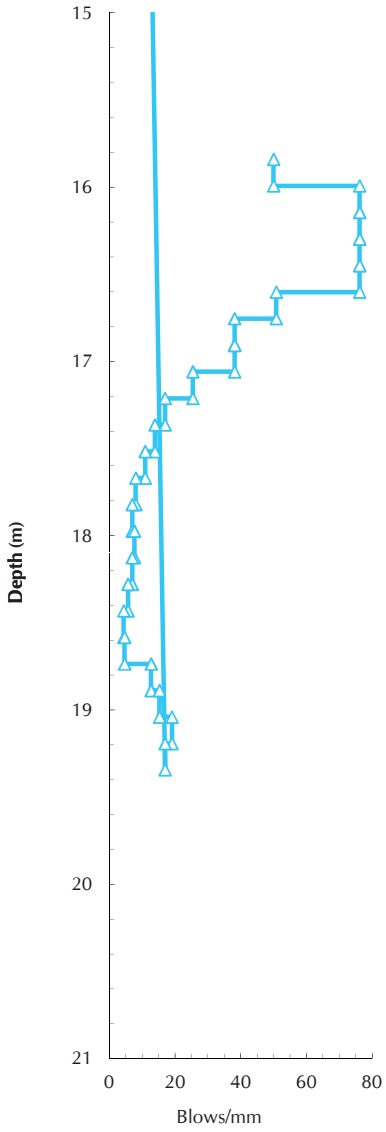
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
15.84	3	50
15.99	2	76
16.14	2	76
16.30	2	76
16.45	2	76
16.60	3	51
16.75	4	38
16.91	4	38
17.06	6	25
17.21	9	17
17.36	11	14
17.52	14	11
17.67	19	8
17.82	22	7
17.97	20	8
18.13	22	7
18.28	27	6
18.43	35	4
18.58	33	5
18.74	12	13
18.89	10	15
19.04	8	19
19.19	9	17

BLOWS PER 150mm



mm PER BLOW



Remarks:

BH09 was drilled to target depth and DCPT was performed at the bottom of the borehole.

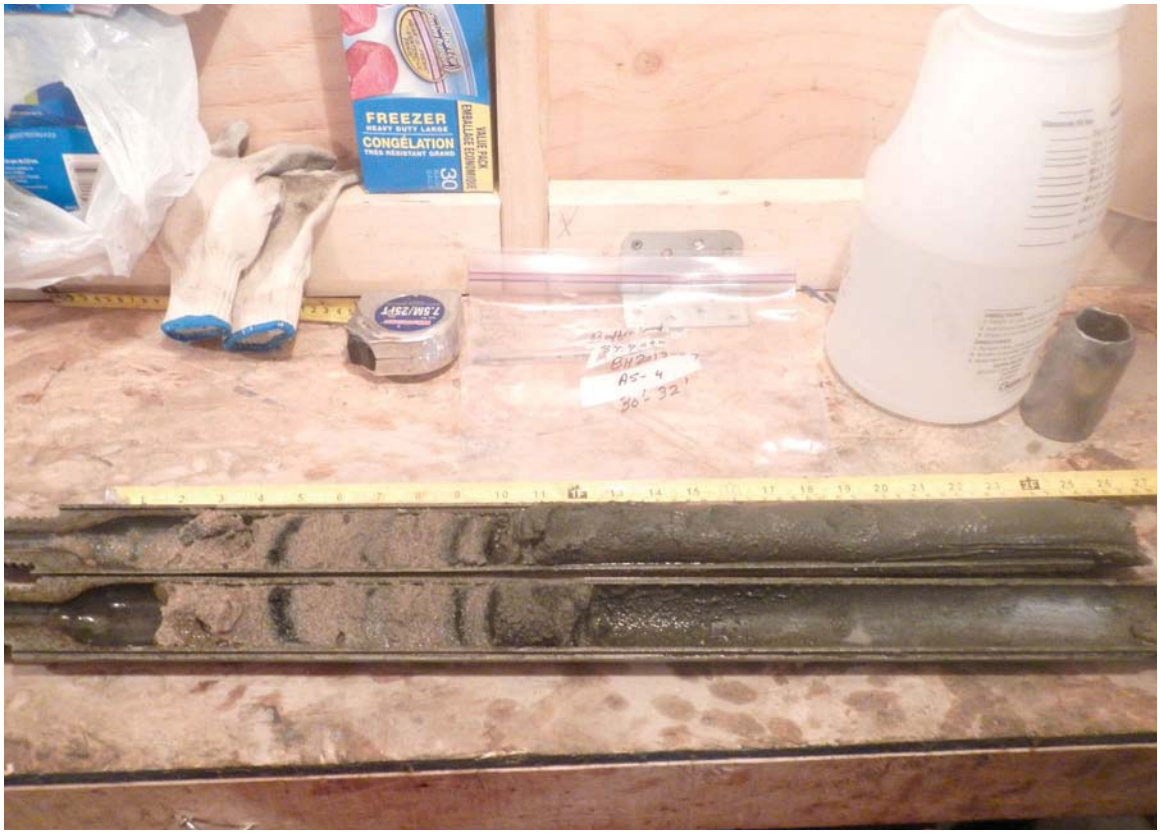
16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07



BH-2013-09 AS-1 (0.3m - 0.91m) 1 of 2



BH-2013-09 AS-1 (0.3m - 0.91m) 2 of 2



BH-2013-09 AS-4 (9.14m - 9.75m)

HATCH™

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-11***

PROJECT: Mary River Project
PAGE: 1 **OF:** 7

SITE: Milne Inlet Bay

COORDINATES: 7976618.93, 503343.566
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -0.68
END OF HOLE: -39.84

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 10/12/2013
FINISHED: 12/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4} / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		SAND, medium to fine grained.										Drill set up on ice surface; casing extended to seabed; soil sampling started	
-1.44													
0.76		SILTY SAND, dark grey, compact, fine grained sand.	0.76	AS1	460	62	10 8 10 10	1	●	○		Water depth measured periodically during drilling.	
-1.58													
0.9		SAND, brown, compact, wet, medium to coarse grained sand.	1.37										
								2					
		2.13 m: Some gravel (10-30 mm), loose to compact, fine to medium grained sand.	2.13	AS2	450	0	2 4 6 6		●	○		10 88 2	
-4.34			2.74					3					
3.66		SAND, some silt, trace of subrounded to rounded gravel, grey, loose, wet, fine grained sand, some organics, some black laminations along bedding at 10 to 20 degrees.	3.66	AS3	380	66	3 3 3 3	4	●			5 79 16	
			4.27										

SAMPLING METHOD

A - Split Tube
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E - Auger
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G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

HATCH

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
			5.18	AS4	0	75	4 4 4 2								
			5.79					6							
-7.38															
6.70		Silty SAND, thin silt laminations, greyish brown, loose, wet, fine grained sand.	6.7	AS5	400	25	3 3 4 6	7							
-7.99			7.31												
7.31		SAND, trace gravel, brown, loose, wet, medium to coarse grained sand.						8							
			8.22	AS6	460	43	3 3 3 4					6	92	3	
			8.83					9							
-10.43															
9.75		SAND AND GRAVEL, greyish brown, loose, wet, coarse garined sand.	9.75	AS7	150	74	4 3 4 4	10							
			10.36												
								11							
		11.29 m: Light brown,	11.28												

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-12.57		compact, coarse grained sand, fine grained gravel.	11.89	AS8	260	41	9 6 6 8	12					
11.89 -13.48		GRAVEL, possible cobble(s), subrounded gravel, some subangular granite fragments.											
12.80 -15.00		SAND AND GRAVEL, light brown, compact, wet, coarse grained sand, fine grained gravel.	12.8 13.41	AS9	450	16	5 6 6 5	13				50 48 2	
14.32 -15.28		Sandy SILT, grey, firm to stiff.	14.32	AS10	250	16	5 3 5 9	14				13 61 26	
14.60 -16.26		SAND, some gravel, light brown, loose, wet, coarse grained sand.	14.93					15				Washed sample.	
15.58		GRAVEL, possible cobbles, sand possibly washed out, red and white, angular to subrounded coarse gravel up to 38 mm particle size.	15.85 16.46	AS11	100	0	5 6 4 6	16					
			17.45	AS12	100	33	12 9 10	17				36 mm rock fragment in the spoon tip	

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PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
			18.06				11	18			Switch to N size casing and advance the casing to 18.89 m below sea bed	
-19.57 / 18.89		SAND, some silt, trace of coarse gravel, brownish grey, medium to coarse grained sand.	18.75 – 19.36	AS13	450	49	13 12 11 12	19			GR 3 SA 84 SI 13 CL Silty sand in the tip of spoon.	
								20			Advancing becoming difficult;drill maxing out on torque.	
								21				
								22				
		22.78 m: Trace fine gravel, trace silt, brown, wet, fine to medium grained sand.	22.78 – 23.39	AS14	200	33	24 26 28 16	23				
-24.91								24				

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
24.23		SAND AND GRAVEL, trace angular granitic gravel, possible cobble fragments, medium to light brown, wet, medium to coarse sand, rounded to angular gravel up to 38 mm.	24.23 – 24.84	AS15	300	66	3 5 6 10	25	● SPT N-VALUES; ⌇ DYNAMIC CONE PENETRATION 20 40 60 80; SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. 50 100 150 200; HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4}; WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)			
			25.45 – 26.06	AS16	200	0	16 10 8 9	26				
-27.81								27				
27.13		SAND, trace rounded to subrounded gravel, possible cobble(s), light brown, compact, wet, medium to coarse grained sand.	27.13 – 27.74	AS17	400	36	7 8 14 17				8 90 2	
								28				
								29				
			29.56 – 30.17	AS18	0		10 11 14 14	30				

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□ Constant Head Test
□ Variable Head Test
▨ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80)	SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4})	WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
			31.09 – 31.7	AS19	220		12 15 17 17	31	●		○				
-32.98 / 32.30		31.09 m: One granite fragment (angular) about 40 mm diameter, dense. DCPT was carried out. 32.3 m: DCPT start.						32							
								33							
								34							
								35							
								36							
								37							

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11***

PROJECT: Mary River Project **PAGE:** 7 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								38				
								39				
-39.84 / 39.16		39.16 m: DCPT end. **END OF BOREHOLE** NOTES: 1. Four thermistors installed at 2.5m,10m,20m and 30m below seabed.										

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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Project: **H/349000**

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11-DCPT

Sheet 1 of 2

TEST PIT No.

BH11

SURFACE ELEVATION:

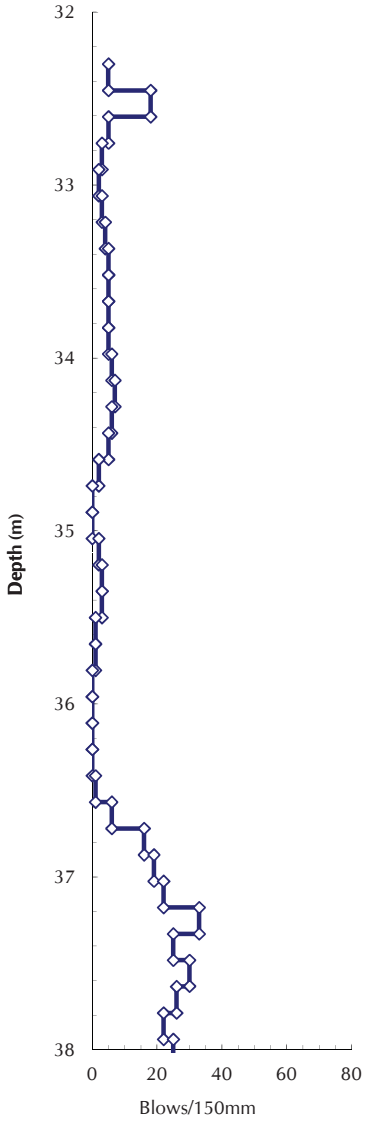
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

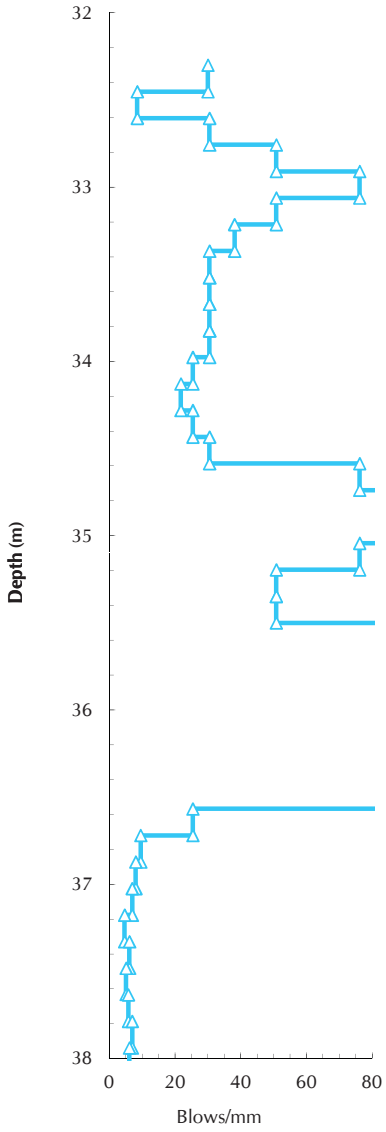
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
32.30	5	30
32.45	18	8
32.60	5	30
32.76	3	51
32.91	2	76
33.06	3	51
33.21	4	38
33.37	5	30
33.52	5	30
33.67	5	30
33.82	5	30
33.98	6	25
34.13	7	22
34.28	6	25
34.43	5	30
34.59	2	76
34.74	0	
34.89	0	
35.04	2	76
35.20	3	51
35.35	3	51
35.50	1	152
35.65	1	152
35.81	0	
35.96	0	
36.11	0	
36.26	0	
36.41	1	152
36.57	6	25
36.72	16	10
36.87	19	8
37.02	22	7
37.18	33	5
37.33	25	6
37.48	30	5

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11-DCPT

Sheet 2 of 2

TEST PIT No.

BH11

SURFACE ELEVATION:

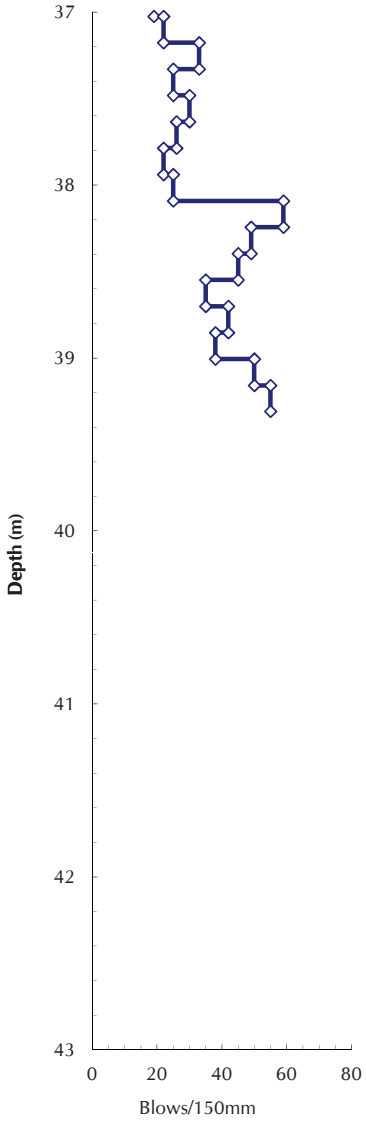
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

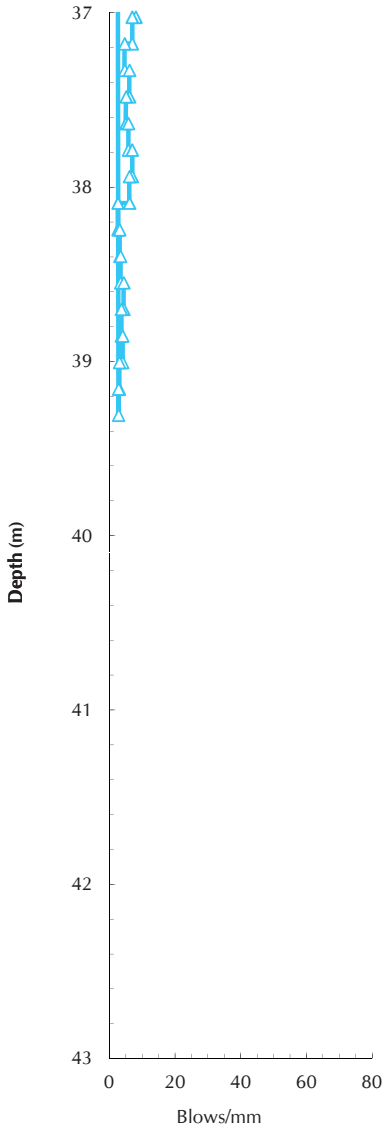
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
37.63	26	6
37.79	22	7
37.94	25	6
38.09	59	3
38.24	49	3
38.40	45	3
38.55	35	4
38.70	42	4
38.85	38	4
39.01	50	3
39.16	55	3

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07



BH-2013-11 AS-1 (0.76m - 0.91m)



BH-2013-11 AS-8 (11.28m - 11.89m)

HATCH™

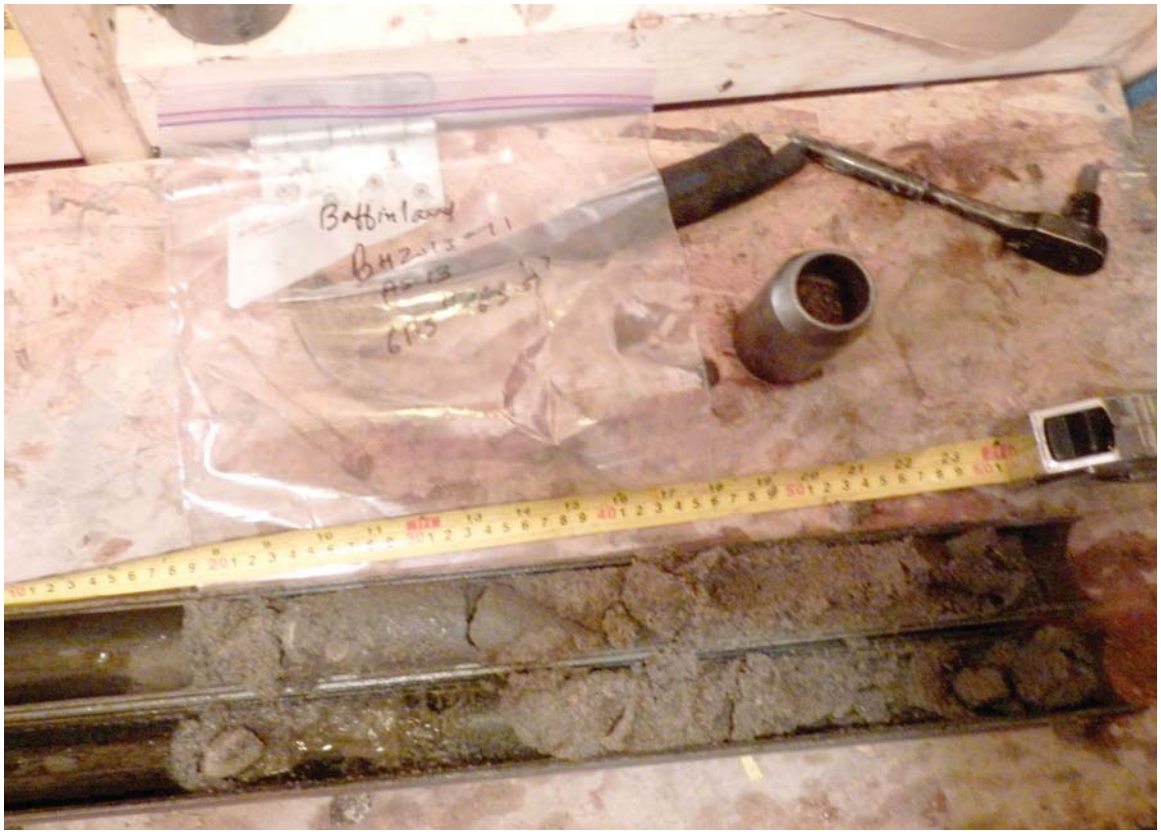


BH-2013-11 AS-9 (?m - ?m)



BH-2013-11 AS-10 (14.32m - 14.93m)

HATCH™



BH-2013-11 AS-13 (18.75m - 19.96m)



BH-2013-11 AS-15 (24.23m - 24.54m)



BH-2013-11 AS-15 (25.43m - 26.04m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH13-11B***

PROJECT: Mary River Project
PAGE: 1 **OF:** 6

SITE: Milne Inlet Bay

COORDINATES: 7976615.955
503340.336
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: 0.47
END OF HOLE: -30.29

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 12/12/2013
FINISHED: 12/12/2013
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.47 0.0		DCPT was carried out. 0 m: DCPT start.						1 2 3 4				Drill set up on ice surface; casing extended to seabed; soil sampling started Water depth measured periodically during drilling.	

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

HATCH

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11B***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4} / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								6					
								7					
								8					
								9					
								10					
								11					

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PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
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☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11B***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								12					
								13					
								14					
								15					
								16					
								17					

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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11B***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18				
								19				
								20				
								21				
								22				
								23				
								24				

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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11B***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL	PIEZOMETER INSTALLATION
								25					
								26					
								27					
								28					
								29					
								30					

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH13-11B***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL	PIEZOMETER INSTALLATION
~~30.29~~ 30.76		30.76 m: DCPT end.							**END OF BOREHOLE**				
		NOTES:											
		1. No thermistors installed.											

SAMPLING METHOD

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K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 1 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

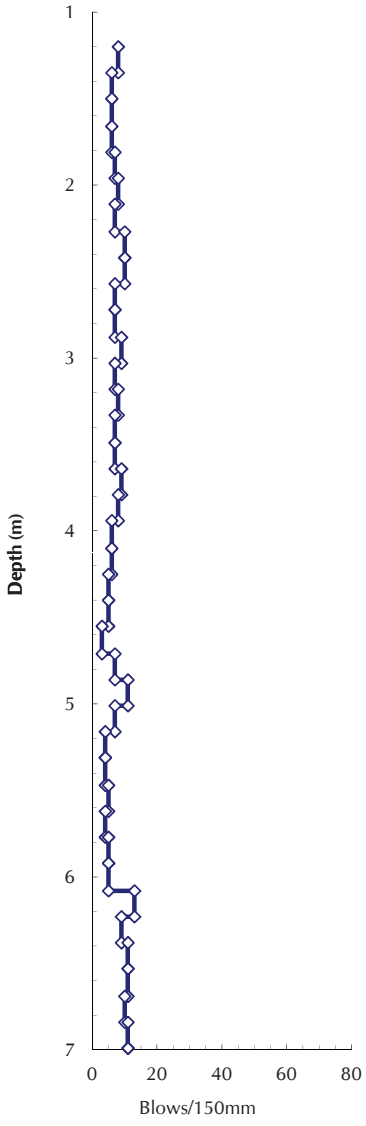
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

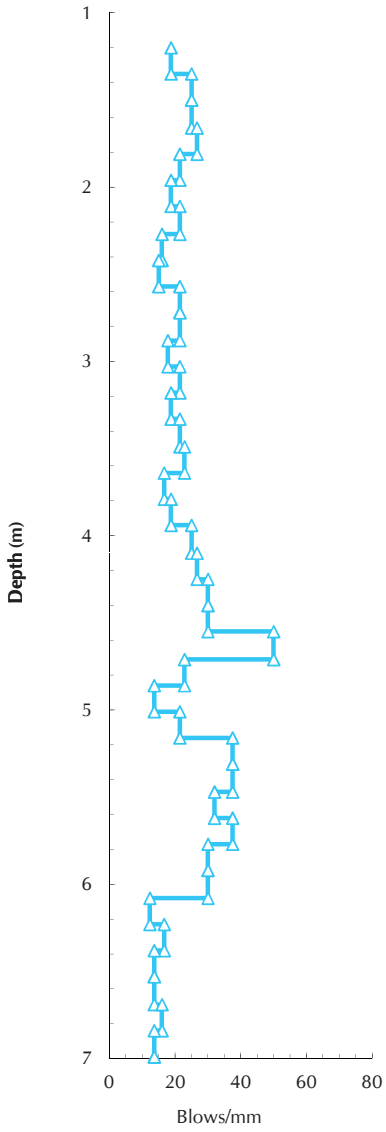
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
1.20	8	19
1.35	6	25
1.50	6	25
1.66	6	27
1.81	7	21
1.96	8	19
2.11	7	21
2.27	10	16
2.42	10	15
2.57	7	21
2.72	7	21
2.88	9	18
3.03	7	21
3.18	8	19
3.33	7	21
3.49	7	23
3.64	9	17
3.79	8	19
3.94	6	25
4.10	6	27
4.25	5	30
4.40	5	30
4.55	3	50
4.71	7	23
4.86	11	14
5.01	7	21
5.16	4	38
5.31	4	37
5.47	5	32
5.62	4	38
5.77	5	30
5.92	5	30
6.08	13	12
6.23	9	17
6.38	11	14

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 2 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

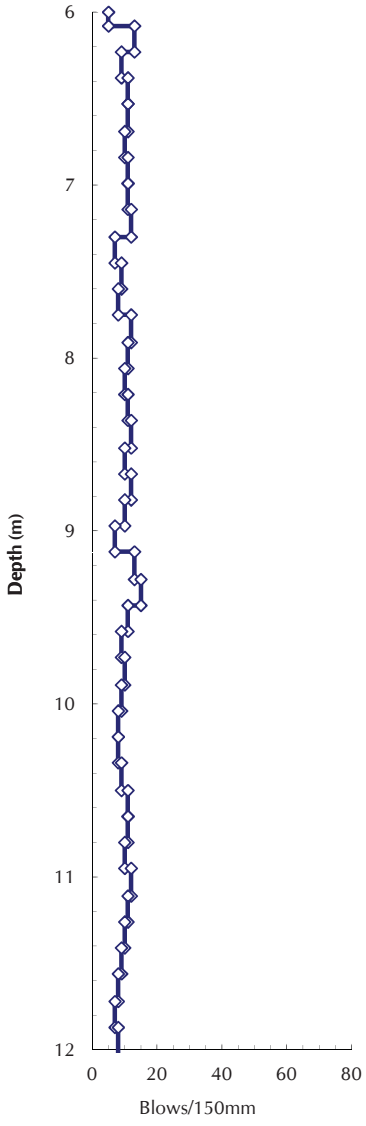
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

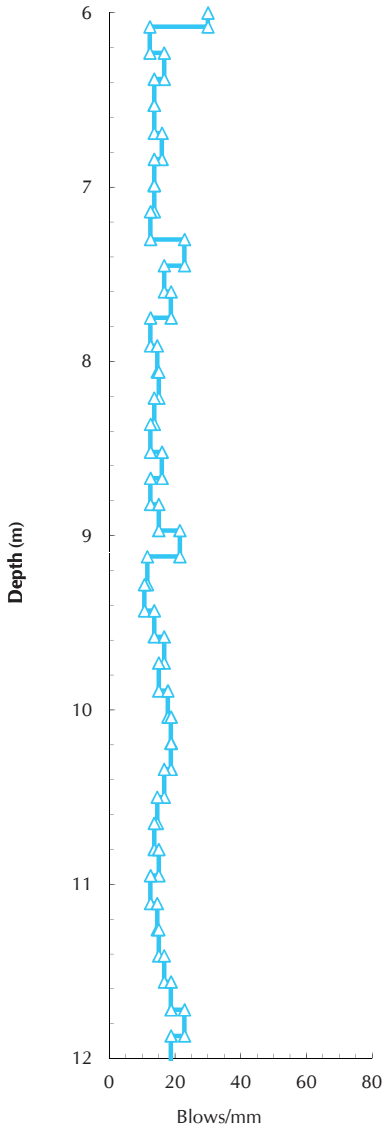
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
6.53	11	14
6.69	10	16
6.84	11	14
6.99	11	14
7.14	12	13
7.30	7	23
7.45	9	17
7.60	8	19
7.75	12	13
7.91	11	15
8.06	10	15
8.21	11	14
8.36	12	12
8.52	10	16
8.67	12	13
8.82	10	15
8.97	7	21
9.12	13	12
9.28	15	11
9.43	11	14
9.58	9	17
9.73	10	15
9.89	9	18
10.04	8	19
10.19	8	19
10.34	9	17
10.50	11	15
10.65	11	14
10.80	10	15
10.95	12	12
11.11	11	15
11.26	10	15
11.41	9	17
11.56	8	19
11.72	7	23

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 3 of 6

TEST PIT No. **BH11B**

SURFACE ELEVATION:

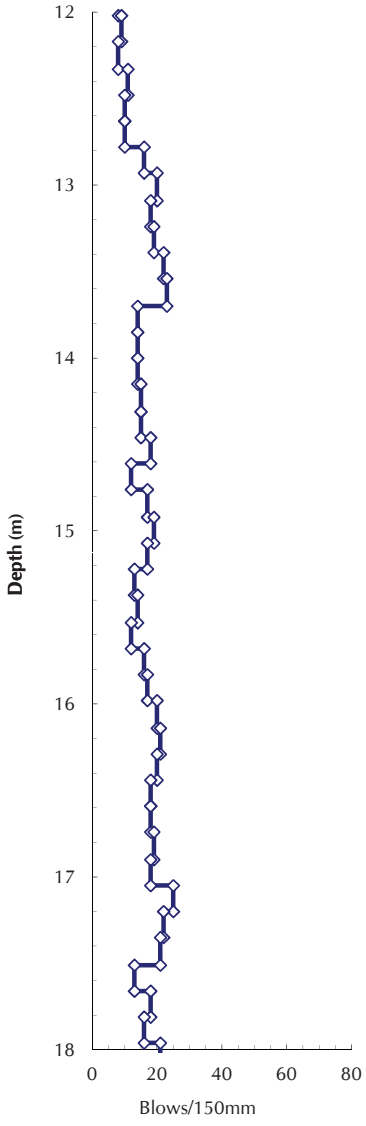
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

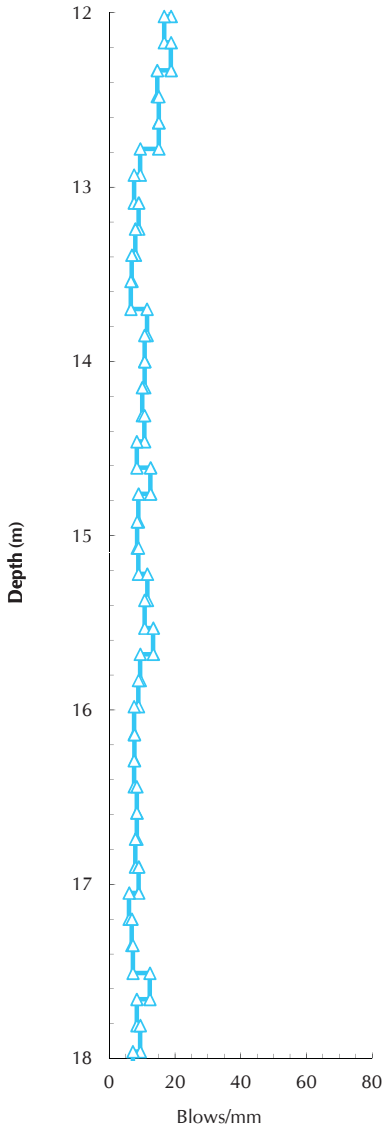
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
11.87	8	19
12.02	9	17
12.17	8	19
12.33	11	15
12.48	10	15
12.63	10	15
12.78	16	9
12.93	20	8
13.09	18	9
13.24	19	8
13.39	22	7
13.54	23	7
13.70	14	11
13.85	14	11
14.00	14	11
14.15	15	10
14.31	15	11
14.46	18	8
14.61	12	12
14.76	17	9
14.92	19	8
15.07	17	9
15.22	13	12
15.37	14	11
15.53	12	13
15.68	16	9
15.83	17	9
15.98	20	8
16.14	21	8
16.29	20	7
16.44	18	8
16.59	18	8
16.74	19	8
16.90	18	9
17.05	25	6

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 4 of 6

TEST PIT No. **BH11B**

SURFACE ELEVATION:

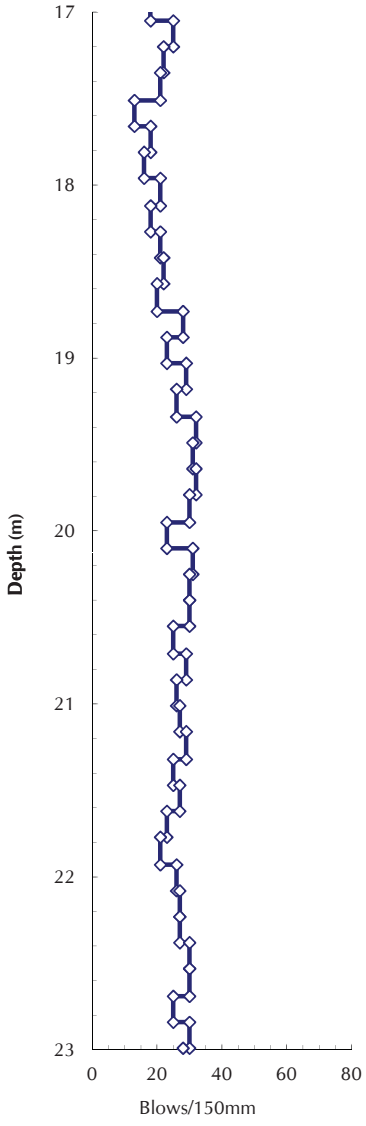
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

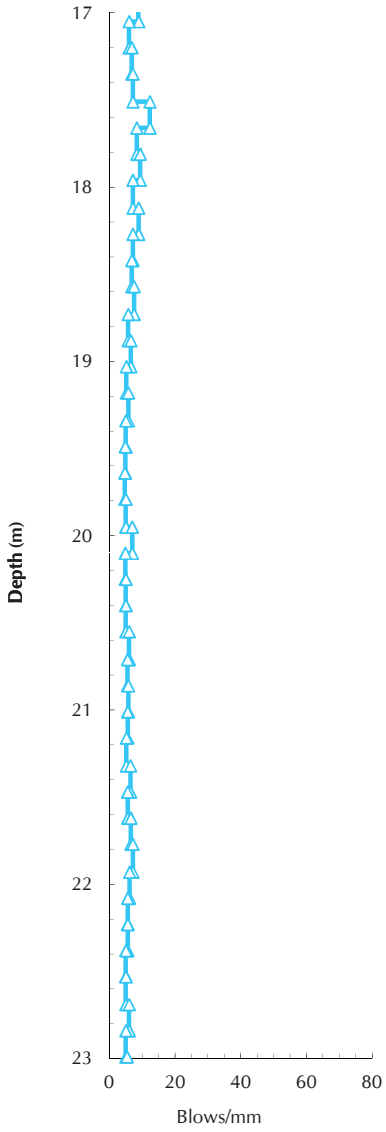
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
17.20	22	7
17.35	21	7
17.51	13	12
17.66	18	8
17.81	16	9
17.96	21	7
18.12	18	9
18.27	21	7
18.42	22	7
18.57	20	7
18.73	28	6
18.88	23	7
19.03	29	5
19.18	26	6
19.34	32	5
19.49	31	5
19.64	32	5
19.79	30	5
19.95	23	7
20.10	31	5
20.25	30	5
20.40	30	5
20.55	25	6
20.71	29	6
20.86	26	6
21.01	27	6
21.16	29	5
21.32	25	6
21.47	27	6
21.62	23	7
21.77	21	7
21.93	26	6
22.08	27	6
22.23	27	6
22.38	30	5

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 5 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

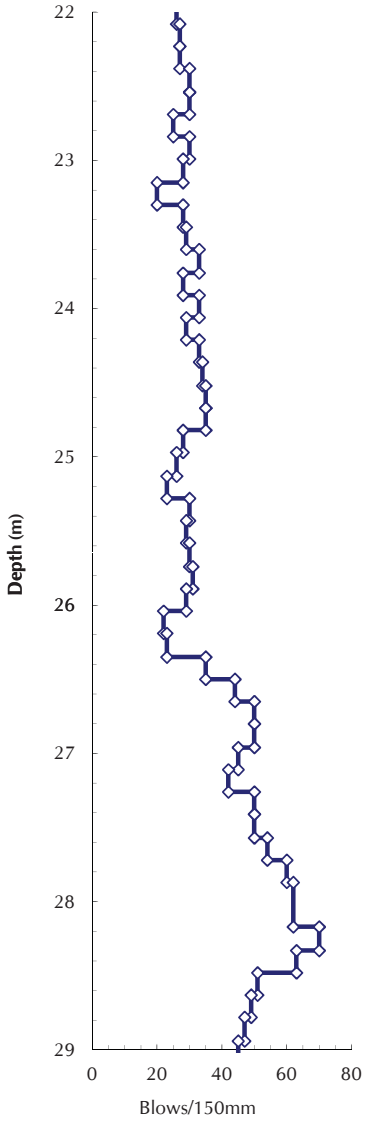
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

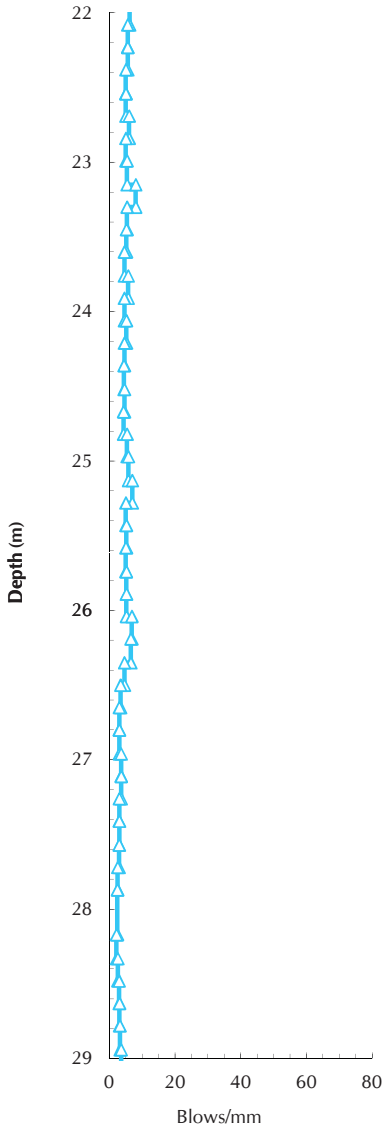
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
22.54	30	5
22.69	25	6
22.84	30	5
22.99	28	5
23.15	20	8
23.30	28	5
23.45	29	5
23.60	33	5
23.76	28	6
23.91	33	5
24.06	29	5
24.21	33	5
24.36	34	4
24.52	35	5
24.67	35	4
24.82	28	5
24.97	26	6
25.13	23	7
25.28	30	5
25.43	29	5
25.58	30	5
25.74	31	5
25.89	29	5
26.04	22	7
26.19	23	7
26.35	35	5
26.50	44	3
26.65	50	3
26.80	50	3
26.96	45	4
27.11	42	4
27.26	50	3
27.41	50	3
27.57	54	3
27.72	60	2

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 6 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

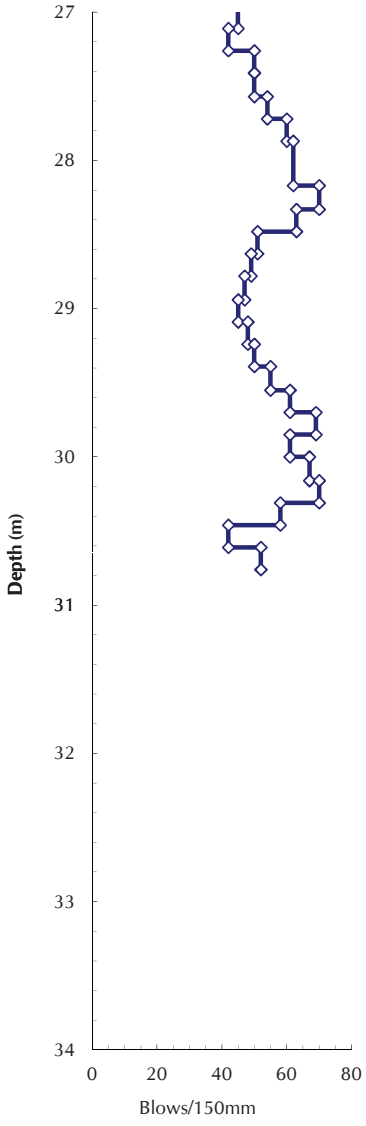
DATE: **August 25, 2008**

Client: Baffinland
Project: Milne Inlet Ore Dock
Project No: H/349000

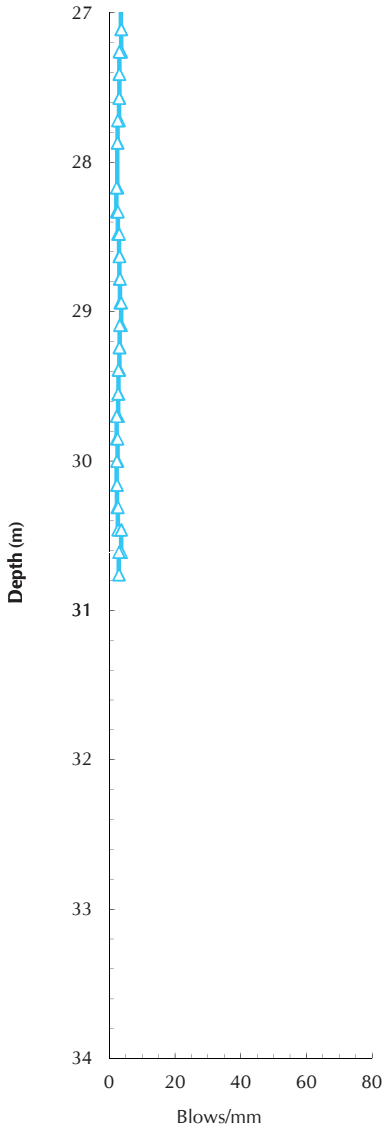
GENERAL DETAILS

Depth From (m)	Blows/ 150mm	mm/ Blow
27.87	60	3
28.02	62	2
28.17	70	2
28.33	63	3
28.48	51	3
28.63	49	3
28.78	47	3
28.94	45	4
29.09	48	3
29.24	50	3
29.39	55	3
29.55	61	3
29.70	69	2
29.85	61	2
30.00	67	2
30.16	70	2
30.31	58	3
30.46	42	4
30.61	52	3

BLOWS PER 150mm



mm PER BLOW



Remarks:

16/01/2014 \\misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnical\[DCPT Logs.xlsx]BH07

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH14-05C***
PROJECT: Mary River Project
PAGE: 1 **OF:** 7

SITE: Milne Inlet Bay

COORDINATES: 7976628.703
503247.852
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -15.49
END OF HOLE: -52.98

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 18/01/2014
FINISHED: 19/01/2014
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-15.49 0.0		Borehole advanced to depth of 14.02 m without sampling. See BH2013-05 for lithology above this depth.						1 2 3 4				Drill set up on ice surface; casing extended to seabed; soil sampling started Water depth measured periodically during drilling.	

