June 29, 2012

# **GIANT MINE REMEDIATION PROJECT**

# Tailings Investigation, Giant Mine, Yellowknife, NWT

#### Submitted to:

Northern Contaminated Sites, Western Region Public Works and Government Services Canada 4th Floor Greenstone Building, 5101 - 50th Ave. P.O. Box 518 Yellowknife, NT X1A 2N4

REPORT

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**Soil, Rock and Groundwater Conditions**: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

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Groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their measurement. Groundwater conditions may vary between reported locations and can be affected by annual, seasonal and special meteorological conditions or tidal fluctuations. Groundwater conditions may also be altered by construction activity on or in the vicinity of the project site.

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**Follow-Up and Construction Services**: All details of the design and proposed construction may not be known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities.





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### 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Public Works and Government Services Canada to conduct an investigation for borrow materials within the Giant Mine site (Site), Yellowknife, Northwest Territories (NWT). The Site incorporates a large mine lease area (see Figure 1) upon which tailings ponds and dams were constructed. The tailings are impounded by a series of dams, designed to contain the tailings and minimize seepage. There are approximately 16 million tonnes of tailings stored in ponds, covering an area of about 95 hectares. There are an additional nine hectares covered by water treatment sludge stored in a settling and polishing pond. Both the tailings and sludge contain moderate amounts of arsenic, and are subject to wind erosion and direct contact by animals.

Tailings and sludge areas are to be covered with a layer of quarried rock and second layer of fine-grained soil. The layer of quarried rock prevents the upward migration of contamination from the tailings, and inhibits the downward penetration of plant roots. The upper layer will allow for re-vegetation and promote runoff and limit seepage into the tailings. The surface will be graded to limit erosion and allow water to run off of the cover without contacting the tailings.

In March 2011, Golder carried out an assessment of four tailings pond areas. The purpose of the investigation was to identify the existing material characteristics for input to the tailings ponds cover design as part of the Giant Mine Remediation Project. The information collected during this assessment is provided in the following sections.

This letter shall be read in conjunction with "**Important Information and Limitations of this Report**" which precedes this text. The reader's attention is specifically drawn to this information for the proper use and interpretation of this report.





## 2.0 PREVIOUS INVESTIGATIONS

Several investigations have been carried out previously to identify the site conditions in and around the tailings ponds at the Site. Those reports reviewed in this assessment have included the following:

- "Phase 1 Tailings Investigation Giant Mine Remediation Project" (Golder 2011)
- Giant Mine Remediation Implementation Plan" (Merit 2009)
- "As-built Report for the Tailings Cover Trails, Giant Mine, NWT" (SRK 2009)
- Giant Mine Remediation Plan: 2008 Seismic Studies Related to Tailings Dam Safety FINAL" (SRK 2008)
- Giant Mine Remediation Plan" (SRK 2007a)
- "Tailings and Settling Pond Field Investigations, Giant Mine, Yellowknife, NWT, Canada" (SRK 2007b)
- "Giant Mine Field Program Characterisation of Tailings" (SRK 2005a)
   "Giant Mine Remediation Plan: Tailings and Sludge Containment Areas" (SRK 2005b)
- "Characterization of Soil and Groundwater in the Calcine and Mill Areas, Giant Mine" (SRK 2004)"Tailings Retreatment Plant Information Brochure" (Giant 1990)



### 3.0 SCOPE OF WORK

The Giant Mine Remediation Plan specifies the closure objectives for the site. The objectives relevant to the closure of the tailings and sludge areas are:

- To remediate the surface of the site to the industrial standard guidelines under the NWT Environmental Protection Act, recognizing that portions of the site will be suitable for other land uses with appropriate restrictions; and
- To minimize the release of contaminants from the site to the surrounding environment.

Specifically related to the cover of the tailings and settling/polishing ponds, the objective is to design a cover that minimises contact between the tailings or tailings pore water and people or animals and to reduce infiltration to the groundwater. The cover design will be dependent on the tailing materials and their engineering properties.

The current task for remediation of the tailings and settling/polishing ponds consists of the following:

- Investigation of the tailings in the South Pond, North Pond and Northwest Pond, which have been under water in the summer months and have not been fully investigated to date;
- Complete model of pond, to design dewatering program to result in zone at center with sufficient strength to support cover design (in flooded areas of pond);
- Complete Preliminary Design of tailings covers;
- Complete Preliminary Design of settling/polishing pond covers;
- Complete a design for tailings surface preparation, including re-grading the surface of the tailings (taking into account design to drain and consolidate the central, soft portions of the ponds currently under water);
- Evaluate long term stability of each dam, including provisions to re-slope or buttress any dams that may need this re-contouring for long term stability (specifically related to long term seismic events); and
- Develop long term maintenance plans for the ponds, including provisions to repair damage to the covers and to manage long term seepage from the ponds.

The first task, the investigation program, is presented in this report. The remaining tasks will be presented in a Preliminary Design Report, under separate cover.





# 3.1 Tailings Investigation Sites

The tailings investigation has been carried out on the following tailings ponds:

- South Pond;
- Central Pond;
- North Pond; and
- Northwest Pond.

This investigation did not include investigation of the settling pond or polishing pond downstream of the existing water treatment plant. The sludges in the settling pond have been investigated previously, and the sludge in the bottom of the polishing pond is expected to be too thin to investigate with conventional methods.

### 3.2 Methodology

To provide the required geotechnical data for the tailings cover and re-grading design, a borehole drilling program was recommended to collect soil samples and provide in-situ soil density information.

The borehole drilling was carried out using an M5 – track mounted auger drill rig supplied by Mobile Augers and Research Ltd., from Edmonton, Alberta. Drilling was conducted from March 8-10, March 12-15 and March 20, 2011. There were fifteen (15) boreholes drilled to depths ranging from 7.16 m to 20.57 m (see Figures 2). There is no borehole record for GA11-T-03, GA11-T-05 or GA11-T-07 as this portion of the Central Pond was investigated by AECOM Canada Ltd. under a separate program related to investigation for potential landfill locations.

Samples were collected at regular intervals (4-5 ft or 1.2-1.5 m) or at changes in material type, and then bagged, labelled and transported to Golder's geotechnical laboratory facility in Edmonton, Alberta. Summary borehole records are provided in Appendix A. The temperature of the soil on the augers was measured using a hand held thermistor immediately after the auger was removed from the ground, where possible. These temperatures are recorded on the borehole records in the additional lab testing column.

#### 3.2.1 Instrumentation

Standpipes were installed in three of the boreholes (GA11-T-01, GA11-T-04 and GA11-T-13) to a depth of 6 m below ground surface. A standpipe was also installed in GA11-T-11 to a depth of 9.6 m. The standpipes were constructed with 10 feet (3.1 m) of 2" (50 mm) slotted PVC pipe at the bottom and then solid 2" (50 mm) PVC to the surface of the borehole. The slotted portion of the standpipe was backfilled using manufactured silica sand up to approximately 0.3 m above the slotted section, where a bentonite seal was developed over the 0.6 m of standpipe above the sand. The remaining upper section of the standpipe was backfilled with soil cuttings produced from the drilling. Approximately 1.0 m of stick-up above the ground surface was left in place and the top of the pipe was sealed using a standard J-plug.



# 4.0 RESULTS

#### 4.1 Field Results

Based on the visual assessment of material types in the field, the soils encountered have been generally described as;

- Clayey silt (tailings);
- Silt (tailings);
- Peat;
- Silty clay (till);
- Sand; and
- Gravel.

Frost penetration was measured in each of the boreholes and ranged from 0.8 m to 2.0 m below ground level.

Possible bedrock contact was identified in Borehole GA11-T-02, and it was observed that this borehole is in close proximity (approximately 100 m) to a bedrock outcrop that is exposed at the north end of the South Tailings Pond.

Groundwater was not identified in any of the boreholes drilled during this investigation, but one borehole in each of the tailings pond areas was developed as a groundwater monitoring well. Water levels were read June 17, 2011 in 3 of the 4 boreholes where the standpipes were installed. The standpipe in Borehole GA11-T-13 located in the Northwest Tailings Pond was underwater at the time of sampling. It is anticipated that the water levels have essentially stabilized since the standpipes were installed and the results are provided in the table below:

Table 1. Results of Oroundwater measurements, sume 17, 2011	Table	1: Results o	of Groundwater	Measurements,	, June 17, 201	1
-------------------------------------------------------------	-------	--------------	----------------	---------------	----------------	---

Borehole No.	Time of Test	Stickup Above Ground	Depth to Water Level
GA11-T-11	11:17	0.99 m	10.51 m
GA11-T-04	11:31	0.97 m	6.52 m
GA11-T-01	11:53	1.04 m	6.35 m
GA11-T-13	UNDERWATER		



## 4.2 Laboratory Results

All samples collected during the borehole drilling program were tested for moisture content. Selected samples were tested for particle size (sieve) analysis, Atterberg Limits, hydrometers, soil-water characteristics and consolidation characteristics. The selected samples are considered to be representative of the soil type from which they were collected. The number of tests conducted on the samples provided, are as follows:

- 180 moisture contents;
- 48 particle size analyses;
- 67 Atterberg Limits;
- 9 Soil-Water Characteristic Curves; and
- 2 Consolidation Falling Head Hydraulic Conductivity tests.

Individual laboratory test result sheets are provided in Appendix B. Select test results are also provided on the borehole records. A summary of index laboratory test results are provided below.





Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	1-2	SA1	Silty - Sand	9.9	61.1	32.3	6.6		NP
	2.5-4	SA2	(Clayey Silt)	24.2					
	5-6	SA3	Clayey - Silt	27.4	2.1	82.8	15.2	25	22
	7.5-9	SA4	Clayey - Silt	27.6	0.2	83.9	15.9		NP
	10.5-11.5	SA5	Sandy-Silt	31.2	29.7	58.4	11.9		NP
	12.5-14	SA6	(Clayey Silt)	25.8					
	15-15.5	SA7	Clayey - Silt	41.7	0.5	79.6	19.9	32	25
	17.5-19	SA8	(Clayey Silt)	33.7					
	20-21	SA9	Sandy - Silt	23.4	15.5	73.8	10.7		NP
GA11-1-01 (Control Bond)	22.5-24	SA10	(Clayey Silt)	29.2					
(Central Pond)	25-26	SA11	Sandy - Silt	23.7	13.8	75.5	10.7		NP
	25-26	SA12	(Clayey Silt)	24.2					
	35-36	SA13	Clayey - Silt	29.0	2.4	79.2	18.4	27	23
	37.5-39	SA15	(Clayey - Silt)	29.9				23	17
	41-42	SA16	(Clayey - Silt)	27.9					
	47.5-49	SA17	(Clayey - Silt)	27.5					
	49.5-50	SA18	(Peat)	45.7					
	52.5-54	SA19	(Silty Clay)	24.9					
	54.5-56	SA20	(Silty Clay)	27.5					
	1-2	SA1	(Silt)	44.3					
	3-5	SA2	Sand and Silt		55.5	39.1	5.4		NP
	10-11	SA5	Clayey - Silt	22.5	11.5	75.0	13.5		NP
	15-16	SA7	Clayey - Silt	34.6	3.8	79.0	17.2	24	20
CA44 T 02	17.5-19	SA8	(Silt)	35.4					
(Central Pond)	20-21	SA9	Sandy, Clayey - Silt	26.6	16.7	69.5	13.8		NP
	22.5-24	SA10	(Silt)	24.8					
	25-26	SA11	Sand and Silt	23.2	46.9	42.1	11.0		NP
	29-30	SA13	(Silt)	30.8					
	30-31	SA14	BR	17.9					
	1-2	SA1	(Sand and Silt)	28.2					
	2.5-4	SA2	(Sand and Silt)	20.0					
GA11-T-04	5-6	SA3	(Sand and Silt)	15.2					
	7.5-9	SA4	(Sand and Silt)	9.7					
	10-11	SA5	Sandy, Clayey - Silt	27.5	18.9	66.0	15.0		NP
	13-14	SA6	Sandy, Clayey - Silt		15.4	71.6	13.0		NP
	15-17	SA7	Silt	19.7				26	23
	17.5-19	SA8	Clayey, Sand and Silt	24.8	51.8	35.9	12.2		NP

#### Table 2: Soil Parameters – Tailings Ponds – Giant Mine



Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	20-21	SA9	(Silt)	20.0					
	22.5-24	SA10	Sandy-Silt	19.1	32.1	60.6	7.3		NP
	25-26	SA11	(Silt)	27.6					
	27.5-28	SA12	Sandy- Silt	23.7	28.7	63.6	7.7		NP
	35-36	SA13	(Silt)	28.5					
	37.5-39	SA14	(Silt)	30.9					
	45-46	SA15	Sandy-Silt	22.8	28.1	60.0	11.9		NP
	47.5-49	SA16	(Silt)	30.5					
	54-55	SA17	(Silt)	23.6					
	61-63	SA18	(Silt)	32.5					NP
	65.5-67	SA19	(Peat)	116.2					
	15-16	SA6	(Clayey Silt)	38.2					
	17.5-19	SA7	Sandy-Silt	24.0	38.1	55.0	6.9		
	20-21	SA8	(Clayey Silt)	29.9					
	22.5-24	SA9	Silt	25.1	11.1	85.7	3.2		NP
	25-26	SA10	(Clayey Silt)	34.7					
GA11-T-06	27.5-29	SA11	Sandy-Silt	23.6	27.2	71.5	1.3		NP
(Central Pond)	34-35	SA12	Sandy - Silt	29.3	14.2	74.9	10.9		NP
	44-45	SA14	(Clayey Silt)	16.8					
	47.5-49	SA15	Silty-Sand	24.3	67.3	26.9	5.8		NP
	54.5-55.5	SA16	(Clayey Silt)	22.8					
	64-65	SA17	(Peat)	25.1					
	65.5-66.5	SA18	(Sand)	18.4					
	1-2	SA1	(Silt)	21.0					
	4.5-5.5	SA2	(Silt)	23.7					
	7.5-9	SA3	(Silt)	27.1					
	10-11	SA4	(Silt)	20.6					
	12.5-14	SA5	(Silt)	22.4					NP
GA11-T-08	15-16	SA6	(Silt)	20.1					
(North Pond)	17.5-19	SA7	(Silt)	21.5					NP
	20.21	SA8	(Silt)	20.2					
	22.5-23.5	SA9A	(Silt)	29.1				23	18
	23.5-24	SA9B	(Sand & Gravel)	14.6					
	25-26	SA10	(Silty Clay)	17.6					NP



Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	1-2	SA1	(Silt)	27.9					
	4-5	SA2	Sand		74.0	20.5	5.5		NP
	6-7	SA3	(Silt)	21.2					NP
	10-11	SA5	(Silt)	26.8				24	23
	15-16	SA7	(Silt)	32.0					
GA11-T-09 (North Pond)	17-18	SA8	(Sand and Gravel)	11.2					
	20.5-21.5	SA9	(Clayey Silt)	20.9				25	24
	24-25	SA10	(Clayey Silt)	23.0					
	27.5-29	SA11	(Clayey Silt)	33.0					
	29.5-30.5	SA12	(Peat)	26.7					
	31.5-32.5	SA13	(Silty Clay)	40.9					
	1-2	SA1	(Silt and Sand)	24.0					
	5-6	SA2	(Silt and Sand)	22.2					NP
	7.5-9	SA3	(Silt and Sand)	31.6					
GA11-T-10	10-11	SA4	(Clayey Silt)	29.4					NP
(North Pond)	15-16	SA6	(Clayey Silt)	26.4					NP
	17.5-19	SA7	(Clayey Silt)	30.6					
	20-21	SA8	(Clayey Silt)	25.6					
	22.5-24	SA9	(Clayey Silt)	29.6					
	25-26	SA10	(Clayey Silt)	38.9				32	27
	27.5-29	SA11	(Silty Clay)	11.3					
	1-2	SA1	(Clayey Silt)	42.3					
	4-5	SA2	(Clayey Silt)	32.3					
	5-7.5	SA3	Sandy - Silt		19.8	68.9	11.3		NP
	10.5-11.5	SA4	(Sandy Silt)	8.4					
	12.5-14	SA5	Clayey - Silt	34.5	1.2	81.5	17.3		
	15-16	SA6	(Clayey Silt)	39.2					
	17.5-19	SA7	Clayey - Silt	40.3	0.5	85.2	14.2		NP
GA11-T-11	20-21	SA8	(Clayey Silt)	36.5					
(North Pond)	22.5-24	SA9	Clayey - Silt	34.5	0.6	86.4	13.0	26	24
	25-26	SA10	(Clayey Silt)	39.2					
	27.5-29	SA11	Clayey - Silt	41.0	0.6	85.6	13.9		NP
	34-35	SA12	(Clayey Silt)	34.6					
	37.5-39	SA13	Clayey - Silt	35.8	0.3	82.6	17.1		NP
	41-42	SA14	(Peat)	63.9					
	44-45	SA15	(Silty Clay)	33.8					
	46-47	SA16	(Silty Sand)	31.5					



Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	16.5-17.5	SA6	Sandy-Silt	23.2	22.2	75.4	2.4		NP
	17.5-19	SA7	(Silty Sand)	13.9					
-	20-21	SA8	Silt	31.9	2.0	91.1	6.9		NP
	22.5-24	SA9	(Silt)	23.9					
	25-26	SA10	Silt	29.7	3.2	89.2	7.6		NP
GA11-T-12	34-35	SA12	(Silt)	26.6					
(Northwest Pond)	39-40	SA13	Sandy-Silt	19.0	30.3	67.7	2.0		NP
i onaj	44-45	SA14	(Silt)	18.3					
	49-50	SA15	Sandy-Silt	21.6	32.6	47.4	20.0		NP
	54.5-55.5	SA16	(Silt)	24.0					
	59-60	SA17	Sandy - Silt	20.2	14.0	83.6	2.4		NP
	65-66	SA18	(Clay)	37.6					
	1-2	SA1	(Clayey Silt)	22.3					
	5-6	SA2	(Clayey Silt)	31.5					
	6-8	SA3	Clayey - Silt		0.0	83.2	16.8		
	10-11	SA4	(Clayey Silt)	29.5					
	12.5-14	SA5	(Clayey Silt)	32.1					
0.1.1.T.10	15-16	SA6	(Clayey Silt)	25.1					NP
GA11-1-13 (Northwort	17.5-19	SA7	(Clayey Silt)	29.0					
Pond)	20-21	SA8	(Clayey Silt)	24.4					NP
,	22.5-24	SA9	(Clayey Silt)	29.7					
	25-26	SA10	(Clayey Silt)	26.6					NP
	27.5-29	SA11	(Clayey Silt)	30.5					
	30-31	SA12	(Clayey Silt)	31.4					NP
	35-36	SA13	(Clayey Silt)	30.3					
	40-41	SA14	(Silty Clay)	29.6					
	15-16	SA6	Clayey - Silt	29.9	0.2	85.1	14.7	29	24
	17.5-19	SA7	(Clayey Silt)	31.3					
	20-21	SA8	Clayey - Silt	32.3	0.0	85.6	14.4		NP
	22.5-24	SA9	(Clayey Silt)	28.7					
GA11-T-14	25-26	SA10	Clayey - Silt	36.4	0.3	85.0	14.7	31	25
(Northwest	27.5-29	SA11	(Clayey Silt)	38.7					
Pond)	34-35	SA12	Clayey-Silt	22.1	3.5	67.2	27.5	27	17
	37.5-39	SA13	(Clayey Silt)	27.6					
	43-44	SA14	Clayey - Silt	31.1	2.1	80.3	17.7		NP
	47.5-49	SA15	(Silty Clay)	30.0					
	54-55	SA16	(Clayey Silt)	29.1					



Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	1-2	SA1	(Clayey Silt)	14.9					
	6-7	SA2	(Clayey Silt)	29.0					
	7.5-9	SA3	(Clayey Silt)	24.4					
GA11-T-15	9.5-10.5	SA4	(Clayey Silt)	25.2					
(Northwest	12.5-14	SA5	(Silty Sand)	18.5					
Pond)	15-16	SA6	(Silty Sand)	21.0					
	17.5-18	SA7	(Silty Sand)	33.6					
	18.5-19	SA8	(Silty Clay)	33.2					
	20-21	SA9	(Silty Clay)	18.7					
	1-2	SA1	(Clayey Silt)	22.1					
	5-6	SA2	(Clayey Silt)	27.2					
	7.5-9	SA3	(Clayey Silt)	34.7					NP
	10-11	SA4	(Clayey Silt)	28.3					
	15-16	SA6	(Clayey Silt)	41.0				25	24
GA11-T-16	17.5-19	SA7	(Clayey Silt)	26.8					
(Northwest	20-21	SA8	(Clayey Silt)	24.4					NP
Pond)	22.5-24	SA9	(Clayey Silt)	36.9					
	25-26	SA10	(Clayey Silt)	29.4					NP
	27.5-29	SA11	(Clayey Silt)	39.1					
	35-36	SA12	(Clayey Silt)	39.3					NP
	37.5-39	SA13	(Clayey Silt)	38.5					
	42-43	SA14	(Silty Clay)	41.5					
	1-2	SA1	(Clayey Silt)	27.3					
	6-7	SA2	(Clayey Silt)	27.7					
	7.5-9	SA3	Sandy, Clayey - Silt	26.4	18.4	67.7	13.9		
	10-11	SA4	(Clayey Silt)	20.5					
	12.5-14.0	SA5	Sandy, Clayey - Silt	24.0	16.3	71.1	12.6		NP
GA11-T-17	15-16	SA6	(Clayey Silt)	23.0					
(Northwest	17.5-19	SA7	(Clayey Silt)	23.8					
Pond)	20-21	SA8	(Clayey Silt)	31.8					
	22.5-24	SA9	Sandy - Silt	23.5	19.1	69.0	11.9		NP
	25-26	SA10A	Clayey - Silt	24.4	4.2	82.5	13.3		NP
	27.5-29	SA10B	(Clayey Silt)	28.1					
	34-35	SA11	(Clayey Silt)	26.1					
	37.5-39	SA12	Clayey - Silt	21.6	0.1	84.1	15.8		NP
	44-43	SA13	(Clayey Silt)	31.6					
	50-51	SA14	(Silty Clay)	24.1					

NP = non-plastic

Blank box = no test carried out

() = Visual field identification



Generally the soils sampled are classified as clayey silt, sandy silt or silt with little to some sand or clay. Thin (<1 m) sand or sand and gravel seams were identified in Boreholes GA11-T-08 and GA11-T-09 located in the North Tailings Pond. It is assumed that some segregation of the tailings has occurred resulting in the loss of fines at these locations and only the sand or sand and gravel sized materials are left. A thin (<1 m) peat seam has also been identified above a layer of silty clay assessed as "Till" in several of the boreholes. This indicates that the ponds were likely constructed directly over the in-situ soils.

The range and average Atterberg limits for each of the soil types encountered are indicated as follows:

Clayey-Silt:	Plastic Limit Range -	17 to 27	Average – 23
	Liquid Limit Range -	25 to 32	Average – 27
Sandy-Silt:	Plastic Limit Range -	NP	
	Liquid Limit Range -	NP	
Silt:	Plastic Limit Range -	17 to 24	Average – 22
	Liquid Limit Range -	23 to 32	Average – 26

Falling head hydraulic conductivity tests were carried out on two mixed samples from GA11-T-14 samples 2 and 3. The two samples were tested twice; once on May 4, 2011 and secondly on May 26, 2011. Hydraulic conductivity's (m/s) were recorded as  $1.8 \times 10^{-8}$  (May 4) at a maximum effective stress of 501 kPa and  $1.8 \times 10^{-8}$  at 1251 kPa (May 26). The summary laboratory results are provided in Appendix B.

Soil-water characteristic curves were measured for samples from GA11-T-06 (Sample 3), GA11-T-12 (Sample 2) and GA11-T-14 (Samples 2 and 3 mixed together). Water content (gravimetric and volumetric) was measured over a suction range from 0.25 kPa to 295,000 kPa for samples from GA11-T-06 and GA11-T-12. For the samples from GA11-T-14 the suction range was from 0.25 kPa to 400 kPa. Results for these tests are provided in Appendix B.

Soil temperatures were recorded on the summary borehole logs in Appendix A. The temperatures were measured to assess whether the soils were frozen (permafrost impacted) or not. Frozen soils will be difficult to excavate during the tailing pond remediation and may require ripping prior to excavation with conventional excavating equipment.





#### 5.0 CLOSURE

We trust this report provides you with the information you require at this time. Should you have any questions regarding the contents of this report, or require any further information, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

## **ORIGINAL SIGNED**

# **ORIGINAL SIGNED AND SEALED**

Rob Buchanan, M.A., P.Geo. Senior Geoscientist Dave Caughill, M.Sc., P.Eng. Associate, Senior Geotechnical Engineer

RB/DC/rs

o:\final\2009\1427\09-1427-0006\3. correspondence\2 issued documents\word\phase 2\doc 058 rep 0906\_11\307-tailings-7-rpt-0001-rev1\_20120629.docx



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NUNAVUT

Fort Smith

SASK



#### REFERENCE

TOPOGRAPHIC MAPS 85J08 AND 85J09 © 2002 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD83 COORDINATE SYSTEM: UTM ZONE 11.









# **APPENDIX A**

**Borehole Logs** 



#### RECORD OF BOREHOLE: GA11-T-01

PROJE	JECT No.: 09-1427-0006 ATION: See Location Plan	RECORD OF BOREHOLE: GA11-T-01 BORING DATE: March 8, 2011	SHEET 1 OF 2 DATUM: Geodetic
Д	SOIL PROFILE	SAMPLES DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOM
METRES BORING METH	DESCRIPTION	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ABDITIONAL ABDITIONAL INSTAIL
0	Ground Surface		
1	(Tailings)	3         0.00           3         1           4         1           5         2           5         2           5         48	Gravel = 0% Sand = 61.1% Silt = 32.3% Clay = 6.6% non-plastic Cuttings
2	Sandy CLAYEY SILT, grey, soft to firm (Tailings) Frost penetration to 1.4 m	HO	$\begin{array}{c} -0.2\ ^{\circ}\text{C} \\ \text{Gravel} = 0\% \\ \text{Sand} = 2.1\% \\ \text{Silt} = 82.8\% \\ \text{Clay} = 15.2\% \\ l_{p} = 2 \end{array}$
3			
4		6 SS 7	Gravel = 0% Sand = 29.7% Silt = 58.4% Clay = 11.9% non-plastic Sand ∑
5 Frack Mounted	Is and Research Ltd.		+2.0 °C Gravel = 0% Sand = 0.5%
<u>-</u>	Mobile Aug		Clay = 19.9% I <sub>p</sub> = 7
			+1.9 °C Gravel = 0% Sand = 15.5% Silt = 73.8% Clay = 10.7% non-plastic
7		10 SS 4	+1.6 °C
8			Graver = U% Sand = 13.8% Silt = 75.5% Clay = 10.7% non-plastic
9	SILT, little to some sand, little clay,	9.45	
	grey, soft to firm		+0.8 °C
10 – L		┧╨╵╫╺╼┠╴┼╶┥╼╞╴╸┼╸╸┝╸╸┼╺╼┝╸╸┼╺╴┝╸╸┼┶┕┦╸╸┽╸╼┤	
7 8 9 10 DEPTH 1 : 50	SILT, little to some sand, little clay, grey, soft to firm <i>CONTINUED NEXT PAGE</i> TH SCALE	10     SS     4       11     AS       12     SS       12     SS       13     AS	+1.6 °C Gravel = 0% Sand = 13.8% Sitt = 75.5% Clay = 10.7% non-plastic +0.8 °C +0.8 °C

#### RECORD OF BOREHOLE: GA11-T-01

ENTRY: AD	Pi	ROJEC	T No.: 09-1427-0006 DN: See Location Plan	R	ECO	RC	0	F BC		HOL	E: March 8.	<b>GA</b> <sup>2</sup>	11-T	-01				SHEET DATUM:	2 OF 2 Geodetic
DATA E	_							D		Ditte.	viai ori o,	2011						271101	
	PTH SCALE METRES	NG METHOD	SOIL PROFILE	TA PLOT	ELEV.	SAM	PLES mc.0/S/	DYNAI RESIS 2 SHEAI	MIC PEN TANCE	NETRATI , BLOWS 40 ( NGTH	ON /0.3m 50 8 hat V. +	30 Q - •	HYDRA 10 W	AULIC CO k, cm/s ) <sup>-6</sup> 10 ATER CO	ONDUCT D <sup>-5</sup> 10 LI ONTENT	IVITY, 10 <sup>-4</sup> 10 <sup>-3</sup> PERCEN <sup>-1</sup>	, I r	ITIONAL TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
	DEP	BORII		STRAI	DEPTH (m)	NN F	BLOW	Cu, kP	'a 10	20 :	rem V. ⊕ 30 4	U - O	Wp 1	0 2	0 3	— W 0 40	1	ADDI LAB. 7	
	— 10             	M5 - Track Mounted	SILT, little to some sand, little clay, grey, soft to firm <i>(continued)</i>		-	14	s											Gravel = 0%, Sand = 2.4% Sitt = 79.2% Clay = 18.4% I <sub>p</sub> = 4	
	- - - - - - - - - - - - - - - - - - -				-	15 S	SS 6							F		>		Gravel = 0% Sand = 8.3% Clay = 14.2% $I_p = 6$ +0.3 °C	
5/12	- - - - - - - - - - - - - - - - - - -	M5 - Track Mounted Mobile Augers and Research Ltd.	PEAT, dark brown-black, fibrous SILTY CLAY, trace gravel, light brown,		15.09	17 S	SS 16								0		0		Slough
LOGS.GPJ CALGARY.GDT 6/1	16   17 17 		(TILL)		17.53	20 4	15								0				
ED ADD. LAB TESTING DRAFT GIANT MINE	- - - - - - - - - - - - - - - - - - -		Notes: Sloughing to 4.6 m. Standpipe installed to 6.1 m. Groundwater level measured at 3.8 mbgs on March 18, 2012.		17.53														
BOREHOLE - EXPAND	- 20 - 20 DI 1	EPTH S : 50	SCALE					(Ĵ	G	folde	er ates						0	Logged: J. Checked: F	IB IK

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-02

LOCATION: See Location Plan

BORING DATE: March 9, 2011

SHEET 1 OF 2

	N: 6932991 E: 636589														
ДÇ	SOIL PROFILE			SA	MPLES	DYNAMIC PE RESISTANCE	NETRATIC E, BLOWS	ON /0.3m	1	HYDRAUL k, d	C CONDUC	TIVITY,	Т		PIEZOMETER
METH		PLOT		ER		20	40 6	i0 8	30	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup> 1	10 <sup>-3</sup>	STING	STANDPIPE
ME	DESCRIPTION	3ATA I	DEPTH	NUMBI	TYPE	SHEAR STRE Cu, kPa	ENGTH r r	at V. + em V.⊕	Q - ● U - O	WATE Wp —	R CONTEN	T PERCE	ENT WI	DDITIO	
<u> </u>		STI	(m)	-  -	ā	10	20 3	i0 4	10	10	20	30	40	LAA	
0	Ground Surface SILTY SAND, some clay, very soft to firm (Toilings)		0.00	1											
					AS								0		
1	Frost penetration to 0.9 m														
				2	SH									Gravel = 0% Sand = 55.5% Silt = 39.1%	
				-										Clay = 5.4% non-plastic	
				3	AS										
2	CLAYEY SILT, some sand, very soft to		2.07												
	firm (Tailings)				22									1 blow for 450	
				4	33									mm	
3		HI.													
				5	AS						0			1.1 °C Gravel = 0%	
														Sand = 11.5% Silt = 75.0% Clay = 13.5%	
														non-plastic	
4	l Ltd.			6	SS									1 blow for 450 mm	
unted	esearch														
ack Mo	and R			7	AS						н	0		1.0 °C Gravel = 0%	
M5 - Tr	Augers													Sand = 3.8% Silt = 79.0% Clay = 17.2%	
alidoM	Mobile													I <sub>p</sub> = 3	
				8	SS 5							0			
6															
0				9	AS						0			1.4 °C	
														Gravel = 0% Sand = 16.7% Silt = 69.5%	
														Clay = 13.8% non-plastic	
7				10	SS 5						0				
	SAND and SILT, some clay, firm (Tailings)		. 7.19 ·	-											
				-										. = 00	
8				11	AS						0			1.7 °C Gravel = 0% Sand = 46.9%	
														Silt = 42.1% Clay = 11% non-plastic	
				12	- 										
				12	33 /										
9				13	AS							þ			
	CLAYSHALE, weathered (BEDROCK)	Ň	9.14	14	AS		_				0	<u> </u>			
	End of BOREHOLE.		9.45												
10	Refusal of auger at 9.8 m		↓	Ļ.	┝-┥-		_		L	<b> </b>   _ ·	_+		∔		
	CONTINUED NEXT PAGE														
DEPTH	ISCALE						Solda	T						LOGGED: JJ	в
1 : 50						<b>VP</b> AS	SOCI	ites						CHECKED: H	к

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-02

LOCATION: See Location Plan

N: 6932991 E: 636589

BORING DATE: March 9, 2011

SHEET 2 OF 2

Notes: Busined for a second model         Notes: Busined for a second model<	┢		Ģ	SOIL PROFILE			SAI	MPLF	s	DYNA	MIC PE	NETRAT	ION		HYDR/	AULIC C	ONDUCT	TIVITY,	т		PIEZOMETER
		SCALE	ЕТНО		Б				۔ چ	RESIS 2	TANCE	40	5/0.3m 60 8	80	1	k, cm/s 0 <sup>-6</sup> 1	0 <sup>-5</sup> 1	0-4 1	0-3	ING	OR STANDPIPE
B       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C <thc< th=""> <thc< th=""> <thc< th=""></thc<></thc<></thc<>		PTH S METR	M DN	DESCRIPTION	TA PL	ELEV.	MBER	ΥPE	0/S/0	SHEAF	R STRE	NGTH	nat V. +	• Q - ●	w	ATER C	ONTENT	PERCE	NT	TEST	INSTALLATION
Note:       Note: <th< td=""><td></td><td>DE</td><td>BOR</td><td></td><td>STRA</td><td>(m)</td><td>R</td><td></td><td>BLO</td><td>1</td><td>0</td><td>20</td><td>30 4</td><td>40</td><td>W<sub>I</sub></td><td>p <b>⊢</b></td><td><u> </u></td><td>30 4</td><td>WI IO</td><td>ADC LAB.</td><td></td></th<>		DE	BOR		STRA	(m)	R		BLO	1	0	20	30 4	40	W <sub>I</sub>	p <b>⊢</b>	<u> </u>	30 4	WI IO	ADC LAB.	
		- 10																			
	E			Notes: Borehole backfilled with cuttings																	-
	E			upon completion.																	-
	F																				-
	F	- 11																			-
	E																				-
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	6/15/1	- 16																			-
	GDT																				-
	ARY.																				-
	CALG																				-
	GPJ	- 17																			-
	-068																				-
																					-
	ANTA	- 18																			_
	FTGL																				-
	DRA																				-
	TING																				-
	BTES	- 19																			
	D. LA																				-
	ED AD																				-
	ANDE	- 20																			-
	- EXP	20																			_
	HOLE		סדט מ		- 1		I			Â	÷.				-						ID
1 : 50 CHECKED: HK	SORE	1 :	50							E		told soci	er ates						C	CHECKED: H	ж.

