Minto Explorations Ltd.
Whitehorse, Yukon

ISSUED FOR USE

GEOTECHNICAL DESIGN
PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YUKON

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1.0 INTRODUCTION

1.1 GENERAL

The Minto Mine is a copper-gold mine located about 240 km north of Whitehorse, Yukon and is owned and operated by Minto Explorations Ltd. (Minto). The general location of the Minto Mine, along with its specific structures, is shown in Figure 1. The mine is being developed as an open pit mining operation and has been in production since June 2007. Development of the Area 1 Open Pit commenced with stripping in April 2006, and currently operates on an ongoing basis with either ore being stockpiled for processing and/or waste materials being disposed of at one of the waste dumps. There are currently three waste dumps permitted at the Minto Mine - the Main Waste Dump (MWD), the Reclamation Overburden Dump (ROD), and the Ice-Rich Overburden Dump (IROD). The MWD is used to store both non ice-rich overburden and waste rock materials while the ROD is used to store non ice-rich overburden for possible use in future reclamation. The IROD is to be used for storing ice-rich overburden. To date, Minto has only used the MWD and ROD for waste from the open pit.

To facilitate future reclamation and optimize current operations, Minto has proposed the design and construction of a fourth waste dump for the storage of non ice-rich overburden and waste rock materials. Consequently, EBA Engineering Consultants Ltd. (EBA) was retained by Minto to undertake the geotechnical design of this fourth waste dump, the Southwest Waste Dump (SWD).

This report presents the detailed geotechnical design of the proposed SWD and supersedes the Preliminary Design report dated May 2008. Background information involving the proposed SWD, findings of several geotechnical characterization programs, which were conducted in 1996, 1997, 2005, and 2008, the layout and geometry of the proposed SWD, and analytical work associated with the geotechnical design of the SWD will be summarized within this detailed design report. Furthermore, construction and monitoring recommendations for the SWD are also included.

EBA received approval from Minto to proceed with the geotechnical design of the SWD in May 2008.

This report is subject to the General Conditions provided in Appendix A.

1.2 SCOPE OF WORK

EBA's scope of work for this report was specifically the geotechnical design of the proposed SWD, and did not include detailed waste deposition planning or evaluating waste rock geochemical testwork and characterization data.

1.3 REPORT FORMAT

This geotechnical design report is contained in one volume and presents the main text together with the figures and appendices.

2.0 BACKGROUND INFORMATION

2.1 DESIGN INFORMATION

EBA developed the geotechnical design for the proposed SWD from the following background information.

- A drawing supplied by Minto on May 12, 2008 that detailed the Stage 1 dump layout and geometry.
- A drawing supplied by Minto on May 21, 2008 that detailed the proposed footprint limit.
- An email by Minto on May 29, 2008 that stipulated the proposed 2008 waste volumes to be excavated from the Area 1 Open Pit.
- A 2008 report (SRK, 2008) entitled "Waste Dump Overburden Drilling, Minto Mine, Yukon" detailing the 2008 geotechnical investigation.
- An email by Minto on August 22, 2008 that presented the proposed 2009 to 2011 waste volumes to be excavated from the Area 1 Open Pit.
- Several conversations, meetings, and site visits with Minto involving the SWD's construction and intended use.

In addition, EBA also used the following information from EBA's files.

- A 1997 report (EBA, 1997) entitled "1996 Geotechnical Drilling Program" detailing the 1996 geotechnical investigation.
- A 1998 report (EBA, 1998a) entitled "1997 Geotechnical Program and Construction Inspection Reports" detailing the 1997 geotechnical investigations.
- A 1998 report (EBA, 1998b) entitled "Geotechnical Evaluation, Proposed Main Waste Dump" summarizing the geotechnical design of the MWD.
- A 2006 report (EBA, 2006) entitled "Geotechnical Design, Ice-Rich Overburden Dump" summarizing the geotechnical design of the IROD.
- A 2007 report (EBA, 2007) entitled "Geotechnical Design Report, "Dry" Stack Tailings Storage Facility" summarizing the geotechnical design of the DSTSF.
- A 2008 report (EBA, 2008a) entitled "Geotechnical Design, Proposed Reclamation Overburden Dump" summarizing the geotechnical design of the ROD.

- A 2008 letter report (EBA, 2008b) entitled "Dry Stack Tailings Storage Facility – 2007/2008 Annual Review" summarizing the construction quality assurance data collected between May 1, 2007 and April 30, 2008 for the DSTSF.

3.0 SITE CHARACTERIZATION

3.1 SITE CHARACTERIZATION PROGRAMS

Four separate site characterization programs have been completed within the proposed SWD footprint. The first three programs were completed by EBA while the fourth was completed by SRK Consulting Inc. (SRK). The first program was completed in July 1996 (EBA, 1997) and was comprised of investigating various areas of the mine site to evaluate future development. The second was completed in September and October 1997 (EBA, 1998a) and formed part of the geotechnical evaluation of the MWD (EBA, 1998b). The third program was completed in October 2005 and formed part of the geotechnical evaluation of the IROD (EBA, 2006). The fourth program was completed in March and April 2008 to conduct condemnation drilling within the proposed area and supplement the data required for the SWD design (SRK, 2008).

3.1.1 1996 Site Characterization Program

The 1996 site characterization program included three boreholes drilled within the vicinity of the proposed SWD location. Only one (96-G05) of the three boreholes is located within the proposed SWD footprint while one (96-G04) is located north and the another (96-G06) is located east of the footprint. Figure 2 shows the location of these three boreholes. Borehole logs summarizing the soil and ground ice descriptions, as well as the laboratory index testing (moisture content and particle size distribution tests) are presented in Appendix B. Individual particle size distribution results are also presented in Appendix B with the associated borehole log.

3.1.2 1997 Site Characterization Program

The 1997 site characterization program included thirteen boreholes drilled within the vicinity of the proposed SWD location. Nine of the thirteen boreholes are located within the proposed SWD footprint while the remaining four (97-G09, -G18, -G19, and –G23) are located north of the footprint. Figure 2 shows the location of these thirteen boreholes, 97-G09 through –G19, -G23 and –G24. Borehole logs summarizing the soil and ground ice descriptions, as well as the laboratory index testing (moisture content and particle size distribution tests) are presented in Appendix B. Individual particle size distribution results are also presented in Appendix B with the associated borehole log.

3.1.3 2005 Site Characterization Program

The 2005 site characterization program included ten testpits excavated within the proposed SWD location along the design toe of the IROD. Figure 2 shows the location of these testpits, 1200179-TP100 through –TP109. Testpit logs summarizing the soil descriptions, as well as the laboratory index testing (moisture content and particle size distribution tests) are presented in Appendix B. Individual particle size distribution results are also presented in Appendix B with the associated testpit log.

3.1.4 2008 Site Characterization Program

The 2008 site characterization program was completed to conduct condemnation drilling and provide additional subsurface information within the vicinity of the proposed SWD. The program included nine boreholes, three of the nine are located within the proposed SWD footprint while the remaining six are located east of the footprint. Figure 2 shows the location of these nine boreholes, 08SWC270 through -280, excluding -276 and -279. Borehole logs summarizing the soil descriptions, as well as the laboratory index testing (moisture content and Atterberg limits tests) are presented in Appendix B. Individual particle size distribution and Atterberg limits results are also presented in Appendix B.

4.0 SITE CONDITIONS

4.1 SURFACE FEATURES

The proposed SWD site is located over gently sloping terrain in the upper portion of a valley, and is directly south of the MWD and east of the IROD. The proposed footprint limit, presented in Figure 2, is enclosed by the main MWD haul road, the IROD and Dyno access road, the IROD and a 30 m offset from the main drainage of this valley that forms part of the upper extent of Minto Creek.

The proposed footprint is located on an east facing slope on the west side of the upper valley. The terrain steepens to the east, south and west of the proposed SWD site. Topographic information indicates the presence of several small ephemeral creeks that converge to the middle of this upper valley into the main drainage. A few small ephemeral creeks enter the proposed footprint from the northwest between the IROD and Pelly laydown pad. These also converge to the middle of this upper valley into the main drainage. These creeks collect the surface run-off water and route it down the mountain side.

The site and adjacent area has sparse to locally dense tree cover. The area was subject to a forest fire in 1995 that has resulted in areas of fallen trees with deciduous species regrowth.

4.2 SUBSURFACE CONDITIONS

The geotechnical site characterizations indicate that the subsurface conditions within the majority of the proposed SWD footprint generally comprise a thin veneer of peat and vegetation overlying a silty sand to sandy silt colluvium overlying residual soil (residuum), which in turn overlies weathered bedrock (granodiorite).

Within the direct vicinity of the IROD, the subsurface conditions generally comprise a thin veneer of peat and vegetation overlying residual soil (residuum), which in turn overlies weathered bedrock (granodiorite).

4.2.1 Groundwater

Groundwater was noted at a depth of 0.5 m at 97-G12 and 2.4 m at 97-G16 during the site characterization. No other borehole or testpit completed within the vicinity of the proposed SWD site during the 1996, 1997, or 2005 characterizations identified groundwater.

Shallow groundwater was noted in SRK, 2008 (up to 2.6 m deep based on short-term data) for each borehole; however, this could be the result of the drilling and soil conditions. Additional monitoring of these instruments is required to better define groundwater conditions at these locations.

4.2.2 Permafrost

Permafrost was encountered in the majority of boreholes drilled during the 1996 and 1997 site characterization programs that are located within the proposed SWD footprint. The observed ice contents in these boreholes were logged as Nbe (Ice not visible – well bonded, excess ice) to Vx (Visible ice – individual ice crystals or inclusions) 5% to 20%. The active layer at the time of drilling varied between 0.3 m and 3.1 m.

Permafrost was not encountered in any of the testpits completed during the 2005 program and is not present beneath or upgradient of the IROD.

Permafrost was encountered in the majority of boreholes drilled during the 2008 site characterization program. The observed ice contents in these boreholes were logged as Nbn (Ice not visible – well bonded) to Ice and Soil. SRK, 2008 noted that distinct permafrost layers were difficult to delineate during the program as not all of the core was recovered in a frozen state. Recent readings from ground temperature cables installed during the program indicate near surface permafrost conditions similar to those observed in the 1996 and 1997 programs. These readings indicate ground temperatures ranging between -0.5 °C and -1.3 °C.

4.2.3 Bedrock

Depth to competent bedrock (granodiorite) at the design toe of the IROD was determined to range between 2.0 m and 3.1 m during the 2005 site characterization program. Weathered bedrock outcrops are present upgradient of the IROD.

All boreholes completed during the 2008 program were terminated within bedrock. Table 1 presents depths to bedrock in these boreholes.

TABLE 1: DEPTH TO BEDROCK – 2008 SITE CHARACTERIZATION

Borehole	Depth to Bedrock (m)
08SWC270	10.7
08SWC271	39.6
08SWC272	42.7
08SWC273	51.8
08SWC274	45.7
08SWC275	26.2
08SWC277	22.3
08SWC278	45.7
08SWC280	19.8

5.0 WASTE SOURCING AND CHARACTERIZATION

5.1 WASTE SOURCING AND CHARACTERIZATION

Waste will be sourced from the Area 1 Open Pit and consist of predominately waste rock; however, some non ice-rich overburden will also require storage within the SWD. This waste material is currently scheduled to be stored at the MWD and is consistent with the material placed to date within the MWD.

The volume of waste to be sourced from the Area 1 Open Pit and ultimately stored within the SWD and/or MWD has been forecasted by Minto as listed in Table 2. These volumes include a 30% swell factor (recommended by Minto based on historic data).

TABLE 2: FORECASTED VOLUMES OF WASTE

Year	Waste Rock Volume (m^3)	Non Ice-Rich Overburden Volume (m^3)
2008	1,027,000(1)	
2009 1st Quarter	888,680	151,115
2009 2nd Quarter	1,054,025	81,055
2009 3rd Quarter	1,269,725	75,420
2009 4th Quarter	1,283,200	126,365
2010 1st Quarter	784,410	105,300
2010 2nd Quarter	195,880	824,890
2010 3rd Quarter	308,820	1,100,055
2010 4th Quarter	746,105	181,015
2011 1st Quarter	238,235	0
TOTAL	7,796,080	2,645,215

Note: (1) Volume for September to December only

6.0 SOUTHWEST WASTE DUMP DESIGN

6.1 DESIGN CONSIDERATIONS

The design considerations for the proposed SWD are summarized below.

- The proposed dump must be geotechnically stable at all stages of construction, with particular attention required to evaluate the effects of permafrost foundation conditions.
- It is Minto's intent to construct the dump in the same manner as the MWD, with a series of setbacks and benches to allow for continued progressive reclamation.
- Surface water management and control of both run-on and run-off water must be incorporated into the design.
- The proposed SWD footprint has been offset 30 m from the main ephemeral creek southeast of the dump.
- Field observation and performance monitoring must be incorporated into the design.
- A design capacity of 12,450,000 m^3 has been assumed for the SWD. This capacity is reduced by approximately 135,000 m^3 because of material already located at the toe of the IROD. This material was stripped from the IROD footprint during its construction and has remained in its current location. This resulting design capacity is roughly 15% larger than the forecasted waste volume from Table 2.

6.2 LAYOUT AND GEOMETRY

The proposed SWD footprint limit is presented in Figure 2 while the overall layout and geometry is shown in Figure 3 and 4. It is Minto's intent to construct the dump by placing the waste material at its angle of repose (approximately 1.5H:1V) with 15 m benches or setbacks at 10 m (vertical) intervals. The only deviation to the 1.5H:1V sideslopes is the bottom bench of the dump, which has been stipulated at 2.5H:1V at all locations around the dump. The ultimate ramp will have 3H:1V sideslopes.

Figure 5 shows the SWD at several stages of construction. Stage 1 consists of the ramp from the haul road and the portion of the SWD directly east of the IROD. Stage 2 fills in the remainder of the north portion of the footprint while Stage 3 fills in the remainder of the south. During construction of Stage 3, Minto will need to address the required protocol of working adjacent to the Dyno site.

6.3 THERMAL EVALUATION

6.3.1 Analysis Methodology

Thermal analyses were carried out using EBA's proprietary two-dimensional finite element computer model, GEOTHERM. The model simulates transient, two-dimensional heat conduction with change of phase for a variety of boundary conditions. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperatures, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled. The model has been verified by comparing its results with closed-form analytical solutions and many different field observations. The model has successfully formed the basis for thermal evaluations and designs of tailings dykes, dams, foundations, pipelines, utilidor systems, landfills, and ground freezing systems in arctic and sub-arctic regions.

6.3.2 Analyzed Profile

The purpose of the thermal analyses was to evaluate the impacts of the proposed waste rock placement on the thermal regime of the underlying foundation soils. The foundation soils used in the analyses were inferred to be silt and sand with varying percentages of gravel, grading into residuum and weathered granodiorite bedrock at depth.

The analysis considered waste rock placement to three final heights, 10 m, 20 m and 30 m. The 10 m lifts were assumed to be placed in two month intervals starting at the beginning of July 2008. In addition, waste rock placement to a final height of 10 m was analyzed assuming a January 2009 start date.

6.3.3 Climatic Data for Analyses

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. Minto Mine's meteorological station collects monthly air temperatures, wind speed, and solar radiation at the site; however, the data is limited to the time period between October 2005 and May 2008. Mine specific snow surveys are limited to 6 years, 1994, 1995, 1998 and 2006 through 2008.

Long term data is required for the analyses; therefore, climatic data from relevant meteorological stations were also used.

Table 3 summarizes the climatic data estimated for the Minto site for the base case model.

TABLE 3: MEAN CLIMATIC CONDITIONS AT MINTO USED IN BASE CASE THERMAL ANALYSES				
Month	Estimated Mean Air Temperatures at Minto [a] (°C)	Monthly Wind Speed[b] (km/h)	Month-End Snow Cover[c] (m)	Daily Solar Radiation[d] (W/m2)
January	-21.3	7.5	0.40	10.2
February	-15.6	8.9	0.44	39.0
March	-10.6	10.0	0.48	102.0
April	0.5	11.7	0.08	180.7
May	8.0	11.8	0.00	229.9
June	14.7	10.8	0.00	255.4
July	16.3	9.5	0.00	225.8
August	13.4	9.6	0.00	170.1
September	6.7	10.7	0.00	99.1
October	-2.3	11.9	0.10	41.5
November	-13.5	8.9	0.23	14.2
December	-18.4	7.8	0.31	5.3

Notes:

[a] Based on Climate Normals 1973-2003 for Carmacks and Pelly Ranch (Environment Canada website) and estimated air temperature changes between 1988-2008. Values presented consider the change observed temperature rate change and are prorated to reflect the temperatures at 2008.

[b] Based on Climate Normals 1971-2000 for Burwash, Mayo, Watson Lake, and Whitehorse (Environment Canada website) and measured data at Minto.

[c] Based on Climate Normals 1971-2000 mean month-end snow data for Mayo (Environment Canada website) and snow depth survey data at Minto.

[d] Based on Climatic Normals 1951-1980 at Norman Wells and Whitehorse (Environment Canada, 1982) and measured data at Minto.

6.3.3.1 Future Climate Change (Global Warming) Conditions

Climate change, global warming conditions, have been incorporated into the analyses to consider potential long-term global warming of the air temperatures at the Minto site area. These climate changes were predicted by Global Circulation Models (GCMs).

GCMs, are mathematical representation of the atmosphere, land surfaces, and oceans that have been developed to predict future climate behaviour in response to changes in the composition of the atmosphere. Several scenarios have been developed to estimate the likely range of future emissions that may affect climate (IPCC, 2000). Different GCMs have been developed, resulting in different degrees of projected global warming. In this study, using results from the Canadian Climate Impact Scenario project (http://www.cics.uvic.ca/scenarios/index.cgi), seasonal temperature changes for the mine site area were estimated from four GCMs: a) CGCM2 (Canadian Centre for Climate Modelling and Analysis, Canada); b) GFDL-R30 (Geophysical Fluid Dynamics Laboratory,

United States); c) ECHAM4 (Max-Planck Institute of Meteorology, Germany), and d) HadCM3 (Hadley Centre for Climate Prediction and Research, United Kingdom).

The average seasonal changes in temperature over 110 years estimated from the four GCM models for the Minto site area are summarized in Table 4. The thermal analyses considering the long-term global warming conditions were conducted for some of the cases in this study.

TABLE 4: MEAN AIR TEMPERATURE CHANGE (°C) OVER 110 YEARS PREDICTED BY GCMS

	December January February	March April May	June July August	September October November	Annual
Average of Four GCM Models	4.2	2.6	3.3	3.1	3.3

6.3.3.2 Air Temperatures for Sensitivity Analyses

Measured air temperatures at Minto differ from the estimated mean air temperatures. A sensitivity analysis was conducted using recent site specific mean monthly air temperatures at Minto Mine to determine the impact on the thermal regime. The estimated air temperatures for the sensitivity analysis are listed in Table 5.