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT | NATURAL MOISTURE CONTENT | LIQUID LIMIT
W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								6					
								7					
								8					
								9					
								10					
								11					

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-29.51								12					
14.02													
-29.74		Silty SAND, trace gravel, brown to greyish, compact.	14.02	AS1	380	62	12 11 14 11	13					
14.25		14.10 - 14.25 m: Black mottling.	14.63										
-31.03								14				Trace of free water in AS01.	
15.54		SAND, trace gravel, light brown, compact, wet, medium grained sand, gravel size up to 30 mm.	15.54	AS2	450	74	8 18 17 28	15					
			16.15					16					
		17.07-18.59 m: Gravel size up to 10 mm.	17.07	AS3	420	69	5 5 7 7	17					
			17.68										

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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Y - Core Box
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
		18.59-20.12 m: Fine, limestonic/granitic gravel.	18.59 – 19.2	AS4	600	98	6 9 12 11
		20.12-21.64 m: Trace fine gravel.	20.12 – 20.73	AS5	600	98	16 10 10 10
-37.29 / 21.80		21.64-21.80 m: Fine to medium grained sand.	21.64 – 22.25	AS6	600	98	16 17 17 24
-38.65 / 23.16		21.80-21.90 m: Brown, silty fine grained sand with black,horizontally bedded laminations.					
		SAND, trace gravel, light brown, dense, wet, medium to coarse grained sand, gravel is mostly limestone/granite with size upto 10mm.	23.16 – 23.77	AS7	600	98	11 13 20 16

DEPTH (m): 18, 19, 20, 21, 22, 23, 24

● SPT N-VALUES
≀ DYNAMIC CONE PENETRATION
20 40 60 80

SHEAR STRENGTH (kPa)
□ UNCONFINED ■ QUICK TRIAXIAL
✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.
50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s)
10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS
15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION; SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN.	HYDRAULIC CONDUCTIVITY (m/s); WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-40.34		24.67-26.23 m: Brown, very dense, fine to medium grained sand.	24.67	AS8	600	98	25 25 44 21	25					
24.85		sandy SILT,grey to greyish brown, mottled black.	25.28										
		SAND, light brown, dense, wet, medium to coarse grained.						26					
-41.72													
26.23			26.25										
-41.94													
26.45		SAND, some silt, brown, some black mottling and black horizontol laminations, compact, wet, fine grained sand.		AS9	600	98	17 20 20 25	27				Sand heaved into casing;wash hole	
-43.23			26.86										
27.74		SAND, brown, dense to very dense, wet, medium to coarse grained sand.	27.74	AS10	600	98	26 28 28 41	28				No free water in AS10.	
-43.74			28.35										
28.25		SILT and SAND, dark greyish brown, very dense.						29					
-44.75													
29.26		SAND, trace gravel, trace silt, medium brown, dense, fine to medium grained sand.	29.26	AS11	610	100	11 18 21 25						
			29.87					30				Partial recovery:	

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		30.78-32.56m:Some silt mixed with organics, trace gravel,medium brown, very dense, fine sand,grey silt	30.78	AS12	250	41	17 36 37 35	31			angular gravel in the tip of spoon.	
			31.39									
								32				
			32.3	AS13	610	100	12 13 21 23					
-48.32		32.56-32.83 m: Greyish brown, dense, fine sand.	32.91									
32.83		Silty SAND, greyish brown, very dense, fine sand.						33				
-49.42											Silty sand at the tip of spoon.	
33.93		SAND, light brown, very dense, fine to medium grained.	33.83	AS14	500	82	16 23 28 28	34				
			34.44									
								35				
								36				
-52.48			36.88					37				
36.99		Silty SAND, dark brown,					18					

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
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Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-05C***

PROJECT: Mary River Project **PAGE:** 7 **OF:** 7

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
-52.98		very dense.	37.49	AS15	610	100	24 28 27		●	○		0	83	14	3	
37.49		NOTES: 1. Four thermistors installed at depths 37.5 m, 27.5 m, 17.5 m and 7.5 m below seabed.							**END OF BOREHOLE**							

SAMPLING METHOD

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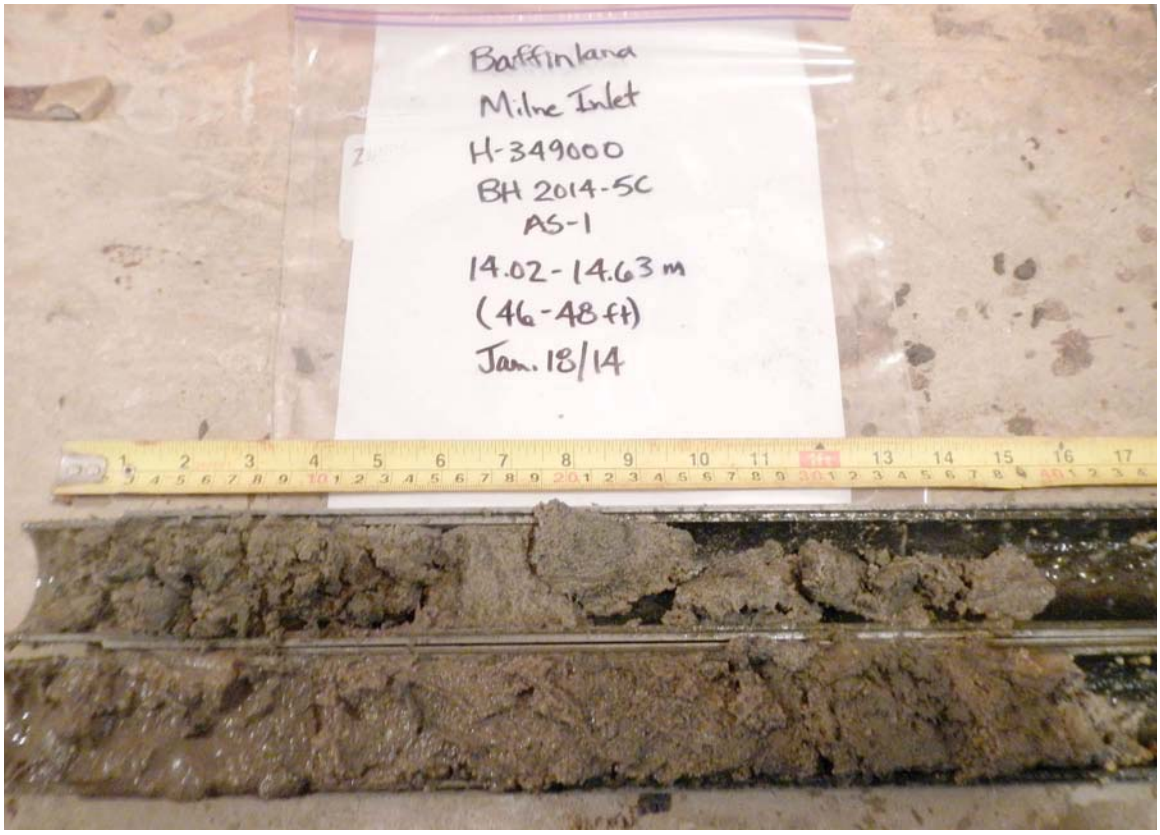
SHIPPING CONTAINER

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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Project: **H/349000**



BH-2014-05C AS-1 (14.02m - 14.63m)



BH-2014-05C AS-2 (15.54m - 16.05m)



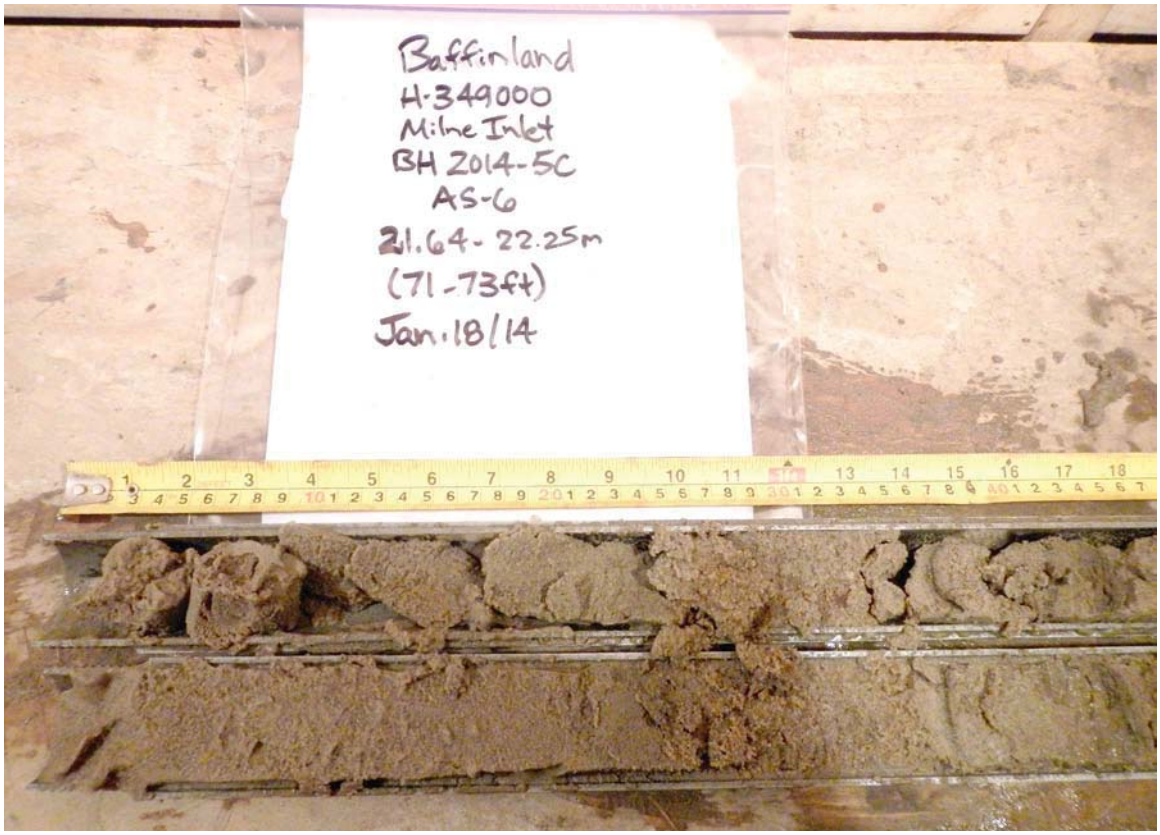
BH-2014-05C AS-3 (17.07m - 17.68m)



BH-2014-05C AS-4 (18.59m - 19.20m)



BH-2014-05C AS-5 (20.12m - 20.73m)



BH-2014-05C AS-6 (21.64m - 22.25m) 1 of 2

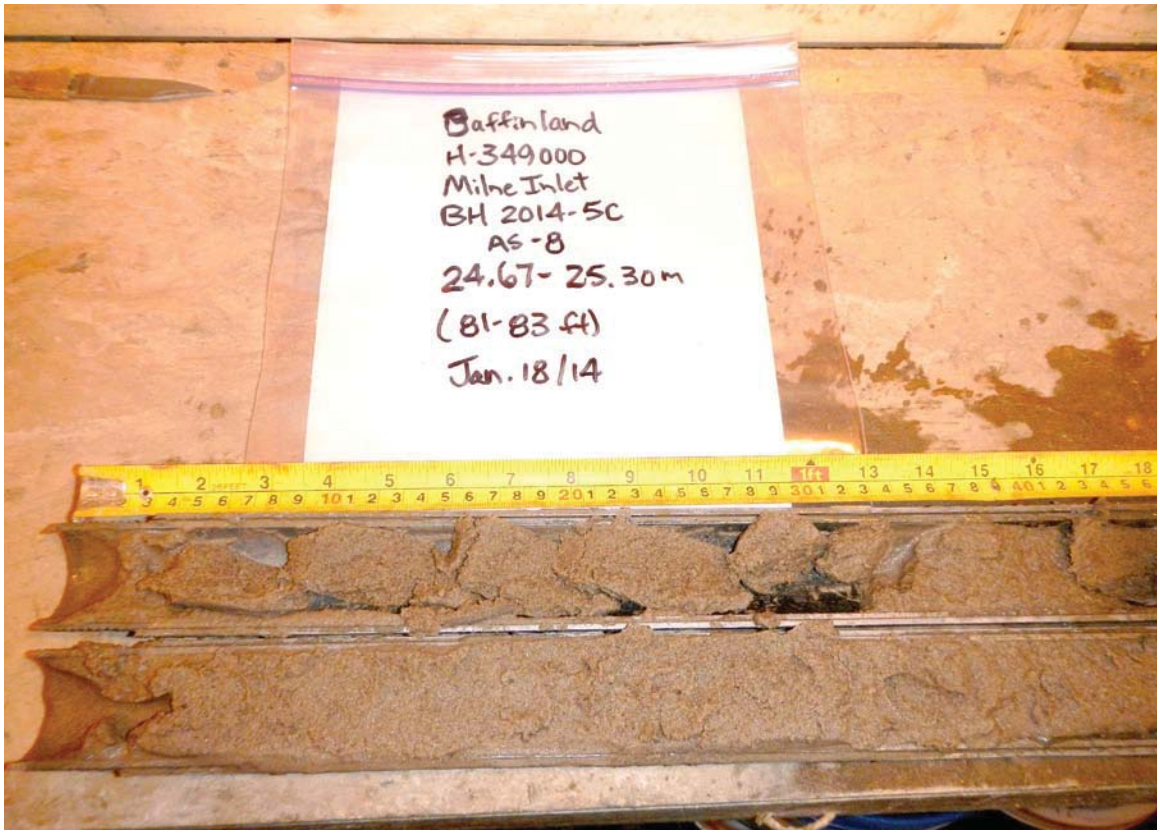
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BH-2014-05C AS-6 (21.64m - 22.25m) 2 of 2



BH-2014-05C AS-7 (23.16m - 23.77m)



BH-2014-05C AS-8 (24.67m - 25.30m) 1 of 2



BH-2014-05C AS-8 (24.67m - 25.30m) 2 of 2

HATCH™



BH-2014-05C AS-9 (26.23m - 26.82m)



BH-2014-05C AS-10 (27.74m - 28.35m)

HATCH™



BH-2014-05C AS-12 (30.78m - 31.39m)



BH-2014-05C AS-14 (33.83m - 34.44m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH14-06***

PROJECT: Mary River Project
PAGE: 1 **OF:** 8

SITE: Milne Inlet Bay

COORDINATES: 7976644.444
503279.184
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -14.33
END OF HOLE: -63.70

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 14/01/2014
FINISHED: 16/01/2014
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) (□ UNCONFINED, ■ QUICK TRIAXIAL, ✖ FIELD VANE, ✚ LAB VANE, ✪ POCKET PEN.)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0		Silty SAND, trace of fine gravel, trace of sea shells/organics, greyish brown silty interbeds.	0.15	AS1	300	49	1 2 2 2					Drill set up on ice surface; casing extended to seabed; soil sampling started 9 67 24	
-14.68 / 0.35		SAND, trace of fine to coarse grained gravel, grey, fine to medium grained sand.	0.76					1				Water depth measured periodically during drilling.	
-15.85 / 1.52		Sandy SILT, trace to some gravel, dark greyish brown with some black laminated beds, loose, wet.	1.52	AS2	360	59	1 1 4 2	2					
			2.13					3					
-17.73 / 3.40		CLAY, some silt, greyish brown, soft, high plasticity.	3.05	AS3	500	83	1 1 4 4					5 23 62 10	
			3.65					4					
-18.90 / 4.57		SAND, some gravel, light brown, compact, wet, medium to coarse grained sand, subrounded gravel	4.57	AS4	350	57	3 4 7					No soil in the casing at the end of advance.	

SAMPLING METHOD

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P — W_N — W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		upto 40 mm.	5.18				7						
-20.43								6					
6.10		SAND and GRAVEL, light brown, loose, wet, medium to coarse grained sand, some angular gravel, coarse grained (possible cobble).	6.1 / 6.71	AS5	170	28	3 3 3 4					0.15 m of soil in the casing at the end of advance; wash hole.	
-21.95								7					
7.62		SAND, some fine gravel, light brown, loose to compact, fine to medium grained sand, subrounded gravel upto 10 mm, possible granitic-subrounded broken cobbles.	7.62 / 8.23	AS6	180	30	5 5 4 6	8					
								9					
		9.14 m: Some coarse grained sand, trace angular gravel up to 60 mm (possible cobble).	9.14 / 9.75	AS7	340	56	6 9 10 10						
								10				Approximately 0.15 m of soil in casing.	
		10.67-11.28 m: Trace fine to coarse gravel.	10.67 / 11.28	AS8	350	57	10 10 10 12	11					

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
								12				
		12.19 m: Trace silt, subrounded to rounded gravel up to 30 mm.	12.19 – 12.8	AS9	460	75	8 10 10 10				Approximately 0.15 m of soil in casing.	
-28.05								13				
13.72		SILT and SAND, some clay, greyish brown silt and sand with black, horizontally bedded clayey lamiantions, slight black mottling, compact, wet.	13.72 – 14.33	AS10	500	82	2 4 8 8	14			Approximately 0.15 m of soil in casing. GR 4 SA 47 SI 39 CL 10	
-28.43												
14.10		SAND, some silt, brown, compact, wet, uniform, fine to medium grained sand.						15				
		15.24 m: Some sea shells, medium to coarse grained sand.	15.24 – 15.85	AS11	520	85	7 7 7 8					
								16				
		16.76 m: Fine to medium grained sand.	16.76 – 17.37	AS12	610	100	10 10 11 14	17			Approximately 0.15 m of soil in casing.	

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18					
		18.29 m: Light brown, compact, fine to medium grained sand, some fine gravel.	18.29 – 18.9	AS13	550	90	10 12 12 12	19					
		19.81m: Dense fine to medium grained sand.	19.81 – 20.42	AS14	600	98	12 18 16 17	20					
		21.33 m: Trace of silt.	21.33 – 21.94	AS15	600	98	15 17 17 18	21					
		22.86 m: Uniform, fine to medium grained sand.	22.86 – 23.47	AS16	520	85	13 15 17 17	22					
								23					
								24					

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
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☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
-39.23		24.38 m: Compact, fine to medium grained sand.	24.38	AS17	420	69	8 12 12 23
24.90 -40.23		Sandy SILT, contains organics, dark greyish brown with black mottling.	24.99				
25.90 -40.33 26		SAND, trace fine gravel, brown, dense, wet, fine to medium grained sand. Sandy SILT, greyish brown with black lamination and mottling.	25.9 26.51	AS18	600	98	15 15 15 15
-41.76 27.43		SAND, trace silt, brown, dense, wet, medium to coarse grained sand.	27.43	AS19	600	98	20 21 23 25
-43.29 28.96		Sandy SILT, dark greyish brown. SAND, brown, dense, fine to medium grained sand.	28.04 28.96	AS20	610	102	13 20 22 28
			29.56				

DEPTH (m): 25, 26, 27, 28, 29, 30

SPT N-VALUES / DYNAMIC CONE PENETRATION: 20 40 60 80

SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. — 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS: 15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								31				
-47.25		Some silt, light brown, compact, wet, fine to medium grained sand.	31.09 – 31.7	AS21	600	98	10 8 8 10	32				
32.92 -47.73		Clayey SILT, possible organics, greyish brown with reddish brown to black mottling laminations, stiff.	32.92 – 33.53	AS22	610	100	5 8 10 22	33			0 16 54 30	
33.40 -49.38		SAND, light brown, fine grained.						34				
35.05		silty CLAY, greyish brown.	35.05 – 35.66	BO23				35			Shelby tube pushed into silty clay.	
								36				
								37				

SPT N-VALUES; DYNAMIC CONE PENETRATION 20 40 60 80; SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. 50 100 150 200; HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4}; WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)

SAMPLING METHOD

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PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

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Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 7 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
-51.51 37.18		Silty SAND, some silt, trace clay, brown with black silt/clay laminates, compact to dense, wet, fine grained sand.	37.18 37.79	AS24	600	98	15 15 15 15
-53.65 39.32		SAND, some silt, brown with some black laminates of silt up to 10 mm thick, very dense, wet, fine to medium grained sand.	39.32 39.93	AS25	520	85	26 30 36 25
		41.45 m: Trace silt, some gravel, brown, fine to medium grained sand, subrounded gravel up to 50 mm.	41.45 42.06	AS26	240	39	11 15 20 21
		43.28 m: Trace silt, medium brown, fine to	43.28				10

DEPTH (m): 38, 39, 40, 41, 42, 43

● SPT N-VALUES
≀ DYNAMIC CONE PENETRATION
20 40 60 80

SHEAR STRENGTH (kPa)
□ UNCONFINED ■ QUICK TRIAXIAL
✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.
50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s)
10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS
15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

PIEZOMETER INSTALLATION

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
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Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-06***

PROJECT: Mary River Project **PAGE:** 8 **OF:** 8

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		medium grained sand.	43.89	AS27	610	100	23 28 25						
			44.8	AS28	610	100	35 41 47 45	44					
			45.41					45					
			46.02	AS29	610	100	11 28 37 53	46					
			46.63					47					
			47.24	AS30	610	100	5 11 19 16						
			47.85					48					
-63.70		49.37 m: Trace silt, medium brown, very dense, fine to medium sand.	48.76	AS31	610	100	3 24 43 55	49					
49.37		NOTES: 1. No thermistors installed.	49.37						**END OF BOREHOLE**				

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
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Project: **H/349000**



BH-2014-06 AS-2 (1.52m - 2.13m)



BH-2014-06 AS-3 (3.05m - 3.65m)



BH-2014-06 AS-4 (4.57m - 5.18m)



BH-2014-06 AS-5 (6.10m - 6.71m)

HATCH™



BH-2014-06 AS-6 (7.62m - 8.23m)



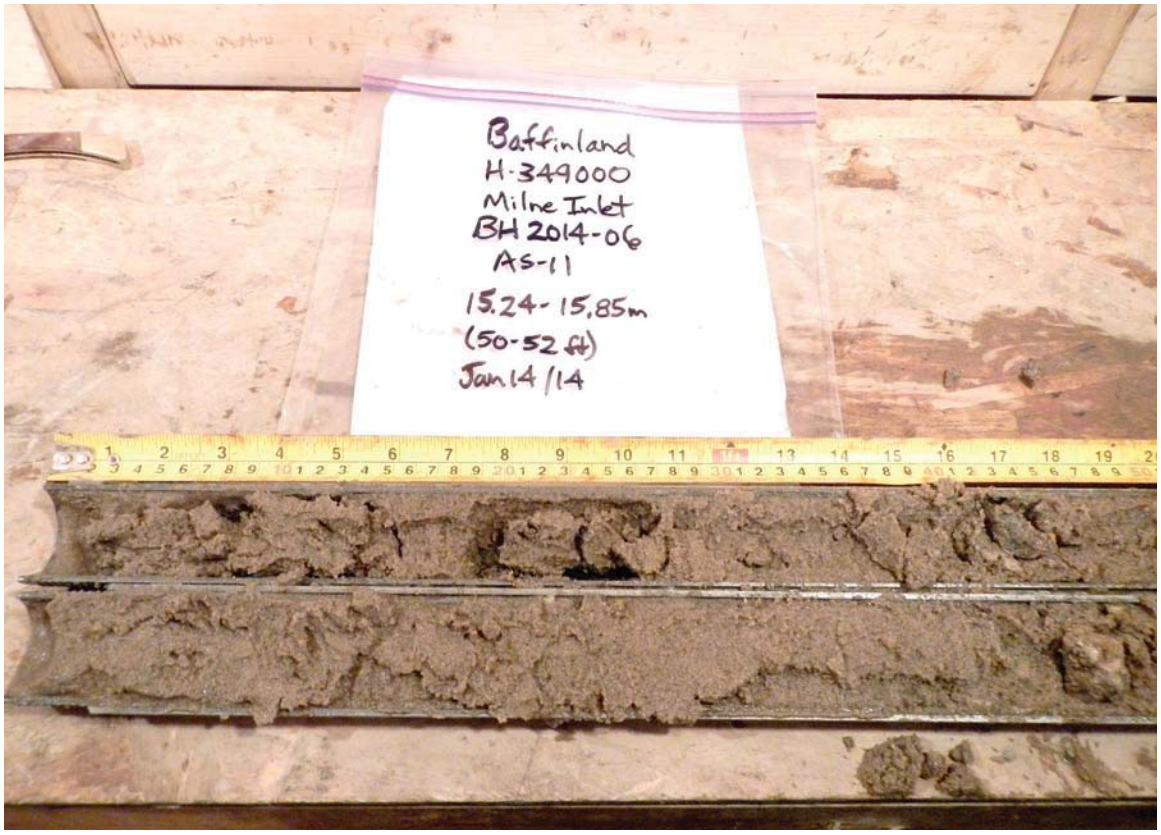
BH-2014-06 AS-7 (9.14m - 9.75m)



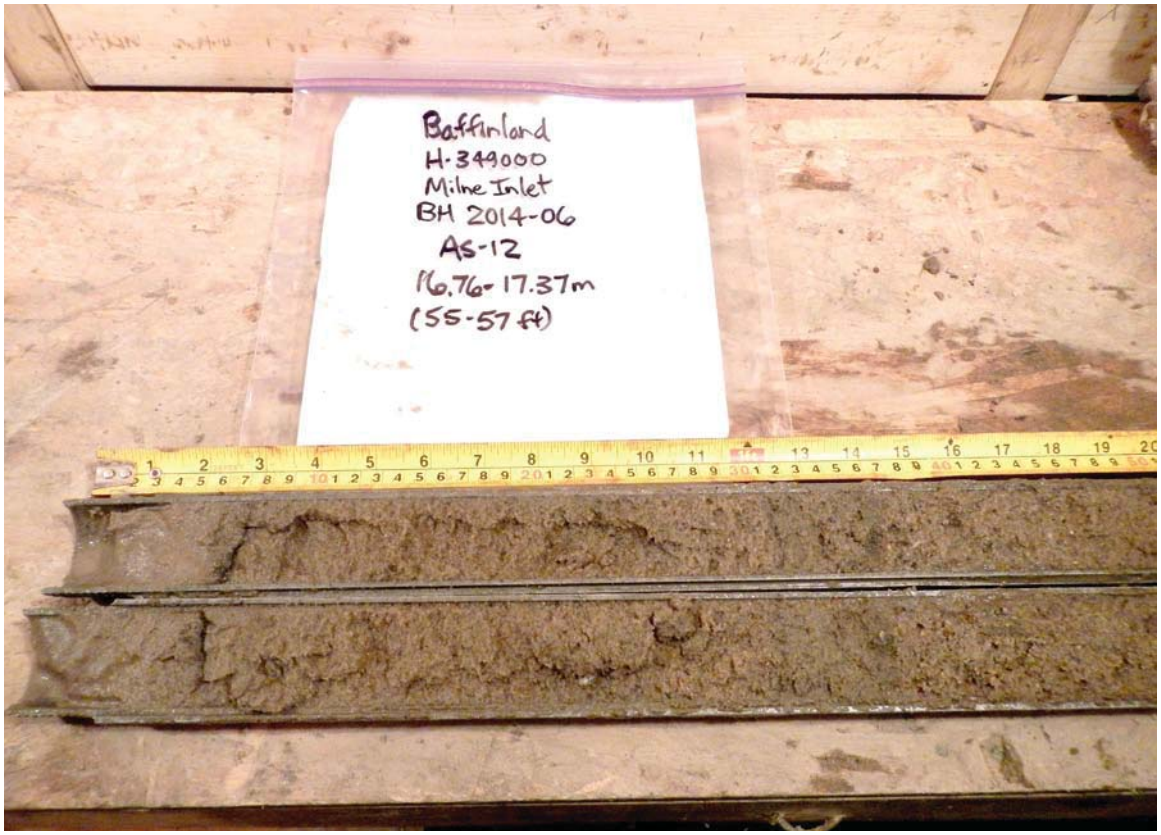
BH-2014-06 AS-8 (10.67m - 11.28m)



BH-2014-06 AS-9 (12.19m - 12.80m)



BH-2014-06 AS-11 (15.24m - 15.85m)

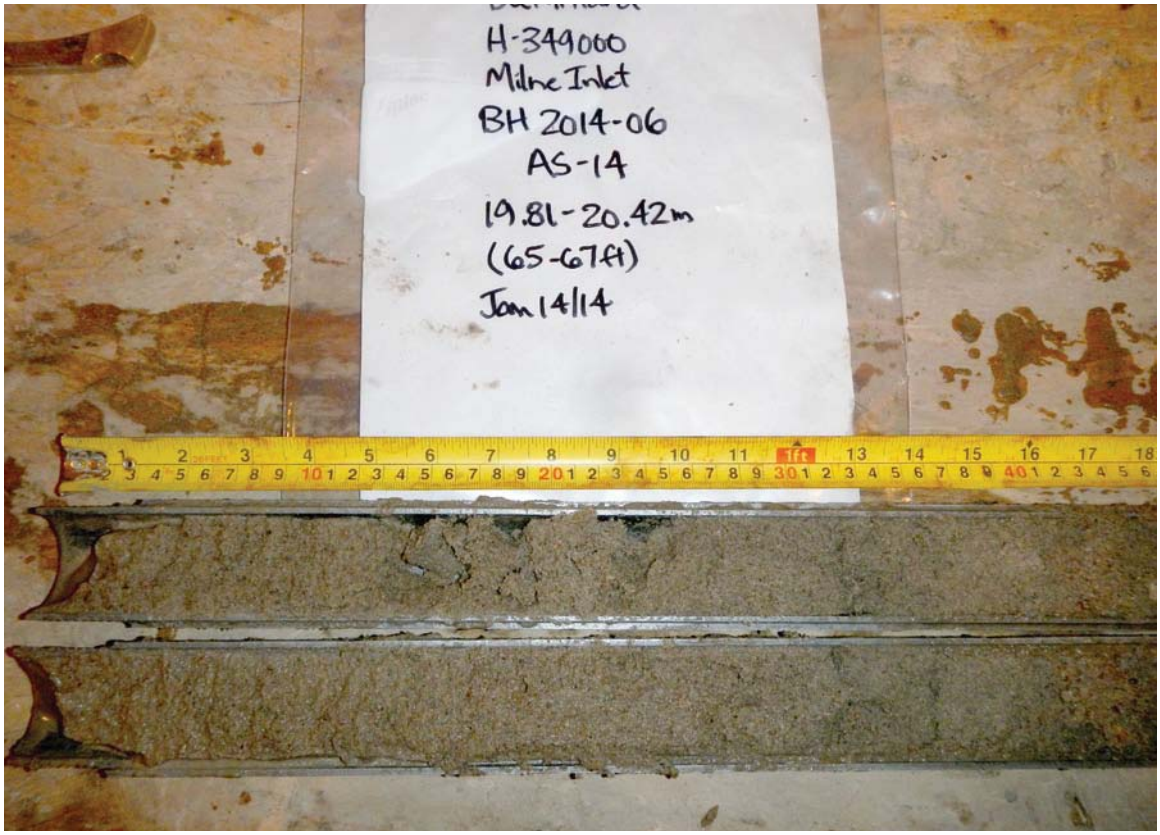


BH-2014-06 AS-12 (16.76m - 17.37m)

HATCH™



BH-2014-06 AS-13 (18.29m - 18.90m)

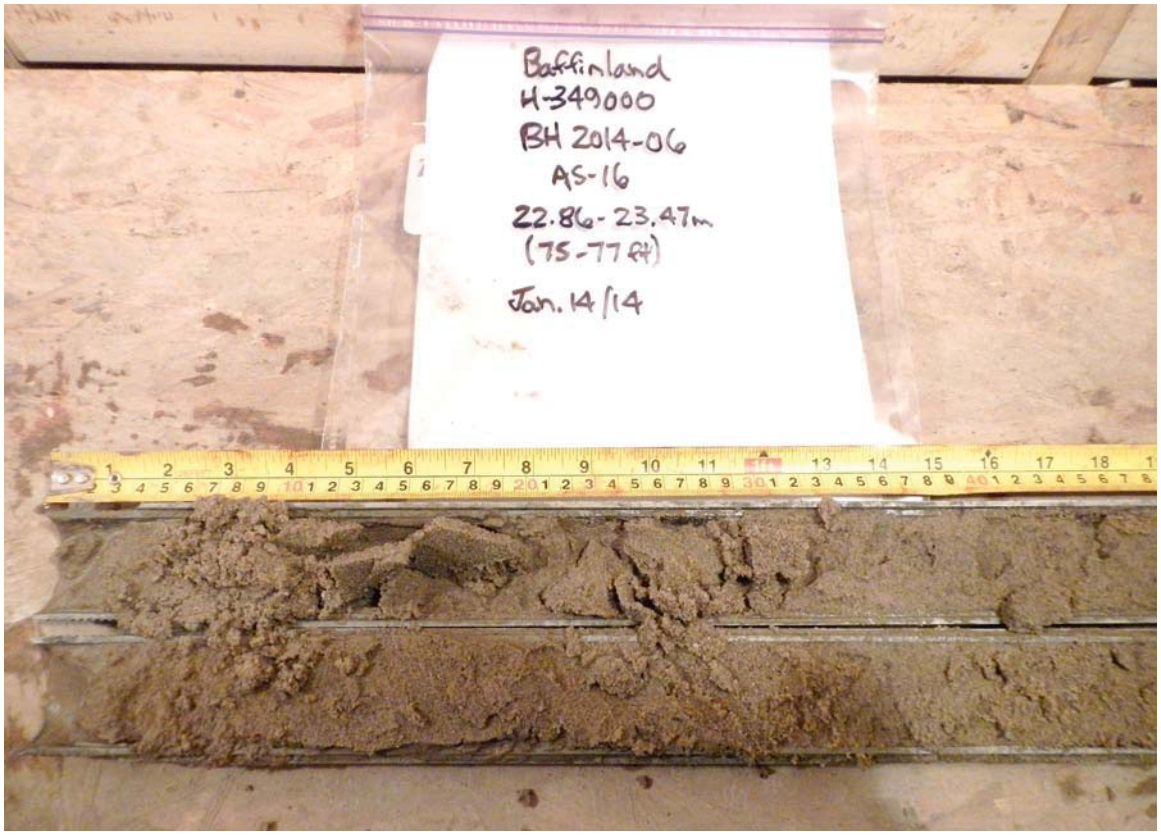


BH-2014-06 AS-14 (19.81m - 20.42m)

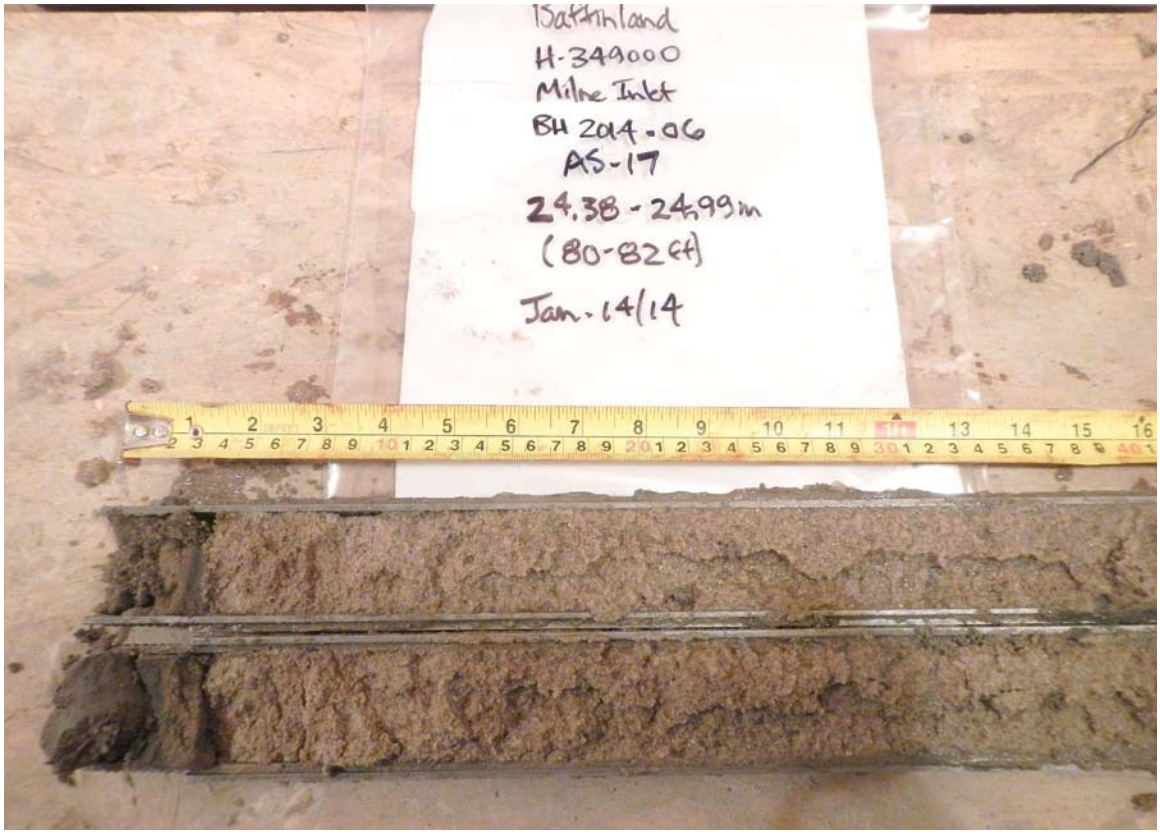
HATCH™



BH-2014-06 AS-15 (21.33m - 21.94m)



BH-2014-06 AS-16 (22.86m - 23.47m)



BH-2014-06 AS-17 (24.38m - 24.99m)



BH-2014-06 AS-18 (25.90m - 26.52m)



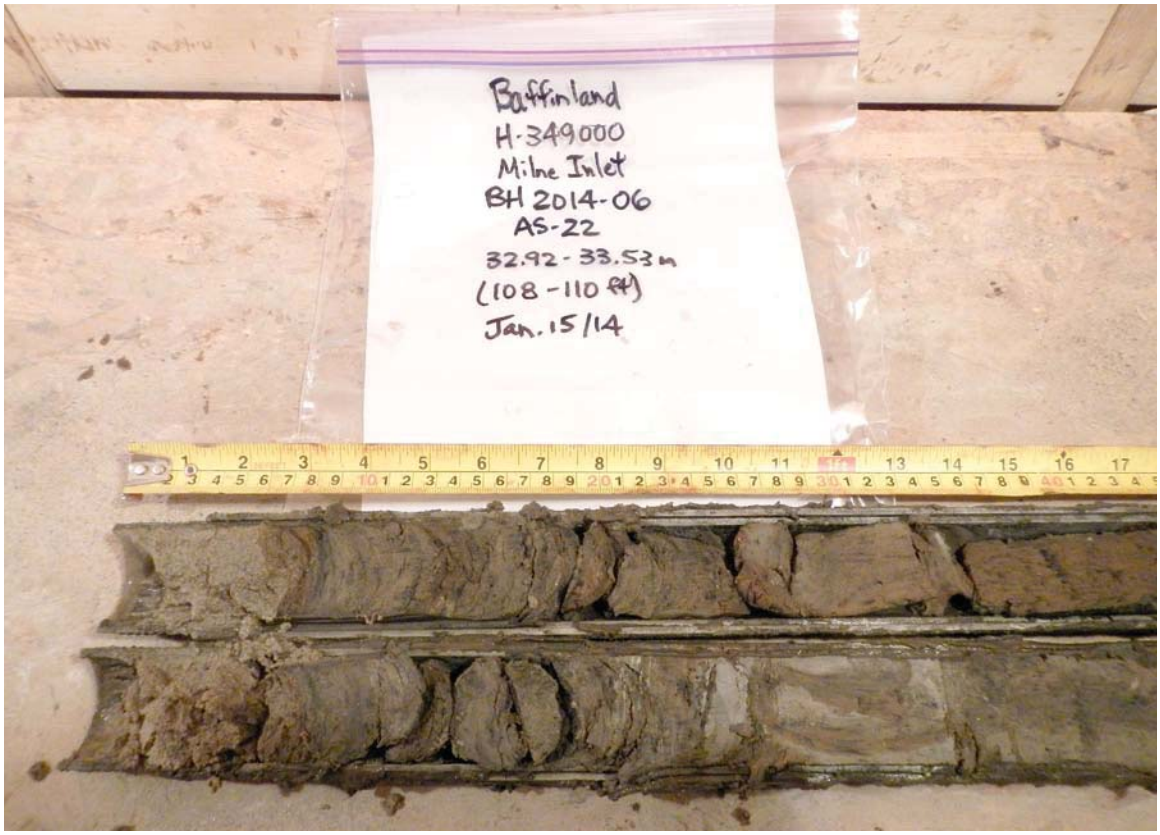
BH-2014-06 AS-19 (27.43m - 28.04m)



BH-2014-06 AS-20 (28.96m - 29.56m)



BH-2014-06 AS-21 (31.09m - 31.70m)



BH-2014-06 AS-22 (32.92m - 33.53m)

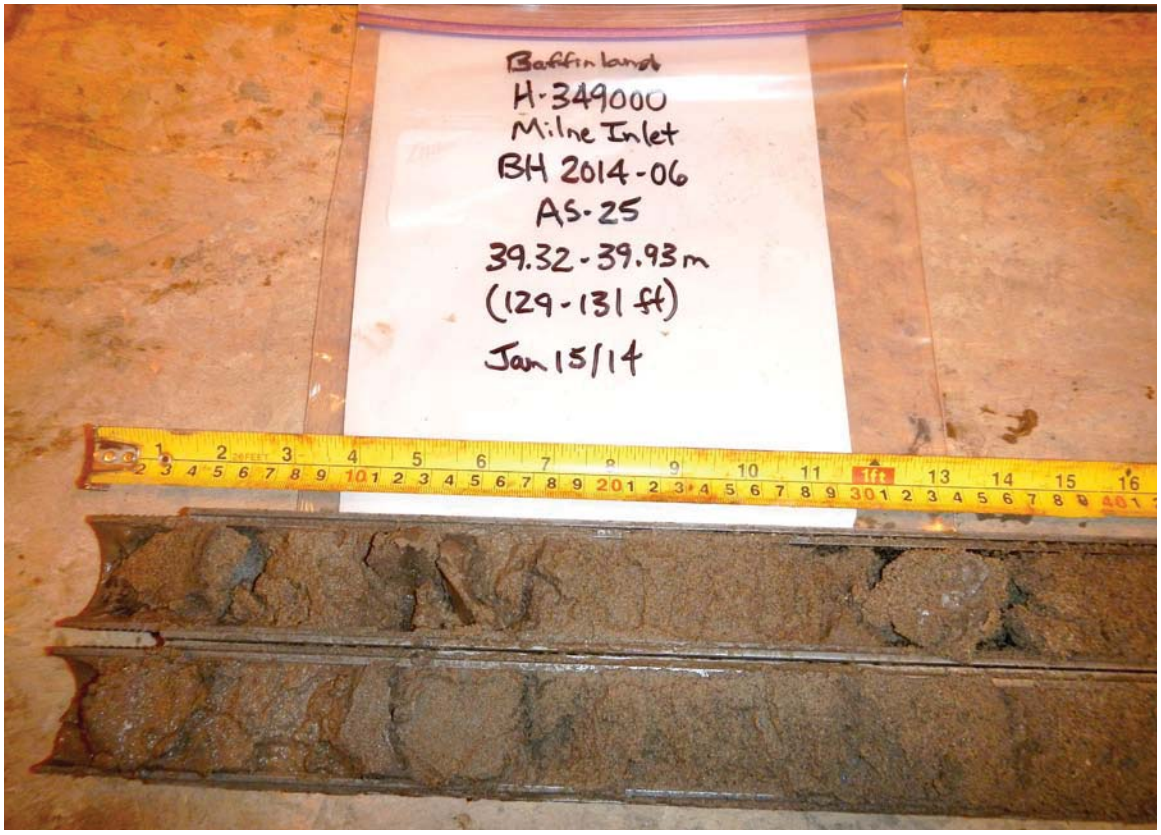
HATCH™



BH-2014-06 AS-24 (37.18m - 37.80m) 1 of 2



BH-2014-06 AS-24 (37.18m - 37.80m) 2 of 2



BH-2014-06 AS-25 (39.32m - 39.93m)



BH-2014-06 AS-30 (48.76m - 49.37m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH14-07B***
PROJECT: Mary River Project
PAGE: 1 **OF:** 9

SITE: Milne Inlet Bay

COORDINATES: 7976661.322
503316.941
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -16.11
END OF HOLE: -67.03

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 12/01/2014
FINISHED: 13/01/2014
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
-16.11									20 40 60 80 / 50 100 150 200	10^{-6} 10^{-5} 10^{-4} / 15 30 45 (%)		GR SA SI CL	
0.0		SAND, some silt, trace of clay, some gravel, greyish brown with black mottling and horizontol laminations along bedding, very loose, wet to saturated.										Drill set up on ice surface; casing extended to seabed; soil sampling started	
			0.91 – 1.52	AS1	500	82	1 1 1 1	1	● SPT N-value	○ Water content		Water depth measured periodically during drilling. 22 55 20 5	
								2					
-18.81			2.44 – 3.05	AS2	480	79	3 3 5 6	3	● SPT N-value	○ Water content			
2.70		SAND, some gravel, light brown, loose to compact, wet, fine to coarse grained sand, granitic and limestone gravel up to 20 mm.											
			3.96 – 4.57	AS3	560	93	5 5 5 5	4	● SPT N-value	○ Water content			

SAMPLING METHOD

A - Split Tube
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C - Piston Sample
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E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
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Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-21.60													
5.49		SAND and GRAVEL, light brown, loose, wet, medium to coarse grained sand, subrounded granitic and limestone gravel up to 30 mm, some angular gravel (possible cobbles)	5.49 – 6.1	AS4	600	98	3 3 3 3	6	●	○			
-23.12													
7.01		SAND, some gravel, light brown, loose, wet, fine to medium grained sand, subrounded gravel.	7.01 – 7.62	AS5	0	0	4 4 4 6	7	●			Sand trap in good condition.	
-24.95													
8.84		Sandy Clayey SILT, greyish brown with black mottling and black horizontal lamination along bedding, loose, wet.	8.84 – 9.44	AS6	500	82	8 8 5 7	8				Approximately 0.15m of soil in casing.	
								9	●			1 33 66	
								10					
-26.78												Approximately 0.15m of soil in casing.	
10.67		SAND, trace silt, brown, compact, wet, fine grained sand.	10.67 – 11.28	AS7	600	98	8 6 5 6	11	●	○			
-27.39		SAND, light brown, fine to medium grained.											
11.28													

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-28.30		Sandy SILT, greyish brown with black mottling and black horizontal lamination, loose to compact.						12				
12.19		SAND, some fine gravel, light brown, compact, wet, fine to medium grained sand, angular gravel, possible subrounded granitic cobbles.	12.19 – 12.8	AS8	200	33	4 5 5 5	13	● at 12	○ at 12		
			13.72 – 14.33	AS9	600	98	8 8 8 12	14	● at 14	○ at 14		
		15.24 m: Trace fine gravel, medium to coarse grained sand, subrounded gravel up to 30 mm.	15.24 – 15.85	AS10	300	49	8 6 7 7	15	● at 15	○ at 15		
		17.07 m: Trace of silt, medium brown, medium to coarse grained sand.	17.07 – 17.68	AS11	610	100	4 6 11 15	16				
								17	● at 17	○ at 17		

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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P — W_N — W_L

□ Constant Head Test
□ Variable Head Test
□ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								18					
		18.89-19.5 m: Loose	18.89 – 19.5	AS12	390	64	2 4 6 10	19				No sand in the casing at the end of advance.	
		20.42 m: Trace of fine to coarse grained gravel, compact.	20.42 – 21.03	AS13	610	100	5 11 13 10	20					
		21.64 m: Some fine gravel, dense.	21.64 – 22.25	AS14	610	100	9 17 17 15	21					
		22.86-24.07 m: Medium brown, compact, medium to coarse grained sand, rounded to subrounded gravel.	22.86 – 23.47	AS15	610	100	7 12 17 15	22					
		24.07-25.60 m: Medium grained sand, trace fine	24.07					23					
								24					

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
		gravel.	24.68	AS16	400	66	4 6 11 15
-41.71							
25.60 -41.95		Silty CLAY, trace of fine gravel, grey to black.	25.6				
25.84		Silty SAND, brown, fine grained sand.		AS17	610	100	12 15 16 20
		26.21 m: Trace of silt, trace of fine gravel, medium brown, fine to medium sand.	26.21				
-43.54							
27.43		SAND, trace to some silt, brown, fine grained sand.	27.43	AS18	400	66	17 23 25 23
-45.06			28.04				
28.95 -45.30		Sandy GRAVEL, brown, fine to coarse grained sand, fine subrounded gravel.	28.95	AS19	610	100	22 30 29 22
29.19		Silty SAND, brown, fine grained.	29.56				

DEPTH (m): 25, 26, 27, 28, 29, 30

● SPT N-VALUES
≀ DYNAMIC CONE PENETRATION
20 40 60 80

SHEAR STRENGTH (kPa)
□ UNCONFINED ■ QUICK TRIAXIAL
✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN.
50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s)
10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS
15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
5	50	35	10

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
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PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT
W_P W_N W_L

☐ Constant Head Test
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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
-46.89							
30.78		Sandy GRAVEL, brown, medium to coarse sand, subrounded fine gravel.	30.78	AS20	610	102	38 29 18 18
-47.17							
31.06		SILT and SAND, with interbeds of sandy gravel, greyish brown, angular gravel up to 30 mm (possible cobble)	31.39				
-48.72							
32.61		SAND and SILT, some clay, trace gravel, brownish grey.	32.61	AS21	610	100	11 14 16 22
-50.55			33.22				
34.44		SAND, trace of silt, brown, medium grained sand.	34.44	AS22	300	49	15 27 21 20
-52.07			35.05				
35.96		SILT and SAND with clay interbeddings, brown to greyish brown with clayey black, laminated bands and reddish brown and black mottling, compact to dense, wet.	35.96	AS23	600	98	15 14 14 18
			36.57				

DEPTH (m): 31, 32, 33, 34, 35, 36, 37

SPT N-VALUES; DYNAMIC CONE PENETRATION (20 40 60 80)

SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 7 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-53.60													
37.49		SAND, trace silt, brown, compact to dense, wet, fine to medium grained.	37.49 – 38.1	AS24	400	66	N.A	38				Push shelby tube;No recovery;push Split spoon; SPT values not valid due to disturbed soil.	
		39.01-39.62 m: Dense sand.	39.01 – 39.62	AS25	600	98	15 15 16 20	39				Approximately 0.30m of soil in casing.	
-56.34								40				Approximately 0.15m of soil in casing.	
40.23		Sandy SILT, some clay, brown to greyish brown with bands with black horizontal laminations, dense, wet, fine sand.	40.84 – 41.45	AS26	610	100	10 12 20 20	41				0 32 52 16	
-57.56													
41.45		SAND, some gravel, brown with bands with black horizontal laminations and reddish brown mottling, dense, wet, fine to medium grained sand, subrounded gravel.	41.45 – 42.06	AS27	600	98	20 23 30 33	42				Approximately 0.15m of soil in casing.	
		41.45-41.55 m: Some rounded to subrounded gravel with size upto 5mm.											
		42.75-42.98 m: Slight black mottling and few horizontal black laminations.	42.98	AS28	600	98	28 23 23 25	43					

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PLASTIC LIMIT W_P | NATURAL MOISTURE CONTENT W_N | LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 8 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
		SAND, brown with closely spaced black laminations, dense, moist to wet, fine to medium sand, silty around laminations.	43.59				
		42.98 m: Brown, dense, sand, increasing silt content around laminations.					
		SAND, light brown, very dense, wet, fine to medium.	44.5	AS29	610	100	31 41 40 39
		44.50 m: Light brown, very dense, medium grained sand, increasing fine sand with depth.	45.11				
		SAND, light brown, very dense, fine to medium.	46.02	AS30	420	69	30 30 40
		46.02 m: Brown, fine to medium grained sand.	46.63				
			47.24	AS31	610	100	8 22 33 43
			47.85				

DEPTH (m): 44, 45, 46, 47, 48, 49

SPT N-VALUES / DYNAMIC CONE PENETRATION: 20 40 60 80

SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. — 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s): 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS: 15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Approximately 0.15m of soil in casing.