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-04

LOCATION: See Location Plan

BORING DATE: March 10, 2011

SHEET 1 OF 3

DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m) 0.00	NUMBER	BLOWS/0.3m	20 40 SHEAR STRENGT Cu, kPa 10 20	60 80 I <sup>T</sup> H nat V. + rem V. ⊕ 30 40		10 <sup>-6</sup> 10 WATER CO Wp	$\frac{10^{-5} \times 10^{-4} \times 10^{-4}}{10^{-4} \times 10^{-4}}$ $\frac{10^{-4} \times 10^{-4}}{10^{-4} \times 10^{-4}}$ $\frac{10^{-4} \times 10^{-4}}{10^{-4} \times 10^{-4}}$	ADDITIONAL	STANDPIF INSTALLAT
DESCRIPTION 	STRATA	DEPTH (m)		BLOWS/	10 SHEAR STRENG Cu, kPa 10 20	1H nat V. + rem V. ⊕ 30 40	υ-Ο )	WATER CC Wp	$-\Theta^W$ W	ADDITIK LAB. TE:	
und Surface ndy CLAYEY SILT, little clay, grey ilings)	STILL	0.00	1	BL	10 20	30 40	2	10 2	1 30 40		1
ind surface ndy CLAYEY SILT, little clay, grey illings)		0.00	1 A						5 30 40	—	Stick-up= 0.96 m
Frost penetration to 1.8 m		-	2 5 5 F	e 22 24 25 24 25 24 25 24 25 24 24 24 24 24 24 24 24 24 24 24 24 24				0	0	-0.4 °C orange = 0% Sand = 18.9%	Stick-up= 0.96 m
NDY SILT, some clay, grey (Frozen lings)			6 T 7 <i>A</i> 8 S 9 <i>A</i>	TO 10 10 10 10 10 10 10 10 10 10 10 10 10				d	, O	Gravel = 0% Gravel = 0% Gravel = 0% Gravel = 0% Sand = 15.4% Sitt = 71.6% Clay = 13.0% 0.0 °C Gravel = 0% Sand = 51.8% Sitt = 35.9% Clay = 12.2% non-plastic	Screen Section 18 Mar 2012 \screw 2
		-	10 5 11 <i>F</i> 12 5	48 48 27				c	0	Gravel = 0% Sand = 32.1% Clay = 7.3% non-plastic -0.1 °C Gravel = 0% Sand = 28.7% Sitt = 63.6% Clay = 7.7%	Cuttings
	┥╩╵╇		-†	1-	$\vdash - + - \vdash$	-+	†		+		k
	NDY SILT, some clay, grey (Frozen lings)	NDY SILT, some clay, grey (Frozen lings)	NDY SILT, some clay, grey (Frozen ings) 5.94	NDY SILT, some clay, grey (Frozen         5.94         9           Ings)         10         10           S         10         11           Ings         10         10	NDY SILT, some clay, grey (Frozen         5         5.94           5         6         TO           5         7         AS           5         7         AS           6         TO           7         AS           8         SS           9         AS           10         SS           3         10           5         11           AS         11           AS         12           5         12         SS           7         AG           5         10           5         11           AS         12           5         12           5         12           5         12           5         12           5         12           5         10           5         12           5         12           5         12           5         12           5         10           5         10           5         10           5         12           5         12 </td <td>NDY SILT, some clay, grey (Frozen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<!--</td--><td>NDY SILT, some clay, grey (Frozen       5.94         0       TO         10       SS         11       AS         11       AS         12       SS         12       SS         12       SS         11       AS         11       AS         12       SS         12       SS         12       SS         12       SS         12       SS         12       SS         13       TO         14       TO         15       AS</td><td>NDY SILT, some clay, grey (Frozen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<!--</td--><td>NDY SILT, some clay, grey (Frozen       5       4       35       9       0       0       0         1       4       35       1       0       0       0       0       0         1       6       TO       0       4       35       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0<!--</td--><td>NDY SILT, some clay, grey (Frozen NDY SILT, some clay, grey (Frozen 1 1 AS 1 2 SS 27 CONTINUED NEXT PAGE</td><td>NDY SLT, some clay, grey (Frozen         6         TO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0</td></td></td></td>	NDY SILT, some clay, grey (Frozen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td>NDY SILT, some clay, grey (Frozen       5.94         0       TO         10       SS         11       AS         11       AS         12       SS         12       SS         12       SS         11       AS         11       AS         12       SS         12       SS         12       SS         12       SS         12       SS         12       SS         13       TO         14       TO         15       AS</td> <td>NDY SILT, some clay, grey (Frozen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<!--</td--><td>NDY SILT, some clay, grey (Frozen       5       4       35       9       0       0       0         1       4       35       1       0       0       0       0       0         1       6       TO       0       4       35       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0<!--</td--><td>NDY SILT, some clay, grey (Frozen NDY SILT, some clay, grey (Frozen 1 1 AS 1 2 SS 27 CONTINUED NEXT PAGE</td><td>NDY SLT, some clay, grey (Frozen         6         TO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0</td></td></td>	NDY SILT, some clay, grey (Frozen       5.94         0       TO         10       SS         11       AS         11       AS         12       SS         12       SS         12       SS         11       AS         11       AS         12       SS         12       SS         12       SS         12       SS         12       SS         12       SS         13       TO         14       TO         15       AS	NDY SILT, some clay, grey (Frozen         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td>NDY SILT, some clay, grey (Frozen       5       4       35       9       0       0       0         1       4       35       1       0       0       0       0       0         1       6       TO       0       4       35       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0<!--</td--><td>NDY SILT, some clay, grey (Frozen NDY SILT, some clay, grey (Frozen 1 1 AS 1 2 SS 27 CONTINUED NEXT PAGE</td><td>NDY SLT, some clay, grey (Frozen         6         TO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0</td></td>	NDY SILT, some clay, grey (Frozen       5       4       35       9       0       0       0         1       4       35       1       0       0       0       0       0         1       6       TO       0       4       35       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 </td <td>NDY SILT, some clay, grey (Frozen NDY SILT, some clay, grey (Frozen 1 1 AS 1 2 SS 27 CONTINUED NEXT PAGE</td> <td>NDY SLT, some clay, grey (Frozen         6         TO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0</td>	NDY SILT, some clay, grey (Frozen NDY SILT, some clay, grey (Frozen 1 1 AS 1 2 SS 27 CONTINUED NEXT PAGE	NDY SLT, some clay, grey (Frozen         6         TO         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-04

LOCATION: See Location Plan

BORING DATE: March 10, 2011

SHEET 2 OF 3

		N: 6933233 E: 636673									
ł	Q	SOIL PROFILE	_		SA	AMPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s		PIEZOMET
TRES	METH		PLOT	ELEV/	ER	ш	0.3m	20 40 60 80		STING	STANDPI
Ξ	ORING	DESCRIPTION	RATA	DEPTH	NUMB	TYP	OWS/	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O		B. TE	
	ă		STI	(m)	<u> </u>		B	10 20 30 40	10 20 30 40	LA	
10		SANDY SILT, some clay, grey (Frozen									
		rannigs) (continueu)									
					13	AS			0	-0.3 °C	
11											
					14	SS	27		ρ		
12											
		SANDY SILT some clay modium to		12.80							
13		dark grey (Tailings)			1						
					15	AS			D	0.0 °C	
14									Sa	ravel = 0% ind = 28.1% Silt = 60%	
	Ltd.									ay = 11.9% I <sub>p</sub> = 0	
	search				16	SS	6				
15	k Mour Ind Res										Cuttinas
	5 - Tra										Ū
	obile A										
	2										
16											
					17	AS			0	0.1 °C	
17											
18											
				1							
				3							
19											
					18	AS			0 g	iravel = 0%	
					-	1				anu = 0.4% ilt = 80.1% ay = 19.5%	
		PEAI, dark to light brown, fibrous	<u>, , ,</u> /, ,	19.66	`					ion-plastic	
20		CONTINUED NEXT PAGE		1		† –	_				
	I						·		· · · · · ·		<b>D</b>
∪EF 1 ·	тн S 50	DUALE						Golder	LC CH	GGED: J]	ь К
•									611		

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-04

LOCATION: See Location Plan

N: 6933233 E: 636673

BORING DATE: March 10, 2011

SHEET 3 OF 3

State         Construction	<u> </u>	þ	SOIL PROFILE			SA	AMPL	ES	DYNAMI		TRATI	DN //	)	HYDR	AULIC	CONDUC	TIVITY,	т		PIEZO	METER
Etc.         Image: Sector Provided Sector Pro	SCALE	AETHC		LOT		2		3m	20 RESISTA	unue, E 4(	D (	70.3m 60 8	30	1	к, cm/	s 10 <sup>-5</sup> 1	0 <sup>-4</sup>	10-3	NAL	STAN	
S     S     S     P     P     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O     O <td>METH</td> <td>NG N</td> <td>DESCRIPTION</td> <td>ATA PI</td> <td>ELEV.</td> <td>MBEI</td> <td>ΓYPE</td> <td>WS/0.</td> <td>SHEAR S Cu, kPa</td> <td>STREN</td> <td>GTH I</td> <td>natV.+ remV.⊕</td> <td>Q - ● U - O</td> <td>W</td> <td>ATER (</td> <td></td> <td>T PERCE</td> <td>INT</td> <td>DITION TEST</td> <td>INSTAL</td> <td>LATION</td>	METH	NG N	DESCRIPTION	ATA PI	ELEV.	MBEI	ΓYPE	WS/0.	SHEAR S Cu, kPa	STREN	GTH I	natV.+ remV.⊕	Q - ● U - O	W	ATER (		T PERCE	INT	DITION TEST	INSTAL	LATION
TopPhi SoLE         Sole         Log         Curron         Sole         Log         Log <thlog< th="">         Log         <thlog< th=""> <thlog<< td=""><td>DE</td><td>BOR</td><td></td><td>STR/</td><td>(m)</td><td>Z</td><td>[</td><td>BLO</td><td>10</td><td>20</td><td>0 :</td><td>30 4</td><td>10</td><td>W</td><td>р —— 10</td><td>20 :</td><td>30</td><td>WI 40</td><td>ADI LAB.</td><td></td><td></td></thlog<<></thlog<></thlog<>	DE	BOR		STR/	(m)	Z	[	BLO	10	20	0 :	30 4	10	W	р —— 10	20 :	30	WI 40	ADI LAB.		
Prior line big reline, mode     1     2     3     3       Tar of BORELOU.E.     200     200     0     0       Vite in Big reline, mode     1     200     0     0       Vite in Big reline, mode     1     200     0     0       Vite in Big reline, mode     1     200     0     0       Vite in Big reline, mode     1     200     0     0       Vite in Big reline, mode     1     0     0     0       Vite in Big reline, mode     1     0     0     0       Vite in Big reline, mode     1     0     0     0       Vite in Big reline, mode     1     0     0     0       Vite in Big reline, mode     1     0     0     0       Vite in Big reline, mode     0     0     0     0       Vite in Big reline, mode     0     0     0     0       Vite in Big reline, mode     0     0     0     0	- 20					10												116.2			Increase
Def of SOREPOLE.         907           1         Boundage analate to a 1 m.           20         Source and a constraint of a constraint			PEA1, dark to light brown, fibrous (continued)		<u>, (</u>	19	ÂS											(	Þ	Cuttings	
Nass:	Ē		End of BOREHOLE.		20.57	<i>.</i>															1969696
	- 21		Notes: Standpipe installed to 6.1 m.																		
	F		Groundwater level measured at 5.4 mbgs on March 18, 2011.																		
	-																				
	22																				
	E																				
	E																				
	F																				
	- 23 -																				
	-																				
	_																				
	- 24																				
	-																				
	_																				
	-																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	- 25 -																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	-																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	-																				
29 29 30 DEPTH SCALE 1:50 LOGGED: JIB CHECKED: HK	F																				
27       28       29       30         DEPTH SCALE       1:50   LOOGED: J.B.	- 26 - -																				
DEPTH SCALE LOGGED: JB 1:50 LOGGED: JB CHECKED: HK	_																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	-																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	- 27																				
DEPTH SCALE LOGGED: JB 1: 50 LOGGED: JB CHECKED: HK	-																				
DEPTH SCALE 1:50 LOGGED: JJB CHECKED: HK	E																				
DEPTH SCALE 1:50 LOGGED: JB CHECKED: HK	F																				
DEPTH SCALE 1:50 LOGGED: JJB CHECKED: HK	- 28																				
DEPTH SCALE 1 : 50 LOGGED: J/B CHECKED: HK	E																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	-																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	Ē																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	29																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	-																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	Ę																				
DEPTH SCALE 1 : 50 LOGGED: JJB CHECKED: HK	- 30																				
DEPTH SCALE LOGGED: JJB 1 : 50 CHECKED: HK																					
1 : 50 CHECKED: HK	DF	EPTH	I SCALE						Â		11								LOGGED: .	IJВ	
	1	: 50							J	<b>Ass</b>	olde oci:	r ates							CHECKED:	нк	

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-06

LOCATION: See Location Plan

BORING DATE: March 10, 2011

SHEET 1 OF 3

DAT/			N: 6933411 E: 636819									
	ш	Q	SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k. cm/s		PIEZOMETER
	SCAL	METH		LOT		Ľ.		.3m	20 40 60 80	10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>	LING	
	EPTH METI	RING	DESCRIPTION	ATA P	ELEV.	UMBE	TYPE	0/S/V0	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O			NSTALLATION
	ā	BOF		STR.	(m)	ž		BLC	10 20 30 40	10 20 30 40	AD	
	- 0		Ground Surface SANDY SILT, some clay, grey	I.T.	0.00							
-			(Tailings)									-
						1	AS				Gravel = 0% Sand = 26% Silt = 69%	-
											Clay = 5%	-
	- 1											
			SILT, some clay, grey (Tailings)		1.71							
	- 2		Eroct penetration to 2.0 m			$\vdash$						-
-						2	AS				Gravel = 0% Sand = 3% Silt = 88%	-
_							-				Clay = 9%	-
						3	10				Gravel = 0% Sand = 7% Silt = 89%	-
	- 3					⊢					Clay = 4%	-
							4				Gravel = 0%	
						-	-				Sand = 4% Silt = 87%	
-	- 4					5	ss	6			Ciay = 370	-
						_						-
		d Irch Ltd	SANDY SILT, trace clay, grey (Tailings)		4.51	1						-
		Mounte d Resea				6	AS			0		-
	- 5	Track ers and										-
_		M5 - bile Auç				⊢						-
_		Mo	Frozen to 5.6 m			7	SS	17		0	Gravel = 0% Sand = 38.1% Silt = 55.0%	
ZL/GL/	- 6										Clay = 6.9%	-
												-
9. H												
CALG												
617	- 7					9	SS	28		0	Gravel = 0% Sand = 11.1%	-
290						8	AS				Silt = 85.7% Clay = 3.2% non-plastic	
						10	45					
	- 8					-	-					_
19 												
A H						11	ss	32			Gravel = 0%	
						Ľ					Sand = 27.2% Silt = 71.5% Clay = 1.3%	
Я E	- 9										non-plastic	-
₹F												
EUAL												
	- 10	μL			1	Ļ.	$\mid \mid$	_	┣┥┝┥┝		-	
EX - EX			CONTINUED NEXT PAGE									
EHOL	DE	PTH S	SCALE					1	Golder		LOGGED: JJB	
BOR	1 :	50							Associates		CHECKED: HK	

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-06

LOCATION: See Location Plan

BORING DATE: March 10, 2011

SHEET 2 OF 3

		N: 6933411 E: 636819								
	Q	SOIL PROFILE	_		SA	MPLE	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
TRES	METH		PLOT	ELEV/	ER		0.3m	20 40 60 80		STANDPIPE
ME	RING	DESCRIPTION	RATA	DEPTH	IUMB	TΥΡ	/SWO	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O		
	BC		STF	(m)			В	10 20 30 40		
10		SANDY SILT, trace clay, grey (Tailings)			-					
		<i>(continued)</i> Dark grey at 10.0 m								
					12	AS			O Gravel = 0% Sand = 14.2%	
									Silt = 74.9% Clay = 10.9% non-plastic	
11										
					13	SS	13			
				, ,						
2										
				-						
3										
		SILTY SAND. some clay, grev		13.47	14	45				
		(Tailings)								
4										
	ch Ltd.				-					
	Resear				15	SS	7		O Gravel = 0% Sand = 67.3%	
5	s and I								Silt = 20.5% Clay = 5.8% non-plastic	
	M5 - T e Augel									
	Mobile									
6										
7					16	AS				
'		Light grey at 17.0 m								
8										
		PEAT, light-dark brown to black, fibrous	$\left  \frac{\sqrt{T}}{T} \right $	18.59	17	AS			0	
19				) /		1				
			4	<u>,</u>						
			<u>\</u> \/	: :						
			1,	19.81	-					
20	_ L_	CONTINUED NEXT PAGE	_ <u>`</u> `	+	F	╞┥	-	F-+		
		1		1	1					
DEF	PTH S	SCALE						Golder	LOGGED: JJ	IB IK
1 :	50							V Associates	CHECKED: H	ir.

#### PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-06

LOCATION: See Location Plan

N: 6933411 E: 636819

BORING DATE: March 10, 2011

SHEET 3 OF 3

												1						
щ	₽	SOIL PROFILE			SA	MPL	ES	DYNAMIC PE RESISTANC	NETRATI	ON 5/0.3m	Ì	HYDRA	AULIC Co k, cm/s	ONDUCT	IVITY,	T		PIEZOMETER
SCAL	METH		LOT		цч		.3m	20	40	60 E	30	1(	D <sup>-6</sup> 1	0 <sup>-5</sup> 1	0 <sup>-4</sup> 1	0 <sup>-3</sup> ⊥	NAL	STANDPIPE
PTH	UC N	DESCRIPTION	TA P	ELEV.	MBE	ΥPE	VS/0	SHEAR STR	ENGTH	nat V. +	Q - ●	W	ATER C	ONTENT	PERCE	NT	TES'	INSTALLATION
DE	BOR		TRA	(m)	R		BLOV	Ou, Ki a				Wp		0 <sup>W</sup>		WI	ADD -AB.	
			05				_	10	20	30 4	10	1	0 2	<u>:0 3</u>	2	10	_	
- 20	)	SAND, medium to coarse, medium to			18 18	AS AS							0					
-		dark grey (continued)																
F																		
E		End of BOREHOLE.		20.57														
- 21		Note:																-
		upon completion.																
-																		
-																		
F																		
22	2																	-
-																		
-																		
F																		
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		JUALL							<b>Jold</b>	er								U V
u 1	: 50								<u>SOCI</u>	<u>ates</u>							HECKED: F	in

PROJECT No.: 09-1427-0006

#### **RECORD OF BOREHOLE:** GA11-T-08

LOCATION: See Location Plan

BORING DATE: March 15, 2011

SHEET 1 OF 1 DATUM: Geodetic

DA			N: 6933621 E: 636923								
	Щ	Д	SOIL PROFILE			S	AMP	LES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
	H SCAL TRES	METH		PLOT	EL EV	ER		0.3m	20 40 60 80		STANDPIPE INSTALLATION
	DEPTF	DRING	DESCRIPTION	RATA	DEPTH	NUMB	TYPE	OWS/	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O		
_	<u> </u>	B		STF	(m)	-		В	10 20 30 40	10 20 30 40	
-	- 0		Ground Surface SANDY SILT, some clay, medium to		. 0.00						
-			dark grey, very soft to soft (Tailings)								
F						1	AS			ρ	
E											
-	- 1										
-			Frost penetration to 0.9 m			_	+				
-					-	2	AS			+0.4 °C	:
Ē	- 2									+1.9 °C	;
-					-						
-						3	ss	2		O Gravel = 1	.5%
Ē										Sand = 19. Silt = 67.1 Clay = 11.	.8% 1% 5%
_	- 3										
-						4	AS			O +2.0 °C	;
-		Ę									
-		ed earch L					-				
-	- 4	Mount nd Res				5	SS	3		O Gravel = 0 Sand = 28	)% .1%
E		5-Track gers al								Silt = 65.0 Clay = 6.9 non-plas	)% 9% tic
-		Mf bile Au				6	1				
E	- 5	₩ ₩				-					
-	- 5				-						
-											
È					-	7	ss	3		Gravel = ( Sand = 35 Silt = 54.5	)% .8% 5%
15/12	- 6				*] ·]					Clay = 9.6 non-plast	3% tic
9 						8	AS			Φ +3.8 °C	:
אא											
ALGA											
ว่- เล่-	- 7					9A	SS			Gravel = 0 Sand = 9.	0% 1%
			SAND and GRAVEL		7.16	9B	ss	11		O Silt = 80.5 Clay = 10. L = 5	3% 4%
				20						p -	
				0 	X X						
GIAN	- 8		SILTY CLAY, some gravel, some fine to medium sand, suspected cobbles, light		7.92	10	AS			0	
KAF -			End of BOREHOLE.		8.38						
			Note:								
	- 9		Borehole backfilled with cuttings upon completion.								
	- 10										
ц Ц											
E	DE	EPTH	SCALE					1	Golder	LOGGEL	): JJB
BOR	1	: 50							Associates	CHECKE	D: HK

#### **RECORD OF BOREHOLE:** GA11-T-09

PROJECT No.: 09-1427-0006 SHEET 1 OF 2 DATUM: Geodetic LOCATION: See Location Plan BORING DATE: March 14, 2011 N: 6933679 E: 636751 DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m HYDRAULIC CONDUCTIVITY, k, cm/s SOIL PROFILE PIEZOMETER SAMPLES BORING METHOD DEPTH SCALE METRES OR STANDPIPE ADDITIONAL LAB. TESTING STRATA PLOT 40 60 80 10<sup>-6</sup> 10-5 10-4 10<sup>-3</sup> BLOWS/0.3m 20 INSTALLATION NUMBER ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -0<sup>W</sup> WpH - WI (m) 20 30 40 10 20 30 40 10 Ground Surface 0 SANDY SILT, some clay, grey 0.00 (Tailings) 0 1 AS Gravel = 0% Sand = 74.0% Silt = 20.5% Clay = 5.5% non-plastic 2 то +2.0 °C Gravel = 0% Sand = 15.6% Silt = 72.8% Clay = 11.6% non-plastic 3 AS þ 2 4 SS 3 Ę Mobile Augers and Research 3 M5-Track Mounted 5 +3.2 °C Gravel = 0% Sand = 25.6% Silt = 64.1% Clay = 10.3%  $I_p = 1$ ΗО AS 4 6 SS 0 7 AS 0 5 SAND and GRAVEL, some silt, grey 5.03 ° C (Tailings) 8 AS b r<sub>o</sub>, Q Clayey SANDY SILT, grey, soft to stiff (Tailings) BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12 5.79 6  $\begin{array}{l} \text{Gravel} = 0.4\% \\ \text{Sand} = 10.0\% \\ \text{Silt} = 75.3\% \\ \text{Clay} = 14.3\% \\ \text{I}_{p} = 1 \end{array}$ 9 þн AS 7 +4.7 °C Gravel = 1.1% Sand = 14.3% Silt = 68.5% Clay = 16.1% non-plastic 10 AS 0 볃 5 8 M5-Track Mounted and Resea Augers 11 0 --- Trace to some organic soil at 8.5 m SS 10 Mobile 9 12 AS 0 9.14 PEAT, dark brown to black, fibrous SILTY CLAY, trace to little gravel, grey, 945 (TILL) 13 AS h X 10 CONTINUED NEXT PAGE

Golder ssociates

LOGGED: JJB CHECKED: HK

1 : 50

DEPTH SCALE
PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-09

LOCATION: See Location Plan

N: 6933679 E: 636751

BORING DATE: March 14, 2011

SHEET 2 OF 2

	Τ	g	SOIL PROFILE			SA	MPLI	ES	DYNA			DN	)	HYDRA		ONDUCT	IVITY,	т		PIEZOMETER
SCALE		METHC		LOT		Ľ		.3m		0	вLOWS 40 б	iu.3m 60 8	30	10	к, cm/s ) <sup>-6</sup> 1(	D <sup>-5</sup> 1(	) <sup>-4</sup> 1(	₽-3 ⊥	NAL	
EPTH		SING N	DESCRIPTION	ATA PI	ELEV. DEPTH	UMBE	TYPE	WS/0.	SHEAF Cu, kP	R STREI a	NGTH r	nat V. + em V. ⊕	Q - ● U - O	W	ATER CO		PERCE	NT	DITION TEST	INSTALLATION
ā		BOF		STR.	(m)	ž		BLC	1	0	20 3	30 4	40	1 VVp	0 2	0 3	0 4	0	AD LAB	
1	10				2															
-			End of BOREHOLE.		10.21															
-			Note:																	
-			Borehole backfilled with cuttings upon completion.																	
- 1	1																			-
-																				-
-																				
F.																				
-	12																			
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- 1	13																			-
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ALGAI																				
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	9																			
DD. L																				
EDA																				
PAND 2	20																			
EX																				
HOLE	DEP	TH S	CALE						Â		ald	184							LOGGED: J.	IB
BORI	1:	50							J	As	50C1	ates						(	CHECKED: H	к

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-10

LOCATION: See Location Plan

BORING DATE: March 15, 2011

SHEET 1 OF 1

DATUM: Geodetic

N: 6933714 E: 636876

	щ		3	SOIL PROFILE			SA	MPL	ES	DYNAI RESIS	MIC PEN	BLOWS	ION 6/0.3m	1	HYDR	AULIC C k, cm/s		TIVITY,	Т		PIEZOMETER
	SCAL	METH			LOT		ц		.3m	2	20	40	60 E	30	1	0 <sup>-6</sup> 1	0 <sup>-5</sup> 1	0 <sup>-4</sup> 1	0 <sup>-3</sup> ⊥	NAL	
	EPTH			DESCRIPTION	ATA F	ELEV.	JMBE	TYPE	0/S/0	SHEAF Cu, kP	R STREI 'a	NGTH	nat V. + rem V. ⊕	Q - ● U - O	W	ATER C	ONTENT	PERCE	NT	DITIO . TES	INGTALLATION
	Ō	1 C a			STR.	(m)	ž		BLC	1	0	20	30 4	40	W	р	20 3	30 4	VVI 10	AD LAB	
	- 0			Ground Surface	11.1	0.00															
F				SILT and SAND, some clay, grey (Tailings)		. 0.00															
E							1	AS									0				
F																					
E	- 1																				-
F						./ .1															
Ē				Frost penetration to 1.4 m		.4															
F						.4	2	AS									0			+1.1 °C	
-						./ ·1														Gravel = 0% Sand = 49.4% Silt = 40.9%	
F	2					.• .•														Clay = 9.7% non-plastic	
F								1													
E							3	SS	1									0			
F				Clavey SANDY SILT little to some fine		2.90															
E	- 3			sand, (Tailings)			4	AS										5		Gravel = 0%	-
F																				Sand = 16.9% Silt = 71.4%	
E																				non-plastic	
F			h Ltd.				-														
E	- 4	nted	searc				5	SS	1												-
F		ik Mou	and Re																		
E		5-Trac	ders a																	10.1°C	-
F		Σ	bile A				6	AS												+3.4 C Gravel = 0% Sand = 16.9%	
E	- 5		Ř																	Silt = 71.4% Clay = 11.8%	-
F																				non-plastic	
Ē							7	SS	4									þ			
/12																					
6/15	- 6																				-
GDT							8	AS									0			+2.4 °C	
ARY																					
SALG																					
L L L	- 7						9	SS	0								0	>			-
GS.C							_														
Ц Ц С																					
T MIN				Trace organics at 7.9 m			10	AS									⊢	H C		+4.7 °C Gravel = 0%	
GIAN	- 8																			Sand = 1.4% Silt = 82.7% Clav = 15.9%	-
AFT (				CLAYEY SILT, trace gravel, grey,	1	8.23														l <sub>p</sub> = 5	
R -							11	SS	13							0					
STINC			Ц	End of BOREHOLE.	1.1	8.84															
B TES	- 9			Noto:																	-
₹F				Borehole backfilled with cuttings																	-
ADE																					
NDEL																					-
EXPA.	- 10																				-
- E- E		<u> </u>			I	1			<u> </u>	Â											
KEHO	DE	PTI	H S	CALE					(		Ĩ	old	er							Logged: JJ	В
BOR	1 :	50	)								As	soci	ates						(	CHECKED: H	к

PROJECT No.: 09-1427-0006

### RECORD OF BOREHOLE: GA11-T-11

LOCATION: See Location Plan

BORING DATE: March 15, 2011

SHEET 1 OF 2

		SOIL PROFILE			SA	MPLI	ES	DYNAMIC PENETRATIC RESISTANCE, BLOWS/	0N <b>\</b>	HYDRAULIC ( k, cm/	CONDUC	TIVITY,	T		PIEZOME
2 L	METH		LOT		2	$\square$	.3m	20 40 6	0 80	10-6	10 <sup>-5</sup> 1	0 <sup>-4</sup> 1	0 <sup>-3</sup> ⊥	NAL	STANDP
ME	- DN	DESCRIPTION	TA P	ELEV.	IMBE	ЪРЕ	WS/0	SHEAR STRENGTH n Cu, kPa	at V. + Q - ● em V. ⊕ U - ∩	WATER		PERCE	NT	TES	INSTALLA
	BOR		STRA	(m)	l₿		BLO	10 20 3	0 40	Wp	<del>O</del> W	30 /	WI 10	ADC LAB.	Stickup
		Ground Surface	1						<u> </u>					1	0.92 m
	Π	CLAYEY SILT, grey, soft to firm (Tailings)		0.00											
				1	1	40									
			<u>III</u>		Ľ								Ŭ		
		Frost penetration to 0.8 m	H											+0.5 °C	
1			Ш												
			Ш		2	AS						0			
			И	1											
				1										1 = 00	
2			ſΨ	1										+1./ °C	
		SANDY SILT, some clay, light grey		2.29											
		( i ami iys)			3	то					н			Gravel = 0%	
														Sand = 19.8% Silt = 68.9% Clay = 11.9%	
3														l <sub>p</sub> = 3	Cuttings
					4	AS				0				+3.4 °C	
		CLAYEY SILT, arev to brown, soft		3.66											
4		(Tailings)													
					5	SS	3							Gravel = 0% Sand = 1.2% Silt = 81.5%	
	Ltd.													Clay = 17.3%	
hed	search				6	AS							}		
5 Now	Ind Ret				$\vdash$										
- Trac	igers a														
M5	bile Au				_		_								
	₩				7	SS	5						Ψ	Gravel = 0% Sand = 0.5% Silt = 85.2%	
6														Clay = 14.2% I <sub>p</sub> = 4	
					8	AS						0		+4.1 °C	
					$\vdash$										Bentonite Seal
7															
					9	55	4							Gravel = 0% Sand = 0.6% Silt = 86.4%	
														Clay = 13.0% I <sub>p</sub> = 2	
					10	AS							\$	+4.2 °C	
8					⊢										
															Screen Section
					4.4								h	Orecast off	
						35	4						Γ	Sand = 0.6% Silt = 85.6%	
9														Clay = 13.9% non-plastic	18 Mar 2011
															Σ
															0.17
0	L		_flk	1	┣-	╞┥	_	+	-  -  ·	+	+		+	-	Cuttings
		CONTINUED NEXT PAGE													
)EP	тнs	CALE												LOGGED: J	JB
	~							Golde	Γ						112