TABLE 5: MINTO 2008 TEMPERATURES USED FOR SENSITIVITY THERMAL ANALYSIS

Month	Difference between Estimated Mean Air Temperatures and Measured 2008 Site Temperatures for the Sensitivity Case and for Base Cases (°C)	Air Temperatures for the Sensitivity Analysis (°C)
January	4.3 (warmer)	-17.0
February	4.0 (warmer)	-11.6
March	1.5 (warmer)	-9.1
April	0.8(colder)	-0.3
May	0.6 (coder)	7.4
June	0.3 (colder)	14.4
July	0.9 (colder)	15.4
August	0.6 (warmer)	14.0
September	1.4 (colder)	5.3
October	1.4 (colder)	-3.7
November	3.8 (warmer)	-9.7
December	2.9 (warmer)	-15.5
Average	1.0 (warmer)	-0.9

6.3.4 Soil Index and Thermal Properties

Soil index and thermal properties chosen for the waste rock and foundation material in the thermal analyses are presented in Table 6. These properties were selected based on data from the DSTSF geotechnical design and the 2008 site characterization. Thermal properties of the soils were determined indirectly from well-established correlations with soil index properties (Farouki, 1986; Johnston, 1981).

It was assumed that the top moss layer under the waste rock would be compressed by the waste rock placement.

TABLE 6: MATERIAL PROPERTIES USED IN WASTE ROCK THERMAL ANALYSIS

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-°C)		Specific Heat (kJ/kg°C)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Waste Rock	3	2.06	1.22	1.42	0.77	0.83	20
Moss/Organics (for cases without waste rock placement)	100	1.00	0.81	0.47	1.89	2.94	167
Compressed Moss/Organics (for cases with waste rock placement)	60	1.60	2.36	1.02	1.24	2.03	200
Organic Silt/Sand	60	1.60	2.36	1.02	1.24	2.03	200
Sand/Gravel	8	2.35	2.61	2.12	0.83	0.99	58
Sand/Silt	28	1.96	2.40	1.34	1.03	1.49	143
Bedrock	1	2.68	3.00	3.00	0.75	0.77	9

6.3.5 Thermal Calibration Analysis

Thermal calibration analysis was performed to calibrate the thermal model and then establish initial ground temperature profiles for each case of the thermal analyses. Borehole 96-G08, located within the DSTSF, was selected for the calibration because of the consistent soil conditions with the SWD area and that it had recent ground temperature measurements.

Results of the calibration, as listed in Table 7, show a good agreement between the modelled and measured ground temperatures in Borehole 96-G08 on September 7, 2007. The predicted active layer thickness is 1.2 m in 2007.

TABLE 7: MEASURED AND PREDICTED GROUND TEMPERATURES AT BH 96-G08		
Depth below Ground Surface (m)	Measured on Sep 7, 2007 (°C)	Predicted on Sep 7, 2007 (°C)
1	2.3	0.2
2	-0.4	-0.5
3	-0.9	-0.7
4	-1.2	-0.9
5	-1.2	-1.0
7.5	-1.1	-1.2
10	-1.0	-0.9

6.3.6 Thermal Analyses

One-dimensional thermal analyses were conducted for two original ground cases (without waste rock placement) and six waste rock placement cases. The detailed climatic data and waste rock placement assumptions for each of the eight cases are summarized in Table 8.

TABLE 8: THERMAL ANALYSIS CASES SIMULATED						
Case	Snow	Time of First 10 m Waste Rock Lift	Time of Second 10 m Waste Rock Lift	Time of Third 10 m Waste Rock Lift	Air Temperatures at Placement	Air Temperatures after Placement
1 (original ground without waste rock placement)	Mean	No waste rock			Mean (1)	Mean (1)
2 (original ground without waste rock placement, snow sensitivity)	Three times mean	No waste rock			Mean (1)	Mean (1)
3 (10 m waste rock placed in summer)	Mean	Jul 1 2008			Mean (1)	Mean (1)
4 (10 m waste rock placed in summer, GW)	Mean	Jul 1 2008			Mean (1)	Mean (1) plus Global Warming
5 (10 m waste rock placed in summer, air temperature sensitivity, GW)	Mean	Jul 1 2008			Sensitivity (2)	Sensitivity (2) plus Global Warming

TABLE 8: THERMAL ANALYSIS CASES SIMULATED CONT'D						
6 (10 m waste rock placed in winter)	Mean	Jan 1 2009			Mean (1)	Mean (1)
7 (20 m (two 10 m lifts) waste rock placed in summer, GW)	Mean	Jul 1 2008	Sep 1 2008		Mean (1)	Mean (1) plus Global Warming
8 (30 m (three 10 m lifts) waste rock placed in summer, GW)	Mean	Jul 1 2008	Sep 1 2008	Nov 1 2008	Mean (1)	Mean (1) plus Global Warming

Note: (1) Mean temperatures from Table 3
(2) Sensitivity temperatures from Table 5

Cases 1 and 2 simulated the original ground adjacent to the toe of the waste rock dump slopes. Case 1 assumed the mean snow thicknesses estimated for the Minto site. Case 2 tripled the Minto mean snow thicknesses to simulate potential snow accumulation at the toe of the waste rock dump slope after waste rock placement.

Cases 3, 4 and 5 assumed summer placement, July 1, 2008, of only one 10 m lift of waste rock during the mine life. The three cases differ with respect to air temperatures assumed. Case 3 assumed the estimated Minto 2008 mean air temperatures (as listed in Table 3). Case 4 assumed the estimated Minto 2008 mean air temperatures plus potential air temperature changes with time, following long-term GCM's global warming trends. Case 5 considered the estimated Minto 2008 sensitivity air temperatures (as listed in Table 5) plus potential air temperature changes following the long-term GCM's global warming trends. The snow conditions were consistent for each case.

Cases 6 assumed winter placement, January 1, 2009, of only one 10 m lift of waste rock for the duration of the mine life. The air temperature and snow conditions for Case 6 were assumed to be the same as Case 3.

Cases 7 and 8 assume summer placement of multiple 10 m lifts of waste rock with Case 7 modelled a final height of 20 m and Case 8 a final height of 30 m. The air temperature and snow conditions for these cases were consistent with Case 3.

6.3.7 Results and Discussions

Table 9 summarizes the predicted maximum thaw depth below the original ground surface after five and ten years for each of the cases analyzed.

TABLE 10: PREDICTED MAXIMUM THAW PENETRATION INTO ORIGINAL GROUND FOR CASES SIMULATED

Case	Predicted Maximum Thaw Depth Penetration into the Original Ground (m)		Comments Based on Thermal Analysis Results
	After Five Years	After Ten Years	
1 (original ground without waste rock placement)	1.6	2.0	Predicted active layer thickness under mean snow conditions
2 (original ground without waste rock placement, snow sensitivity)	2.4	3.6	Thaw depth increased under tripled mean snow conditions (Case 2 vs. 1)
3 (10 m waste rock placed in summer)	1.0	1.3	Thaw depth into original ground increases from initial 0.7 to 1 m after five years
4 (10 m waste rock placed in summer, GW)(1)	1.0	1.3	Effects of global warming on the predicted thaw depth are negligible for time period (Case 4 vs. 3)
5 (10 m waste rock placed in summer, air temperature sensitivity, GW) (1)	1.1	1.6	Effects of air temperature sensitivity on the predicted thaw depth indicates a deeper thaw (Case 5 vs. 3)
6 (10 m waste rock placed in winter)	1.3	1.3	Effects of initial winter placement show slightly deeper thaw within five years (Case 6 vs. 3)
7 (20 m (two 10 m lifts) waste rock placed in summer, GW) (1)	1.3	1.6	Similar to Case 5
8 (30 m (three 10 m lifts) waste rock placed in summer, GW) (1)	1.3	1.3	Similar to Case 6

Note: (1) Considers GCM's global warming

In general terms, the thermal analyses results indicate that the original ground temperatures of the foundation soils would warm up with time for all cases analyzed and the original ground surface which experienced seasonal freezing and thawing would no longer do so with the placement of the waste rock fill. This seasonal frost depth will be maintained within the waste rock once the dump is constructed. Waste rock fill located below the seasonal frost depth would remain unfrozen year round for all the summer waste rock placement cases (Case 3, 4, 5, 7, and 8). A frozen waste rock zone, sandwiched between the top seasonal frozen/thaw waste rock zone and the top unfrozen foundation soil prior to

waste rock placement, would exist in waste rock placed in winter in the initial several years before it thawed entirely later.

Snow depth significantly affects the thaw depth of the original ground (Case 1 vs. 2). If three times the mean snow cover is assumed over the original ground surface, the predicted thaw depth increases 0.8 m after five years and 1.6 m after ten years.

In five years, the predicted maximum thaw depth into the original ground ranges from 1 m to 1.3 m for all waste rock placement cases. In ten years, the maximum thaw depth is predicted to be either the same or increase by 0.3 m. The exception to this is Case 5 that indicated a maximum thaw depth increase of 0.5 m.

The effects of global warming on the predicted thaw depth are negligible for the 5 year and 10 year study periods (Case 3 vs. 4).

The effects of the air temperature sensitivity on the predicted thaw depth indicates an increase of 0.1 m and 0.3 m for 5 years and 10 years, respectively (Case 3 vs. 5).

Comparing Case 3 and Case 6, the results indicate that starting construction in January 2009 as oppose to July 2008 would result in a slight increase of thaw depth by Year 5 but similar effect by Year 10.

The effects of placing additional 10 m lifts of waste rock (Cases 7 and 8 vs. 4) on the predicted thaw depth indicates an increase of 0.3 m after 5 years and negligible to 0.3 m after 10 years.

6.3.8 Limitations

The thermal analyses in this study were based on limited available site-specific climatic data and estimated long-term climatic conditions and a number of assumptions were applied. It is expected that the soil profiles and properties will be different from one location to another over the SWD footprint, and climatic conditions over the mine life could be different from those estimated. Therefore, although reasonable assumptions and estimates have been made, the actual thermal conditions may differ from those predicted in this study.

Additional analyses must be completed during final closure design of the dump. The results from this study cannot be directly used for the closure design for the following reasons:

- Long term climatic data, specifically mean air temperatures, at the Minto Mine are still unknown. The future climatic data collected at the Minto site will be used to complete the closure design.
- The actual thermal conditions in the SWD may be different from those predicted in this study due to differences in actual waste rock placement rates and construction schedules. Actual waste rock/ground temperature monitoring data should be regularly monitored to confirm the predicted ground/waste rock thermal conditions and to provide additional information for future mine closure design.

- The design criteria for the long-term closure design would be different from those for the current dump design, the latter mainly focuses on the short term during the remaining mine life and several years after the mine closure. Long-term closure design must take into consideration the performance of the dump and final configuration of the mine and related components (open pits, dumps, etc.).

6.4 STABILITY EVALUATION

6.4.1 Analysis Methodology

Limit equilibrium analyses were conducted to determine the factor of safety against slope failure during construction of the dump. All analyses were conducted using the commercially available two-dimensional, limit equilibrium software, SLOPE/W (Geo-Slope International Ltd., GeoStudio 2007 (Version 7.03)). The principles underlying the method of limit equilibrium analyses of slope stability are as follows:

- A slip mechanism is postulated;
- The shear resistance required to equilibrate the assumed slip mechanism is calculated by means of statics;
- The calculated shear resistance required for equilibrium is compared with the available shear strength in terms of factor of safety; and
- The slip surface with the lowest factor of safety is determined through iteration.

A factor of safety is used to account for the uncertainty and variability in the strength and porewater pressure parameters, and to limit deformations.

Earthquake loading has been modeled using pseudostatic peak horizontal ground acceleration.

6.4.2 Analyzed Profile

Stability analyses were carried out for a typical profile, shown in Figure 6, of the proposed SWD. The foundation soils at this location were inferred to be silt and sand with varying percentages of gravel, grading into residuum and weathered granodiorite bedrock at depth. The presence of permafrost was incorporated into the stability evaluation. The depth to permafrost was assumed to be 1.6 m based on the thermal analyses and 2008 site characterization data.

6.4.3 Failure Scenario

It has been postulated for the stability analyses that some thaw at the base of the current active layer will occur and that the shear strength acting along the thawed frozen interface will be a controlling factor in the overall dump design; although it is the design intent to retain the permafrost within the foundation. A slow thaw rate would allow dissipation of pore pressure resulting from thaw.

The failure scenario assessed for overall dump stability was based on a deeper failure plane cutting through the dump to the permafrost interface in the foundation soil. The failure would then follow the permafrost interface and exit below the toe of the slope.

The underlying permafrost is considered much stronger than the unfrozen soil; therefore, the risk of shear failure through the frozen ground was not analysed.

The potential for creep displacements occurring deep within the permafrost has not been specifically analysed. Creep displacements, if they were to occur would be identified in the deformation monitoring system and by manifestation of cracking in the slope. These movements are slow, seldom resulting in substantial earth movement and there would be adequate time for mitigative measures.

6.4.4 Design Criteria

The guidelines for minimum design factor of safety have been adopted from the British Columbia Interim Guidelines for Investigation and Design of Mine Dumps (Waste Rock Design Manual).

The design criteria adopted from the guidelines are included in Table 11.

TABLE 11: DESIGN FACTORS OF SAFETY

Stability Condition	Minimum Design Factor of Safety
Long Term Stability	1.3
Seismic (Pseudostatic) Stability	1.1

The Waste Rock Design Manual recommends that seismic stability should be evaluated using pseudostatic horizontal accelerations that correspond to a 10% probability of exceedance in 50 years. When work was originally undertaken on the MWD in the mid 1990's, the Canadian Geological Survey Pacific Geosciences Centre provided a value for the peak horizontal acceleration for the project site of 0.15 g. An updated value for the site has been provided by the Pacific Geosciences Centre and the current peak horizontal acceleration that corresponds to a 10% probability of exceedance in 50 years is 0.055 g. The reasoning for the decrease in the peak ground acceleration provided by the Pacific Geosciences Centre is that seismic data collection has increased substantially in the Yukon in recent years. A better understanding of ground motion and improved modelling has resulted in revised predictions, which are considered to be more accurate and representative for the project area.

6.4.5 Material Properties

The material properties chosen for the waste rock and foundation materials in the stability analyses are presented in Table 12. The properties for the materials were selected based on the completed laboratory testing, and properties used in the design of the existing facilities on the site as detailed below.

TABLE 12: MATERIAL PROPERTIES USED IN STABILITY ANALYSES

Material	Angle of Internal Friction (º)	Cohesion (kPa)	Unit Weight (kN/m³)
Waste Rock	35	--	20.0
Unfrozen Foundation Soils	28	--	18.4
Permafrost	--	--	--

6.4.5.1 Waste Rock

It is anticipated that the majority of the waste rock from the open pit will be "rock like" with a friction angle of 37° to 38°; however, some of the waste rock excavated may not be as competent. Therefore, the waste rock parameters have been treated as "soil like" waste rock with a friction angle of 35°.

6.4.5.2 Unfrozen Foundation Soils

The active layer soils are typically a silty sand or silt and sand with trace to some gravel. This material is believed to be representative of the colluvium found at Testpit 97-TP01 (location shown in Figure 2). Direct shear testing of a silty sand colluvium sample from Testpit 97-TP01 indicates this material could exhibit strain-softening behaviour with a peak friction angle of 35º and a residual friction angle of 28º. Based on these results, strength parameters of $\theta' = 28º$ and $c' = 0$ kPa were used for the stability analyses.

6.4.5.3 Permafrost

For the purpose of these analyses, the frozen foundation soil has been modelled to behave as bedrock. This forces the critical failure surface to the contact of the thawed and frozen material.

6.4.6 Porewater Pressure Conditions

6.4.6.1 Natural Stratigraphy

The geotechnical drilling and testpitting at this site suggests that the existing active layer was relatively dry; however, free flowing water was noted at two locations. Therefore, it is possible that a shallow perched groundwater table may exist for short periods of the year.

A groundwater table at the original ground surface was used for the stability analyses.

6.4.6.2 Waste Rock

The potential for a phreatic surface developing within the dump slope was not considered due to the coarse gradation of the material will allow for any free water within the dump or its foundation to drain away from the facility. Should non ice-rich overburden be stored within the dump it will be located away from the overall slope of the dump.

6.4.7 Stability Analyses

The static and pseudostatic analyses have been evaluated assuming that a thin layer at the top of the existing permafrost will thaw with some porewater liberated, resulting in reduced shear strength. To analyse this reduction in shear strength, the unfrozen foundation soils (0-1.6 m) have been assigned a pore pressure parameter (Ru) from zero for a fully drained condition up to 0.2 to account for the possibility of porewater pressure build-up within the thawed foundation soil.

As expected, the stability of the dump is governed by the case where Ru = 0.2. Based on the thermal analyses predictions, the expected actual site conditions will be closer to Ru = 0 due to the slow rate of thaw, if any.

6.4.7.1 Static Cases

The results of the minimum factors of safety calculated during the static stability analyses are summarized in Table 13. Figure 6 presents the typical profile used for the analyses and the resulting critical slip surfaces.

TABLE 13: SUMMARY OF STATIC STABILITY ANALYSES RESULTS		
Case		Minimum Factor of Safety of the ROD
	Bench 1 Failure	
1	Static, groundwater table at original grade, Ru=0	1.60
2	Static, groundwater table at original grade, Ru=0.2	1.36
	Bench 2 Failure	
3	Static, groundwater table at original grade, Ru=0	2.03
4	Static, groundwater table at original grade, Ru=0.2	1.71
	Bench 5 Failure	
5	Static, groundwater table at original grade, Ru=0	2.43
6	Static, groundwater table at original grade, Ru=0.2	2.16

6.4.7.2 Pseudostatic (Earthquake) Cases

The results of the minimum factors of safety calculated during the pseudostatic stability analyses are summarized in Table 14. Figure 6 presents the typical profile used for the analyses and the resulting critical slip surfaces.

TABLE 14: SUMMARY OF PSEUDOSTATIC STABILITY ANALYSES RESULTS		
Case		Minimum Factor of Safety of the ROD
	Bench 1 Failure	
7	Pseudostatic (0.055g), groundwater table at original grade, Ru=0	1.32
8	Pseudostatic (0.055g), groundwater table at original grade, Ru=0.2	1.14
	Bench 2 Failure	
9	Pseudostatic (0.055g), groundwater table at original grade, Ru=0	1.70
10	Pseudostatic (0.055g), groundwater table at original grade, Ru=0.2	1.42
	Bench 5 Failure	
11	Pseudostatic (0.055g), groundwater table at original grade, Ru=0	1.98
12	Pseudostatic (0.055g), groundwater table at original grade, Ru=0.2	1.74

6.4.7.3 Results and Discussion

A porewater pressure parameter of Ru=0 is expected for the unfrozen foundation soils. For Ru=0, static cases 1, 3, and 5 indicate a factor of safety of 1.60 for Bench 1, 2.03 for Bench 2, to 2.43 for Bench 5. Pseudostatic cases 7, 9, 11 indicate a factor of safety of 1.32 for Bench 1, 1.70 for Bench 2, to 1.98 for Bench 5. These results indicate that the factor of safety for the overall dump stability exceed the design criteria in both the static and pseudostatic condition based on the expected porewater pressure parameter.