PIEZOMETER INSTALLATION

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

□ Constant Head Test
□ Variable Head Test
▨ Lab. Permeability

Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-07B***

PROJECT: Mary River Project **PAGE:** 9 **OF:** 9

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80); SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}); WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		50.29 m: Trace silt, dense, fine to medium grained sand.	50.29	AS32	610	100	17 22 19 33		●	○			
-67.03 50.92		NOTES: 1. Four thermistors installed; lost under the ice when pulling casing.	50.92				**END OF BOREHOLE**						

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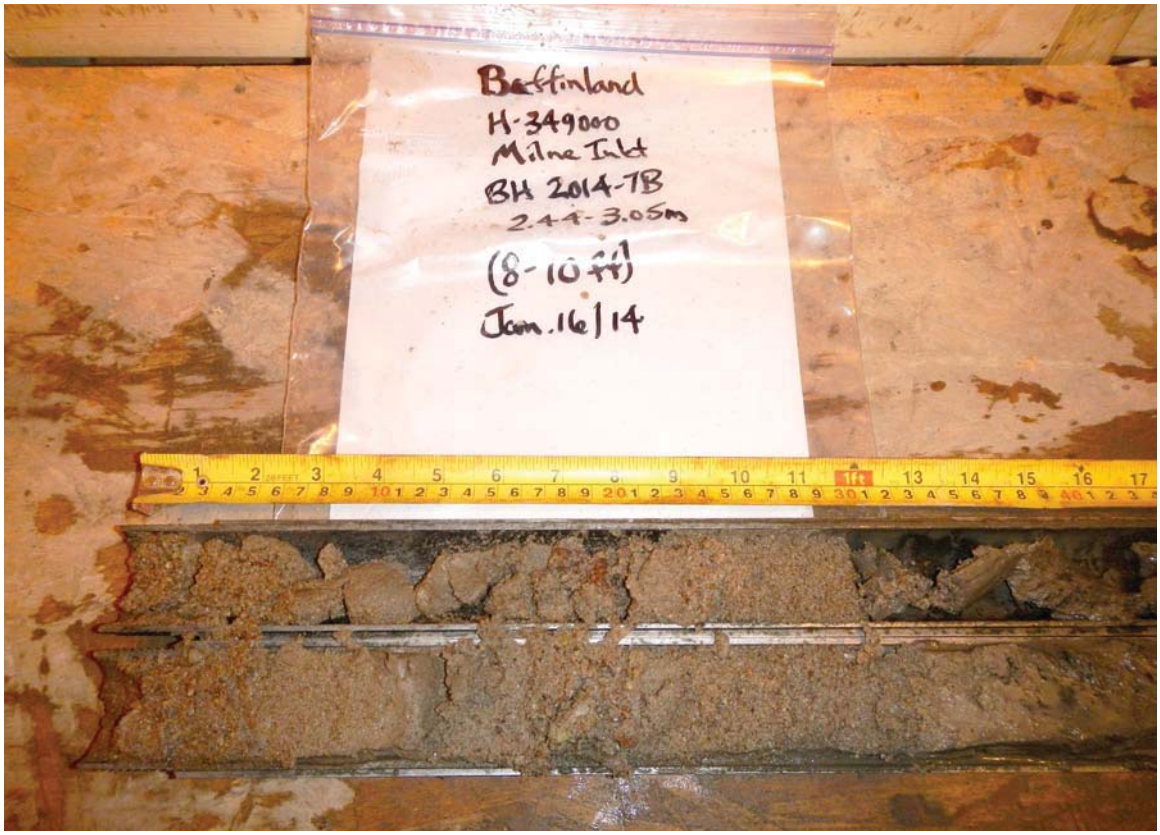
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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☐ Lab. Permeability

Project: H/349000

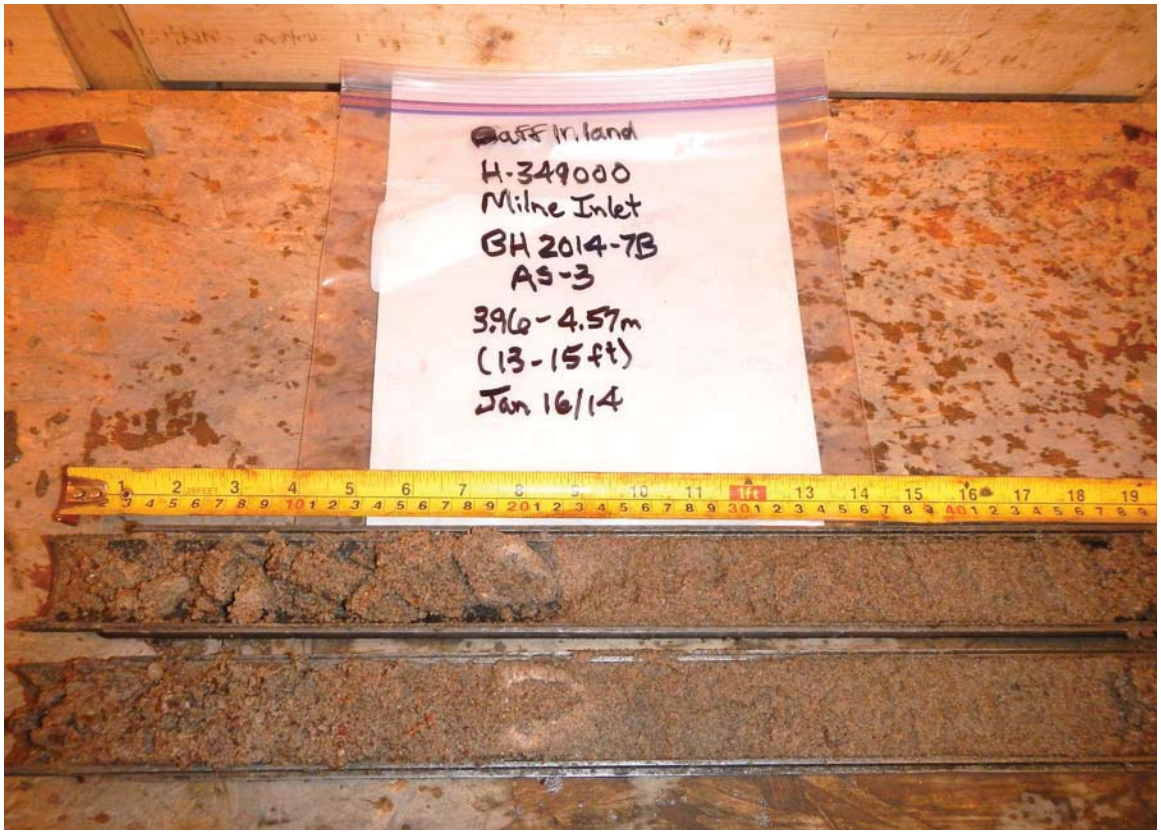


BH-2014-07B AS-1 (0.91m - 1.52m)



BH-2014-07B AS-2 (2.44m - 3.05m)

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BH-2014-07B AS-3 (3.96m - 4.57m)



BH-2014-07B AS-4 (5.49m - 6.10m)



BH-2014-07B AS-6 (8.84m - 9.44m)



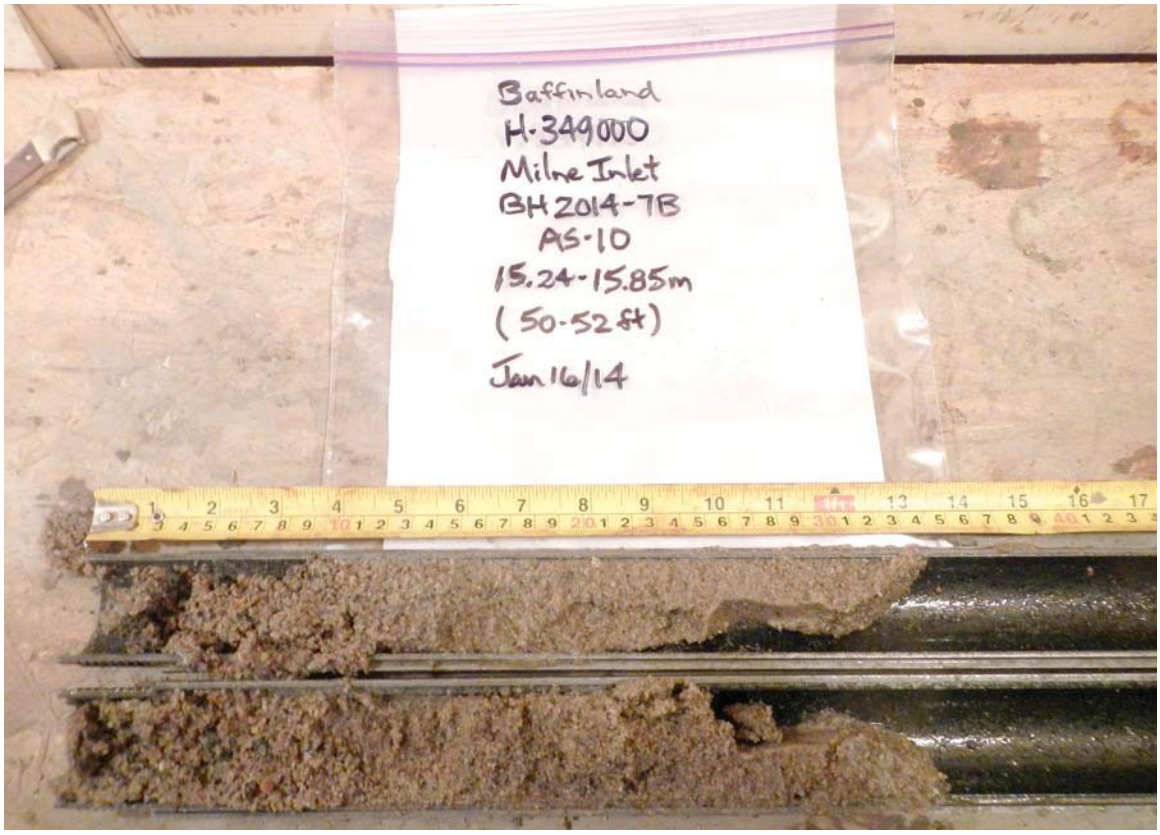
BH-2014-07B AS-7 (10.67m - 11.28m)



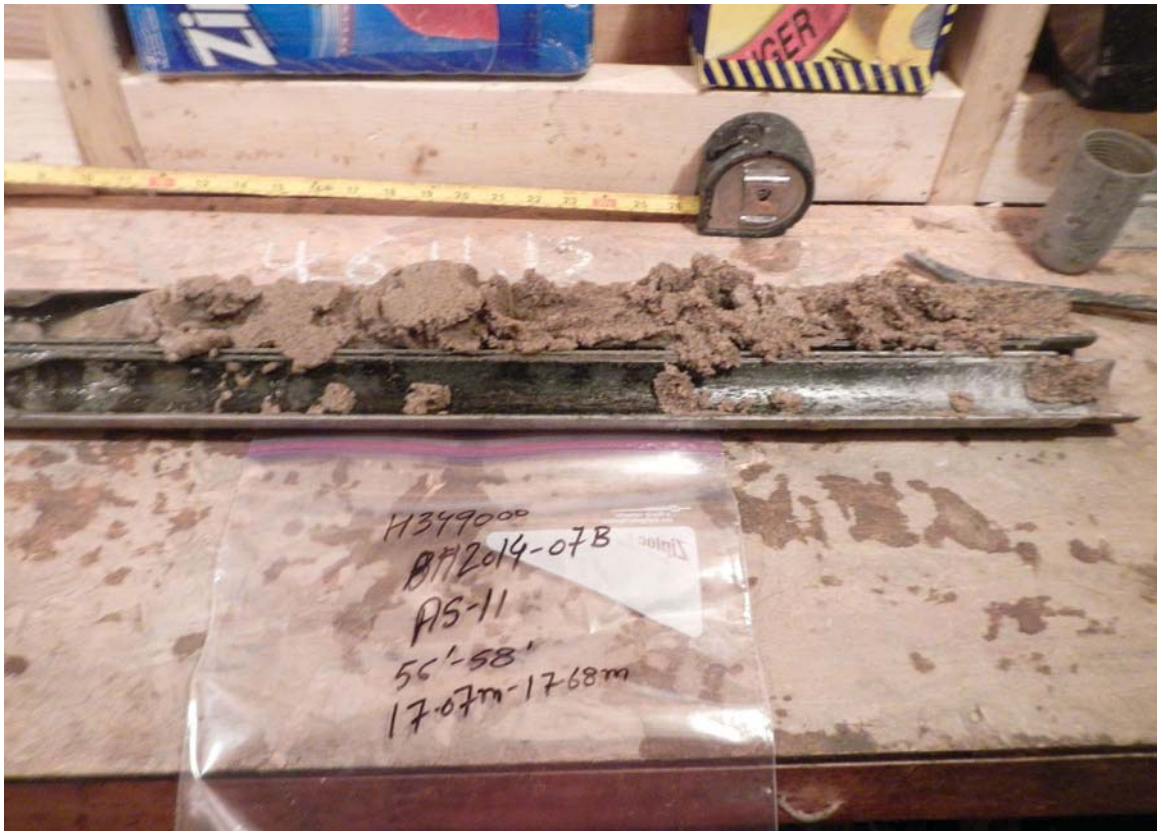
BH-2014-07B AS-8 (12.14m - 12.80m)



BH-2014-07B AS-9 (13.72m - 14.33m)



BH-2014-07B AS-10 (15.24m - 15.85m)



BH-2014-07B AS-11 (17.07m - 17.68m)



BH-2014-07B AS-12 (18.89m - 19.50m)

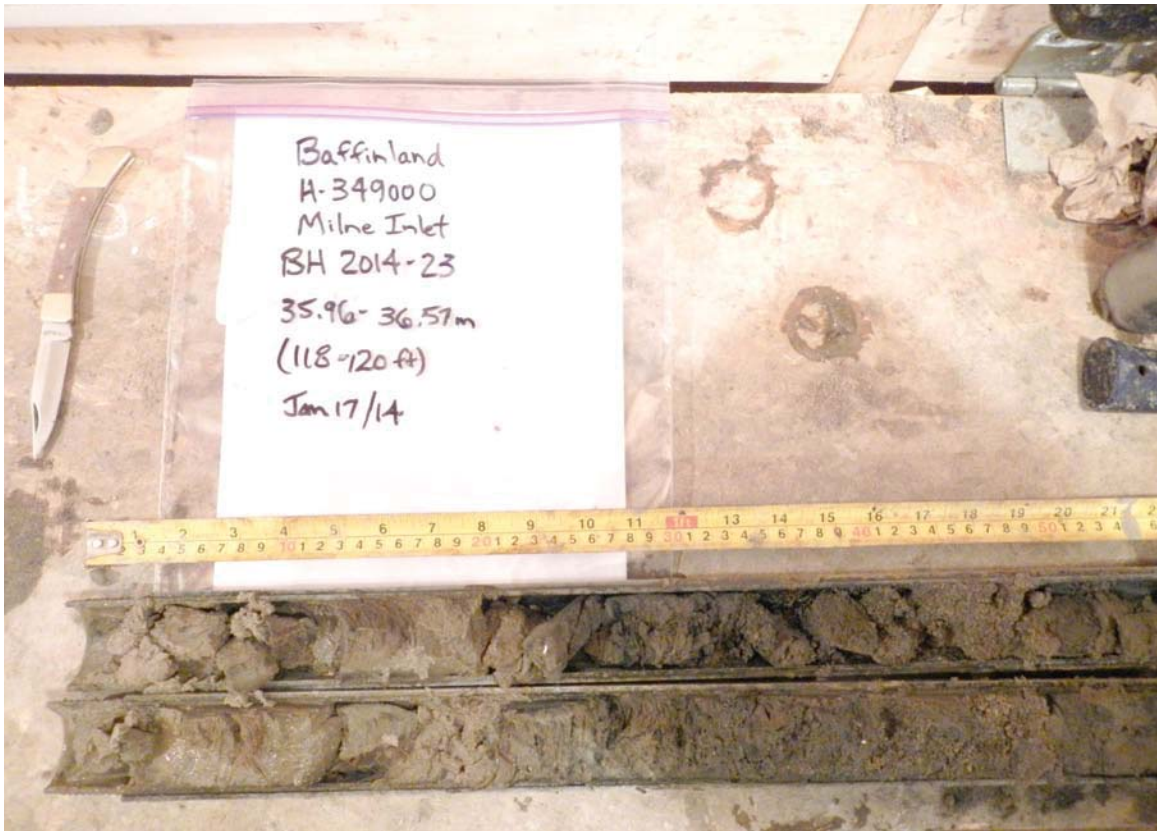


BH-2014-07B AS-16 (24.07m - 24.68m)

HATCH™



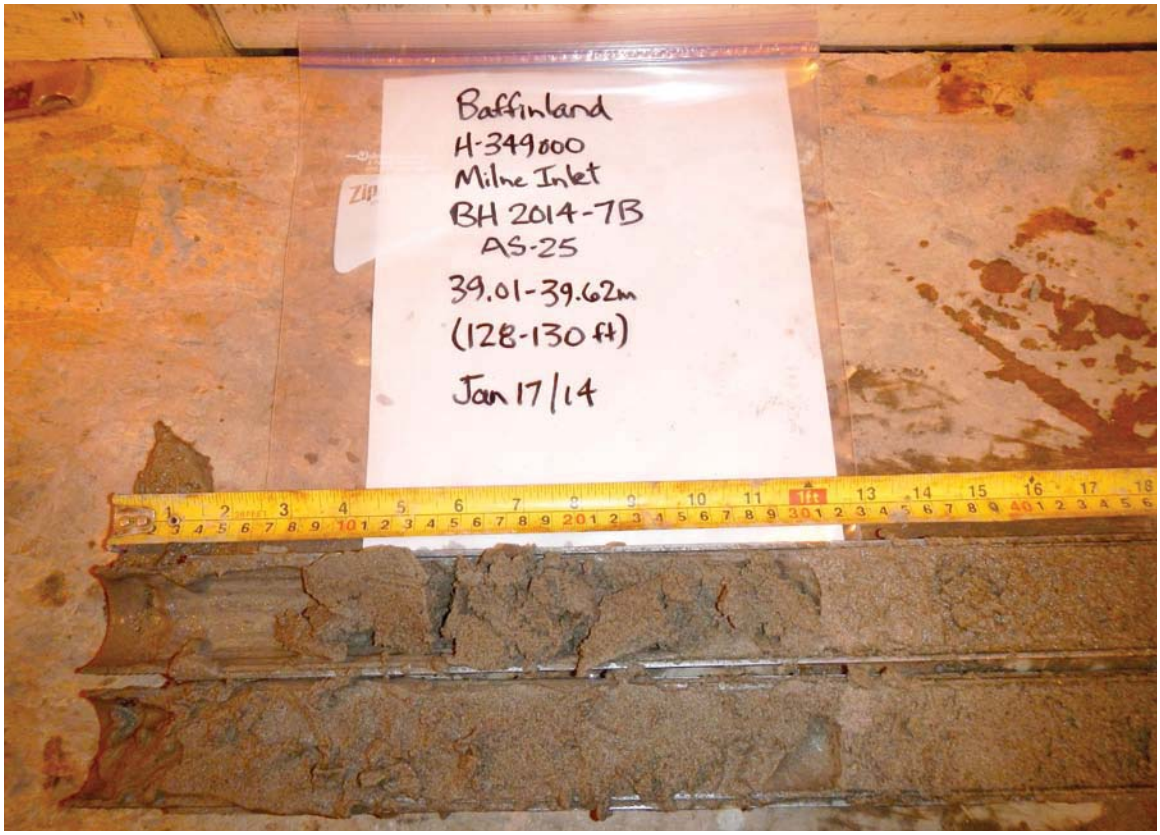
BH-2014-07B AS-17 (25.60m - 26.21m)



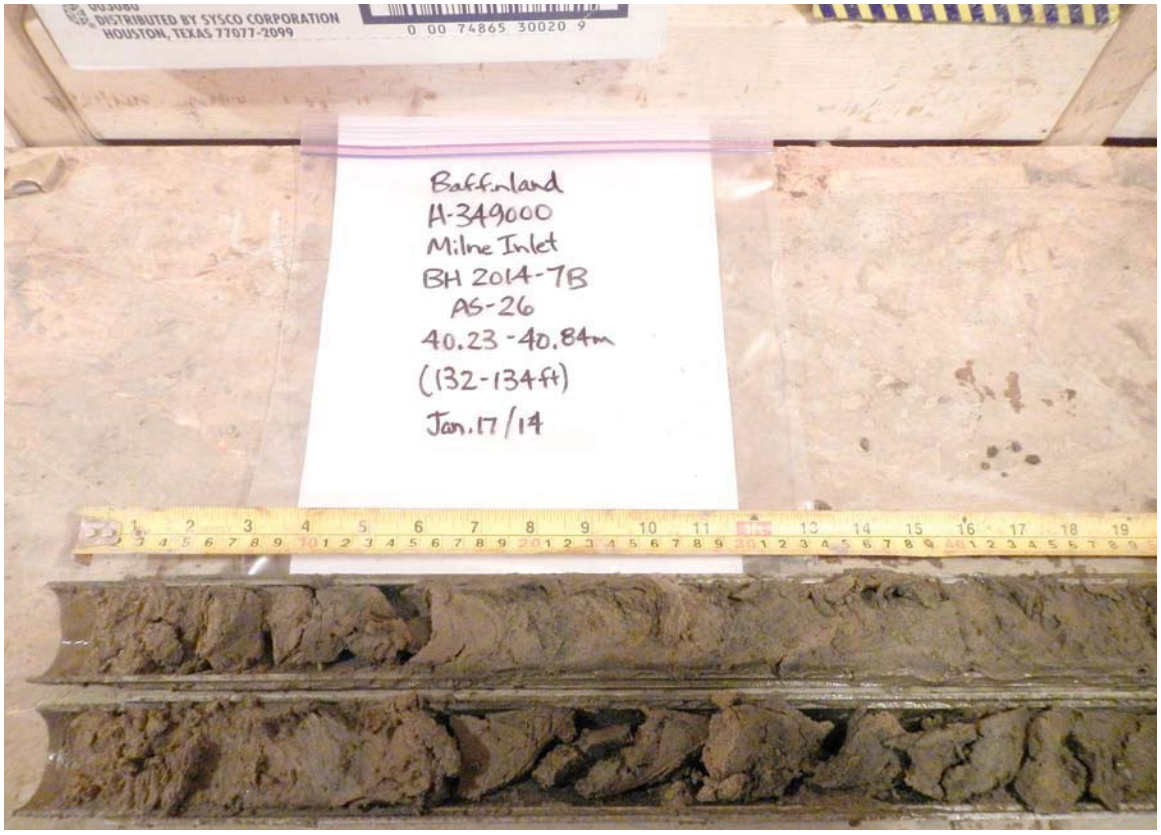
BH-2014-07B AS-23 (35.96m - 36.57m)



BH-2014-07B AS-24 (37.49m - 38.10m)



BH-2014-07B AS-25 (39.01m - 39.62m)



BH-2014-07B AS-26 (40.23m - 40.84m)



BH-2014-07B AS-27 (41.45m - 42.06m)

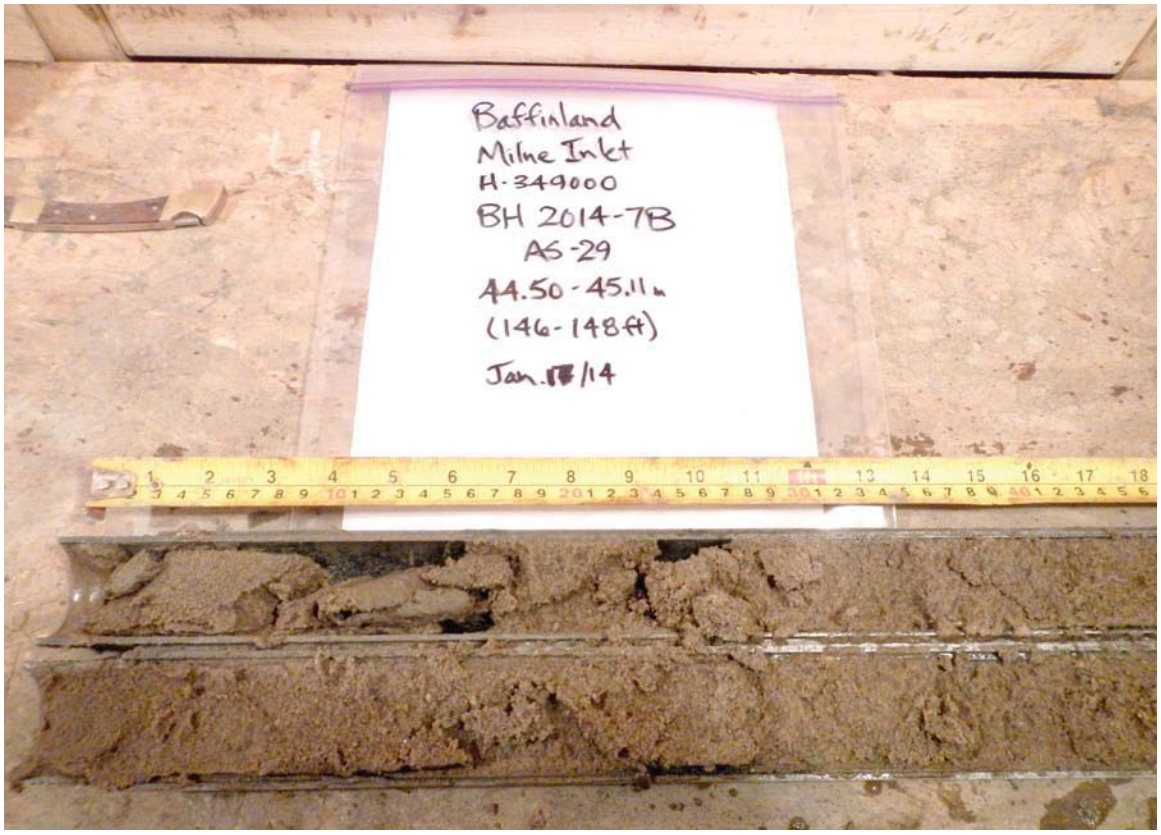


BH-2014-07B AS-28 (42.98m - 43.59m) 1 of 2



BH-2014-07B AS-28 (42.98m - 43.59m) 2 of 2

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BH-2014-07B AS-29 (44.50m - 45.11m)



BH-2014-07B AS-30 (46.22m - 46.63m) 2 of 2

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation
HOLE: ***BH14-12***
PROJECT: Mary River Project
PAGE: 1 **OF:** 4

SITE: Milne Inlet Bay

COORDINATES: 7976537.16
503242.708
DIP DIRECTION:
DIP: 90
ELEVATIONS
DATUM: Seabed
PLATFORM:
GROUND: -0.48
END OF HOLE: -19.37

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 13/01/2014
FINISHED: 14/01/2014
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) (□ UNCONFINED, ■ QUICK TRIAXIAL, ✖ FIELD VANE, ✚ LAB VANE, ✪ POCKET PEN.)	HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
0.0 / -0.48		SAND, some silt, some gravel, light brown, compact, wet, fine to medium grained sand, coarse subrounded gravel.	0 – 0.76	AS1	340	45	12 9 7 7	1	● at ~20 kPa	○ at ~10^{-4} m/s		Drill set up on ice surface; casing extended to seabed; soil sampling started	
-2.00 / 1.52 / -2.13 / 1.65 / -2.38 / 1.90		Gravelly SAND, brown, loose, wet, sand with subrounded to subangular,fine to coarse grained gravel	1.52 – 2.13	AS2	360	59	8 3 3 4	2	● at ~20 kPa	○ at ~10^{-4} m/s		Water depth measured periodically during drilling.	
		SAND, some angular gravel, possible cobbles, light brown, loose, medium to coarse grained sand.										No soil in the casing at the end of advance.	
-3.53 / 3.05		Sandy SILT, trace clay, dark brown, with black laminations along sea bed.						3					
		Sandy GRAVEL, possible cobbles, brown, compact, saturated, angular to subround gravel.	3.05 – 3.66	AS3	260	43	4 5 5 5		● at ~20 kPa	○ at ~10^{-4} m/s			
-5.05 / 4.57		SAND and GRAVEL, some angular cobbles fragments of limestones and granite, brown, loose, wet to	4.57	AS4	400	66	7 4 4	4	● at ~20 kPa	○ at ~10^{-4} m/s		50 48 2	

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-12***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL	PIEZOMETER INSTALLATION
		saturated,medium to coarse grained sand.	5.18				4									
-6.58								6								
6.10		SAND, some silt, trace gravel, light brown, loose, wet, fine to medium grained sand, fine to medium grained, round to subangular gravel.	6.1	AS5	330	54	2 3 5 3		●	○		7	83	10		
			6.71													
		6.50 m: Some coarse sand, some gravel.						7								
-8.10																
7.62		SAND, trace gravel/cobbles, light brown, compact, wet, medium to fine grained sand reddish, coarse angular gravel.	7.62	AS6	230	38	4 5 7 7	8	●	○						
			8.23													
								9								
		9.14 m: Light brown, compact, medium to coarse grained sand, trace rounded, fine to medium grained gravel.	9.14	AS7	460	75	6 7 9 9		●	○						
			9.75													
								10								
		10.67 m: Loose, some gravel, possible cobbles, some angular rock fragments with subrounded sides.	10.67	AS8	600	98	2 4 4 4	11	●	○						
			11.28													

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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☐ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-12***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80)	SHEAR STRENGTH (kPa): UNCONFINED / QUICK TRIAXIAL / FIELD VANE / LAB VANE / POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4})	WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-12.67								12							
12.19		Sandy GRAVEL, some subrounded to subangular, fine to coarse grained limestone and granite gravel, greyish brown, compact, wet.	12.19 – 12.8	AS9	350	57	6 6 6 8								
-14.19								13							
13.71		SAND, some gravel, possible cobbles, brown, compact, fine to medium grained sand.	13.71 – 14.32	AS10	460	75	8 8 9 33	14							
-14.68															
14.20		SAND, trace of silt, frozen, medium dense, fine grained.	14.48 – 15.09	AS11	420	69	33 120 133 110	15						Partially frozen sample at the bottom end of spoon;refusal. Likely frozen. 0 91 9	
-15.88															
15.40		SAND, fine to medium grained sand, not frozen, very dense.	15.24 – 15.85	AS12	380	62	75 85 250	16							
-17.24															
16.76		SAND AND GRAVEL, brown, frozen, medium to coarse grained sand, subround to angular, fine to coarse, granitic and limestone gravel.	16.76 – 17.37	AS13	600	98	190 170 150 250	17						Frost noted along bedded layers and fine sand.	

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-12***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 4

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa) / HYDRAULIC CONDUCTIVITY (m/s) / WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-18.76								18				
18.28		gravelly SAND, medium brown, fine to medium grained sand, fine, rounded to subrounded gravel, partially frozen.	18.28	AS14	500	82	57 135 185 175 for 50 mm					
-19.37			18.89									
18.89		NOTES: 1. Four thermistors installed at depths 18.89 m, 13.9 m, 3.9 m and 2.4 m below seabed.							**END OF BOREHOLE**			

SPT N-VALUES; DYNAMIC CONE PENETRATION 20 40 60 80; SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. 50 100 150 200; HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4}; WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)

SAMPLING METHOD

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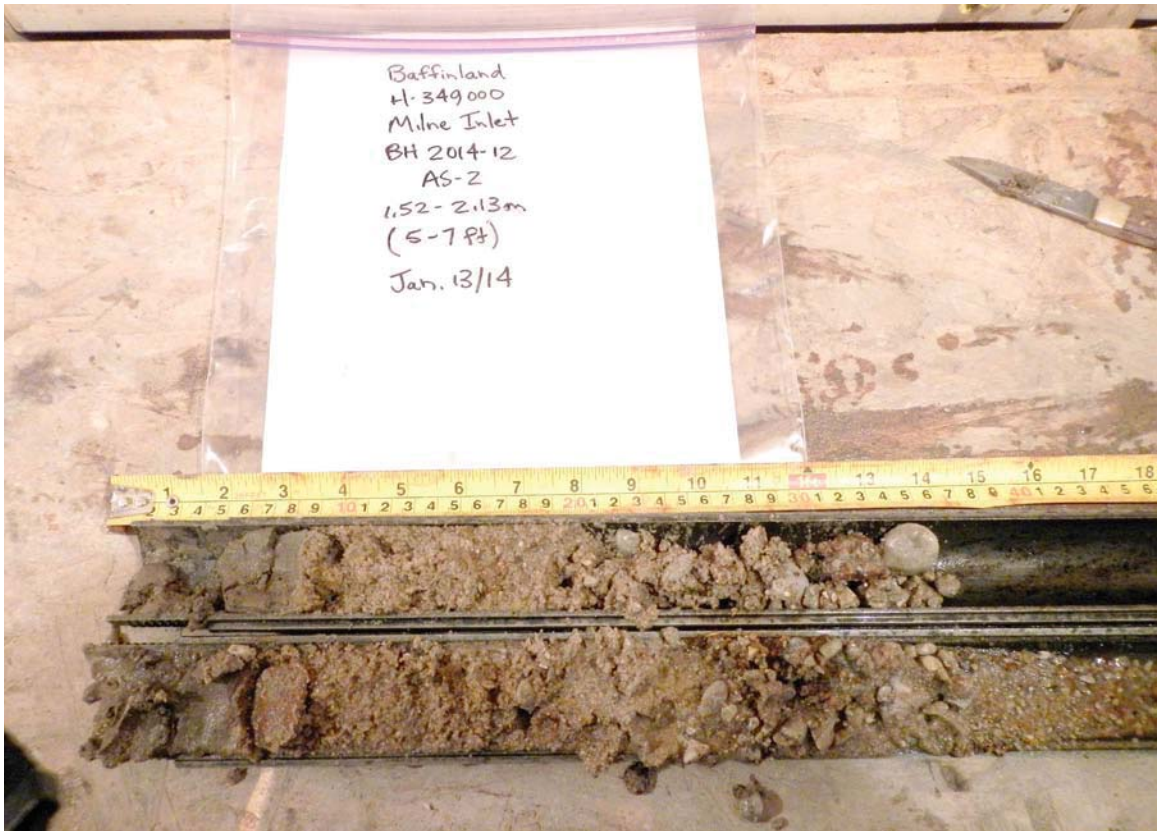
PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

☐ Constant Head Test
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Project: H/349000



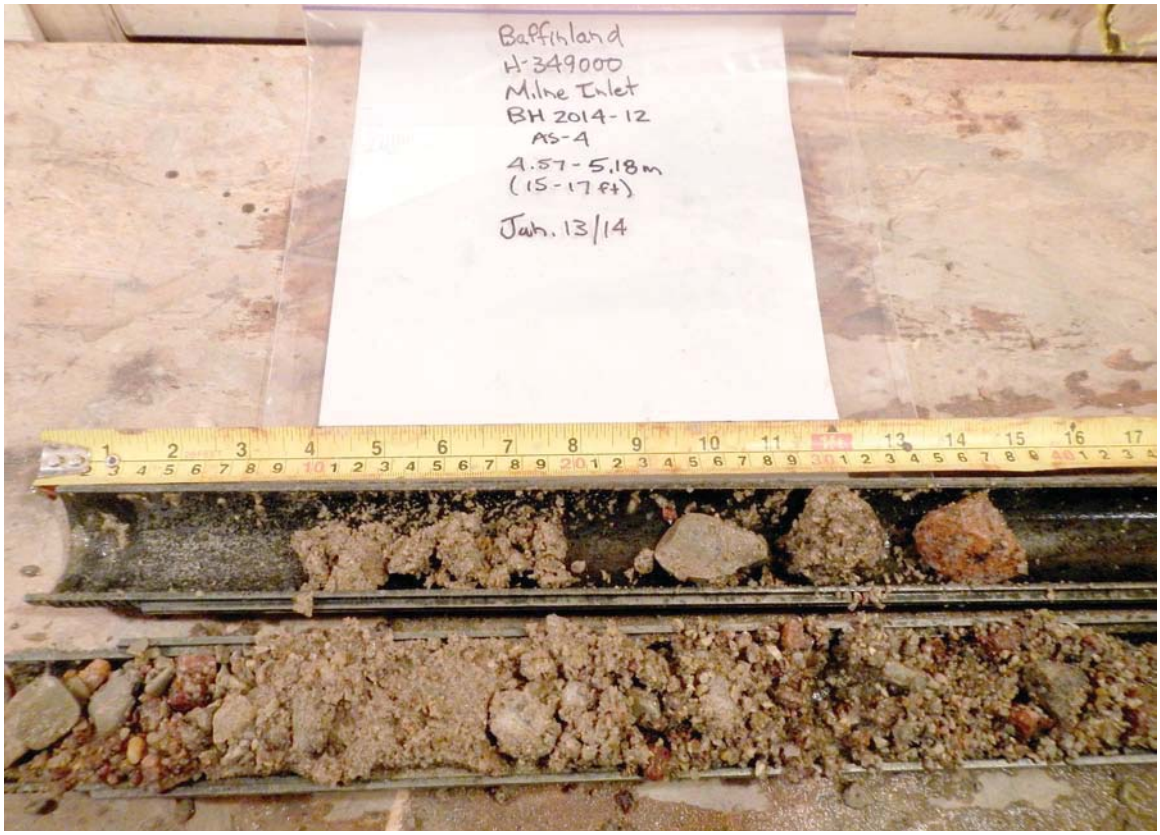
BH-2014-12 AS-1 (0.0m - 0.76m)



BH-2014-12 AS-2 (1.52m - 2.13m)



BH-2014-12 AS-3 (3.05m - 3.66m)



BH-2014-12 AS-4 (4.57m - 5.18m)



BH-2014-12 AS-5 (6.10m - 6.71m)



BH-2014-12 AS-6 (7.62m - 8.23m)



BH-2014-12 AS-8 (10.67m - 11.28m)



BH-2014-12 AS-9 (12.19m - 12.80m)

HATCH™



BH-2014-12 AS-10 (13.71m - 14.30m)



BH-2014-12 AS-11 (14.48m - 15.09m)



BH-2014-12 AS-12 (15.24m - 15.85m)



BH-2014-12 AS-13 (16.76m - 17.37m)

HATCH™

HATCH

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: ***BH14-13***

PROJECT: Mary River Project

PAGE: 1 **OF:** 6

SITE: Milne Inlet Bay

COORDINATES: 7976601.64
503243.863

DIP DIRECTION:

DIP: 90

ELEVATIONS

DATUM: Seabed

PLATFORM:

GROUND: -6.62

END OF HOLE: -37.10

CONTRACTOR: Logan Drilling Group
DRILL TYPE: Skid mounted CME 55
METHOD SOIL: Wash Boring
ROCK: NA
CASING: HWT-Casing

CORE: Not Applicable

STARTED: 12/01/2014
FINISHED: 13/01/2014
INSPECTOR: C.S.S/W.R.H
LOGGED BY: C.S.S
REVIEWED: W.R.H

DATE: January, 2014

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y(%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-6.62												
0.0 / -6.74		SILT, black, organic silt.										Drill set up on ice surface; casing extended to seabed; soil sampling started
0.12		Silty SAND,trace gravel, brown, mottled black, fine grained sand.										
-7.52												
0.9		Sandy SILT, trace gravel, dark brown, very loose, wet silt, some gravel, rounded to subangular, fine to medium grained gravel, small shell fragments.	0.9 / 1.52	AS1	300	48	1 2 2 5	1	●	○		Water depth measured periodically during drilling.
-9.06								2				
2.44		SAND, some silt, some gravel, brown, loose, wet, fine to medium grained sand, subrounded to subangular, fine to medium grained gravel with size upto 20mm.	2.44 / 3.05	AS2	440	72	3 3 3 3	3	●	○		No heaving sand in the casing at the end of advance.
		4.05 m: Black band of silty sand with organics.	3.96 / 4.57	AS3	330	54	3 4 3 2	4	●	○		No heaving sand in the casing at the end of advance.

SAMPLING METHOD

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-13***

PROJECT: Mary River Project **PAGE:** 2 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-12.11												300 mm of sand heaved into the casing at the end of advance.	
5.49		Silty SAND, trace of clay, laminations on bedding, some gravel in sand beds brown to dark brown, very loose, wet.	5.49 – 6.1	AS4	520	85	0 2 1 1	6	●	○		6 55 32 7	
-13.63													
7.01		SAND, trace gravel, light brown, compact, fine to medium grained sand, subrounded, medium grained limestone gravel.	7.01 – 7.62	AS5	240	39	4 8 7 8	7	●	○			
		8.53 m: Medium to coarse grained sand, some gravel, subrounded to rounded, fine to medium grained limestone and granite gravel.	8.53 – 9.14	AS6	380	62	5 9 9 12	8					
								9	●	○		No heaving sand in the casing at the end of advance.	
			10.06 – 10.67	AS7	0	0	5 4 7 8	10	●			No heaving sand in the casing at the end of advance; Sand trap in good condition.	
								11				Biodegradable bentonite mixed with the mud polymer to reduce the drilling	

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BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-13***

PROJECT: Mary River Project **PAGE:** 3 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80)	SHEAR STRENGTH (kPa): UNCONFINED, QUICK TRIAXIAL, FIELD VANE, LAB VANE, POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4})	WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
														disturbance in fine sands.	
		11.58 m: Loose, medium to coarse grained sand, trace of reddish/brown, subangular to angular limestone and granite gravel.	11.58 – 12.19	AS8	300	49	1 2 3 3	12	●		○			
-19.72								13						Low blow counts likely due to washing at the end of last casing advance.	
13.1		13.1: Gravel increasing to Gravelly.	13.1 – 13.71	AS9	260	43	2 4 5 6		●		○			No heaving sand in the casing at the end of advance. 35 63 2	
								14							
			14.63 – 15.24	AS10	0	0	5 4 5 6	15	●					Washing done after casing advanced due to some heaving sand in the casing.	
-22.77								16							
16.15		SILT, SAND AND GRAVEL, possible cobbles, brownish grey, silt and fine sand, angular gravel up to 40 mm.	16.15 – 16.76	AS11	40	7	5 11 19 17			●	○				
-23.38															
16.76		SAND, trace gravel, light brown, fine to medium grained sand, reddish, fine grained, rounded gravel						17							
			17.67												

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PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
▨ Lab. Permeability

Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-13***

PROJECT: Mary River Project **PAGE:** 4 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS
			18.28	AS12	400	66	10 11 13 15
		19.2 m: Fine sand, trace silt.	19.2	AS13	500	82	14 12 11 13
			19.81				
		20.42 m: Trace silt, trace gravel and cobbles, dark brown to brown, fine to medium grained sand, fine to coarse rounded to angular gravel up to 30 mm.	20.42	AS14	600	98	11 13 10 12
			21.03				
-28.56 21.94							
-28.71 22.09		Sandy SILT, trace fine rounded gravel, dark grey.	21.94	AS15	500	82	13 11 11 12
		SAND, trace fine rounded gravel, light brown, fine to medium grained sand.	22.55				
-30.08 23.46		SAND AND GRAVEL, brown, medium to coarse grained sand, rounded to subrounded fine gravel.	23.46	AS16	610	100	6 13 15 16
			24.07				

DEPTH (m): 18, 19, 20, 21, 22, 23, 24

SPT N-VALUES; DYNAMIC CONE PENETRATION 20 40 60 80

SHEAR STRENGTH (kPa): □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. 50 100 150 200

HYDRAULIC CONDUCTIVITY (m/s) 10^{-6} 10^{-5} 10^{-4}

WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)

DRY DENSITY (kg/m3)

REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

PIEZOMETER INSTALLATION

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
P - Water Content Tin
Q - Jar
X - Plastic & PVC Sleeve
R - Cloth Bag
S - Plastic Bag
U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W_N LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-13***

PROJECT: Mary River Project **PAGE:** 5 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
								25					
		24.99m: Sand becoming finer, fine gravel decreasing to about 35% by weight.	24.99	AS17	610	100	15 11 14 13						
			25.6					26					
		26.51 m: Medium to fine grained sand, some fine, rounded gravel.	26.51	AS18	610	100	18 12 16 17						
			27.12					27					
								28					
			28.34	AS19	610	100	9 10 10 14						
			28.85					29					
				AS20	610	100	15 17 15 11						
			29.48										
-37.10 30.48		NOTES:							**END OF BOREHOLE**				

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
G - Shovel Grab
K - Slotted

SHIPPING CONTAINER

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U - Wooden Box
Y - Core Box
Z - Discarded

PLASTIC LIMIT — NATURAL MOISTURE CONTENT — LIQUID LIMIT

W_P W_N W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: **H/349000**

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation **HOLE:** ***BH14-13***

PROJECT: Mary River Project **PAGE:** 6 **OF:** 6

ELEV. / DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE or RUN: DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)	SPT N-VALUES / DYNAMIC CONE PENETRATION (20 40 60 80) / SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL ✖ FIELD VANE ✚ LAB VANE ✪ POCKET PEN. (50 100 150 200)	HYDRAULIC CONDUCTIVITY (m/s) (10^{-6} 10^{-5} 10^{-4}) / WATER CONTENT & ATTERBERG LIMITS (15 30 45 (%))	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		1. Four thermistors installed at depths 30 m, 20 m,10 m and 5 m below seabed.											