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-11

LOCATION: See Location Plan

BORING DATE: March 15, 2011

SHEET 2 OF 2

DAT/				N: 6934000 E: 637173																	
	щ	Ģ		SOIL PROFILE			SA	MPL	ES	DYNAMIC PE RESISTANCE	NETRATI	ON 5/0.3m	1	HYDRA	ULIC CO k, cm/s	ONDUCT	IVITY,	T		PIEZOM	ETER
	H SCA	METL			PLOT	FLEV	ER	ш	/0.3m	20	40	60 E	30	10	<sup>16</sup> 10	) <sup>-5</sup> 1(	) <sup>-4</sup> 10	)-3 ⊥	ONAL	STAND	PIPE ATION
	DEPTI	- CINICO		DESCRIPTION	RATA	DEPTH (m)	NUMB	TΥΡ	LOWS	Cu, kPa	NGTH	nat V. + rem V. ⊕	Q - ● U - O	Wp				M	AB. TE		
		0			ST	(11)			m	10	20	30 4	10	1(	) 2	0 3	0 4	0			
	10 			CLAYEY SILT, grey to brown, soft (Tailings) (continued)																	
	-			(			40	4.0											14.4 °C		
	-						12	AS									0		+4.4 C		
	- - - 11																				
	-																				
	-		p.				13	92	7								0		Gravel = 0%		
	-	ted	earch Li						ľ								Ŭ		Sand = 0.3% Silt = 82.6% Clay = 17.1%		
	— 12 _	k Moun	nd Rest	DEAT brown stiff fbrows		12.10													non-plastic	Cuttings	
	-	5 - Trac	ugers a	FEAT, DIOWII, Sull, IIDIOUS	<u> </u>	12.10														outango	
	-	W	Aobile A		<u>\\ //</u>		14	AS										63.9			
	- 13				<u>/</u>		-														
	-			SILTY CLAY, trace gravel, brown, (TILL)	X	13.11															
	-				X	]	15	AS									0				
	- - 14				X																
	-			SILTY SAND, fine to medium, trace to little clay, grey		14.02	16	AS									0				
	-	H	4	End of BOREHOLE.		14.48															
	-			Notes:																	-
	15 			Groundwater level measured at 9.2 mbgs on March 18, 2011.																	
	-																				
~	-																				
3/15/1:	- 16																				-
GDT (	-																				
BARY.	-																				
CALO	- - - 17																				
S.GPJ	- ''																				-
ELOG	-																				-
T MINE	-																				•
GIAN <sup>-</sup>	— 18 _																				-
RAFT	-																				-
NG D	-																				-
TESTI	- 19																				-
. LAB	-																				
D ADD	-																				
ANDE																					-
- EXP	20																				
HOLE	DE	EPT	H SC	CALE							ъ <b>1</b> 4								LOGGED: J	JB	
BORE	1	: 50	)								10100 <u>SOCI</u>	ates						(	CHECKED: H	к	

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-12

LOCATION: See Location Plan

BORING DATE: March 12, 2011

SHEET 1 OF 3

		N: 6934533 E: 636085												
ДĢ		SOIL PROFILE		1	SA	AMPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	1	HYDRAULIC k, cm	CONDUCT	IVITY, -		PIEZOMET
METH			PLOT	ELEV/	ER	UI	0.3m	20 40 60	80	10 <sup>-6</sup>	10 <sup>-5</sup> 10	) <sup>-4</sup> 10 <sup>-3</sup>	STING	STANDPIP
RING		DESCRIPTION	RATA	DEPTH	NMB	TYPE	OWS/	SHEAR STRENGTH nat V. + Cu, kPa rem V. +	- Q - ● 9 U - O	WATER			DDITIO B. TES	
BC			STF	(m)	2		В	10 20 30	40	10	20 3	0 40	L AL	
0	-	Ground Surface SANDY SILT, light grey, soft to firm		0.00		-								
		(Tailings)												
					1	AS							-3.2 °C Gravel = 0% Sand = 24%	
													Silt = 68% Clay = 8%	
1														
	ſ	SILT and SAND to SILTY SAND, soft to firm (Tailings)		1.49										
2		Frost penetration to 1.5 m			2	AS							+1.5 °C Gravel = 0% Sand = 54%	
													Sand = 34% Silt = 42% Clay = 4%	
				-	3	SS	6						Gravel = 0%	
													Sand = 73% Silt = 24% Clay = 3%	
3														
					4	AS							Gravel = 0% Sand = 23%	
													Clay = 5%	
		SILT to SANDY SILT, some clay, light to dark grey, very soft to firm (Tailings)	TT	3.66										
4													Crevel - 0%	
	ġ				5								Gravel = 0% Sand = 47% Silt = 51%	
fed	earch L												Clay = 2%	
Moun	nd Rese				6	AS					0		Gravel = 0% Sand = 22.2%	
- Tracl	gers ar												Silt = 75.4% Clay = 2.4%	
M5	bile Au												non placio	
	Ň				7	SS	2			0				
6														
					8	AS						0	Gravel = 0%	
						1							Salid = 2.0% Silt = 91.1% Clay = 6.9%	
													non-plastic	
7		Soft at 7.0 m			9	SS	3				0			
					10	AS					+4	Þ	Gravel = 0% Sand = 3.2%	
8													Clay = 7.6% $l_p = 4$	
		Firm at 8.5 m			11	SS	5				0			
9						1								
10 H L	-		┨╨╹╴	+	┝-	+-	-	┣-+┝-+			+	+	-	
		COMMOLD INLAT FAGE											1	
DEPTH	H S(	CALE					(	Golder					LOGGED: JJ	В
1 : 50								V Associates					CHECKED: H	к

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-12

LOCATION: See Location Plan

N: 6934533 E: 636085

BORING DATE: March 12, 2011

SHEET 2 OF 3

щ		SOIL PROFILE		s	AMPL	.ES	DYNAMIC PER RESISTANCE	IETRA1 BLOW	-ION S/0.3m	1	HYDRAUL k,	IC CONDU cm/s	CTIVITY,	T		PIEZOMETER
METRES	NG MET	DESCRIPTION	TA PLOT	EV. B	ΥΡΕ	VS/0.3m	20 SHEAR STRE	10 I NGTH	60 nat V. +	80 - Q - •	10 <sup>-6</sup> WATE	10 <sup>-5</sup> ER CONTE	10 <sup>-4</sup> 1 NT PERCE	0 <sup>-3</sup> ⊥ NT	ITIONAL TESTING	STANDPIPE INSTALLATION
	BORI		STRAT (u	n)	ŕ	BLOM	Cu, kPa 10	20	30 ·	40	Wp	20	<u>30 4</u>	WI 10	ADDI LAB. 7	
- 10		SILT to SANDY SILT, some clay, light to dark grey, very soft to firm (Tailings)														
		(continued)		12	AS								0			
11																
12				13	a AS							0			Gravel = 0% Sand = 30.3%	
															Silt = 67.7% Clay = 2.0% non-plastic	
13																
				14	AS							0				
14																
	h Ltd.															
Mounted	d Researc															
15 - Track	Augers an			15	6 AS							0			Gravel = 0% Sand = 32.6% Silt = 47.4%	
	Mobile														non-plastic	
16																
				16	as							0				
17																
18				17											Gravel = 0%	
												Ĭ			Sand = 14.0% Silt = 83.6% Clay = 2.4%	
19		CLAY, trace silt, trace gravel,	1	19.20												
		interbedded fine to medium sand layers, brown, (TILL)														
20 -			<u> </u>	18	AS	_		<u> </u>	+		<b> </b>	_+_				
		CONTINUED NEXT PAGE														
DEPT	тн s 0	CALE				(		old	er ates						Logged: J. Checked: H	IB IK

#### PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-12

LOCATION: See Location Plan

BORING DATE: March 12, 2011

SHEET 3 OF 3

DATUM: Geodetic

Ю	SOIL PROFILE	
BORING METH	DESCRIPTION	

N: 6934533 E: 636085

	ш	ОО	SOIL PROFILE			SA	MPL	ES	DYNA	AIC PEN		0N 10.3m	1	HYDR	AULIC C	ONDUCT	TIVITY,	Т		PIEZOMETER
	SCAL	ЕTH		OT.		~		ш	2	0 4	ю б	0 8	10	1	0 <sup>-6</sup> 1	0 <sup>-5</sup> 1	0-4 1	₀-₃ ⊥	ING	STANDPIPE
	NETR	M DN	DESCRIPTION	A PL	ELEV.	ABEF	ĥ	/S/0.3	SHEAF	R STREM	IGTH r	at V. +	Q - ●	w	ATER C	L ONTENT	PERCE	NT	TION	INSTALLATION
	DEP DEP	ORIN		<b>FRAT</b>	DEPTH (m)	NN	F	LOW	Cu, kP	а	r	em V. ⊕	U - O	w	p	-0 <sup>W</sup>		WI	ADDI AB. T	
_		8		S	(,			В	1	0 2	20 3	0 4	0	1	0 2	:0 3 I	80 4	0 I	<u>ر</u> ۲	
E	- 20		CLAY, trace silt, trace gravel.	////		18	AS													
E			interbedded fine to medium sand																	-
-			ayers, brown, (TEE) (continued)																	-
F			End of BOREHOLE.		20.57															-
F			Note:																	-
E	- 21		Borehole backfilled with cuttings upon completion.																	-
E																				-
-																				-
F																				-
E	- 22																			
-																				-
-																				-
-																				-
F	22																			-
E	- 23																			-
-																				-
-																				-
-																				-
-	- 24																			
-																				-
-																				-
E																				-
-	- 25																			
-																				-
E																				-
_																				-
5/12																				-
6/1	- 26																			
GDT																				-
ARY																				-
ALG																				-
	- 27																			
SS.GI																				=
Ľ0																				-
AINE																				-
NTN -	- 28																			
T GIA																				-
SAF1																				-
																				-
STIN																				-
3 TE	- 29																			
I-I																				-
ADC																	-			
DED																				-
(PAN	- 30																			-
Ш.																				
HOLE	DF	PTHS	SCALE						Â										LOGGED	B
ORE	1 ·	50							F	F.G.	olde	r Itee						c	CHECKED: H	K
ш										100	<u>vvuič</u>	1103								

PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-13

LOCATION: See Location Plan

BORING DATE: March 12, 2011

SHEET 1 OF 2 DATUM: Geodetic

N: 6934651 E: 635866 HYDRAULIC CONDUCTIVITY, k, cm/s DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m PIEZOMETER SOIL PROFILE SAMPLES BORING METHOD DEPTH SCALE METRES OR STANDPIPE ADDITIONAL LAB. TESTING STRATA PLOT 40 60 80 10<sup>-6</sup> 10-5 10-4 10<sup>-3</sup> BLOWS/0.3m 20 INSTALLATION NUMBER ELEV. TYPE SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - O WATER CONTENT PERCENT DESCRIPTION DEPTH -0<sup>W</sup> WpH - WI (m) Stick-up= 20 30 40 10 20 30 40 10 0.96 m Ground Surface 0 CLAYEY SILT, trace to some fine sand, 0.00 grey, very soft (Tailings) 0 1 AS Cuttings --- Frost penetration to 1.1 m 2 0 AS то Gravel = 0% Sand = 0.0% Silt = 83.2% Clay = 16.8% 3 2 Bentonite Seal 3 Mobile Augers and Research M5 - Track Mounted 4 AS d 18 Mar 2011 ⊻ 4 5 SS 1 0 Screen Section Gravel = 0% Sand = 11.6% Silt = 74.9% Clay = 13.5% non-plastic 6 0 AS 5 7 SS 2 C BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12 6 8 AS 0 Gravel = 0% Sand = 2.5% Silt = 86.7% Clay = 10.8% non-plastic 7 --- Soft at 7.1 m 9 SS 4 C Gravel = 0% Sand = 3.2% Silt = 81.7% Clay = 15.1% non-plastic 10 0 AS Ltd. 8 Research Cuttings M5 - Track Mounted and Augers ---- Firm at 8.5 m 11 SS 6 h Mobile / 9 12 0 Gravel = 0% Sand = 1.0% Silt = 83.1% Clay = 15.9% non-plastic AS ŁΙ 10 CONTINUED NEXT PAGE DEPTH SCALE LOGGED: JJB Golder A 1 : 50 CHECKED: HK ssociates

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

#### PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-13

LOCATION: See Location Plan

BORING DATE: March 12, 2011

SHEET 2 OF 2

			N: 6934651 E: 635866																		
щ		3	SOIL PROFILE			SA	AMPL	ES	DYNAN RESIST	IIC PEN ANCE,	IETRATI BLOWS	ON 5/0.3m	1	HYDR	AULIC C k, cm/s	ONDUC	FIVITY,	T		PIEZOM	ETER
H SCA TRES	METH			PLOT	FLEV	ER	ω	/0.3m	20	) 4	10	60 E	30	1	0 <sup>-6</sup> 1	0 <sup>-5</sup> 1	0 <sup>-4</sup> 1	0 <sup>-3</sup> ⊥	ONAL	STANDF INSTALL/	PIPE ATION
DEPTI	ONIAC		DESCRIPTION	IRATA	DEPTH (m)	NUME	ΤΥΡ	LOWS	Cu, kPa	SIREP	NGTH	nat v. + rem V.⊕	Q-● U-O	W				WI	ADDITI AB. TE		
	<u>م</u>	,		S	(,			8	10	) 2	20	30 4	10	1	10 2	20 3	30 4	10	1		
— 10 - - -			CLAYEY SILT, trace to some fine sand, grey, very soft (Tailings) (continued)																		
- - - - - 11		ch Ltd.				13	AS									,	¢				
- - - -	Track Mounted	ers and Resear																		Cuttings	
- - - 12 -	- 9M5 -	Mobile Aug	SILTY CLAY, trace to little gravel, light to medium brown, (TILL)		11.89		_														
-						14	AS										>				
- 13			End of BOREHOLE.		12.95															<u> </u>	1000
- - - -			Notes: Standpipe installed to 6.1 m. Groundwater level measured at 4.1 mbgs on March 18, 2011.																		
- - - 14 -																					
-																					
15 - - - -																					
- - - - 16																					
-																					
- - 17 -																					
- - - - - 18																					
-																					
- - - - 19 -																					
- - - -																					
- 20																					
DE 1	PTI 50	 + S'	CALE	<u> </u>	1	<u> </u>	<u> </u>	(	Â	G	olde	er	I	I	1	1	1	۱ ۱	Logged: J Checked: I	JB HK	
										<b>U9</b> 2	outi	uics								·	

PROJECT No.: 09-1427-0006

### RECORD OF BOREHOLE: GA11-T-14

LOCATION: See Location Plan

BORING DATE: March 13, 2011

SHEET 1 OF 2

DATA			N: 6934668 E: 636033								
Ī	ш	ДQ	SOIL PROFILE	-	,	SA	MPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
	H SCA TRES	B METH		PLOT	FLEV	ER	ш	/0.3m			STANDPIPE
	DEPTI	ORING	DESCRIPTION	<b>IRATA</b>	DEPTH (m)	NUME	μ	LOWS	Cu, kPa rem V. ⊕ U - O		
		8	Ground Surface	S	( )			-	10 20 30 40		
	— 0		CLAYEY SILT, trace sand, grey, very soft (Tailings)		0.00						-
	•				1	1	AS				-
					1						-
	- 1			$\mathbb{H}$	1						-
-			Frost penetration at 1.4 m	И	]						-
			Host penetration at 1.4 m	H	]	2	AS				-
-	- 2			Ж						AS2+SS3 Gravel = 1%	
-				H						Sand = 4% Sitt = 90% Clav = 6%	-
				H		3	SS	1			-
											-
						4	AS			+2.6 °C	-
											-
											-
	- 4				1	5	SS	2			
		, Ltd.			1						-
		bunted			1	6	AS			+1.2 °C Gravel = 0%	-
	- 5	rack Mo		$\mathbb{H}$	1					Sand = 0.2% Silt = 85.1% Clay = 14.7%	
		M5 - 7		$\mathbb{H}$	1					l <sub>p</sub> = 5	-
		Mobi	Soft at 5.5 m	H		7	SS	4		0	-
115/12	- 6			H							-
3DT 6				H		8	AS			O +1.7 °C Gravel = 0%	-
BARY.(										Sand = 0% Silt = 85.6% Clay = 14.4%	-
CALO	- 7									non-plasuc	-
S.GPJ						9	SS	4		0	-
ELOG											-
TMIN						10	AS			+1.6 °C Gravel = 0%	-
GIAN	- 8									Sand = 0.3% Silt = 85.0% Clay = 14.7%	
DRAFT					1					· · · · · · · · · · · · · · · · · · ·	-
LING			Very soft at 8.5 m		1	11	SS	2			-
3 TES	- 9			$\mathbb{H}$	1						
D. LAI				$\mathbb{H}$	]						-
ED AL				$\mathbb{H}$							
XPANE	- 10	LL		-JII	+	L -		-	┝-+		
ГЕ - Е)			CONTINUED NEXT PAGE								
REHO	DE	PTH S	SCALE					(	Golder	LOGGED: J	JB
BO	1 :	50								CHECKED:	нк

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-14

LOCATION: See Location Plan

BORING DATE: March 13, 2011

SHEET 2 OF 2 DATUM: Geodetic

N: 6934668 E: 636033

ш		OD	SOIL PROFILE			SA	MPL	ES	DYNAMIC PER	BLOWS	ON 5/0.3m	1	HYDR/	AULIC C	ONDUCT	TIVITY,	Т		PIEZOMETER
SCAL		метн		LOT		Ř		.3m	20	40	60 8	0	1	0 <sup>-6</sup> 1	0 <sup>-5</sup> 10	0 <sup>-4</sup> 10	-3 ⊥	NAL	
EPTH		RING	DESCRIPTION	ATA F	ELEV.	UMBE	TYPE	0/S/V	SHEAR STRE Cu, kPa	NGTH	nat V. + rem V.⊕	Q - ● U - O	W	ATER C		PERCE	NT	DITIO TES	INGTALLATION
ī		BOF		STR.	(m)	ž		BLC	10	20 :	30 4	0	1	0 2	20 3	30 4	0	AD LAB	
- 1	0	_			ļ														
Ē			soft (Tailings) (continued)	Ш															
-				$\mathbb{H}$	1	12	AS							⊢				+3.0 °C	
-					1													Gravel = 1.8% Sand = 3.5% Silt = 67.2%	
- 1	1			ſμ														Clay = 27.5% $I_p = 10$	-
-				11															
-				ΥIJ															
-			Firm at 11.6 m	H.		13	SS	5							0				
- 1:	2			K															-
F				И															
Ē				Ш															
F				$\mathbb{V}$	1														
- 1	3				1	14	AS								н	ο		+3.0 °C Gravel = 0.0%	-
F		, Ltd.		ĺ	1													Sand = 2.1% Silt = 80.3% Clay = 17.7%	
E	nted	search,																l <sub>p</sub> = 1	
-	k Mou	nd Re		1L															
- 1	4 12	igers a		n,															-
-	¥	bile Au		Щ	4 14 22														
-		Mo	brown, (TILL)	$\boldsymbol{\lambda}$	. 14.55														
E					1	15	AS								0	þ		+4.3 °C	
- 1	5																		-
-																			
-																			
/GL/9	6																		-
AKY-			CLAYEY SILT, light grey	1Ú	16.46	16	AS								c	>			
	7																		-
				H.															
			5 h (2025/1015	ИI															
N -			End of BOREHOLE.		17.68														
	8		Note: Borehole backfilled with cuttings																=
			upon completion.																
ן ר פר																			
	<u>م</u>																		-
ab Bb	Ĩ																		
EU A																			
	0																		-
	)FD1	ГН 9							Â.										IB
	: 5	i0								iolde soci:	er ates						(	CHECKED: H	- IK

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-15

LOCATION: See Location Plan

BORING DATE: March 13, 2011

SHEET 1 OF 1

DAT/				N: 6934801 E: 636249																
ŀ	ш	(		SOIL PROFILE			SA	MPL	ES	DYNAMIC PEN RESISTANCE.	ETRATIO	N .3m	1	HYDRA	AULIC CO	ONDUCT	IVITY,	Т		PIEZOMETER
	SCAL		METH		LOT		ц.		.3m	20 4	0 60	8	0	10	) <sup>-6</sup> 10	) <sup>-5</sup> 1(	)-4 10	) <sup>-3</sup> ⊥	NAL	STANDPIPE
	EPTH MET		RING	DESCRIPTION	ATA F	ELEV. DEPTH	UMBE	түре	0/S/MC	SHEAR STREN Cu, kPa	GTH na re	it V. + m V. ⊕	Q - O U - O	W	ATER CO		PERCEN		DITIO 3. TES	INGTALLATION
		0	8		STR	(m)	z		BLO	10 2	0 30	4	0	1	0 2	0 3	0 4	0	LAE	
ŀ	0			Ground Surface Sandy CLAYEY SILT, mottled brown		0.00	,													
E	-			and grey, firm (Tailings)		· ·														-
þ	-						1	AS							0					
Ē	-																			-
E	- 1 -																			
E	-			Frost penetration at 1.5 m																
	-						2	AS								o			+3.0 °C	
F	- - - 2																			-
Ē	-				X															
E	-						3	SS	8							0			Gravel = 0%	
	-						$\vdash$												Sand = 21.8% Silt = 69.7% Clay = 8.6%	
F	- 3		th Ltd.				4	AS								0			+2.4 °C	-
E	-	ounted	Researc	SANDY SILT, some clay, grey, firm (Tailings)		3.20	)													
	-	ack Mo	s and F																	-
þ	-	M5 - TI	e Auger																	
F	- 4 -		Mobile				5	SS	7						0				Gravel = 0% Sand = 40.7% Silt = 52.0%	-
F	-																		Clay = 7.4%	-
	-						6	AS								o			+4.2 °C	-
þ	- 																			-
F	-																			-
Ē	-						7A	SS	5								0		Gravel = 0% Sand = 19.7%	-
12	-			SILTY CLAY, trace to some fibrous		5.72	7B	SS									0		Silt = 65.6% Clay = 14.6%	-
6/15/	- 6			brown, (TILL)																-
.GDT	-																			-
GARY	-						8	AS							0					-
CAL	- - 7																			_
S.GP.	-	$\vdash$		End of BOREHOLE.		·. 7.16	;													-
FOG	-			Note:																
MINE	-			Borehole backfilled with cuttings upon completion.																-
BIANT	- 8 - 8																			-
AFT 0	-																			-
G DR	-																			-
STIN	-																			-
ABTE	- 9 -																			-
D.L	-																			-
EDA	-																			-
(PANC	- - 10																			-
<u>а</u> -																				
EHOL	DE	EPT	́нs	CALE					(	A C	olde	r							LOGGED: JJ	3
BOR	1	: 5	0								ocia	tes							CHECKED: H	<

PROJECT No.: 09-1427-0006

### RECORD OF BOREHOLE: GA11-T-16

LOCATION: See Location Plan

BORING DATE: March 14, 2011

SHEET 1 OF 2

		N. 0939455 E. 035750									
Д		SOIL PROFILE			SA	MPL	ES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s		PIEZOMETER
METH			PLOT		ER		0.3m	20 40 60 80	10 <sup>-6</sup> 10 <sup>-5</sup> 10 <sup>-4</sup> 10 <sup>-3</sup>	STING	STANDPIPE INSTALLATION
DRING		DESCRIPTION	RATA	DEPTH	NUMB	ΤΥΡΕ	OWS/	SHEAR STRENGTH nat V. + Q - ● Cu, kPa rem V. ⊕ U - ○	WATER CONTENT PERCENT	DDITIC AB. TES	
<u> </u>	+	Provind Surface	ST	(11)			B	10 20 30 40	10 20 30 40		
0		SILTY SAND, some clay, grey, very soft to soft (Tailings)		0.00							
					1	AS			0		
	-	Frost penetration at 1.4 m			2	AS			0	+0.6 °C	
					3	SS	1		0	Gravel = 0% Sand = 58.5%	
										Silt = 30.4% Clay = 11.1% non-plastic	
					4	AS			0		
			X								
					5	ss	3				
3				4 4 4 2							
Inted	) ) )	(Tailings)	Ж	4.42	6	AS			но	+1.9 °C	
ack Mou	and Ke		Ш							Gravel = 0% Sand = 4.5% Silt = 82.0%	
M5 - Tra	Augers		H							$l_p = 0$	
Achidon A	Mobile		H		7	SS	3		0		
			H								
			$\Pi$		8	AS			0	+2.0 °C	
										Gravel = 0% Sand = 14.4% Silt = 75.6%	
										Clay = 10.0% non-plastic	
					9	SS	3		0		
				1	10	AS				+0.6 °C	
				1						Gravel = 0% Sand = 6.7% Silt = 80.0%	
				1						Clay = 13.3% non-plastic	
			$\mathbb{H}$	1	11	SS	4		o		
			W	]							
			H								
			H								
			H								
'  - L	- -			†		+ -	-	-+		-	
)EPTH	I SC/	ALE								LOGGED: J.I	3
1:50								<b>Associates</b>		CHECKED: H	ĸ

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS GPJ CALGARY GDT 6/15/12

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-16

LOCATION: See Location Plan

BORING DATE: March 14, 2011

SHEET 2 OF 2

			N: 6935455 E: 635750																
щ		3	SOIL PROFILE			SA	MPL	ES	DYNAMIC F	PENETRATIC	0N 0.3m	1	HYDR	AULIC Co k, cm/s	ONDUCT	IVITY,	T		PIEZOMETER
SCAL	METH			LOT		ц.		.3m	20	40 6	0 8	30	10	D <sup>-6</sup> 1	D <sup>-5</sup> 10	)-4 1	0 <sup>-3</sup> ⊥	TING	
EPTH MET	UN D		DESCRIPTION	ATA F	ELEV.	UMBE	TYPE	0/S/AC	SHEAR STI Cu, kPa	RENGTH r	at V. + em V. ⊕	Q - ● U - O	W	ATER C		PERCE	NT	DITIO 3. TES	INGTALLATION
Ω	G	3		STR	(m)	z		BLO	10	20 3	0 4	10	1	0 2	0 3	0 4	0	AD	
— 10 	Mounted	d Research Ltd.	CLAYEY SILT, some sand, grey, soft (Tailings) (continued)			12	AS									C	>	Gravel = 0% Sand = 1.0% Sitt = 83.9% Clay = 15.0%	
- - - - - - - - - - - - - - - - - - -	M5 - Track	Mobile Augers ar	SILTY CLAY, trace gravel, brown, (TILL)		11.58	13A 13B	ss	34								0	0	non-plastic	
-			End of BOREHOLE. Refusal of auger at 12.3 m.	. 121	12.34														
- - - 13 -			Notes: Borehole backfilled with cuttings upon completion.																
- - - - - - - - - - -																			
- - - - - - 15																			
· · · ·																			
- 16 - - - -																			
- - - 17 -																			
- - - - - - -																			
- 20																			
DE 1 :	PTI 50	HS	CALE						<b>D</b>	Golde ssocia	r ites						(	logged: Jj Checked: H	IB IK

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-17

LOCATION: See Location Plan

BORING DATE: March 13, 2011

SHEET 1 OF 2

DA			N: 6935296 E: 636117							
ı	ų	ДQ	SOIL PROFILE		:	SAI	MPLES	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s	PIEZOMETER
	IRES	METH		гот		۲	: 0.3m	20 40 60 80		STANDPIPE INSTALLATION
H L		RING	DESCRIPTION	ATA F	DEPTH	UMBt	TYPE DWS/(0	SHEAR STRENGTH Cu, kPanat V. + Q - ● rem V. ⊕ U - ○		
(	ב	BO		STR	(m)	Z	BLO	10 20 30 40	10 20 30 40	L L
_	0		Ground Surface Sandy CLAYEY SILT, grey, very soft to		0.00					
-			soft (Tailings)							
Ē										
_						1	AS		0	
-	1									-
E										
Ē										
_	2		Frost penetration to 1.7 m		-	2	45			°C
_	2				-	~	~3			
						3	SS 4		Gravel	= 0%
									Sand = Silt = 6	18.4% 7.7%
_	3								olay -	-
						4	AS		O +2.6	ి
-										
_					-					
_	4					5	SS 2		O Gravel Sand =	= 0% 16.3%
		Ę			-				Silt = 7 Clay = 1 non-ol	1.1% 2.6% astic
		ted earch L			F	_	40			~
_	~	K Moun			-	0	AS		+3.4	C .
-	э	- Tracl gers ar								
_		M5 bile Au			F					
_		₽				7	SS 4		Gravel Sand = 3 Silt = 5	= 0% 34.7% 8.7%
_	6								Clay =	3.6%
_						8	AS		0	
-										
-										
-	7					9	SS 2		O Gravel	= 0%
-					-				Sand = Silt = 6 Clay = 1	9.1% 9.0% 1.9%
-					-				non-pi	ISTIC
-					1	DA	AS		IO +3.5 Ip=	°C 0
-	0									
-					-					
-					1	OВ	SS 4		O Gravel Sand =	= 0% 4.2% 2.5%
_	9								Clay = 1	3.3%
_										
_										
_										
-	10	┝└		-121	· -	- +		+	┟──┝─┼──┝─┼──┝─·	
	DE	PTH	SCALE					Golder	LOGGE	ED: JJB
L	1 :	50						V Associates	CHECK	2D: HK

PROJECT No.: 09-1427-0006

## RECORD OF BOREHOLE: GA11-T-17

LOCATION: See Location Plan

N: 6935296 E: 636117

BORING DATE: March 13, 2011

SHEET 2 OF 2 DATUM: Geodetic

ш		DO		SOIL PROFILE			SA	MPL	.ES	DYNA	VIC PEN		ION S/0.3m	1	HYDR	AULIC C	ONDUC	TIVITY,	Т		PIEZOMETER
SCAL		METH			LOT		۲		.3m	2	20 4	40	60	80	1	0 <sup>-6</sup>	10 <sup>-5</sup> 1	0-4 1	<sub>0³</sub> ⊥	NAL	
TH		SING P		DESCRIPTION	ATA P	ELEV.	JMBE	ГУРЕ	WS/0	SHEAI Cu, kP	R STREI	NGTH	nat V. + rem V. €	- Q- ● - U- O	w	ATER	ONTEN	F PERCE	NT	DITIO	INSTALLATION
DE		BOR			STR/	(m)	z		BLO	1	0 3	20	30	40	W	p     0	20	30 4	WI 10	ADIC LAB.	
	10				FOL 1																
F				Sandy CLAYEY SILT, grey, very soft to soft (Tailings) (continued)																	
-						s	11	1												+2.7 °C	-
F																				12.7 0	
E	11																				
F																					
E																					-
E				Firm at 11.6 m	X		12	SS	6								0	н		Gravel = 0%	
F	10																			Sand = 0.1% Silt = 84.1% Clay = 15.8%	
E	12																			I <sub>p</sub> = 2	-
-						8															
E			h Ltd.																		
F		unted	searc																		
E	13	ck Mot	and Re																		-
-		5 - Tra	ngers a																		
E		ž	bile A				13	AS										0		+3.6 °C	-
-			ž																		-
F	14																				-
E						8															-
F			ľ	SILTY CLAY, medium sand pockets, mottled brown and grey		14.48															-
-				noulou brown and groy																	-
-	15																				-
E							14	AS									0				-
F																					-
12																					
1 1	16																				
I GDI	ł		+	End of BOREHOLE.		16.31															
AK -				Note:																	
				Borehole backfilled with cuttings upon completion.																	
- Li	17																				-
																					-
CIAN	18																				-
4																					
ЯF																					
	19																				-
Ξ.																					
ADL																					
APA A	20																				_
<u>н</u> Щ																					
EHO	DEF	PTH	I S	CALE					(		E.	old	er							Logged: J.	B
BOR	1:	50								V	As	soci	ates						(	CHECKED: H	ĸ

#### PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-18

LOCATION: See Location Plan

BORING DATE: March 20, 2011

SHEET 1 OF 2

DATUM: Geodetic

N: 6932885 E: 636595

щ		Ð	SOIL PROFILE			SA	AMPL	ES	DYNAMIC PENETRA RESISTANCE, BLOV	TION /S/0.3m	ι	HYDRA	ULIC CO k, cm/s	ONDUCT	IVITY,	Т		PIEZOMETER
SCAL		METH		LOT		ч		.3m	20 40	60 80		10	) <sup>-6</sup> 1(	) <sup>-5</sup> 1(	0 <sup>-4</sup> 10 <sup>-3</sup>	T	NAL	
PTH		DNG N	DESCRIPTION	TAP	ELEV.	MBE	ΥPE	NS/0	SHEAR STRENGTH	nat V. + Q	2 - ● 1 - ○	W	ATER CO	ONTENT	PERCENT		TEST	INSTALLATION
DE		BOR		STRA	(m)	₽	F	BLO	10 20	30 40		Wp	·	 	WI		ADC LAB.	
			Ground Surface	•,						30 40			0 2	0 3	40			
-	0		SILT, little to some clay, trace to some sand light to dark grey very soft		0.00													
-			(Tailings)															
-																		
Ē						1	AS											
_	1																	
-																		
E																		
F			Frost penetration to 1.7 m															
Ē	2					2	AS										+0.9 °C	
E																		
F																		
Ē																		
E	3					3	SS	2										-
F							1											
E							1.0										+1.4 °C	
E						<u> </u>											11.4 0	:
F																		
-	4					_												-
-		Ę				5	SS	1										
F	-	arch				_												
E	Access	Rese																
-	5	's and				6	AS											-
F	1	Augel																
E		Aobile																-
N -						-												
1/91/	6					Ĺ	55	0										-
																		-
5-							10										+2.3 °C	
																	12.2 0	
5	7																	-
- - -						9		1										
3-						-		'										
≥-																		
	8					10	AS										+1.7 °C	-
							1											
Б <u>Г</u>																		
						44	]											
	9						55											-
₹ -																		
						12	٩٩										+2 9 ℃	
						Ľ											-2.5 0	
	0	-L			<b>↓</b>	┣.	+-		┣╡┝-	+					+·			
			CONTINUED NEXT PAGE															
HOLI	DEP	TH S	CALE					4		l						1	LOGGED: ,I.I	B
1 30KE	:	50								ier iates						c	CHECKED: H	к

#### PROJECT No.: 09-1427-0006

#### RECORD OF BOREHOLE: GA11-T-18

LOCATION: See Location Plan

BORING DATE: March 20, 2011

SHEET 2 OF 2

DAT/				N: 6932885 E: 636595																	
	щ		ДŎ	SOIL PROFILE			SA	MPL	ES	DYNA RESIS	MIC PEN TANCE,	IETRAT	ON 5/0.3m	1	HYDR/	AULIC C k, cm/s	ONDUCT	FIVITY,	T		PIEZOMETER
	SCAL		METH		LOT		н		3m	2	20 4	40 I	60 8	30	10	0 <sup>-6</sup> 1	0 <sup>-5</sup> 1	0 <sup>-4</sup> 1	0 <sup>-3</sup> ⊥	TING	
	EPTH		RING	DESCRIPTION	ATA F	DEPTH	UMBE	TYPE	D/S//C	SHEA Cu, kP	R STREM Pa	NGTH	nat V. + rem V. ⊕	Q - ● U - O	W	ATER C		PERCE	NT	DITIC 3. TES	
	Δ		во		STR	(m)	z		BLO		10 2	20	30 4	40	1	0 2	0 3	30 4	10	AD	
	10     			SILT, little to some clay, trace to some sand, light to dark grey, very soft (Tailings) <i>(continued)</i>			13	SS	0												
	- 11 - 11 		ch Ltd.				14 15A	AS	8											+2.4 °C	
	      	ME - Track Mounted	Mobile Augers and Resear	PEAT, dark brown to black, fibrous		12.65	15B	SS													
	- - - - - - - - - - - - - - - - - - -	ł		SILTY CLAY, trace organic tibers, trace wood chips, light to dark brown		13.26	16	AS												+3.4 ℃	
	- - - - - - - - - -	;		End of BOREHOLE. Note: Borehole backfilled with cuttings upon completion.		14.78															
CALGARY.GDT 6/15/12	16  	5																			
ANT MINE LOGS GPJ	- 17 - - - - - - - - - - - - - - - - - - -	5																			
AB TESTING DRAFT GI		,																			
- EXPANDED ADD. L/	  20	)																			
BOREHOLE	DI 1	EP : {	TH S 50	CALE					(	Ĵ	G	old	er ates						L C	.ogged: J. Hecked: H	IB IK



# **APPENDIX B**

**Laboratory Test Results** 





## Atterbergs



	Atte Det	rberg Limits termination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	21	00
E	<b>Golde</b> Associ	er ates	Tested By:	HVD		Date:	10-Ma	y-11
Borehole	e: GA11-T-01	Sample #	#: SA	1			Depth:	
Plastic	Limit Determinat	ion:						
Tare #								
Mass of w	et sample + tare (g)							
Mass of d	ry sample + tare (g)							
Mass of w	ater (g)							
Mass of ta	are (g)							
Mass of d	ry soil (g)							
Water con	itent (%)							
Liquid L	Limit Determinati	ion:						
Number of	f Blows							
Tare #								
Mass of w	vet sample + tare (g)							
Mass of d	ry sample + tare (g)							
Mass of w	vater (g)							
Mass of ta	are (g)							
Mass of di	ry soil (g)							
Water con	ntent (%)							
Correction	factor							
Corrected	Limit							
T					Plastic Lin	nit:	0	
					Liquid Lim	nit:	0	
<b>Q</b>					Plasticity I	ndex.	0	
nt (%					i laotiony i		°	
onte								
Ler C								
A A								
-								
-								
║ ┤	10 1	5 20	25 30	35 40				
		of Player						
Comme	nts: Non-plastic							
								Digitally signed by Dave
						Povioured by		um.ume.oreg.oregoteer Associates Ltd., oou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.14/28-27.06/00'
						Reviewed by	•	

	Atterb	perg Limits	Project #:	09-1427-0	0006	Phase:	2^	100
	Dete	rmination	Short Title:	Giant Min	e			
	Golder	r						
	Associa	ites	Tested Bv:	LM		Date:	8-May	/-11
Boreho	le: GA11-T-01	Sample	#: 3				Depth:	
Plastic	Limit Determinatio	n:					•	
Tare #		А						
Mass of v	wet sample + tare (g)	21.72						
Mass of c	dry sample + tare (g)	20.36						
Mass of v	water (g)	1.36						
Mass of t	are (g)	14.25						
Mass of c	dry soil (g)	6.11						
Water co	ntent (%)	22.26						
Liquid	Limit Determinatio	n:						
Number o	of Blows	35	33					
Tare #		В	С					
Mass of v	wet sample + tare (g)	43.47	39.18					
Mass of c	dry sample + tare (g)	37.63	34.40					
Mass of v	water (g)	5.84	4.78					
Mass of t	are (g)	13.32	14.55					
Mass of c	dry soil (g)	24.31	19.85					
Water co	ntent (%)	24.02	24.08					
Correctio	n factor	1.022	1.022					
Corrected	d Limit	24.55	24.61					
-					Plastic L	imit:	22	
-					Liquid Li	mit:	25	
(%)					Plasticity	Index:	2	
ent (								
Cont								
ater								
Š.								
-								
-								
-	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents:							
							1 that	Digitally signed by Dave Dh: cn-Dave, o-Golder Associates Ltd., ou-McDonald, email=Dave_McDonald@Golder.com, c=CA
						Reviewed by	y:	Competition of a standing standing
						I LEVIEWEU D	у.	