The sensitivity analyses assessing the effects of a porewater pressure parameter of Ru was utilized to account for the potential of excessive porewater pressure build up in the unfrozen foundation soils. Static cases 2, 4, and 6 assume a porewater pressure parameter of Ru=0.2 and had factor of safety ranges from 1.36 for Bench 1, 1.71 for Bench 2, to 2.16 for Bench 5. Pseudostatic cases 8, 10, 12 had a factor of safety of 1.14 for Bench 1, 1.42 for Bench 2, to 1.74 for Bench 5 assuming Ru=0.2. These results indicate that the factor of safety for the overall dump stability exceed the design criteria in both the static and pseudostatic condition for Ru=0.2.

A critical zone for slope stability within the placed waste material is the overall slope of the dump. This zone has been analyzed assuming waste rock material without a phreatic surface. Ensuring that pore pressures do not build-up in this area is critical to the overall stability of the dump; therefore, it is recommended that only free-draining waste rock be placed within this zone. This zone should extent from the design toe to a 30 m offset from the ultimate design crest. Finer grained waste rock and non ice-rich overburden must be placed upslope of this zone.

7.0 SURFACE WATER MANAGEMENT

There are several small ephemeral creeks that converge to the middle of this upper valley into the main drainage as shown in Figures 2 and 5. The majority of these ephemeral creeks originate with the proposed SWD footprint; however, a few enter the proposed footprint from the northwest between the IROD and Pelly laydown area. These also converge to the middle of this upper valley into the main drainage. These creeks collect the surface run-off water and route it down to and through the main haul road and into the Area 1 Open Pit area.

Surface water management has been considered for the following conditions; the main drainage that forms part of upper Minto creek, small ephemeral creeks that originate within the dump perimeter, and run-on water from ephemeral creeks entering the proposed footprint from the northwest.

To account for the main ephemeral drainage that forms a part of upper Minto creek, the SWD footprint limit includes a 30 m setback from this drainage. This will allow unaffected areas, specifically those east of the footprint, to continue to report to this drainage and minimize the impact of the proposed dump.

The ephemeral creeks originating within the dump will not pose any significant issues within the dump as they will be covered with waste material (Stage 1 and 3). Direct precipitation will then filter through the waste and report to the main drainage in the similar fashion it previously did. The construction of the overall dump slope with free draining waste rock (design toe to 30 m set back from design crest) will allow for this runoff water to flow through this portion of the dump relatively freely. Short term management of non ice-rich overburden slopes within the dump should include the construction of a waste rock shell cover immediately following the completion of overburden placed in the given area to reduce the potential for erosion to occur.

The few small ephemeral creeks entering the proposed footprint from the northwest between the IROD and Pelly laydown will be addressed with the staged construction. The Stage 1 dump footprint does not infringe on these water courses with the exception of the ramp. To enable run-on water to pass through the ramp and not pond within or in the vicinity of the dump, the waste rock used for construction must be coarse graded. This coarse material will act similar to a French drain through the ramp and allow for water flow. This practice was utilized during the construction of the main haul road.

During the 2009 freshet event, or any other high precipitation event, the effectiveness of the ramp material must be evaluated prior to the construction of Stage 2. Once it is confirmed that the ramp material is able to pass the run-on water effectively, the Pelly laydown extension can be infilled with coarse waster rock along with the remainder of the Stage 2 dump.

8.0 CONSTRUCTION RECOMMENDATIONS

Construction recommendations for the SWD are summarized below.

- Subgrade preparation for the proposed SWD is not required. The organic mat should remain undisturbed.
- Only coarse waste rock material sourced during pit development should be used within the exterior slope of the dump (design toe to 30 m setback from ultimate design crest). Finer grained waste rock and non ice-rich overburden must be placed within the interior of the dump.
- Minto must monitor the overburden material to determine whether it should be stored within the SWD (non ice-rich) or IROD (ice-rich).
- Regular visual inspections by Minto and EBA should be completed to note potential areas of instability.
- A monitoring program must be incorporated to provide photographs and record (as built) information of the construction progress. This information should include the division of waste rock and non ice-rich overburden material.
- Placement planning must account for the storage of non ice-rich overburden specifically in the 2nd and 3rd quarter of 2010 when a large volume will be excavated compared to the waste rock. A waste rock shell should be placed on the overburden slope immediately after its completion. Alternatively, an interior waste rock berm could be constructed prior to the placement of the overburden.
- The base of the ramp must be constructed with coarse waste rock along the zone of the ultimate side slope of the dump to allow for water movement away from the facility. The effectiveness of the ramp to allow for surface water runoff must be evaluated by EBA prior to the construction of Stage 2.
- Stage 3 construction can be completed in conjunction with Stage 1 and prior to Stage 2.

9.0 PERFORMANCE MONITORING

Performance monitoring is an integral part of the design, construction, and operation of the SWD. This section describes a recommended minimum monitoring program for the construction and operation phases of the dump.

The results of the monitoring program can be the basis of an adaptive management process that continually reviews the operation of the dump and will provide data for the final closure plan.

9.1 OVERBURDEN MATERIAL MONITORING

Monitoring of the overburden waste soils should be completed during open pit development to ensure only non ice-rich overburden waste is placed in the proposed SWD. Ice-rich waste should be placed in the IROD.

9.2 VISUAL MONITORING

Visual monitoring should be completed by Minto personnel daily and include the following:

- Inspection of the external slopes for any signs of distress;
- Inspection of the crest of the dump for any signs of transverse cracking;
- Inspection of the dump toe for any signs of seepage from the base: and
- Inspection of the dump toe for any signs of distress resulting from snow accumulation during the winter months. Snow accumulation depth at the dump toe should be noted with respect to surrounding area.

9.3 DEFORMATION SURVEYS

The breaklines (crest and toes) of the SWD should be surveyed at the completion of each main construction phase to determine the record (as built) geometry and to establish a basis for determining future deformations. These same breaklines should be resurveyed and reviewed in the summer of each year, or periodically at the discretion of the Geotechnical Engineer, to monitor deformation movements.

9.4 EXISTING INSTRUMENTATION MONITORING

During the 2008 site characterization program, four ground temperature cables and six Casagrande piezometers were installed. The location of these instruments is presented in Figure 7. One of the ground temperature cables and three of the piezometers are located within the proposed footprint will the remaining instruments are located east of the SWD.

These instruments should be monitored on a monthly basis or periodically at the discretion of the Geotechnical Engineer.

9.5 PROPOSED INSTRUMENTATION MONITORING

The installation of five instrumentation locations is recommended for additional monitoring of the SWD. Each location is to be installed through Bench 1 of the given area. Three locations are situated within Stage 1 while the remaining two are scheduled for Stage 3. Each location will have a vibrating wire piezometer, ground temperature cable and survey hub installed.

9.5.1 Vibrating Wire Piezometers

Vibrating wire piezometers are to be installed to confirm the assumed phreatic surfaces used for the stability analyses and monitor any build up of porewater pressure.

The piezometers shall have a 19 mm diameter steel housing with high air entry filter and integrated thermistor. The pressure rating for the piezometers will range from 0 - 170 kPa and 0 - 350 kPa. The electrical cable shall be PVC jacketed and rated for direct burial. The electrical cable shall be of sufficient length to reduce the need for field splicing.

9.5.2 Ground Temperature Cables

Ground temperature cables are to be installed to monitor the thermal regime of the foundation soils and waste rock fill.

The ground temperature cables will be prefabricated by EBA using 10 mm diameter, 20 conductor cable with a water block component included within the insulating sheath. The thermistor beads will be located along the cable and surrounded by a polyurethane protective moulding. The thermistor beads will be calibrated prior to installation.

9.5.3 Survey Hubs

The survey hubs will be constructed into the waste rock fill to monitor horizontal and vertical displacement within the instrumentation location.

The hubs will be comprised of a piece of rebar grouted into drill steel installed into the waste rock fill.

9.5.4 Monitoring Plan

Table 15 summarizes the minimum monitoring requirements for the proposed instrumentation.

TABLE 15: SCHEDULE FOR MONITORING

Item	Frequency
Vibrating Wire Piezometer	Biweekly (May through October) Monthly (November through April)
Ground Temperature Cable	Monthly
Survey Hubs	Monthly

9.5.5 Threshold Warning Levels

Threshold warning levels (triggers for action) for each type of instrumentation are specified in Table 16.

TABLE 16: THRESHOLD WARNING LEVELS

Item	Threshold Warning Level
Vibrating Wire Piezometer P1, P2, P3, P4, P5	Porewater pressure parameter (Ru) exceeds 0.2
Ground Temperature Cable T1, T2, T3, T4, T5	Temperatures greater than 0ºC for thermistor beads at depths greater than 1.5 m below original ground. (1)
Survey Hub SH1, SH2, SH3, SH4, SH5	Displacements greater than 150 mm in any given direction.

Note: (1) Assumes all beads below 1.5 m are located in permafrost at time of installation

9.5.6 Adaptive Management Approaches

Adaptive management approaches may be required should the threshold warning levels be exceeded. Each situation will vary depending on the severity and rate of the exceedance. Table 17 summarizes adaptive management approaches given a specific exceedance for a given monitoring function.

TABLE 17: ADAPTIVE MANAGEMENT APPROACHES

Item	Adaptive Management Approaches (1)
Vibrating Wire Piezometer	
Porewater pressure parameter (Ru) exceeds 0.2	- EBA will review existing piezometer, temperature, and survey data. - Monitoring and review will be increased to semi-weekly until determined unnecessary.
Porewater pressure parameter (Ru) exceeds 0.4	- EBA will review of existing piezometer, temperature, and survey data. - EBA will conduct a site visit and determine if waste placement and/or construction plan requires modification. - Monitoring and review will be increased to daily until determined unnecessary. - EBA will determine if additional instrumentation is required. - EBA will complete analysis of mitigative measures should exceedance continue.
Ground Temperature Cable	
Thaw at 1.5 m depth	- EBA will review existing piezometer, temperature, and survey data.
Thaw at 2.0 m depth and greater	- EBA will review existing piezometer, temperature, and survey data. - EBA will conduct a site visit and determine if waste placement and/or construction plan requires modification. - EBA will determine requirement for increased monitoring and review. - EBA will determine if additional instrumentation or analysis is required. - EBA will complete analysis of mitigative measures should exceedance continue. - Minto to complete survey of area of interest to monitor any future displacement, if any.

TABLE 17: ADAPTIVE MANAGEMENT APPROACHES (CONT'D)

Survey Hub	
Displacements between 150 mm and 500 mm	- EBA will review existing piezometer, temperature, and survey data. - Monitoring and review will be increased to bi-weekly until determined unnecessary. - Minto to complete survey of area of interest to monitor any future displacement, if any. - EBA will determine if waste placement and/or construction plan requires modification. - EBA will determine if additional instrumentation is required.
Displacements greater than 500 mm	- EBA will review existing piezometer, temperature, and survey data. - EBA will conduct a site visit and determine if waste placement and/or construction plan requires modification. - Monitoring and review will be increased to semi-weekly until determined unnecessary. - Minto to complete survey of area of interest to monitor any future displacement, if any - EBA will determine if additional instrumentation is required. - EBA will complete analysis of mitigative measures should exceedance continue.

Note: (1) Adaptive management approaches are subject to change depending on the severity and rate of the exceedance

10.0 ANNUAL INSPECTION

It is recommended that an annual site inspection be conducted by the Geotechnical Engineer during the operational period to document the performance of the SWD. The specific tasks of these visits include:

- Inspection of the external slopes for any signs of distress;
- Inspection of the crest of the dump for any signs of transverse cracking;
- Inspection of the dump for any signs of seepage from the base;
- Review of survey data to confirm conformance with design assumptions; and
- Preparation of an annual report that summarizes the data and provides recommendations for maintenance or modification to the dump.

11.0 LIMITATIONS

Geological conditions are innately variable and are seldom spatially uniform. At the time of this report, information on stratigraphy at the project was at identified borehole locations from past studies. In order to develop recommendations from this information, it is necessary to make some assumptions concerning conditions other than at the specifically tested locations. Adequate monitoring should be provided during construction to check that these assumptions are reasonable.

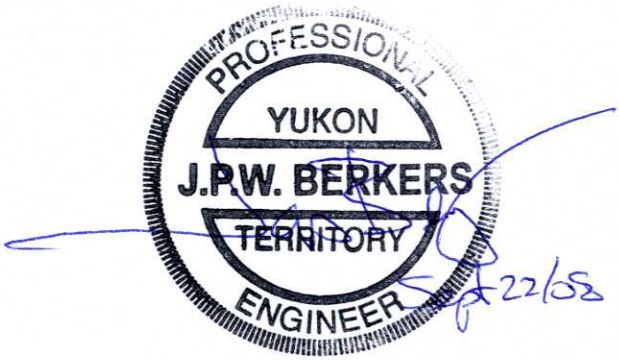
The recommendations prepared and presented in this report are based on the geotechnical data gathered by EBA from previous reports and site characterization programs and SRK in 2008. The provided data, in the form of geotechnical boreholes and associated laboratory index property test results, has been supplemented by EBA's direct observations of the site.

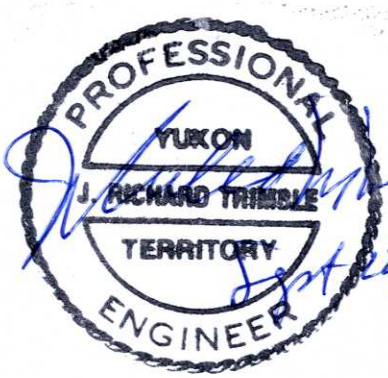
This report and the recommendations contained in it are intended for the sole use of Minto Explorations Ltd. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report if the information presented in this report is used or relied upon by any party other than that specified above for the proposed SWD. Any such unauthorized use of this report is at the sole risk of the user. Additional information regarding the use of this report is presented in the attached General Conditions, which form a part of this report.

12.0 CLOSURE

EBA trusts that this report satisfies your requirements. Please do not hesitate to contact the undersigned should you have any questions or comments.

Respectfully Submitted,
EBA Engineering Consultants Ltd.





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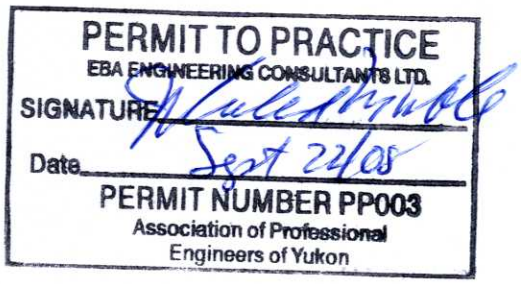

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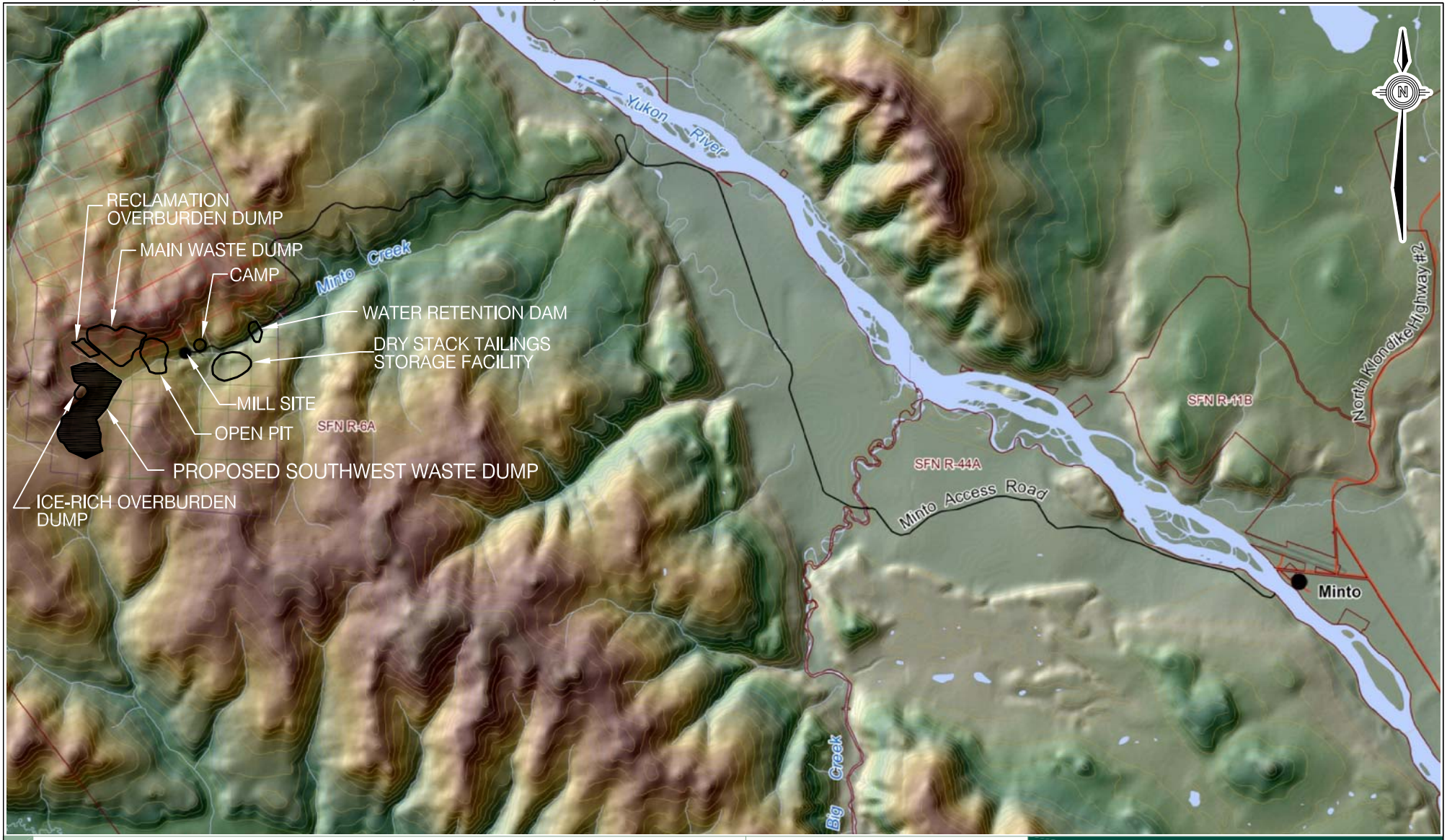
FIGURES