SAMPLING METHOD

A - Split Tube
B - Thin Wall Tube
C - Piston Sample
D - Core Barrel (sonic or diamond drill)
E - Auger
F - Wash
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K - Slotted

SHIPPING CONTAINER

N - Insert
O - Tube
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Y - Core Box
Z - Discarded

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W_N — LIQUID LIMIT W_L

☐ Constant Head Test
☐ Variable Head Test
☐ Lab. Permeability

Project: **H/349000**



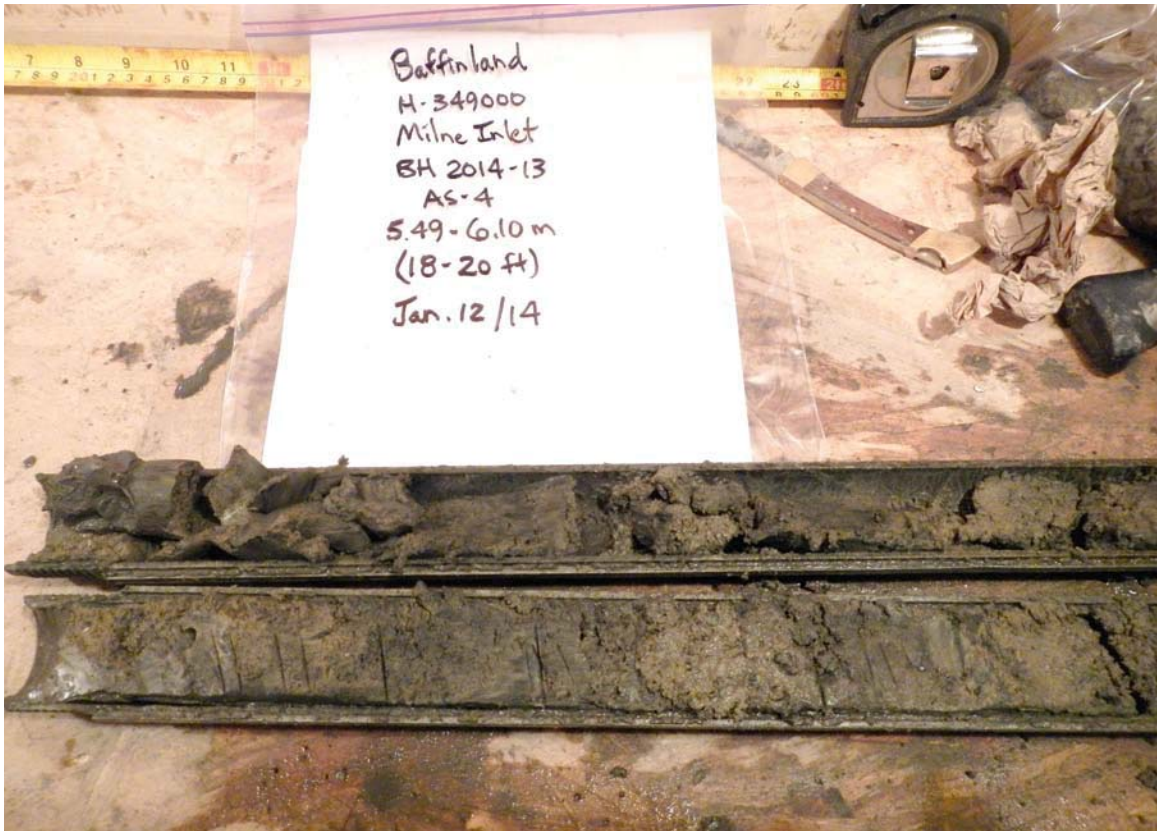
BH-2014-13 AS-1 (0.9m - 1.52m)



BH-2014-13 AS-2 (2.44m - 3.05m)



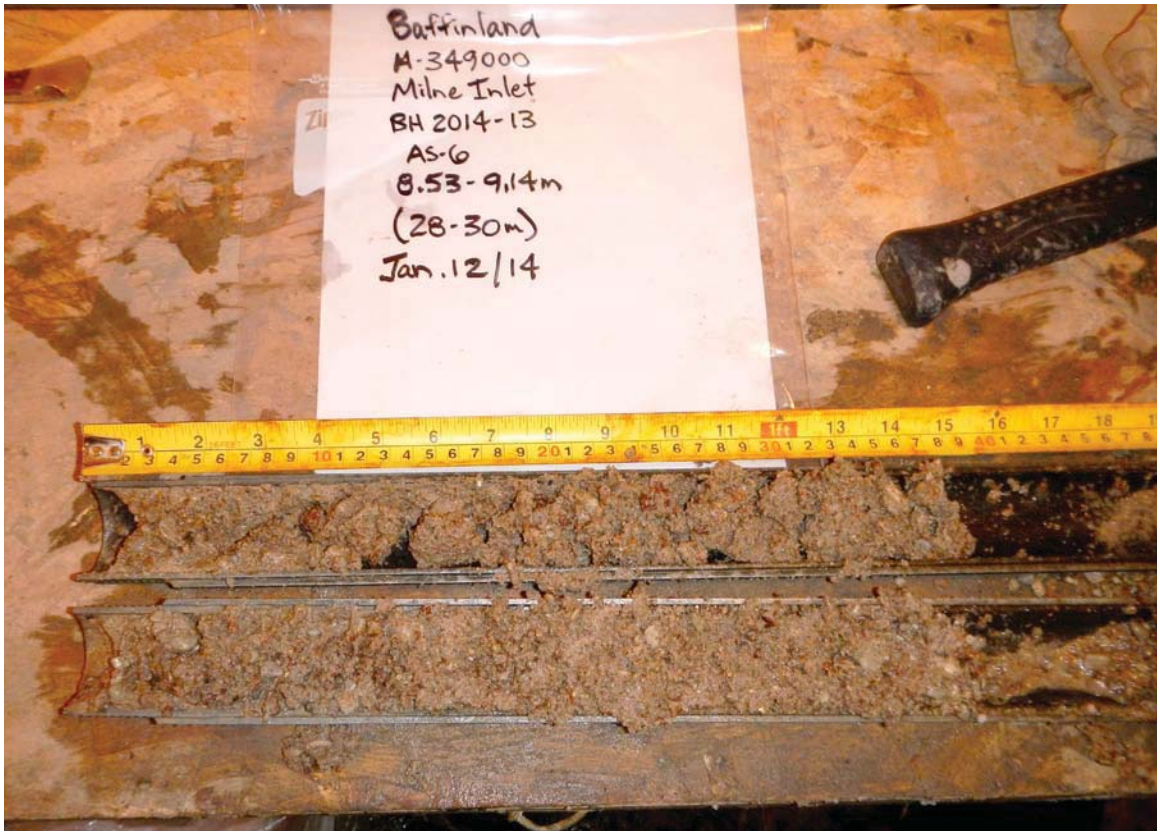
BH-2014-13 AS-3 (3.96m - 4.57m)



BH-2014-13 AS-4 (5.49m - 6.10m)



BH-2014-13 AS-5 (7.01m - 7.62m)



BH-2014-13 AS-6 (8.53m - 9.14m)



BH-2014-13 AS-8 (11.58m - 12.19m)



BH-2014-13 AS-9 (13.10m - 13.71m)



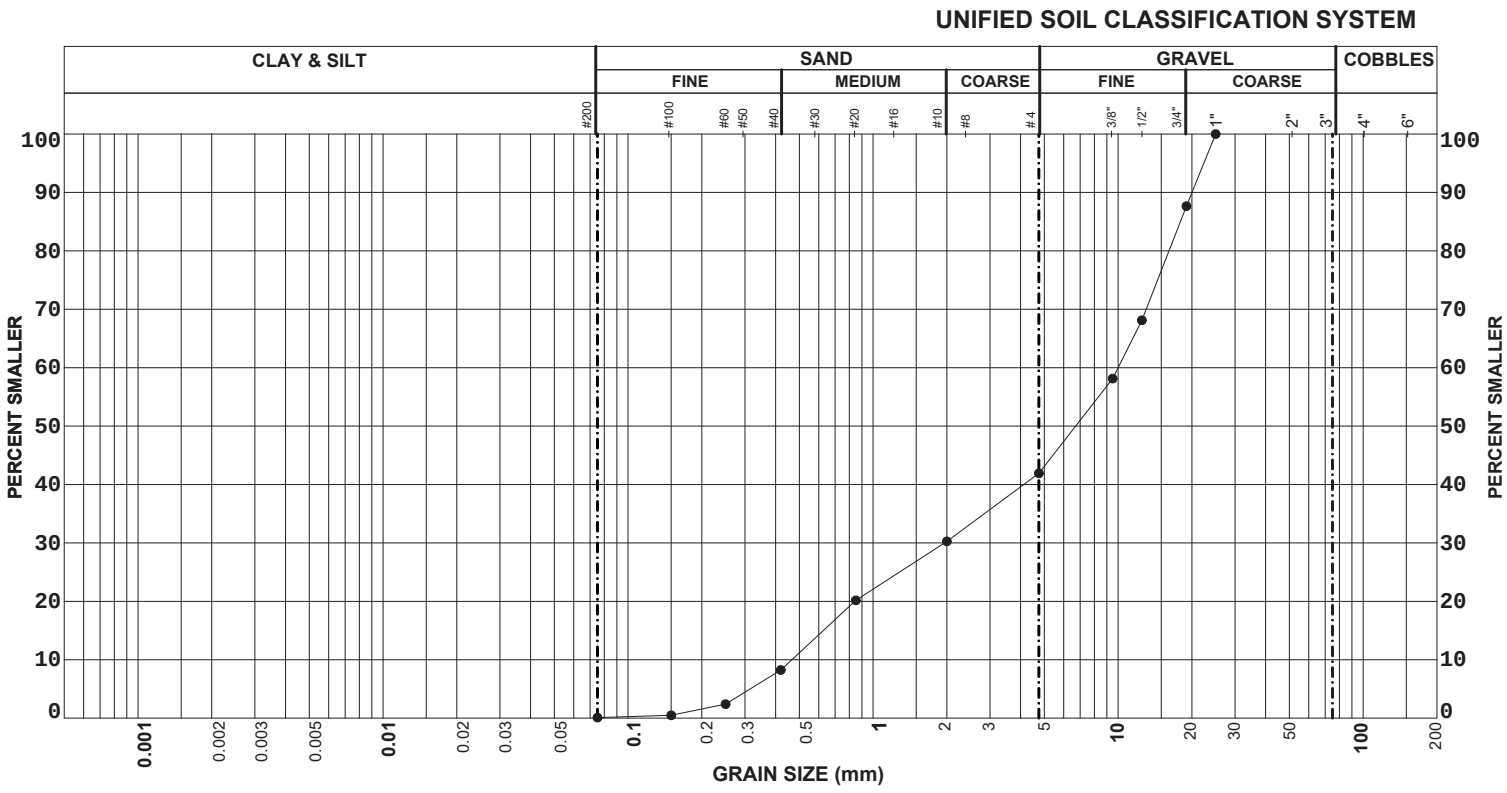
BH-2014-13 AS-11 (16.15m - 16.76m)



BH-2014-13 AS-17 (24.99m - 25.60m)

Appendix B
Laboratory Test Results

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-01		8.07	58	42	0		

GRAIN SIZE DISTRIBUTION

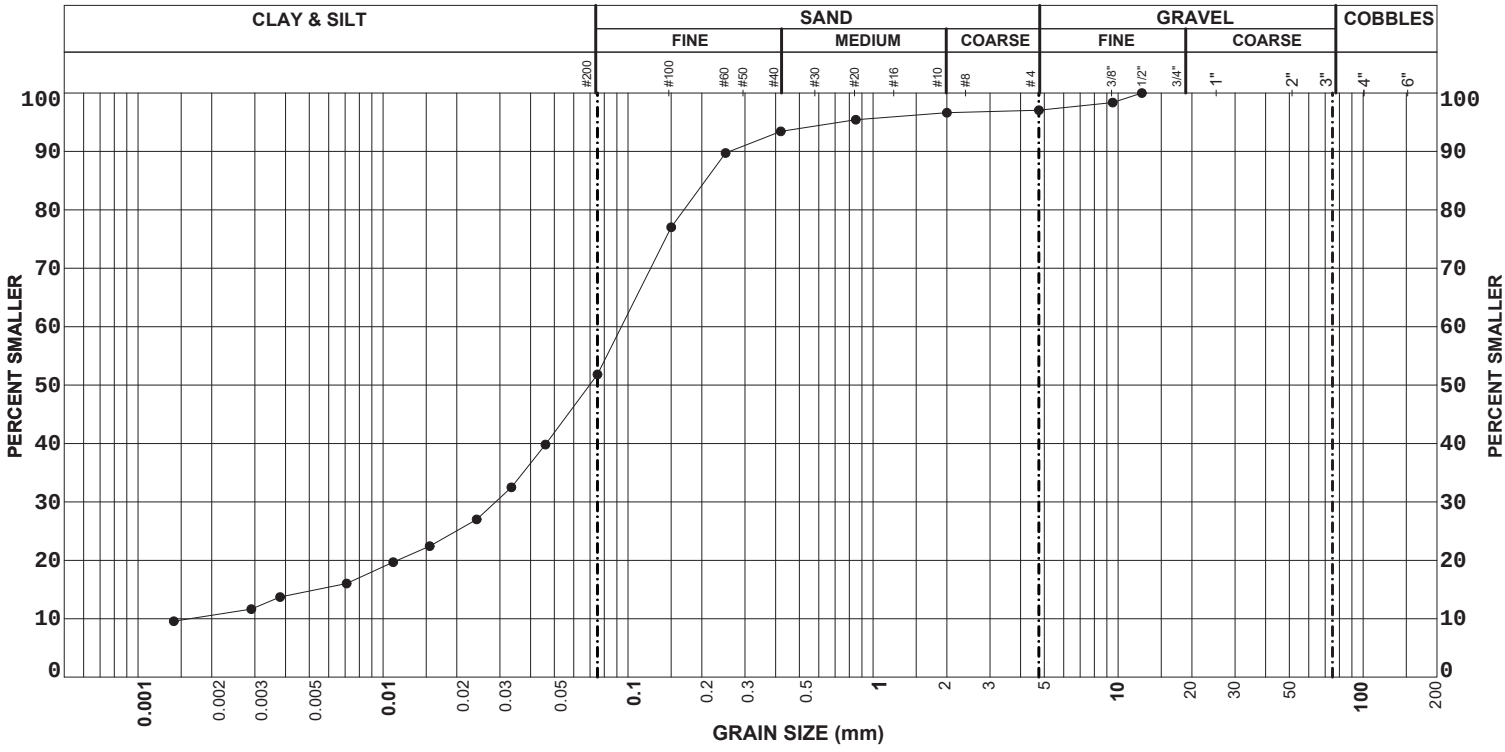
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UNIFIED SOIL CLASSIFICATION SYSTEM



REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-01		10.21	3	45	52		

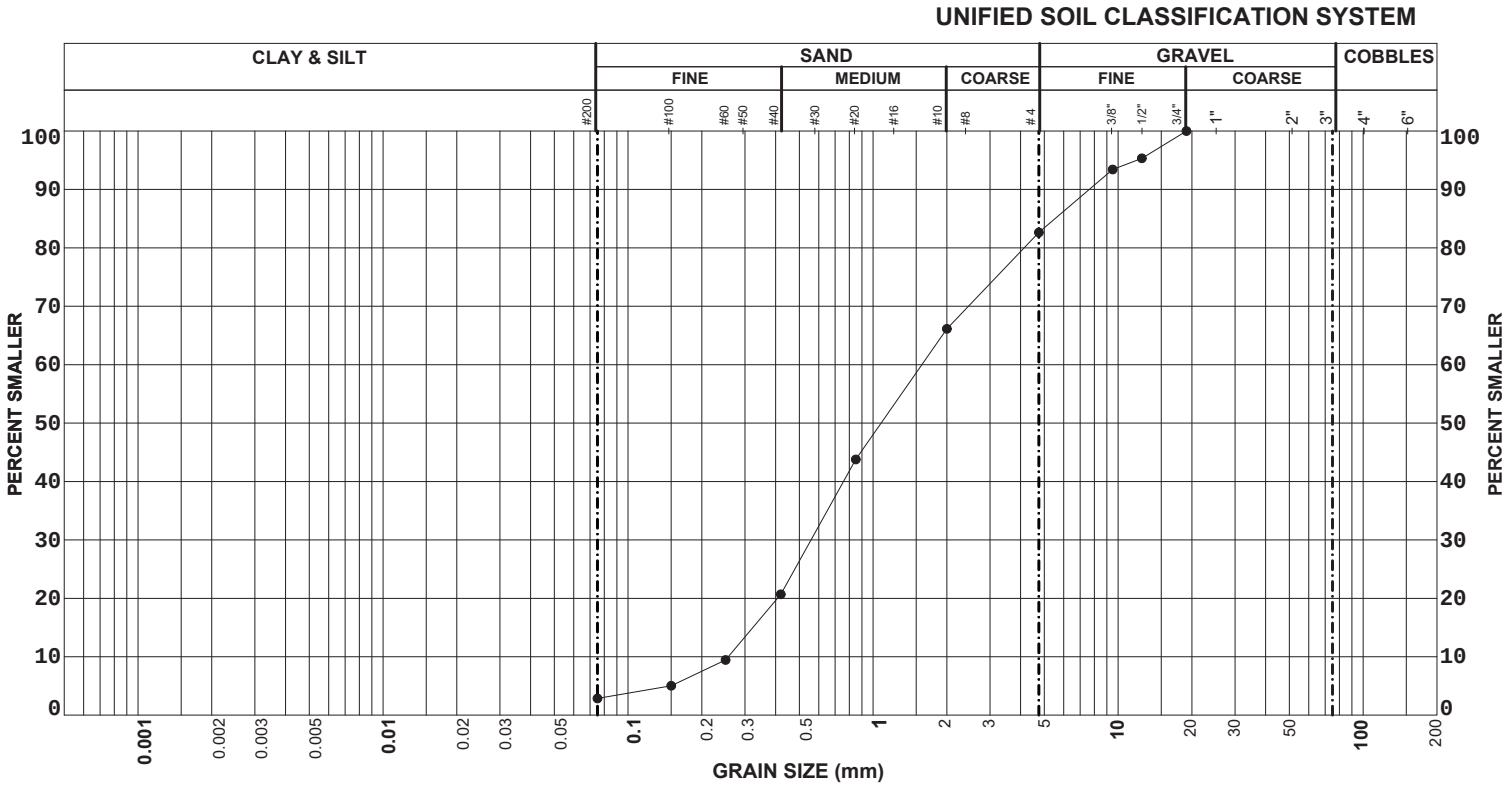
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-01		11.58	17	80	3		

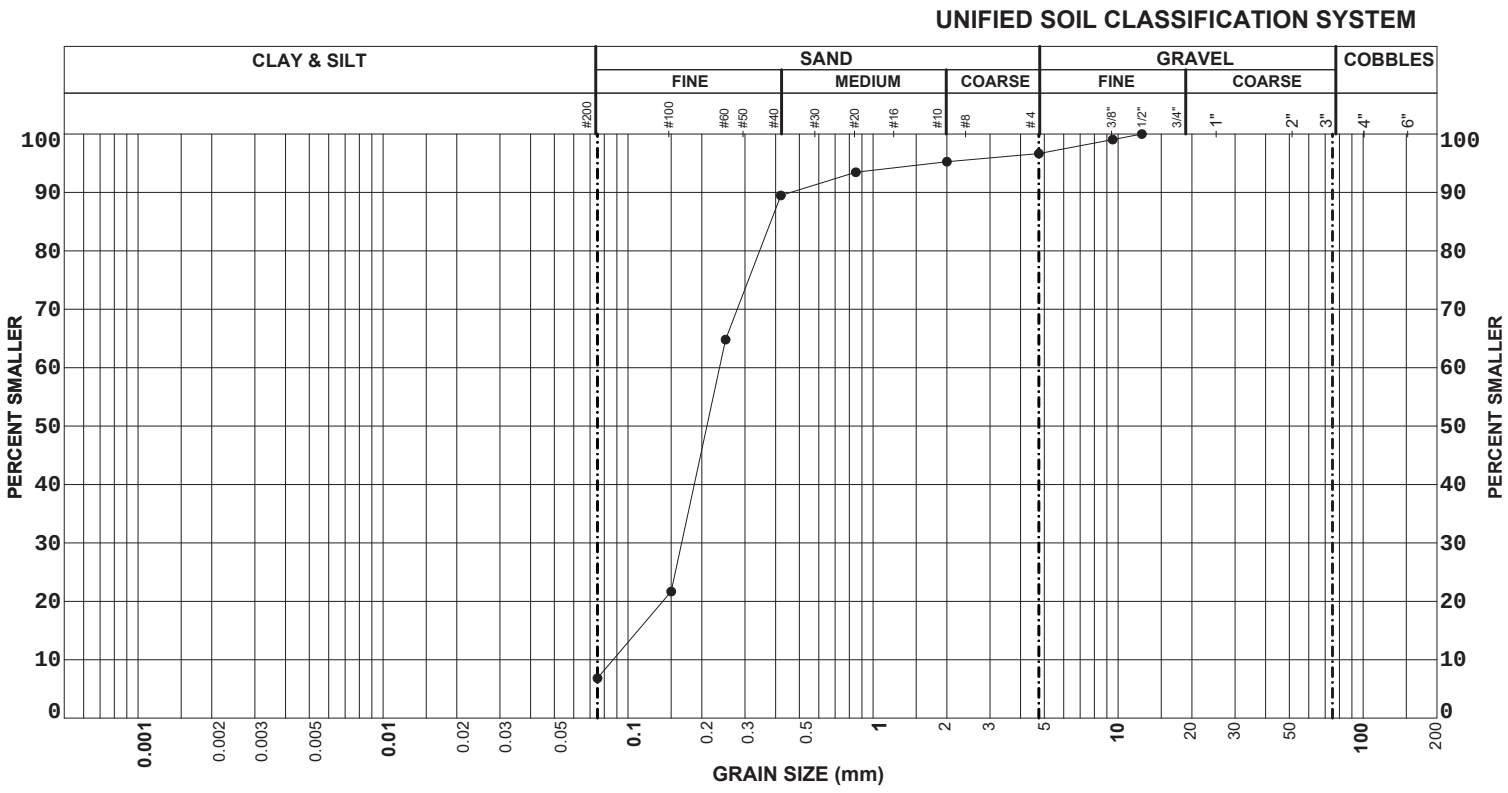
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-02		6.09	3	90	7		

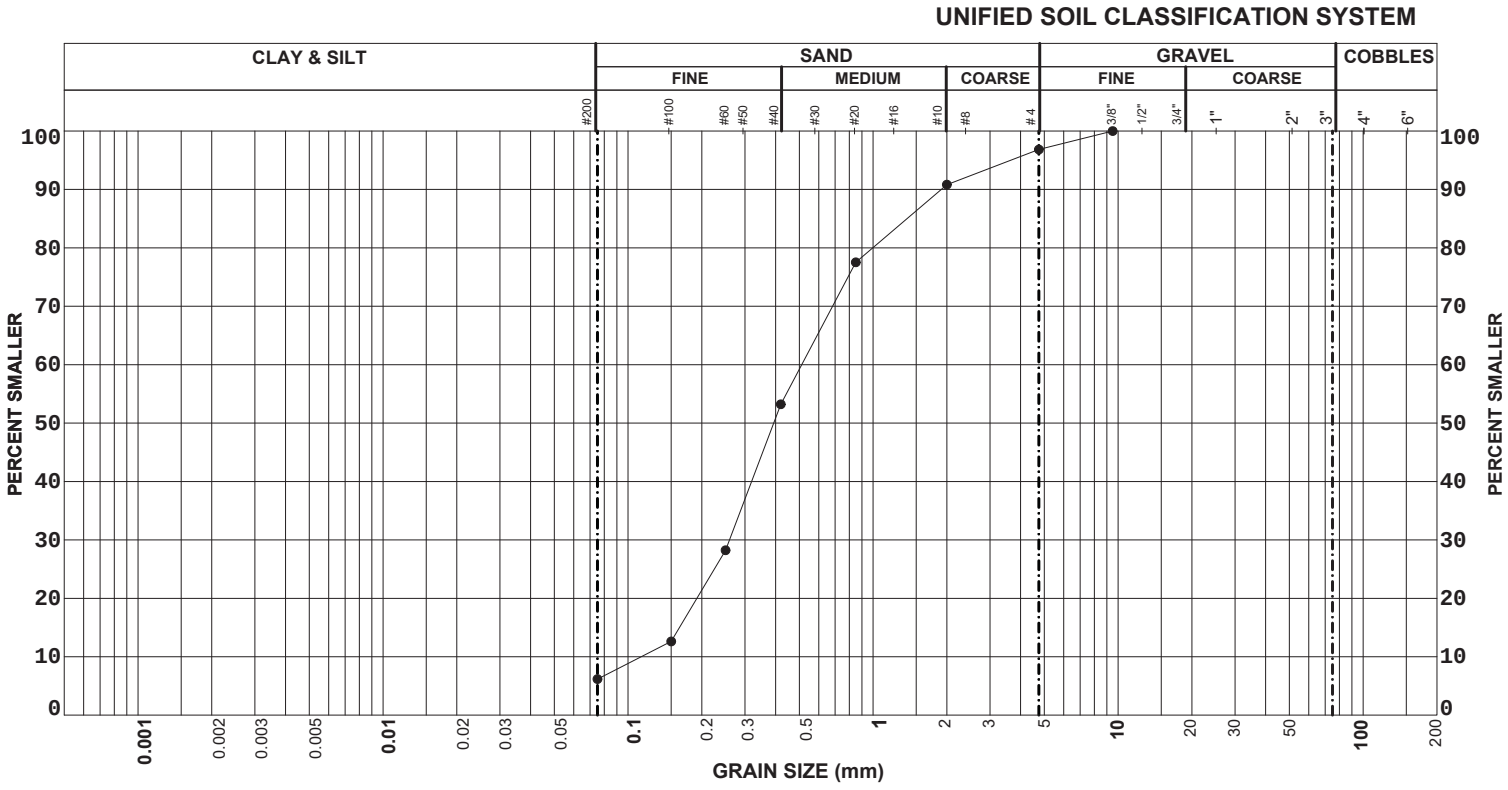
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-03	AS4	3.81	3	91	6		

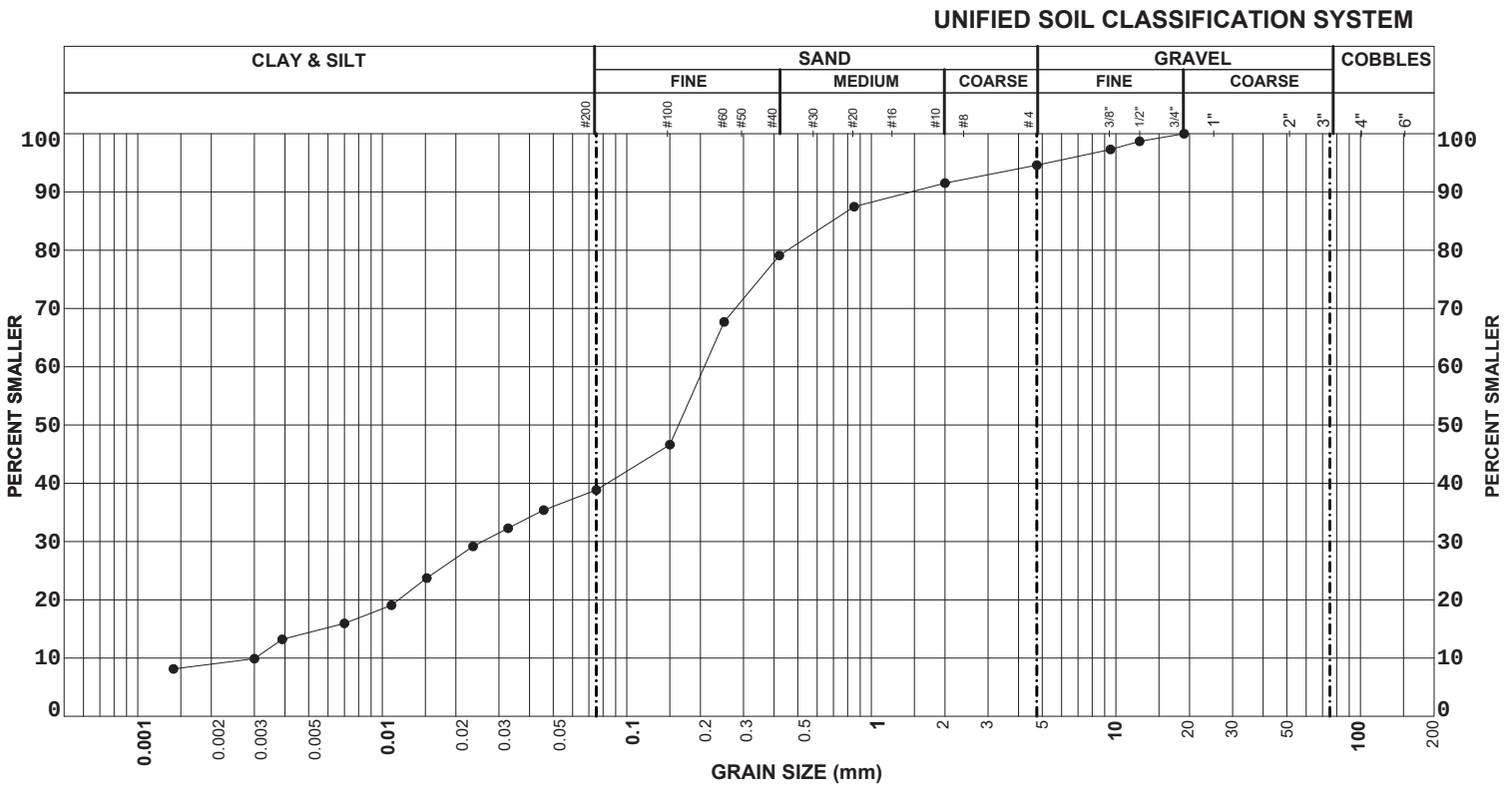
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-03	AS8	7.62	5	56	39		

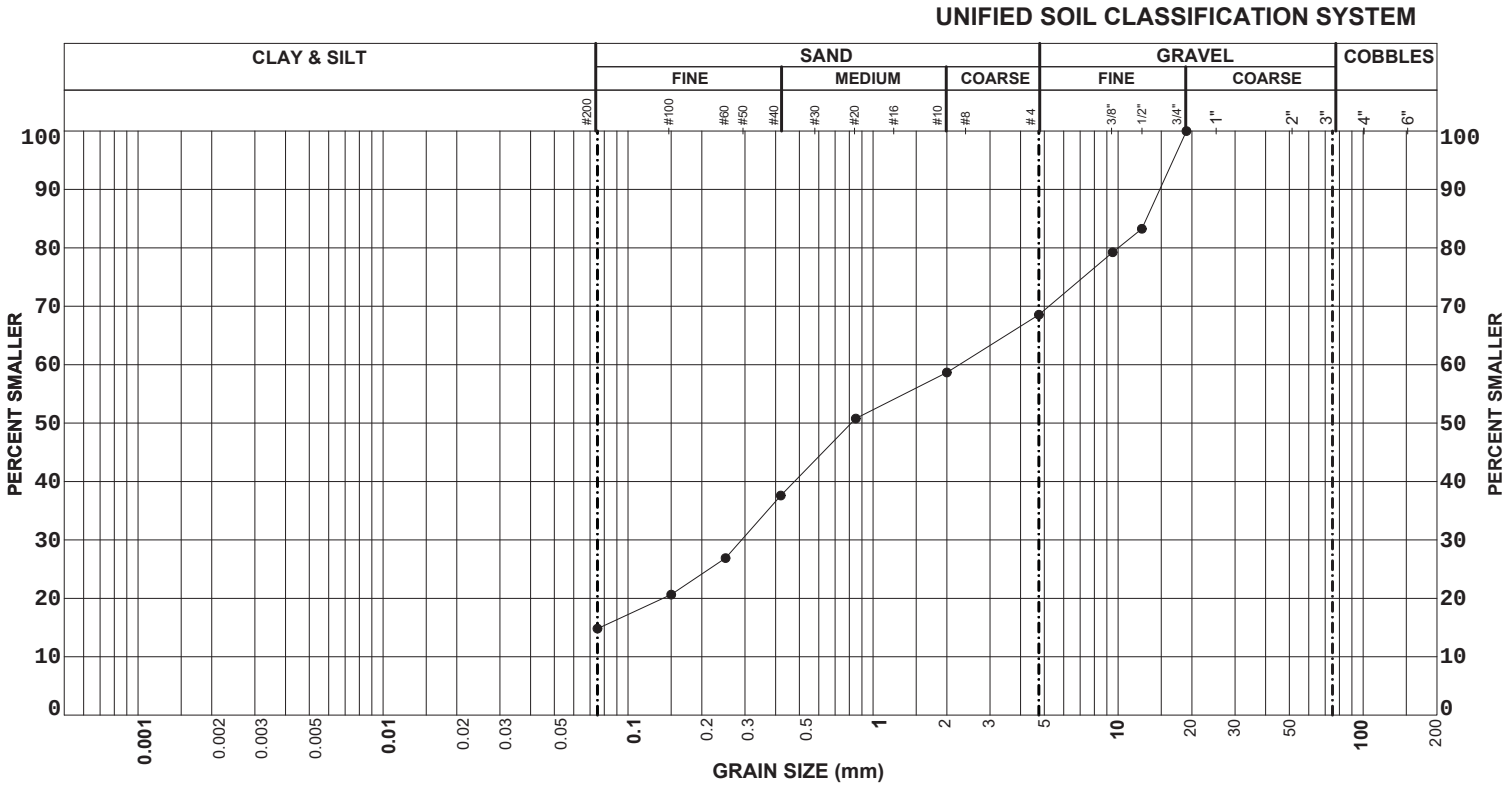
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-03	AS11	12.19	31	54	15		

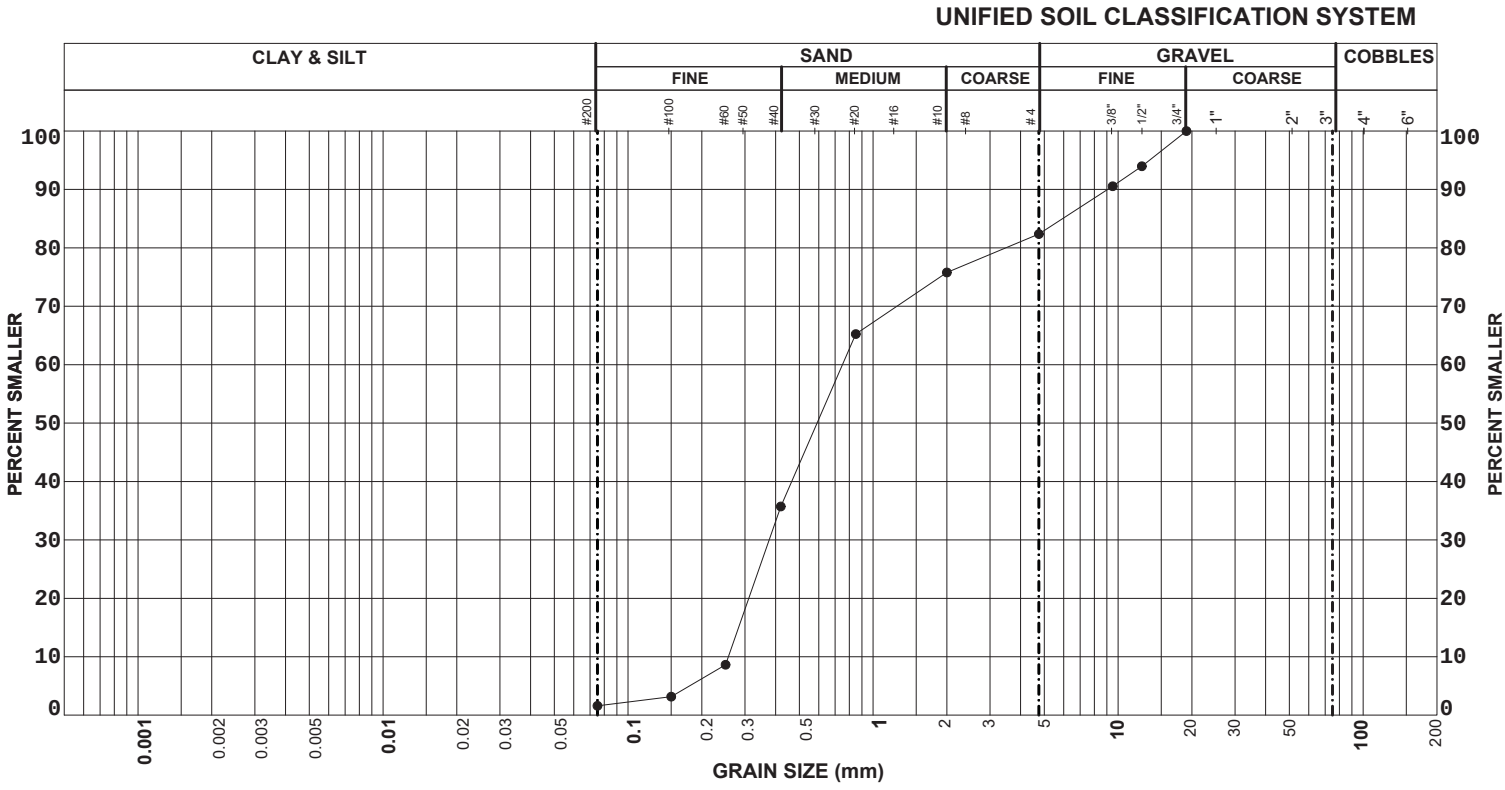
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-03	AS13	14.48	18	81	2		

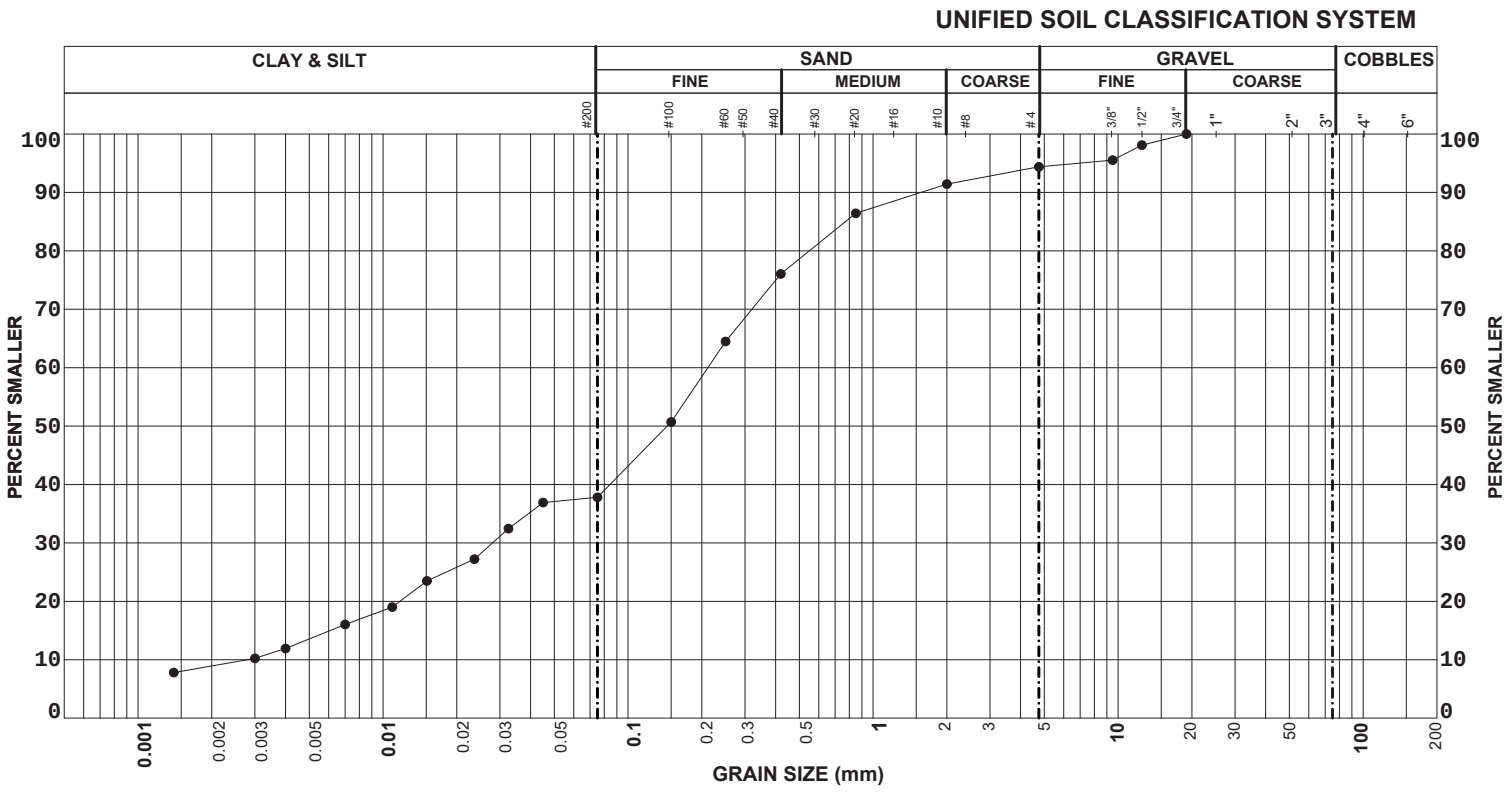
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05	AS2	1.52	6	57	38		

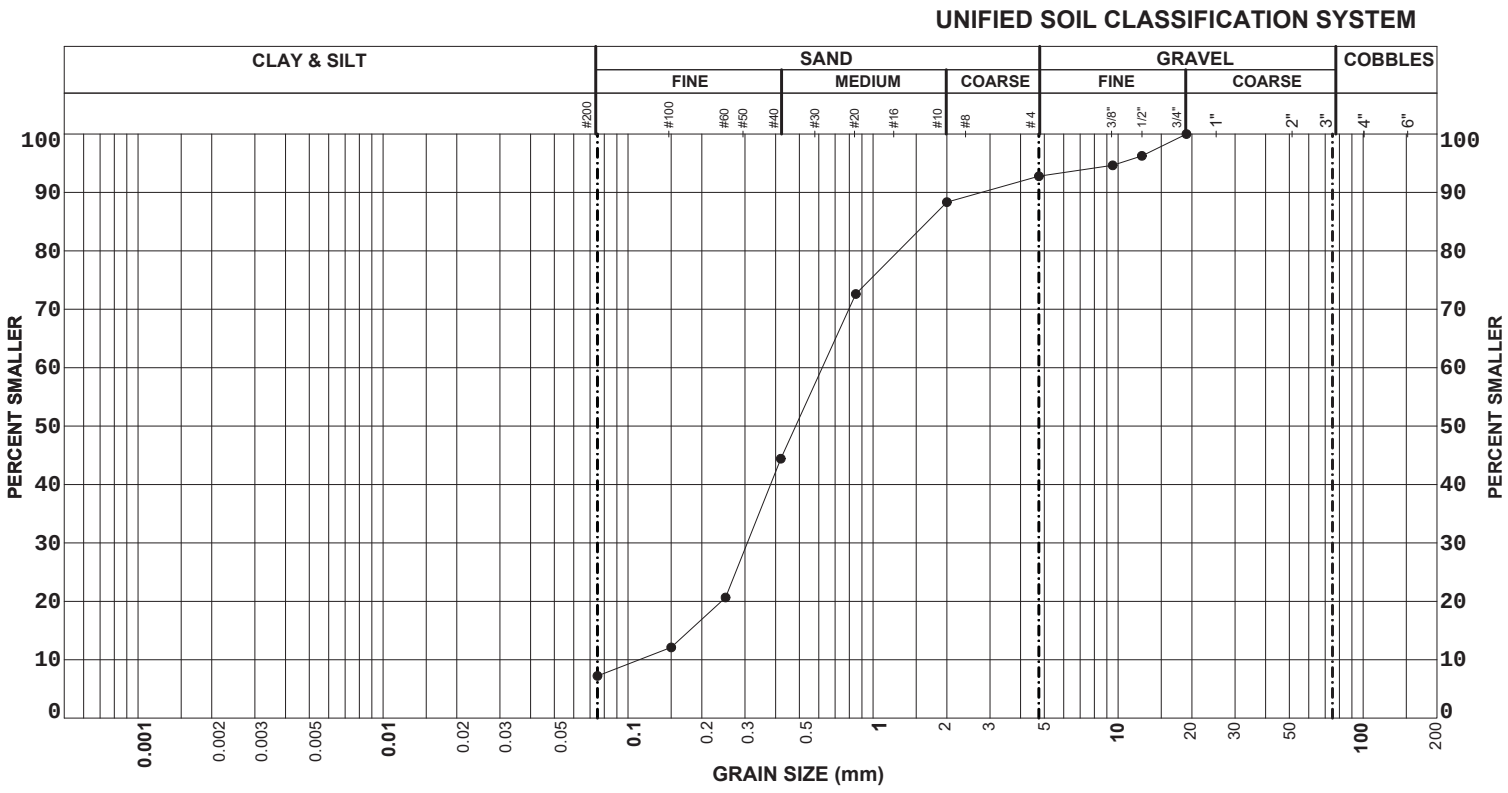
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05	AS4	4.57	7	86	7		

GRAIN SIZE DISTRIBUTION

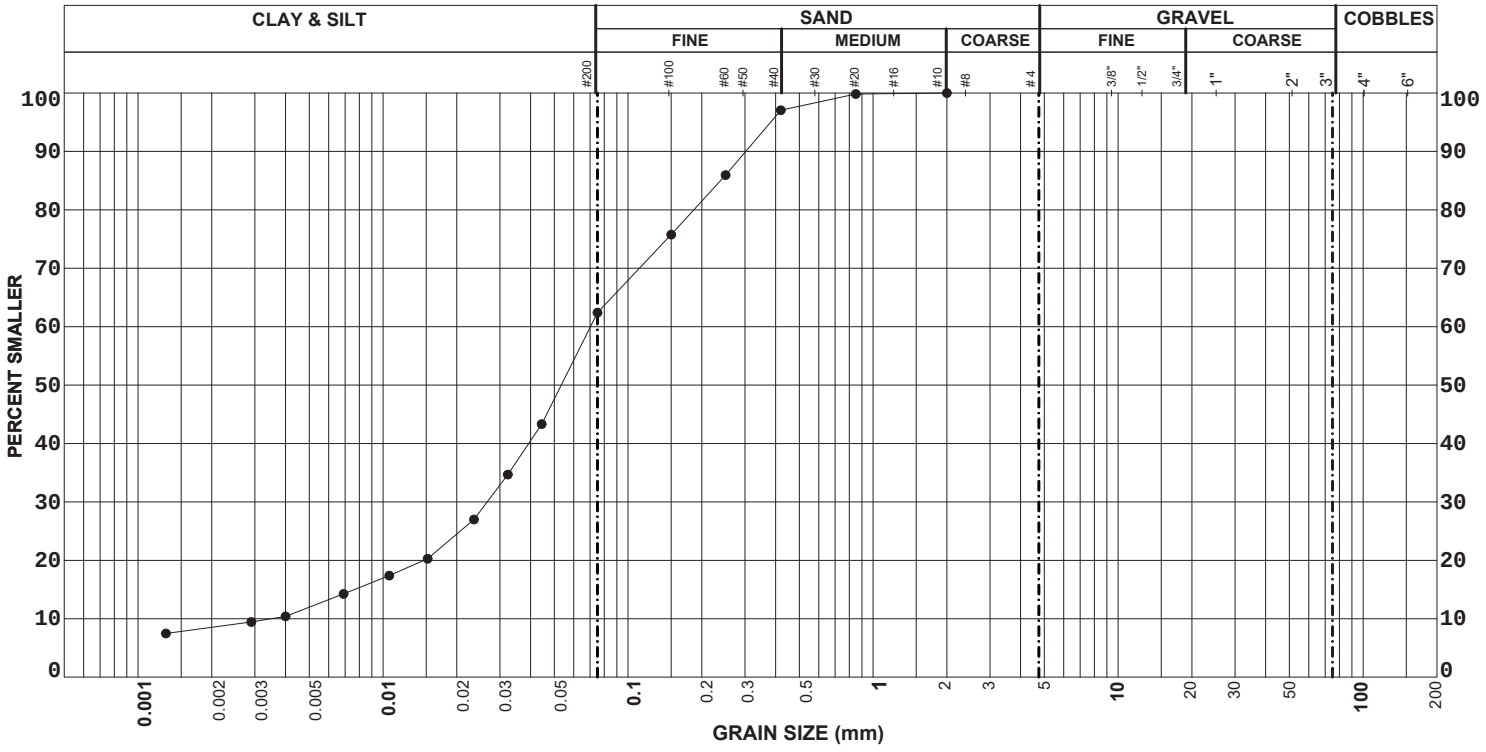
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-05	AS5	6.10	0	38	62		

GRAIN SIZE DISTRIBUTION

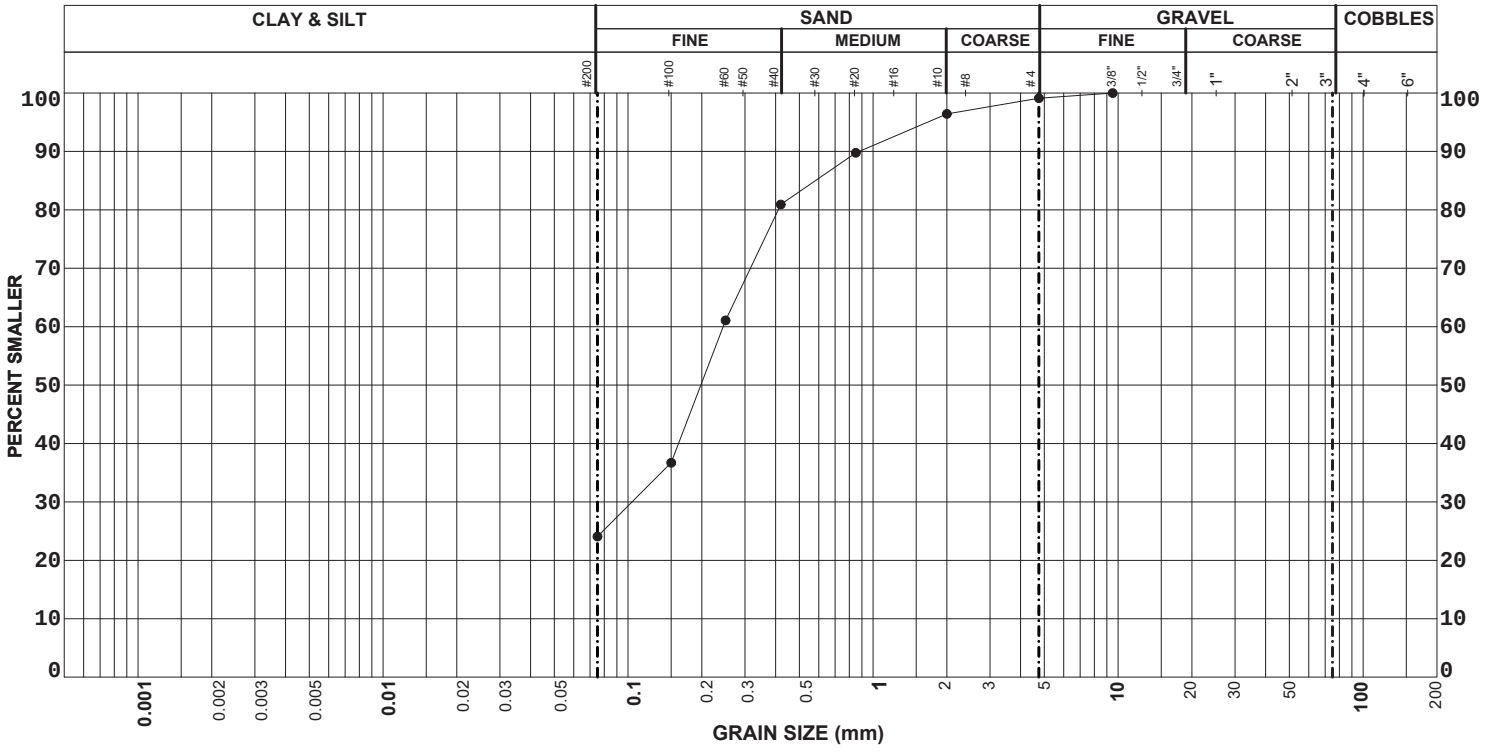
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UNIFIED SOIL CLASSIFICATION SYSTEM



REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-05	AS9	12.19	1	75	24		

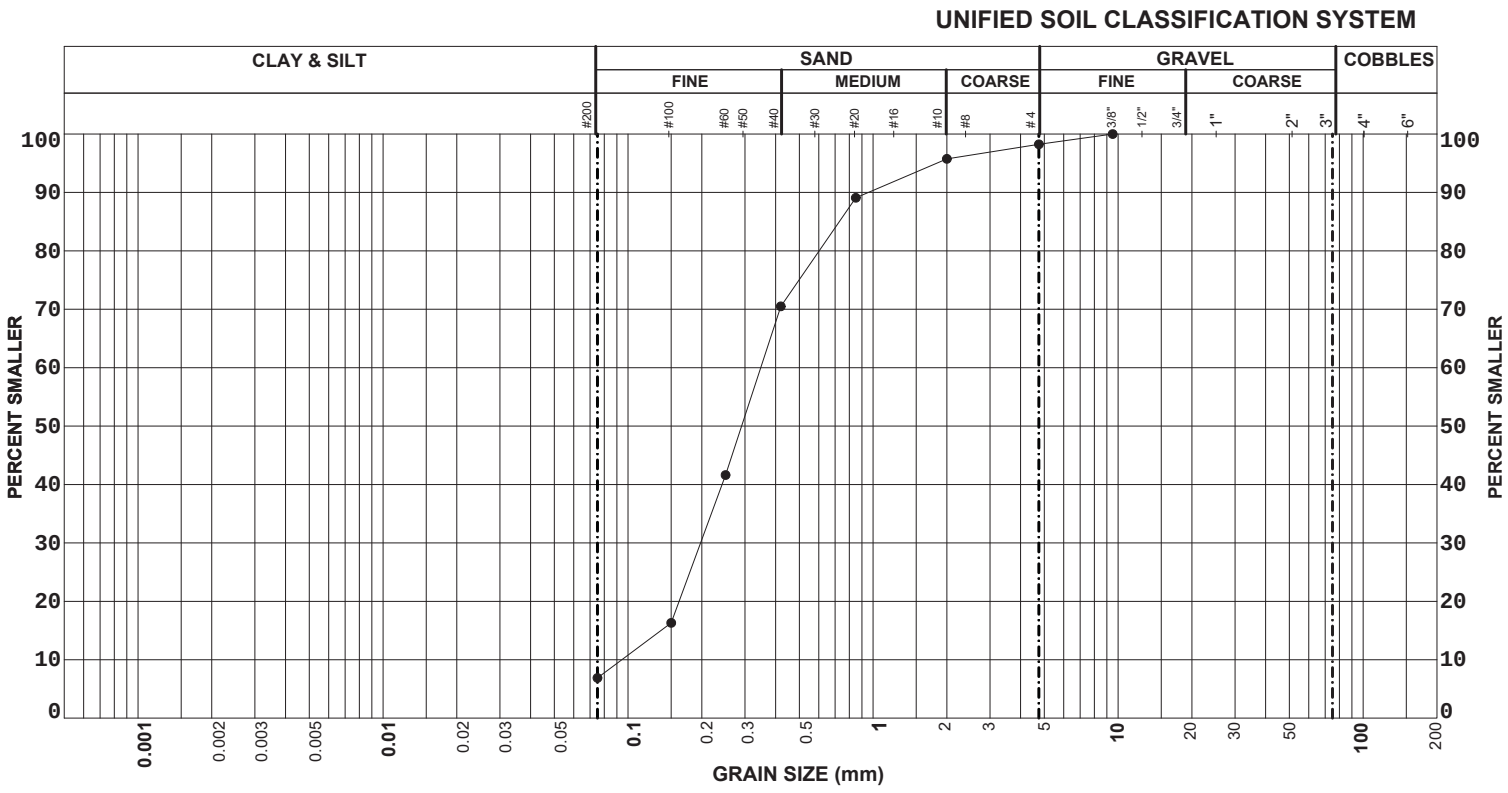
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-05	AS10	13.72	2	91	7		