	Atterb	erg Limits	Project #:	09-1427-0	0006	Phase:	2	2100
	Dete	rmination	Short Title:	Giant Min	e			
	Golde							
	ASSUCIA		Tested By:	LM		Date:	10-M	ay-11
Borehol	e: GA11-T-01	Sample	#: 4				Depth:	7.5-10'
Plastic	Limit Determinatio	n:						
Tare #		А						
Mass of w	vet sample + tare (g)	20.51						
Mass of d	ry sample + tare (g)	19.21						
Mass of w	vater (g)	1.30						
Mass of ta	are (g)	14.26						
Mass of d	ry soil (g)	4.95						
Water cor	ntent (%)	26.26						
Liquid I	Limit Determinatio	n:	· ·				- i	
Number o	f Blows	15	16					
Tare #		PG-27	PG-25					
Mass of w	vet sample + tare (g)	65.77	70.68					
Mass of d	ry sample + tare (g)	56.94	60.47					
Mass of w	vater (g)	8.83	10.21					
Mass of ta	are (g)	31.17	30.21					
Mass of d		25.77	30.26					
Water cor	ntent (%)	34.26	33.74					
Correction	a factor	1.066	1.066					
Corrected	Limit	32.14	31.65					
			н				4	
1					Plastic Lim	nit:	26	
					Liguid Limi	it:	32	
<b>G</b>					Plasticity Ir	ndex.	6	
nt (%					r laotionty in		0	
onte								
Ler C								
Wat								
-								
-								
4	10 15	20	25 30	35 40				
	10 13	20	20 00	55 40				
	Number of	Blows						
Comme	ents:							
							1 Al	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.11.14/29:11-06/00/
						Reviewed b	y:	

Atterberg Limits	; Project #:	09-1427-0	0006	Phase:	21	100
Determination	Short Title:	Giant Min	е			
Associates	T. ( 1 D			D. (	40.14	
	Tested By:	HVD		Date:	16-Ma	y-11
Plastic Limit Determination:	le#: :	0			Depth:	
Tare #						
Mass of wet sample + tare (q)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Liquid Limit Determination:	1		1		I	
Number of Blows						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Correction factor						
Corrected Limit						
			Plastic Lir	nit:	0	
			Liquid Lim	nit:	0	
(%)			Plasticity	ndex:	0	
Wate						
	25 30	35 40				
	20 00	55 40				
Number of Blows						
Comments: <u>Non-plastic</u>						
						Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
				Reviewed by		ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date=2011.05.24.15:39:14_06/00
L						

Atterberg Limits	Project #:	09-1427-0	006	Phase:	21	00
Determination	Short Title:	Giant Mine	e			
Golder						
Associates	Tested By:	LM		Date:	8-May	-11
Borehole: GA11-T-01 Sample #	±: 7				Depth:	
Plastic Limit Determination:		1				[
Tare # 114						
Mass of wet sample + tare (g) 22.53						
Mass of dry sample + tare (g) 20.88						
Mass of water (g) 1.65						
Mass of tare (g) 14.24						
Mass of dry soil (g) 6.64						
Water content (%) 24.85						
Liquid Limit Determination:						
Number of Blows 17	17					
Tare # 17	88					
Mass of wet sample + tare (g) 36.03	40.85					
Mass of dry sample + tare (g) 30.59	34.26					
Mass of water (g) 5.44	6.59					
Mass of tare (g) 14.39	14.48					
Mass of dry soil (g) 16.20	19.78					
Water content (%) 33.58	33.32					
Correction factor 1.050	1.050					
Corrected Limit 31.98	31.73					
			Plastic Lim	it:	25	
			Liquid Limi	t:	32	
			Plasticity Ir	idex:	7	
ater						
10 15 20	25 30	35 40				
Number of Blows						
Comments:						
					LAL )	Digitally signed by Dave DN: cn=Dave, 0=Golder Associates Ltd., ou=McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.09.13:58:4406:00'
			F	Reviewed by	· · · · ·	

Atterberg Limits Determination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	2100	
Golder Associates	Tested By:	LM		Date:	8-May-11	
Borehole: GA11-T-01 Samp	le#: 9	)			Depth:	
Plastic Limit Determination:						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Liquid Limit Determination:						
Number of Blows						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Correction factor						
Corrected Limit						
			I			
			Plastic Lim	nit:	0	
			Liquid Lim	it:	0	
Q			Plasticitv li	ndex:	0	
int (3						
oute oute						
A A						
	25 30	35 40				
Number of Blows						
Comments: Non-plastic						
					Bathilis rinord hu Prov	
					Dir. Conductor build acceleration of the second	es Ltd., com, c=CA
				Reviewed by	:	

	Atterberg Limits Determination		Project #: 09-1427-0 Short Title: Giant Mine		0006 Phase: e		21	00
	Golder ssocia	tes	Tested By:	LM		Date:	8-May	-11
Borehole:	GA11-T-01	Sample #	t: 1	1			Depth:	
Plastic Limit	Determination	1:						
Tare #								
Mass of wet sam	ple + tare (g)							
Mass of dry samp	ole + tare (g)							
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (	g)							
Water content (%	)							
Liquid Limit I	Determination	:						1
Number of Blows								
Tare #								
Mass of wet same	ple + tare (g)							
Mass of dry samp	ole + tare (g)							
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (	g)							
Water content (%	)							
Correction factor								
Corrected Limit								
								I
					Plastic Lin	nit:	0	
					Liquid Lim	nit:	0	
<b></b>					Plasticity I	ndex:	0	
ut (%					i laotiony i		°	
oute								
A A								
10	15	20	25 30	35 40				
	Newtown		20 00					
Comments:	Non-plastic							
							1	Digitally signed by Dave
					Monitorial M			
						Reviewed by	:	

	Atterberg Limits		Project #:	091427-	0006	Phase:	2100	
	Dete	rmination	Short Title:	Giant Min	е			
<b>F</b>	Golde	r						
	Associa	ites	Tested Bv <sup>.</sup>	HVD		Date:	28-1	lav-11
Boreho	le: GA11-T-01	Sample	#: SA	15		Duto.	Depth:	37.5-39'
Plastic	Limit Determinatio	on:		-				
Tare #		PG-37						
Mass of v	wet sample + tare (g)	33.08						
Mass of o	dry sample + tare (g)	32.74						
Mass of v	water (g)	0.34						
Mass of t	tare (g)	30.68						
Mass of o	dry soil (g)	2.06						
Water co	ontent (%)	16.50						
Liquid	Limit Determinatio	n:					-	
Number	of Blows	21	21					
Tare #		202	207					
Mass of v	wet sample + tare (g)	53.65	53.85					
Mass of o	dry sample + tare (g)	50.07	50.23					
Mass of v	water (g)	3.58	3.62					
Mass of t	tare (g)	34.56	34.50					
Mass of o	dry soil (g)	15.51	15.73					
Water co	ontent (%)	23.08	23.01					
Correctio	on factor	0.979	0.979					
Corrected	d Limit	22.60	22.53					
					Plastic Li	mit:	17	
					Liquid Lin	nit:	23	
(%)					Plasticity	Index:	6	
tent								
Con								
/ater								
5								
-								
	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents:							
							1 fish	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
						Reviewed b	y:	Date: 2011.05.30.16-21-14-06'00'
Ľ								

	Atterberg Limits Determination		Project #: Short Title:	09-1427-0 Giant Min	0006 Phase:		2100	
E	F Golde Associa	r <b>ites</b>	Tested By:	HVD		Date:	10-Ma	y-11
Borehole:	GA11-T-02	Sample #	#: 2				Depth:	
Plastic Li	imit Determinatio	n:						
Tare #								
Mass of wet	sample + tare (g)							
Mass of dry	sample + tare (g)							
Mass of wat	er (g)							
Mass of tare	e (g)							
Mass of dry	soil (g)							
Water conte	ent (%)							
Liquid Li	mit Determinatio	n:						
Number of E	Blows							
Tare #								
Mass of wet	sample + tare (g)							
Mass of dry	sample + tare (g)							
Mass of wat	er (g)							
Mass of tare	e (g)							
Mass of dry	soil (g)							
Water conte	ent (%)							
Correction fa	actor							
Corrected Li	imit							
			L.					
Water Content (%)	10 15 Number of	20 Blows	25 30		Plastic Lin Liquid Lim Plasticity I	nit: it: ndex:	0 0	
Comment	ts: <u>Non-plastic</u>					Reviewed by		Organy speedy case Of co-Dee, c-Colder Associate Mit co-Dee, C-Colder Associate the co-McDoold, Colder Associate Colder Associate To an organized associate

	Atterl	berg Limits	Project #:	09-1427-0	0006	Phase:	2100	
	Dete	rmination	Short Title:	Giant Min	е			
	Associa	tes l				<b>.</b>	(0.14	
			Tested By:	HVD -		Date:	16-Ma	y-11
Borenole:	GA11-1-02	Sample #	F: t	)			Deptn:	10-11
Taro #								
Mass of wet	t sample + tare (a)							
Mass of dry	sample + tare (g)							
Mass of wat	ter (g)							
Mass of tare	e (g)							
Mass of dry	soil (a)							
Water conte	ent (%)							
Liquid Li	mit Determinatio	n:						
Number of E	Blows							
Tare #								
Mass of wet	t sample + tare (g)							
Mass of dry	sample + tare (g)							
Mass of wat	ter (g)							
Mass of tare	e (g)							
Mass of dry	soil (g)							
Water conte	ent (%)							
Correction fa	actor							
Corrected Li	imit							
_								
					Plastic Lin	nit:	0	
					Liquid Lim	iit:	0	
(%)					Plasticity I	ndex:	0	
tent								
Co								
Vater								
	10 15	20	25 30	35 40				
	Number of	Blows						
Comment	Comments: Non-plastic							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd_
						Reviewed by	AAL	ou-McConald, email=Dave_McConald@Golder.com, c=CA Date: 2011.05.24.15:38:5606/00'
<u> </u>							<i>.</i>	

	Atterberg Limits	Project #:	09-1427-0	)006	Phase:	2100		
	Dete	rmination	Short Title:	Giant Min	е			
	Golde							
	ASSUCIA		Tested By:	LM		Date:	8-Ma	y-11
Boreho	le: GA11-T-02	Sample	#: 7	,			Depth:	15-16'
Plastic	Limit Determinatio	n:						
Tare #		1						
Mass of v	wet sample + tare (g)	21.70						
Mass of c	dry sample + tare (g)	20.32						
Mass of v	water (g)	1.38						
Mass of t	are (g)	14.39						
Mass of c	dry soil (g)	5.93						
Water co	ntent (%)	23.27						
Liquid	Limit Determination	n:	1			1	1	
Number o	of Blows	20	20					
Tare #		2	3					
Mass of v	wet sample + tare (g)	35.32	48.27					
Mass of c	dry sample + tare (g)	30.88	41.21					
Mass of v	water (g)	4.44	7.06					
Mass of t	are (g)	14.28	14.46					
Mass of c	drv soil (a)	16.60	26.75					
Water co	ntent (%)	26.75	26.39					
Correctio	n factor	0.973	0.973					
Corrected	d Limit	26.02	25.68					
-					Plastic L	imit:	23	
-					Liquid Li	mit:	26	
()					Plasticity	/Index:	3	
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-	10 15	20	25 30	35 40				
	Number		20 00					
	Number of	DIUWS						
Comme	ents:				<u>.</u>			
	· · · · · · · · · · · · · · · · · · ·							
					1 list	Digitally signed by Dave DN: cn-Dave, o-Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com.c=CA		
						Reviewed h	<i>•</i> /	Date: 2011.05.09.14:01-23-06/00/
l							J.	

	Atterb	perg Limits	Project #:	09-1427-0	0006	Phase:	21	100
	Dete	rmination	Short Title:	Giant Min	e			
	Golde							
	ASSUCIA		Tested By:	HVD		Date:	16-Ma	y-11
Boreho	le: GA11-T-02	Sample	#: SA	47			Depth:	15-16'
Plastic	Limit Determinatio	n:						
Tare #		240						
Mass of v	wet sample + tare (g)	45.56						
Mass of c	dry sample + tare (g)	43.91						
Mass of v	water (g)	1.65						
Mass of t	are (g)	35.84						
Mass of c	dry soil (g)	8.07						
Water co	ntent (%)	20.45						
Liquid	Limit Determination	n:						
Number o	of Blows	21	22					
Tare #		256	434					
Mass of v	wet sample + tare (g)	63.36	65.67					
Mass of o	dry sample + tare (g)	57.78	59.64					
Mass of v	water (g)	5.58	6.03					
Mass of t	are (g)	35.13	34.81					_
Mass of c	drv soil (a)	22.65	24.83					
Water co	ntent (%)	24.64	24.29					
Correctio	n factor	0.979	0.985					
Corrected	d Limit	24.12	23.92					
						1		
					Plastic Li	imit:	20	
					Liguid Lir	mit:	24	
(%					Plasticity	Index:	4	
nt (%							·	
onte								
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Wat								
.								
-	10 15	20	25 30	35 40				
		20	20 00	00 10				
	Number of	BIOWS						
Comme	ents:							
							) list	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald.
						Reviewed h	<i>A-++A</i> E V:	
							<u>.</u>	

	Atte	erberg Limits	Project #:	09-1427-0	0006	Phase:	2100		
	De	etermination	Short Title:	Giant Min	е				
		<b>0</b> 7							
	<b>ASSOC</b>	iates				<b>.</b>	(0.14		
Develo			Tested By:	HVD		Date:	16-Ma	y-11	
Boreno	le: GA11-1-0	Sample :	#: \$	9			Deptn:	20-21	
Tare #	Linit Determina								
Mass of y	vet sample + tare (a)								
Mass of c	dry sample + tare (g)								
Mass of v	water (g)								
Mass of t	are (g)								
Mass of o	drv soil (g)								
Water co	ntent (%)								
Liquid	Limit Determina	tion:	I						
Number o	of Blows								
Tare #									
Mass of v	wet sample + tare (g)								
Mass of c	dry sample + tare (g)								
Mass of v	water (g)								
Mass of t	are (g)								
Mass of c	dry soil (g)								
Water co	ntent (%)								
Correctio	n factor								
Corrected	d Limit								
					Plastic Lin	nit:	0		
-					Liquid Lim	it:	0		
(%)					Plasticity I	ndex:	0		
itent									
Cor									
Nate									
-									
-									
	10	15 20	25 20	25 40					
	10	13 20	20 30	55 40					
	Numbe	r of Blows							
Comme	ents: Non-plastic	) )							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.	
						Devices and have			
<u> </u>							y .		

Atterberg Limits	Project #:	09-1427-0	0006	Phase:	2100			
Determination	Short Title:	Giant Min	е					
Golder								
Associates	Tested By:	HVD		Date:	16-Ma	<i>y</i> -11		
Borehole: GA11-T-02 Sample #	¢: 1	1			Depth:			
Plastic Limit Determination:								
Tare #								
Mass of wet sample + tare (g)								
Mass of dry sample + tare (g)								
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (g)								
Water content (%)								
Liquid Limit Determination:								
Number of Blows								
Tare #								
Mass of wet sample + tare (g)								
Mass of dry sample + tare (g)								
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (g)								
Water content (%)								
Correction factor								
Corrected Limit								
				<u>.</u>				
			Plastic Lir	nit:	0			
			Liquid Lim	nit:	0			
			Plasticity	Index:	0			
			-					
×								
10 15 20	25 30	35 40						
Number of Blows								
Comments: Non-plastic	Comments: Non-plastic							
						Distributional In C		
					LAL )	Signatury signed by UBWE DN: cn=Dave, o=Golder Associates Ltd., og=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.24.15:37:5106/00/		
				Reviewed by	•			

	Atterberg Limits Determination		Project #: Short Title:	Project #: 09-1427-0 Short Title: Giant Min		0006 Phase: e		2100	
Ê	G	olde	ľ						
	ASS	UCIA		Tested By:	HVD		Date:	16-M	ay-11
Boreho	ole: GA1	1-T-04	Sample	: # :	5			Depth:	10-11'
Plastic	: Limit Dete	rminatio	on:						
Tare #									
Mass of	wet sample + ta	are (g)							
Mass of	dry sample + ta	ire (g)							
Mass of	water (g)								
Mass of	tare (g)								
Mass of	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Deter	minatio	n:			1	1		
Number	of Blows								
Tare #									
Mass of	wet sample + ta	are (g)							
Mass of	dry sample + ta	ire (g)							
Mass of	water (g)								
Mass of	tare (g)								
Mass of	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Correcte	d Limit								
			l l	l.					
						Plastic Lir	mit:	0	
						Liquid Lin	nit:	0	
(%						Plasticitv	Index:	0	
int (9									
conte									
ter C									
Na									
	10	15	20	25 30	35 40				
	Ν	lumber of	Blows						
Comm	ents: <u>Non-</u> p	olastic				1			
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed b	<i>I</i> A y:	email-Deva. (ACDonald) email-Deva. (ACDonald@Golder.com, c=CA Date: 2011.05.24.15:d0:52.06/00'
L								-	

Atterberg Limits Determination	Project #: Short Title:	09-1427-0 Giant Min	0006 Phase: e		2500					
Golder	Tested By:	HVD		Date:	24-May-	11				
Borehole: GA11-T-04 Samp	le#: SA	46			Depth:					
Plastic Limit Determination:										
Tare #										
Mass of wet sample + tare (g)										
Mass of dry sample + tare (g)										
Mass of water (g)										
Mass of tare (g)										
Mass of dry soil (g)										
Water content (%)										
Liquid Limit Determination:										
Number of Blows										
Tare #										
Mass of wet sample + tare (g)										
Mass of dry sample + tare (g)										
Mass of water (g)										
Mass of tare (g)										
Mass of dry soil (g)										
Water content (%)										
Correction factor										
Corrected Limit										
	Ч		I		μ					
			Plastic Lim	nit:	0					
			Liquid Lim	it:	0					
Q			Plasticitv li	ndex:	0					
int (3										
oute oute										
A A										
	25 30	35 40								
Number of Blows										
Comments: Non plastic										
						Itally signed by Dave				
			Digital grand to the bit concount of the Associates tild, ender the Associ							
				Reviewed by						
	At D	terberg Limit etermination	ts I	Project #: Short Title:	09-142 : Giant N	27-00 Vline	06	Phase:		2100
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E	<b>Gold</b>	ler Liates		Tested By:	LM			Date:	8-M	ay-11
Borehol	le: GA11-T-	-04 Sam	ple #	:	8				Depth:	17.5-19'
Plastic	Limit Determin	nation:								
Tare #										
Mass of w	vet sample + tare (g	))								
Mass of d	dry sample + tare (g	)								
Mass of w	vater (g)									
Mass of ta	are (g)									
Mass of d	dry soil (g)									
Water cor	ntent (%)									
Liquid	Limit Determin	ation:								
Number o	of Blows									
Tare #										
Mass of w	vet sample + tare (g	)								
Mass of d	dry sample + tare (g	)								
Mass of w	vater (g)									
Mass of ta	are (g)									
Mass of d	dry soil (g)									
Water cor	ntent (%)									
Correction	n factor									
Corrected	d Limit									
-							Plastic Lin	nit:	0	
_							Liquid Lim	it:	0	
()							Plasticity I	ndex:	0	
nt (%									·	
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-			$\vdash$							
-	10	15 20	ЦĻ	25 30	35 40					
	 Al	or of Blows								
	Numb									
Comme	ents: Non-plast	ic								
										Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
								Reviewed h		ou-McDonald, ematl=Dave, McDonald@Golder.com, c=CA Date: 2011 05:09 16:02:38 -06:00/
									y ·	

Atterberg Limits	Project #:	09-1427-0	0006	Phase:	21	00
Determination	Short Title:	Giant Min	е			
Associates					40.14	
	Tested By:			Date:	10-Maj	y-11
Borenole: GA11-1-04 Sample	#: 1	0			Depth:	22.5-24
Mass of wet sample + tare (n)						
Mass of dry sample + tare $(q)$						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Liquid Limit Determination:	I				1	
Number of Blows						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Correction factor						
Corrected Limit						
			Plastic Lim	it:	0	
			Liquid Limi	t:	0	
(%)			Plasticity Ir	idex:	0	
A ate						
10 15 20	25 30	35 40				
Number of Blows						
Comments: Non-plastic						
						Digitally signed by Dave
			Reviewed by:			
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	Atterb	perg Limits	Project #:	09-1427-0	0006	Phase:	2	100
	Dete	rmination	Short Title:	Giant Min	е			
	Golde							
	ASSUCIA		Tested By:	DM		Date:	29-Ap	r-11
Boreho	le: GA11-T-04	Sample	#: 1	5			Depth:	45-46'
Plastic	Limit Determinatio	n:						
Tare #		411						
Mass of v	wet sample + tare (g)	51.19						
Mass of c	dry sample + tare (g)	48.26						
Mass of v	water (g)	2.93						
Mass of t	are (g)	34.99						
Mass of c	dry soil (g)	13.27						
Water co	Water content (%) 22.08							
Liquid	Limit Determination	n:						
Number o	of Blows	15	15					
Tare #		250	252					
Mass of v	wet sample + tare (g)	76.86	80.10					
Mass of c	dry sample + tare (g)	69.02	74.51					
Mass of v	water (g)	7.84	6.47					
Mass of t	are (g)	34.47	47.98					
Mass of c	drv soil (a)	34.55	26.53					
Water co	ntent (%)	22.69	24.39					
Correctio	n factor	1 066	1 066					
Corrected	d Limit	21.29	22.88					
		-						
-					Plastic L	imit:	22	
-					Liquid Lii	mit:	22	
()					Plasticity	Index:	0	
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-	10 15	20	25 30	35 40				
Comme	ents:							
							1 list	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
						Reviewed b	y:	Date: 2011.05.09.14:02-13-06'00'
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	Atterberg Limits Determination		Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	:	2100
<b>G</b> AS	older social	es	Tested By:	LM		Date:	5-Ma	ay-11
Borehole: G	A11-T-06	Sample #	±: 9	)			Depth:	22.5-24'
Plastic Limit De	etermination							
Tare #								
Mass of wet sample	+ tare (g)							
Mass of dry sample	+ tare (g)							
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (g)								
Water content (%)								
Liquid Limit De	termination:		1		1		1	
Number of Blows								
Tare #								
Mass of wet sample	+ tare (g)							
Mass of dry sample	+ tare (g)							
Mass of water (g)								
Mass of tare (q)								
Mass of dry soil (g)								
Water content (%)								
Conected Limit								
					Plastic I im	it.	0	
					Liquid Limi	it.	0	
					Plasticity Ir	ndov:	0	
nt (%					Flasholty II	IUEX.	0	
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er C								
Mat Nat								
.								
10	15	20	25 20	35 40				
10	GI	20	20 30	55 40				
	Number of Bl	ows						
Comments: No	n-plastic							
								Digitally signed by Dave
							- AAL-	une: cn=uave, o=Golder Associates Ltd, ou=McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.09.14:04:06-06:00'
						Reviewed b	y:	

Atterberg Limits	Project #:	09-1427-0	0006	Phase:	2	100
Determination	Short Title:	Giant Min	e			
Associates						
	Tested By:			Date:	29-Ap	r-11
Borenole: GA11-1-06 Sample #	7: 1	1			Deptn:	27.5-29.6
Toro #						
Mass of wet sample + tare $(a)$						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Liquid Limit Determination:						
Number of Blows						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Correction factor						
Corrected Limit						
			Plastic Lim	it:	0	
			Liquid Limit	t:	0	
%			Plasticity In	idex:	0	
C C C C C C C C C C C C C C C C C C C						
Jater						
10 15 20	25 30	35 40				
Number of Blows						
Comments: Non-plastic						
					1	Digitally signed by Dave
			Die como -Golder Associates Lid, on-McDonaid emilie-Dare, McDonaidg-Golder.com, c-CA Diez 2011 (509 LaSt 43, 6600			
		F	Reviewed by	:		

	At D	tterberg Lin Determinati	nits on	Project #: Short Title	09-1427- e: Giant Mir	0006 Ie	Phase:		2100
G	<b>Gold</b> Assoc	ler Liates		Tested By	r: LM		Date:	5-Ma	ay-11
Borehol	le: GA11-T	-06 Sa	ample #	£ :	12			Depth:	34-35'
Plastic	Limit Determin	nation:							
Tare #									
Mass of v	vet sample + tare (g	g)							
Mass of d	lry sample + tare (g	)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	lry soil (g)								
Water co	ntent (%)								
Liquid	Limit Determin	ation:							
Number o	of Blows								
Tare #									
Mass of w	vet sample + tare (g	g)							
Mass of d	lry sample + tare (g	)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	lrv soil (g)								
Water co	ntent (%)								
Correctio	n factor								
Corrected	d Limit								
						Plastic Lin	nit:	0	
-						Liquid Lim	it:	0	
()						Plasticity I	ndex.	0	
nt (%						1 laotiony i		0	
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-									
	10	15 2	20	25 30	35 40				
	Numh	er of Blows	-						
	Num	ber of blows							
Comme	ents: Non-plast	tic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed h		ou=McDonald, emall=Dave_McDonald@Golder.com, c=CA Date: 2011 05:09 14:03:26-06/007
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Atter Dete	berg Limits ermination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	2	2100
Golde	r Mes	Tested By:	HVD		Date:	10-Ma	ay-11
Borehole: GA11-T-06	Sample #	#: SA	15			Depth:	47.5-49'
Plastic Limit Determination	on:						
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Liquid Limit Determination	on:						
Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							
				Plastic Lim	it:	0	
				Liquid Limi	t.	0	
				Plasticity Ir	udev:	0	
ut (%				i lasticity ii		0	
oute							
U U U U U U U U U U U U U U U U U U U							
Nat Nat							
	20	25 30	35 40				
10 10	20	20 00					
Number o	t Blows						
Comments: Non-plastic							
							Digitally signed by Dave
				A A A Dec 2011 63.1 May 20. 6007			
				F	Reviewed b	y:	

	Atterk Dete	perg Limits rmination	Project #: Short Title:	09-1427-0 Giant Mine	0006 e	Phase:	2500	
V	Associa	r <b>ites</b>	Tested By:	HVD		Date:	1-Jun	-11
Borehole	: GA11-T-08	Sample #	‡: SA	.3			Depth:	
Plastic L	imit Determinatio	n:						
Tare #								
Mass of we	t sample + tare (g)							
Mass of dry	sample + tare (g)							
Mass of wat	ter (g)							
Mass of tare	e (g)							
Mass of dry	soil (g)							
Water conte	ent (%)							
Liquid Li	mit Determinatio	n:						
Number of I	Blows							
Tare #								
Mass of we	t sample + tare (g)							
Mass of dry	sample + tare (g)							
Mass of wat	ter (g)							
Mass of tare	e (g)							
Mass of dry	soil (g)							
Water conte	ent (%)							
Correction f	actor							
Corrected L	imit							
			· · · · ·					
Water Content (%)	10 15 Number of	Plastic Lim Liquid Limi Plasticity Ir	iit: it: ndex:	0 0 0				
Commen	ts: Not enough of	f sample to do at	terberg lim					
						Reviewed by	r:	Lagrally signed by Dave Dit cn-Dave, oeloder Associates Ltd., ou-McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.06.09.10:29:59.0600

	Atterberg Limits Determination Golder		Project #: <u>09-1427-00</u> Short Title: <u>Giant Mine</u>		0006 e	Phase:	2	2100
Ø	<b>Golder</b> Ssocial	tes	Tested By:	MA		Date:	25-May-11	
Borehole:	GA11-T-08	Sample #	t: SA	05			Depth:	12.5-14'
Plastic Limi	t Determination	:						
Tare #								
Mass of wet sar	mple + tare (g)							
Mass of dry sar	nple + tare (g)							
Mass of water (	g)							
Mass of tare (g)	1							
Mass of dry soil	(g)							
Water content (	%)							
Liquid Limit	Determination							
Number of Blow	/S							
Tare #								
Mass of wet sar	mple + tare (g)							
Mass of dry sar	nple + tare (g)							
Mass of water (	g)							
Mass of tare (g)	1							
Mass of dry soil	(q)							
Water content (	%)							
Correction facto	or							
Corrected Limit								
					Plastic Lim	it:	0	
					Liquid Limi	t:	0	
					Plasticity Ir	ndex:	0	
nt (%							·	
onte								
C Let								
A at								
10	15	20	25 30	35 40				
	Number of B	lows						
Constration	New glast's							
Comments:	INON-PIASTIC							
							1 Jul	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
					F	Reviewed b	y:	- Cate: 2011.05.30.16:20:56-06:00'

	At	terberg L	imits	Project #:	09-1427-	0006	Phase:	2	500
		etermina:	tion	Short Title	: Giant Min	e			
<b>S</b>		lov							
	Assoc	riates		TUIN			D.L	04.14	
Daraha				Tested By	: HVD		Date:	24-Ma	y-11
Plastic	I imit Determir	-09 3	Sample #	<i>F</i> : 3	540			Depth:	2.5-5
Tare #									
Mass of v	wet sample + tare (o	1)							
Mass of o	drv sample + tare (g	)							
Mass of v	water (q)	/							
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determin	ation:							
Number	of Blows								
Tare #									
Mass of v	wet sample + tare (g	a)							
Mass of o	dry sample + tare (g	)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Correcte	d Limit								
	·								
						Plastic Lir	nit:	0	
						Liquid Lim	nit:	0	
(%)						Plasticity	Index:	0	
Itent									
r Cor									
Nate									
-									
	10	15	20	25 20	25 40				
		15	20	25 50	55 40				
	Numb	er of Blows							
Comme	ents: Non plast	ic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed by	// v:	ou=McClonald, emati=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09:10:29:30:-0600'
J <b>I</b>								1	

Atterber Determ	Atterberg Limits Determination		09-1427-0 Giant Mine	0006 e	_Phase:	2	100
Golder	es	Tested By:	HVD		Date:	2-Ju	n-11
Borehole: GA11-T-08	Sample #	t: SA	.7			Depth:	17.5-19'
Plastic Limit Determination:							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Liquid Limit Determination:							
Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							
						1	
Mater Content (%)	20		35 40	Plastic Limi Liquid Limit Plasticity In	it: :: :dex:	0 0 0	
Comments: Non plastic							
	F	Reviewed by	/	Digitally Lipsed by Dave DR cm-Daves e-colder Associates Ltd, jou-McDonald, amit-Dave, McDonald@Colder.com, <-CA Dave. 2011.06.06.001.8.00.0600			

Atterberg Limits	Project #:	09-1427-0	0006	Phase:	2100	
Determination	Short Title:	Giant Min	e			
Golder						
Associates	Tested By:	HVD		Date:	4-Jun-11	
Borehole: GA11-T-08 Sampl	e#: SA	9A			Depth:	22.5-23.5'
Plastic Limit Determination:			1			
Tare # PG-33						
Mass of wet sample + tare (g) 32.98						
Mass of dry sample + tare (g) 32.59						
Mass of water (g) 0.39						
Mass of tare (g) 30.39						
Mass of dry soil (g) 2.20						
Water content (%) 17.73						
Liquid Limit Determination:			J J			
Number of Blows 28	28					
Tare # 432	403					
Mass of wet sample + tare (g) 54.48	52.42					
Mass of dry sample + tare (g) 50.98	48.90					
Mass of water (g) $3.50$	3 52					
Mass of tare (g) 35.27	33 13					
Mass of dry soil (g) 15.71	15 77					
Water content (%) 22.28	22.32					
Correction factor 1 014	1 01/					
Corrected Limit 22.59	22.63					
					1	
			Plastic Lin	nit:	18	
			Liquid Lim	it:	23	
Q			Plasticity I	ndex:	5	
					-	
oute						
A A A A A A A A A A A A A A A A A A A						
	25 30	35 40				
	20 00	00 10				
Number of Blows						
Comments:						
						The second second
					AAL	Digitally signed by Dave DN: cn-Dave, o-Golder Associates Ltd, ou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 3011.06.06.09:13/26-06/00'
				Reviewed b	y:	

	Atte	rberg Limits	Project #:	09-1427-0	0006	Phase:	25	500
	Det	termination	Short Title:	Giant Min	е			
	Associ	ates	TUID			D. (	7 .	44
Derehe			Tested By:			Date:	/-Jun	-11
Boreno Plastic	Limit Determinat	ion:	4: 5/	43			Depth:	0-7
Tare #								
Mass of v	wet sample + tare (g)							
Mass of c	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (q)							
Mass of c	drv soil (a)							
Water co	ntent (%)							
Liquid	Limit Determinati	ion:	I		I		1	
Number o	of Blows							
Tare #								
Mass of v	wet sample + tare (g)							
Mass of c	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (g)							
Mass of c	dry soil (g)							
Water co	ntent (%)							
Correctio	n factor							
Corrected	d Limit							
-	· · · · · · · · · · · · · · · · · · ·							
					Plastic Lir	nit:	0	
					Liquid Lim	nit:	0	
(%)					Plasticity	ndex:	0	
itent								
Cor								
Vater								
-								
	10 1	5 20	25 30	35 40				
	Number	of Blows						
Comme	ents: Non plastic							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates I trl
						Reviewed by	AAL	
<u> </u>		Leviewed D	у.					