1000m 0 1000m 2000m 3000m 4000m

BAR SCALE

CLIENT

MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

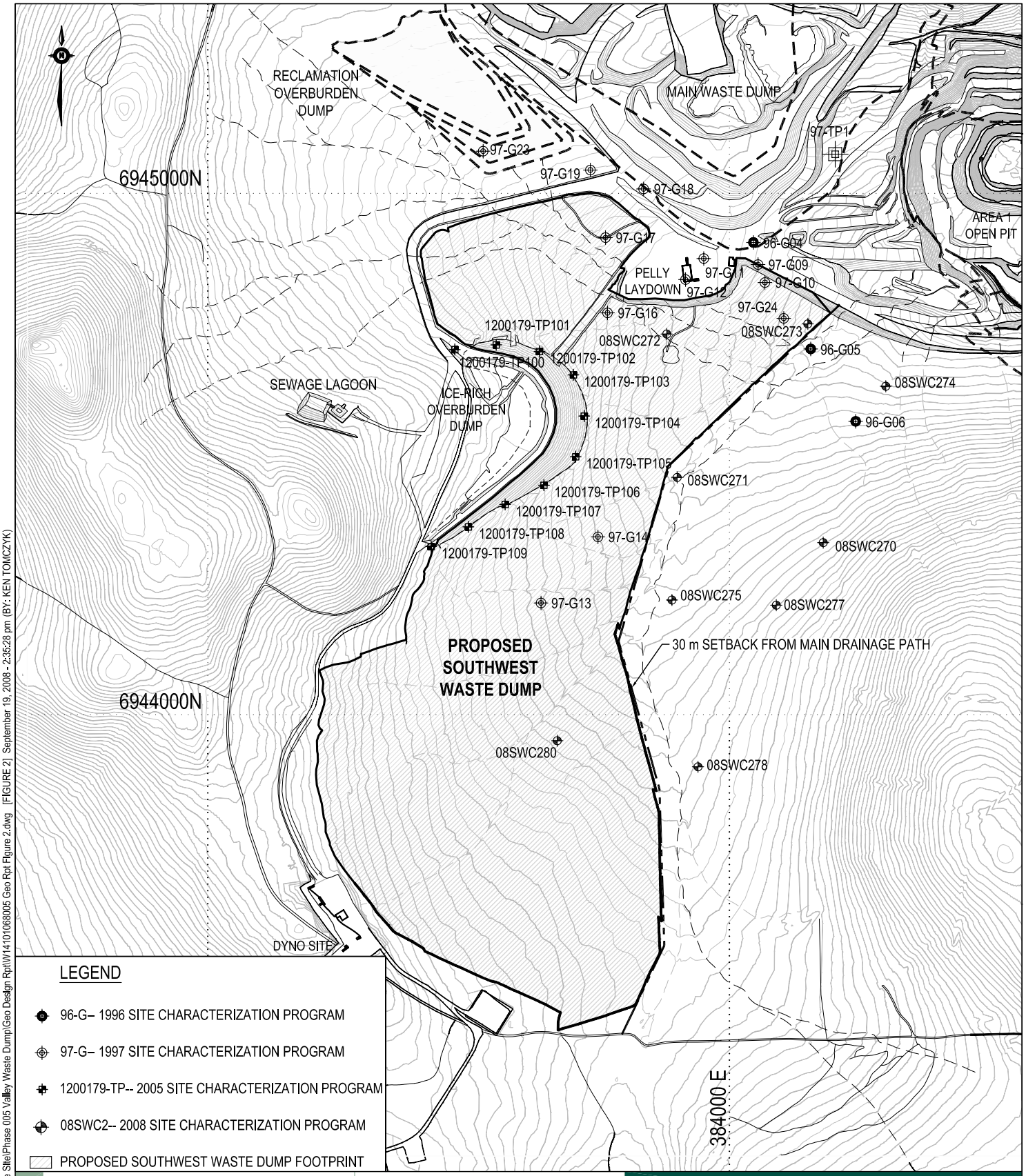
LOCATION PLAN

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JSB	0

OFFICE	DATE
EBA-WHSE	AUGUST 22, 2008

Figure 1



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CLIENT

MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

PROPOSED FOOTPRINT LIMIT AND EXISTING GEOTECHNICAL INFORMATION

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
	KJT	JPB	0
OFFICE	DATE		
EBA-WHSE	AUGUST 22, 2008		

Figure 2

RECLAMATION OVERBURDEN DUMP

DESIGN CREST

DESIGN TOE

MAIN WASTE DUMP

AREA 1 OPEN PIT

MILL

CAMP

6945000N

PELLY LAYDOWN

ICE-RICH OVERBURDEN DUMP

PROPOSED SOUTHWEST WASTE DUMP

30 m SETBACK FROM MAIN DRAINAGE

PROPOSED AREA 2 OPEN PIT

DRY STACK TAILINGS STORAGE FACILITY

6944000N

DYNO EXPLOSIVES

383000 E

384000 E

385000 E

386000 E

0 500

Scale: 1: 10 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP MINTO MINE, YT

SITE PLAN

EBA Engineering Consultants Ltd.

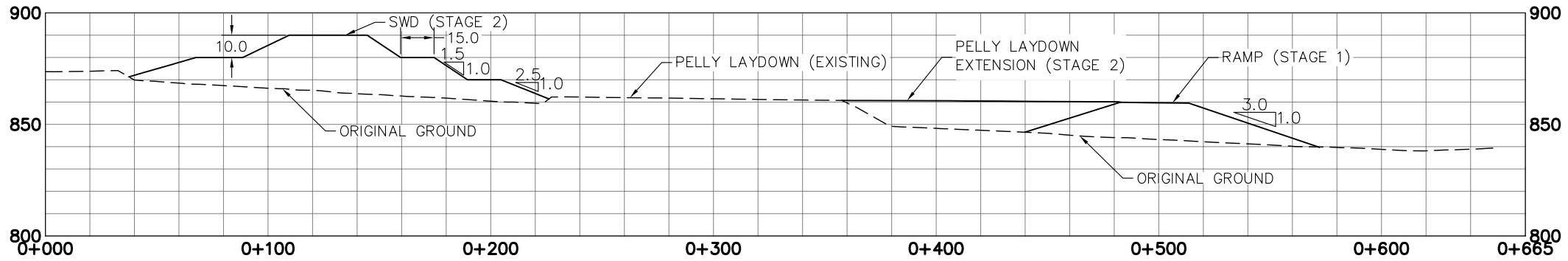
PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JPB	0

OFFICE: WHSE

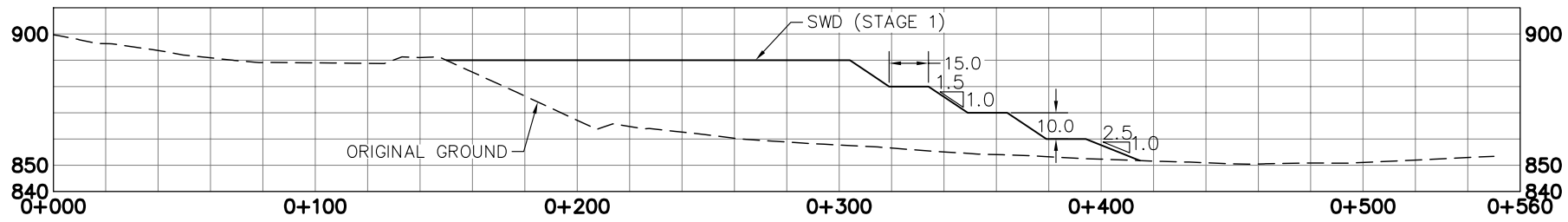
DATE: AUGUST 22, 2008

Figure 3

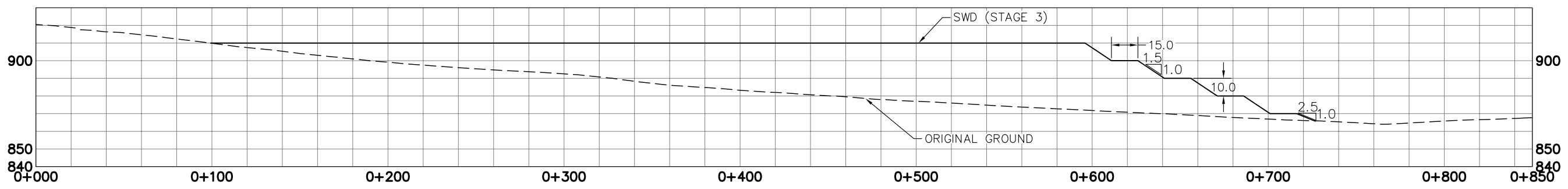
C:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 005 Valley Waste Dump\Geo Design Rpt\W14101068005 Geo Rpt figure 3-5.dwg [FIGURE 3] September 16, 2008 - 11:04:16 am (BY: KEN TOMCZYK)



A/3 NORTH SECTION
SCALE 1:2,500



B/3 CENTRAL SECTION
SCALE 1:2,500



C/3 SOUTH SECTION
SCALE 1:2,500

CLIENT

MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

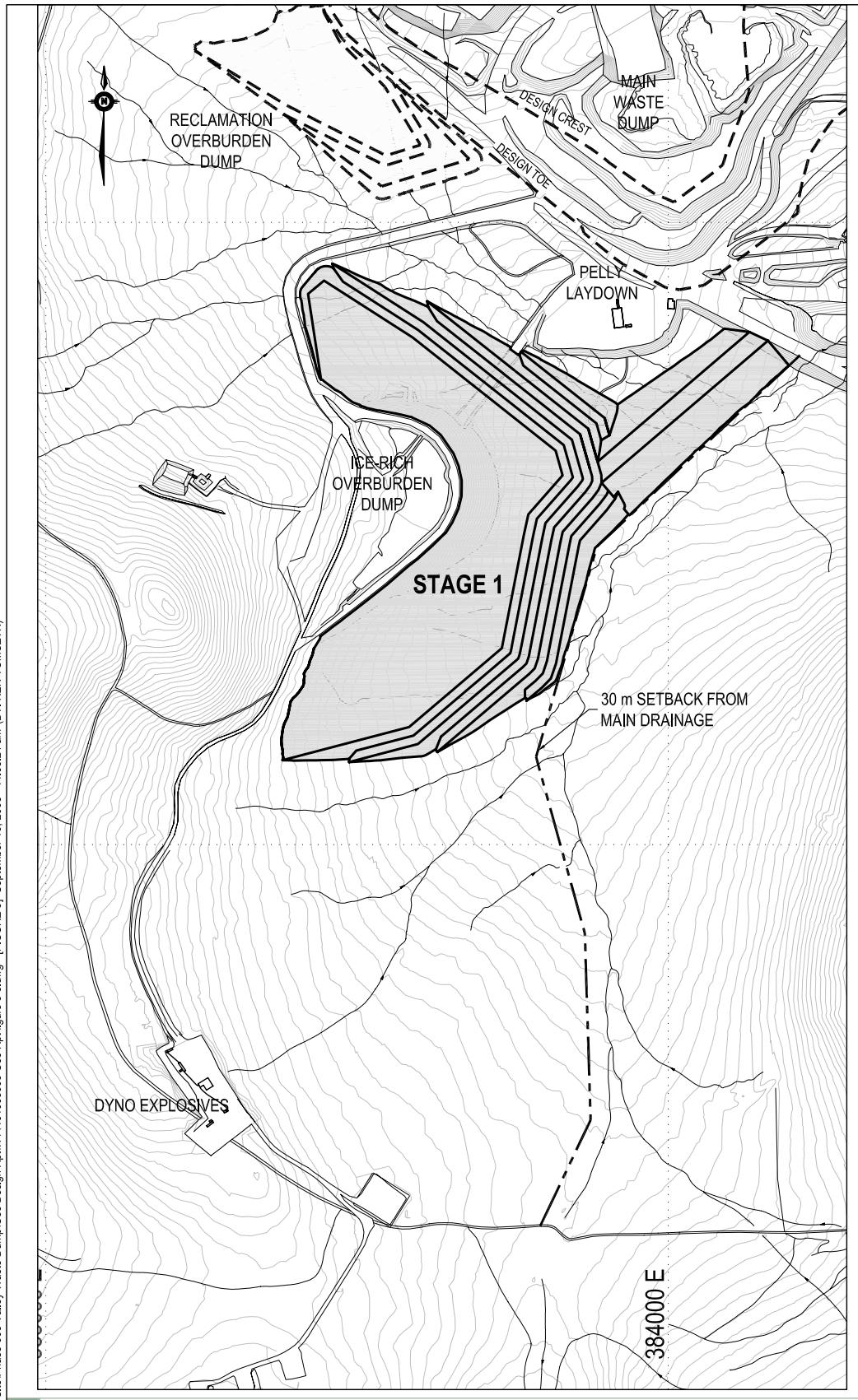
SECTIONS

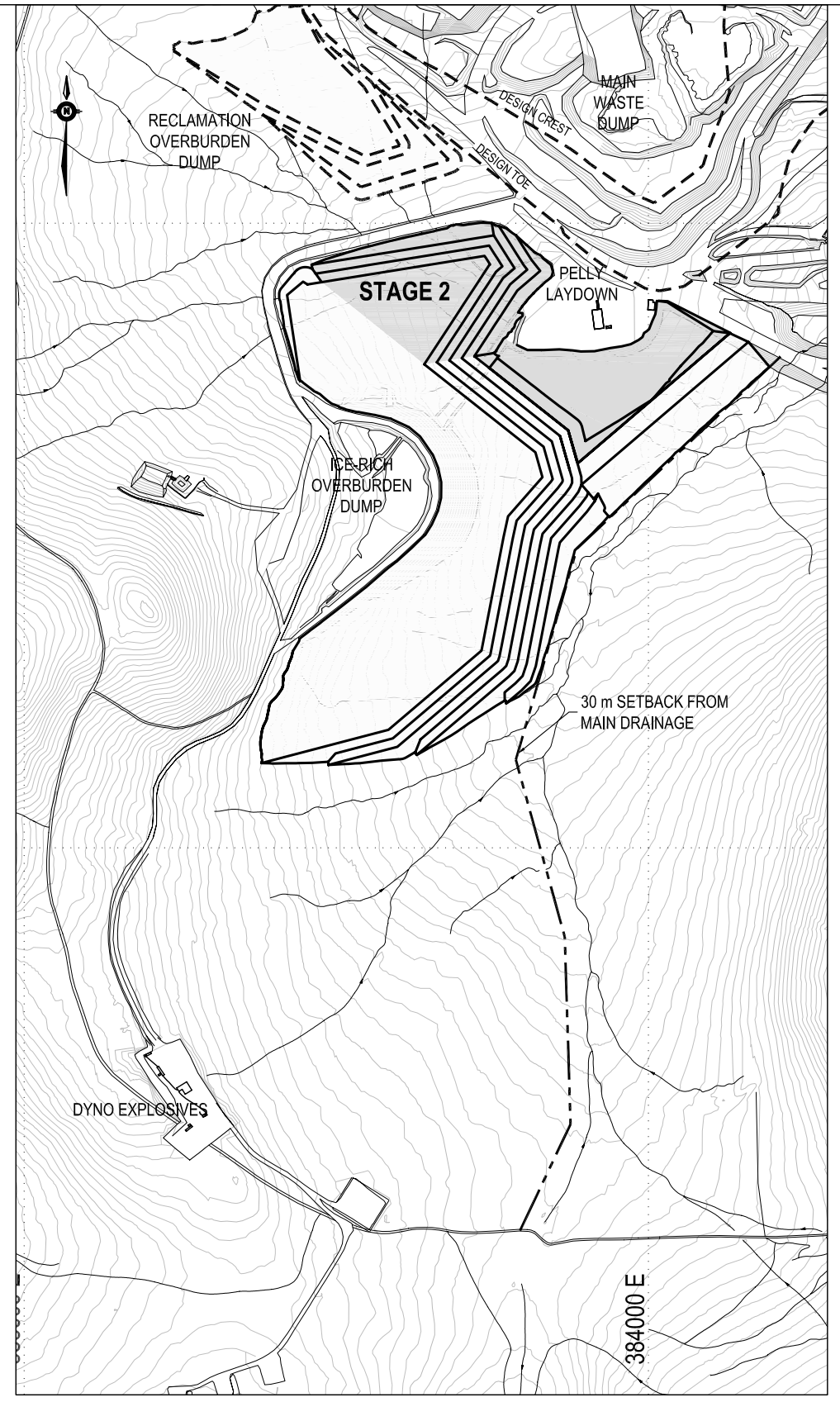
EBA Engineering Consultants Ltd.

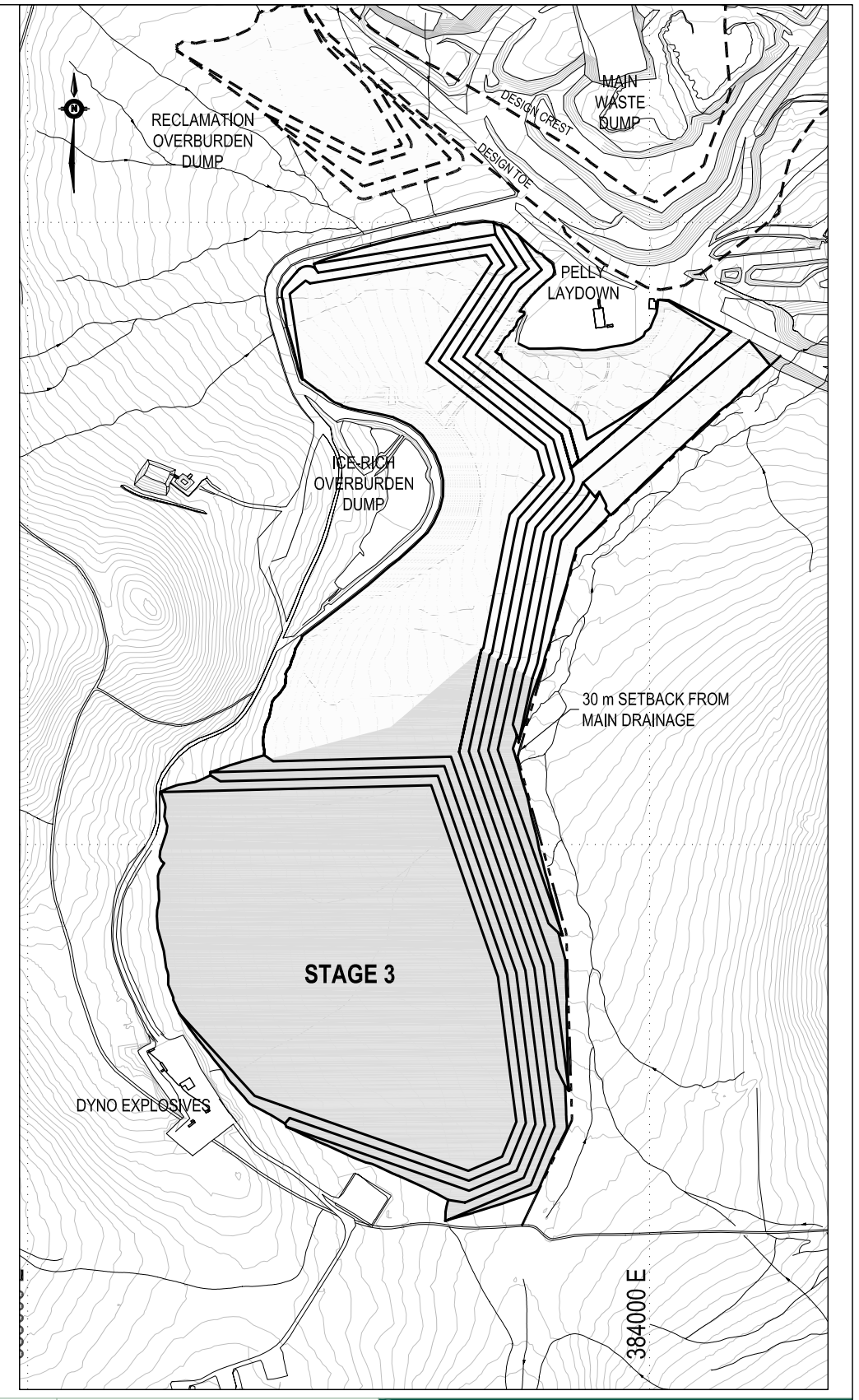
PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JPB	0