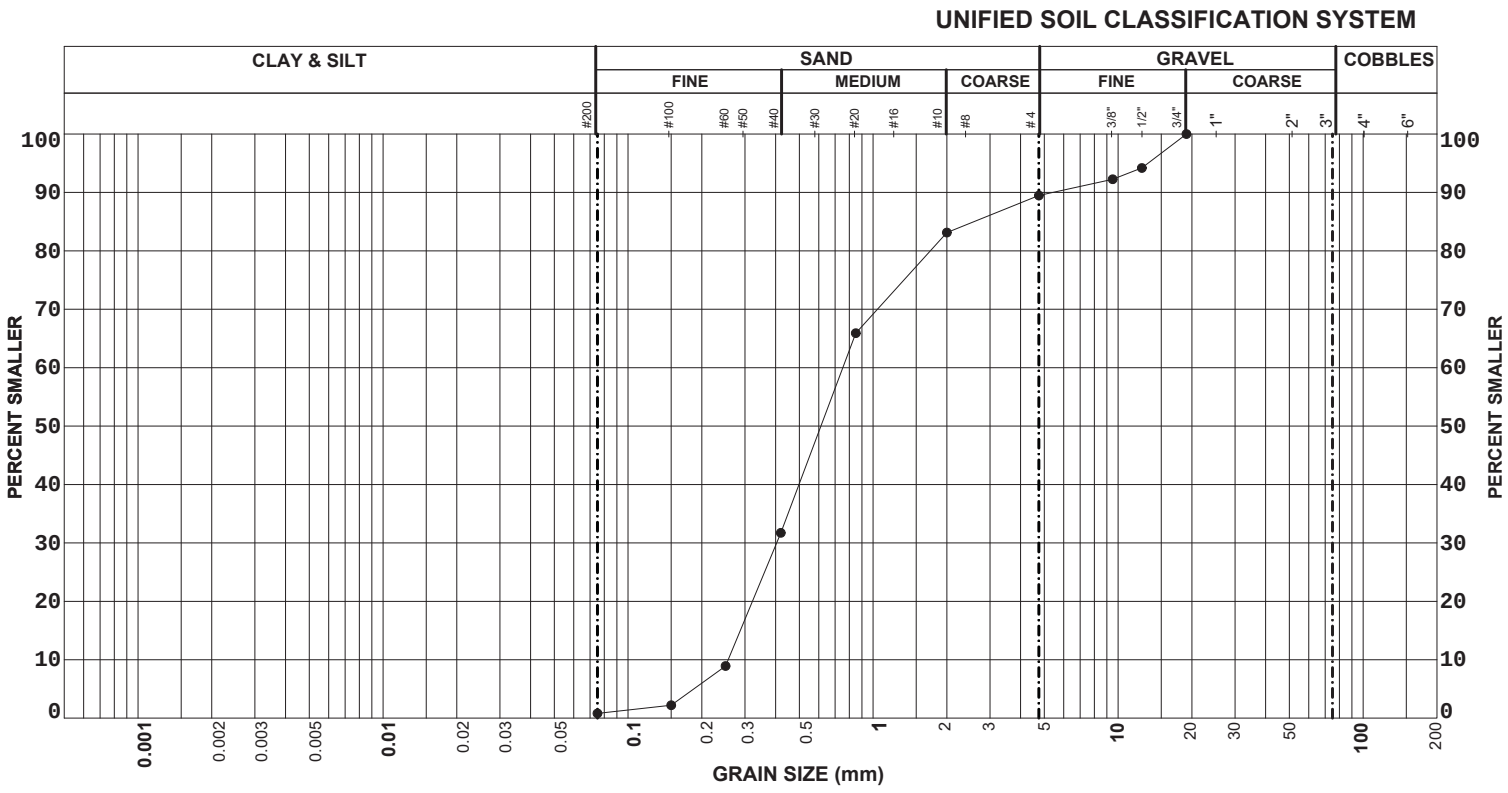
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05		20.73	11	89	1		

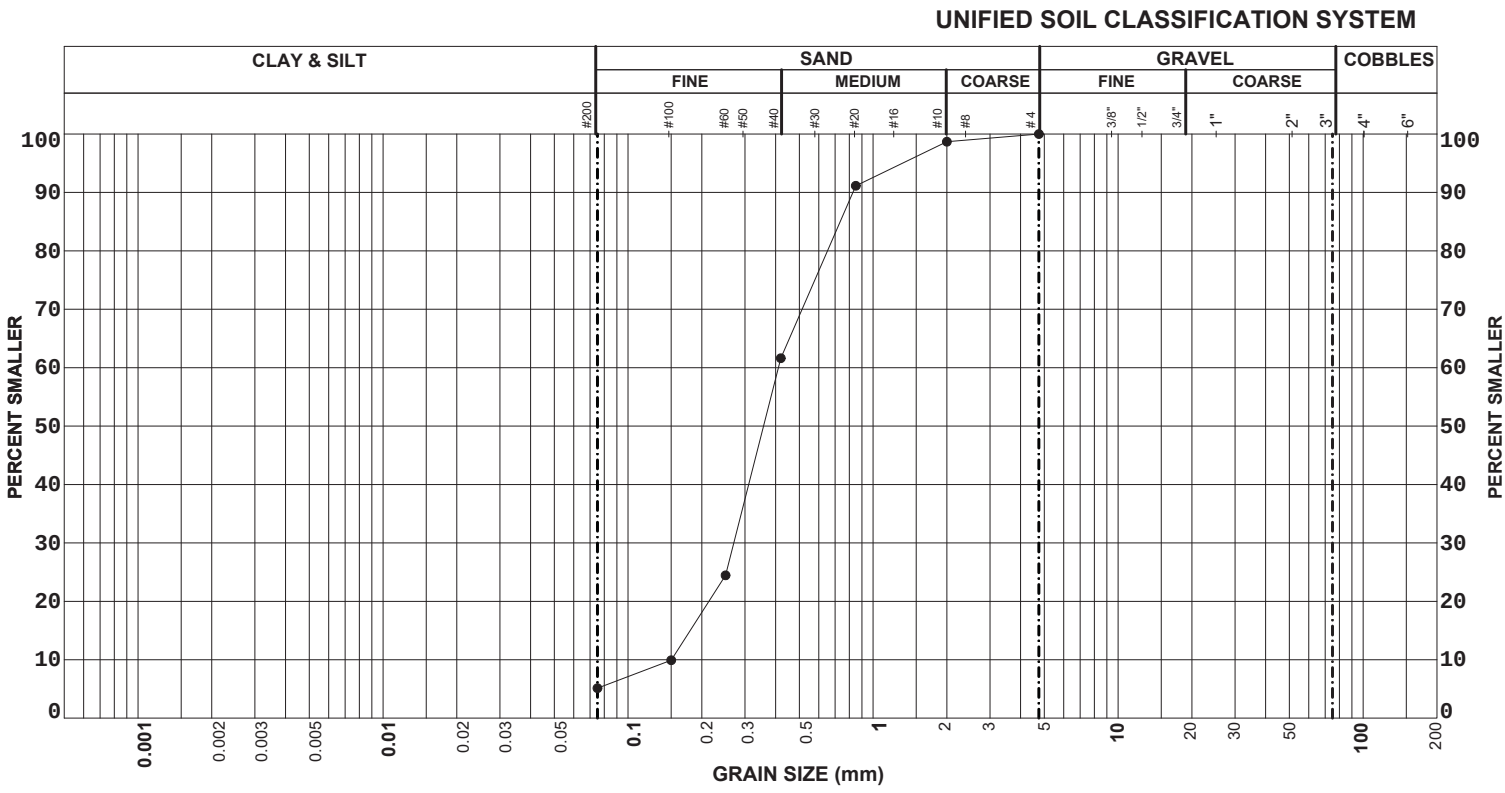
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05		33.53	0	95	5		

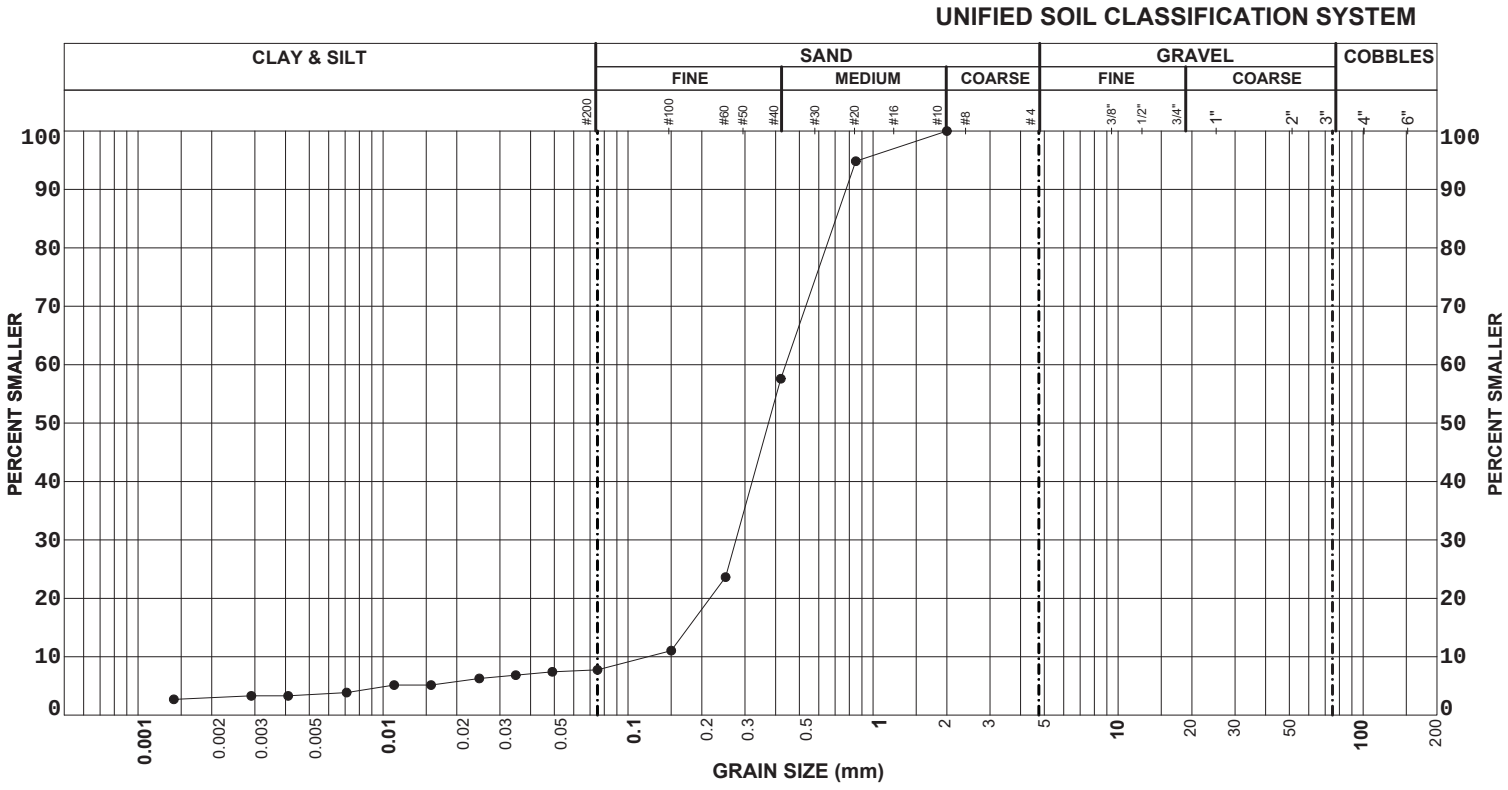
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-05B	AS3	20.11	0	92	8		

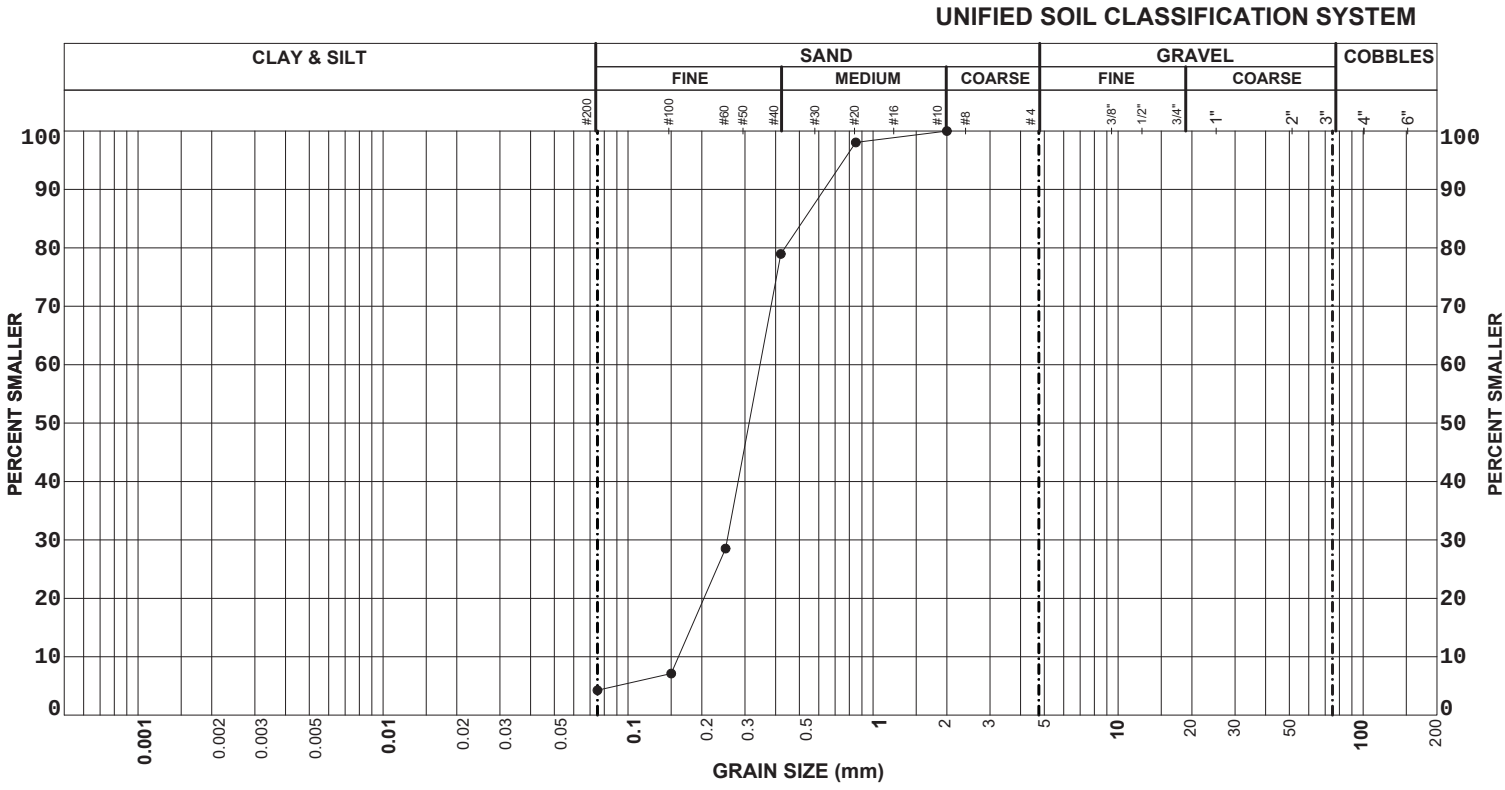
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05B		24.68	0	96	4		

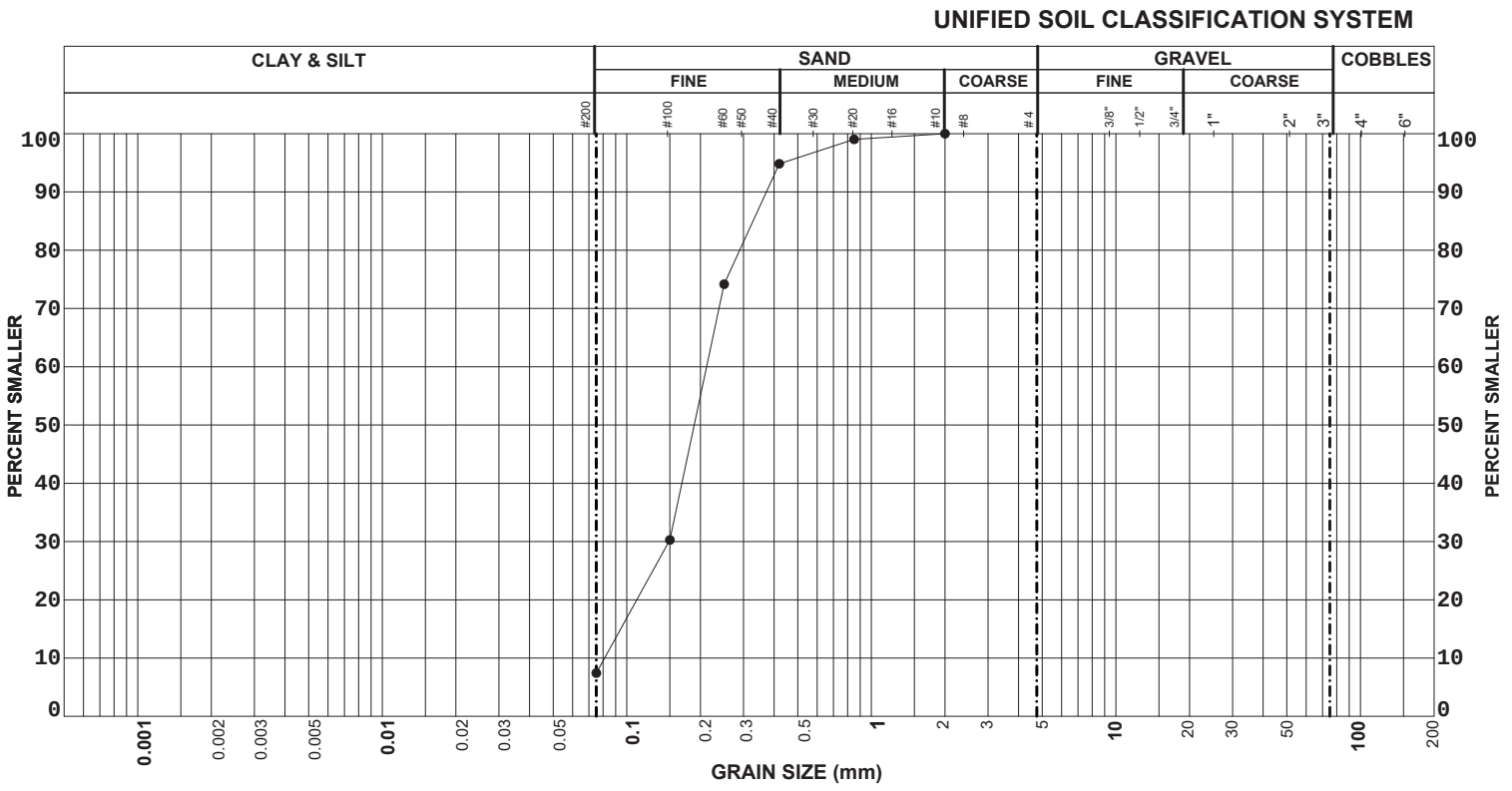
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-05B	AS8	39.62	0	93	7		

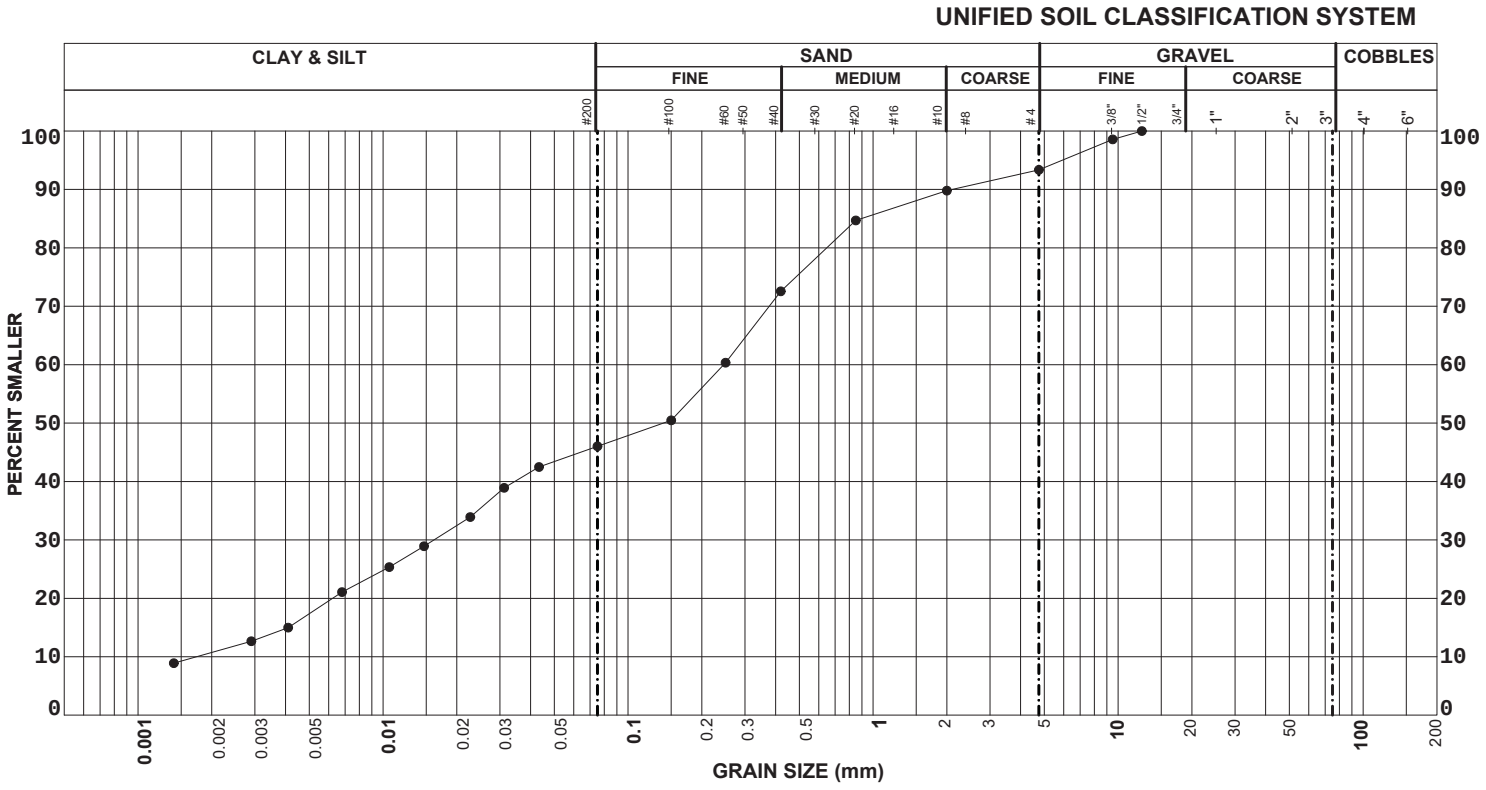
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-07	AS2	1.83	7	47	46		

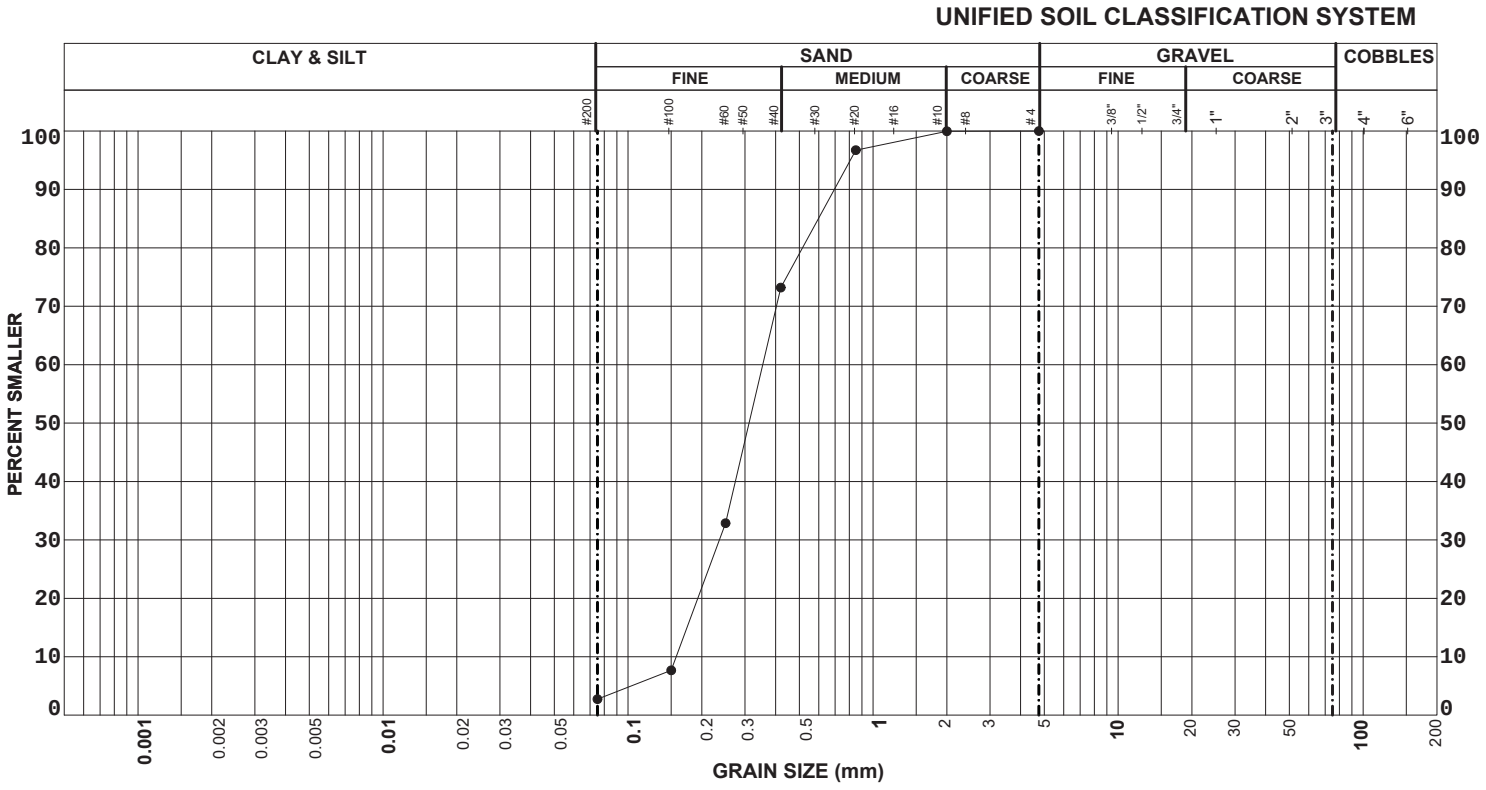
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-07	AS3	3.35	0	97	3		

GRAIN SIZE DISTRIBUTION

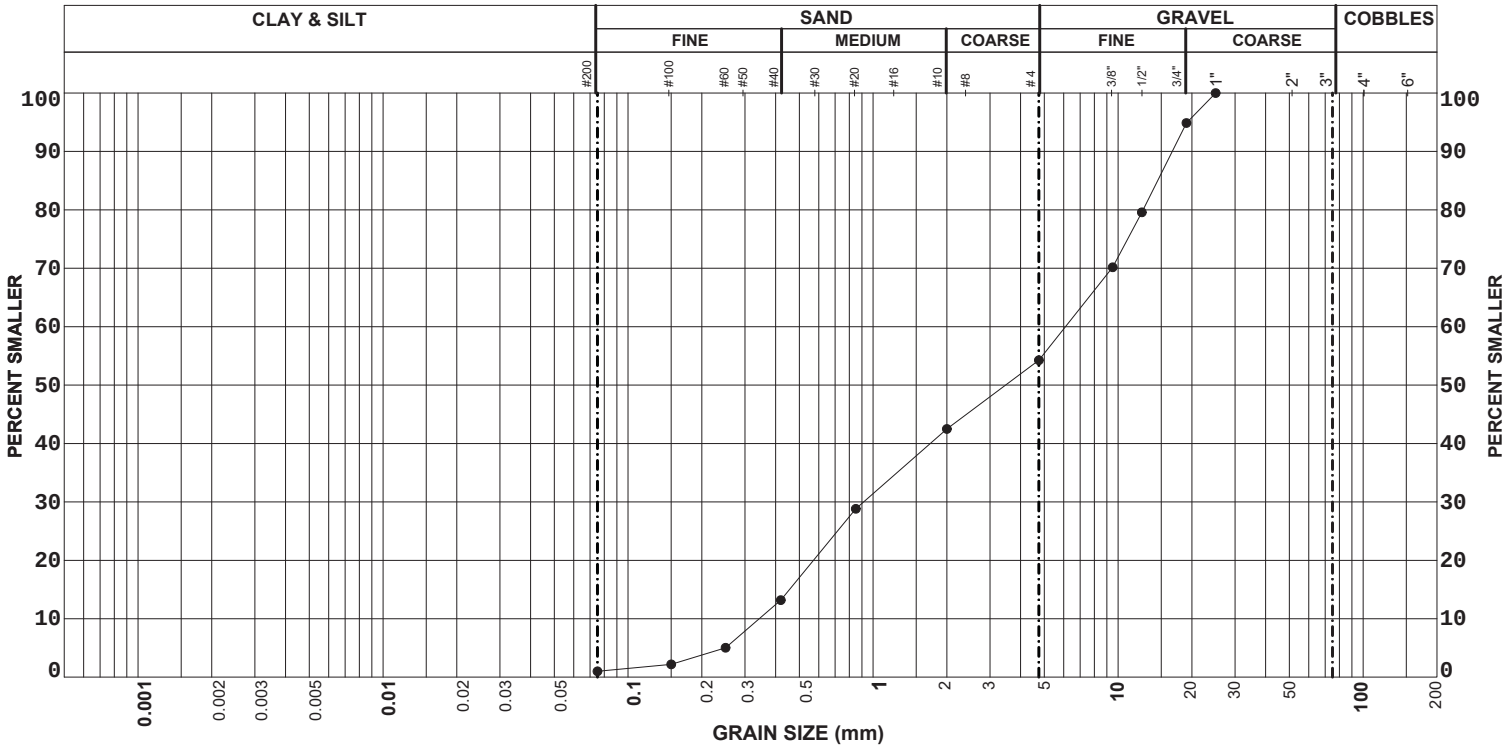
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UNIFIED SOIL CLASSIFICATION SYSTEM



REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-07		4.87	46	53	1		

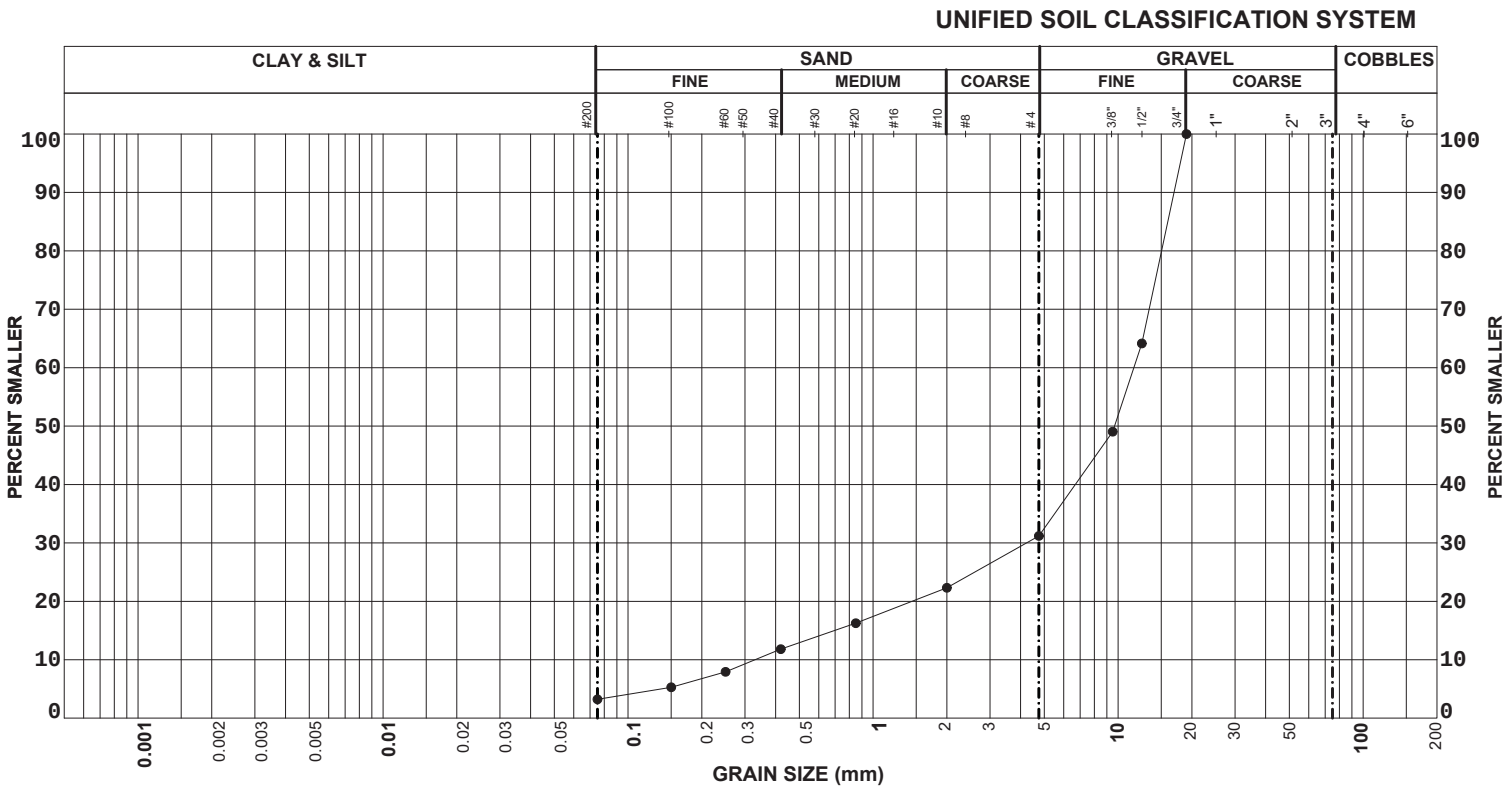
GRAIN SIZE DISTRIBUTION

Baffinland Iron Mines Corporation

Mary River Project

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-07		9.74	69	28	3		

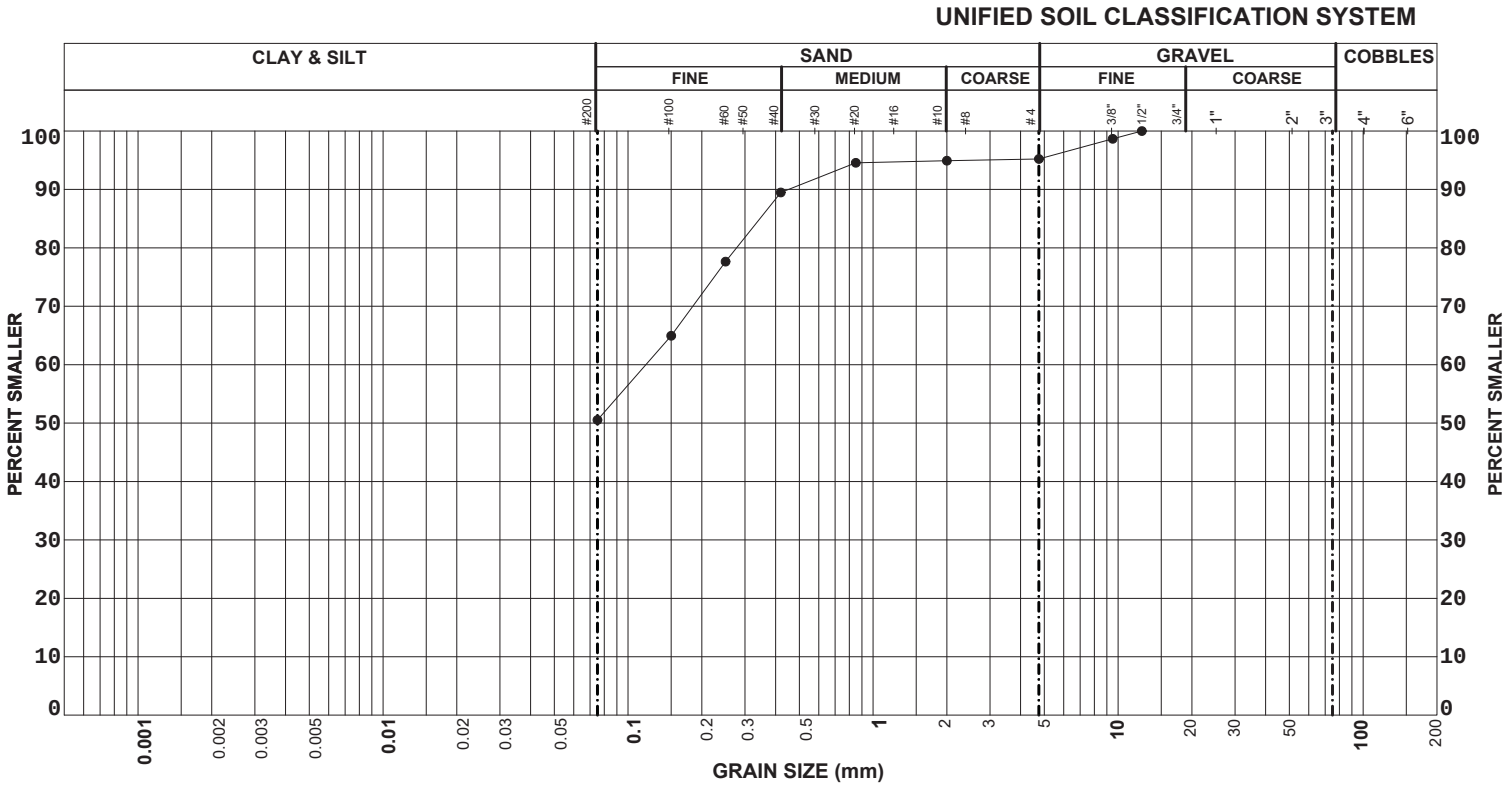
GRAIN SIZE DISTRIBUTION

Baffinland Iron Mines Corporation

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH13-07	AS7	9.75	5	45	51		

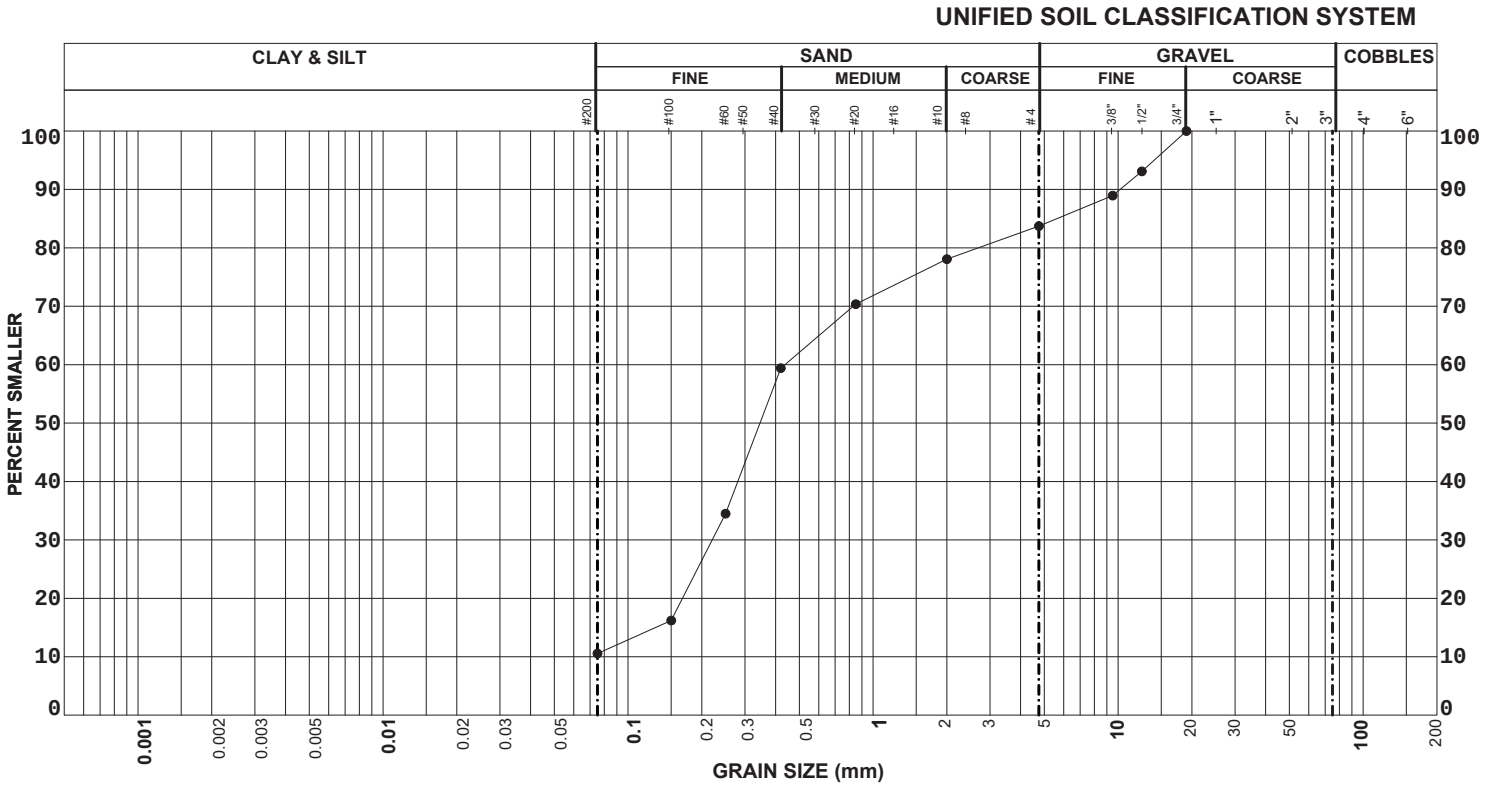
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-07		10.36	16	73	11		

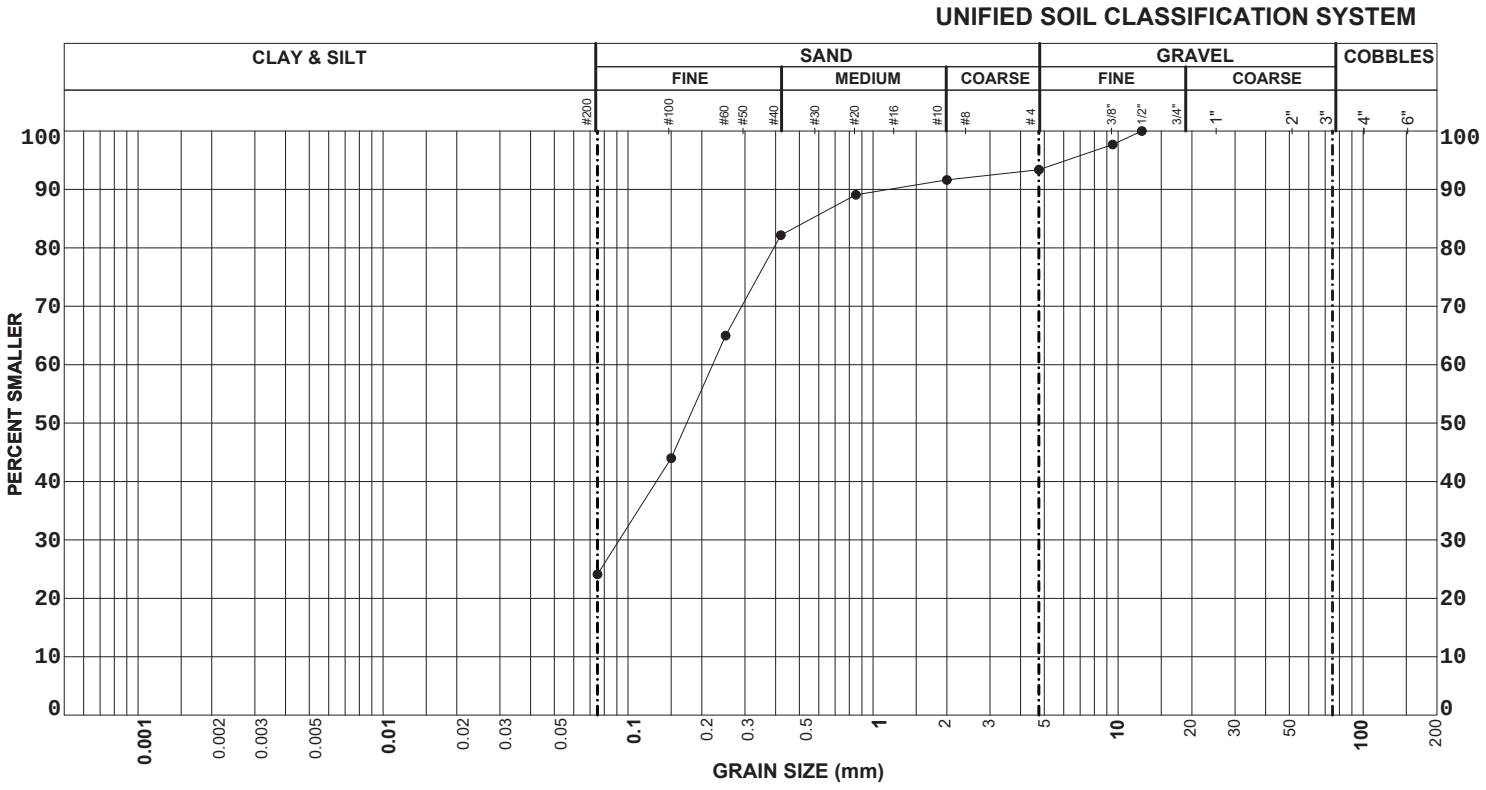
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-07		11.28	7	69	24		

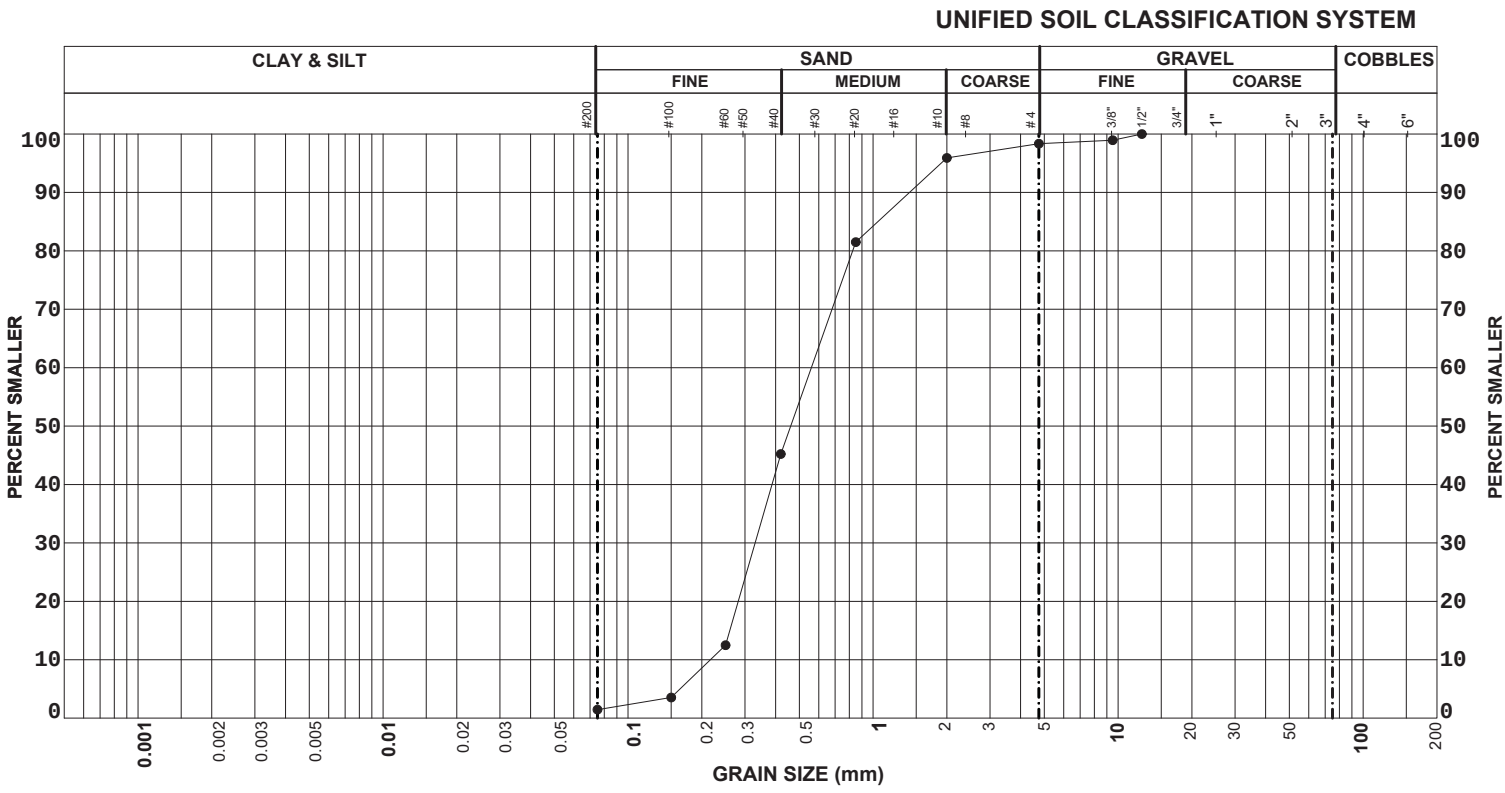
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH13-07	AS11	14.63	2	97	1		