A	tterk Dete	perg Limits rmination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	:	2500
Gol	de cia	r Ates	Tested By:	HVD		Date:	8-Ju	ın-11
Borehole: GA11-	T-09	Sample	#: S/	45			Depth:	10-11'
Plastic Limit Determ	inatio	n:	1				I	
Tare #		PG-14						
vlass of wet sample + tare	(g)	43.25						
Mass of dry sample + tare	(g)	42.86						
Mass of water (g)		0.39						
lass of tare (g)		41.13						
Aass of dry soil (g)		1.73						
Vater content (%)	ter content (%) 22.54							
_iquid Limit Determi	inatio	n:						
Number of Blows		21	20					
Tare #		408	234					
Aass of wet sample + tare	(g)	53.72	57.07					
Alass of dry sample + tare (g) $50.03$		52.90						
Alass of water (g) $3.69$		4.17						
lass of tare (g) 34.73		35.78						
Aass of day soil (a) 15.30		17.12						
Vater content (%)		24.12	24.36					
Correction factor		0 979	0.973					
		23.61	23 70					
		20.01	25.70					
itent (%)					Plastic Limi Liquid Limit Plasticity In	t: : dex:	23 24 1	
Mater Co								
10 Num	15 nber of	20 Blows	25 30	35 40				
Comments:								Digitally signed by Dave Dit: on-Dave, o=Golder Assoc
							AAA.	Ou=McDonald, email=Dave_McDonald@Gold Date: 2011.06.09 10:28:16-06
					F	eviewed b	y:	

	Attert	berg Limits	Project #:	09-1427-0	0006	Phase:		2500
	Dete	rmination	Short Title:	Giant Min	е			
<b>S</b>								
	Associa	tes						
			Tested By:	HVD		Date:	8-J	un-11
Boreho	e: GA11-1-09	Sample	#: SA	49			Depth:	20.5-21.5
Tare #	wat some $\pm tars (a)$	33.88						
Mass of	drugemple + tare (g)	22.27						
Mass of C	ury sample + tare (g)	0.51						
Mass of V	water (g)	0.01						
Mass of t	tare (g)	31.25						
Mass of o	dry soil (g)	2.12						
Water co	I imit Dotorminatio	24.06						
Number		20	20					
Toro #	of blows	20	20					
Tare #		240 50.22	57.90					
Mass of	drugemple + tare (g)	52.52	52.21					
Mass of C	ury sample + tare (g)	4.74	1.69					
Mass of V	water (g)	4.74	4.00					
Mass of t	tare (g)	35.30	35.28					
Mass of o	dry soil (g)	18.22	17.93					
Water co	ontent (%)	26.02	26.10					
Correctio	on factor	0.973	0.973					
Correcte	d Limit	25.31	25.40					
					Plastic Lir	mit:	24	
						nit.	24	
					Liquid Lin	nit: Indexe	20	
it (%)					Plasticity	Index:	1	
nten								
er Co								
Wate								
	10 15	20	25 30	35 40				
	10 13	20	25 50	55 40				
	Number of	Blows						
Comme	ents:							
							1 list	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com. c=CA
						Reviewed b	y:	Date: 2011.06.09.10:27:20-06/00
p							•	

	Atterb Deter	erg Limits mination	Project #: Short Title:	09-1427-0 Giant Min	09-1427-0006 Phase: 2100 Giant Mine				
	<b>SSOCIA</b>	tes	Tested By:	HVD		Date:	2100  2-Jun-11  Depth: 24-25'		
Borehole:	GA11-T-09	Sample #	#: SA <sup>^</sup>	10			Depth:	24-25'	
Plastic Limit [	Determination	า:							
Tare #									
Mass of wet samp	le + tare (g)								
Mass of dry sampl	e + tare (g)								
Mass of water (g)									
Mass of tare (g)									
Mass of dry soil (g	)								
Water content (%)	-								
Liquid Limit D	etermination	):							
Number of Blows									
Tare #									
Mass of wet samp	le + tare (g)								
Mass of dry sampl	e + tare (g)								
Mass of water (g)									
Mass of tare (q)									
Mass of dry soil (g	)								
Water content (%)	/								
Corrected Limit									
Mater Content (%)	15 Number of E	20 Blows			Plastic Lim Liquid Limi Plasticity Ir	it: t: ndex:	0 0		
Comments: <u>N</u>	lon plastic								
	F	Reviewed b	y:	Digitally signed by Dave ON cn-Dave, or-Colder Associates Ltd, 					

	Atte	rberg Limits	Project #:	09-1427-0	0006	Phase:	25	500
	Det	ermination	Short Title:	Giant Min	е			
<b>S</b>								
	Associ	ates	TULE			D.I.	7 1	44
Derehe		Comple	Tested By:	HVD		Date:	/-Jun	-11
Plastic	Limit Determinat	ion:	4: SF	42			Depin:	0-0
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	dry sample + tare (g)							
Mass of v	water (q)							
Mass of t	are (g)							
Mass of o	dry soil (g)							
Water co	ntent (%)							
Liquid	Limit Determinati	on:						
Number	of Blows							
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (g)							
Mass of o	dry soil (g)							
Water co	ntent (%)							
Correctio	n factor							
Corrected	d Limit							
	· · · · · ·							
					Plastic Lin	nit:	0	
					Liquid Lim	nit:	0	
(%)					Plasticity I	ndex:	0	
Itent								
L Col								
Nate								
-								
		5 20	25 20	35 40				
	··· ·	5 20	20 30	JJ 4U				
	Number	of Blows						
Comme	ents: Non plastic							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd
						Reviewed by	AA	ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09.10.26:1006/00*
<u> </u>	Reviewed by:							

	Atterberg Limits		Project #:	09-1427-0	0006	Phase:	25	00
	De	etermination	Short Title:	Giant Min	е			
		OT						
	Assoc	iates	TULE			D	7 .	44
Derehal			Tested By:	HVD		Date:	/-Jun-	-11
Plastic	e: GATI-I-1	ion:	#: SP	\4			Depth:	10-11
Tare #	Linit Determina							
Mass of w	yet sample + tare (a)							
Mass of d	ry sample + tare (g)							
Mass of w	vater (g)							
Mass of ta	are (g)							
Mass of d	ry soil (a)							
Water cor	ntent (%)							
Liquid I	Limit Determina	ation:			I I			
Number o	f Blows							
Tare #								
Mass of w	vet sample + tare (g)							
Mass of d	ry sample + tare (g)							
Mass of w	vater (g)							
Mass of ta	are (g)							
Mass of d	ry soil (g)							
Water cor	ntent (%)							
Correction	n factor							
Corrected	Limit							
т								
-					Plastic Lin	nit:	0	
-					Liquid Lim	it:	0	
(%)					Plasticity I	ndex:	0	
itent								
L C C								
Vate								
	10	15 20	25 20	25 40				
	iU ••••••		20 00	JJ 40				
	Numbe	PR OT BIOWS						
Comme	nts: Non plastic	C						
	·							
							Digitality Di: cn-D itid, cu-l email-Da c-CA	igned By Dave ave, o-Golder Associates AcDonald, ve_McDonald@Golder.com,
						Reviewed by	/:	1.06.09 10.26:38 -06'00'

	A	tterbe	rg Limits	Project #:	09-1427-	0006	Phase:	25	500
		Detern	nination	Short Title	: Giant Min	е			
Ê		Jon							
		ciat	20						
				Tested By	: HVD		Date:	7-Jun	-11
Borehol	le: GA11-1	T-10	Sample	#: 5	SA6			Depth:	15-16'
Plastic	Limit Determi	ination:							
Tare #									
Mass of v	vet sample + tare	(g)							
Mass of d	dry sample + tare (	(g)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	dry soil (g)								
Water co	ntent (%)								
Liquid	Limit Determi	nation:							
Number c	of Blows								
Tare #									
Mass of v	vet sample + tare	(g)							
Mass of d	dry sample + tare (	(g)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	dry soil (g)								
Water co	ntent (%)								
Correction	n factor								
Corrected	d Limit								
	<u> </u>		<u> </u>						
-						Plastic Li	mit:	0	
-						Liquid Lin	nit:	0	
t (%)						Plasticity	Index:	0	
nten									
r Co									
Wate									
-									
-									
_	10	15	20						
	10		20	20 00	55 40				
	Num	iber of Bl	ows						
Comme	ents: Non plas	stic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
┣───							Reviewed by		ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09.10:25:3906/00/
<u> </u>	Reviewed by:								

	A	Atterbe	erg Limits	Project #:	09-1427-0	0006	Phase:	25	500
		Deter	mination	Short Title:	Giant Min	е			
Ê		الم	•						
	<b>JASSO</b>		tes						
		Tito		Tested By:	HVD		Date:	1-Jun	-11
Boreho	le: GA11-	-I-10	Sample :	#: S	A8			Depth:	
Tare #		Ination	1.						
Tare #	wat sample + tare	(a)							
Mass of	dry sample + tare	; (g)							
Mass of y	water (g)	(9)							
Mass of t	tare (g)								
Mass of o	drv soil (a)								
Water co	ontent (%)								
Liquid	Limit Determ	ination	:	I		1	1		
Number	of Blows								
Tare #									
Mass of v	wet sample + tare	e (g)							
Mass of o	dry sample + tare	(g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Corrected	d Limit								
	·								
						Plastic Lir	mit:	0	
						Liquid Lin	nit:	0	
(%)						Plasticity	Index:	0	
Itent									
r Co									
Vate									
	10	15	20	25 30	35 40				
	N		20	20 00	55 40				
	Nur	mber of B	BIOWS						
Comme	ents: Sample	es not lo	cated						
								1.1	Digitally signed by Dave DN: cm-Dave, o=Golder Associates Ltd.,
						Reviewed by	// /:	uu=McCuonana, mmall=Dave, McDonald⊚Golder.com, c=CA Date: 2011.05.09.10:22:200600/	
	Neviewed by.								

Atterberg Lim	Atterberg Limits		09-1427-0	0006	Phase:	25	500
Determinatio	n	Short Title:	Giant Min	e			
Golder							
Associates		Tested By:	HVD		Date:	8-Jun	-11
Borehole: GA11-T-10 Sar	nple #	‡: SA	10			Depth:	25-26'
Plastic Limit Determination:							
Tare # PG-40							
Mass of wet sample + tare (g) 32.85							
Mass of dry sample + tare (g) 32.40							
Mass of water (g) 0.45							
Mass of tare (g) 30.74							
Mass of dry soil (g) 1.66							
Water content (%) 27.11							
Liquid Limit Determination:							
Number of Blows 21		22					
Tare # 204		241					
Mass of wet sample + tare (g) 54.44		53.84					
Mass of dry sample + tare (g) 49.39		49.22					
Mass of water (g) 5.05		4.62					
Mass of tare (g) 33.83		35.01					
Mass of dry soil (g) 15.56		14.21					
Water content (%) 32.46		32.51					
Correction factor 0.979		0.985					
Corrected Limit 31.77		32.02					
				Plastic Lir	nit:	27	
	+ $+$			Liquid Lim	nit:	32	
(%)	+ +			Plasticity	Index:	5	
te te	+						
C C C C C C C C C C C C C C C C C C C	+						
ater	+ +						
3							
10 15 20							
Number of Blows							
Comments:							
						1 Ad	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, omail=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09.10:24:27_06/00'
					Reviewed b	y:	
					Reviewed b	y:	

Atterberg Lim	Atterberg Limits		09-1427-0	0006	Phase:	2	100
Determinatio	on	Short Title:	Giant Min	e			
<b>Golder</b> Associates					<b>.</b>		
	. ,	Tested By:			Date:	10-Ma	ay-11
Borehole: GA11-1-11 Sa	mple #	<i>‡</i> : 3	3			Depth:	5-7.5
lare # 1							
Mass of wet sample + tare (g) 19.02							
Mass of dry sample + tare (g) 18.72							
Mass of water (g) 1.10							
Mass of tare (g) 14.42							
Mass of dry soil (g) 4.30							
Water content (%) 25.58							
Liquid Limit Determination:		00					
Number of Blows 27		29					
Tare # PG-22		PG-24					
Mass of wet sample + tare (g) 58.50		56.27					
Mass of dry sample + tare (g) 51.88		50.55					
Mass of water (g) 6.62		5.72					
Mass of tare (g) 30.32		31.17					
Mass of dry soil (g) 21.56		19.38					
Water content (%) 30.71		29.51					
Correction factor 1.066		1.066					
Corrected Limit 28.80		27.69					
· · · · · · · · · · · · · · · · · · ·							
				Plastic Lim	it:	26	
	_			Liquid Limi	t:	28	
(%)				Plasticity In	idex:	3	
te t							
S S							
ater and a second secon							
10 15 2	) C	25 30	35 40				
Number of Blows							
Comments:							
							Digitally signed by Dave
						- AAL -	ove: cn=uave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.1344/45-06/00/
				F	Reviewed by	y:	

	Atterb	perg Limits	Project #:	09-1427-0	)006	Phase:	2	100
	Dete	rmination	Short Title:	Giant Min	е			
	Golde							
	ASSUCIA		Tested By:	LM		Date:	10-Ma	iy-11
Boreho	le: GA11-T-11	Sample	#: 7	7			Depth:	17.5-19
Plastic	Limit Determinatio	n:						
Tare #		5						
Mass of v	wet sample + tare (g)	38.69						
Mass of c	dry sample + tare (g)	36.95						
Mass of v	water (g)	1.74						
Mass of t	are (g)	31.30						
Mass of c	dry soil (g)	5.65						
Water co	ntent (%)	30.80						
Liquid	Limit Determinatio	n:						
Number o	of Blows	20	20					
Tare #		35	25					
Mass of v	wet sample + tare (g)	84.79	70.32					
Mass of o	dry sample + tare (g)	73.05	59.42					
Mass of v	water (g)	11.74	10.90					
Mass of t	are (g)	41.52	30.08					
Mass of o	dry soil (g)	31.53	29.34					
Water co	ntent (%)	37.23	37.15					
Correctio	n factor	1.066	1.066					
Corrected	d Limit	34.93	34.85					
			· · · ·					
					Plastic Li	imit:	31	
					Liquid Lir	nit:	35	
(%					Plasticity	Index:	4	
ent (								
Conte								
ater (								
Ň.								
-								
-								
-	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents:							
							1 fish	Digitally signed by Dave DN: cn-Dave, o=Golder Associates Ltd., ou=McDonald, emat=Dave_McDonald@Golder.com, c=CA
						Reviewed b	y:	Date: 2011.05.11.08:18:0306'00'
<u></u>							*	

	Atterk	berg Limits	Project #:	09-1427-0	0006	Phase:		2100
	Dete	rmination	Short Title:	Giant Min	е			
<b>S</b>								
	Associa	fes				<b>.</b>		
			Tested By:	LM		Date:	6-Ma	ay-11
Boreho	e: GA11-1-11	Sample	#: 9				Depth:	22.5-24
Tare #		20 45						
Mass of V	wet sample + tare (g)	27.06						
Mass of C	ury sample + tare (g)	1 20						
Mass of V	water (g)	21.10						
Mass of t	tare (g)	51.18						
Mass of o	dry soil (g)	5.88						
Water co	Limit Determination	23.04						
Number	of Plows	15	15					
Taro #	of blows	PG-08	PG_25					
Mass of y	wet sample + tare (a)	63.12	62.36					
Mass of	dry sample + tare (g)	55.89	55.44					
Mass of v	water (g)	7.23	6.92					
Mass of t	tare (a)	29.99	30.17					
Mass of	dry soil (a)	25.00	25.27					
Water co	ontent (%)	23.30	27.38					
Correctio	on factor	1.066	1.066					
Corrected	d Limit	26 19	25.69					
		20110	20100					
					Plastic Li	mit:	24	
					Liquid Lir	nit:	26	
(%					Plasticity	Index:	2	
ent (%								
conte								
Iter C								
Na								
	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents:							
	·							
							d that	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd, ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
						Reviewed b	y:	- Unite: 2011 US 11 08:12:12:06/00'
							<i>.</i>	

	Atte De	erberg Limits termination	Project #: Short Title:	Project #: <u>09-1427-0</u> Short Title: <u>Giant Mine</u>		Phase:	2	2100
E	F Gold Associ	er ates	Tested By:	LM	Date:		5-May-11	
Borehole	e: GA11-T-1	1 Sample a	#: 1	1			Depth:	27.5-29'
Plastic I	Limit Determina	tion:						
Tare #								
Mass of we	et sample + tare (g)							
Mass of dr	y sample + tare (g)							
Mass of wa	ater (g)							
Mass of ta	re (g)							
Mass of dr	y soil (g)							
Water cont	tent (%)							
Liquid L	imit Determinat	ion:						
Number of	Blows							
Tare #								
Mass of we	et sample + tare (g)							
Mass of dr	y sample + tare (g)							
Mass of wa	ater (g)							
Mass of ta	re (g)							
Mass of dr	y soil (g)							
Water cont	tent (%)							
Correction	factor							
Corrected	Limit							
∥ Т					Plastic Lim	it:	0	
					Liauid Limi	t:	0	
					Plasticity Ir	ndex:	0	
nt (%							•	
⊢ oute								
ter C								
– Nat								
+								
+								
║└	10	15 20	25 30	35 40				
	Number	of Blows						
Commer	nts: Non-plastic							
							1	Digitally signed by Dave
							AA	DN: cn-Dave, o=Golder Associates Ltd., ou-McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.11.08.11.5906/00'
					F	≺eviewed b	y:	

	Atterberg Limits Determination Golder			Project #: 09-1427-0 Short Title: Giant Mine		0006 ie	Phase:		2100
G	<b>Gold</b> Assoc	ler ciates		Tested By	: LM	Date:		5-May-11	
Borehol	le: GA11-T	-11 5	Sample #	ŧ:	13			Depth:	37.5-39'
Plastic	Limit Determin	nation:							
Tare #									
Mass of v	vet sample + tare (g	g)							
Mass of d	dry sample + tare (g	)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	dry soil (g)								
Water co	ntent (%)								
Liquid	Limit Determin	ation:							
Number o	of Blows								
Tare #									
Mass of v	vet sample + tare (g	g)							
Mass of d	dry sample + tare (g	)							
Mass of v	vater (g)								
Mass of ta	are (g)								
Mass of d	dry soil (g)								
Water co	ntent (%)								
Correctio	n factor								
Corrected	d Limit								
						Plastic Lin	nit:	0	
_						Liquid Lim	it:	0	
()						Plasticity I	ndex:	0	
nt (%						i laotionty i		0	
onte									
ter C									
Wa									
-									
-									
	10	15	20	25 30	35 40				
	Numb	per of Blows							
Comme	ents: Non-plast	tic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed h		ou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date=2011.05.11.08.11.360600/
								J.	

	Atterberg Limits			09-1427-0	0006	Phase:	2100	
	De	etermination	Short Title:	Giant Min	е			
Ê		07		. <u> </u>				
	<b>Assoc</b>	er iates					00.4	
David			Tested By:	DM		Date:	29-Ap	or-11
Boreno	GA11-1-1	IZ Sample ?	#: c	)			Depth:	16.5-17.5
Toro #								
Mass of v	wet sample + tare (a)							
Mass of	drv sample + tare (g)							
Mass of	water (g)							
Mass of	tare (q)							
Mass of	dry soil (g)							
Water co	ontent (%)							
Liquid	Limit Determina	tion:						
Number	of Blows							
Tare #								
Mass of	wet sample + tare (g)							
Mass of	dry sample + tare (g)							
Mass of	water (g)							
Mass of t	tare (g)							
Mass of o	dry soil (g)							
Water co	ontent (%)							
Correctio	on factor							
Correcte	d Limit							
					Plastic Lin	nit:	0	
					Liquid Lim	it:	0	
(%)					Plasticity I	ndex:	0	
Itent								
L Cor								
Nate								
-								
	10	15 20	25 20	25 40				
	10	15 20	25 50	35 40				
	Numbe	r of Blows						
Comme	ents: Non-plastic	2						
								Digitally signed by Dave DN: cn–Dave, o–Golder Associates Ltd.,
						Reviewed by		ou=McDonald, emati=Dave_McDonald@Golder.com, c=CA bate=2011.05.11.13.42/2806/00/
[ <b></b>								

	Atterberg Limits Determination Golder			Project #: 09-1427-0 Short Title: Giant Mine		Phase:	2	100
G	Asso	ler ciates	Tested By:	AC/KC	Date:		13-Apr-11	
Borehol	le: GA11-T	-12 Sample	#: 8				Depth:	20-21'
Plastic	Limit Determin	nation:						
Tare #								
Mass of v	vet sample + tare (g	3)						
Mass of d	lry sample + tare (g	)						
Mass of v	vater (g)							
Mass of ta	are (g)							
Mass of d	lry soil (g)							
Water co	ntent (%)							
Liquid	Limit Determin	ation:						
Number o	of Blows							
Tare #								
Mass of v	vet sample + tare (g	a)						
Mass of d	lry sample + tare (g	)						
Mass of v	vater (g)							
Mass of ta	are (g)							
Mass of d	lry soil (q)							
Water co	ntent (%)							
Correctio	n factor							
Corrected	l l imit							
					Plastic Lim	it:	0	
-					Liquid Limi	t:	0	
					Plasticity In	ndex.	0	
nt (%					T lability II		0	
onte								
er C								
Wat								
-								
-								
	10	15 20	25 30	35 40				
			20 00	01 0				
	Numb							
Comme	ents: Non-plasi	tic						
							1	Digitally signed by Dave DN: cn=Dave, our Golder Accortance Ltd
					г	Reviewed h	AAA _	ou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.13:42:09-06:00'
J					ſ	Veviewen D	у.	

	Atterberg Limits			09-1427-0	0006	Phase:	2100	
	Dete	rmination	Short Title:	Giant Min	е			
	Jde	r						
Ass	ocia	ites	Tested Bv <sup>.</sup>	AC		Date <sup>.</sup>	13-Ar	or-11
Borehole: GA1	1-T-12	Sample	#: 1	0		Bato.	Depth:	25-26'
Plastic Limit Deter	rminatio	on:		-				
Tare #		PG-34						
Mass of wet sample + ta	are (g)	38.47						
Mass of dry sample + ta	are (g)	36.98						
Mass of water (g)		1.49						
Mass of tare (g)		31.26						
Mass of dry soil (g)		5.72						
Water content (%)		26.05						
Liquid Limit Deter	rminatio	n:	1					
Number of Blows		15	15					
Tare #		PG-08	412					
Mass of wet sample + ta	are (g)	66.82	64.89					
Mass of dry sample + ta	are (g)	57.81	57.52					
Mass of water (g)	Mass of water (g) 9.01		7.37					
Mass of tare (g)		29.92	34.80					
Mass of dry soil (g)		27.89	22.72					
Water content (%)		32.31	32.44					
Correction factor		1.066	1.066					
Corrected Limit		30.31	30.43					
					Plastic Lir	nit:	26	
					Liquid Lim	nit:	30	
(%)					Plasticity	ndex:	4	
tent								
C C O C O C O C O C O C O C O C O C O C								
Vater								
10	15	20	25 30	35 40				
N	lumber of	Blows						
Comments:								
							1 Hel	Digitally signed by Dave DN: cn-Dave, o=Golder Associates Ltd., ou=McDonald, omail=Dave, McDonald@Golder.com, c=CA
						Reviewed b	y:	- seer 2011 (b) 11 1 (28) 52 -06007

Atterberg Limits	Project #:	09-1427-0	0006	Phase:	2100	
Determination	Short Title:	Giant Min	е			
Associates	<b>T</b> ( 15					
	Tested By:	DM		Date:	29-Ap	r-11
Borenole: GA11-1-12 Samp	le # : 1	3			Deptn:	39-40
Toro #						
Mass of wet sample + tare (a)						
Mass of dry sample + tare $(g)$						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Liquid Limit Determination:			I I			
Number of Blows						
Tare #						
Mass of wet sample + tare (g)						
Mass of dry sample + tare (g)						
Mass of water (g)						
Mass of tare (g)						
Mass of dry soil (g)						
Water content (%)						
Correction factor						
Corrected Limit						
			Plastic Lim	nit:	0	
			Liquid Lim	it:	0	
(%)			Plasticity I	ndex:	0	
tet i i i i i i i i i i i i i i i i i i						
Nate						
-						
	25 20	25 40				
	20 30	JJ 4U				
Number of Blows						
Comments: <u>Non-plastic</u>						
						Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
						ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.13.46:3606/b0
L						

	Atterberg Limits			09-1427-0	0006	Phase:	2100	
	Det	ermination	Short Title:	Giant Min	е			
	Associ	ates	Tested Des			Deter	<b>5</b> Mar	. 44
Poreho		Sampled		LIVI		Date:	5-IVIA)	40.50'
Plastic	Limit Determinat	ion:	<i>4</i> : I	5			Depth:	49-50
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	drv sample + tare (g)							
Mass of v	water (q)							
Mass of t	are (g)							
Mass of c	dry soil (g)							
Water co	ntent (%)							
Liquid	Limit Determinati	on:						
Number o	of Blows							
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (g)							
Mass of c	dry soil (g)							
Water co	ntent (%)							
Correctio	n factor							
Corrected	d Limit							
	· · · · ·							
					Plastic Lin	nit:	0	
-					Liquid Lim	nit:	0	
(%)					Plasticity I	ndex:	0	
Itent								
r Cor								
Nate								
		5 20	25 20	25 40				
		5 20	25 50	35 40				
	Number	of Blows						
Comme	ents: Non-plastic							
								Digitally signed by Dave Dh: cn=Dave, o=Golder Associate < 1 td
						Reviewed by	AA	u-McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.11.13.46:11-06/00'
<u> </u>						i zevieweu D	y.	

	Atterberg Limits			Project #:	09-1427-	0006	Phase:	2100	
		Deteri	mination	Short Title:	Giant Mir	ie			
Ê		dor							
	<b>ZASSO</b>	ciat	tes						
				Tested By:			Date:	5-May	/-11
Boreno	I imit Dotorm	I-12 ination	Sample	#:	17			Deptn:	59-60
Toro #		mation	•						
Mass of y	wet sample + tare	(a)							
Mass of o	drv sample + tare (	(g)							
Mass of v	water (g)	(3)							
Mass of t	tare (q)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determi	nation	· · · · · · · · · · · · · · · · · · ·			l	Į		l.
Number	of Blows								
Tare #									
Mass of v	wet sample + tare	(g)							
Mass of o	dry sample + tare (	(g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Corrected	d Limit								
	·								
						Plastic Lir	nit:	0	
						Liquid Lim	nit:	0	
(%)						Plasticity	Index:	0	
Itent									
r Cor									
Nate									
-									
	10	15	20	25 20	25 40				
	10		. 20	25 50	35 40				
	Num	iber of B	lows						
Comme	ents: Non-plas	stic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed by		ou=McDonald, emal=Dave_McDonald@Golder.com, c=CA Date=2011.05.11.13.45:5206007
Revie									

	Atterk Dete	perg Limits rmination	Project #: Short Title:	09-1427-0 Giant Mine	006 Phase:		2500	
	F Golde Associa	r <b>ites</b>	Tested By:	HVD	Date:		1-Jun	-11
Borehole:	GA11-T-13	Sample #	#: SA	\3			Depth:	
Plastic Li	mit Determinatio	n:						
Tare #								
Mass of wet	sample + tare (g)							
Mass of dry s	sample + tare (g)							
Mass of wate	er (g)							
Mass of tare	(g)							
Mass of dry s	soil (g)							
Water conter	nt (%)							
Liquid Lir	nit Determinatio	n:						
Number of B	lows							
Tare #								
Mass of wet	sample + tare (g)							
Mass of dry s	sample + tare (g)							
Mass of wate	er (g)							
Mass of tare	(g)							
Mass of dry s	soil (g)							
Water conter	nt (%)							
Correction fa	ctor							
Corrected Lir	nit							
								·
Water Content (%)	0 15 Number of	20 Blows			Plastic Lim Liquid Lim Plasticity I	iit: it: ndex:	0 0 0	
Comments	s: Not enough of	sample to do at	tterberg lim					
						Reviewed by		Digitally signed by Dave DN: cn-Oadler Associates Ltd., e-maile-Dave, McDonaddgoolder.com, c-CA naue-2011.dtd1.10:21:40.4000°

	Atterberg Limits		Project #:	09-1427-0	0006	Phase:	25	2500	
		Determir	nation	Short Title	: Giant Min	е			
		Jon							
		ciate	Q						
				Tested By	: HVD		Date:	7-Jun	-11
Boreho	le: GA11-T	-13	Sample a	#: \$	SA6			Depth:	15-16'
Plastic	Limit Determi	nation:							
Tare #									
Mass of v	vet sample + tare (	g)							
Mass of c	dry sample + tare (g	g)							
Mass of v	vater (g)								
Mass of t	are (g)								
Mass of c	dry soil (g)								
Water co	ntent (%)								
Liquid	Limit Determin	nation:							
Number o	of Blows								
Tare #									
Mass of v	vet sample + tare (	g)							
Mass of c	dry sample + tare (g	g)							
Mass of v	vater (g)								
Mass of t	are (g)								
Mass of c	dry soil (g)								
Water co	ntent (%)								
Correction	n factor								
Corrected	d Limit								
-	<u> </u>	- <u> </u>		<u> </u>					
-						Plastic Li	mit:	0	
-						Liquid Lin	nit:	0	
t (%)						Plasticity	Index:	0	
nten									
- Co									
Wate									
· .									
-									
-	10	15	20	25 30	35 40				
	10		20	20 50	55 40				
	Numl	ber of Blows	5						
Comme	ents: Non plas	tic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed by		ou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2013.06.09.10.23.0006/00/
Reviewed									

	Atterberg Limits			09-1427-0	0006	Phase:	2500	
	Dete	rmination	Short Title:	Giant Min	е			
	oldor	<b>W</b>						
		tes	TUID			<b>D</b> .(	7 1	4.4
Darahalar	44 T 42	Complet	Tested By:	HVD		Date:	/-Jun	-11
Plastic Limit Det	erminatio	Sample #	F: 5/	40			Depin:	10-11
Tare #								
Mass of wet sample +	tare (g)							
Mass of dry sample +	tare (g)							
Mass of water (q)	(0)							
Mass of tare (g)								
Mass of dry soil (g)								
Water content (%)								
Liquid Limit Det	erminatio	n:						
Number of Blows								
Tare #								
Mass of wet sample +	tare (g)							
Mass of dry sample +	tare (g)							
Mass of water (g)								
Mass of tare (g)								
Mass of dry soil (g)								
Water content (%)								
Correction factor								
Corrected Limit								
·								
					Plastic Lir	nit:	0	
					Liquid Lim	nit:	0	
(%)					Plasticity	ndex:	0	
Nate								
10	15	20	25 20	35 40				
	10	20	20 30	JJ 4U				
	Number of	Blows						
Comments: Non	plastic							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd_
						Reviewed by	A /:	ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09.10.20.30.06/b0
<u> </u>								

	Atterberg Limits			Project #:	09-1427-0	0006	Phase:	2500	
		Determi	nation	Short Title:	Giant Min	е			
<b>S</b>		dor							
	ASSO	ciate	S	<b>T</b>			D.L	7 .	4.4
Daraha			Complex	Tested By:	HVD		Date:	/-Jun	-11
Plastic	I imit Determi	nation:	Sample	#: 5/	410			Depth:	20-20
Tare #									
Mass of v	wet sample + tare (	a)							
Mass of o	dry sample + tare (	a)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determi	nation:							
Number	of Blows								
Tare #									
Mass of v	wet sample + tare (	(g)							
Mass of o	dry sample + tare (	g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Corrected	d Limit								
						Plastic Lir	nit:	0	
						Liquid Lin	nit:	0	
(%)					+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	Plasticity	Index:	0	
Itent					+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$				
Cor									
Vater									
	10	15							
	10	15	20	25 30	35 40				
	Num	ber of Blow	/S						
Comme	ents: Non plas	stic							
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed b	<i>I</i> /_ y:	ou-McConaid, emaileDave, McDonaideGolder.com, c=CA Date-2011.06.09.10.20:010600'
<b></b>	Reviewed by:								
	Atte	rberg Limits	Project #:	09-1427-0	0006	Phase:	2	500	
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	Dei	termination	Short Title:	Giant Min	е				
<b>S</b>		2.14							
	Associ	ates	TUIN			D. (	7 .	44	
Dereha		Complex	Tested By:	HVD		Date:	/-Jun	-11	
Plastic	Limit Determinat	sample	#: 5A				Depth:	30-31	
Tare #									
Mass of v	wet sample + tare (g)								
Mass of o	drv sample + tare (g)								
Mass of v	water (g)								
Mass of t	are (q)								
Mass of o	dry soil (g)								
Water co	ntent (%)								
Liquid	Limit Determinat	ion:	len en e		l				
Number	of Blows								
Tare #									
Mass of v	wet sample + tare (g)								
Mass of o	dry sample + tare (g)								
Mass of v	water (g)								
Mass of t	are (g)								
Mass of o	dry soil (g)								
Water co	ntent (%)								
Correctio	n factor								
Corrected	d Limit								
				· · · · · ·					
					Plastic Lir	nit:	0		
					Liquid Lim	iit:	0		
(%)				+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	Plasticity	ndex:	0		
itent									
Cor									
Vater									
	10 1	o 20	∠o 30	35 40					
Number of Blows									
Comments: Non plastic									
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,	
				Reviewed by	AAL	ou-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.06.09.10.19-3006700			
<u> </u>							y.		