OFFICE: WHSE
DATE: AUGUST 22, 2008

Figure 4







0 500
Scale: 1: 10 000 (metres)

CLIENT
MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

STAGING PLAN

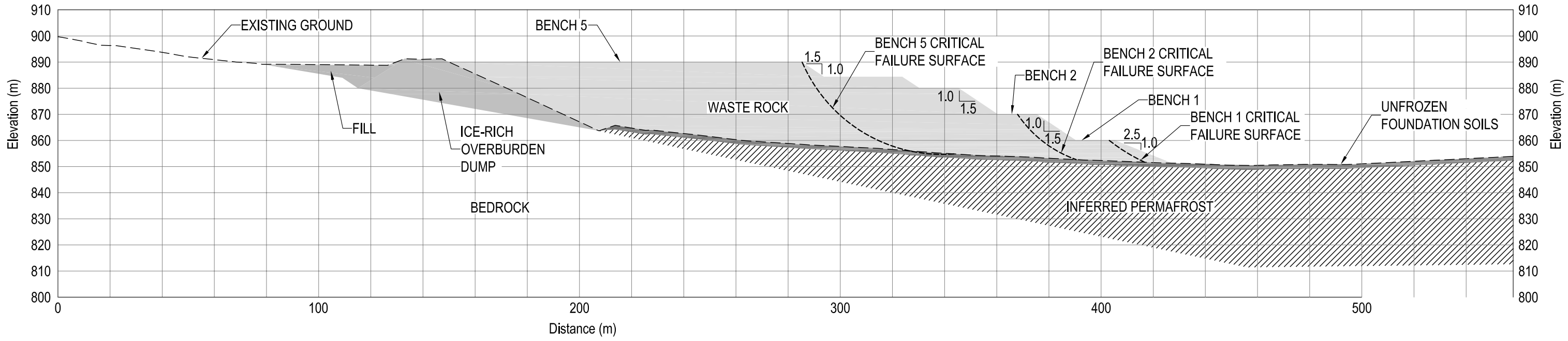
EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JPB	0
OFFICE: WHSE	DATE: AUGUST 22, 2008		

Figure 5

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 005 Valley Waste Dump\Geo Design Rpt\W14101068005 Geo Rpt figure 3-5.dwg [FIGURE 5] September 16, 2008 - 11:08:24 am (BY: KEN TOMCZYK)

SOIL PARAMETERS			
MATERIAL	BULK DENSITY (kN/m^3)	FRICTION ANGLE (DEGREES)	COHESION (kPa)
WASTE ROCK	20.0	35	0
UNFROZEN FOUNDATION SOILS	18.4	28	0
PERMAFROST	--	--	--



ANALYZED SECTION
SCALE 1: 1500

CLIENT
MINTO EXPLORATIONS LTD.

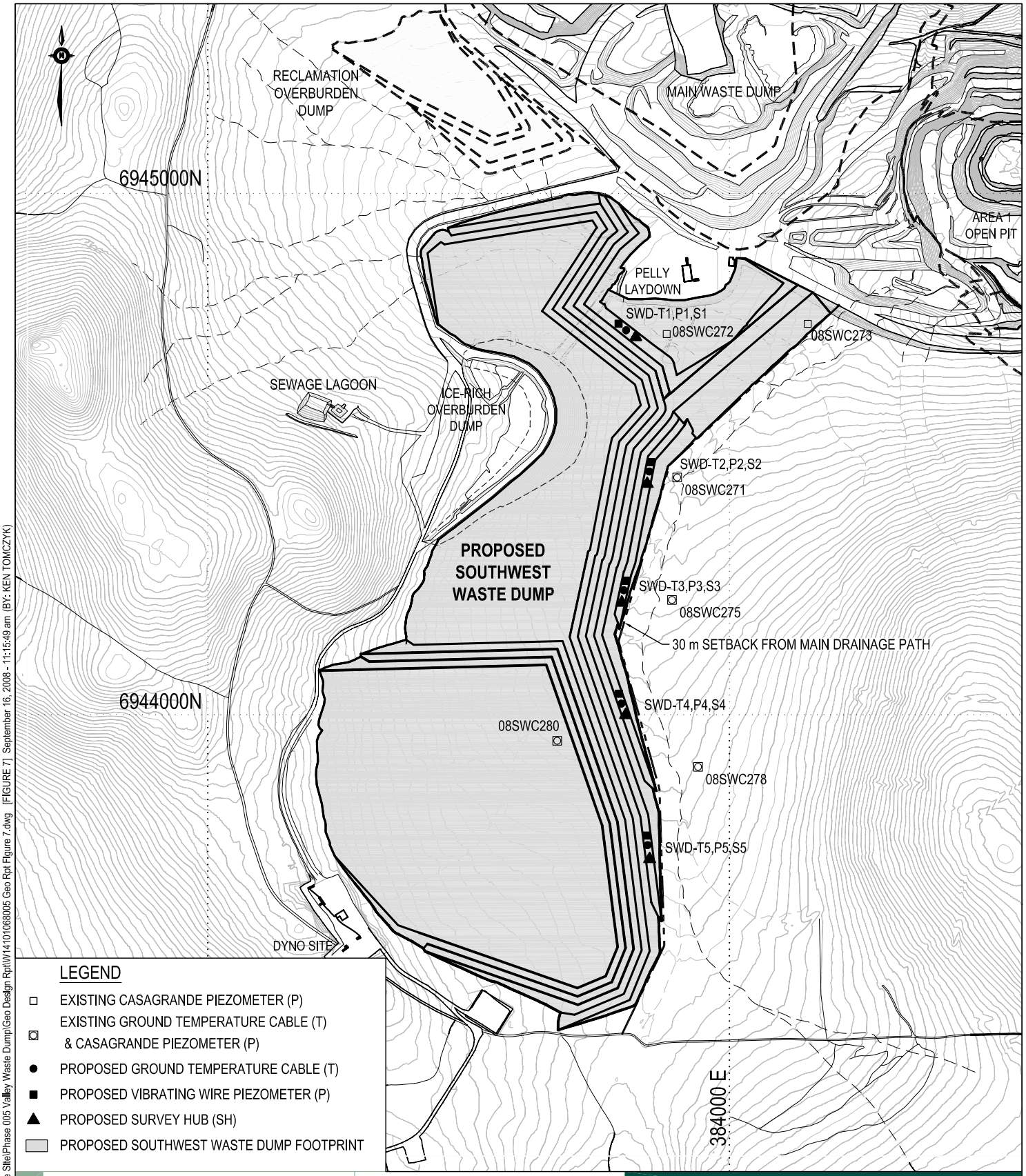
PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

TYPICAL CROSS SECTION FOR STABILITY ANALYSIS

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JPB	0
OFFICE: WHSE	DATE: SEPTEMBER 4, 2008		

Figure 6



0 500

Scale: 1: 10 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

PROPOSED SOUTHWEST WASTE DUMP
MINTO MINE, YT

PROPOSED AND EXISTING INSTRUMENTATION

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W14101068.005	KJT	JPB	0
OFFICE: EBA-WHSE	DATE: SEPTEMBER 5, 2008		

Figure 7

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 005 Valley Waste Dump\Geo Design Rpt\W14101068005 Geo Rpt Figure 7.dwg [FIGURE 7] September 16, 2008 - 11:15:49 am (BY: KEN TOMCZYK)

APPENDIX

APPENDIX A GENERAL CONDITIONS

PROJECT DESIGN REPORT – GENERAL CONDITIONS

This Design Report incorporates and is subject to these "General Conditions".

1.0 PURPOSE

These General Conditions apply to this Design Report that EBA has prepared in fulfillment of certain project specific requirements that have been previously agreed to by EBA and its Client. The Design Report may include plans, drawings, profiles and other support documents that collectively constitute the Design Report.

2.0 USE OF REPORT

This Design Report pertains to a specific site, a specific development, and a specific scope of work. The Report and all supporting documents are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, analyses or other contents of the Design Report when it is used or relied upon by any party other than EBA's Client, unless authorized in writing by EBA. Any unauthorized use of the Design Report is at the sole risk of the user.

3.0 CALCULATIONS AND DESIGNS

EBA has undertaken design calculations and has prepared project specific designs in accordance with terms of reference that were previously set out in consultation with, and agreement of, EBA's client. These designs have been prepared to a standard that is consistent with industry practice. Notwithstanding, if any error or omission is detected by EBA's client or any party that is authorized to use the Design Report, the error or omission should be immediately drawn to the attention of EBA.

4.0 GEOTECHNICAL CONDITIONS

A Geotechnical Report is commonly the basis upon which the specific project design has been completed. It is incumbent upon EBA's Client, and any other authorized party, to be knowledgeable of the level of risk that has been incorporated into the project design, in consideration of the level of the geotechnical information that was reasonably acquired to facilitate completion of the design.

If the Geotechnical Report for the project was prepared by EBA, it would have been included in the Project Design Report. That Report contains General Conditions that should be read in conjunction with these General Conditions.

5.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless so stipulated in the Project Design Report, EBA was not retained to investigate, address or consider, and has not investigated, addressed or considered any environmental or regulatory issues associated with the project specific design.

6.0 STANDARD OF CARE

Services that EBA provided to complete this Design Report have been undertaken in a manner that is consistent with the approach ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services were provided. Engineering judgement has been applied in developing design elements that are integral to this Project Design Report. No other warranty or guarantee, expressed or implied, is made concerning the content of this Project Design Report.

6.0 ALTERNATIVE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX

APPENDIX B SITE CHARACTERIZATION PROGRAMS - BOREHOLE AND TESTPIT LOGS

MINTO CREEK MINE DEVELOPMENT	CLIENT: MINTO EXPLORATIONS LTD.	TEST PIT NO: 96-G04
GEOTECHNICAL EVALUATION-WEST WASTE DUMP	DRILL: CME-75 C/W SOLID SHAFT AUGERS	PROJECT NO: 0201-11509
MINTO CREEK, YUKON	UTM ZONE: 8 N6944726.8 E384145.3	ELEVATION: 2787.30 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

SOIL DESCRIPTION

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 24 48 72 96

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH(ft)
0.0					MOSS, ORGANIC SILT	0.0
	■	1			SAND AND SILT – some gravel; fine to coarse angular sand; fine to medium angular gravel; frozen, Nbe; brown	
1.0					– more gravel and sand with depth; grading into residuum	4.0
	⊠	2			– occasional zones of SILT – some sand throughout	
2.0						6.0
	■	3				
						8.0
3.0					GRAVEL AND SAND (residuum) – trace to some silt; occasional silt inclusions; fine angular gravel, some coarse; sand is angular to subangular; unfrozen; damp; dense; light brown	10.0
	⊠	4			– slow, rough drilling	
					– drilling refusal @ 3.7 m	12.0
					END OF BOREHOLE @ 3.7 m	
4.0						14.0
5.0						16.0
6.0						18.0

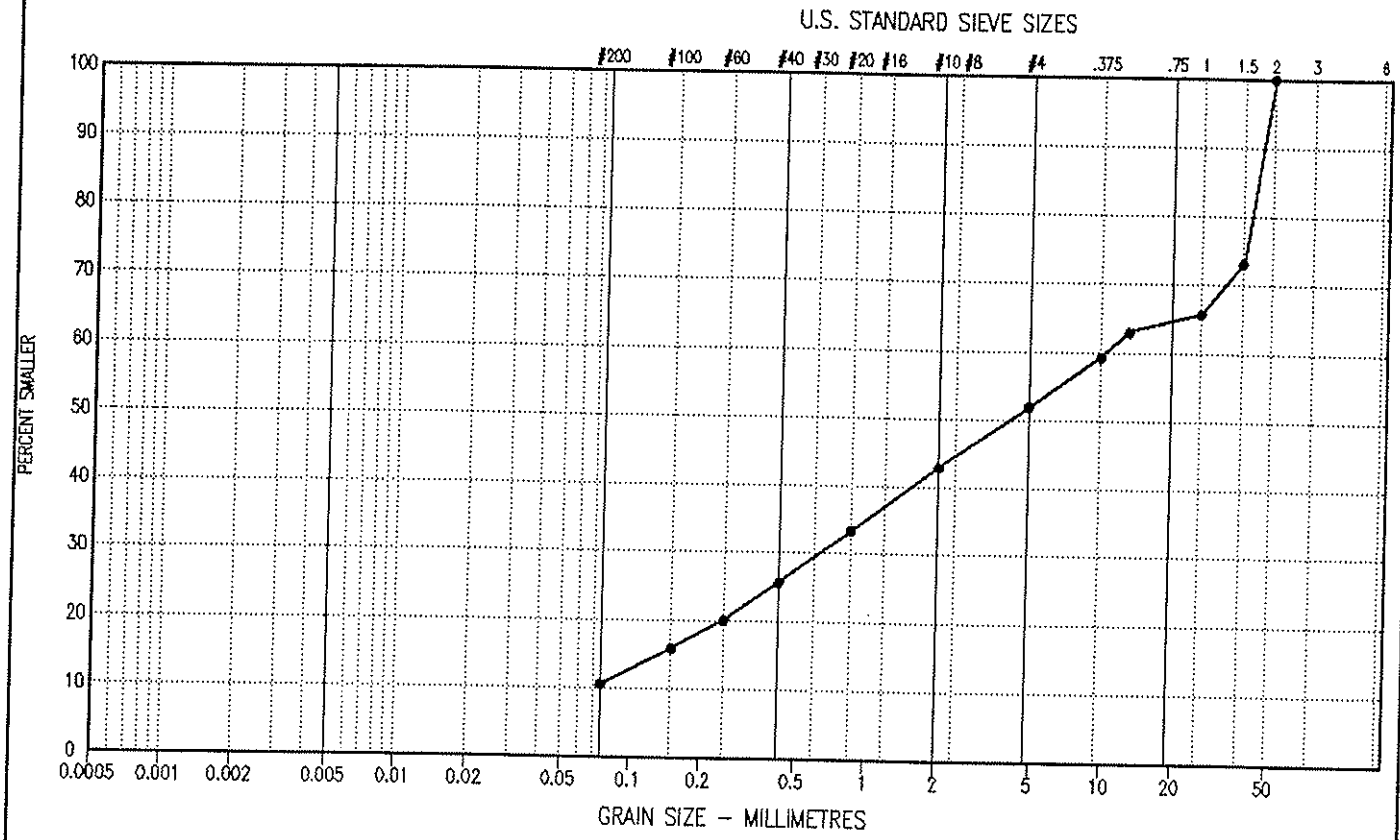
EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: CRH	COMPLETION DEPTH: 3.7 m
	REVIEWED BY: CRH	COMPLETE: 96/07/05
	Fig. No:	Page 1 of 1

96/08/13 03:42PM (YUKON-6)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●	96-G04	3.10 – 3.60	10.6	41.4	48.0	143.3	0.6	GP-GM

Project: 0201-11509

Date Tested: 96/07/11 BY: AA

Tested in accordance with ASTM D422 unless otherwise noted.

MINTO CREEK MINE DEVELOPMENT	CLIENT: MINTO EXPLORATIONS LTD.	TEST PIT NO: 96-G05
GEOTECHNICAL EVALUATION-WEST WASTE DUMP	DRILL: CME-75 C/W SOLID SHAFT AUGERS	PROJECT NO: 0201-11509
MINTO CREEK, YUKON	UTM ZONE: 8 N6944522.9 E384254.8	ELEVATION: 2739.30 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

SOIL DESCRIPTION

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 24 48 72 96

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0					ORGANIC SILT/MOSS
	■	1			ORGANIC SILT – some clay, frequent organic inclusions; frozen, Nbe; strong organic odour
1.0	■	2			SAND – trace of silt; occasional silt inclusions; Vx,c 10 to 15% ICE; medium to coarse sand; light brown
					– grinding drilling below 1.5 m
2.0					SAND AND SILT – some gravel, trace of clay, occasional cobbles; low plastic; frozen, Vx,c 5 to 10% ICE; grey
3.0	■	3			– some clay by 3.0 m – 15 to 20% ICE from 3.0 to 4.0 m – 10 to 15% below 4.0 m
4.0	■	4			
5.0					END OF BOREHOLE @ 5.2 m – samples below 1.5 m exhibit high dry strength
6.0					

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

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: CRH	COMPLETION DEPTH: 5.2 m
REVIEWED BY: CRH	COMPLETE: 96/07/04
Fig. No:	Page 1 of 1

96/08/13 03:43PM (YUKON-6)

MINTO CREEK MINE DEVELOPMENT	CLIENT: MINTO EXPLORATIONS LTD.	TEST PIT NO: 96-G06
GEOTECHNICAL EVALUATION-WEST WASTE DUMP	DRILL: CME-75 C/W SOLID SHAFT AUGERS	PROJECT NO: 0201-11509
MINTO CREEK, YUKON	UTM ZONE: 8 N6944384.2 E384340.8	ELEVATION: 2798.60 (m)

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▯ CRREL BARREL

SOIL DESCRIPTION

■ STANDARD PENETRATION ■ 10 20 30 40

PLASTIC M.C. LIQUID 24 48 72 96

■ PERCENT GRAVEL ■ 20 40 60 80

● PERCENT SAND ● 20 40 60 80

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

◆ PERCENT CLAY ◆ 20 40 60 80

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH(ft)
0.0					ORGANIC SILT – frequent roots; soft; wet; black	0.0
					SAND AND SILT – trace of clay, occasional fine gravel; mica platelets dissemented throughout; fine to medium sand; low plastic; frozen, Nbe; brown	
1.0		1			– more sand below 1.2 m	4.0
2.0		2				6.0
						8.0
3.0					ICE INCLUSION, 0.5 m in thickness	10.0
					SILT – trace to some fine sand; Vx; 15 to 20% ICE; brown; mild to strong organic odour	12.0
4.0					– some zones of ash	14.0
5.0		3				16.0
					END OF BOREHOLE @ 5.3 m	18.0
6.0						