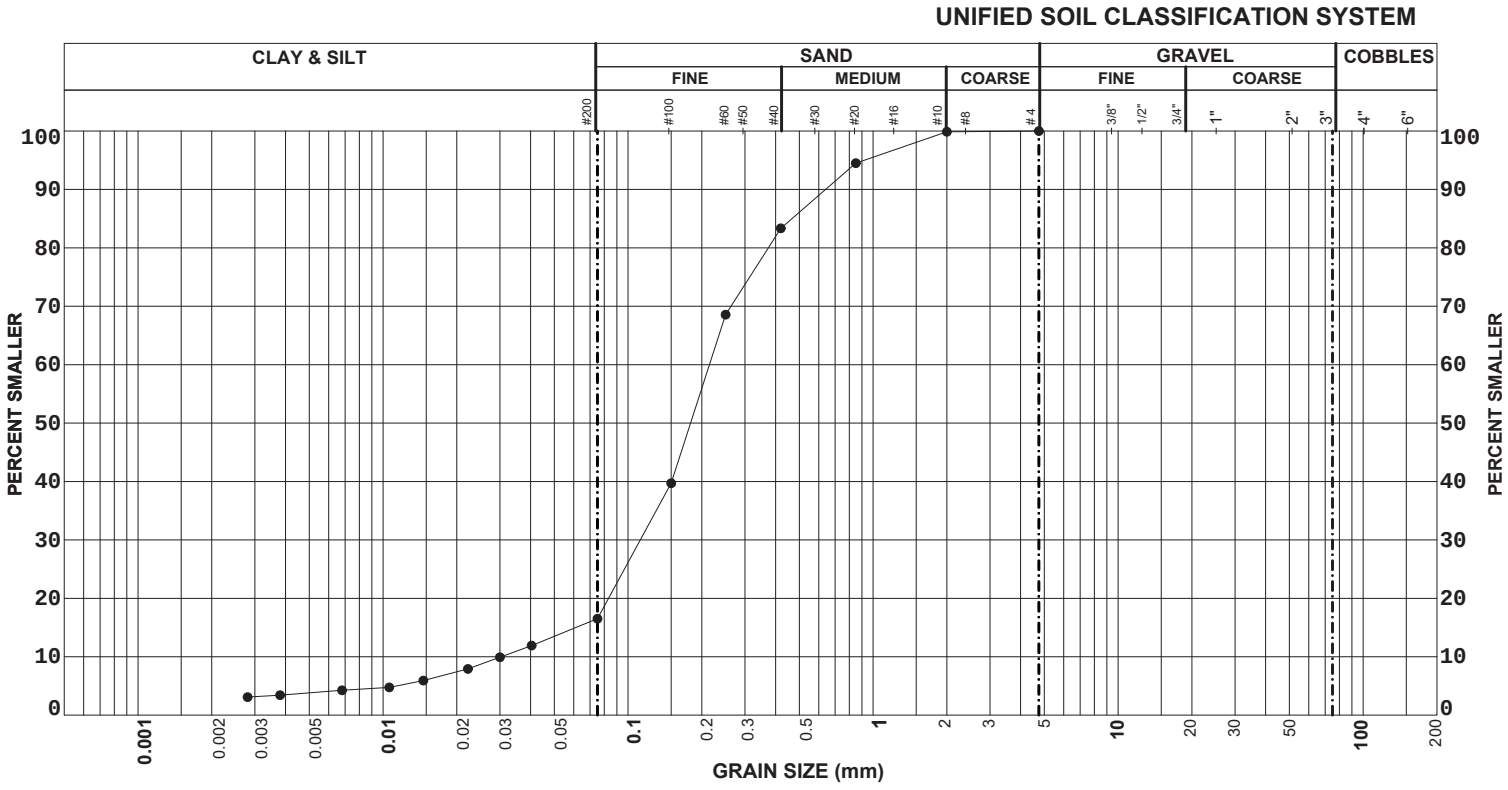
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-05C	AS15	36.88	0	83	17		

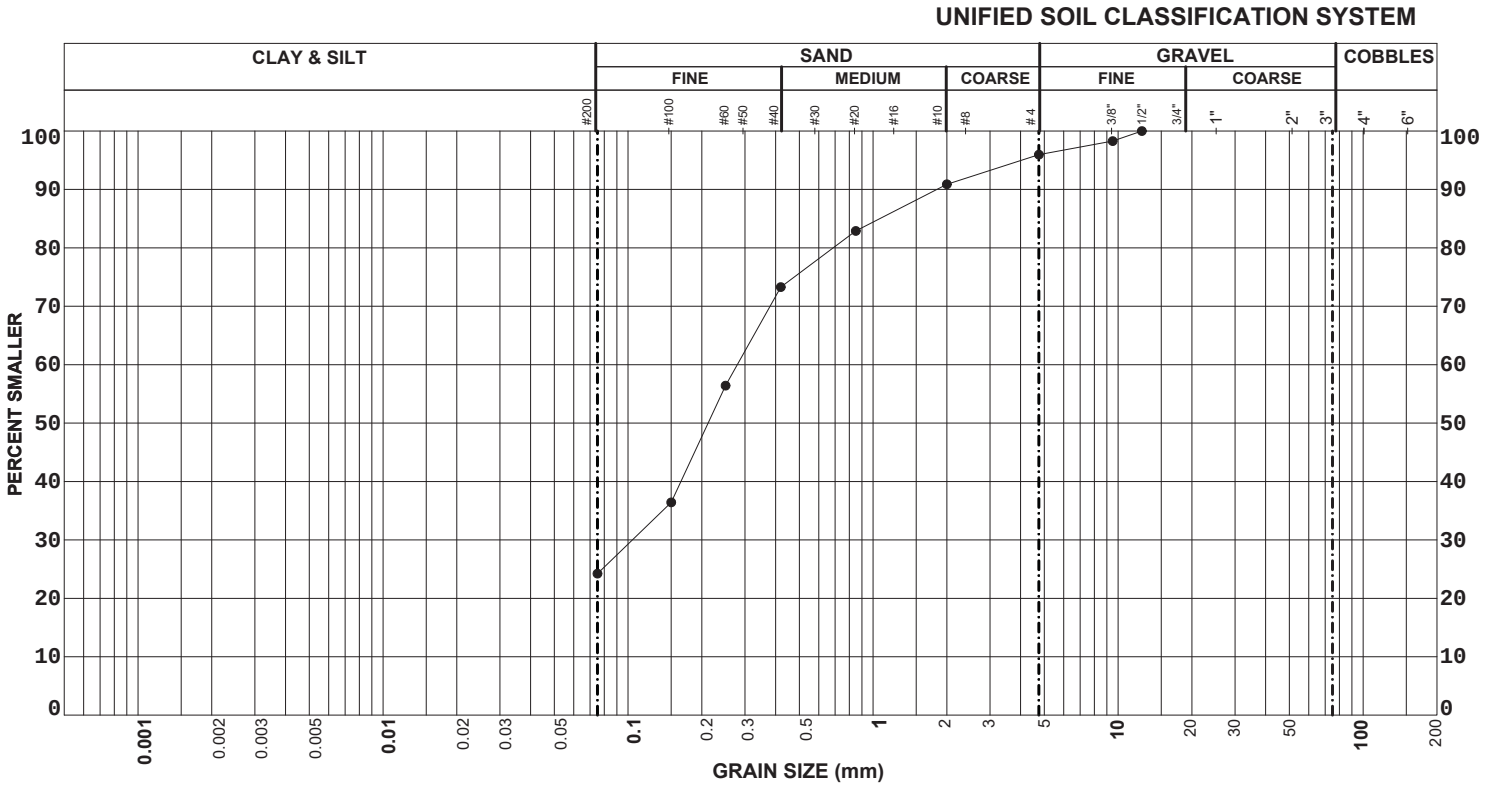
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-06	AS1	0.15	4	72	24		

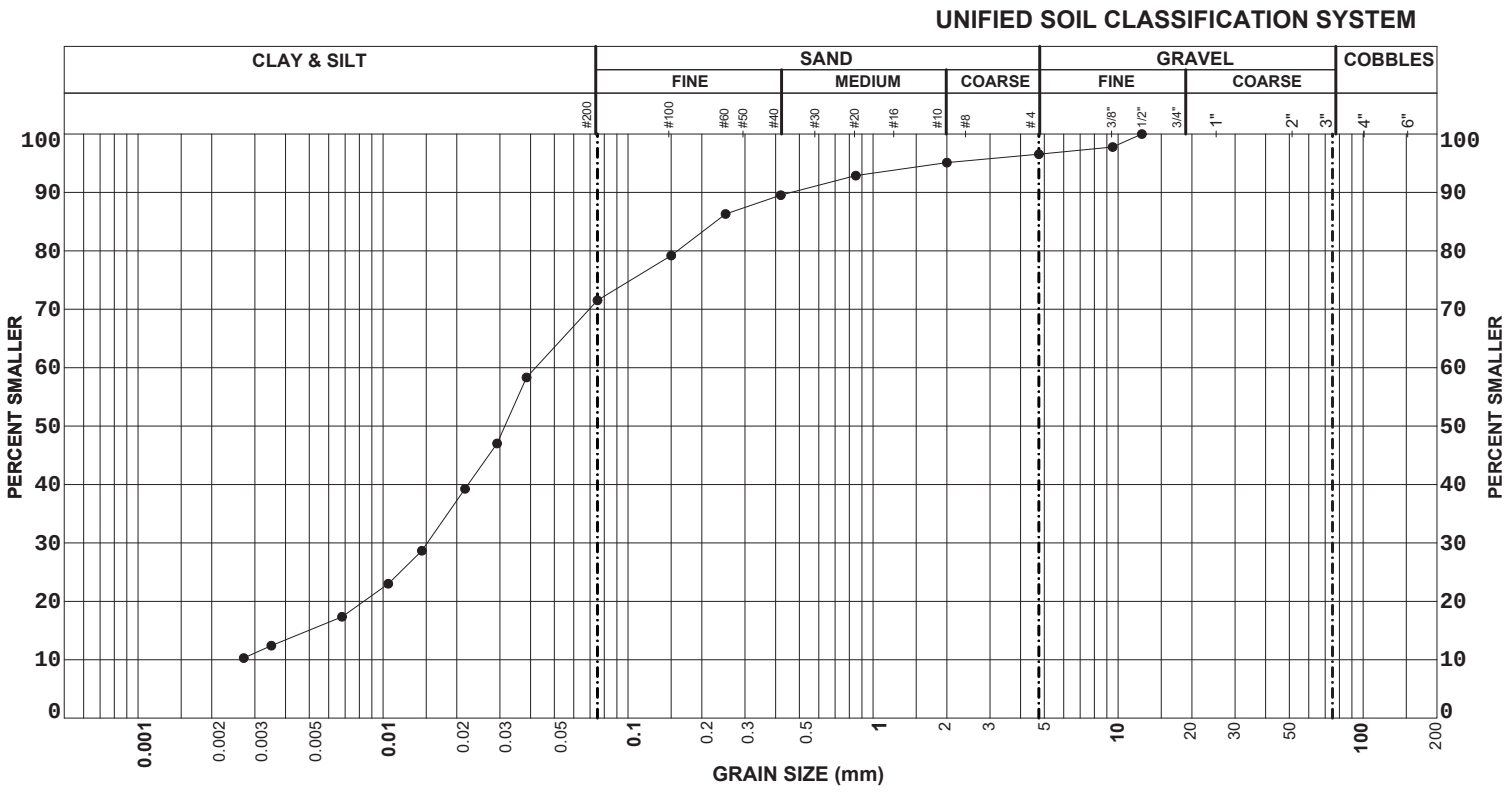
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-06	AS3	3.05	3	25	72		

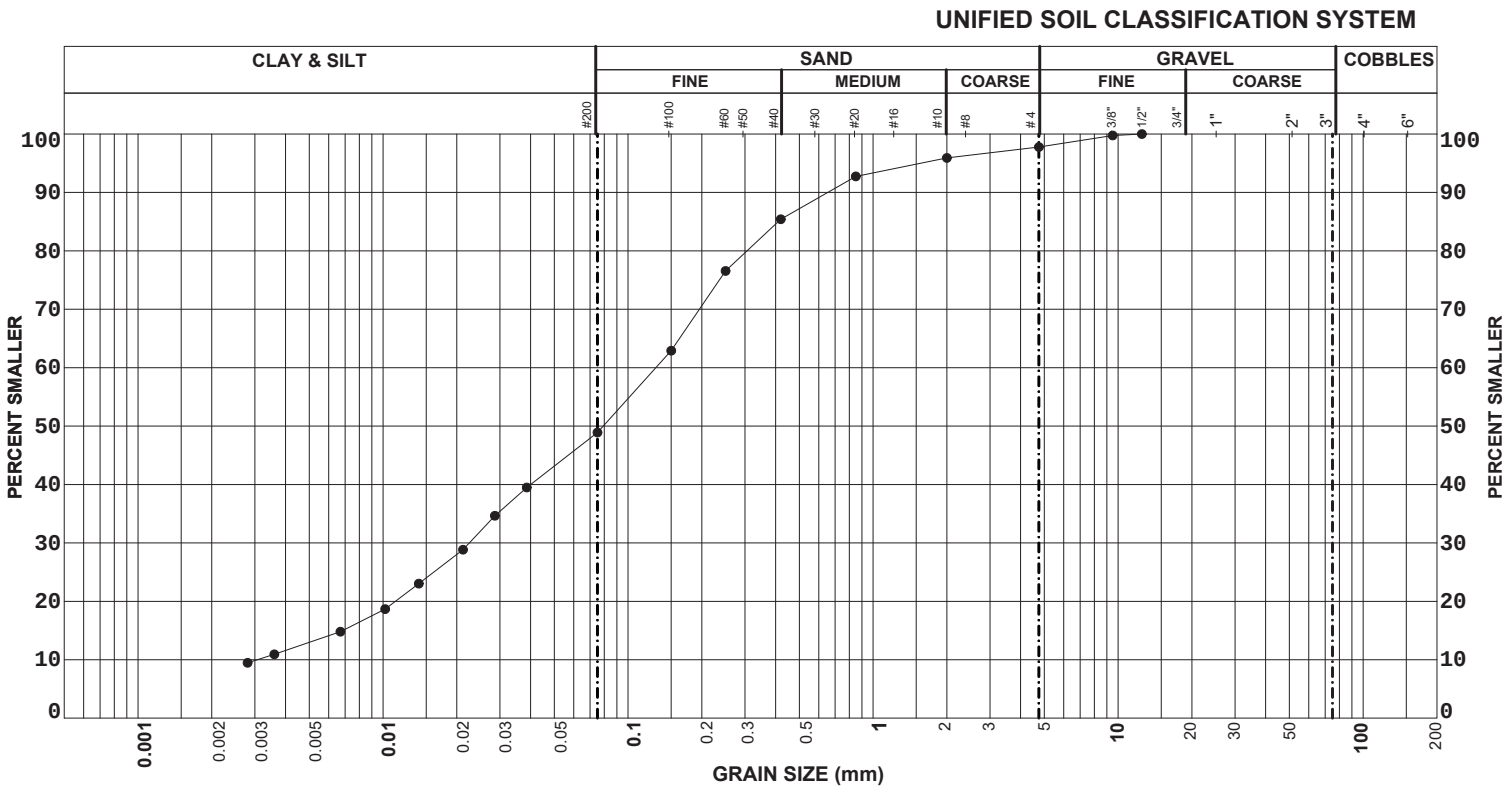
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-06	AS10	13.72	2	49	49		

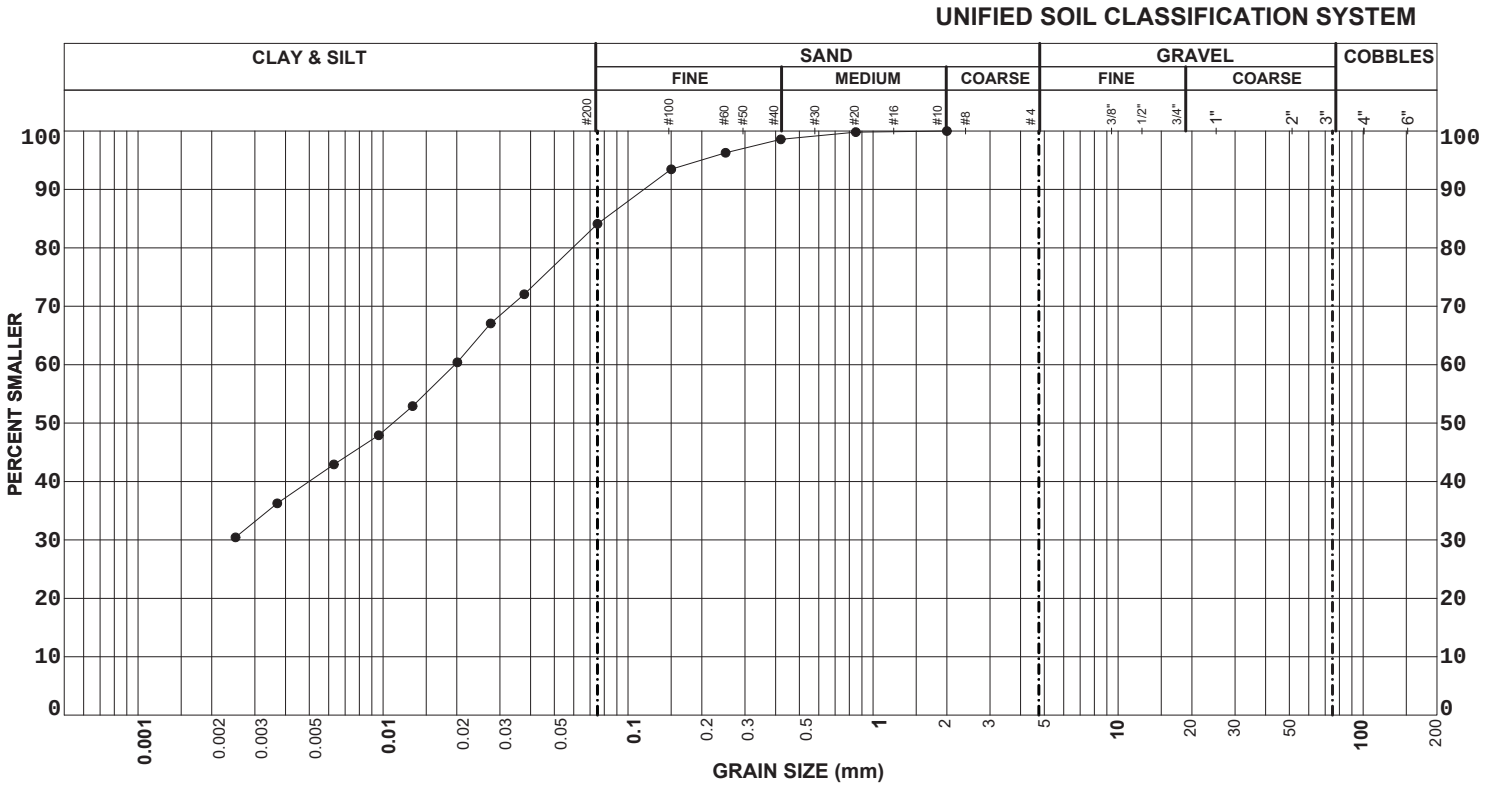
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-06	AS22	32.92	0	16	84	25	9

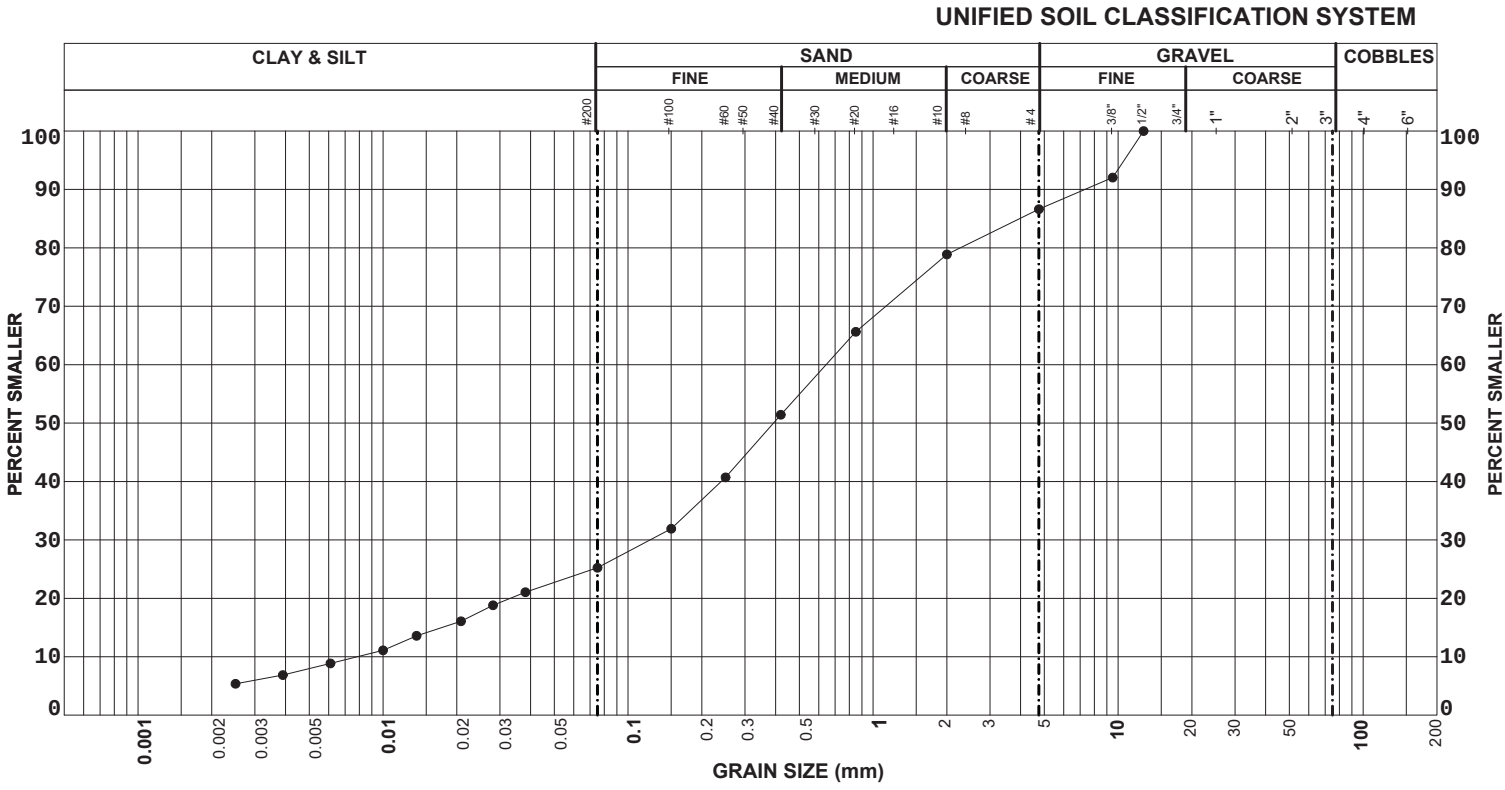
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-07B	AS1	0.91	13	61	25		

GRAIN SIZE DISTRIBUTION

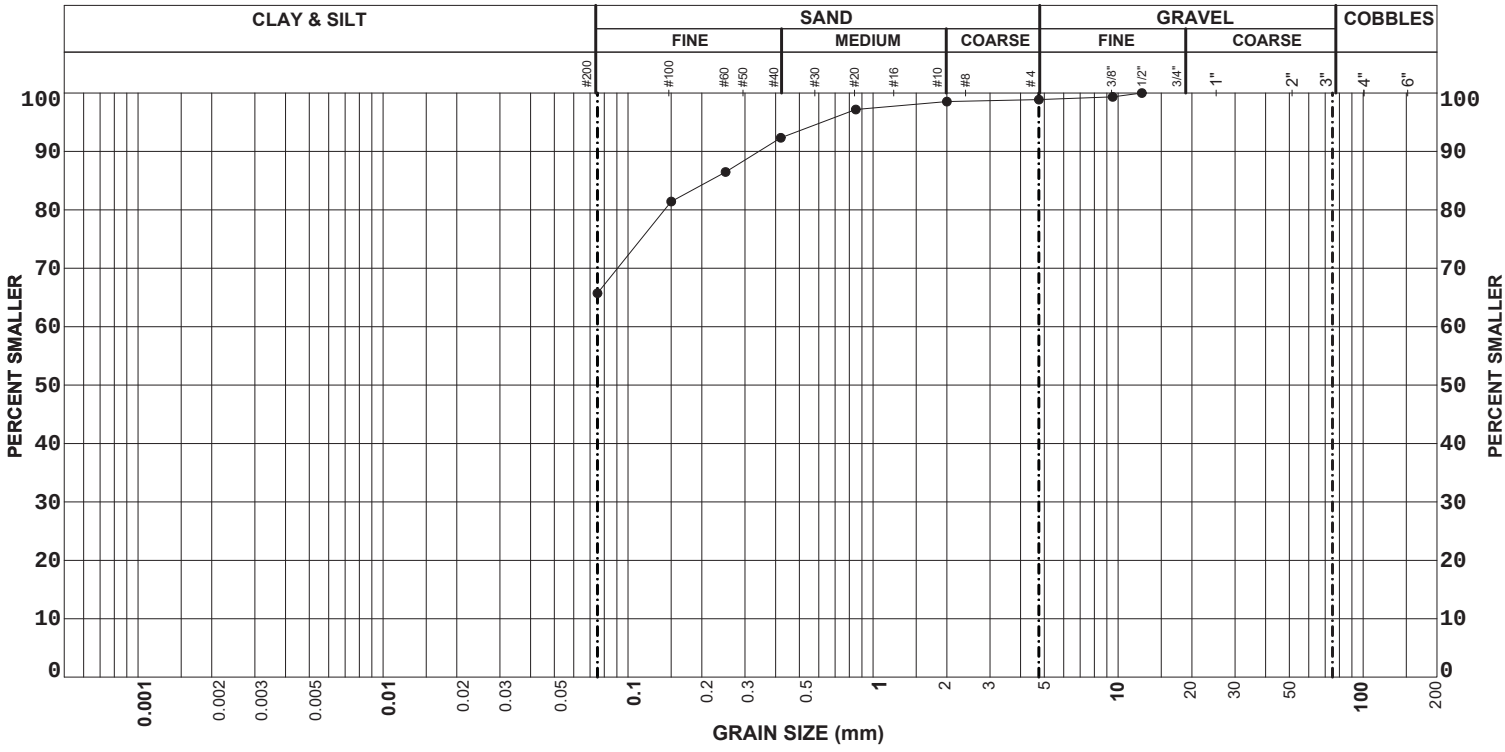
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UNIFIED SOIL CLASSIFICATION SYSTEM



REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-07B	AS6	8.84	1	33	66		

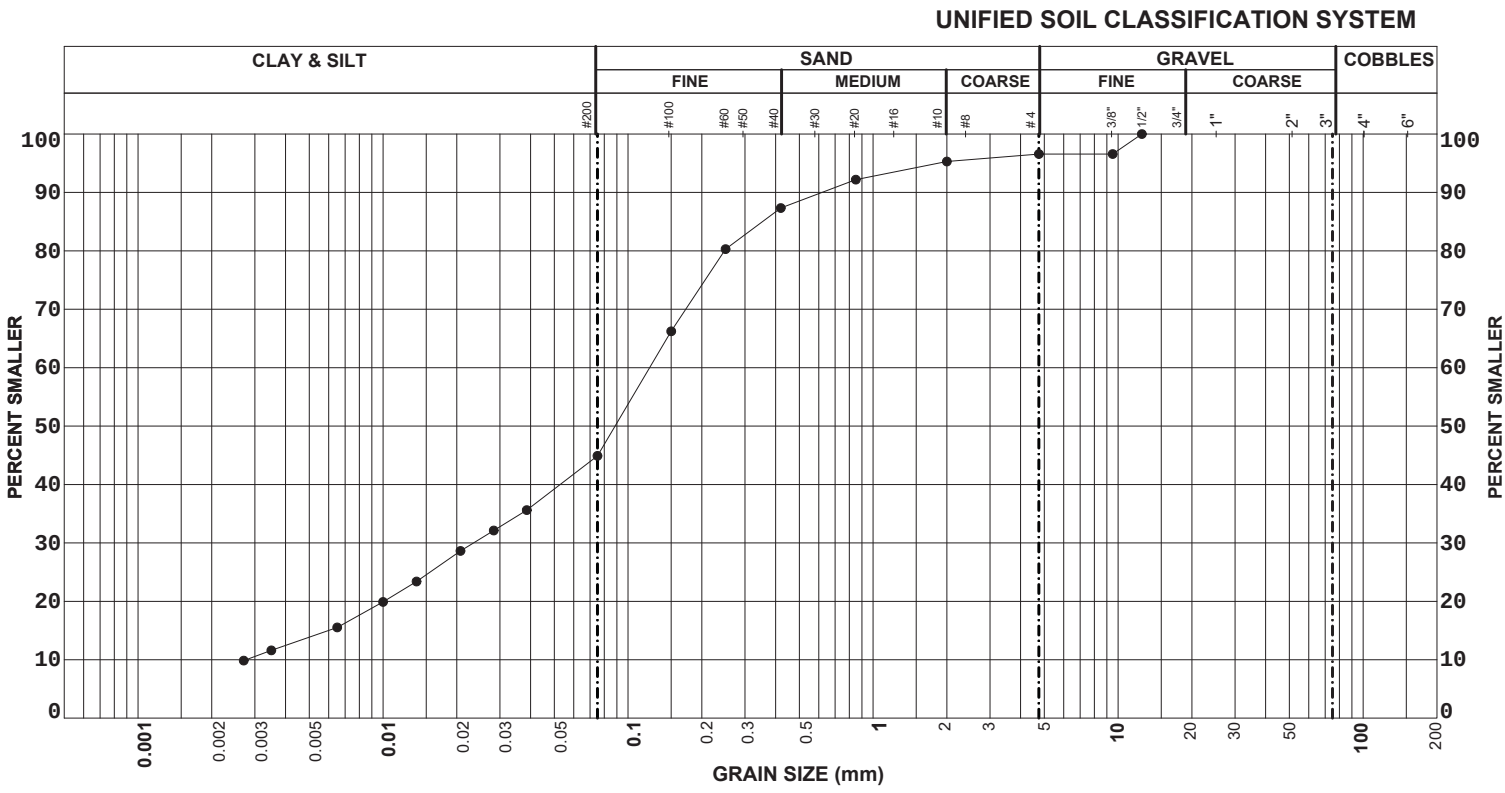
GRAIN SIZE DISTRIBUTION

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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-07B	AS17	25.60	3	52	45		

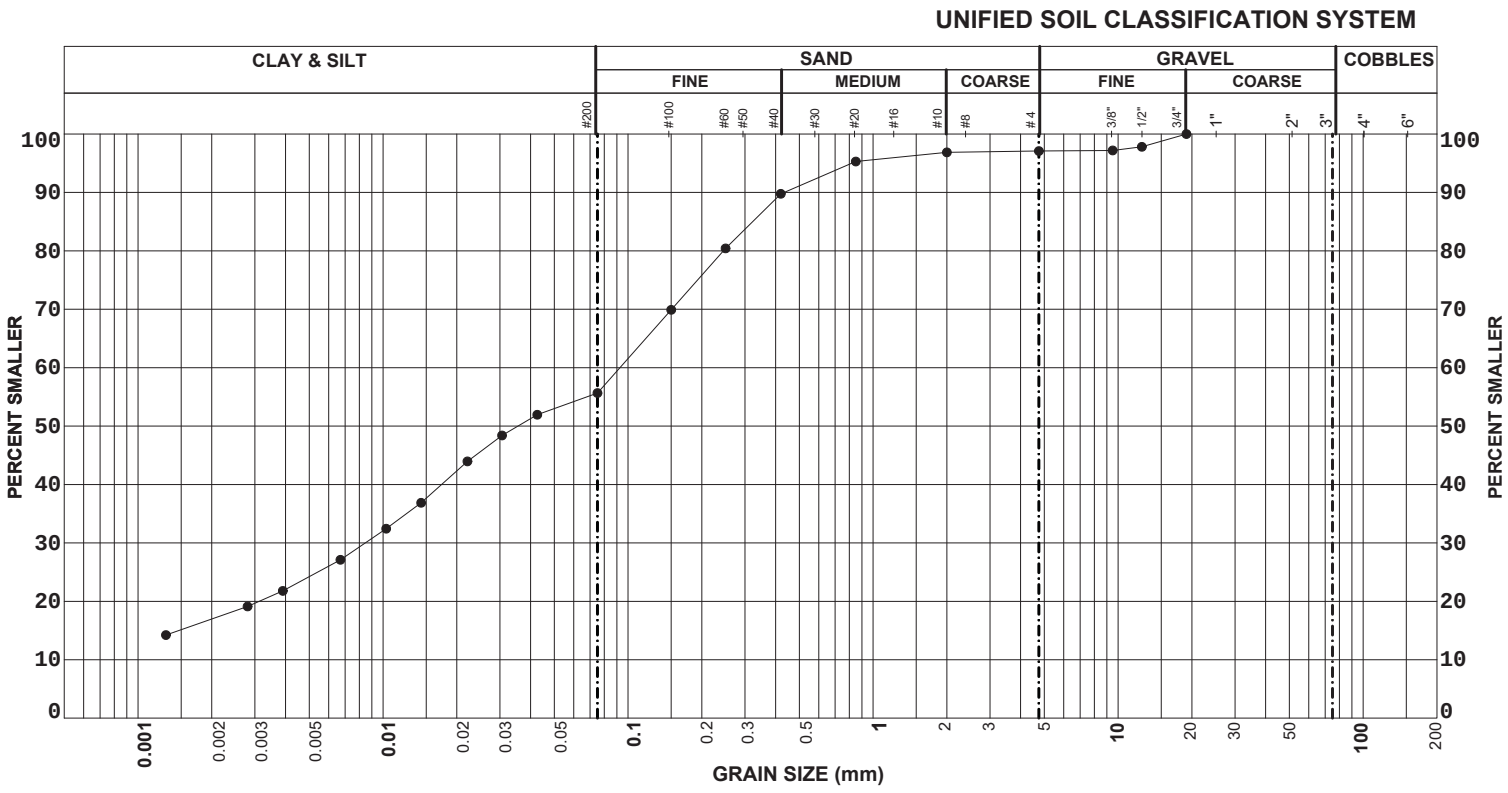
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-07B	AS21	32.61	3	41	56	20	6

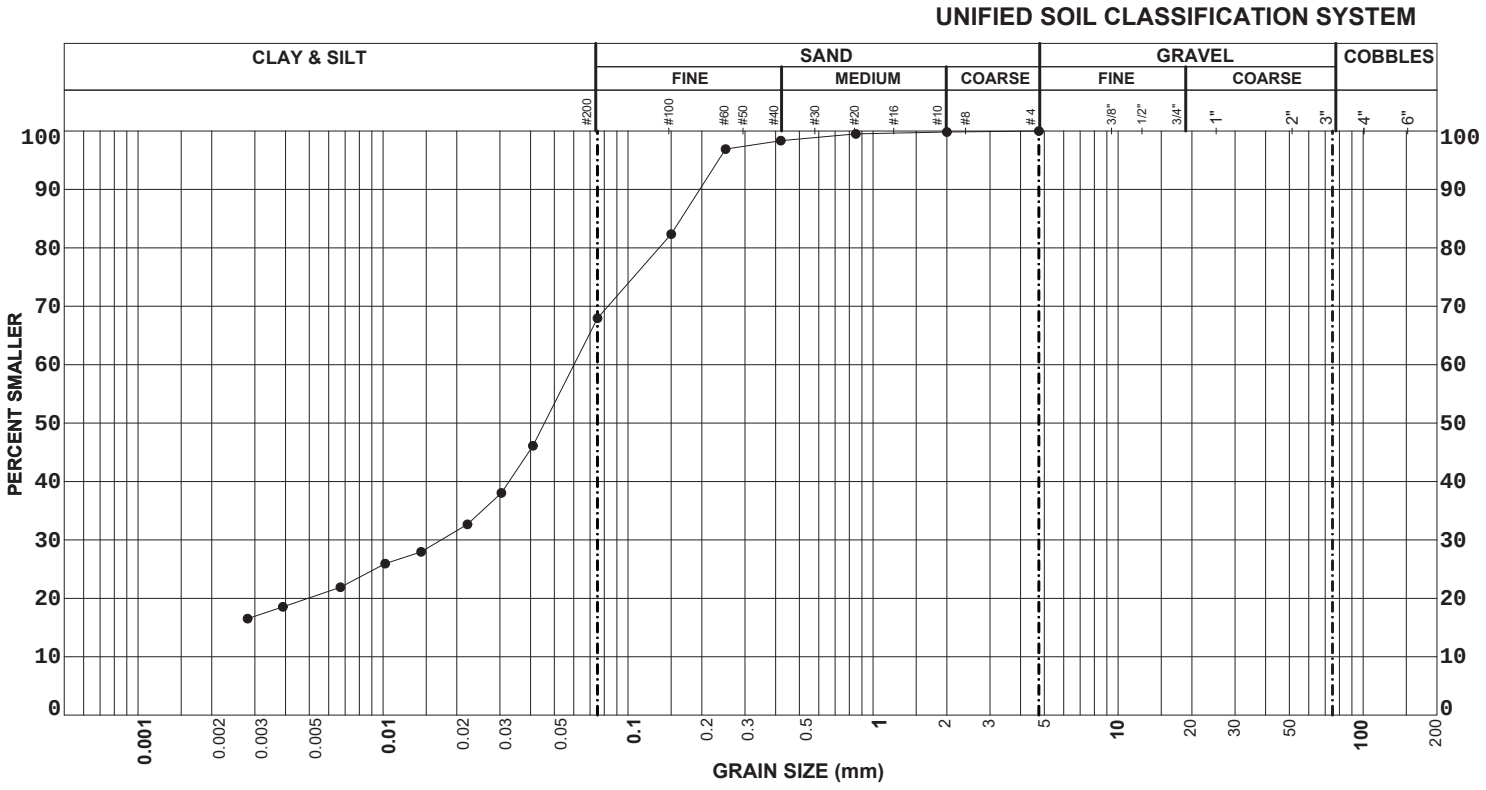
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-07B	AS26	40.84	0	32	68		

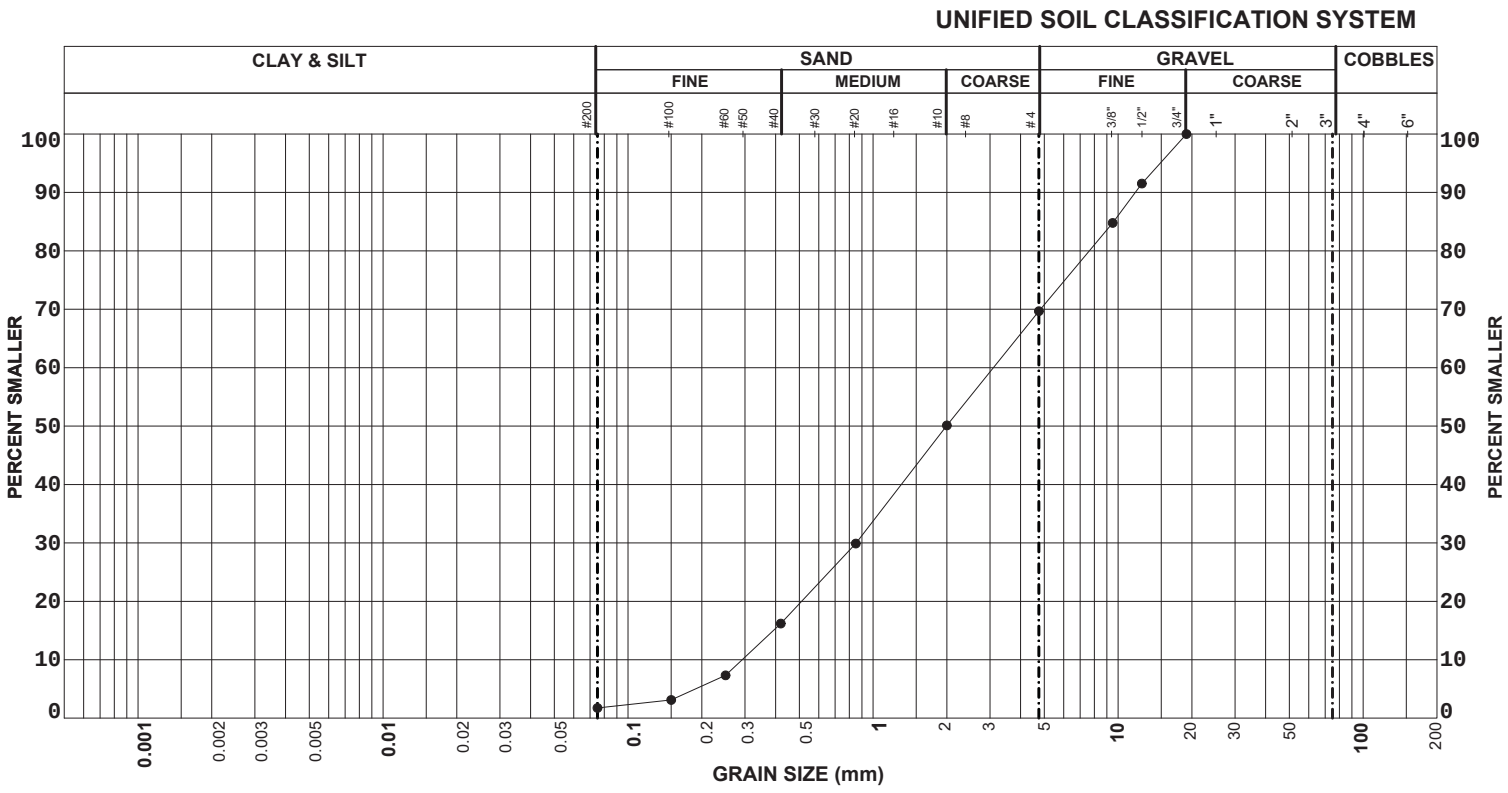
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH14-12	AS4	4.57	30	68	2		

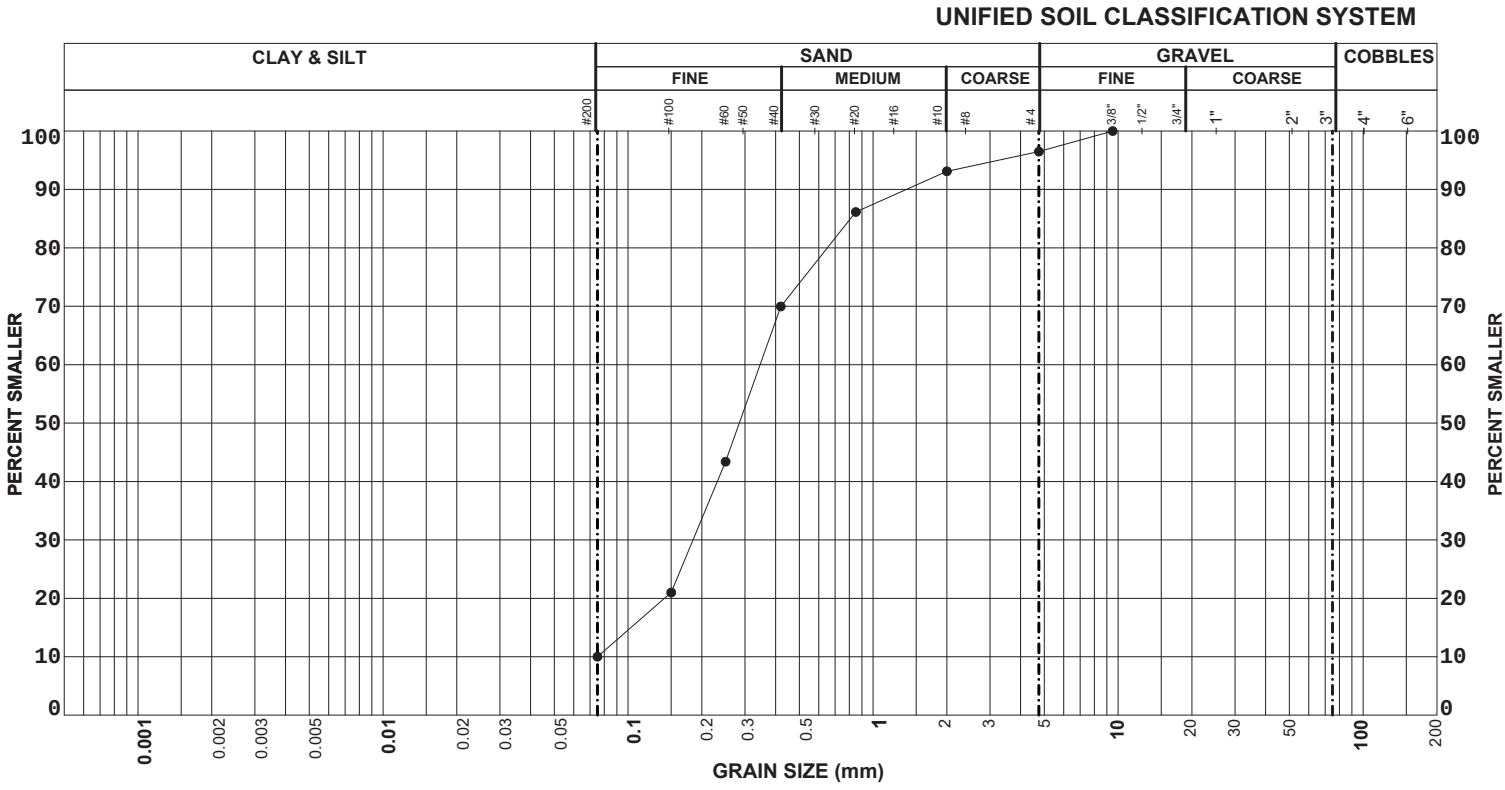
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-12	AS5	6.10	4	86	10		