	Atterb	perg Limits	Project #:	09-1427-0	)006	Phase:	2	100
	Dete	rmination	Short Title:	Giant Min	е			
	Golde							
	ASSUCIA		Tested By:	LM		Date:	8-Ma	y-11
Boreho	le: GA11-T-14	Sample	#: 6	6			Depth:	15-16'
Plastic	Limit Determinatio	n:			T			
Tare #		105						
Mass of v	wet sample + tare (g)	20.78						
Mass of c	dry sample + tare (g)	19.55						
Mass of v	water (g)	1.23						
Mass of t	are (g)	14.45						
Mass of c	dry soil (g)	5.10						
Water co	ntent (%)	24.12						
Liquid	Limit Determination	n:			T			
Number o	of Blows	18	20					
Tare #		PG-13	A74					
Mass of v	wet sample + tare (g)	30.80	53.52					
Mass of c	dry sample + tare (g)	25.90	44.76					
Mass of v	Mass of water (g) 4.90		8.76					
Mass of t	Mass of tare (g) 9.94		14.32					
Mass of c	dry soil (g)	15.96	30.44					
Water co	ntent (%)	30.70	28.78					
Correctio	n factor	1.043	0.973					
Corrected	d Limit	29.44	28.00					
					Plastic L	_imit:	24	
					Liquid Li	imit:	29	
(%					Plasticity	y Index:	5	
ent (								
Cont								
ater								
Š.								
-								
-	10 15	20	25 30	35 40				
	Number of	Blows						
Comments:					<u>.</u>			
							1 fil	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
						Reviewed b	V:	Date: 2011.05.11.13:50:10:-06/00'
L							1	

	A	Atterbe	erg Limits	Project #:	09-1427-0	0006	Phase:	2^	100
		Deterr	nination	Short Title:	Giant Min	е			
Ê		dor							
	ASSO	ciat	es	T. ( ) D	A 0/1/0		D. (	40.4	
Daraha		T 44	Complex	Tested By:	AC/KC		Date:	13-Ap	r-11
Plastic	I imit Determ	ination	Sample -	<i>+</i> :	ŏ			Depth:	20-21
Tare #			•						
Mass of v	wet sample + tare	(a)							
Mass of	dry sample + tare	(g)							
Mass of	water (g)	(0)							
Mass of t	tare (g)								
Mass of (	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determi	ination:							
Number	of Blows								
Tare #									
Mass of	wet sample + tare	(g)							
Mass of	dry sample + tare	(g)							
Mass of	water (g)								
Mass of t	tare (g)								
Mass of	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Correcte	d Limit								
						Plastic Lir	nit:	0	
						Liquid Lim	nit:	0	
(%)						Plasticity	ndex:	0	
ntent									
r Col									
Vate									
-									
	10	15	20	25 30	35 40				
	10	10	20	20 30	55 40				
Number of Blows									
Comments: Non-plastic									
									Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							Reviewed by	A_A v:	\gu=McDonald, .email=Dave_McDonald@Golder.com, c=CA .Date=2011.05.11.1340-51_06000'
J <b>I</b>								1	

Atterberg Limits	Project #:	09-1427-0	006	Phase:	21	2100	
Determination	Short Title:	Giant Mine	e				
Golder							
Associates	Tested By:	LM		Date:	8-May	-11	
Borehole: GA11-T-14 Sample #	ŧ: 1(	0			Depth:	25-26'	
Plastic Limit Determination:							
Tare # X19							
Mass of wet sample + tare (g) 20.40							
Mass of dry sample + tare (g) 19.20							
Mass of water (g) 1.20							
Mass of tare (g) 14.40							
Mass of dry soil (g) 4.80							
Water content (%) 25.00							
Liquid Limit Determination:							
Number of Blows 21	19						
Tare # PG-27	A46						
Mass of wet sample + tare (g) 36.86	46.85						
Mass of dry sample + tare (g) 30.45	39.35						
Mass of water (g) 6.41	7.50						
Mass of tare (g) 10.18	14.29						
Mass of dry soil (g) 20.27	25.06						
Water content (%) 31.62	29.93						
Correction factor 0.979	1.036						
Corrected Limit 30.96	31.01						
			Plastic Lim	it:	25		
			Liquid Limi	t:	31		
%			Plasticity Ir	idex:	6		
ater							
10 15 20	25 30	35 40					
Number of Blows							
Comments:							
					J.H.L.	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.11.13:49:28-06:00'	
			F	Reviewed by	/:		

	Atterb	erg Limits	Project #:	09-1427-0	0006	Phase:	2	100
	Dete	rmination	Short Title:	Giant Min	е			
	Associa	tes						
			Tested By:	HVD		Date:	10-Ma	iy-11
Boreho	le: GA11-I-14	Sample	#: U				Depth:	43-44'
		241						
Tare #		52 17						
Mass of V	wet sample + tare (g)	00.17						
Mass of C	ary sample + tare (g)	49.19						
Mass of v	water (g)	3.98						
Mass of t	are (g)	34.98						
Mass of c	dry soil (g)	14.21						
Water co	ntent (%)	28.01						
Liquia		ו. ייי	22					
Tana #	DI BIOWS	DC 26	DC 12					
Tare #		FG-30	62.04					
Mass of V	wet sample + tare (g)	54.65	56.04					
Mass of C	Mass of dry sample + tare (g) 54.65		7.00					
Mass of V	Mass of water (g) 6.77		7.00					
Mass of t	are (g)	31.03	31.34					
Mass of c	dry soil (g)	23.62	24.70					
Water co	ntent (%)	28.00	28.34					
Correctio	n factor	0.985	1.036					
Corrected		20.23	29.30					
					Plastic I i	mit <sup>.</sup>	28	
						nit:	20	
						Indov:	29	
nt (%					Plasticity	muex.	I	
onter								
er C								
Wat								
	10 15	20	25 30	35 40				
	Number of	Blows						
	Number of	DIGWS						
Comme	ents:							
								Digitally signed by Dave DN: cm-Dave, o-Golder Associates Ltd.,
						Reviewed b	<i>II</i>	ou-McDanald, email=Duw, McDanald@Golder.com, c=CA Date: 2011.05.11.13-48-46-06/00'
							/	

	Atterberg Limits Determination	Project #:	09-1427-0	0006	Phase:	2	100	
	Dete	rmination	Short Title:	Giant Min	e			
	Golde	ľ						
	ASSOCIA	lles	Tested By:	AC		Date:	13-Ap	or-11
Boreho	le: GA11-T-14	Sample	#: SA	1Î			Depth:	54-55
Plastic	Limit Determinatio	on:						
Tare #		PG-10						
Mass of v	wet sample + tare (g)	47.96						
Mass of c	dry sample + tare (g)	46.84						
Mass of v	water (g)	1.12						
Mass of t	tare (g)	40.31						
Mass of o	dry soil (g)	6.53						
Water co	ontent (%)	17.15						
Liquid	Limit Determinatio	n:						
Number o	of Blows	23	30					
Tare #		418	229					
Mass of v	wet sample + tare (g)	69.85	72.49					
Mass of c	dry sample + tare (g)	62.01	64.58					
Mass of v	water (g)	7.84	7.91					
Mass of t	tare (g)	33.57	34.92					
Mass of c	dry soil (g)	28.44	29.66					
Water co	ontent (%)	27.57	26.67					
Correctio	n factor	0.990	1.022					
Corrected	d Limit	27.29	27.26					
	,							
					Plastic Lim	it:	17	
					Liquid Limi	t:	27	
(%)					Plasticity Ir	ndex:	10	
tent								
Con								
ater								
5								
· ·								
	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents: CL							
					F	Reviewed b	y:	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
							A-HA	email=Dave_McDonald@Golder.com, c=CA

Atterberg Limi Determination	ts 1	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	2	100
Associates		Tested By:	HVD		Date:	25-Ma	y-11
Borehole: GA11-T-16 Sam	ple #	: SA	03			Depth:	7.5-9'
Plastic Limit Determination:						I	
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Liquid Limit Determination:				1		1	
Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							
		<sup>_</sup>					
				Plastic Lim	iit:	0	
				Liquid Limi	it:	0	
(%)				Plasticity Ir	ndex:	0	
ate							
S							
10 15 20		25 30	35 40				
Number of Blows							
Comments: Non-plastic							
						1	Digitally signed by Dave
						LAA J	DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.30.16:20:37.46500'
					Reviewed b	y:	

Atterberg Limits Determination	Project #: Short Title:	09-1427-0 Giant Min	)006 e	Phase:		2100
Golder						
Associates	Tested By:	HVD		Date:	2-Jı	ın-11
Borehole: GA11-T-16 Sample	e#: SA	46			Depth:	15-16'
Plastic Limit Determination:						
Tare # PG-06						
Mass of wet sample + tare (g) 33.20						
Mass of dry sample + tare (g) 32.78						
Mass of water (g) 0.42						
Mass of tare (g) 31.06						
Mass of dry soil (g) 1.72						
Water content (%) 24.42						
Liquid Limit Determination:						
Number of Blows 26	26					
Tare # 217	253					
Mass of wet sample + tare (g) 54.01	51.61					
Mass of dry sample + tare (g) 50.33	48.33					
Mass of water (g) 3.68	3.28					
Mass of tare (g) 35.27	35.08					
Mass of dry soil (g) 15.06	13.25					
Water content (%) 24.44	24.75					
Correction factor 1.005	1.005					
Corrected Limit 24.56	24.88					
	I					- I
			Plastic Lim	nit:	24	
			Liguid Limi	it:	25	
			Plasticity Ir	ndex.	0	
ut (%			r laouoity ii		0	
Mat Aat						
	25 30	35 40				
	20 00	JU TU				
Number of Blows						
Comments:						
					1.1.1	Digitally signed by Dave DN: cn-Dave, o-Golder Associates Ltd, ou-M-Conald,
				Reviewed b	y:	Comate-Dave_McDonald@Golder.com, c=CA Dave-3011.06.06.09.08.24 - 06007

	Attert Dete	perg Limits rmination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	21	00
E	F Golder Associa	r <b>ites</b>	Tested By:	HVD		Date:	2-Jun	-11
Borehole	: GA11-T-16	Sample #	#: SA	.8			Depth:	
Plastic L	imit Determinatio.	n:						
Tare #								
Mass of we	et sample + tare (g)							
Mass of dry	y sample + tare (g)							
Mass of wa	ater (g)							
Mass of tar	re (g)							
Mass of dry	y soil (g)							
Water cont	ent (%)							
Liquid L	imit Determinatio	n:						
Number of	Blows							
Tare #								
Mass of we	et sample + tare (g)							
Mass of dry	y sample + tare (g)							
Mass of wa	ater (g)							
Mass of tar	re (g)							
Mass of dry	y soil (g)							
Water cont	ent (%)							
Correction	factor							
Corrected L	_imit							
Mumber of Blows					Plastic Lin Liquid Lim Plasticity I	nit: it: ndex:	0 0	
Commen	Comments: <u>Non plastic</u>					Reviewed by		Digitally Upped by Dow           Dir Co-Daw, s-Colder Associates           Litt, c-Judboald, Litt, c-Judboald, -CC-C           Dir Co-Daw, S-Colder Associates           Dir Co-Daw, S-Colder Associates

	A	tterberg Li	mits	Project #:	09-1427-0	0006	Phase:	2	500
		Determinat	ion	Short Title	: Giant Min	е			
<b>S</b>		dor							
	ZASSO	ciates		Tested Div			Data	7	44
Daraha				Tested By:			Date:	/-Jun	-11
Plastic	Limit Determi	nation:	ample #	F: 5.	ATU			Depth:	20-20
Tare #									
Mass of v	wet sample + tare (	a)							
Mass of o	dry sample + tare (	g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determin	nation:							
Number	of Blows								
Tare #									
Mass of v	wet sample + tare (	g)							
Mass of o	dry sample + tare (g	g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Correcte	d Limit								
	·								
						Plastic Lir	nit:	0	
						Liquid Lim	nit:	0	
(%)						Plasticity	Index:	0	
Itent									
Cor									
Vater									
	10	15							
	IU	10	20	20 30	ა <del>ა</del> 40				
Number of Blows									
Comments: Non plastic									
								1.1	Digitally signed by Dave DN: cn-Dave, o-Golder Associates Ltd.,
							Reviewed b	<i>I</i> AA y:	ou-McDonald, 
<b></b>								<i>.</i>	

	Atte	rberg Limits	Project #:	09-1427-0	0006	Phase:	2	500
	Det	termination	Short Title:	Giant Min	е			
<b>S</b>								
	Associ	ates	TUID			D. (	7 .	44
Dereha		Complex	Tested By:	HVD		Date:	/-Jun	-11
Plastic	Limit Determinat	ion:	#: 5A				Depth:	30-30
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (g)							
Mass of o	dry soil (g)							
Water co	ntent (%)							
Liquid	Limit Determinat	ion:						
Number	of Blows							
Tare #								
Mass of v	wet sample + tare (g)							
Mass of o	dry sample + tare (g)							
Mass of v	water (g)							
Mass of t	are (g)							
Mass of o	dry soil (g)							
Water co	ntent (%)							
Correctio	n factor							
Corrected	d Limit							
				<del>, , , , , ,</del>				
					Plastic Lir	nit:	0	
					Liquid Lim	nit:	0	
(%)					Plasticity	ndex:	0	
Itent								
L Col								
Nate								
-								
		5 20	25 20	25 40				
		5 20	20 30	35 40				
Number of Blows								
Comments: Non plastic								
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
				Reviewed by	AAL	ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date=2011.06.09.10.12755_06/00'		
<u> </u>							y •	

	Atte De	rberg Limits termination	Project #: Short Title:	09-1427-0 Giant Min	0006 e	Phase:	2	2100
E	Associ	er ates	Tested By:	HVD		Date:	10-M	ay-11
Borehol	e: GA11-T-1	7 Sample #	#: SA	\5			Depth:	12.5-14'
Plastic	Limit Determina	tion:						
Tare #								
Mass of w	et sample + tare (g)							
Mass of d	ry sample + tare (g)							
Mass of w	vater (g)							
Mass of ta	are (g)							
Mass of d	ry soil (g)							
Water cor	itent (%)							
Liquid I	Limit Determinat	ion:						
Number o	f Blows							
Tare #								
Mass of w	vet sample + tare (g)							
Mass of d	ry sample + tare (g)							
Mass of w	vater (g)							
Mass of ta	are (g)							
Mass of d	ry soil (g)							
Water con	itent (%)							
Correction	factor							
Corrected	Limit							
					Plastic Lim	nit:	0	
					Liauid Limi	it:	0	
()					Plasticity Ir	ndex:	0	
nt (%							·	
onte								
ter C								
A at								
-								
-								
║ ┤	10	5 20	25 30	35 40				
	Number	of Blows						
Comments: Non-plastic								
								Digitally signed by Dave
						Doview	- AAL-	ore cire-core of velociter Associates Ltd., org-McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.13:54:5106:00'
						Reviewed b	y:	

	A	tterberg	Limits	Project #:	09-1427-0	0006	Phase:	2	100
		Determin	nation	Short Title	Giant Min	е			
Ê		Tor							
	ASSO	ciate	2						
Danaha		. 47	<b>S</b> ome a la d	Tested By	LM		Date:	8-May	y-11
Boreno	GA11-1	-1/	Sample #	7:	9			Deptn:	22.5-24
Toro #									
Mass of y	wet sample + tare (	a)							
Mass of o	drv sample + tare (c	a)							
Mass of v	water (q)	57							
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Liquid	Limit Determir	nation:							
Number	of Blows								
Tare #									
Mass of v	wet sample + tare (	g)							
Mass of o	dry sample + tare (g	g)							
Mass of v	water (g)								
Mass of t	tare (g)								
Mass of o	dry soil (g)								
Water co	ontent (%)								
Correctio	on factor								
Correcte	d Limit								
	· · · · ·								
						Plastic Lin	nit:	0	
						Liquid Lim	nit:	0	
t (%)						Plasticity I	ndex:	0	
ntent									
r Co									
Wate									
	10	15	20	25 30	35 40				
	Num	har of Playe							
	Nulli	Del OI DIOWS	•						
Comme	ents: <u>Non-plas</u>	tic							
									Digitally signed by Dave DN: cn:Dave, o=Golder Associates Ltd.,
							Reviewed by	A_A/ y:	ou=McDonald, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.11.14:36:56:-06/00'
<b></b>								,	

Determination         Short Title:         Giant Mine           Tested By:         DM         Date:         29-Apr-11           Bornhole:         GA11-Ti-17         Sample # ::         10A         Depth::         25-26'           Plastic Limit Determination:         Tare #         PG15         Image: PG16	Atterb	erg Limits	Project #:	09-1427-0	0006	Phase:	21	100
Line         Tested By:         Dm         Date:         29-Apr-11           Borehole:         GA11-T-17         Sample # :         10A         Depth:         25-26'           Flatic Linit Determination:         Image: Arrowski aample + tare (a)         47.95         Image: Arrowski aample + tare (a)         47.95           Mass of vasample + tare (a)         47.95         Image: Arrowski aample + tare (a)         44.67         Image: Arrowski aample + tare (a)         43.28           Mass of vasample + tare (a)         30.57         Image: Arrowski aample + tare (a)         32.26         Image: Arrowski aample + tare (a)         44.67           Mass of vasample + tare (a)         30.57         Image: Arrowski aample + tare (a)         55.76         66.42         Image: Arrowski aample + tare (a)         65.76         1mage: Arrowski aample + tare (a)         65.76         1mage: Arrowski aample + tare (a)         1mage: Arrowski aample + tare (a)         1mage: Arrowski aample + tare (a) </td <td>Dete</td> <td>rmination</td> <td>Short Title:</td> <td>Giant Min</td> <td>е</td> <td></td> <td></td> <td></td>	Dete	rmination	Short Title:	Giant Min	е			
Tested By:         DM         Date:         29-Apr-11           Borehole:         GA11-T-17         Sample #:         10A         Depth:         25-26'           Plastic Limit Determination:         Tran #         PG15         Image: PG15								
Chapter Contracts         Tested By:         DM         Date:         29-Apr-11           Borehole:         GA11-T-17         Sample # :         10A         Depth:         25-26'           Plastic Limit Determination:         Tare #         PG15	<b>Golde</b>	100						
Borchole:     GA11-17     Sample #:     10A     Depth:     25-26'       Plastic Limit Determination:     Tare #     PG15			Tested By:	DM		Date:	29-Ap	r-11
Plastic Limit Determination:       PG15       Image: Constraint of the second s	Borehole: GA11-T-17	Sample	#: 10	A			Depth:	25-26'
Tare #       PC115         Mess of wet sample + tare (g)       44.67         Mess of value (g)       3.28         Mess of value (g)       3.28         Mess of value (g)       30.57         Mess of value (g)       30.57         Mess of value (g)       30.57         Mess of value (g)       14.10         Water content (%)       23.26         Liquid Limit Determination:	Plastic Limit Determinatio	n:						
Mass of wet sample + tare (g)       47.95         Mass of dry sample + tare (g)       3.28         Mass of tare (g)       3.28         Mass of tare (g)       3.28         Mass of tare (g)       30.57         Mass of tare (g)       32.26         Liquid Limit Determination:         Number of Blows       15         Tare #       23.26         Mass of wet sample + tare (g)       65.76         66.42	Tare #	PG15						
Mass of dry sample + tare (g)       44.67         Mass of vater (g)       30.57         Mass of vater (g)       30.57         Mass of vater (g)       30.57         Mass of vater (g)       23.26         Liquid Limit Determination:	Mass of wet sample + tare (g)	47.95						
Mass of vater (g)       3.28	Mass of dry sample + tare (g)	44.67						
Mass of tare (g)       30.57	Mass of water (g)	3.28						
Mass of dry soil (g)       14.10         Water content (%)       23.26         Liquid Limit Determination:         Number of Blows       15         Tare #       23.3         417A         Mass of wet sample + tare (g)       65.76         66.42         Mass of vet sample + tare (g)       59.60         Mass of vetare (g)       6.16         Mass of vetare (g)       34.57         Mass of vetare (g)       34.57         Mass of vetare (g)       24.61         Vetar content (%)       Vetar content (%)         Vetar content (%)       Vetar content (%)         Vetar content (%)       Vetar content (%)         Vetar content (%)       Vetar content (%) <tr< td=""><td>Mass of tare (g)</td><td>30.57</td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>	Mass of tare (g)	30.57						
Water content (%)         23.26           Liquid Limit Determination:         Image: Content (%)         15         15           Number of Blows         15         15         Image: Content (%)         Image: Content (%)           Tare #         233         417A         Image: Content (%)	Mass of dry soil (g)	14.10						
Liquid Limit Determination:         Number of Blows       15       15       15       15         Tare #       233       417A       1       1       1         Mass of wet sample + tare (g)       65.76       66.42       1       1       1         Mass of dry sample + tare (g)       69.60       59.95       1       1       1         Mass of tare (g)       6.16       6.47       1       1       1       1         Mass of tare (g)       6.16       6.47       1       1       1       1       1         Mass of tare (g)       34.57       34.39       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	Water content (%)	23.26						
Number of Blows       15       15       15         Tare #       233       417A	Liquid Limit Determination	n:						
Tare #       233       417A	Number of Blows	15	15					
Mass of wet sample + tare (g)       65.76       66.42         Mass of dry sample + tare (g)       59.60       59.95         Mass of water (g)       6.16       6.47         Mass of tare (g)       34.57       34.39         Mass of dry soil (g)       25.03       25.56         Water content (%)       24.61       25.31         Corrected Limit       23.09       23.75         Image: target targe	Tare #	233	417A					
Mass of dry sample + tare (g)       59.60       59.95	Mass of wet sample + tare (g)	65.76	66.42					
Mass of water (g)       6.16       6.47	Mass of dry sample + tare (g)	59.60	59.95					
Mass of tare (g)       34.57       34.39	Mass of water (g)	6.16	6.47					
Mass of dry soil (g)       25.03       25.56       Image: Constraint of the system o	Mass of tare (g)	34.57	34.39					
Water content (%)       24.61       25.31       Image: Content (%)       Image: Content (%)         Corrected Limit       23.09       23.75       Image: Content (%)       Image: Conte	Mass of dry soil (g)	25.03	25.56					
Correction factor       1.066       1.066       1.066         Corrected Limit       23.09       23.75       Plastic Limit:       23         Image: Corrected Limit       Image: Corrected Limit <thimage: correc<="" td=""><td>Water content (%)</td><td>24.61</td><td>25.31</td><td></td><td></td><td></td><td></td><td></td></thimage:>	Water content (%)	24.61	25.31					
Corrected Limit       23.09       23.75         Image: Corrected Limit       Image: Corrected Limit<	Correction factor	1.066	1.066					
Image: Second	Corrected Limit	23.09	23.75					
Comments:								
Comments:					Plastic Lim	it:	23	
(%)       Image: Comments:       Image: Comme					Liquid Limi	t:	23	
Structure       Image: Comments:       Image:	Q				Plasticitv Ir	ndex:	0	
a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a       a	int (%							
O         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I         I	oute oute							
Image: Solution of Blows	et C							
Image: Comments:	× ×							
10         15         20         25         30         35         40           Number of Blows           Comments:								
Image: Number of Blows         Image: Number of Blows           Comments:								
Number of Blows           Comments:	10 15	20	25 30	35 40				
Comments:	Alima harrof	•						
Comments:	Number of	BIOWS						
	Comments:							
								,
							1 Hel	Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011.05.11.14/36:09.00101
Reviewed by:					F	Reviewed by	y:	

	Attert	berg Limits	Project #:	09-1427-0	0006	Phase:		2100
	Dete	rmination	Short Title:	Giant Min	е			
<b>S</b>								
	Associa	tes						
			Tested By:	DM		Date:	29-A	pr-11
Boreho	e: GA11-1-1/	Sample	#: 12	2			Depth:	37.5-39
Tare #	wat some $\pm tars (a)$	PG-09 41.60						
Mass of	drugemple + tare (g)	20.12						
Mass of C	ury sample + tare (g)	2.47						
Mass of V	water (g)	2.47						
Mass of t	tare (g)	31.08						
Mass of o	dry soil (g)	8.05						
Liquid	Limit Determination	30.00 n:						
Number	of Blows	15	15					
Tare #		402	421					
Mass of y	wet sample + tare (a)	67.82	72.54					
Mass of a	dry sample + tare (g)	59 47	62 45					
Mass of y	water (g)	8.35	10.09					
Mass of t	tare (g)	35.44	34 39					
Mass of a	drv soil (a)	24.03	28.06					
Water co	ontent (%)	34.75	35.96					
Correctio	on factor	1 066	1 066					
Corrected	d Limit	32.60	33.73					
						1		
					Plastic Lir	mit:	31	
					Liquid Lin	nit:	33	
(%					Plasticity	Index:	2	
ent (					-			
Cont								
ater								
>								
	10 15	20	25 30	35 40				
	Number of	Blows						
Comme	ents:							
								Digitally signed by Dave DN: cn=Dave, o=Golder Associates Ltd.,
						Reviewed h	V.	ou=McDonald, email=Dave_McDonald@Golder.com, c=CA Date: 2011 05 11 16:37:14-06/00'
						I VENIEMER D	у.	



# Consolidation

June 29, 2012 Project No. 09-1427-0006/2100 Doc. No. 058





# CONSOLIDATION - FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Project #	09-1427-00	006			Phase: 20	000
Short Title:	: AECOM / E	Engineering Services /	Giant Mine, NWT		T 11050. 2	
Tested By:	: D.B				Date: M	lay 4, 2011
Sample:	GA11-T-14	SA2, SA3 (mix toget	her)			
Tost Posu	ulter		Sample Data:			
Effective	Void	Hydraulic	Specific gravity:	2.85	(measured)	
Stress	Ratio	Conductivity	Diameter:	63.4	, mm	
(kPa)		(m/s)	Initial height:	27.2	mm	
4.6 15	0.68		Initial water content:	25.9	% (prior to satisfy $ka/m^3$ (prior to	aturation)
32	0.66	2.5E-08	Initial void ratio:	0.68	(prior to loadi	na)
64	0.65	2.3E-08	Final water content:	21.6	%	
126	0.64	2.3E-08	Final dry density:	1770	kg/m <sup>3</sup>	
251	0.62	2.3E-08	Comments:			
501 125	0.61	1.8E-08				
32	0.61					
8.9	0.61					
0.69						
-						
-						
0.67						
0.07					•	
-						
-						
0.65						
Itio						
d Ra					◆	
<b>&gt;</b> 0.63						
0.00						
-						
-						
0.61	<b>•</b>					
-						
-						
0.50						
1	1	0 100	1,000 10.000	1E-09	1F-08	1E-07 1E-06
-		Effective Stress (kPa	)	00 Н	ydraulic Conduc	tivity (m/s)

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.





# CONSOLIDATION - FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Project #	· 09-1427-00	006		Phase 2000
Short Title	e: AECOM / E	Engineering Services /	Giant Mine, NWT	11100. 2000
Tested By	y: D.B.			Date: May 26, 2011
Sample:	GA11-T-14	SA2, SA3 (Mix Toget	her)	
Tost Pos	ulter		Samplo Data:	
Effective	e Void	Hydraulic	Specific gravity:	2.85 (measured)
Stress	Ratio	Conductivity	Diameter:	63.6 mm
(kPa)		(m/s)	Initial height:	28.5 mm
2.3	1.16		Initial water content:	27.2 % (prior to saturation)
6.7	1.10	1.2E-05	Initial dry density:	1321 kg/m <sup>°</sup> (prior to loading)
10 20	1.05	2.9E-05 7.2E-08	Final water content:	
77	0.99	5.4E-08	Final dry density:	$1669  ext{ kg/m}^3$
156	0.89	1.5E-08	Comments:	1000
311	0.83	1.4E-08		
625	0.77	2.0E-08		
1251	0.71	1.6E-08		
311	0.69			
19	0.70			
10	0.7 1			
1.2	_			
	. 🗨 🔢			
-	.   N			
1.1				
	-			
-	-			
1.0				
-				
tio	-			
0.9 <b>Sa</b>				
Voic				
-	- -			
0.8				
	-			
-	-			
0.7				
-				
	·			
0.6				
1	1	0 100	1,000 10,000	1E-09 1E-08 1E-07 1E-06 1E-05 1E-04
		Effective Stress (kPa	)	Hydraulic Conductivity (m/s)

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.