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

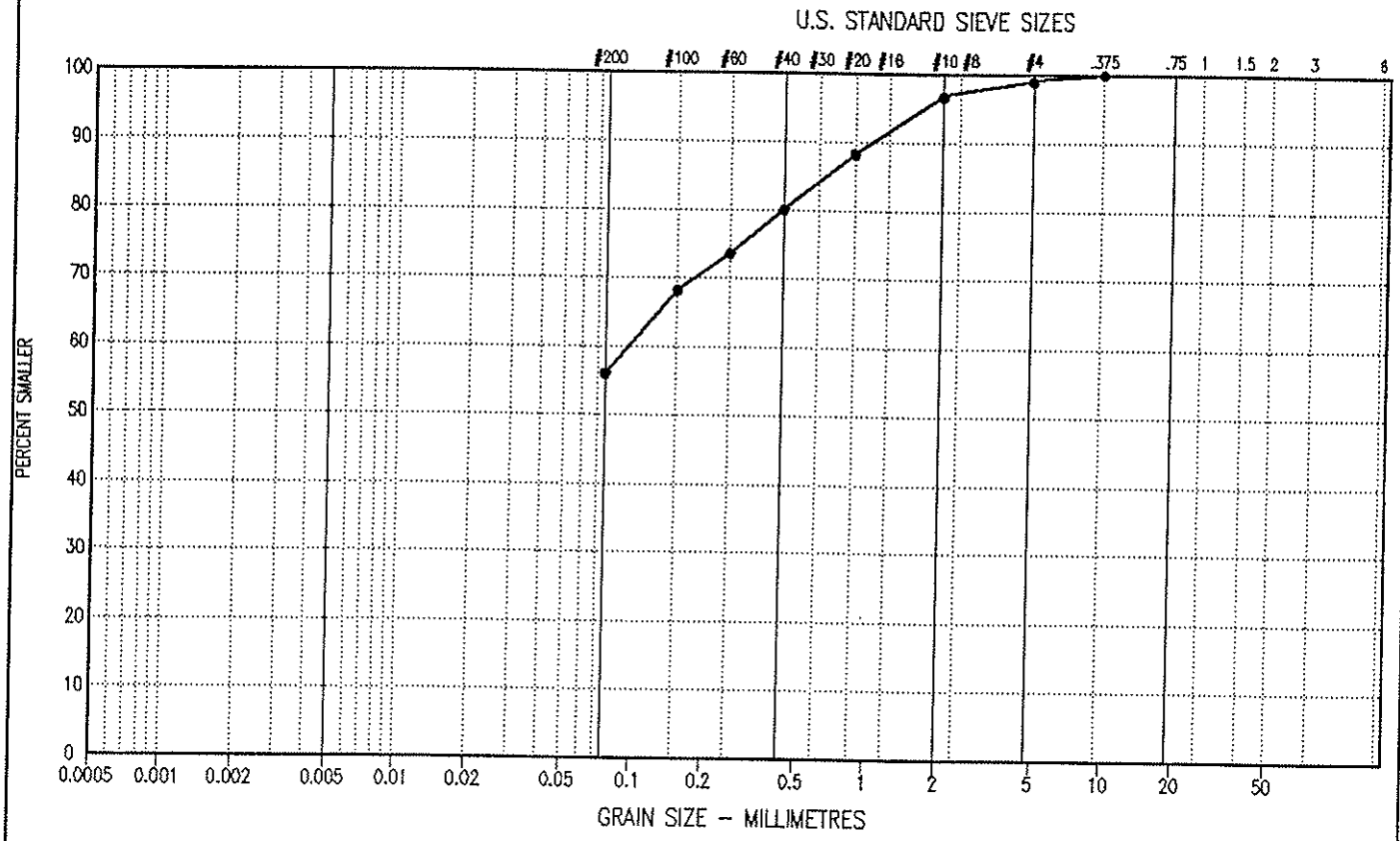
LOGGED BY: CRH	COMPLETION DEPTH: 5.3 m
REVIEWED BY: CRH	COMPLETE: 96/07/04
Fig. No:	Page 1 of 1

96/08/14 10:36AM (YUKON-6)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●—●	96–G06	0.70 – 1.00	55.9	43.0	1.1	7.4	1.2	

Project: 0201–11509

Date Tested: 96/07/11 BY: AA

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G09
GEOTECHNICAL EVAL. – WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: – N – E –	ELEVATION: 2776.3 '

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0					MOSS AND ROOT MAT	UNFROZEN
		57			SILT & SAND – some clay, trace of gravel, fine grained sand, low to non-plastic, soft, very moist, olive brown	
1.0						
		58			– hole sloughing	
2.0					– becomes some gravel to gravelly fine to med. grained sub-rounded below 1.8 m – damp to moist below 1.8 m – silt content decreases below 1.8 m – sand content increases below 1.8 m	
3.0		59				
					– grinding and hard drilling below 3.4 to 3.7 m – coarse grained sand, some silt, some gravel fine to med. grained 3.4 m to 3.7 m	PERMAFROST Nf
4.0					– some sand below 3.7 m – silt content increases, trace of clay below 3.7 m	–0.8 degree C.
5.0		60			– no gravel below 3.7 m	
					– grinding below 5.2 m	
6.0		61			SAND – gravelly, some silt, coarse grained sand, fine to med. grained sub-rounded gravel, compact, moist, brownish grey	0.0 degree C.
					END OF BOREHOLE @ 6.1 m (REFUSAL) – sloughing from top of hole NOTE: Mine Coordinates N 10280.00 E 8310.00	
7.0						
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C): –1 0 1 2

PLASTIC M.C. LIQUID: 10 20 30 40

PERCENT GRAVEL: 20 40 60 80

PERCENT SAND: 20 40 60 80

PERCENT SILT OR FINES: 20 40 60 80

PERCENT CLAY: 20 40 60 80

DEPTH(m): 0.0 2.0 4.0 6.0 8.0 10.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

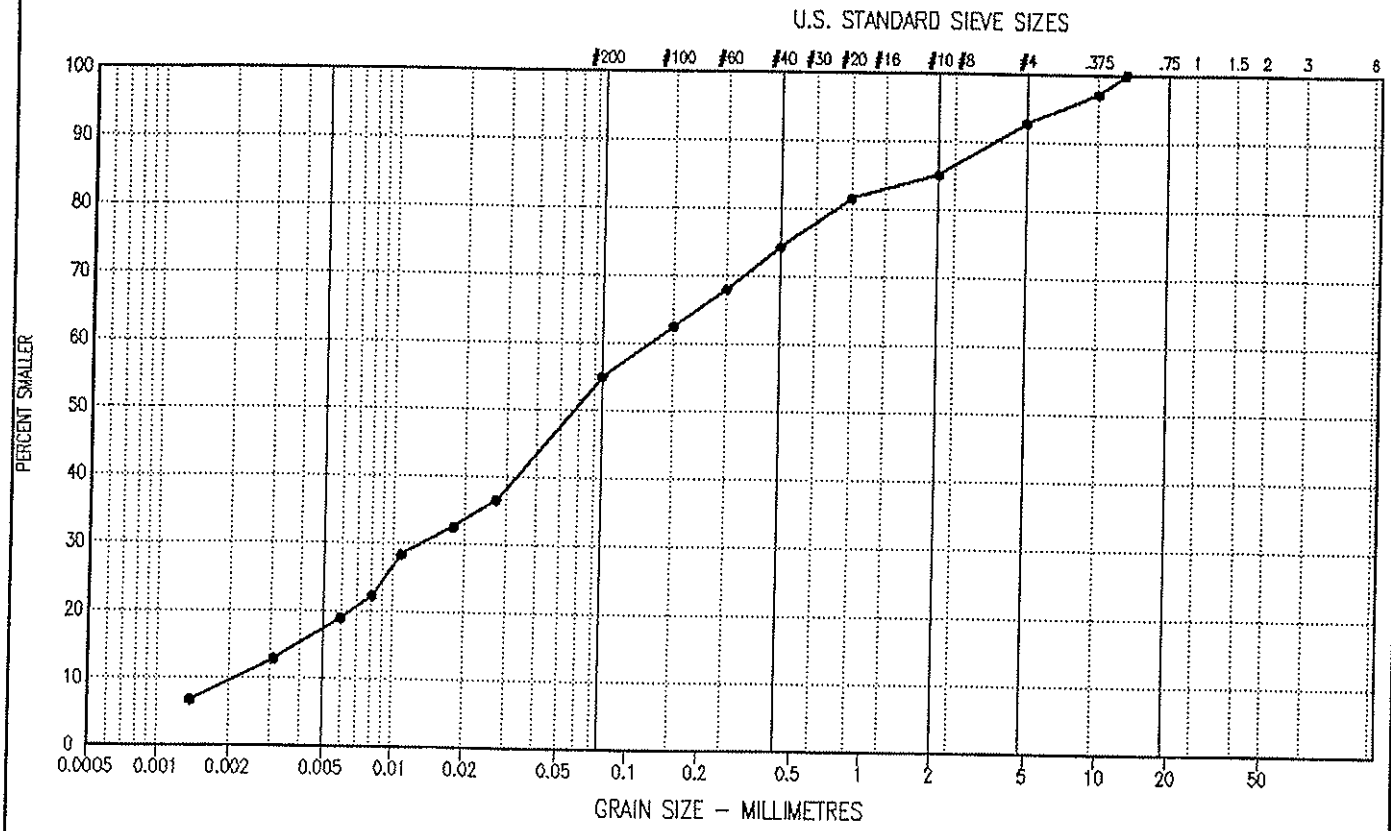
LOGGED BY: JSB	COMPLETION DEPTH: 6.1 m
REVIEWED BY: CRH	COMPLETE: 97/09/11
Fig. No:	Page 1 of 1

98/02/17 11:47AM (YUK-PT10)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●—●	97-G09	2.80 – 3.00	16.8	38.0	38.0	7.2	54.9	0.7	

Project: 0201-97-11509

Date Tested: 97/10/21 BY: JSB

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G10
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2768.8'

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

SOIL DESCRIPTION

CONE PENETRATION 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

PERCENT GRAVEL 20 40 60 80

PERCENT SAND 20 40 60 80

PERCENT SILT OR FINES 20 40 60 80

PERCENT CLAY 20 40 60 80

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0						MOSS AND ROOT MAT
		62				SILT - sandy, well graded sand, low plastic, soft, very moist, olive brown
1.0						- trace of fine grained gravel below 0.5 m
		63				- color changes to light greyish brown around 0.9 m
2.0						- becomes gravelly, fine to med. grained below 2.2 m
3.0		64				- 0.0 degree C. at 3.0 m - some visable ice inclusion Vr > 10% various depths from 3.2 m - 4.5 m
4.0						
		65				
5.0						- dense hard drilling below 4.9 m
						SAND - silty, some gravel, coarse grained sand, fine to med. grained sub-angular gravel, moist, dense, light greyish brown
6.0		66		SM		
						- grinding and hard drilling below 6.7 m
7.0		67				- broke off fish tail bit, lost in hole
						END OF BOREHOLE @ 7.0 m (REFUSAL)
						- major slough throughout
						NOTE: Mine Coordinates N 10169.00 E 8357.00
8.0						
9.0						
10.0						

INSTRUMENTATION DATA

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0, 24.0, 26.0, 28.0, 30.0, 32.0, 34.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

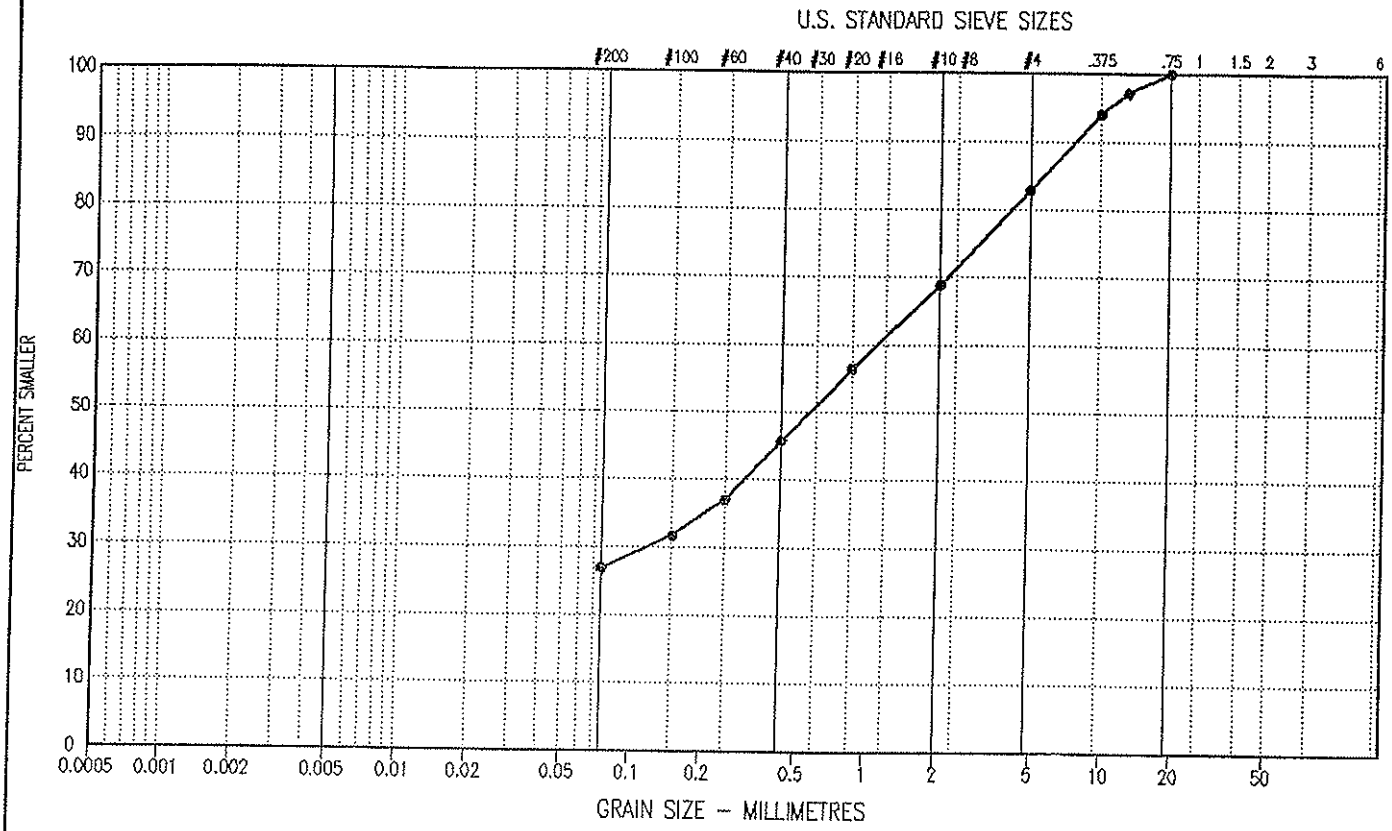
LOGGED BY: JSB	COMPLETION DEPTH: 7 m
REVIEWED BY: CRH	COMPLETE: 97/09/11
Fig. No:	Page 1 of 1

98/01/14 09:54AM (YUKON-10)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
⊕——⊕	97-G10	5.90 – 6.10	26.9	55.9	17.2	42.4	0.5	SM

Project: 0201-97-11509 Date Tested: 97/10/20 BY: RS

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G11
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2798.7'

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0					MOSS AND ROOT MAT	UNFROZEN
		68			SILT & SAND - some clay, fine to med. grained sand, very moist, greyish brown	
1.0					- trace of fine grained sub-rounded gravel below 0.4 m	
		69			- sand content increases slightly below 0.4m	
2.0						
3.0		70				PERMAFROST -0.6 degree C. Nf
4.0					- moisture content decreases around 3.7 m	
					- coarse grained sand below 3.7 m	
5.0		71			- silt content decreases to some silt below 4.8 m	
6.0		72			- becomes silty, clayey below 5.9 m	
					END OF BOREHOLE @ 6.1 m (REFUSAL)	
					- major slough throughout	
					- no water table encountered	
7.0					NOTE: Mine Coordinates N 10306.00 E 7968.00	
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C): -1 0 1 2

PLASTIC M.C. LIQUID: 10 20 30 40

PERCENT GRAVEL: 20 40 60 80

PERCENT SAND: 20 40 60 80

PERCENT SILT OR FINES: 20 40 60 80

PERCENT CLAY: 20 40 60 80

DEPTH(m): 0.0 2.0 4.0 6.0 8.0 10.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: CRH
Fig. No:

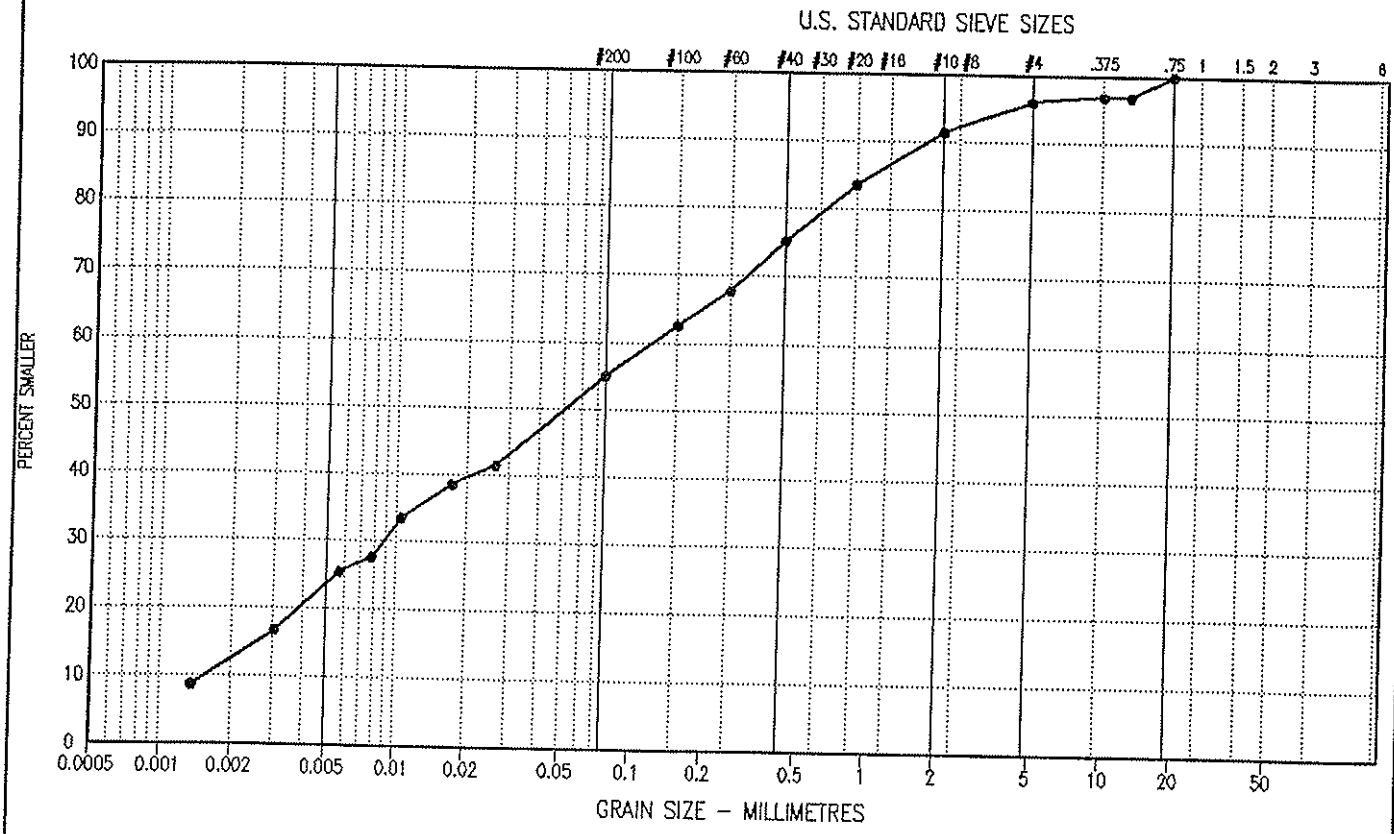
COMPLETION DEPTH: 6.1 m
COMPLETE: 97/09/12