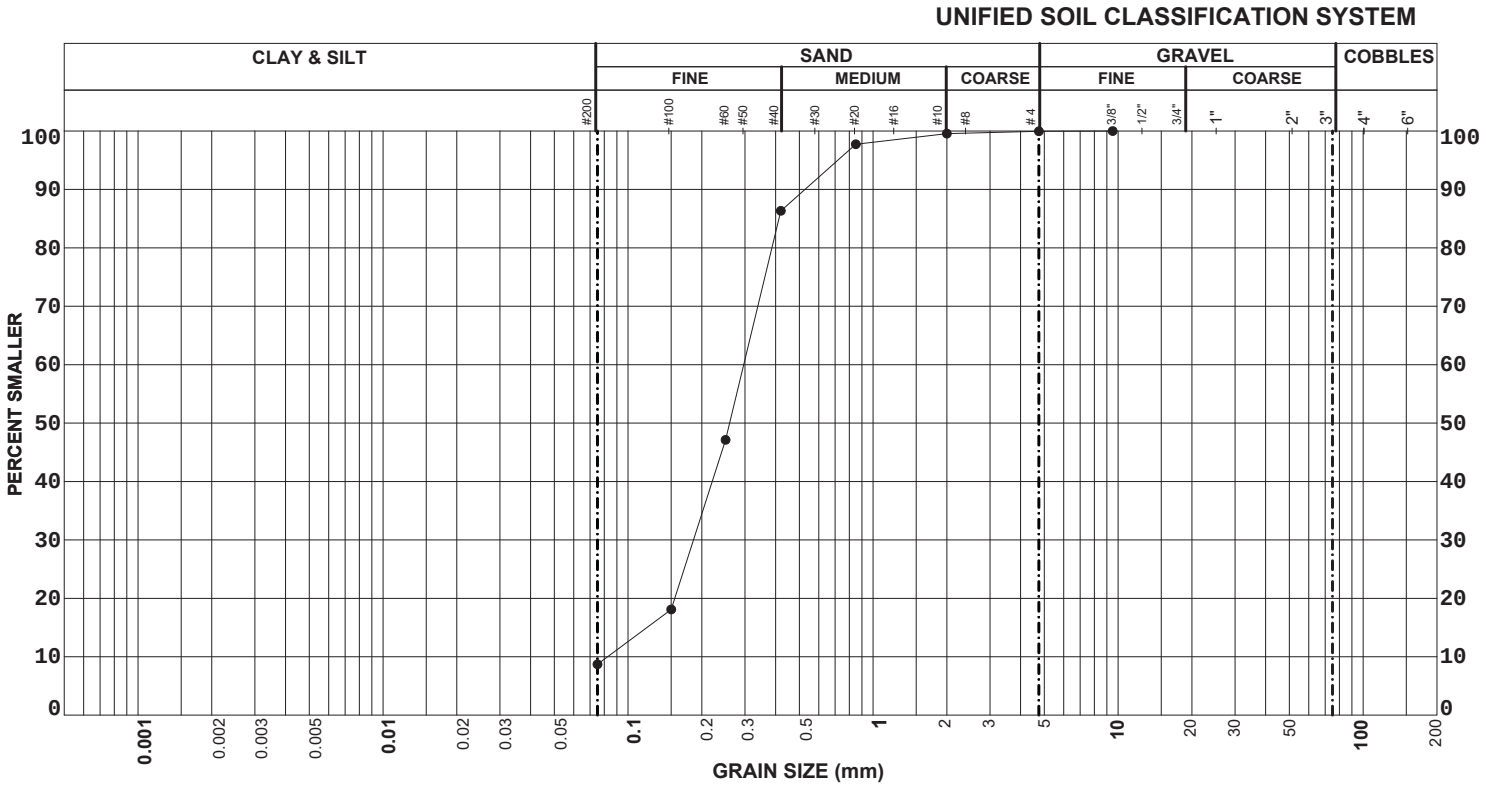
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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH14-12	AS11	14.48	0	91	9		

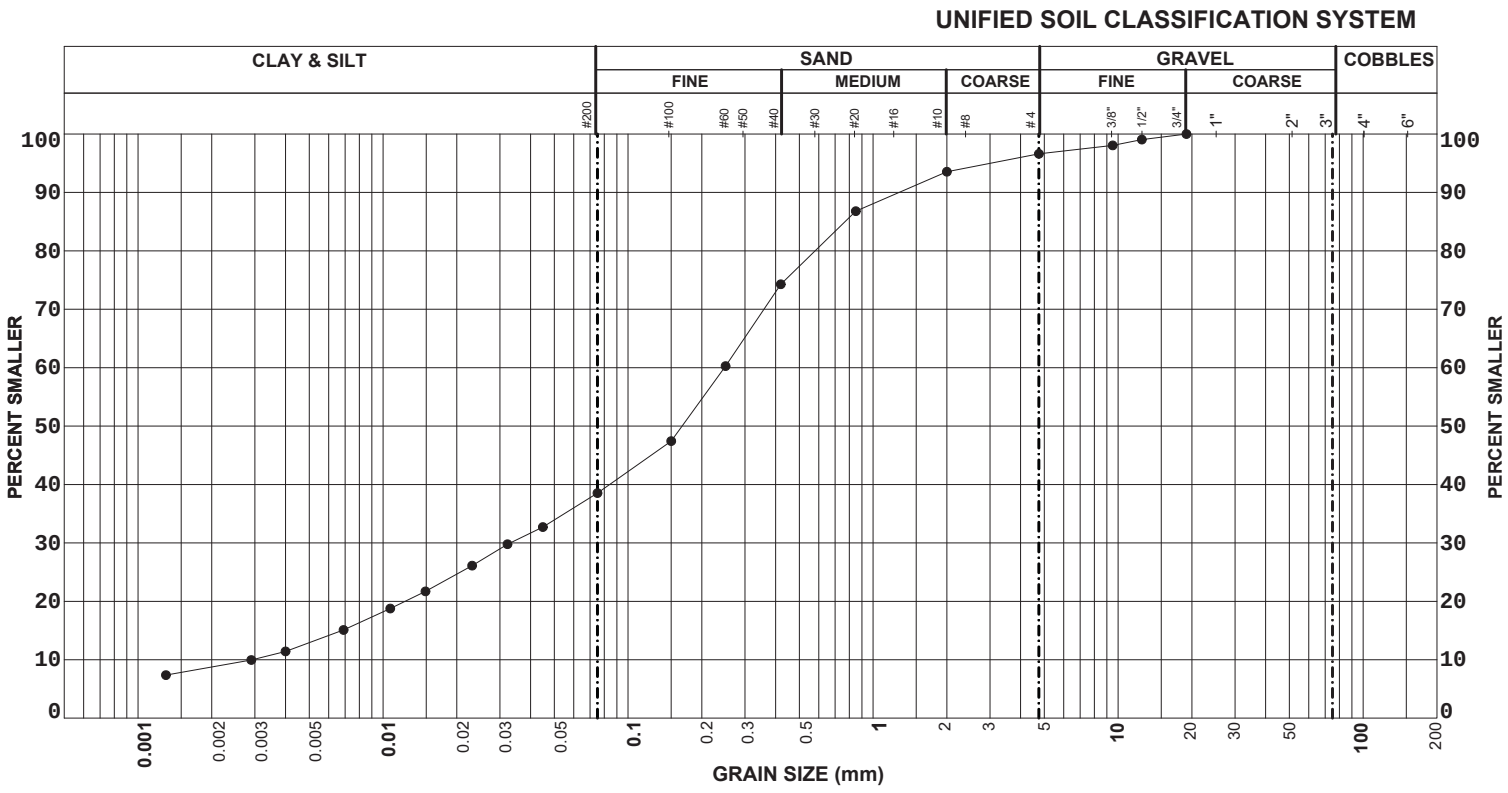
GRAIN SIZE DISTRIBUTION

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REMARKS:

BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
● BH14-13	AS4	5.49	3	58	39		

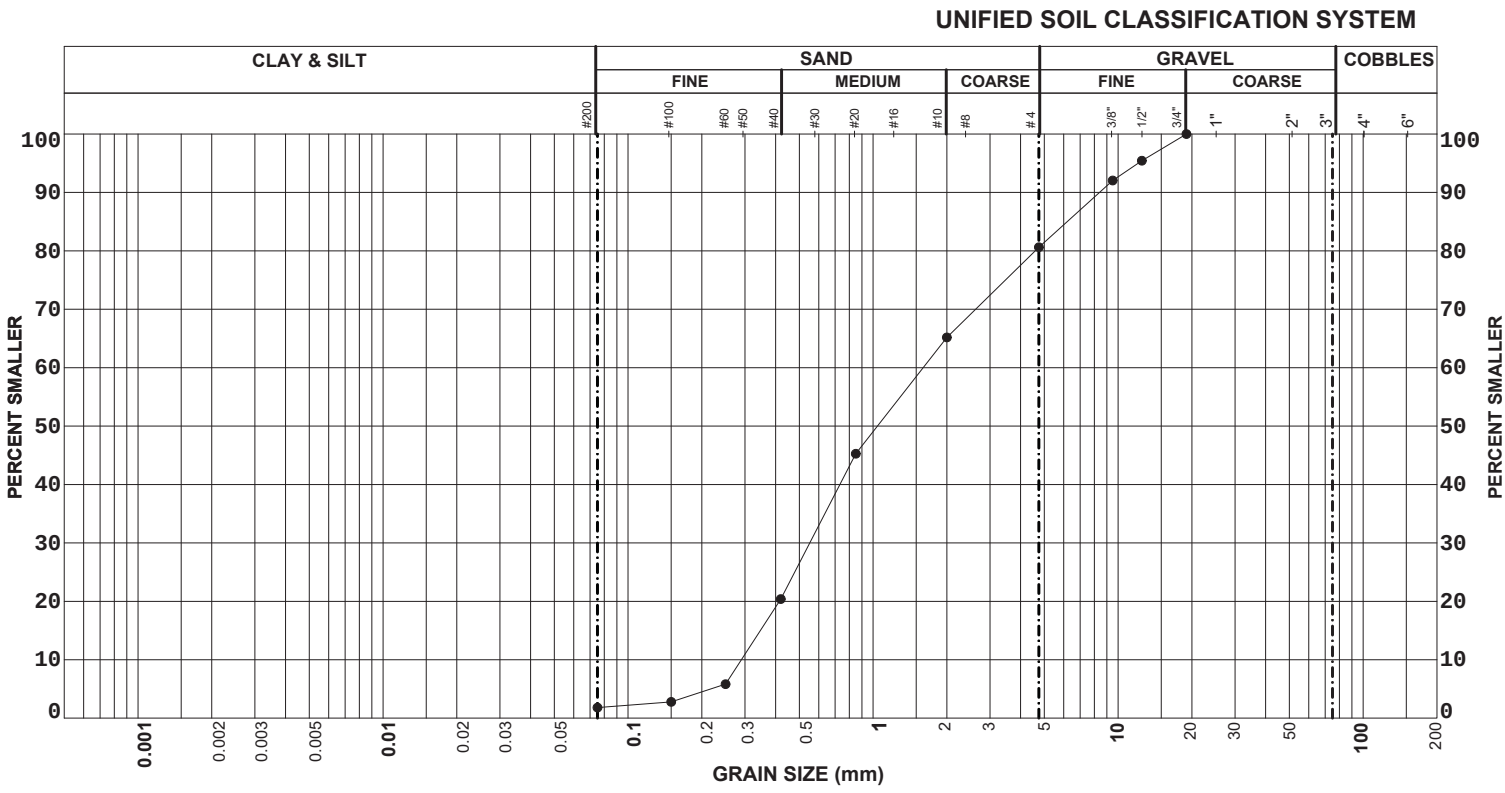
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REMARKS:

	BOREHOLE	SAMPLE	DEPTH	GRAVEL (%)	SAND (%)	FINES (%)	LL (%)	PI (%)
●	BH14-13	AS9	13.10	19	79	2		

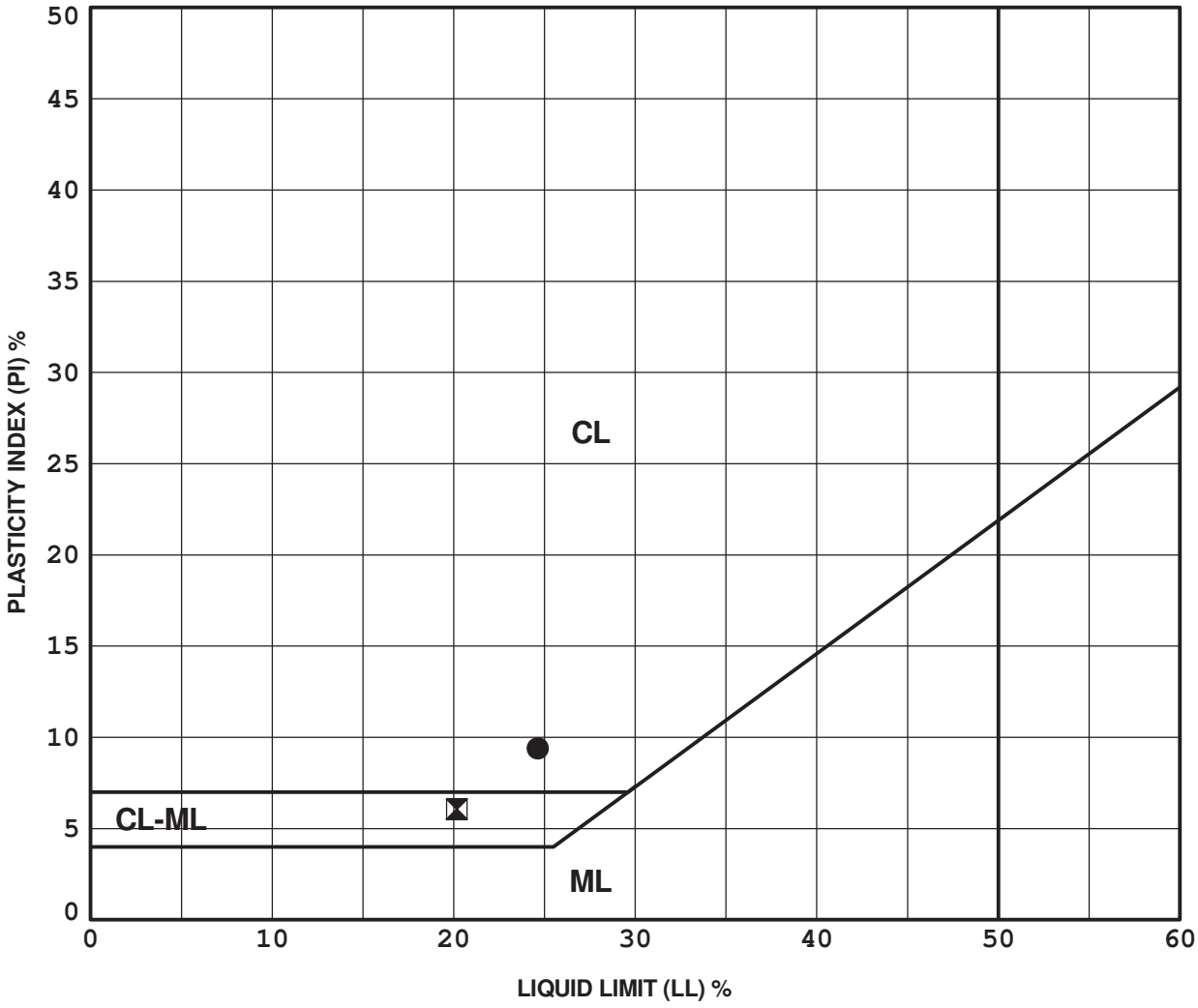
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LEGEND	BOREHOLE	SAMPLE	DEPTH (m)	LL %	PI %
●	BH14-06	AS22	32.92	25	9
⊠	BH14-07B	AS21	32.61	20	6

NP - Non-Plastic

PLASTICITY CHART

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Test Salinity Test Results

Methodology of Salinity Testing

1. Take a soil sample and leave it to dry as long as possible (leave the sample bag open to let moisture escape).

2. Crush the air dried sample so there are no large aggregates (clods of soil). You may need to crush these aggregates with a rolling pin or hammer. Soil particles should be no larger than 2 mm. Remove asmuch foreign matter, plant material and stones from the sample as you can.

3. The test involves adding one part soil for every five parts water. So if you put 50g of soil (weighed on scales) into the container, then you need to add 250ml of the rainwater or distilled water.

4. Shake the container vigorously for three minutes to make sure the salts dissolve. In clay loam to clay soils, more shaking (for one minute every three minutes repeated three times) will bring more salts into the solution and increase the accuracy of the test.

5. Allow the solution to settle for at lest one minute before testing.

6. Place the salinity meter in the solution (but not in the soil at the bottom of the jar) and read the display once it has stabilised.

7. Wash the meter electrodes and sample jar with distilled or rainwater, and dry.

8. Convert your salinity meter readings to soil salinity (ECe) by multiplying the value by the Conversion Factor in Table C9 based on the texture of the soil sample.

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3-Point pH	Spec. Cond.	ORP	DO
4.00, 7.00, 10.00	1413uS/cm	240mV	100.0% @ 20 Deg. C
pH 4.00 lot # 3AL369	lot # 10115	lot # 3160	
pH 7.00 lot # A3023	@ 25 deg C		
pH 10.00 lot # A3150			

JAN. 20, 2014

Calibrated

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Test Salinity Test Results

Borehole	Sample ID	Depth	Salinity (ppt)	pH
BH13-01	AS1	0.00	0.06	9.03
	AS3	1.21	0.40	9.05
	AS5	2.43	0.56	8.89
	Core	19.35	0.30	8.76
BH13-02	AS1	1.50	0.75	8.35
	AS2	3.05	0.76	8.74
	AS3	4.57	1.92	8.70
	AS4	6.10	1.24	8.49
	AS7	10.05	0.30	8.87
	AS15	22.25	1.55	8.83
BH13-03	AS1	0.00	1.03	8.78
	AS5	4.57	1.12	8.93
	AS9	9.14	1.02	9.01
	AS10	10.67	1.31	8.58
BH14-05C	AS3	17.07	1.51	9.08
	AS10	27.74	1.05	9.30
	AS15	36.88	1.31	8.67
BH14-06	AS2	1.52	1.30	9.00
	AS8	10.67	1.40	9.68
	AS17	24.38	1.20	9.08
	AS22	32.92	1.91	8.16
	AS30	47.24	1.21	9.12
BH14-07B	AS1	0.91	1.43	8.60
	AS9	13.72	1.54	9.65
	AS16	24.07	1.41	9.31
	AS22	34.44	1.69	9.23
BH13-09	AS1	0.30	1.30	8.80
	AS4	9.14	1.60	8.44
BH13-11	AS1	0.76	1.19	9.23
	AS5	6.70	1.59	9.09
	AS7	9.75	0.75	9.23
	AS17	27.13	0.95	9.09
	AS19	31.09	1.19	9.04

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH13-01	0.12	16.11
	0.61	6.36
	1.21	13.66
	2.21	11.75
	2.43	7.22
	6.53	12.11
	6.55	8.65
	9.5	6.64
	9.6	14.01
	11	14.65
	11.13	13.86
	11.58	18.46
	12.6	20.75
	12.65	15.64
	14.1	14.48
	14.63	17.96
	14.7	9.50
	14.8	7.87
	16.1	8.70
	16.15	1.24
	17.8	3.10
	20.9	7.14
	22.4	7.48

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH13-01B	0.3	5.74
	1.82	6.20
	3.35	6.40
	4.87	10.27
	7.92	10.05
	9.44	4.58
	10.97	2.19
	12.49	9.88
	15.53	16.51
	17.05	20.43
	18.57	6.51
	20.09	6.84
	21.61	8.04
	23.13	3.92
	24.65	12.70
	26.17	2.44
	29.21	9.13
	30.73	16.58
BH13-02	1.5	7.87
	3.05	9.05
	4.57	17.73
	6.1	17.84
	7.01	12.32
	10.06	10.50
	11.58	11.76
	14.63	10.47
	16.15	16.23
	20.72	15.94
	22.25	13.16
	23.77	3.70

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH13-03	0	15.84
	3.05	17.23
	3.81	15.70
	4.57	19.63
	5.18	16.54
	6.1	16.54
	9.14	14.46
	23.46	10.23
BH13-05	0	14.97
	3.05	16.90
	4.57	17.02
	9.14	21.94
	10.67	13.93
	13.72	0.00
	22.86	15.71
BH13-05B	17.67	13.94
	19.2	46.67
	33.53	22.48
	36.58	17.45
BH13-07	7.92	2.99
	12.8	13.78
BH13-08	0.76	14.54
	2.43	12.03
	12.19	16.84
	16.76	13.59
	19.81	13.47
BH13-09	0.3	17.04
	1.83	15.29
	9.39	16.83

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Client Baffinland Iron Mines
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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH13-11	0.76	12.59
	2.13	9.43
	6.7	18.13
	9.75	9.46
	11.28	6.99
	18.75	17.65
	22.78	11.20
	24.23	11.35
	25.45	7.29
	27.13	9.27
	31.09	10.42
BH14-05C	14.02	21.01
	15.54	20.00
	17.07	20.67
	18.59	13.57
	20.12	18.30
	21.64	18.75
	23.16	16.05
	24.67	19.39
	26.25	18.41
	27.74	10.77
	29.26	21.40
	30.78	22.63
	32.3	18.97
	33.83	20.49
	36.88	23.59
	36.99	25.39

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH14-06	0.15	12.31
	0.35	15.70
	1.52	15.75
	3.05	18.32
	3.4	19.06
	4.57	12.24
	6.1	10.39
	7.62	13.56
	9.14	17.47
	10.67	15.48
	12.19	16.05
	13.72	16.96
	14.1	19.57
	15.24	19.41
	16.76	17.03
	17.25	20.00
	18.29	15.98
	19.81	16.85
	21.33	17.83
	22.86	17.12
	24.38	17.60
	24.9	15.55
	25.9	15.10
	26	15.17
	27.43	15.97
	28.96	16.43
	31.09	20.82
	32.92	23.73
	33.4	19.23
	37.18	20.73
	39.32	15.30
	41.45	20.21
	43.28	18.10
	44.8	18.60
	46.02	18.67
	47.24	21.20
	48.76	22.02

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH14-07B	0.91	16.13
	2.44	25.20
	2.7	16.38
	3.96	16.38
	5.49	10.28
	8.95	60.94
	10.67	15.09
	12.19	19.34
	13.72	19.33
	15.24	14.53
	17.07	19.05
	18.89	16.73
	20.42	14.97
	21.64	16.67
	22.86	12.20
	24.07	17.37
	24.35	20.33
	25.6	18.13
	25.84	22.44
	27.43	19.30
	28.95	19.44
	29.19	19.57
	30.78	14.88
	31.08	19.16
	32.61	21.46
	32.9	17.68
	34.44	19.77
	35.96	10.19
	36.3	18.45
	37.49	21.05
	39.01	17.27
	40.84	20.23
	41.45	17.39
	42.98	18.55
	44.5	16.67
	46.02	24.97
	47.24	7.97
	50.29	17.96

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Test Moisture Content

BH ID	Depth*	Water Content (%)
BH14-12	0	15.79
	1.52	14.66
	3.05	8.12
	4.57	9.97
	6.1	17.84
	7.62	18.23
	9.14	21.04
	10.67	13.43
	12.19	9.15
	13.71	12.33
	14.48	17.02
	15.24	16.30
	16.76	5.93
	18.28	18.46
BH14-13	0.9	15.24
	2.44	16.83
	3.96	15.83
	5.49	15.76
	7.01	19.34
	8.53	19.17
	11.58	1.55
	13.1	13.13
	16.15	24.47
	17.67	19.31
	19.2	20.17
	20.42	22.22
	21.94	26.67
	22.09	20.35
	23.46	13.73
	24.99	13.14
	26.51	12.86
	28.34	8.49
	28.87	13.43

Appendix C
Thermistor Results

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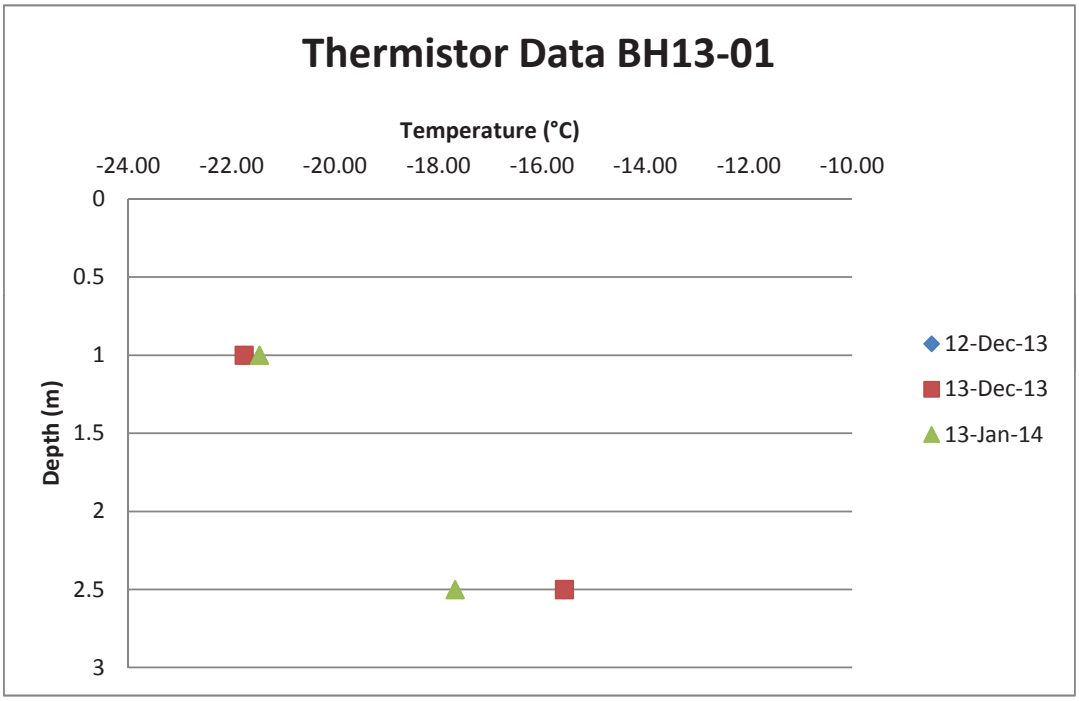
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Borehole BH13-01

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Project H349000

Test Combined Thermistor and Salinity Results

Borehole	Sample ID	Depth	Salinity (ppt)	pH
BH13-01	AS1	0.00	0.06	9.03
	AS3	1.21	0.40	9.05
	AS5	2.43	0.56	8.89
	Core	19.35	0.30	8.76



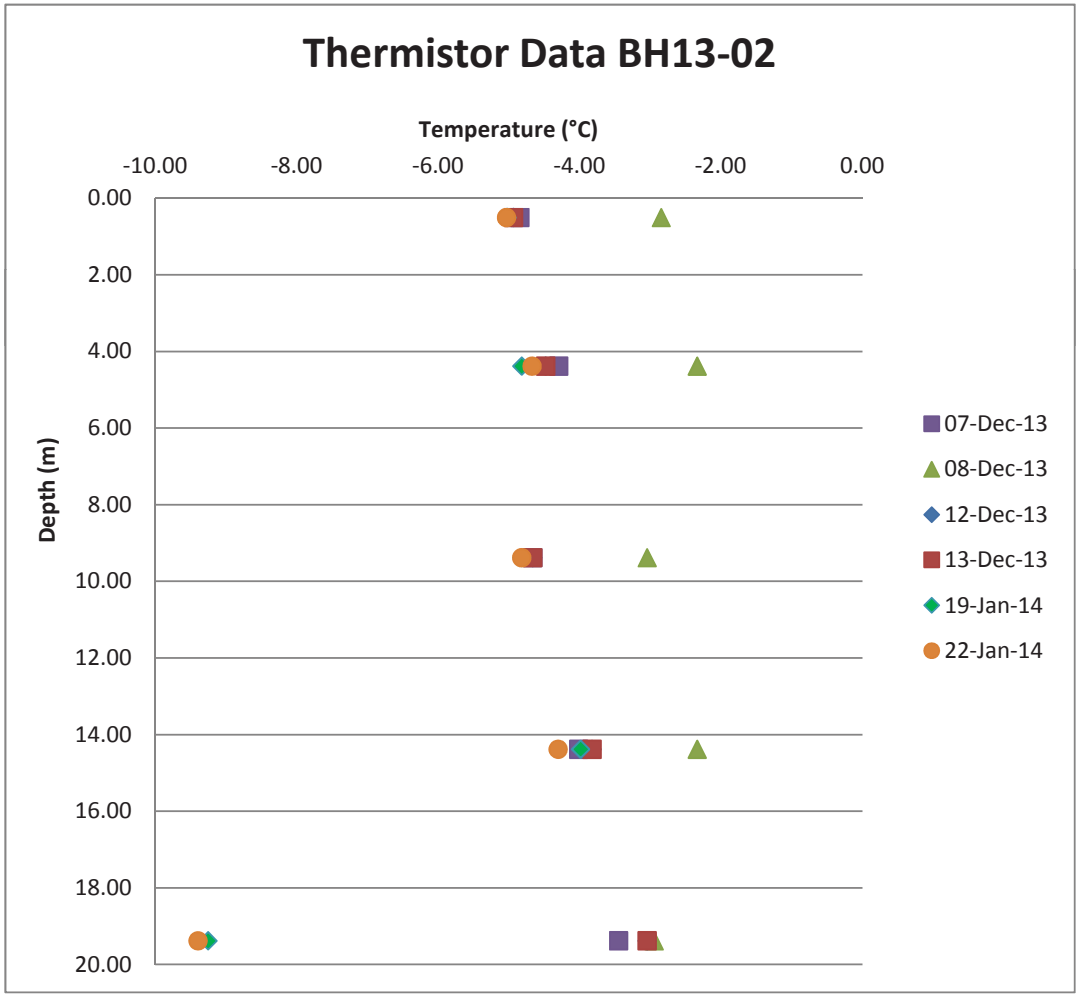
HATCH™

Borehole BH13-02

Client Baffinland Iron Mines
Project H349000

Test Combined Thermistor and Salinity Results

Borehole	Sample ID	Depth	Salinity (ppt)	pH
BH13-02	AS1	1.50	0.75	8.35
	AS2	3.05	0.76	8.74
	AS3	4.57	1.92	8.70
	AS4	6.10	1.24	8.49
	AS7	10.05	0.30	8.87
	AS15	22.25	1.55	8.83



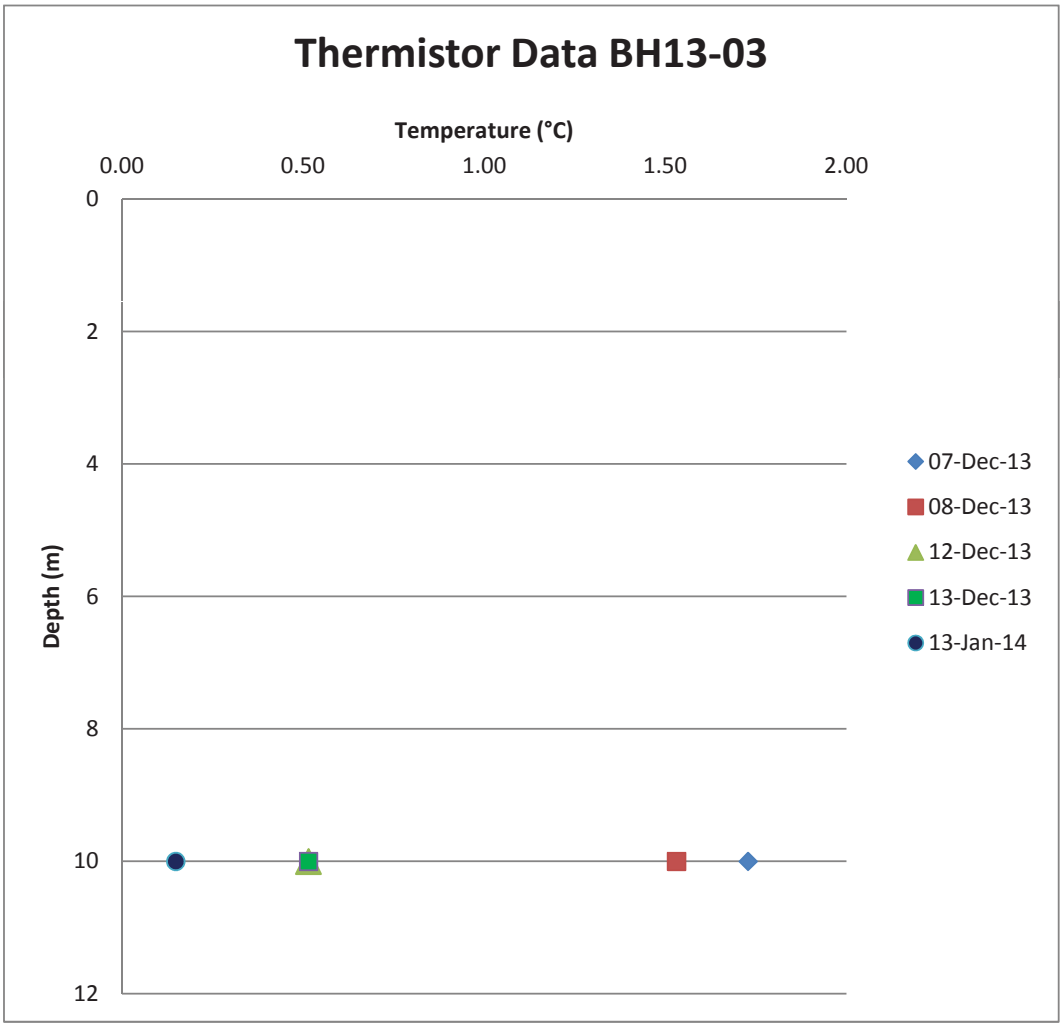
HATCH™

Borehole BH13-03

Client Baffinland Iron Mines
Project H349000

Test Combined Thermistor and Salinity Results

Borehole	Sample ID	Depth	Salinity (ppt)	pH
BH13-03	AS1	0.00	1.03	8.78
	AS5	4.57	1.12	8.93
	AS9	9.14	1.02	9.01
	AS10	10.67	1.31	8.58



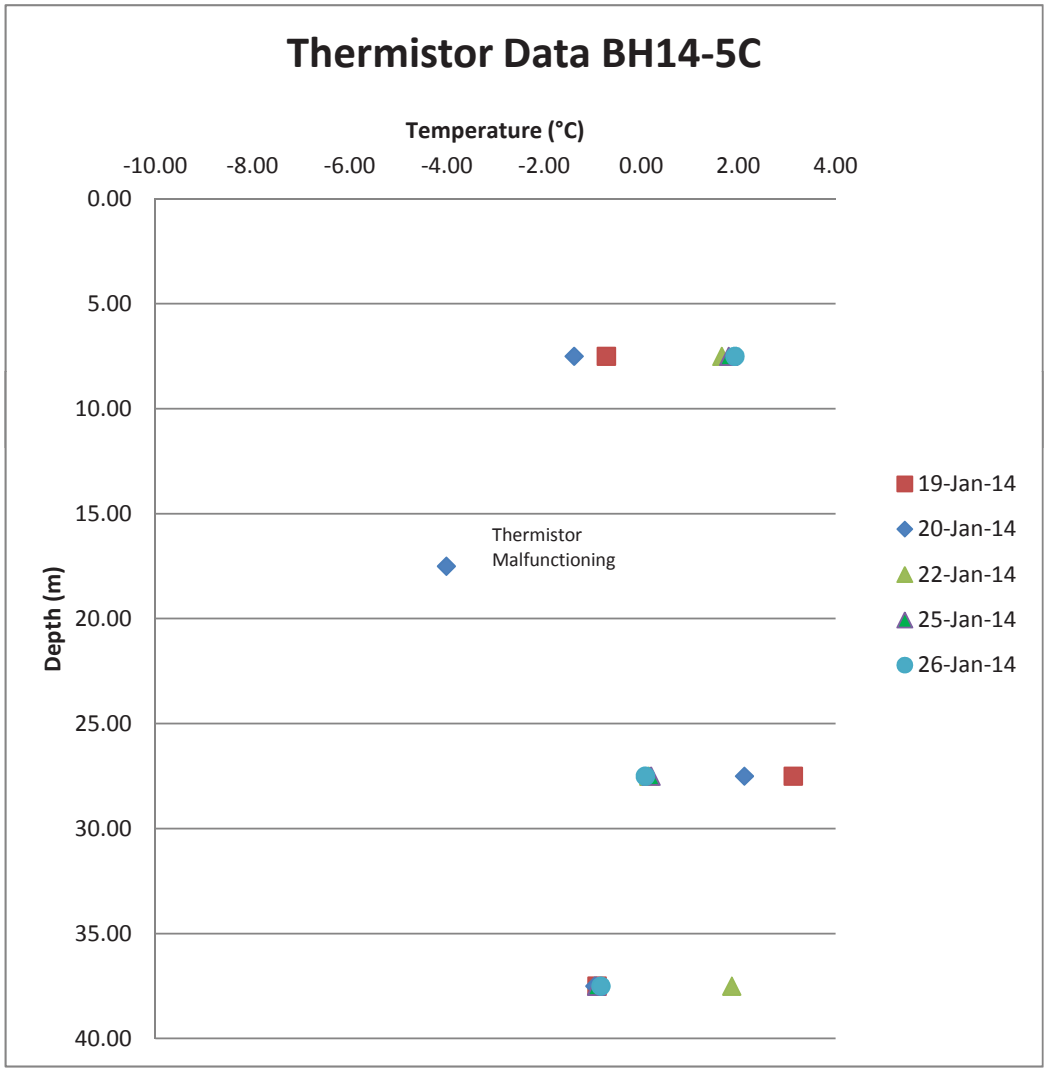
HATCH™

Borehole BH14-5C

Client Baffinland Iron Mines
Project H349000

Test Thermistor Results

Borehole	Sample ID	Depth	Salinity (ppt)	pH
BH14-05C	AS3	17.07	1.51	9.08
	AS10	27.74	1.05	9.30
	AS15	36.88	1.31	8.67

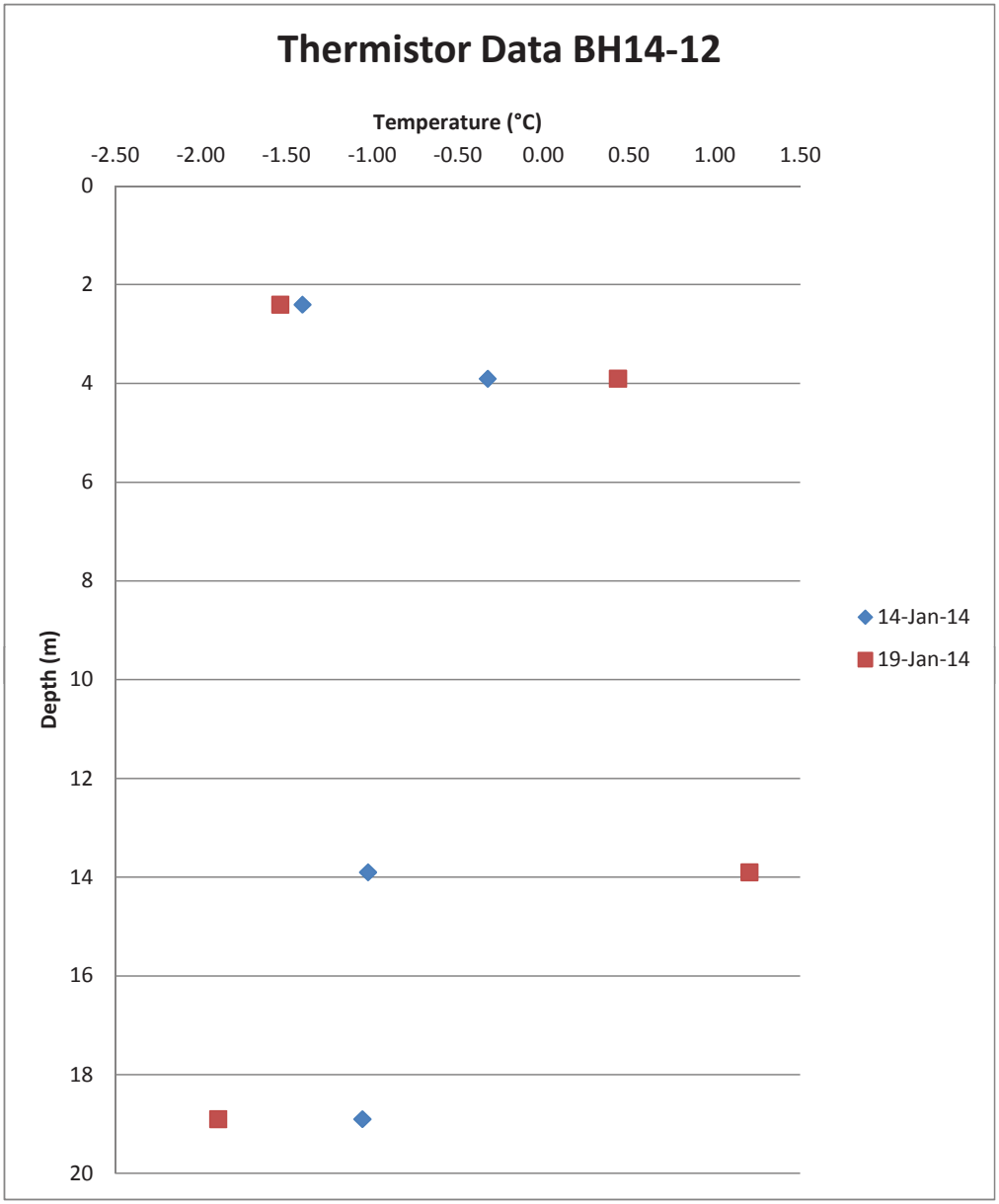


HATCH™

Borehole BH14-12

Client Baffinland Iron Mines
Project H349000

Test Thermistor Results

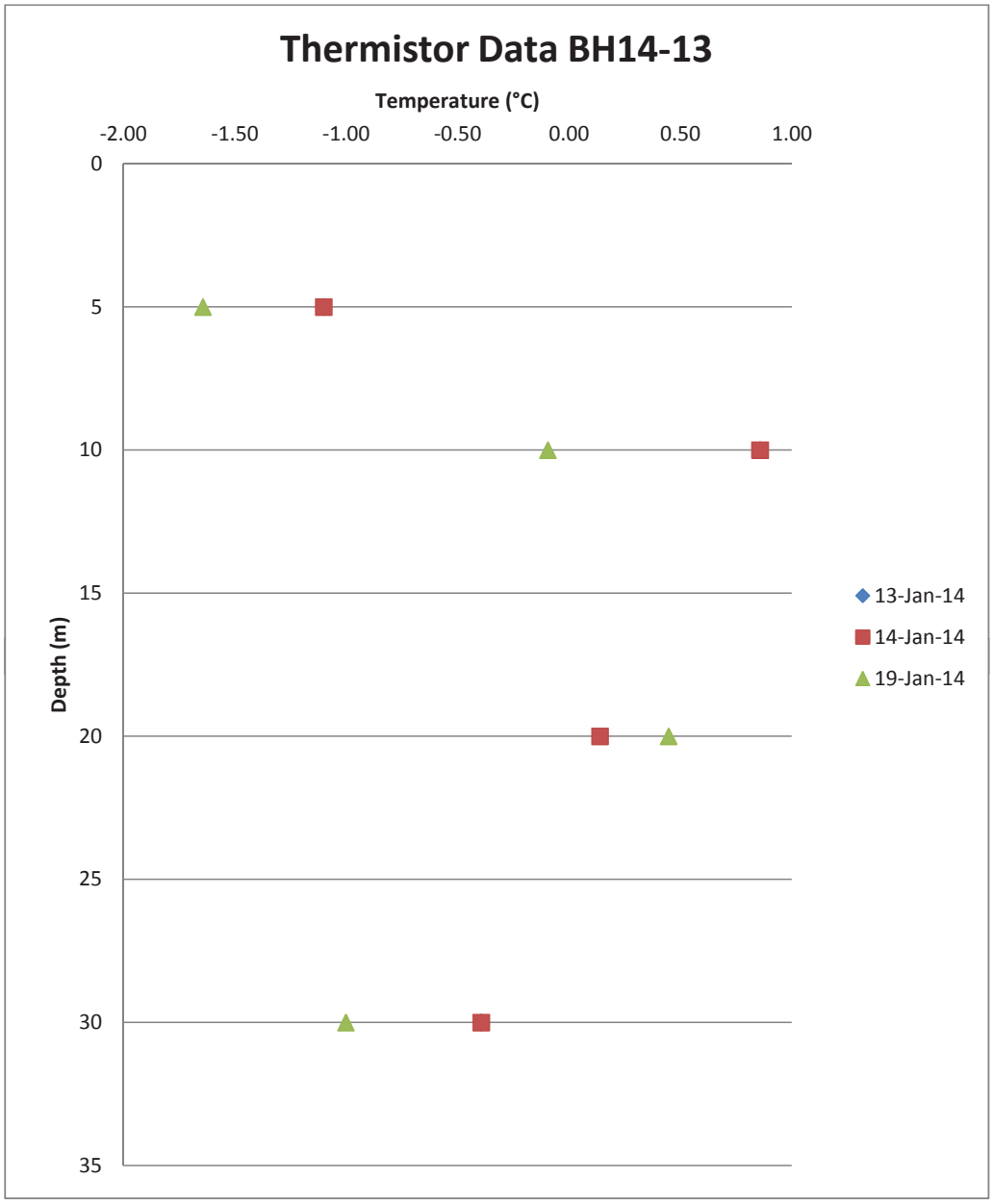


HATCH™

Borehole BH14-13

Client Baffinland Iron Mines
Project H349000

Test Thermistor Results



Appendix D
Geophysics Report

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GEOPHYSICAL SEISMIC SURVEY FOR A PROPOSED FIXED DOCK, MARY RIVER PROJECT, MILNE INLET, NUNAVUT

DRAFT

Presented to:
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300,
Oakville, Ontario
L6H 0C3

Presented by:
Geophysics GPR International Inc.
6741 Columbus Road, Unit 14
Mississauga, Ontario
L5T 2G9

February 2014 T13615

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1. Introduction

Geophysics GPR International Inc. was requested by Baffinland Iron Mines Corporation to carry out a geophysical survey to aid in projection and planning of a proposed fixed dock for the Mary River Project, Milne Inlet, Nunavut. The aim of the investigation was to map the depth to bedrock and provide details of the overburden material.

Seismic profiles were collected approximately parallel with the shoreline as well as lines going from land perpendicularly out to sea (Figure 1). The start and end of line coordinates are outlined in Table 1.

Table 1: Profile Line UTM Coordinates and Chainage

Profile	UTM Start		UTM End		Chainage Start	Chainage End
A-A'	503251E	7976390N	503238E	7976742N	0+000	0+352.5
B-B'	503325E	7976422N	503312E	7976774N	0+000	0+352.5
C-C'	503091E	7976600N	503415E	7976740N	0+000	0+352.5
D-D'	503105E	7976568N	503430E	7976707N	0+000	0+352.5
E-E'	503114E	7976547N	503439E	7976686N	0+000	0+352.5

Geophysics GPR field personnel involved in this project and the dates that they were on-site are outlined in Table 2.

Employee	Title	Dates On-Site
Cameron Coatsworth	Field Supervisor	Nov. 26 to Dec. 5, 2013
Benoit Maille	Senior Tech	Nov. 26 to Dec. 5, 2013
Nicolas Beaulieu	Geophysicist	Nov. 26 to Dec. 5, 2013

Table 2: Geophysics GPR Field Personnel

The seismic reflection, refraction, TISAR and shear-wave velocity analysis methods were applied to collect the data along the alignments shown in Figure 1. Approximately 1.76 km of profiled data was collected.

The following report describes the survey design, the principles of the seismic methods, the methodology for interpreting the data and finally a culmination of the results in the form of interpreted bedrock profiles.



Figure 1: Approximate seismic profile locations, Milne Inlet, Nunavut

2. Methodology

2.1. Positioning, Topography and Units of Measurement

The locations of the seismic profiles were oriented to encompass the area and to align with the design of the proposed fixed dock location.

The positioning data (northing and easting) were collected by Monteith & Sutherland Limited at the start and end of each line as well as every 15 m along the lines.

The GPS coordinates and field observations were then converted to project chainage based on site plans provided by Baffinland and Hatch.

The geophones were installed on the ice surface. The elevation of the geophones varied with the tides. Ice elevation data provided by Monteith & Sutherland Limited from December 2nd and 3rd indicate a range of approximate 0.9m to -1.1 m over the course of the survey day. An average elevation of the geophones on the ice has been assumed to be 0m.

The topography for the land portions of the Line A and B has been estimated using field observations and borehole elevation data.

All geophysical measurements were collected in SI units.

2.2. Seismic Methods

Seismic methods for geologic mapping involve measuring/recording the response of vibration sensors. Multiple techniques and methodologies are available for analysis of the data depending on the ultimate goal of the investigation. The profiles were collected using a standard stationary geophone arrangement. Several different seismic sources were applied including; propelled elastic generator (PEG) hammer, buffalo gun and explosives. After initial testing, it was determined that the buffalo gun and explosives were the most suitable sources for this particular site.

Several essentially independent techniques were used to analysis the resulting data; namely, seismic reflection, seismic refraction, TISAR and surface wave analysis.

Each of the seismic techniques has strengths and weaknesses primarily related to the depth of interest and local geology. After initial testing, it was determined that the seismic reflection method was likely going to be the primary methodology supplemented with seismic refraction and TISAR and surface wave analysis.

2.2.1. Seismic Reflection

Basic Theory

The seismic reflection method relies on measuring the transit time of an acoustic energy wave that travels from the energy source location to a reflective event (i.e. change in acoustic impedance) and back to a receiver (geophone). The fastest seismic waves are the compressional (P) or acoustic waves. Figure 2 is a basic geometric layout for reflection ray paths.

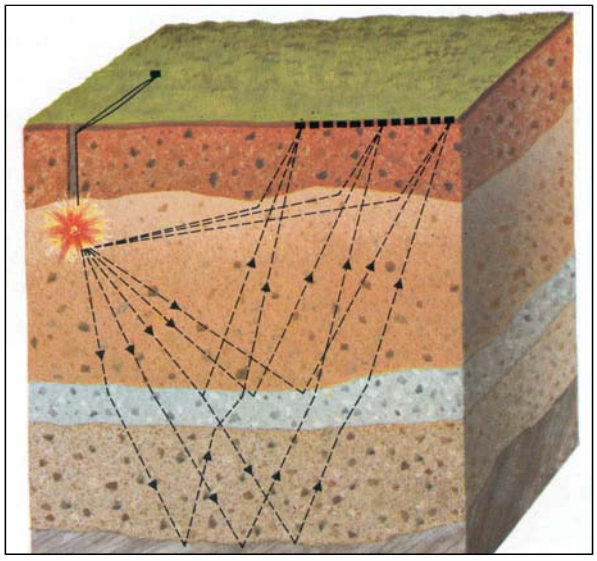


Figure 2: Simple Geometry of reflected pulse ray paths

Survey Design

A seismic spread consisted of 48 vibration monitoring devices (geophones) connected in line (spread) to a seismograph (ABEM Terraloc Pro) by connector cables. A seismic pulse (shot) is generated at a known location relative to the spread with a trigger system linked with the seismograph to begin the recording of the time-arrivals of the various seismic waves (shot record).