# Hydrometers

June 29, 2012 Project No. 09-1427-0006/2100 Doc. No. 058





Proje Short Clien	ct #: t Title: t:	09- GA AE	-1427-0 JNT M COM	0006 INE	6						F	Pha Date	se: e Sar	nple	21 ed:	00 April	4, 2	011	Repor	t Nurr	nber:	A26	15
Samp Samp	ole Nun ole Loca	nber ation		GA GIA	11-T	-01, S MINE	SA1							G	rada (	ntion mm)	Size		Perce Passi	ent ng	$\left  \right $		
Samp	oled By	,		0.0										F									
Souro Samp	ce ble Des	cription		INS See	SITU e Boi	rehole	Log	S														eve	
In situ Date Teste Rema	u Water Tested ed By arks:	r Conter I	nt	10.0 Tue RB	6 esdaj	y, May	y 10,	201	11						( ( ( ( ( ( ( ( ( ( ( ()))))))))))))))	1.25 0.6 0.32 0.16 0.080 0.046 0.033			100. 99.9 98.6 84.7 42.7 24.0 20.0	0 ) )   )		Ie lei	
Distri	bution															0.022 0.013 0.009 0.006 0.003 0.001			16.9 13.7 10.9 9.1 7.7 6.1	5		nyarome	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0			100				10									0.1		•	0.01			0.001
											Gra	in S	Size (r	nm)									
		Boulders	s Cob	bles	(	G Coarse	iravel	Fine	1	Co	arse		Mediu	San um	nd	Fine				Silt			Clay
		Grave	%		0.0	)	Sa	and	%			61.	1	Si <b>Re</b>	lt% viev	ved B	32 y:	2.3	IAL	Clay	Digitally sign DN: cn=Dave ou=McDona email=Dave, Date: 2011.0	6.6 eed by Dave e, o=Golder A ld, McDonald@4 5.12 11:52:11	ssociates Ltd., Golder.com, c=CA -06'00'

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Proje Short Clien	ct #: : Title: t:	09-1 GAI AEC	1427-0006 NT MINE COM				Phase: Date San	2 <sup>.</sup> npled:	100 April 4, 20	Report Num	ber: A26	615
Samp Samp	ole Nur ole Loc	nber ation	GA1 GIAI	1-T-01, S NT MINE	A3			Grad	ation Size (mm)	Percent Passing		
Samp	oled By	,	0.0									
Sourc Samp	ce ble Des	scription	INSI See	TU Borehole	Logs						lieve	
In situ Date Teste Rema	u Wate Tested ed By arks:	r Conten I	t 28.4 Tue: RB	sday, May	<sup>7</sup> 10, 2011				0.32 0.16 0.080 0.037 0.027	100.0 99.8 98.4 94.9 87.1	er S	
Distri	bution								0.018 0.011 0.008 0.006 0.003 0.001	74.6 58.9 44.9 29.2 18.8 13.1	Hydromet	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0		100		10				0.1	0.01		0.001
						G	rain Size (m	ım)				
		Boulders	Cobbles	Gi	Fine	Coarse	Mediu	Sand m	Fine	Silt		Clay
		Gravel	%	0.0	Sand %		2.1	Silt% Reviev	82.8 wed By: _	8 Clay9	6 15. igitally signed by Dave k: cn=Dave, oeGolder u=McDonald, mail=Dave, McDonald( ate: 2011.05.12 11:50:5	2 Associates Ltd., 3Golder.com, c=CA 7-0600'

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Project Short T Client:	#: ītle:	0: G A	9-14 AIN ECC	27-00 T MIN M	006 IE	;								Pha Dat	ise: e S	am	nple	21 d:	00 Apr	il 4,	201	R(	eport	Nu	mbe	er: A	261	5	
Sample Sample	e Num e Loca	ber ation		0	SA SIA	11-1 NT	<sup>-</sup> -01, Mine	SA5	5								Gr	ada (	ition mm)	) Siz	e	P P	erce assi	nt ng			1		
Sample	ed By			0	0.0																								
Source Sample	e Deso	criptio	n	ll S	NS See	iTU e Bo	rehol	e Lo	ogs																	eve			
In situ V Date Te Tested Remark	Water ested By ks:	Conte	ent	2 T F	27.4 Tue RB	4 esda	y, Ma	ay 1	0, 2	201	1								1.25 0.6 0.32 0.16 0.080 0.046	)			100. 99.8 99.6 99.1 75.3 46.9 36.4	0 3 5 		ter Si	-		
Distribu	ution																		).022 ).013 ).009 ).006 ).003	2 3 9 3 3			28.8 22.8 18.3 17.0 13.1 11.3	3 3 3 ) 1 3		Hydrome			
01 9 7 6 6 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9	200 200 300 700 500 400 300 200 1000			10					10				Gr	ain	1 Size		m)			0.1				0.0	•••			0.0	001
		Boulde	ers	Cobble	es		Coarse	e Grav	ei F	ine		Co	arse		Ме	diu	San m	d	Fine					Silt				Clay	
		Grav	el %			0.0	)		Sar	nd '	%			29	.7		Sil <sup>:</sup> Rev	t% ⁄iew	/ed	5 By:	i8.4 	Ą	LAL	Clay	Digita DN: cr ou=M email Date:	1 Ily signed by =Dave, o=G cDonald, EDave_MCDc 2011.05.12 1	<b>1.9</b> Dave Older Associ mald@Gold( 1:47:54 -06'0	ates Ltd., er.com, c=CA 0'	

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Project #: Short Title: Client:	09-1427 GAINT I AECOM	-0006 MINE				Phase: Date Sa	mpled	2100 : April 4, 2	Repor	rt Number	: A261	5
Sample Numl Sample Loca	ber tion	GA1 GIA	1-T-01, S NT MINE	SA7			Gra	dation Size (mm)	Perc Pass	ent ing		
Sampled By Source Sample Desc	ription	0.0 INS See	TU Borehole	Logs							leve	
In situ Water Date Tested Tested By Remarks:	Content	34.4 Tue RB	sday, May	y 10, 2011				0.16 0.080 0.035 0.026	100 99. 97. 93.	.0 8 7 4	ter S	
Distribution								0.017 0.011 0.008 0.006 0.003 0.001	86. 70. 58. 47. 27. 15.	4 3 7 3 2 5	Hydrome	
000 90 00 00 00 00 00 00 00 00 00 00 00		100								0.01		0.001
	Boulders Co	obbles	G	iravel	G	rain Size (	<b>mm)</b> Sand			Silt		Clay
	Gravel %		0.0	Fine Sand %	Coarse	0.5	ium   Silt% Revie	Fine 6 79 ewed By:	9.6 J-44	Clay% Digitally si Dit on Do out-MCOr email=Day Date: 2011	19.9 gred by Dave we, o=Golder Assoc nald, we, McDonald@Gold .05.12 11:33:33 -06'	jates Ltd., Jer.com, c=CA '00'

#300 10525 170th Street, Edmonton Alberta T5P 4W2



Proje Shor Clien	ect #: t Title: it:	() () ()	9-1 Gair Aec	427-0 NT M OM	0006 INE	;					F	Phase Date \$	e: Sarr	nple	21( ed:	)0 April 4	4, 20	F )11	Repo	ort Nu	imbe	er: A2	2615
Sam Sam	ple Nun ple Loc	nber ation			GA <sup>2</sup> GIA	11-T .NT	-01, S MINE	SA9						G	rada (r	tion \$ nm)	Size		Perc Pass	cent sing			1
Sam	pled By	,			0.0																		
Sour Sam	ce ple Des	criptic	n		INS See	ITU e Bo	rehole	e Log	S													eve	
In sit Date Teste Rema	u Wate Tested ed By arks:	r Cont	ent		23.0 Tue RB	) esda	y, Ma	y 10,	201	1					1 0 0 0.	.25 0.6 0.32 0.16 080 042			100 99 99 99 89 57	0.0 0.8 0.7 0.5 0.6 7.7		er	
Distri	ibution														0. 0. 0. 0. 0. 0.	032 021 013 009 006 003 001			44 33 20 19 15 11	.4 5.7 5.6 5.3 .6 5.2		Hydromet <sub>(</sub>	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000				100				10								0.1			0.	01		0.001
								Pravel			Gra	in Siz	e (m	m)									
		Bould	ers	Cobl	bles	(	Coarse		Fine		Coarse	M	ediu	san m		Fine				Silt			Clay
		Grav	/el 9	6		0.0	)	Si	and '	%		15.5		Sil Rev	t% view	ed By	73. <b>y:</b>	8	1	Cla 44	ıy%	10 Digitally sign DN: cn=Dave ou=McDonale C=CA Date: 2011.05	10 Dave o-Golder Associates Ltd., d, email=Dave_McDonald@Golder. .12 11:32:34-06'00'

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Proje Short Clien	ect #: t Title: t:	09- GAI AE(	1427-0 INT MI COM	0006 INE	6					PI Di	hase ate S	: Sam	2 pled:	2100 : April	4, 20	R 11	eport I	Numb	er: A2	2615
Samı Samı	ple Nun ple Loca	nber ation		GA GIA	11-T	-01, S MINE	SA11						Grad	dation (mm)	Size	P P	ercen assin	t g		1
Sam	pled By			0.0																
Sour Samj	ce ple Des	cription		INS See	SITU e Boi	rehole	Logs												ieve	
In site Date Teste Rema	u Wateı Tested ed By arks:	r Conten	t	23. Tue RB	6 esda <u>y</u>	y, May	y 10, 2	2011						0.16 0.080 0.043 0.032			100.0 91.1 61.1 45.7		ter S	-
Distri	bution													0.021 0.013 0.009 0.006 0.003 0.001			33.4 24.2 19.5 16.4 12.4 9.8		Hydrome	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000			100			10			Grai	1 n Size	e (mi	m)		0.1			0.01		0.001
		Boulders	Cobl	oles		G	iravel			araa	Ma	, ,	Sand	Eino			S	Silt		Clay
		Gravel	%		0.0	Juarse	Sar	nd %	)	<u>1</u>	3.8		Silt%	ewed E	75.: 3 <b>y</b> :	5	c	Clay%	10 itally signed by Oo : cn=Dave, o=Coo McDonald, ail=Dave_McDona e: 2011.05.12 11:5	ve Jer Associates Ltd., HigleGolder.com, c=CA 4:34-0600'

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Proje Shor Clier	ect #: t Title: nt:	09 G. Al	)-14 AIN EC(	427-00 IT MIN OM	006 NE	6					F	<sup>o</sup> ha Dat	ase: re S	am	nplea	210 d: /	)0 April	4. 20	)11	Rep	ort N	lum	oer:	A26	515	
Sam Sam	ple Nun ple Loca	nber ation		(	GA GI/	11-1 ANT	Г-01, MINE	SA1	3					-	Gra	adat (n	ion ( nm)	Size		Per Pas	cent sing	: 				
Sam	pled By			(	0.0																					
Sour Sam	ce ple Des	criptior	ו		NS See	SITU e Bo	rehol	e Lo	gs															anal		
In sit Date Teste Rem	u Water Tested ed By arks:	r Conte	ent	2 T	25. Fue RB	7 esda	iy, Ma	ay 1(	), 20	11						0 0. 0. 0.	.16 080 038 028			10 98 92 84	00.0 8.4 2.7 4.8					
Distr	ibution															0. 0. 0. 0. 0.	018 011 008 006 003 001			75 50 40 3 25 15	5.3 6.3 6.7 7.5 3.3 5.6					
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Boulde	rs	1 Cobbl	00 es		Coarse	Grave	10 Fine		Gra	ain	1 Size	(m	m)		Fine	0.1			S	0.01			0.0 Clay	)             
		Grave	əl %	6		0.(	D	\$	Sand	%		2.	4	ļ	Silt <b>Rev</b>	% view	ed B	79. y:	.2	J-H	c	lay%	gitally sign N: cn=Dave I=McDona nail=Dave, ate: 2011.0	<b>18.4</b> ed by Dave , o=Golder A d, McDonald@ 5.12 11:53:46	t ssociates Ltd., Golder.com, c=CA -06'00'	
																										<u> </u>

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Proje Short Client	ct #: t Title: t:	09-1 GAI AEC	1427-0006 NT MINE COM				Phase: Date Sam	21 npled:	00 April 4, 20	Report Nu	ort Number: A2615					
Samp	ole Nur ple Loc	nber ation	GA1 GIAI	1-T-01, SANT MINE	A15			Grada (r	tion Size nm)	Percent Passing	]	1				
Samp	oled By	/	0.0													
Sourc Samp	ce ble Des	scription	INSI See	TU Borehole	Logs						ieve					
In situ Date Teste Rema	u Wate Testec ed By arks:	r Content	t 27.2 Tues RB	sday, May	10, 2011			 0 0 0	0.16 .080 .040 .030	100.0 93.7 80.6 68.3	ter S					
Distri	bution							0 0 0 0 0 0	.018 .012 .009 .006 .003 .001	54.2 43.2 33.8 29.1 18.3 12.1	Hydrome					
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0				10				0.1	0.	.01	0.001				
				1		Gr	ain Size (m	m)								
		Boulders	Cobbles	Gr Coarse	avel Fine	Coarse	Mediur	Sand m	Fine	Silt		Clay				
		Gravel	%	0.0	Sand %		8.3	Silt% <b>Review</b>	77. red By:	5 Cla	Digitally signed by Da Div cn=Dave, o=Gold ou=McDonald, email=Dave, McDona Date: 2011.05.12.11.52	.ve er Associates Ltd., de/Golder.com, c=CA :49-06'00'				

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Proje Short Client	ct #: Title: t:	0 0 4	09-1427-0006 GAINT MINE AECOM											Phase: 2100 Report Number: A2 Date Sampled: April 4, 2011											: A2	615			
Samp Samp	ole Nun ole Loca	nber ation			GA GI/	.11- <sup>-</sup> \NT	Г-02, MINI	SA5									Gra	adat (n	tion nm)	Siz	е	F	Per Pas	cent sing	t J	]			
Samp	oled By				0.0																╈								
SourceINSITUSample DescriptionSee Borehole Logs																								eve					
In situ Water Content 2 Date Tested 7 Tested By F Remarks:						21.0 Tuesday, May 10, 2011 RB										•	1.25 0.6 0.32 0.16 0.080 0.041 0.031					100.0 99.8 99.6 97.9 91.0 75.1 62.9					ter Si		
Distril	bution															•		0. 0. 0. 0.	020 012 009 006 003				49 39 30 20 10	9.1 5.4 0.8 3.4 6.3			Hydrome		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Bould	ers /el 9	Cobb	100	0.1	Coarse	Grave	10 Fi	ine	%	Coa	Gra	• iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	1 Med		n) Sand	• • • • •	Fine	0.1	5.0			s	0.01		13.	C	• 0.001
																F	Rev	iew	ed E	By:	_	ł	L-h	42		Digitally sig DN: cn=Da Du=McDor email=Dav Date: 2011	gned by Davi ve, o=Golder iald, e_McDonald .05.12 11:31:	Associates Ltd @Golder.com, i i0 -06'00'	1., c=CA

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Proje Short Clien	ect #: t Title: t <sup>.</sup>	09- GA	1427-000 INT MINE COM	6			Phase: Date San	2 noled:	100 April 4 - 20	Report Numl	oer: A261	5	
Samp	ole Num	nber	G/ GI	11-T-02 אחד MIN	, SA7			Grad	lation Size (mm)	Percent Passing			
Samp	oled By		0.0	)	۷ <b>۲</b>								
Sourc Samp	ce ole Des	cription	IN Se	SITU e Boreho	ole Logs						eve		
In situ Date Teste Rema	u Water Tested ed By arks:	r Conten	it 32 Tu RE	.0 esday, M 3	1ay 10, 2011				0.6 0.32 0.16 0.080 0.037	100.0 99.6 98.9 96.4 94.9	S.		
Distri	bution								0.027 0.018 0.011 0.008 0.006	87.4 76.8 67.8 51.3 40.8	/dromete		
	100 -								0.003	22.0 14.3	Ŧ		
Percent Finer Than	90       80       70       60       50       40       30       20       10       0												
	1000	)	100		10	Gr	1 ain Size (m	um)	0.1	0.01		0.001	
		Boulders	Cobbles	Coar	Gravel se Fine	Coarse	Mediu	Sand m	Fine	Silt		Clay	
	Gravel % 0.0 Sand % 3.8 Silt% 79.0 Clay%												

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Projec Short Client	ct #: Title: t:	09- GAI AEC	1427-0006 NT MINE COM				Phase: Date Sar	2 npled:	100 April 4, 20	Report Num	ber: A20	315
Samp Samp	ole Nur ole Loc	nber ation	GA1 GIA	1-T-02, S NT MINE	A9		Grad	ation Size (mm)	Percent Passing			
Samp	oled By	/	0.0								1	
Sourc Samp	ce ble Des	scription	INSI See	ITU Borehole	Logs						ieve	
In situ Date Teste Rema	u Wate Tested ed By arks:	r Conten I	t 29.0 Tue: RB	) sday, May	10, 2011				0.32 0.16 0.080 0.042 0.032	100.0 98.6 86.0 69.0 56.5	ter	
Distrit	bution								0.021 0.012 0.009 0.006 0.003 0.001	45.5 36.1 28.3 23.9 16.7 12.3	Hydrome	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0		100		10	G	1 rain Size (n	• • • • • • • • • • • • • • • • • • •	0.1	0.01		0.001
		Boulders	Cobbles	Gi	ravel Fine	Coarse	Mediu	Sand	Fine	Silt		Clay
		Gravel	%	0.0	Sand %		16.7	Silt% <b>Revie</b>	69. wed By:	5 Clay	% 13. Digitally signed by Dave DN: cn=Dave, o=Golder ou=McDonald, email=Dave, McDonald, Date: 2011.05.12 11:29.4	8 Associates Ltd., ©Golder.com, c=CA 3-06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2



Projec Short Client	ct #: Title: t:	09 G/ AE	09-1427-0006 GAINT MINE AECOM										Phase:   2100   Report Numb     Date Sampled:   April 4, 2011										er: A	261	5	
Samp Samp	ole Num ole Loca	nber ation		GA GIA	11-T- NT I	-02, S MINE	A11							G	Grad	latio (mr	on S n)	ize	F	Perce Passi	ent ng			1		
Samp	led By			0.0										E												
Source INS Sample Description See						ehole	Log	8															ieve			
In situ Water Content 22 Date Tested Tu Tested By RE Remarks:					22.0 Tuesday, May 10, 2011 RB										0.6 0.32 0.16 0.080 0.046 0.033					100.0 99.8 90.2 56.0 39.6 35.6						
Distrit	bution															0.0 0.0 0.0 0.0 0.0 0.0	21 13 09 06 03 01			30.4 23.8 20.7 17.7 12.7 10.7	4 3 1 7 7 1		Hydromet			
Percent Finer Than	100       90       80       70       60       50       40       30       20       10       0			100																		•				01
	1000	[		100				0			Gra	in S	ize (	mm)	)						0.0				0.00	01
	Boulders Cobb				bles Gravel						rse		Medi	Sa um	ind	Fi	ne				Silt				Clay	
	Gravel % 0.0 Sand % 46.9 Silt% 42.1 Cla Reviewed By:												Clay	Digital DN: cn ou=Mc email= Date: 2	11.0 Digitally signed by Dave DN: cn-Dave, o-Golder Associates Ltd, uMcDonal, email=Dave, McDonald@Golder.com, c=CA Date: 2011.05.12 11:28:49-06:00'											

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Project #: Short Title: Client:	09-1 Giar AFC	427-0006 nt Mine COM Canac	da		P	'hase: late Sam	2100	Report Num	ber: A26	15
Sample Num Sample Loca	nber ation	SA3 GA1	1-T-08				Gradation Size (mm)	Percent Passing		
Sampled By		JB								
Source Sample Dese	cription	Insitu See	u bore logs				10 5 2.0	100.0 98.5 95.7	eve	
In situ Water Date Tested Tested By Remarks:	<sup>-</sup> Content	27.1 Frida HVD	ay, May 27	r, 2011			1.25 0.6 0.32 0.16 0.080	94.4 93.4 92.5 90.8 82.9 56.6	S	
Distribution							0.031 0.020 0.012 0.009	49.0 42.9 30.7 26.2	rometer	
							0.006 0.003 0.001	20.1 13.0 10.7	Hyd	
100 90 80 70 60 40 40 20 10 10 0										
1000		100		10	0	1	0.1	0.01		0.001
	Boulders	Cobbles	Gra Coarse	Fine	Coarse	Mediur	Sand n Fine	Silt		Clay
	Gravel <sup>o</sup>	%	1.5	Sand %		19.8 I	Silt% 67 Reviewed By:	.1 Clay%	6 11.00 Ngitally signed by Dave N: cn=Dave, o=Golder A: u=McDonald mail=Dave, McDonald@( hate: 2011.06.03 15:03:34	5 sociates Ltd., Solder.com, c=CA -06'00'

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Project Short Ti Client:	#: itle:	09- Gia AE	-1427-0 ant Min COM 0	0006 e Cana	ada						Pł Da	nase ate \$	e: Sarr	nple	21( ed:	00		R	epor	t Nur	nbe	r: A2	615
Sample Sample	Num Loca	nber ation		SA5 GA	5 11-T-	-08								Gr	rada (r	tion nm)	Size	F	Perce Passi	ent ng	]		
Sample	d By			JB										E									
Source Sample	Des	cription		Insi See	tu e bore	e logs	i							E								ieve	
In situ V Date Te Tested Remark	Vater ested By ks:	<sup>-</sup> Conter	nt	22.4 Frid HVI	4 Iay, N D	/lay 2	7, 20	)11							0 0 0	0.6 ).32 ).16 .080 .038 .029			100. 99.9 97.7 76.7 43.7 36.4	0 9 7 7 7 7		er S	
Distribu	ition														0 0 0 0 0 0	.020 .012 .008 .006 .003 .001			27.0 21.7 18.7 13.9 9.0 5.7	5 1 7 9		Hydromet	
01 9 7 6 4 8 2 2 1																				<b></b>			
	1000			100			1	10			Grai	1 n Siz	e (m	ım)			0.1			0.0	1		0.00
		Boulders	s Cobl	oles	C	G Coarse	ravel	Fine		Coa	rse	М	ediu	, San m	d	Fine				Silt			Clay
		Grave	۱ %		0.0		Sa	and '	%		2	8.1		Sil Rev	t% view	ed B	65. y:	0	LAL	Clay	Digitally DN: cn= ou=McC email=C Date: 20	6.9 rsigned by Dav Dave, o=Golde Jonald, Jave_McDonald 111.06.03 15:14	e r Associates Ltd., d@Golder.com, c=CA 05-06'00'

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Projec Short Client	ct #: Title: t:	0: G A	9-14 iant EC(	427-0 t Mine OM C	000 ∋ ana	3 ada							Pha Date	ise: e Sa	amp	olec	210 1:	)0			Re	port	Num	ıbe	r: A2	2615	
Samp Samp	ole Nur ole Loc	nber ation			SA GA	7 11-1	-08									Gra	adat (n	tion nm)	Size		Pe Pa	rcer ssin	nt g	]			
Samp	oled By	,			JB										ŀ												
Sourc Samp	ce ble Des	scriptio	٦		Insi See	itu e bo	re log	js									2	5			1	00.0 99.9	1		ieve		
In situ Date Teste Rema	u Wate Tested ed By arks:	r Conte I	ent		21. Fric HV	5 day, D	May	27, 2	2011	1							1 ( 0 0. 0. 0.	.25 ).6 .32 .16 080 045 032				99.7 99.5 99.5 96.0 69.0 40.9 35.0			ter S		
Distril	bution																0. 0. 0. 0. 0.	021 012 009 006 003 001				27.7 23.2 18.5 14.1 9.9 9.7			Hydromet		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000			1					10			Gr	rain	1 Size	(mn	n)			0.1				0.01				0.001
		Boulde	ers	Cobb	les		Coarse	Grave	el Fir	ie	C	oarse		Med	S	and		Fine		-		:	Silt				Clay
		Grav	el %	6		0.(	)	S	Sano	d %	)		35.	.8	Ŗ	Silt <sup>e</sup>	% i <b>ew</b> (	ed B	54 y:	1.5	4	HL	Clay	Digitally DN: cn= ou=Mcf email=C Date: 20	9 Dave, o=Golo Dave, 0=Golo Dave_McDonald, 111.06.03 15:1	8 Ider Associates Id@Golder.cc 2:33 -06'00'	: Ltd., om, c=CA

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Project #: Short Title: Client:	09 Gia AE	-1427-0006 ant Mine COM Cana	da			Phase: Date Sam	2100 npled:	Report Numl	ber: A26	315
Sample Nu Sample Lo	umber cation	9A GA1	1-T-08				Gradation Size (mm)	Percent Passing		
Sampled B	Бу	0.0								
Source Sample De	escription	Insit See	u bore logs				5 2.0	100.0 99.7	ieve	
In situ Wat Date Teste Tested By Remarks:	er Contei d	nt 29.1 Frida HVD	ay, May 27, 2 )	011			1.25 0.6 0.32 0.16 0.080 0.031 0.024	99.6 99.6 99.5 99.4 95.0 61.6 53.5	S	
Distributior	ı						0.017 0.010 0.008 0.006 0.003 0.001	47.0 37.3 30.1 23.6 14.1 8.1	Hydromet	
100 90 08 00 00 40 40 30 20 10 0										
10	00	100		10	G	1 rain Size (m	0.1 m)	0.01		0.001
	Boulder	s Cobbles	Grave	Fine	Coarse	Mediur	Sand m Fine	Silt		Clay
	Grave	۱%	0.0 S	and %		9.1	Silt% 80 Reviewed By:	.5 Clay%	6 100.4 Ng tally signed by Dave Ng cn=Dave, o=Golder H u=McDonald, mail=Dave, McDonaldg hate: 2011.06.03 15:01:15	4 Associates Ltd., 'Golder.com, c=CA ;-06'00'

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Projec Short Client	ct #: Title: ::	09 Gi Al	)-142 iant N ECOI	7-0006 ⁄line M Cana	) ada						F	<sup>o</sup> has Date	e: San	nple	21 əd:	00		F	Repor	t Nui	mbe	er: A2	2615	
Samp Samp	le Nur le Loc	nber ation		SA: GA	3 11-T	-09								G	rada (	ntion mm)	Size		Perce Passi	ent ng			1	
Samp	led By	1		JB										E										
Sourc Samp	e le Des	scriptior	ı	Insi See	itu e bor	e logs	i															ieve		
In situ Date <sup>-</sup> Teste Rema	ı Wate Tested d By arks:	r Conte I	ent	21.: Tue TR	2 esday	y, Jun	e 07	7, 20	11							0.6 0.32 0.16 0.080 0.045 0.032			100. 100. 97.0 92.3 46.3 43.2	0 0 3 3 2	_	ter	-	
Distrik	oution														0 0 0 0 0 0	0.021 0.012 0.009 0.006 0.003 0.001			35.3 29.0 21. 18.0 11.0 11.0	3 D 1 D 3 6		Hydromet		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000			100		G	ravel	10			Gra	hin Si	1 lize (n	nm)	nd		0.1			0.0	)1			0.001
		Grave	el %		0.0	Coarse	s	Fine and	%	Co	arse	15.6	Mediu	m Si	lt%	Fine	72	.8		Clay	v%	11		lay
		2.47	. ,0		5.0		5							Re	view	ved E	sy:		I HA		Digita DN: cr ou=M email: Date:	lly signed by D ==Dave, o=Gole cDonald, =Dave_McDoni 2011.06.09 10:1	ive Jer Associates Li ild@Golder.com 0:13 -06'00'	:d., 1, c=CA

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Projec Short Client:	t #: Title:	C C A	9-1 Gian	427-( t Min OM (	0000 ie Can	3 ada							Pha Date	ise: e Sa	amp	olec	21( d:	00			Re	port	Num	ıbeı	r: A2	615	
Sampl Sampl	e Nun e Loc	nber ation			SA GA	5 .11- <sup>-</sup>	Г-09									Gra	ada (r	tion nm)	Size	è	Pe Pa	ercer ssin	nt g	]		1	
Sampl	ed By	,			JB										ł												
Source Sampl	e e Des	criptic	'n		Ins Se	itu e bo	re lo	gs																	ieve		
In situ Date T Testec Remar	Water ested By rks:	r Cont I	ent		26. Tue TR	8 esda	ay, Ju	ine 0	7, 2	011							0. 0. 0.	0.6 ).32 ).16 .080 .036				00.0 99.9 94.4 75.6 67.3 64.0			ter S		
Distrib	ution																0. 0. 0. 0.	.019 .012 .008 .006 .003 .001				47.3 33.7 27.0 22.7 12.7 8.9			Hydromet		
Percent Finer Than	00 90 80 70 60 50 40 30 20 10 0 1000				100				10			Gr	rain §	1 Size	(mn	n)			0.1				0.01				0.001
		Bould	ers	Cobl	bles		Coars	Grave	el Fir	ne	C	oarse		Mec	S lium	and		Fine		_			Silt				Clay
		Grav	vel %	%		0.	0	\$	Sano	d %			25.	.6	R	Silt <sup>o</sup> Revi	% iew	ed E	64 By:	4.1	1	HL (	Clay	Digitally DN: cn=[ ou=McD email=D. Date: 201	10 signed by Da Dave, o=Gold onald, ave_McDona 11.06.09 10.00	.3 ve er Associates Id@Golder.cr 3:52 -06'00'	i Ltd., om, c=CA

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Projec Short Client	:t #: Title: :	09- Gia AE	1427-0006 Int Mine COM Cana	ada			Phase: Date Sarr	2100 npled:		Report Num	ber: A26	\$15
Samp Samp	le Nun le Loca	nber ation	SA9 GA1	) 11-T-09				Gradation (mm)	Size	Percent Passing		
Samp	led By		JB									
Sourc Samp	e le Des	cription	Insi See	tu e bore logs				10 5 2.0		100.0 99.6 97.5	ieve	
In situ Date T Testeo Rema	Water Fested d By rks:	r Conten	t 20.9 Tue TR	9 esday, June	07, 2011			1.25 0.6 0.32 0.16 0.080 0.040 0.029		96.9 96.5 96.3 95.9 92.4 73.2 70.1	er	
Distrib	oution							0.018 0.018 0.008 0.008 0.003 0.003		67.0 51.9 42.6 33.0 17.6 12.4	Hydromet	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0		100		10				0.1	0.01		0.001
	1000				10	Gr	ain Size (m	m)	0.1	0.01		0.001
		Boulders	Cobbles	Gra	avel Fine	Coarse	Mediu	Sand m Fine		Silt		Clay
		Gravel	%	0.4	Sand %		10.0	Silt% Reviewed E	75.3 <b>3y:</b>	Clay%	6 14 Ng tally signed by Dave Ng cn=Dave, o=Golder A u=McDonald, mall=Dave_McDonald@ are: 2011.06.09 10.04.08	3 Issociates Ltd., KGolder.com, c=CA 3-06'00'

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Project #: Short Title: Client:	09- Gia AE(	1427-0 nt Mine COM C	000 e Cana	6 ada	l						[	⊃ha Date	ise: e Si	am	nplee	21) d:	00 Janu	Jary	0,	R( 1900	epor )	t Nu	ımb	er:	A26	615	
Sample Num Sample Loca	iber ation		SA GA	.10 .11-	·T-C	)9									Gra	ada (r	tion nm)	Siz	e	P P	erce assi	ent ing					
Sampled By			JB																╈								
Source Sample Desc	cription		Ins Se	itu e bo	ore	logs	i										10 5 2.0				100 98.9	.0 9 2			avai		
In situ Water Date Tested Tested By Remarks:	Conten	t	23. Tue HV	0 esd D	ay,	Мау	/ 31,	201	11							1 () () () () () () () () () () () () ()	0.6 0.32 0.16 .080 .040				98.0 97.4 97.0 95.0 86.0 72.4	0 4 0 8 8 4		3			
Distribution																0 0 0 0 0 0	.029 .019 .011 .008 .006 .003 .001				61. 48. 39. 32. 20. 13.	2 3 7 2 5 2 6		Undromot	uninen Lina		
Liner Than 100 90 80 70 60 50 40 30 20 10 0 1000		1						•			Gr	ain S	1 Size	(m	m)			0.1				0.	.01				0.001
	Boulders	Cobb	les		Co	G arse	ravel	Fine	•	Co	arse		Me	diui	Sanc m	1	Fine					Silt				С	Clay
	Gravel	%		1	.1		Sa	and	%			14.	.3		Silt <b>Rev</b>	% iew	ed E	6 3y:	8.5	4	44	Cla	Big Dig Dig Dig Dig Dig Dig Dig Dig Dig D	itally sign : cn=Dave =McDonal all=Dave _te: 2011.00	16. ed by Dave , o=Golder A d, McDonald@ 3.03 14:48:46	1 ssociates Lt Golder.com i-06'00'	d., , c=CA

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#300 10525 170th Street, Edmonton Alberta T5P 4W2





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Projec Short Client	ct #: Title: :	(	)9-1 Gian AEC	427-( t Min OM (	000 ie Can	6 iad	а						F	Pha Date	se: e Sa	mp	2 oled:	210	C			Rep	oort	Num	nbe	er: A	261	5	
Samp Samp	le Nun le Loc	nber ation			SA GA	\6 \11	1-T-	·10									Grad	dati (m	on \$ m)	Size		Pe Pa	rcer ssin	nt g	$\left.\right]$		- -		
Samp	led By	,			JB											þ													
Sourc Samp	e le Des	criptio	on		Ins Se	situ e t	ore	e log	s																	ieve			
In situ Date T Testeo Rema	Wate Tested d By rks:	r Con	tent		26 Tu TR	.4 eso	day	, Jui	ne O	7, 20	011							0.0 0.0 0.0 0.0	32 16 )80 )43 )32				00.0 99.0 38.6 55.4			ter S			
Distrib	oution																	0.0 0.0 0.0 0.0 0.0	)20 )12 )09 )06 )03 )01			4 3 2 1 1 1	1.6 30.6 24.1 7.8 3.1 1.0			Hydromet	•		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Bould	lers	Cob	100 bles				Grave	10			Gra	ain S	1 3	mm	))			0.1				0.01				0.00	01
		Douid		COD	DIES		С	oarse	•	Fin	e	Co	oarse		Medi	um		F	ine					5111				Clay	
		Gra	vel 9	%		(	0.0		ŝ	Sand	1%			16.	9	R	Silt% evie	ewe	d B	71 y:	.4	1	AL.	Clay	Digital DN: cn: ou=Mc email= Date: 2	ly signed b =Dave, o=0 Donald, Dave_McD 011.06.09	1.8 / Dave folder Asson onald@Gold 0:01:53 -06	iates Ltd., ler.com, c=CA 00'	

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Proje Shor Clien	ect #: t Title: it:	09- Gia AE	1427-000 Int Mine COM Cai	)6 nada					F	Phas Date	e: San	nple	21 ed:	00		F	Repoi	rt Nu	mbe	ər: A	261	5	
Sam Sam	ple Nun ple Loca	nber ation	S/ G/	A10 A11- <sup>-</sup>	T-10							G	rada (	tion mm)	Size		Perco Pass	ent ing			٦		
Sam	pled By		JE	3																			
Sour Sam	ce ple Des	cription	In Se	situ ee bo	ore log	s														ieve			
In sit Date Teste Rema	u Water Tested ed By arks:	r Conter	nt 38 Tu TF	3.9 Jesda R	ay, Jur	าе 07	, 20	11						0.16			100 98. 97. 92.	.0 8 3 5		ter			
Distri	ibution													.017 .011 .008 .006 .003 .001			83. 67. 52. 41. 21. 12.	0 2 9 8 2 7		Hvdromet	,		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Boulders	100	) 5	Coarse	Gravel	Fine		Gra	iin Siz	1 lediu	Im) Sar m		Fine	0.1			0.1 Silt	01			0.0 Clay	001
		Gravel	%	0.	0	Si	and	%		1.4		Si <b>Re</b>	lt% viev	ved B	82 5 <b>y</b> :	.7	J-HA	Cla	y% Digita DN: c ou=N email Date:	ally signed b n=Dave, o= AcDonald, I=Dave_McC 2011.06.09	5.9 y Dave Golder Assort	:iates Ltd., Jer.com, c=CA '00'	