08/02/17 11:48AM (YUK-PITS)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	97-G11	5.90 – 6.10	23.1	31.9	41.0	4.0	76.4	0.4	

Project: 0201-97-11509

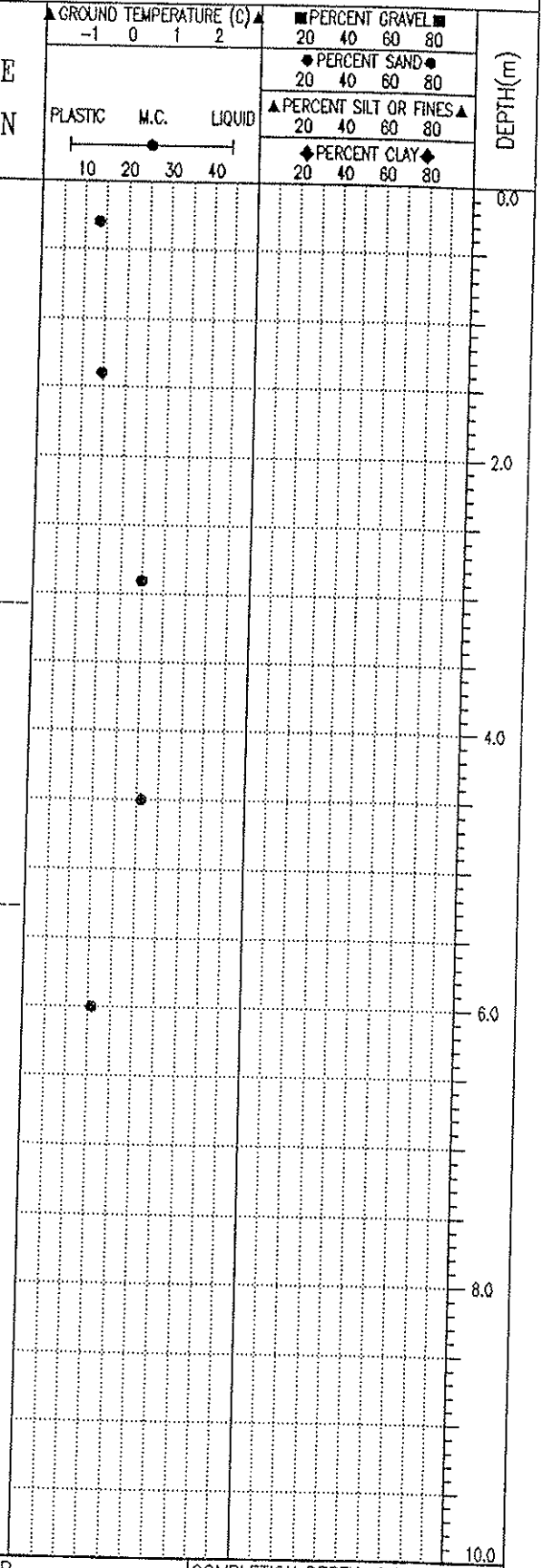
Date Tested: 97/10/21 BY: JSB

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G12
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2793.9 '

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0					MOSS AND ROOTMAT	UNFROZEN
		73			SILT & SAND - fine to med. grained sand, low plastic, soft, moist, greyish brown	
					- water at 0.5 m	
1.0					- trace of fine grained gravel below 0.5 m	
		74				
					SAND - some silt, med. grained uniform sand, soft, wet, light greyish brown	
2.0						
		75				
3.0						PERMAFROST
						-0.8 degree C.
						Nf
4.0					- drill slightly firmer below 3.7 m	Vx, <5%
		76				
						-0.9 degree C.
5.0					- trace of some gravel fine to med. grained below 4.9 m	
					- unfrozen below 5.2 m	UNFROZEN
6.0		77				
					END OF BOREHOLE @ 6.1 m	
					- major slough throughout	
					- water at 0.5 m	
7.0					NOTE: Mine Coordinate N 10170 E 7858	
8.0						
9.0						
10.0						



EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 6.1 m
	REVIEWED BY: CRH	COMPLETE: 97/09/12
	Fig. No:	Page 1 of 1

98/02/17 11:50AM (YUK-P110)

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G13
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2851.7'

SAMPLE TYPE ■ GRAB SAMPLE ⧄ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	■	78			MOSS AND ROOTMAT SILT & SAND - well graded sand, low plastic, wet, brownish black - trace of fine to med. grained gravel below 0.4 m	UNFROZEN PERMAFROST Vx, 10 - 15%
1.0	■	79				-1.8 degree C.
2.0					SAND (RESIDUM) - gravelly, some silt, well graded sand, fine to med. grained angular gravel, moist brownish grey, no visable ice, poorly, bonded, Nf	
3.0	■	80				-0.8 degree C.
	■	81			- grinding and hard drilling below 3.1 m - fish tail replaced with button bit at 3.15 m - slow hard drilling continues - easier drilling below 3.5 m	
4.0	■	82			- grinding at 4.0 tO 4.3 m Note: sample silty with ground up gravel, unable to determine temp at depth	
5.0						
6.0					END OF BOREHOLE @ 5.8 m (REFUSAL) - some sloughing - no water table encountered NOTE: Mine Coordinates N 8108.00 E 7022.00	
7.0						
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C) -1 0 1 2

PLASTIC M.C. LIQUID 10 20 30 40

■PERCENT GRAVEL■ 20 40 60 80

●PERCENT SAND● 20 40 60 80

▲PERCENT SILT OR FINES▲ 20 40 60 80

◆PERCENT CLAY◆ 20 40 60 80

DEPTH(m) 0.0 2.0 4.0 6.0 8.0 10.0

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LOGGED BY: JSB	COMPLETION DEPTH: 5.8 m
REVIEWED BY: CRH	COMPLETE: 97/09/12
Fig. No:	Page 1 of 1

98/02/17 11:51AM (YUK-PT10)

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G14
GEOTECHNICAL EVAL. – WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: – N – E –	ELEVATION: 2824.5 '

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	■	83			MOSS AND ROOT MAT	UNFROZEN
	■	84			SILT & SAND – well graded sand, low plastic, wet, brownish brown	
					– color changes to greyish brown at 0.3 m	PERMAFROST Vx, 10 – 15%
1.0					– trace of fine to med. grained sub-angular gravels	
	■	85				Vx, 10 –15%, Nf
2.0					– grinding below 1.8 m	Vx, <5% poorly bonded
	■	86				
3.0					SAND (RESIDUUM) – some gravel, some silt, med. to coarse grained sand, fine to med. grained angular gravels, moist, greyish brown	
4.0						
	▥	87			– change fish tail bit to CRREL barrel	
5.0					– grinding and hard drilling below 4.9 m	
	▥	88			– large cobble in CRREL barrel	
6.0					END OF BOREHOLE @ 5.5 m (REFUSAL)	
					– little to no slough	
					– no water table encountered	
7.0					NOTE: Mine Coordinates N 8535.00 E 7365.00	
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C) –1 0 1 2 | PLASTIC M.C. LIQUID 10 20 30 40 | ■PERCENT GRAVEL■ 20 40 60 80 | ●PERCENT SAND● 20 40 60 80 | ▲PERCENT SILT OR FINES▲ 20 40 60 80 | ◆PERCENT CLAY◆ 20 40 60 80

DEPTH(m) 0.0 2.0 4.0 6.0 8.0 10.0

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LOGGED BY: JSB
REVIEWED BY: CRH
Fig. No:

COMPLETION DEPTH: 5.5 m
COMPLETE: 97/09/12

98/02/17 11:52AM (YUK-PITS)

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G15
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2795 '

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ▩ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0					MOSS AND ROOT MAT	UNFROZEN
	■	89			SILT - sandy, fine to med. grained sand, very moist, greyish brown	
1.0					SAND - some silt, trace of gravel, med. to coarse grained sand, fine grained angular gravel, soft, moist, grey	PERMAFROST Vx, <5%
	■	90				-0.3 degree C. Vx, 15 - 20%
2.0						Vx, 10 - 15%
	■	91				-0.2 degree C.
3.0						
4.0						
	■	92			- hard drilling at 4.6 m - 4.9 m	
5.0					END OF BOREHOLE @ 4.9 m - some slough - no water table encountered NOTE: Mine Coordinates N 9147.00 E 7550.00	
6.0						
7.0						
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C) -1 0 1 2

PLASTIC M.C. LIQUID 10 20 30 40

■PERCENT GRAVEL■ 20 40 60 80

●PERCENT SAND● 20 40 60 80

▲PERCENT SILT OR FINES▲ 20 40 60 80

◆PERCENT CLAY◆ 20 40 60 80

DEPTH(m) 0.0 2.0 4.0 6.0 8.0 10.0

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REVIEWED BY: CRH
Fig. No:

COMPLETION DEPTH: 4.9
COMPLETE: 97/09/12

98/02/17 11:53AM (YUK-PT10)

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G16
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2814.3 '

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0		93				MOSS AND ROOT MAT
						SILT & SAND - well graded sand, low plastic, wet, dark olive bown
1.0						SAND - silty, fine grained uniform sand, non-plastic, soft, moist, light greyish brown
		94				
2.0						
						- trace of fine grained angular gravel below 2.4 m
3.0		95				- sand becomes well graded below 2.4 m
						- moisture content increases to very moist below 2.7 m
4.0						- + 3.9 degree C. at 3.0 m
						- possible water table around 3.5 m
		96				
5.0						
		97				
6.0						END OF BOREHOLE @ 5.5 m (REFUSAL)
						- major slough throughout
						- possible water table at 2.4 m
						NOTE: Mine Coorindates N 9944.00 E 7376.00
7.0						
8.0						
9.0						
10.0						

CONE PENETRATION 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

PERCENT GRAVEL 20 40 60 80

PERCENT SAND 20 40 60 80

PERCENT SILT OR FINES 20 40 60 80

PERCENT CLAY 20 40 60 80

INSTRUMENTATION DATA

DEPTH(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0, 24.0, 26.0, 28.0, 30.0, 32.0, 34.0

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LOGGED BY: JSB	COMPLETION DEPTH: *.*
REVIEWED BY: CRH	COMPLETE: 97/09/16
Fig. No:	Page 1 of 1

98/01/14 10:09AM (YUKON-10)

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD.	BOREHOLE NO: 97-G17
GEOTECHNICAL EVAL. - WASTE SUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2827.2 '

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0					MOSS AND ROOT MAT	UNFROZEN
		98			SAND & SILT - trace of fine grained gravel, well graded sand, brownish grey	
		99				PERMAFROST Vx, <5%
1.0					- become some silt to silty below 0.3 m	
		100				Vx, 15 to 20%
2.0					- silt content increases to silty below 1.6 m - trace of clay below 1.6 m - gravel becomes fine to med grained below 1.6 m - color becomes grey below 1.6 m	
3.0		101			- some gravel below 3.0 m	Vx, <5%
4.0						
		102				
5.0						
6.0		103			END OF BOREHOLE @ 6.1 m - no water table encountered - some slough throughout NOTE: Mine Coordinates N 10416.00 E 7347.00	
7.0						
8.0						
9.0						
10.0						

GROUND TEMPERATURE (C): -1 0 1 2

PLASTIC M.C. LIQUID: 10 20 30 40

PERCENT GRAVEL: 20 40 60 80

PERCENT SAND: 20 40 60 80

PERCENT SILT OR FINES: 20 40 60 80

PERCENT CLAY: 20 40 60 80

DEPTH(m): 0.0 2.0 4.0 6.0 8.0 10.0

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LOGGED BY: JSB	COMPLETION DEPTH: *.*
REVIEWED BY: CRH	COMPLETE: 97/09/12
Fig. No:	Page 1 of 1

98/02/17 11:54AM (YUK-PT10)

THE MINTO PROJECT

GEOTECHNICAL EVAL. – WASTE DUMP AREA

MINTO CREEK, YUKON

CLIENT: MINTO EXPLORATIONS LTD

DRILL: CME–75 c/w SOLID SHAFT AUGERS

UTM ZONE: – N – E –

BOREHOLE NO: 97–G18

PROJECT NO: 0201–97–11509

ELEVATION: 2841.5 ′

SAMPLE TYPE: GRAB SAMPLE; NO RECOVERY; STANDARD PEN.; 75 mm SPOON; CRREL BARREL

BACKFILL TYPE: BENTONITE; PEA GRAVEL; SLOUGH; GROUT; DRILL CUTTINGS; SAND

SOIL DESCRIPTION

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0						MOSS AND ROOT MAT
		104				SILT & SAND – trace of gravel, well graded sand, fine to med. grained angular and sub–rounded gravels, moist, loose, mottled brown and grey
1.0		105				SAND – silty, some gravel, well graded sand, fine to med. grained angular and sub–rounded gravel, loose, moist, light greyish brown
						– sand becomes coarse grained below 2.1 m
2.0		106		SP–SM		– some silt below 2.1 m
						– some fine grained gravel below 2.1 m
3.0						– trace of silt below 2.1 m
						– very wet below 2.1 m, possible water table
4.0		107				
						– sand becomes fine to med. grained below 4.3 m
5.0						– trace of fine grained gravel below 4.3 m
		108				
6.0						
7.0		109		SM		– silty, some clay below 7.1 m
						END OF BOREHOLE @ 7.3 m
8.0						– major sloughing
						NOTE: Mine Coordinates N 10730.00 E 7575.00
9.0						
10.0						

CONE PENETRATION 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

PERCENT GRAVEL 20 40 60 80

PERCENT SAND 20 40 60 80

PERCENT SILT OR FINES 20 40 60 80

PERCENT CLAY 20 40 60 80

INSTRUMENTATION DATA

DEPTH(ft) 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0

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Whitehorse, Yukon

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REVIEWED BY: CRH
Fig. No:

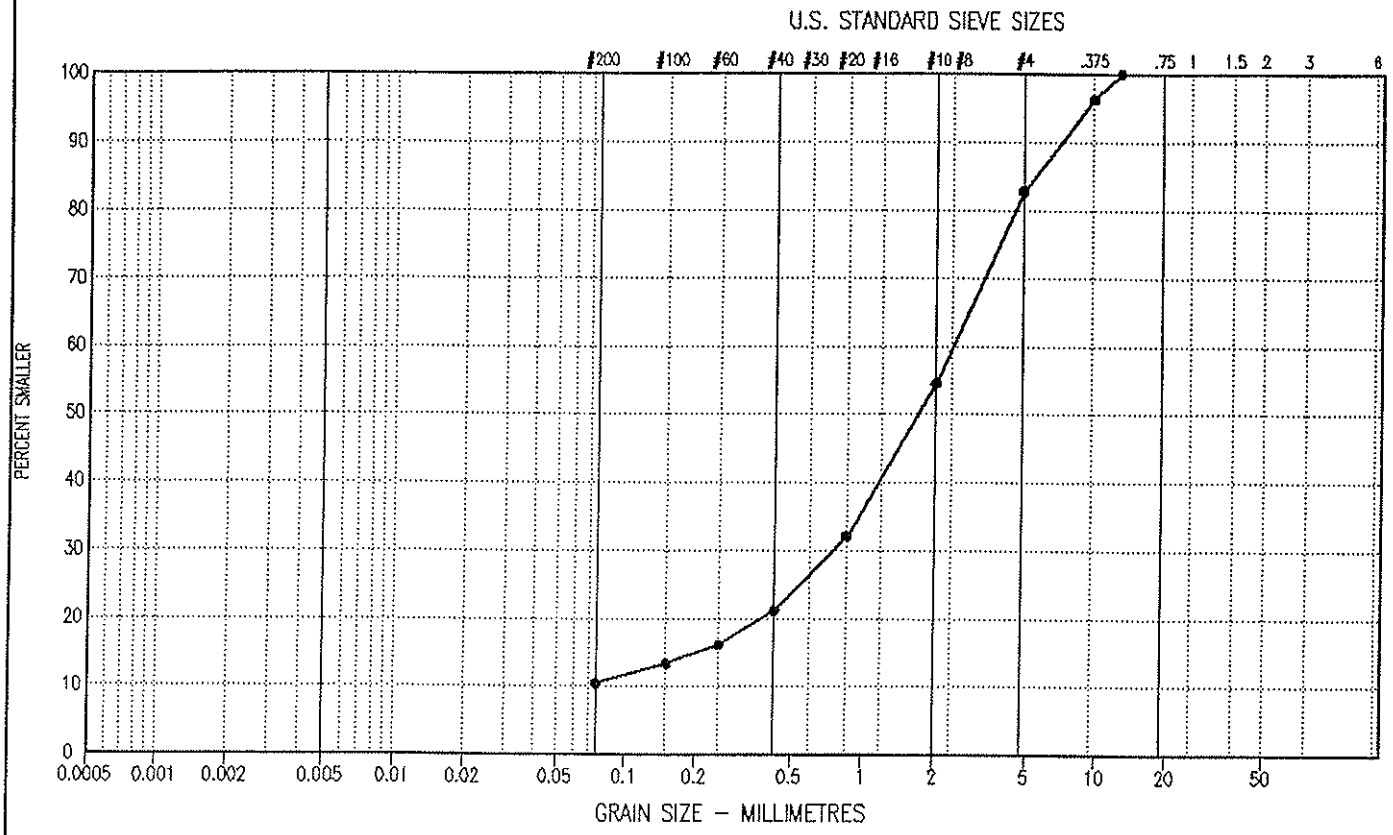
COMPLETION DEPTH: *.*
COMPLETE: 97/09/13

98/01/14 10:15AM (YUKON-TD)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	97-G18	2.50 – 2.70	10.3	72.4	17.3	35.0	3.2	SP-SM