This investigation used 48 – 4.5Hz geophones with a spacing of 7.5m between geophones for a total individual profile length of 352.5 m.

The spacing between shots was 15m with the shot inline with the seismic spread. Typically single shots were taken for each shot record, stacking was not needed to improve the signal to noise ratio.

The combination of geophone spacing and shot interval used for this investigation results in a varied-fold data set. Where fold refers to the multiplicity of the common-midpoint data. The highest fold was in the middle of the spread and decreased toward the ends.

The fold may be less for some shot gathers depending on geometry and individual geophone trace quality.

The seismic sources selected for this survey were devices called a “buffalo gun” and a “propelled elastic generator” (PEG). The “buffalo gun” was designed to fire a 12-gauge shotgun shell into a 2-inch diameter hole drilled through the ice. The PEG is a weight drop accelerated by elastic bands. The PEG was determined to be inadequate. It could not generate enough energy to transmit to the depths required of the geology. The “buffalo gun” source was determined to be the best option due to the prohibited use of explosives for the marine portion of this site.

Processing of Reflection Data

There are some common processing steps for every reflection dataset. These are purely mathematical or systematic steps that account for site conditions. There are also processing steps that serve to enhance the appearance of reflectors. Some of the more common steps include the removal of traces that are unusually noisy (trace kills) or correction of topography (statics corrections). In the processing sequence used for this project, there is flexibility in the order and the settings used in some optional processing steps.

It is important to note that there is no one correct processing sequence, as the processing steps and sequence are dependent on the geology and method of data collection. The following is a list of the processing steps and the order in which they were applied for this project.

1) Input seg2 data
2) time cut to 600ms
3) trace editing (remove noisy traces)
4) Interpolation of removed traces
5) Gain correction
6) Filtering (bandpass and frequency-wave number)
7) Velocity Analysis
8) Normal move-out corrections
9) Common mid-point (CMP) Stacking
10) Time to depth conversion
11) Visual gain adjustments, horizontal filtering and contouring

Interpretation Method and Accuracy of Results

The reflection profile is essentially an image which must be interpreted. Without corroborating data, the true source or nature of a reflector can only be assumed. Interpretation of the data involves identifying reflectors and assigning a geologic context to them.

The two main sources of uncertainty in the results of a seismic reflection survey are in the velocity analysis and the assigning of reflectors to given geologic units.

2.2.2. Seismic Refraction

Basic Theory

The seismic refraction method relies on measuring the transit time of the wave that takes the shortest time to travel from the shot-point to each geophone. The fastest seismic waves are the compressional (P) or acoustic waves, where displaced particles oscillate in the direction of wave propagation. The energy that follows this first arrival, such as reflected waves, transverse (S) waves and resonance, is not considered under routine seismic refraction interpretation. Figure 3 illustrates the basic operating principle for refraction surveys.

Survey Design

The seismic spread setup utilized for seismic reflection was also used for seismic refraction. The seismic source was mainly buffalo gun. Explosives were used for the end and far shots on the land portion of the Line A and Line B.

This investigation used 48 – 4.5Hz geophones with a spacing of 7.5m between geophones for a total individual profile length of 352.5 m.

Typically, seven or more shots are executed per seismic spread; three to five shots within the profile to obtain the lateral velocity variation in the overburden and two shots on either side of the spread to provide the true velocity of the bedrock surface. The spacing between shots was generally every 45 m with the shot inline with the seismic spread. Typically single shots were taken for each shot record, stacking was not needed to improve the signal to noise ratio.

Interpretation Method and Accuracy of Results

Interpretation of the seismic data was primarily done using the critical distance method. Ideally, the Hawkins' method is the preferred method as it allows the computation of the rock depth to every geophone, information on the thickness of the various overburden layers, depth to bedrock and rock quality. At this particular site, the depth of the rock was greater than expected, performing a full Hawkins' interpretation would have required the use of explosives in the water which was not permissible. Accordingly the critical distance and partial Hawkins' method were employed.

A full description of the strengths and limitations of the refraction seismic method is presented in Appendix A.

The seismic refraction method typically allows the determination of the bedrock profile with a precision of 10% or better for depths greater than 10 m and a precision of 1 m for depths less than 10 m. The precision in the determination of rock velocities is plus or minus 3%.

The two most significant problem areas for refraction mapping are the “hidden” layer and effect of velocity inversions.

A “hidden” layer or “blind zone” is a stratigraphic layer that is not possible to discern from the arrival time data due to insufficient velocity variation or thickness. The unknown presence of a hidden layer has the effect of making the interpreted bedrock depth too shallow. The presence of a “hidden” layer is typically revealed through borehole or test-pit data and calculations can be made to compensate for the presence of such a layer.

Velocity inversions occur when the velocity does not increase with depth. The velocity inversion can result from the presence of a low or high velocity layer. Refractions from low-velocity layers cannot be determined from the arrival time data. The unknown presence of a low velocity layer has the effect of making the interpreted depths deeper than actual depths.

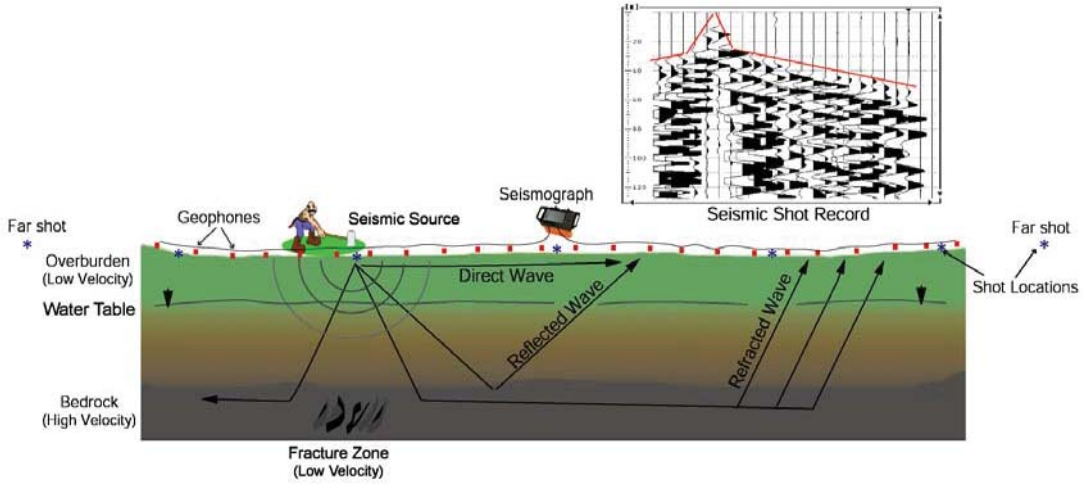


Figure 3: Seismic Refraction Operating Principle

2.2.3. Seismic Resonance (TISAR)

Basic Theory

The seismic resonance, or *TISAR (Testing & Imaging using Seismic Acoustic Resonance),* method is based on the frequency analysis of seismic records. It considers the seismic resonance within the signal. The method was originally developed for geological sub-surface profiling (1 to 15m deep); however it has been shown to be effective for ranges smaller than 0.1m for testing of concrete/asphalt structures, as well as for deep (100m) geological investigations. Figure 4 is a combination figure showing

applications for the method and a small sample of an output that is interpreted for geologic contacts.

The method uses the information from an induced seismic signal in the frequency domain instead of the direct time domain as with classic seismic reflection. For both methods, however, the principal physical parameter involved remains the acoustic impedance contrast, which is the product of the seismic velocity and the volumetric mass of the investigated materials. At the interface between two materials with different acoustic impedance, the seismic signal is partially reflected back to the surface. Under specific conditions, the repetition of such reflections leads to the build-up of a resonance signal, whose frequency is related to the depth of the interface and the seismic velocity of the upper material. The resonance frequency is inversely proportional to the reflection time. The first advantage of the use of frequencies instead of reflection times is the amplitude and the repetitive signal, which is less sensitive to the ambient noise and produces a resolution that increases with shallow depths. The second advantage of using resonance frequencies is the ability to resolve very thin layers (contrary to standard reflection).

Survey Design

The seismic spread setup utilized for seismic reflection and seismic refraction was also used for TISAR. A buffalo gun was used as the primary energy source. The buffalo gun was a good energy source for the resonance survey. The TISAR data was primarily used to supplement the reflection data in the shallow on-land portions.

Interpretation Method and Accuracy of Results

The seismic resonance method requires adequate geological models and seismic velocities. These parameters are typically derived from seismic refraction measurements. The accuracy of the depths of TISAR reflectors is related to the accuracy of the layer velocities and thicknesses of the geological model. It may be possible that velocities vary by approximately 10% or more resulting in a similar variation in depth to a given reflector. Layer thicknesses estimated in the model could vary by a few metres resulting in variations of 20 to 30% in the resonance reflector depth. Resonance has the advantage of a vertical resolution that cannot be obtained from conventional seismic methods.

TISAR resonators can occur from geologic contacts, fractures and/or voids. As with seismic reflection and ground penetrating radar, the true nature/source of the resonators cannot be certain. Interpretation involves identifying trends in the relative amplitude of resonators.

The use of the word “relative” is the operative word. The vibration response of each geophone is normalized to itself and then a gain curve is applied to the entire geophone spread to compensate for the decrease in signal amplitude with depth (this is similar to ground radar). The gain curves are kept similar between profiles; however, changes in near surface geology and the resulting geophone coupling and hammer signal amplitude and frequency requires individual adjustment of the gain curves for each profile. Accordingly, discretion must be used when comparing the relative amplitudes of the resonators between profiles and depths.

The same colour palette (blue through violet) has been applied in all the data sets presented in this report. The TISAR values are unitless. The blue has "relatively" little or no acoustic impedance contrast when compared to the red within an entire data set. A geologic contact such as a fracture should appear in yellow to red unless there is a stronger contact such as a larger void within the data set in which case a subtle stratigraphic contact may not be visible.

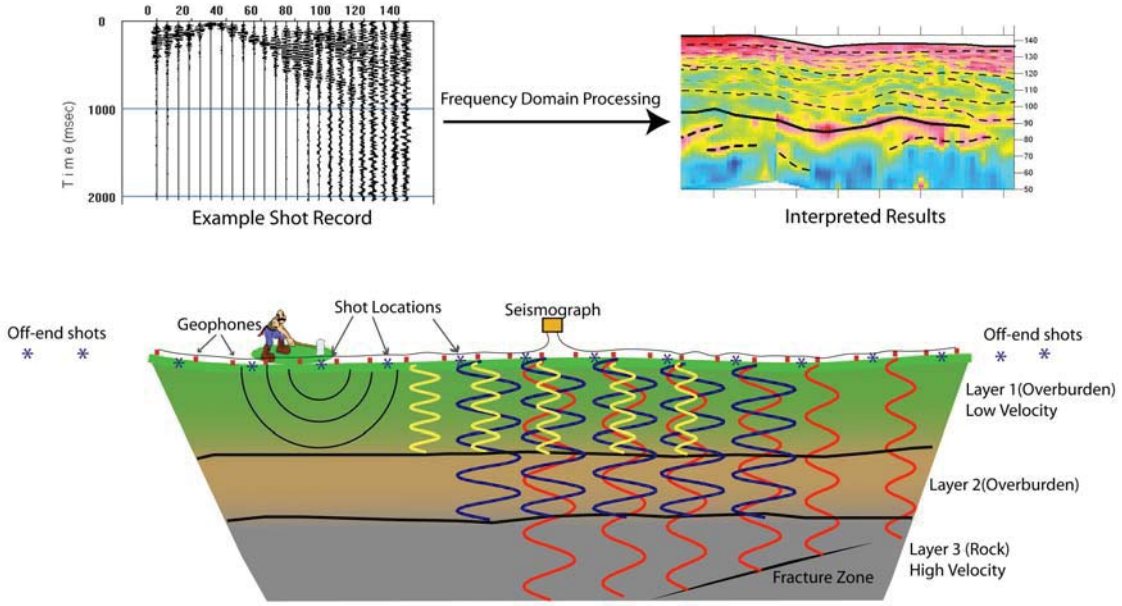


Figure 4: TISAR operating principle.

2.2.4. Multichannel Analysis of Surface Waves (M.A.S.W.)

Basic Theory

The Multi-channel Analysis of Surface Waves (MASW) is a seismic method used to evaluate the shear-wave velocities of subsurface materials through the analysis of the dispersion properties of Rayleigh surface waves ("ground roll"). The dispersion properties are measured as a change in phase velocity with frequency. Surface wave energy will decay exponentially with depth. Lower frequency surface waves will travel deeper and thus be more influenced by deeper velocity layering than the shallow higher frequency waves. Inversion of the Rayleigh wave dispersion curve yields a shear-wave (V_s) velocity depth profile (sounding). Figure 5 outlines the basic operating procedure for the MASW method. Figure 6 is an example image of a typical MASW record and resulting 1D V_s model. A more detailed description of the method can be found in the paper *Multi-channel Analysis of Surface Waves,* Park, C.B., Miller, R.D. and Xia, J. Geophysics, Vol. 64, No. 3 (May-June 1999); P. 800–808.

Survey Design

The geometry of an MASW survey is similar set to that of a seismic reflection investigation (i.e. 48 geophones in a linear array). The fundamental principle involves intentionally generating an acoustic wave at the surface and digitally recording the surface waves from the moment of source impact with a linear series of geophones on the surface. This is referred to as an "active source" method. Unlike the reflection method, which produces a data point beneath each geophone, the shear-wave depth profile is the average of the bulk area within the entirety of the geophone spread.

Interpretation Method and Accuracy of Results

The main processing sequence involved plotting, picking, and 1-D inversion of the MASW shot records using the SeisimagerSW™ software package. The results of the inversion process are inherently non-unique and the final model must be judged geologically realistic. The inversion modelling also assumes that all layering is flat/horizontal and laterally uniform.

Typically the accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The estimated error is typically higher for shear-wave velocities within rock formations.

At this particular site, the geology was not ideal for MASW soundings. The permafrost, ice and water layers will complicate the dispersion images. The method also assumes that the geology is laterally homogenous. The most suitable profile for MASW analysis was SL-E as the water depth was relatively shallow and uniform; however, analysis of the dispersion images for SL-D and SL-C appear to yield reasonable results. Ideally for marine MASW surveys, the geophones/hydrophones are placed on or as close as possible to the sea-floor.

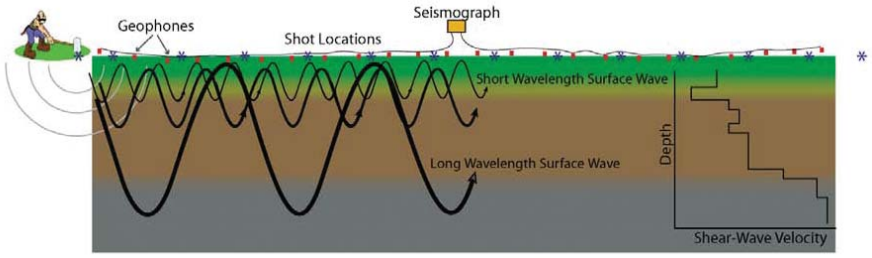


Figure 5: MASW Operating Principle

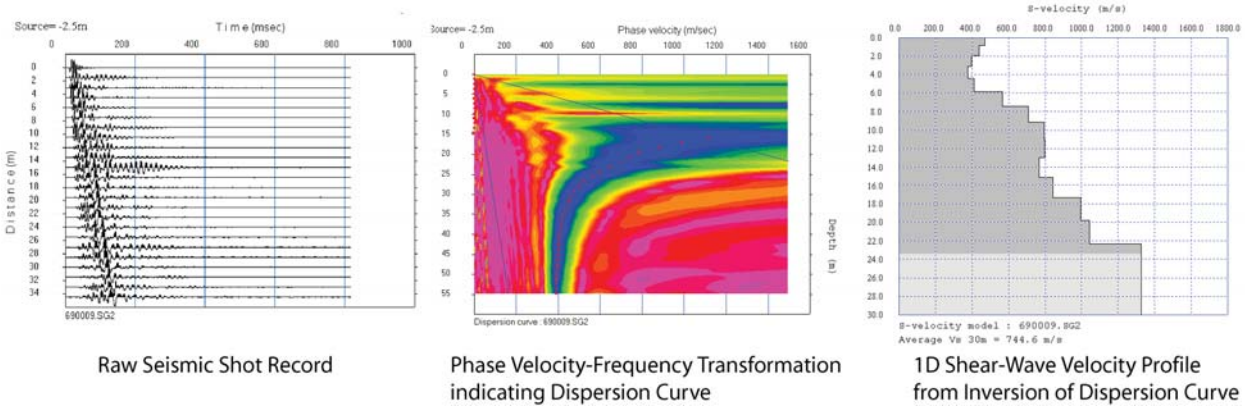


Figure 6: Example of a typical MASW shot record, phase velocity/frequency curve and resulting 1D shear-wave velocity model.

3. Results

The combined results of the seismic reflection, refraction, TISAR and MASW interpretations are presented in Appendix C in the form of interpreted cross-sections (Drawing T13615_A1). The interpreted contacts are based on the combined results of the shear-wave modelling, reflection images, critical distance calculations and borehole data.

The overall quality of the seismic records was very good.

Initial testing indicated that the seismic reflection method was most suitable to this particular site.

The primary objective of the survey was to identify the top of rock. It has been represented by a thick red line from the reflection interpretation and a magenta line based on the refraction analysis. Additional overburden contacts interpreted from the reflection and TISAR images are indicated by blue and grey lines respectively.

S-wave velocities can be used as an indicator of overburden types and bedrock competence. Appendix A contains a table of soil and rock classification based on S-wave velocities. MASW shear-wave data were analyzed for SL-C, SL-D and SL-E. The shear-wave models have been overlain on the cross-sections of drawing T13615_A1. As discussed above, the conditions for MASW analysis were not ideal at this particular site. The S-wave velocities determined through the MASW method are modelled velocities as opposed to true velocities measured using standard in-situ measuring methodology. The modelled velocities are typically within +/-10 to 15% of the true velocities of the overburden material; however, the added complications of the ice/water layers and multiple dispersion modes likely increase this error for this particular survey.

The seismic reflection and resonance (TISAR) data are primarily imaging tools. Alone, the methods do not provide indications of the material type. In addition, a velocity must be applied to convert the vertical scale of the images to a depth scale. The velocity can be estimated by correlation with borehole data. Interpretation of the data involves visually identifying reflector trends and corroborating with borehole data.

Interpretation of the seismic reflection data has identified 6 layers based on relatively stronger reflectors. These 6 layers have very good correlation at the intersection points of the seismic lines. The identification of the layers does not necessarily indicate uniform material within the layer. Gradual changes or thin layers may not generate a clear detectable reflection.

Relatively weaker reflectors have also been identified. The correlation of the weaker reflectors between the seismic profiles has not been systemically analyzed.

Comparison with the borehole logs suggest the following summaries for the defined overburden layers:

Layer 1: Layer 1 the upper most layer and represents materials from the sea floor to an elevation of approximately -10 m (onshore) to -32 m (offshore at SL-C). Offshore, in the vicinity of Line C, and based on borehole BH-13-09, this layer is interpreted as loose silty sand. Towards the shore there appears to be an increase in coarser grained materials; however the layer remains loose (BH-13-05 and MASW data). At the shoreline, boreholes indicate that this layer is fully (BH-13-01) to partially frozen (BH-13-02).

MASW S-wave velocities were modelled to be between 175 to 250m/s for this layer.

Layer 2: Layer 2 is defined by a strong upper reflector. Borehole 13-09, along SL-C, suggests that this layer is characterized by compact silt and sand. Boreholes along SL-D indicate the layer is dominated by relatively uniform compact sand. Boreholes along SL-E indicate predominately compact sand (BH-13-08) with some silt and gravel layers (BH-14-13 and BH-13-11).

MASW S-wave velocities were modelled to be between 175 to 275m/s for this layer.

Layer 3: The top of Layer 3 is best defined along SL-D.

BH-14-07b indicates primarily sand with some gravel and silt layers. The SPT N-Values are higher than the overlying layers.

BH-14-06 indicates more silt content than BH-14-07b.

BH-14-05C indicates primarily dense to very dense sand with some silt layers. As with BH-14-07b, the SPT N-Values are higher than the overlying layers.

BH-13-05b indicates very loose sand. This conflicts with the nearby BH-14-05C.

BH-13-09 intersects with the top of Layer 3 on SL-C. There is no sample logging; however, the DCPT indicates an increase (followed by a decrease) in blows near the top of Layer 3.

BH-14-13 along SL-E extends into the top of this layer and indicates sand and gravel for the upper 7m.

No boreholes on-shore extend to this layer.

MASW S-wave velocities were modelled to be between 250 to 375m/s for this layer.

Layer 4: The top of layer 4 is well defined along SL-C; however there are no boreholes that extend to it along the line nor along SL-E. Along SL-D BH-13-05B, BH-14-05C, BH-14-06 and BH-14-07B extend into this interpreted layer at an elevation of approximately -53m. The boreholes indicate primarily dense to very dense sand.

MASW S-wave velocities were modelled to be between 400 to 460 m/s for this layer.

No on-shore boreholes extended into this interpreted layer.

Layer 5: A single borehole (BH-14-07b) extends to the top of Layer 5 at an elevation of -66m. The borehole indicates dense sand with trace silt, less dense than the material immediately overlying it.

MASW S-wave velocities were modelled to be between 460 to 600 m/s for this layer.

Layer 6: MASW S-wave velocities were modelled to be between 525 to 760 m/s for this layer indicating the potential for dense sediments.

No boreholes extend to layer 6.

4. Conclusions & Recommendations

A total of approximately 1.76 km of seismic data were collected along five profiles in the vicinity of the proposed fixed dock, Mary River Project, Milne Inlet, Nunavut (Figure 1).

The data are presented in the form of cross-sectional figures in drawing T13615_A1.

Bedrock depths have been interpreted from a combination of seismic reflection and refraction data. The interpreted bedrock elevation ranged from approximately 90 to 140 m below sea-level. There was no borehole data available to corroborate the bedrock depth. P-wave velocities in the order of 3900 to 5100m/s suggest the bedrock is competent.

Interpretation of the reflection data identifies 6 overburden layers overlying the bedrock based on relatively stronger, continuous reflectors. Borehole data for 16 boreholes were provided by Hatch Ltd. to aid in the interpretation of the seismic data. Brief descriptions of the bulk layer properties based on borehole data have been provided above. The reader is referred to the geotechnical report by Hatch Ltd. for the analysis of borehole and geotechnical data.

Interpretation of the TISAR data identifies a number of resonators that could represent geologic overburden contacts. In general the TISAR method provides a higher resolution than the seismic reflection method. The TISAR contacts are interpreted to represent the various sand/gravel contacts identified in the borehole logs. As mentioned above, the TISAR data requires an accurate velocity model. At this particular site, due to the permafrost, assumptions had to be made regarding the velocity model. Variations in the thickness or seismic velocity of the permafrost layers will have a large effective in the overall accuracy of the interpreted results.

The velocity model, and thus interpreted images, for the on-shore portions are likely less accurate than the off-shore profiles. This is due to the irregularly/discontinuous frozen soil as indicated in BH-13-01/b, BH-13-02 and BH-14-12. The combined TISAR and reflection images for SL-A and SL-B do suggest however, that the geologic layers interpreted off-shore, can be interpreted continuing on-shore.

Line SL-E was the most suitable data set for MASW processing due to the shallow water and unfrozen sediments. The frozen ground on/near the shore created a large velocity inversion and contrast at surface, which does not allow adequate frequency dispersion. The water was shallow for SL-E and the sediments unfrozen. Lines SL-C and SL-D had deep water and unfrozen sediments. The overall accuracy of the shear-wave velocity measurements is not certain due to water depths and ice.

Shear strength data can be more reliably measured in marine conditions using data collected with hydrophones on or near the water bottom and a seismic source such as an air gun. On-shore, intrusive, e.g. downhole, methods can accurately measure the shear-wave velocity beneath the permafrost.

Processing and interpretation of the seismic data was performed by Ben McClement, P.Eng. and Olivier Létourneau. This report has been written by Milan Situm, P.Geo. and reviewed by Ben McClement, P.Eng.

_____	_____
Ben McClement, P.Eng.	Milan Situm, P.Geo.
Geophysicist	Manager

APPENDIX A

SEISMIC EQUIPMENT AND METHODOLOGY FACT SHEETS

TERRALOC PRO FEATURES





Terraloc Pro - Your guarantee for high-quality fieldwork

A STAND-ALONE SEISMOGRAPH, RUGGED FOR DEMANDING ENVIRONMENTS:
A self-contained instrument, designed to cope with rough field conditions.

VERSATILE & FUTURE-PROOF: You don't know what your next job will demand, with the Terraloc Pro you are equipped to successfully take on a wide range of seismic surveys.

SAVES VALUABLE FIELD TIME: Terraloc Pro offers built-in diagnostics and remote management as well as vendor assisted support over the net.

HIGH QUALITY DATA: Don't compromise, return from the field with superior data, Terraloc Pro delivers top class performance.

SECURE INVESTMENT: Terraloc Pro is a product for the future, it allows for add-on of new functionality and seamless expansion.

The ABEM Terraloc line of seismographs has a long and well-known reputation for ease of use and reliability under the toughest field conditions. With this brand new Terraloc Pro instrument, ABEM has stretched the specification and incorporated several new features. Well working software functionality has been inherited from its predecessor in order to save time and effort for the user. All together, this new instrument is a high quality product, designed to meet demanding field requirements.

A

General

No. of channels	12, 24 and 48
Additional channels	Easily obtained by linking two or more units together
Up-hole channel	Yes, 2 additional independent
Sampling rate (selectable)	100 sps – 50 ksps (20 µs - 10 ms)
Record length (selectable)	Up to 480 k samples / ch. equivalent to: 5,1 ms - 80 min
Pre-trig record (selectable)	0 – 100 % of record length
Delay time	Up to 2 minutes
Stacking	32 bits, up to 999 impacts
Unstack	Remove last shot from stack
Trigger inputs	Trigger coil, make/break, geophone, TTL
A/D converter resolution	24 bits
Dynamic range	(theoretical / measured) 144 dB / >120 dB
Input voltage range (selectable)	0,5 Vpp, 5 Vpp, 12,5 Vpp
Input gain (selectable)	0 dB, 12 dB, 24 dB, 36 dB, 48 dB
Input impedance (selectable)	3 kΩ, 20 kΩ, 20 MΩ
Frequency range	DC to 20 kHz
Total harmonic distortion	0,0005%
Crosstalk	-120 dB
Noise monitor	Amplitude
Anti-alias filters	Set automatically based on sampling rate
Connectors	NK-27 / KPT 55
GPS	Yes

Post recording features

Digital filters	Band-, low-, high- pass band-reject, remove DC offset
Spectrum analysis	Any single trace, FFT analysis
Velocity Analysis	On-screen analysis of refractor velocity
First arrivals picking	Automatic or manual Times can be saved with record
Pre-stack correlation	Yes, cross correlation with reference or any other ch.

Processor, RAM and hard disk

Processor	Low power Intel Atom, 1,6 GHz
Operating System	Windows XP Pro
Internal RAM	2GB (DDR SO-DIMM module)
Hard disk capacity	100 GB or greater
Display	8,4" Active TFT LCD, full colour, daylight visible, 800x600 res.
External display port	VGA output
I / O port	3 x USB 2.0 ports
Network interfaces	1 x IEEE 802.3 TP-10/100/1000 RJ-45 IP 67 2 x TP-10/100 KPT 08 WLAN antenna
Power	10 – 34 V DC external power 12 V internal battery
Power consumption	30/60 W (man/acq)
Ambient temp (operating)	-20 to + 55 °C
Ambient temp (storage)	-30 to + 70 °C
Casing	Rugged Al alloy, meets IEC IP 66
Weight, 24 channels	10 kg
Weight, 48 channels	11 kg
Dimensions (W x L x H)	39 x 21 x 32 cm

To order, please specify

Terraloc Pro, 12 CHANNEL UNIT	33 7000 12
Terraloc Pro, 24 CHANNEL UNIT	33 7000 14
Terraloc Pro, 48 CHANNEL UNIT	33 7000 16

Each unit includes:

- **Terraloc Pro instrument (of chosen type)**
- **Reference manual**
- **Trigger cable 250 m on reel, Office power supply (charger), Trigger coil, Accessories & Tools kit**
- **Windows XP compatible USB keyboard and mouse**
- **Software SeisTW and sample records**
- **Transport case (plywood)**

Field Accessories (ordered separately)

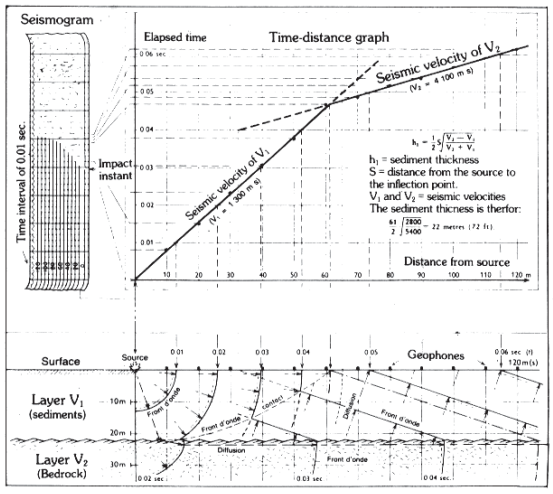
Seismic cable 24 take-outs at 5 m	36 0001 96
Extension cable 160 m (for 24 take-out cable)	36 0001 97
Seismic cable 12 take-outs at 12.5 m	36 0001 26
Extension cable, 160 m (for 12 take-out cable)	36 0001 28
(other cable configurations also available)	
Portable reel	38 3001 52
10 Hz vertical geophone	39 1000 61
10 Hz horizontal geophone	39 1000 93
4.5 Hz vertical geophone	39 1000 63
4.5 Hz horizontal geophone	39 1000 64
4.5 Hz 3-D geophone	39 1000 85
100 Hz vertical geophone (land)	39 1000 77
100 Hz vertical geophone (marsh)	39 1000 78
Shock plate	33 0010 18
Hi-voltage CB 20 VA shotbox	39 9000 23

GEOPHYSICS G P R INTERNATIONAL INC.

SEISMIC REFRACTION

Seismic refraction consists of recording the length of time taken for an artificially provoked surface vibration to propagate through the earth. By processing the data, the seismic velocities and depths of the underlying rock layers can be determined. These velocities are characteristic of the nature and quality of the bedrock; a fissured, fractured or sheared rock will be characterized by reduced seismic velocities.

The method is generally used to obtain a better geological analysis of the sub-surface and to determine the following characteristics: the quality, profile and depth of bedrock, its nature, degree of alteration and any other physical contrasts. Seismic refraction ensures that maximum information may be gained from geological field work, and that direct investment costs (drilling, excavation), will be reduced.



PRINCIPLE OF SEISMIC REFRACTION

FEATURES

- Precise determination of soil thickness .
- Precise determination of the seismic velocities (rock type and quality).
- Localization and identification of geological units.
- Detailed analysis of soil.
- Year-round use.
- Sea and land surveys (above and below ground).
- Great accessibility possible to rough terrain and remote regions.

AREAS OF APPLICATION

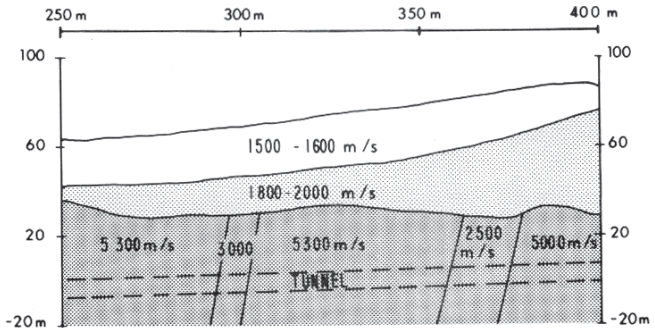
Civil Engineering/Mining Exploration - Exploitation/Petroleum and Gas Sectors/ Geotechnology/Geology/ Hydrology.

- Identification of faults, fractures, shear zones.
- Detection of rock differences (veins, dykes, cavities, etc.).
- Determination of rock topography.
- Evaluation of volume of soil present or to be excavated.
- Excellent complement to geological mapping.
- Recognition of geophysical anomalies such as VLF, gravimetry, etc.
- Drill site selection, better target identification.
- Evaluation of the size, thickness and condition of surface shafts (mining exploitation).
- Mass Rock Quality Determination (MRQD).
- Detection of rock irregularities and breaks.
- Hydrogeology (detection of water tables, veins, reservoirs).
- Excellent complement to any geological analysis.

AREAS OF APPLICATION

Civil Engineering/Mining Exploration - Exploitation/Petroleum and Gas Sectors/ Geotechnology/Geology/ Hydrology.

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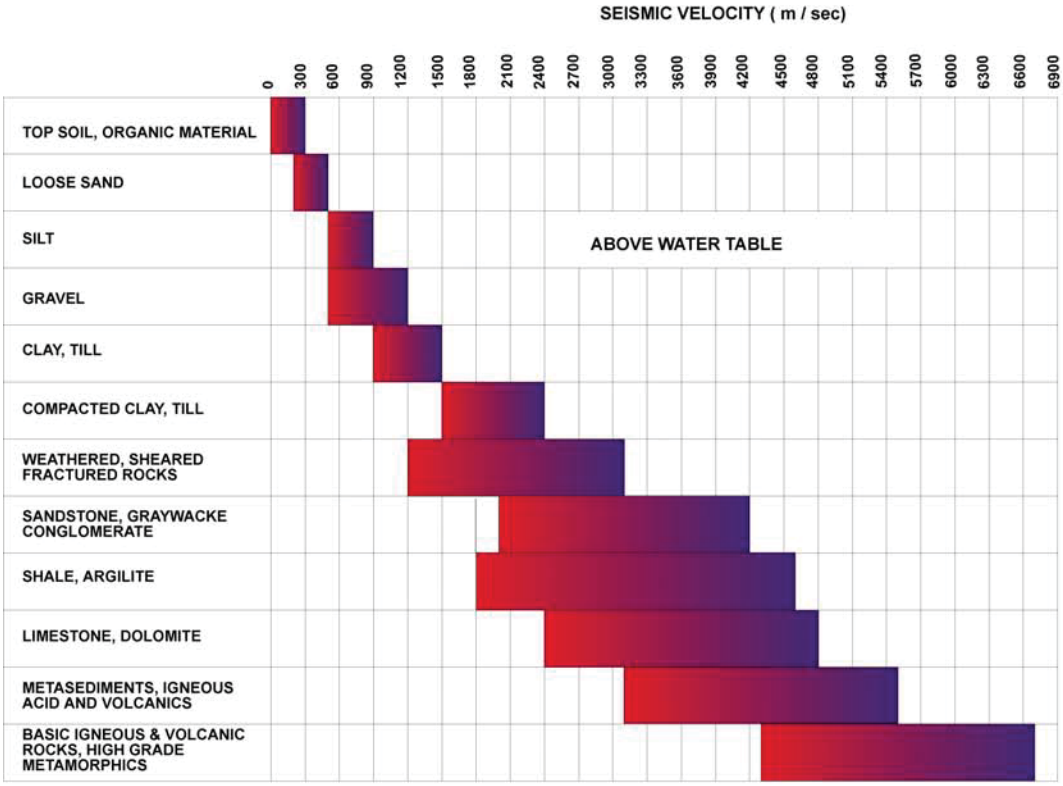


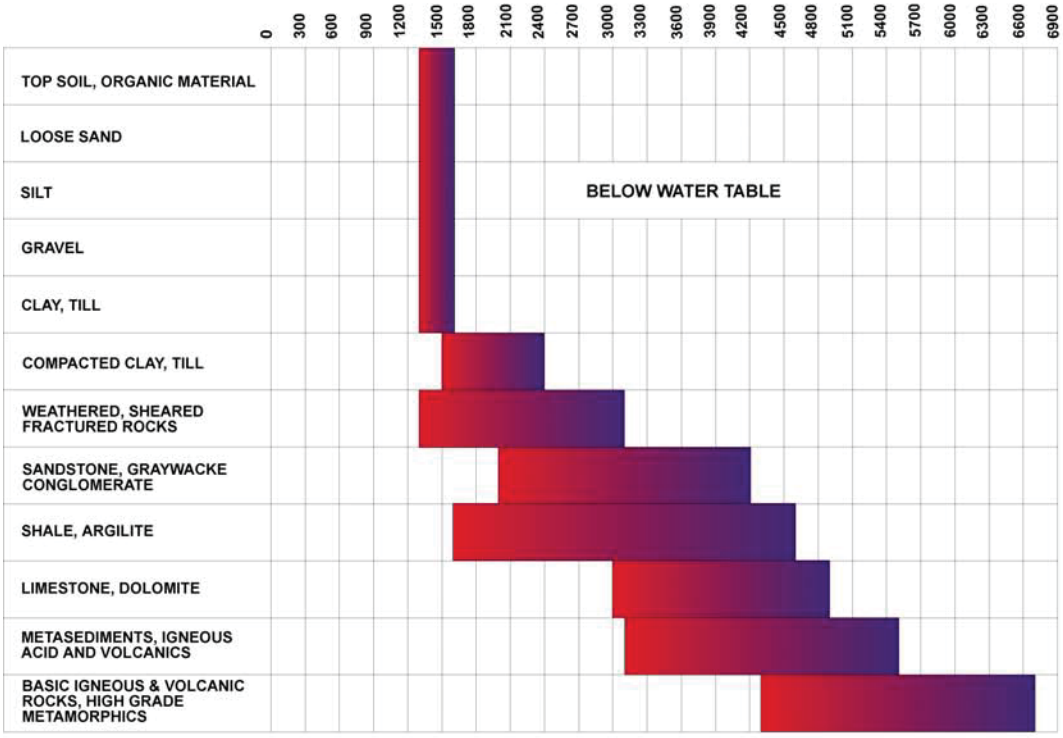
Interpretation results of a seismic profile

ADDITIONAL REMARKS

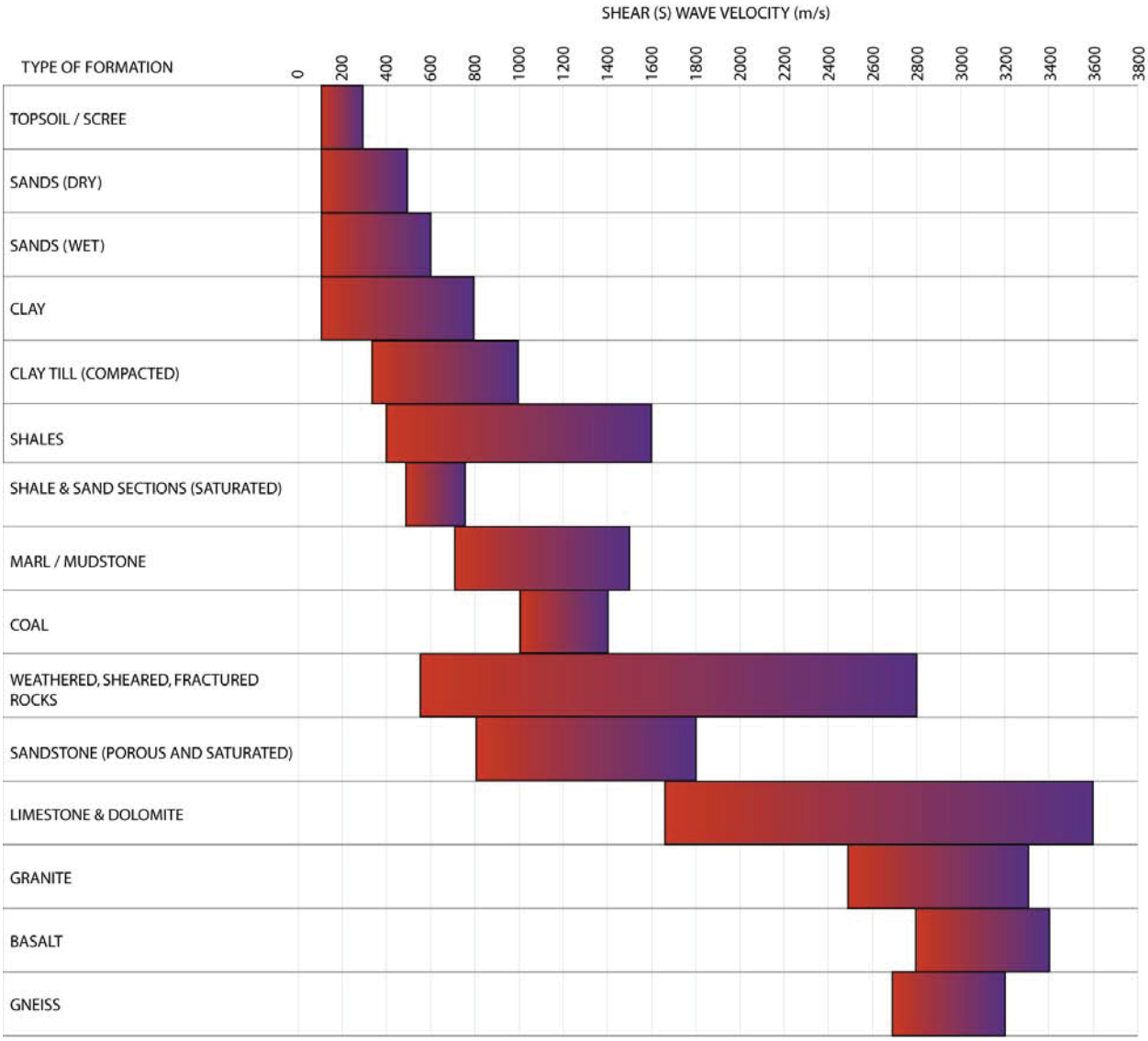
Geophysics GPR International Inc. has been recognized for the past fifteen years as a leader in both the application and the development of seismic methods. Seismic refraction is currently used in both civil and mining engineering; the use of lighter high-performance equipment and better tomographical interpretation of the results have contributed to its growing popularity.

GEOPHYSICS G P R INTERNATIONAL INC.





SOIL AND ROCK CLASSIFICATION BASED ON SEISMIC VELOCITIES



Typical rock velocities, Based on Bourbie, Coussy and Zinszner, Acoustics of Porous Media, 1987
with modifications by Geophysics GPR. Rev A.1 July 2011

APPENDIX B

SITE PHOTOS



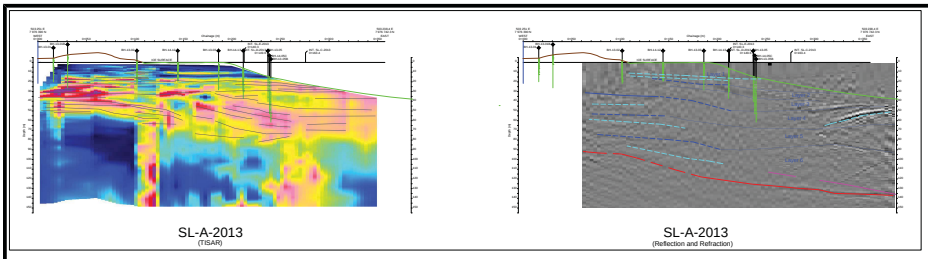
Photo 1: Seismic line setup with buffalo gun



Photo 2: Seismic line setup, with seismograph shelter

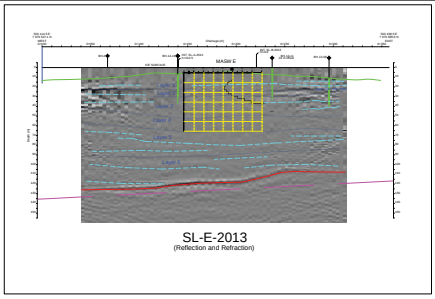
APPENDIX C

DRAWING T13615_A1

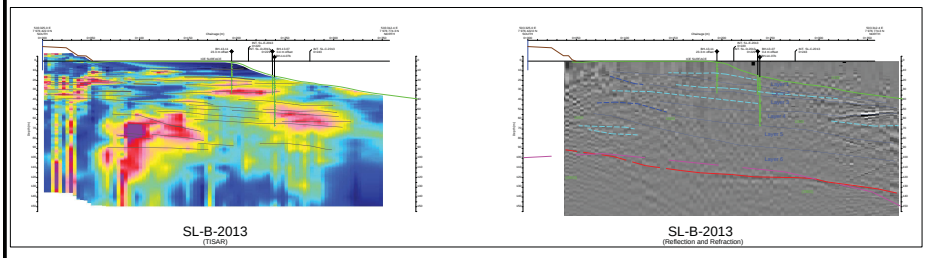


SL-A-2013
(TISAR)

SL-A-2013
(Reflection and Refraction)

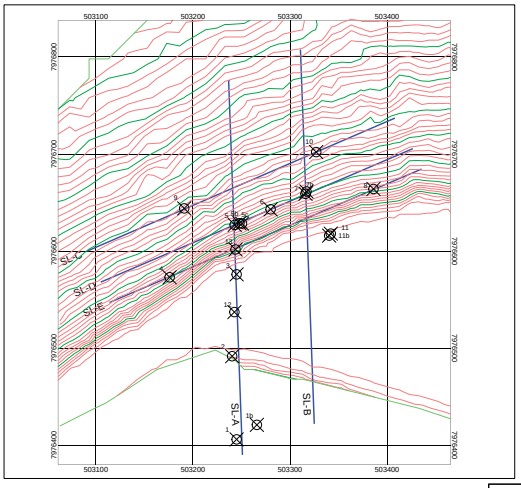


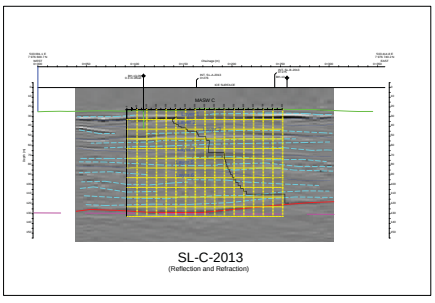
SL-E-2013
(Reflection and Refraction)



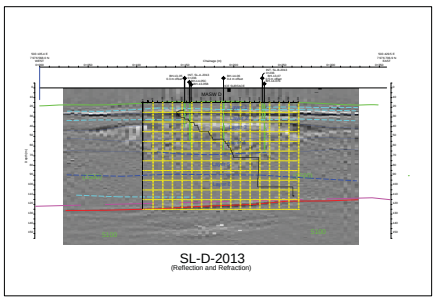
SL-B-2013
(TISAR)

SL-B-2013
(Reflection and Refraction)





SL-C-2013
(Reflection and Refraction)



SL-D-2013
(Reflection and Refraction)

LEGEND

- Interpreted Bedrock from Reflection data
- Interpreted Bedrock from Refraction data
- Interpreted Overburden Reflector (stronger)
- Interpreted Overburden Reflector (weaker)
- Seismic Refraction Velocity
- Interpreted Overburden Resonator (TISAR)
- Bathymetry Profile
- Topography Profile

DRAFT

No	NOTES
1	THE GEOPHYSICAL SURVEY WAS EXECUTED BY GEOPHYSICS GPR INTERNATIONAL INC. DECEMBER, 2013
2	COORDINATE SYSTEM: NAD83 UTM ZONE 17N
3	BATHYMETRY DATA, AND BOREHOLE DATA PROVIDED BY HATCH LTD.
4	REFER TO THE FULL REPORT FOR A DISCUSSION OF METHODLOGY, RESULTS, ACCURICIES AND LIMITATIONS
5	
6	

No	DATE	MODIFICATIONS
1	Feb 10, 2014	Minor adjustments to layer interpretation at intersection points of lines Added interpretation for weaker seismic reflectors and MASW S-wave Profiles

GPR
APP.

GEOPHYSICS GPR INTERNATIONAL INC.

DESSINE PAR / DRAWN BY	RBM
VERIFIÉ PAR / CHECKED BY	B.McClement, P. Eng.
APPROUVÉ PAR / APPROVED BY	M. Situm, P. Geo.
# CONTRAT / CONTRACT #	T-13615
ÉCHELLE / SCALE	AS SHOWN
DATE	JANUARY 31, 2014
# DESSIN / DRAWING #	T13615_A1

CLIENT / CLIENT
BAFFINLAND IRON MINES CORP.

PROJET / PROJECT
MARY RIVER PROJECT
MILNE INLET, NUNAVUT

TITRE / TITLE
GEOPHYSICAL SEISMIC INVESTIGATION
INTERPRETED SEISMIC PROFILES