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Projec Short <sup>-</sup> Client:	:t #: Title:	0 G A	9-1 Jian	427-0 t Mine OM C	006 e Cana	) ada						F	Phas Date	e: Sar	npl	2´ ed:	100			Repo	ort Nu	umb	er: A	261	5
Sampl Sampl	le Nun le Loca	nber ation			SA( GA	06 11-T	-13								G	irada (	ation (mm)	Size		Perc Pass	cent sing			7	
Sampl	led By				JB																				
Source Sampl	e le Des	criptio	n		Insi See	tu e bor	e logs	6															<b>bieve</b>		
In situ Date T Testec Rema	Water Fested d By rks:	r Cont	ent		25. We TR	1 dnes	sday,	June	08,	20	11					(	0.16 0.080 0.043 0.031			10( 93 62 57	0.0 6.4 2.4 7.6		er   S		
Distrib	oution																0.020 0.012 0.009 0.006 0.003 0.001			51 36 33 25 17 11	.2 .8 .6 .6 .6 .6 .6 .2		Hvdromet	,	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0							1						1				0.1			0	.01			0.001
												Gra	in Si	ze (n	nm)			-							
		Boulde	ərs	Cobb	les	(	G Coarse	Bravel	Fine		Со	arse	N	Лediu	Sai um	nd	Fine				Silt	:			Clay
		Grav	′el %	6		0.0		Sa	and	%			11.6	)	S Re	ilt% viev	ved E	74 3y:	.9	J-H	Cla	Digit DN: ou= Date	ally signed b cn=Dave, o= McDonald, II=Dave_McC 2011.06.09	3.5 y Dave Golder Assoc	iates Ltd., ler.com, c=CA 00'

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Proje Shor Clier	ect #: t Title: nt <sup>.</sup>	09 Gia AF	-1427- ant Mir	0006 ie Cana	) ada						P	hase	e: San	nole	21 ed:	00			Rep	ort Ni	umb	er: A	261	5
Sam Sam	ple Nun ple Loc	nber ation		SA( GA	08 11-T-	-13								G	rada (	ition mm)	Size		Per Pas	cent sing			7	
Sam	pled By	,		JB										E										
Sour Sam	ce ple Des	cription		Insi See	itu e bor	e logs	;							E							_	bieve		
In sit Date Teste Rem	tu Wate Tested ed By arks:	r Conte I	nt	24.4 We TR	4 dnes	day, .	June	08,	20	11						0.16			10 99 85	0.0 9.6 5.5 7.4		er		
Distr	ibution															.020 .012 .009 .006 .003 .001			50 37 27 19 12 9	5.4 7.1 7.4 9.4 2.9 .7		Hvdromet	,	
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000			100				10			Gra	in Siz	ce (m				0.1				0.01			0.001
		Boulder	s Cob	bles	C	G Coarse	ravel	Fine		Coa	irse	M	ediu	San m	ld	Fine				Sil	t			Clay
		Grave	H %		0.0		Sa	and	%			2.5		Sil <b>Re</b>	lt% view	ved E	86 s <b>y</b> :	.7	J.H.	Cla	ay% Digi DN: ou= ema Date	tally signed E cn=Dave, o= McDonald, ili=Dave_McD 2011.06.09	0.8 y Dave Golder Assoc Nonald@Gold 15:19:39 -06'	iates Ltd., Ier.com, c=CA 00'

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#300 10525 170th Street, Edmonton Alberta T5P 4W2


Project # Short Tit Client:	t: le:	09-1 Giar AEC	1427-0006 nt Mine COM Cana	da			Phase: Date Sam	2100 pled:	Report Num	ber: A2	615
Sample I Sample I	Numl Loca	ber tion	SA1 GA1	0  1-T-13				Gradation Siz (mm)	ze Percent Passing		
Sampled	l By		JB								
Source Sample I	Desc	ription	Insit See	u bore logs						ieve	
In situ W Date Tes Tested B Remarks	/ater sted By s:	Content	26.6 Wea TR	) dnesday, Ju	ıne 08, 20	11		0.16 0.080 0.040 0.028	100.0 99.8 79.5 76.3	ter S	
Distributi	on							0.019 0.012 0.009 0.006 0.003 0.001	66.8 41.4 31.8 25.5 19.1 12.8	Hydromet	
100 90 00 00 60 50 50 30 20 10 0	1000		100		10	Gr	1 ain Size (m	0.1	0.01		0.001
		Boulders	Cobbles	Gra	vel			Sand	Silt		Clay
		Gravel	%	0.0	Sand %	COAL26	3.2	Silt% {	B1.7 Clay?	6 15. vigitally signed by Dave N: cn=Dave, o=Golder u=MCDonald, mail=Dave, McDonald hate: 2011.06.09 15:18:	1 Associates Ltd., igi6older.com, c=CA 38-0600

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Project #: Short Title: Client:	09-1 Gian AFC	427-0006 it Mine :OM Canai	da			Phase: Date Sam	2100		Report Num	ber: A26	315
Sample Nun Sample Loca	nber ation	SA1 GA1	2 1-T-13				Gradation (mm)	Size	Percent Passing		
Sampled By		JB									
Source Sample Des	cription	Insit See	u bore logs							bieve -	
In situ Water Date Tested Tested By Remarks:	r Content	31.4 Wed TR	lnesday, Jun	e 08, 20	11		0.16 0.080 0.036 0.026		100.0 99.4 96.6 90.4	ter	
Distribution							0.018 0.011 0.008 0.006 0.003 0.001		77.9 65.4 46.8 34.3 21.8 12.5	Hydromet	
001 90 07 08 00 00 00 00 00 00 00 00 00 00 00											
1000	)	100		10	Gr	1 ain Size (m	m)	0.1	0.01		0.001
	Boulders	Cobbles	Grave	Fine	Coarse	Mediu	Sand m Fine		Silt		Clay
	Gravel	%	0.0 \$	Sand %		1.0	Silt% Reviewed E	83.1 Sy:	Clay9	6 15. igitally signed by Dave № cn=Dave, o=Golder w=McDonald, mail=Dave, McDonaldg hate: 2011.06.09 15:17:3	9 Associates Ltd., KGolder.com, c=CA 8-0600'

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Proje Shor Clier	ect #: t Title: nt <sup>.</sup>	09 Gi AF	-14 ant	27-0 Mine	000 9	6								Ph Da	ase te S	e: San	npl	2 ed <sup>.</sup>	10	C			R	ерс	ort N	lum	ber	: A2	261	5	
Sam Sam	ple Nun ple Loca	nber ation		(	GA Gia	∖11∙ ant	-T- Mii	14, ne	SA	12							G	rad	lati (m	on m)	Siz	e	F P	Perc Pass	cent sing	]	]		1		
Sam	pled By	,			JB												L					$\pm$									
Sour Sam	ce ple Des	scription	I																1 (	0 5 .0				10( 98 97	0.0 .2 .6			jeve			
In sit Date Test	tu Wate Tested ed By arks:	r Conte I	nt		26. Frio AC	.3 day	ν, Α	.pril	15	, 20	)11								1. 0 0. 0.0 0.0	25 .6 32 16 )80 )36				97 97 97 96 94 93	.6 .4 .0 .2 .9 .6			<u></u>			
Distr	ibution																		0.0 0.0 0.0 0.0 0.0	026 017 011 008 006 003				91 82 65 51 40 30	.5 .6 .2 .2 .4 .1			Hydromete			
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Boulder	rs	1 Cobb	00				Gra	1	0 Fine		Gi	rain	• 1 Siz	e (m	mm)	nd		ine	0.1				Si	0.01				0.0	001
		Grave	el %	)		1	.8	ouroc		Sa	and	%		3	.5		Si	ilt%		d B	6 V-	7.2		L.A.	C	lay%	Digitally si DN: cn=Da Du=McDor email=Dav Date: 2011	27 gned by Di ive, o=Gold nald, re_McDona .04.27 11:0	1.5 ave der Associa ald@Golde 14:26 - 06'0	ites Ltd., r.com, c=CA 9'	
																	176	AIG.	**6		y.	-									

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Proje Short Client	ct #: Title: t:	0 G A	9-14 lian EC	427-0 t Mine OM C	)000 e Cana	6 ada							Ph Da	ase: te S	am	nple	21 ed:	00			Re	port	Num	ber:	A2	615	
Samp Samp	ole Nur ole Loc	nber ation			SA GA	3 .11- <sup>-</sup>	Г-16									Gr	ada (	ition mm)	Siz	e	P∉ Pa	ercer	nt g				
Samp	oled By	,			JB																						
Sourc Samp	ce ble Des	scriptio	n		Ins See	itu e Bc	ore Lo	ogs										5 2.0			1	00.0 99.9			leve		
In situ Date Teste Rema	u Wate Tested ed By arks:	r Conte I	ent		24. Mo HV	4 nda D	y, Ma	ay 30	), 2(	011								1.25 0.6 0.32 0.16 0.080 0.048				99.6 99.6 99.6 92.0 44.5 29.0 25.4			ter S		
Distril	bution																	.022 .013 .009 .006 .003 .001				20.0 18.2 14.7 12.9 11.1 11.1			Hydrome		
Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0			Cobb	100			Grav	10 el			G	¢rain	1 Size	• (m	im) San			0.1				0.01				).001
		Boulde	515	CODL			Coars	se	Fi	ine	(	Coarse	э	Ме	diuı	m		Fine					5111				У
		Grav	el %	6		0.	0		Sar	nd %	6		58	3.5		Sil Rev	t% ⁄iev	ved E	3 3y:	0.4	L	AL	Clay%	Digitally sig DN: cn=Dav ou=McDon email=Dav Date: 2011.	11. ined by Dave ve, o=Golder ald, e_McDonald 06.03 14:47:5	Associates Ltd., @Golder.com, c=CA 11-06'00'	A

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Project #: Short Title: Client:	09 Gi AE	-1427-0006 ant Mine ECOM Cana	da			Phase: Date Sam	2100 ipled:	Report Num	ber: A2	615
Sample Nu Sample Lo	umber cation	SA6 GA1	1-T-16				Gradation Size (mm)	Percent Passing		
Sampled B	Ву	JB								
Source Sample De	escription	Insit See	u Bore Logs						ieve	
In situ Wat Date Teste Tested By Remarks:	er Conte ed	nt 49.7 Tue HVE	, sday, May 31 )	, 2011			0.6 0.32 0.16 0.080 0.039 0.028	100.0 99.6 99.4 98.2 79.8 75.0	er S	
Distributior	1						0.019 0.012 0.008 0.006 0.003 0.001	57.7 41.9 34.0 26.1 16.7 11.6	Hydromet	
001 90 03 04 90 90 90 90 90 90 10 90 90 90 90 90 90 90 90 90 90 90 90 90										
10	00	100		10	G	1 rain Size (m	0.1 m)	0.01		0.001
	Boulder	rs Cobbles	Grave	Fine	Coarse	Mediur	Sand m Fine	Silt		Clay
	Grave	el %	0.0 S	and %		4.5	Silt% 82 Reviewed By:	Clay%	6 13. Jigitally signed by Dave NY: cn=Dave, o=Golder u=McDonald, mail=Dave, McDonald, Date: 2011.06.03 13:38:3	5 Associates Ltd., @Golder.com, c=CA 3-0600'

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



Projec Short Client:	t #: Title:	09 Gi AE	-1427 ant Mi ECOM	-0006 ne Cana	da						P	has Date	e: San	nple	21 əd:	00		R	leport	Num	nber	: A2	315
Sampl Sampl	e Nun e Loca	nber ation		SA8 GA1	;  1-T-	·16								G	rada (I	ntion mm)	Size	F	Perce Passii	nt าg			
Sampl	ed By			JB										L									
Source Sampl	e le Des	cription	l	Insit See	u Bore	e Log	S							E		2.0			100 (	<u>ີ</u>		eve	
In situ Date T Testec Remar	Water ested d By rks:	r Conte	nt	24.4 Tue HVI	l sday )	r, May	/ 31,	201	1						( ( ( 0 0 0	1.25 0.6 0.32 0.16 0.080 0.044 0.031			100.0 99.8 99.8 99.4 92.2 52.0 45.8			ter	
Distrib	ution														0 0 0 0 0	.021 .012 .009 .006 .003 .001			33.4 24.1 19.5 16.4 10.2 9.9			Hydrome	
Percent Finer Than	00       90       80       70       60       50       40       30       20       10       0																						
	1000	)		100				10			Gra	in Si	1 ze (n	າm)			0.1			0.01	1		0.001
		Boulder	rs Co	bbles	С	G oarse	ravel	Fine		Соа	arse	N	Леdiu	Sar	nd	Fine				Silt			Clay
		Grave	el %		0.0		Sa	and	%			14.4		Si <b>Re</b>	lt% <b>view</b>	ved B	75. y:	6	d-AL	Clay	Digitally si DN: cn=Da ou=McDoo email=Dav Date: 2011	10. gned by Dave ve, o=Golder hald, e_McDonald, .06.03 15:34:4	O Associates Ltd., @Golder.com, c=CA 10-06'00'

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Project #: Short Title	: e:	09-14 Gian	427-0006 t Mine OM Cana	) ada		F	hase:	2 moled:	100		Report Nurr	ber: A26	15
Sample N Sample L	lumber .ocatior	1	SA GA	10 11-T-16				Grad	lation Si (mm)	ze	Percent Passing		
Sampled	Ву		JB										
Source Sample D	Descript	tion	Insi See	itu e bore logs	3							ieve	
In situ Wa Date Test Tested By	ater Co ted y	ntent	29.4 Tue TR	4 esday, Jun	e 07, 2011				0.6 0.32 0.16 0.080		100.0 100.0 99.6 97.2	S S	
Remarks:	:								0.040		71.3 68.2	eter	
Distributio	on								0.019 0.012 0.008 0.006 0.003 0.001		58.8 42.9 35.0 25.7 14.7 12.6	Hydrome	
100 90 80 60 50 40 30 20 10 0 10			100		10		1		0.		0.01		0.001
I			100		10	Gra	in Size (r	nm)	0.	•	0.01		0.001
	Βοι	Iders	Cobbles	G Coarse	Fine	Coarse	Mediu	Sand Im	Fine		Silt		Clay
	Gr	avel %	6	0.0	Sand %		6.7	Silt% <b>Revie</b>	wed By:	80.0	Clay LAA	% 13.3 Digitally signed by 1 DN: cn=Dave, o=Go DN: Cn=Dave, o=Go C=CA Date: 2011.06.09 09	Dave Ider Associates Ltd., II=Dave_McDonald@Golde 58:22-06'00'

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Proje Shor Clien	ect #: t Title: it:	0: G A	9-14 lian EC	427-0 t Mine OM C	000 e Can	6 ada	а						F	Pha Date	se: e S	am	nple	21 ed:	00			F	lepc	ort N	um	ber	: A2	615	5	
Sam Sam	ple Nun ple Loc	nber ation	-		SA GA	12	-T-	-16								-	Gı	rada (	atior mm	n Si )	ze	F	Perc	ent sing		]		1		
Sam	pled By	,			JB																									
Sour Sam	ce ple Des	criptio	n		Ins Se	itu e b	ore	e log	IS																		leve			
In sit Date Teste Rem	u Wate Tested ed By arks:	r Conte	ent		39. Tue TR	.3 esc	day	, Jui	ne C	)7, 1	201	11							0.16	5 0 6			100 99 94 85	).0 .6 .8			cer v			
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Percent Finer Than	100 90 80 70 60 50 40 30 20 10 0 1000	Boulde Grav	ers	Cobb	100				Grav	100 rel F		%	Gra	ain \$	1 Size Me	(m	m) San M	d t%	Fine	0.	1			Si	0.01		15 grad by Ga	.0	0.C Clay	001
																I	Rev	viev	ved	By	: _	4	d He	ł	Å	DN: cn=Da pu=McDor email=Dav Date: 2011	ve, o=Golde nald, e_McDonale .06.09 09:47	r Associate d@Golder.c	es Ltd., com, c=CA	

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#300 10525 170th Street, Edmonton Alberta T5P 4W2



(Mechanical & Hydrometer)









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(Mechanical & Hydrometer)







# **Soil-water Characteristic Curve**





## SOIL-WATER CHARACTERISTIC CURVE

Project #:       09-1427-0006       Phase:       2000         Short Title:       AECOM / Engineering Services / Giant Mine, NWT       Date:       May 30, 2011         Sample:       GA11-T-06 SA3       Sample Data:       Diameter:       63.88 mm (initial)         Test Results:       Sample Data:       Diameter:       63.88 mm (initial)         0.25       0.307       0.466       Diameter:       20.0 % (gravimetric)       Dry Density:         1       0.308       0.467       2       0.307       0.466         1       0.308       0.467       Material used passing:       4.75 mm sieve         2       0.302       0.466       Specimen trimmed from Shelby tube sample.       0         16       0.304       0.466       0.466       0       0         120       0.285       0.448       0.005       0.008       0         200       0.265       0.423       0       0.007       0       0       0.007       0         295000       0.008       0.013       0.007       0       0       0.000       10000       00000       0000000         0.45       0.45       0.1       1       0       0.00       0.0000       0.0000	
Tested By:         D.B.         Date:         May 30, 2011           Sample:         GA11-T-06 SA3         Sample Data:         Diameter:         63.88 mm (initial)           Test Results:         Sample Data:         Diameter:         63.88 mm (initial)           0.25         0.307         0.466         Dry Density:         1556 kg/m³ (initial)           1         0.308         0.467         Dry Density:         1556 kg/m³ (initial)           2         0.302         0.462         Material used passing:         4.75 mm sieve           2         0.306         0.466         Dry Density:         Specimen trimmed from Shelby tube sample.           16         0.304         0.464         Specimen trimmed from Shelby tube sample.         100%           2         0.300         0.461         64         0.293         0.455           120         0.285         0.448         200         0.285         0.423           400         0.148         0.236         0.003         0.013         0.01         0.000         1000         1000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000         10000 <td></td>	
Sample:       GA11-T-06 SA3         Test Results:       Sample Data:         Suction       Gravimetric       Volumetric         0.25       0.307       0.466         1       0.308       0.467         2       0.302       0.466         1       0.306       0.466         1       0.306       0.466         2       0.302       0.466         16       0.304       0.466         32       0.300       0.466         16       0.304       0.466         32       0.300       0.466         16       0.304       0.466         32       0.300       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         150300       0.004       0.007         295000       0.008       0.013         0.45       0.446       0.40         0.45       0.45       0.45         0.45       0	
Suction         Water Content (kPa)         Sample Data: Gravimetric         Diameter:         63.88 mm (initial)           0.25         0.307         0.466         Diameter:         63.88 mm (initial)           1         0.308         0.467         29.0302         0.466           1         0.306         0.466         Dry Density:         1556 kg/m³ (initial)           2         0.302         0.466         Material used passing:         4.75 mm sieve           2         0.306         0.466         Sector         Material used passing:         4.75 mm sieve           2         0.306         0.466         Sector         Sector         Sector         Material used passing:         4.75 mm sieve           2         0.300         0.466         Sector         Secravimetric         Sector         Se	
Suction         Water Content         Diameter:         63.88 mm (initia)           0.25         0.307         0.466         11.55 mm (initia)           0.5         0.307         0.466         1           1         0.308         0.467         2.0.302         0.466           2         0.302         0.466         Dry Density:         1556 kg/m <sup>3</sup> (initia)           4         0.306         0.466         Dry Density:         1556 kg/m <sup>3</sup> (initia)           4         0.306         0.466         Specimen trimmed from Shelby tube sample.         Comments:           20         0.2265         0.448         Specimen trimmed from Shelby tube sample. $100\%$ 120         0.285         0.448 $0.265$ $0.423$ 4100         0.016         0.025 $80\%$ $60\%$ 382200         0.008         0.013 $40\%$ $20\%$ Pressure Cell Points           150300         0.004         0.007 $20\%$ $0.1$ $1$ $0.20$ $10000$ $10000$ $10000$ $10000$ $10000$ $10000$ $10000$ $10000$ $10000$ $000000$ $0.45$ <	
(kPa)         Gravimetric         Volumetric         Height:         31.55 mm (initial)           0.25         0.307         0.466         Initial Water Content:         29.0 % (gravimetric)           1         0.308         0.467         Dry Density:         1556 kg/m <sup>3</sup> (initial)           2         0.302         0.466         Material used passing:         4.75 mm sieve           4         0.306         0.466         Comments:         Specimen trimmed from Shelby tube sample.           32         0.300         0.461         4         0.293         0.455           120         0.285         0.448         200         0.265         0.423           400         0.148         0.236         40%         9%         6%           90%         9%         6%         6%         0%         0           150300         0.008         0.013         84350         0.005         0.008         0.013           0.45         0.445         0.1         1         0         1000         10000         10000         10000           0.45         0.40         0.013         0.45         0.46         0.45         0.40         0.45         0.40         0.40         0.40	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
0.3       0.307       0.467       1350 kg/m (mma)         1       0.308       0.467       Material used passing: 4.75 mm sieve         2       0.302       0.462         4       0.306       0.466         8       0.306       0.466         16       0.304       0.464         32       0.300       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.45       0.45       0.1       1       10       1000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000	
1       0.302       0.467       Waterial used passing.       4.73 mm sieve         2       0.302       0.462       Comments:       Specimen trimmed from Shelby tube sample.         4       0.306       0.466       Specimen trimmed from Shelby tube sample.       Image: sample sampl	
2       0.302       0.402       0.402         4       0.306       0.466         8       0.306       0.466         16       0.304       0.464         32       0.300       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.50       0.45       0.45         0.45       0.45       0.45         0.45       0.45       0.46         0.35       0.45       0.45	
4       0.306       0.466         8       0.306       0.466         16       0.304       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         95000       0.008       0.013         0%       0%       0%         0.1       1       10       1000       10000       100000       100000         0.45       0.40       0.35       0.40       0.41       0.40       0.45       0.40	
0       0.304       0.464         32       0.300       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.1       1       10       100         0.1       1       10       1000       10000       100000         0.45       0.40       0.35       0.40       0.45       0.40         0.35       0.45       0.40       0.45       0.40       0.45	
10       0.304       0.404         32       0.300       0.461         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.1       1       10       100       1000       10000       10000       10000         0.50       0.08       0.013       0.1       1       10       100       1000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       10000       1000       10000	
32       0.300       0.401         64       0.293       0.455         120       0.285       0.448         200       0.265       0.423         400       0.148       0.236         60%       60%         60%       60%         60%       60%         60%       60%         60%       60%         61%       0.016         0.008       0.013         84350       0.005         0.008       0.013         0%       0%         0%       0%         0%       0.1         0.1       1         100       1000         1000       1000         0.1       1         0.1       1         0.1       1         0.35       0.45	
120 0.285 0.448 200 0.265 0.423 400 0.148 0.256 38200 0.008 150300 0.008 0.005 0.008 0.005 0.008 0.007 295000 0.008 0.013 0.008 0.013 0.007 20% 0.1 1 0 0.0 0.0 0.0 0.0 0.0 0.	$\square$
120       0.265       0.446         200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.1       1       10       100         0.45       0.45         0.45       0.45         0.45       0.45         0.40       0.35	Π
200       0.265       0.423         400       0.148       0.236         4100       0.016       0.025         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.50       0.008       0.013         0.45       0.45         0.45       0.45         0.40       0.35	<u> </u>
400 0.148 0.236 4100 0.016 0.025 38200 0.008 0.013 84350 0.005 0.008 150300 0.004 0.007 295000 0.008 0.013 0.1 1 10 100 1000 10000 100 0.1 1 10 Suction (kPa) 0.50 0.45 0.40 0.35	
4100       0.016       0.023         38200       0.008       0.013         84350       0.005       0.008         150300       0.004       0.007         295000       0.008       0.013         0.50       0.008       0.013         0.50       0.008       0.013         0.50       0.011       1       10         0.50       0.011       1       10       1000         0.50       0.45       0.45       0.45       0.45         0.45       0.45       0.45       0.45       0.45         0.45       0.45       0.45       0.45       0.45         0.35       0.45       0.45       0.45       0.45	
38200       0.008       0.013       0.008       0.008       0.007         295000       0.008       0.013       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0%       0% <td></td>	
34350       0.005       0.006         150300       0.004       0.007         295000       0.008       0.013         0%       0.1       1       10       1000       10000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       100000       1000000       1000000       100000       1	
295000 0.004 0.007 295000 0.008 0.013 0.1 1 10 100 1000 10000 10 0.1 1 10 Suction (kPa) 0.45 0.40 0.35	<b> </b>
295000 0.008 0.013 0% 0.1 1 10 100 1000 10000 10 0.50 0.45 0.40 0.35	
0.1 1 10 100 1000 10000 10 0.50 0.45 0.40 0.35	щ
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0.45 0.40 0.35	$\square$
0.40 0.35	<u></u>
0.40 0.35 • Volumetric Best-Fit Curve	
0.35	
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<u>8</u> 0.25	
0.15	
0.10	++
0.05	++
0.1 1 10 100 1000 10000 1	00000
Suction (kPa)	




## SOIL-WATER CHARACTERISTIC CURVE

	Associate	S						
Project #: Short Title: Tested By:	09-1427-0006 AECOM / Eng D.B	es / Giant Mine, NWT Date: May 31, 2011						
Sample:	GA11-T-06 S	GA11-T-06 SA3						
Test Result Suction (kPa) 1 2 4 8 16 32	Its: Gravimetric 0.303 0.307 0.305 0.282 0.215 0.170	Content Volumetric 0.447 0.452 0.449 0.417 0.318 0.251	Sample Data:Diameter:63.87mm (initial)Height:32.21mm (initial)Initial Water Content:16.5% (gravimetric)Dry Density:1462kg/m³ (initial)Material used passing:4.75mm sieveComments:111					
64 120 4100 38200 84350 150300 295000	0.137 0.112 0.016 0.008 0.005 0.004 0.008	0.203 0.166 0.023 0.012 0.007 0.006 0.012	$ \begin{array}{c} 100\% \\ 60\% \\ 60\% \\ 40\% \\ 20\% \\ 0\% \\ 0\% \\ 0\% \\ 0\% \\ 0\% \\ 0\% \\$					
0.60								
0.50		• •	Gravimetric Volumetric Best-Fit Curve					
0.40								
/ater Cont	· · · · · · · · · · · · · · · · · · ·	* * * *						
> <sub>0.20</sub>								
0.10								
0.00	D.1 1	10						
			Suction (kPa)					

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.





## SOIL-WATER CHARACTERISTIC CURVE

		sociates	5					
Proje	ect #:	09-1427-0006	;			Phase	e: 2000	
Short	t Title:	AECOM / Engineering Services / Giant Mine, NWT						
Teste	ed By:	D.B.				Date:	June 2, 20	11
Samp	ple:	GA11-T-12 S	A2					
Test	Results:			Sample Data:				
S	uction	Water (	Content	Diameter:	63.98	mm (initial)		
(	(kPa)	Gravimetric	Volumetric	Height:	31.33	mm (initial)		
	0.25	0.243	0.391	Initial Water Co	ontent: 4.2	% (gravimetric)		
	1	0.252	0.405	Dry Density:	1606	kg/m <sup>°</sup> (initial)		
	2	0.252	0.404	Material used p	assing: 4.75	mm sieve		
	4	0.238	0.382	Comments:				
	8	0.217	0.348					
	16	0.113	0.182					
	32	0.069	0.112					
	64	0.052	0.083					
	120	0.041	0.067	100%		• P	ressure Cell Points	
	200	0.032	0.051	•		Δ D	essicator Points	
	400	0.021	0.033	२ २		В	est-Fit Curve	
	800	0.016	0.025	<u>୧</u> 60%				
	1500	0.011	0.017	atio				
41000.0060.009382000.0020.003		0.009	Ž 40%					
		ю́						
150300		0.001	0.002	20%				
2	95000	0.001	0.001	0%				
				0.1	1 10	100 1000	10000 100000	1000000
						Suction (kPa)		
	0.50							
	0.45						Gravimetric	
	0.40		•			•	Volumetric	
		●						
	0.35						Best-Fit Curve	
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sr O		◆						
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3	-							
	0.15							
	0.10		<u> </u>					
	0.05							
	0.05							
	0.00					* · · · · · · · · · · · · · · · · · · ·		
	0.1	1	10	100	1000	10000	100000	1000000

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Suction (kPa)





## SOIL-WATER CHARACTERISTIC CURVE

			5						
Project	t #:	09-1427-0006	;		Phas	se: 2000			
Short 7	Title:	AECOM / Eng	ineering Service	es / Giant Mine, NWT					
Tested	l By:	D.B.		(1 )	Date	: May 31, 2011			
Sample	e:	GA11-I-14 S	A2, SA3 (Mix To	ogether)					
Test R	Results:			Sample Data:					
Su	ction	Water 0	Content	Diameter: 6	3.94 mm (initial)				
(kPa) Gravimetric Volumetric			Volumetric	Height: 2	9.02 mm (initial)				
0	.25	0.266	0.431	Initial Water Content:	29.6 % (gravimetric, p	rior to consolidation)			
	1	0.265	0.430	Dry Density:	1651 kg/m <sup>3</sup> (after con	solidation)			
	2	0.263	0.428	Material used passing:	4.75 mm sieve				
	4	0.262	0.427	Comments:					
	8	0.262	0.427	Specimen consolidated at	25 kPa prior to testin	g.			
	16	0.260	0.426						
	32	0.252	0.417						
6	64	0.247	0.412						
1	20	0.219	0.377	100%		Pressure Cell Points			
2	200	0.177	0.307	80%		- Best-Fit Curve			
4	-00	0.106	0.184	(%					
				5 60%					
				ratio					
				, <b>1</b> 40%					
				<i>о</i> 20%					
				2078					
				0%					
				0.1 1 1	0 100 1000 Suction (kPa)	10000 100000 1000000			
	0.50 -								
	0.45				♦	Gravimetric			
	0.40	• • • • • • • • • • • • • • • • • • •			•	Volumetric			
	0.40								
	0.35					Best-Fit Curve			
nt	0.30			$\bullet \bullet $					
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5									
	0.15								
	0.10								
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	0.05								
	0.1	1	10	100 1000	10000	100000 1000000			
	5			Suction (kPa)					

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## **Unit Weight Determination**



Drv Densitv	Project #:	09-1427-0	09-1427-0006 Phase: 2100 Giant Mine					
Determination	Short Title	: Giant Mir						
Golder								
VAssociates	Tested By	: AC/DS		Date: 18	-Apr-11			
Sample Identification:				1				
Borehole #	GA11-T13	GA11-T11	GA11-T04	GA11-T01	GA11-T02	GA11-T09		
Sample #	3	3	6	4	2	2		
Sample depth (ft)	5.0-7.5	7.5-10.0	12.5-15.0	7.5-10.0	2.5-5.0	2.5-5.0		
Water Content Determination:			1	1	1	1		
Tare #	P02	24D	PG-51	2E	25B	2C		
vlass of wet soil + tare (g)	349.00	419.40	456.70	402.10	410.80	452.30		
Mass of dry soil + tare (g)	304.20	390.70	409.10	337.40	364.80	397.90		
Mass of water (g)	44.80	28.70	47.60	64.70	46.00	54.40		
Mass of tare (g)	199.60	194.50	196.60	195.30	199.50	198.70		
Mass of dry soil (g)	104.60	196.20	212.50	142.10	165.30	199.20		
Water content (%)	42.8	14.6	22.4	45.5	27.8	27.3		
Unit Weight Determination:	L. L		I	l	I	I		
Mass of sample in air = M <sub>s</sub> (g)	340.60	289.40	286.60	360.00	221.30	270.80		
Aass of sample + wax in air (g)	358.00	303.90	300.80	375.10	241.30	286.80		
Aass of sample + wax in water (g)	152.20	123.50	143.40	160.80	103.90	131.80		
lass of wax (g)	17.40	14.50	14.20	15.10	20.00	16.00		
/olume of sample + wax (cc)	205.80	180.40	157.40	214.30	137.40	155.00		
/olume of wax (cc) = Mass of wax								
0.78	22.31	18.59	18.21	19.36	25.64	20.51		
/olume of sample = V <sub>s</sub> (cc)	183.49	161.81	139.19	194.94	111.76	134.49		
Net density = $(M_s / V_s) \times 1000 (kg/m^3)$	1856	1789	2059	1847	1980	2014		
Dry density (kg/m <sup>3</sup> )	1300	1560	1682	1269	1549	1582		
Comments:								
GA11-T13-03 : Vane Shear Reading - 2	27.8 Kpa; Poo	ket Pen Rea	ding, tons/ft <sup>2</sup>	: Bot 1.25 <i>,</i> r	Vid 0 , Top	- 0.25		
GA11-T11-03 : Vane Shear Reading -	18.5 Kpa; No	pocket pen r	eading. Samp	le cracks.				
GA11-T04-06 : Vane Shear Reading - 8	3 Kpa; No poo	cket pen read	ling. Sample of	cracks.				
GA11-T01-04 : Vane Shear Reading - 1	18 Kpa; Pock	et Pen Readi	ng, tons/ft <sup>2</sup> : E	3ot 0, Mid	- 0 , Top - 0.	5		
GA11-T02-02 : Vane Shear Reading - 1	16 Kpa: No po	ocket pen rea	ading. Sample	cracks.				
GA11-T09-02 : Vane Shear Reading - 2	29 Kpa: No po	ocket pen rea	ading on top &	bottom, sam	ple cracks. M	id - 0.75		
					p.e e.e.e			
				Reviewed by				

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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