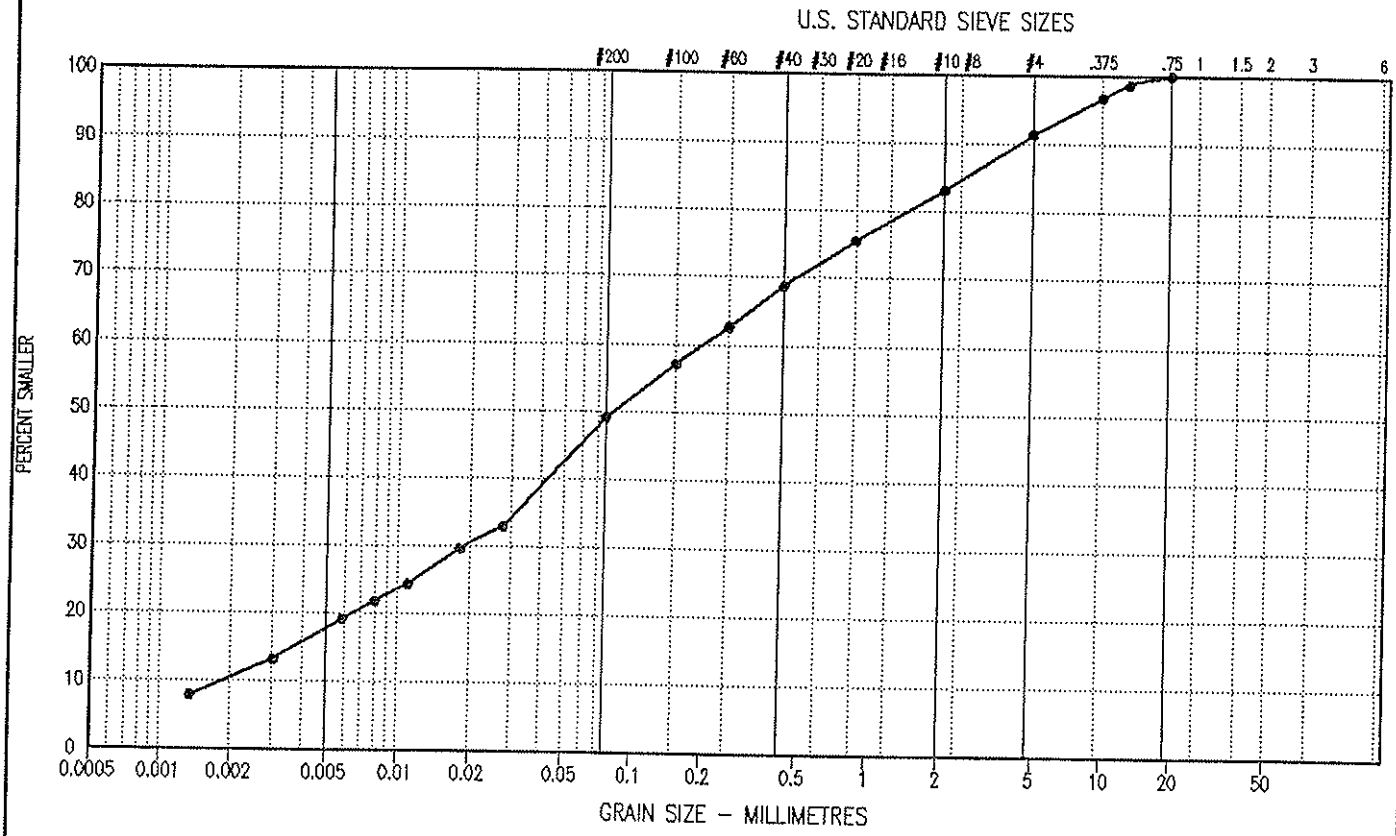
Project: 0201-97-11509 Date Tested: 97/10/20 BY: RS

Tested in accordance with ASTM D422 unless otherwise noted.

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	97-G18	7.10 – 7.30	17.3	31.8	42.2	8.7	100.5	0.9	SM

Project: 0201-97-11509 Date Tested: 97/10/27 BY: JSB

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G19
GEOTECHNICAL EVAL. - WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: - N - E -	ELEVATION: 2857.7'

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0						MOSS AND ROOTMAT
		110				SILT & SAND - trace of gravel, well graded sand, fine to med. grained sub-rounded gravel, soft, moist, dark olive brown
1.0		111				SAND - silty, trace of gravel, well graded sand, fine to med. grained sub-rounded gravel, loose, moist, greyish brown
						- water table at 1.2 m possibly lower at sand seam below 2.1 m
2.0		112				- 0.3 m thick layer of med. to coarse grained sand, trace of silt, loose, very wet, grey
		113				
3.0						
4.0		114		SM		- sand becomes med to coarse grained below 3.7 m - some silt below 3.7 m - trace of fine grained sub-rounded gravels
5.0						- gravel content increases below 4.1 m - becomes silty below 4.4 m
		115				
6.0						- drilling slightly harder below 6.1 m
7.0		116				
8.0						
		117				
9.0						END OF BOREHOLE @ 8.8 m - borehole sloughing - water around 1.2 m
10.0						NOTE: Mine Coordinates N 10837.00 E 7237.00

CONE PENETRATION 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

PERCENT GRAVEL 20 40 60 80

PERCENT SAND 20 40 60 80

PERCENT SILT OR FINES 20 40 60 80

PERCENT CLAY 20 40 60 80

INSTRUMENTATION DATA

DEPTH(ft) 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0

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Whitehorse, Yukon

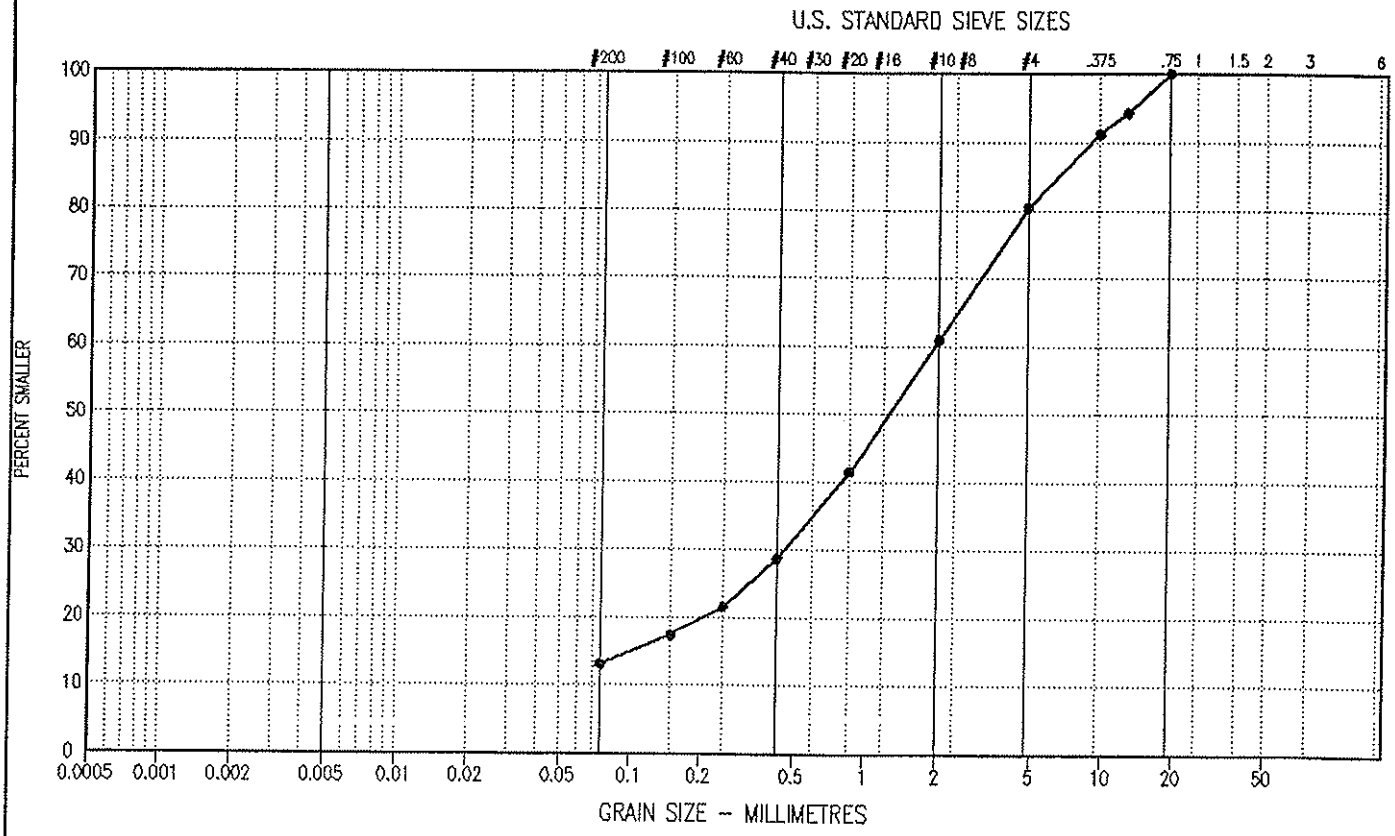
LOGGED BY: JSB	COMPLETION DEPTH: *.*
REVIEWED BY: CRH	COMPLETE: 97/09/13
Fig. No:	Page 1 of 1

98/01/14 10:46AM (YUKON-TB)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION			Cu	Cc	U.S.C
			CLAY & SILT %	SAND %	GRAVEL %			
●——●	97-G19	4.10 – 4.30	13.0	67.5	19.5	33.7	2.0	SM

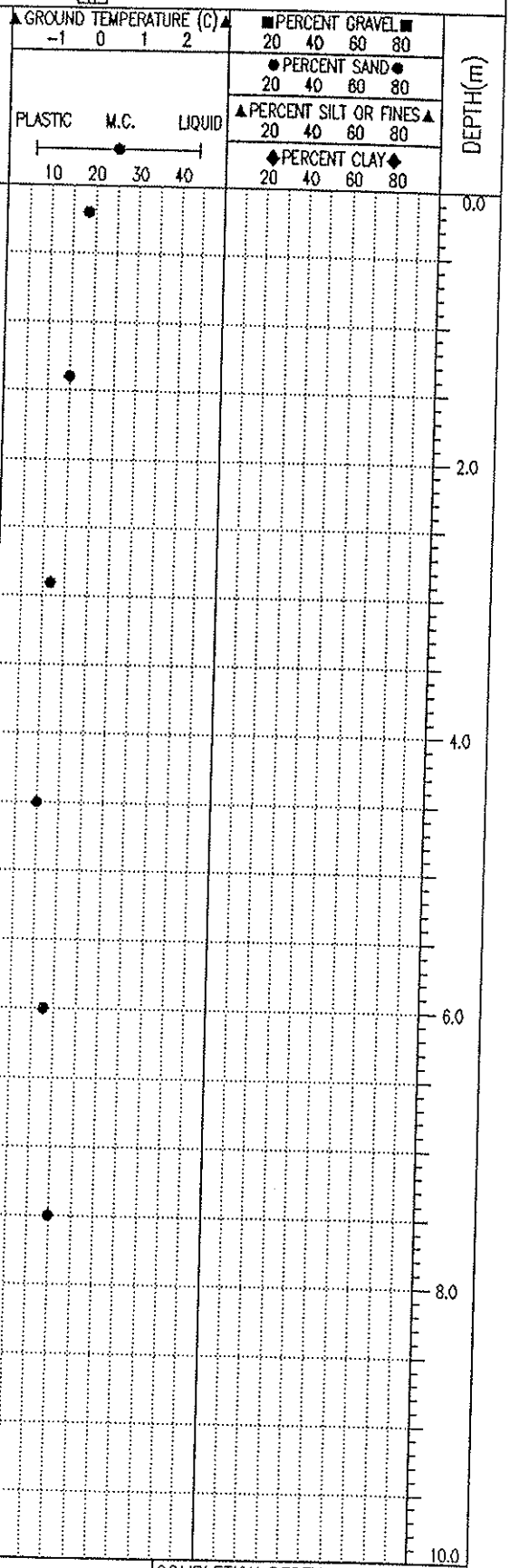
Project: 0201-97-11509 Date Tested: 97/10/20 BY: RS

Tested in accordance with ASTM D422 unless otherwise noted.

THE MINTO PROJECT	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G23
GEOTECHNICAL EVAL. – WASTE DUMP AREA	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
MINTO CREEK, YUKON	UTM ZONE: – N – E –	ELEVATION: 2885′

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0	■	141			MOSS AND ROOT MAT	UNFROZEN
					SAND – some silt, trace of gravel, med. to coarse grained sand, fine grained sub-rounded gravel, dense, moist, light greyish brown	
1.0					– harder drilling below 0.3 m	
	■	142				
					– gravel content increases slightly and becomes fine to med. grained below 1.6 m	
2.0						
	■	143				
3.0						
4.0						
	■	144				
5.0						PERMAFROST
6.0	■	145				–0.09 degree C. Nf
7.0						
	■	146				
8.0					– very hard drilling and grinding below 7.7 m	
					END OF BOREHOLE 7.9 m (REFUSAL)	
9.0					– very little slough	
					– no water table encountered	
10.0					NOTE: Mine Coordinates N 10932.00 E 6560.00	



EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: *.*
	REVIEWED BY: CRH	COMPLETE: 97/09/14
	Fig. No:	Page 1 of 1

98/02/17 11:55AM (YUK-PT10)

THE MINTO PROJECT

GEOTECHNICAL EVAL. – WASTE DUMP AREA	CLIENT: MINTO EXPLORATIONS LTD	BOREHOLE NO: 97-G24
MINTO CREEK, YUKON	DRILL: CME-75 c/w SOLID SHAFT AUGERS	PROJECT NO: 0201-97-11509
	UTM ZONE: – N – E –	ELEVATION: 2752.8′

SAMPLE TYPE: GRAB SAMPLE; NO RECOVERY; STANDARD PEN.; 75 mm SPOON; CRREL BARREL

BACKFILL TYPE: BENTONITE; PEA GRAVEL; SLOUGH; GROUT; DRILL CUTTINGS; SAND

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION
0.0		147				MOSS AND ROOT MAT
						SILT – sandy, trace of gravel, well graded sand, fine grained sub-rounded gravel, moist, soft, dark olive brown
1.0		148				SAND & SILT – trace of gravel, well graded sand, fine grained sub-rounded gravel, soft, moist, brownish grey
						– trace of clay below 1.5 m
2.0						– becomes sandy, silt, trace of clay, trace fine grained gravel below 2.0 m
		149				
3.0						– clay content decreases below 2.8m – gravel becomes well graded below 2.8 m
4.0		150				– hard drilling, some grinding below 3.9 m
5.0						
		151				
6.0						
7.0		152				
						END OF BOREHOLE 7.6 m (REFUSAL)
8.0						– no water table encountered – some minor sloughing
						NOTE: Mine Coordinates N 9948.00 E 8483.00
9.0						
10.0						

CONE PENETRATION 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

PERCENT GRAVEL 20 40 60 80

PERCENT SAND 20 40 60 80

PERCENT SILT OR FINES 20 40 60 80

PERCENT CLAY 20 40 60 80

INSTRUMENTATION DATA

DEPTH(ft) 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0

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Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: *.*
REVIEWED BY: CRH	COMPLETE: 97/09/14
Fig. No:	Page 1 of 1

98/01/14 10:23AM (YUKON-1B)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP100
Minto Copper Mine	Excavator: CAT 416 C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944700 N, 383473.6 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				SAND (RESIDIUUM) – silty, trace of gravel
				– becomes some gravel, fine to medium grained, angular 0.5 m
1.0				– trace to some silt below 1.0 m
2.0				
				BEDROCK (GRANITE) – poor quality, friable
3.0				– becomes more competent with depth
				END OF TESTPIT 3.0 m (REFUSAL)
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

EBA Engineering Consultants Ltd.

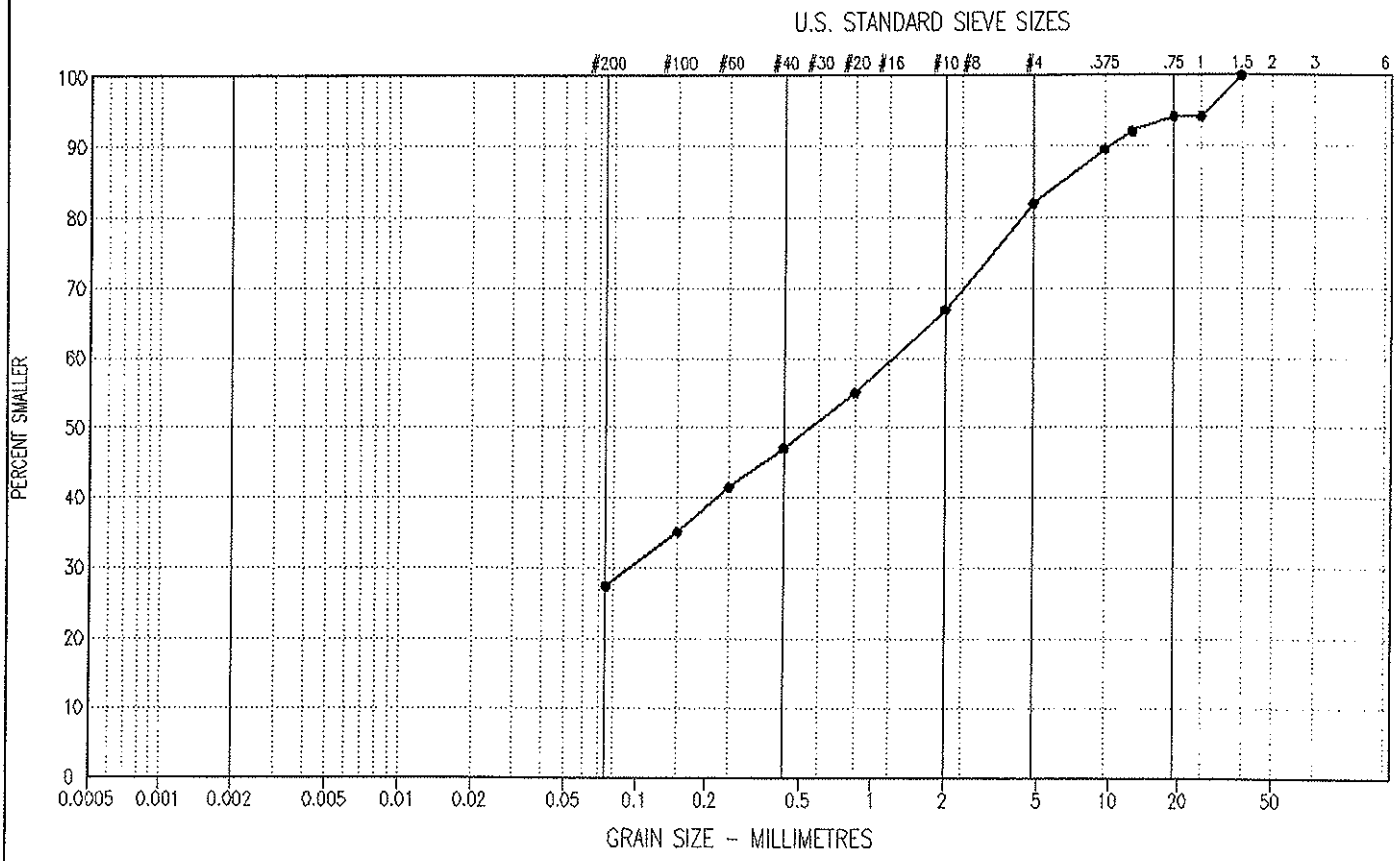
LOGGED BY: JSB	COMPLETION DEPTH: 3 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●——●	1200173-100	0.50 – 0.70	--- 27 ---		54	19	–	–	

Project: 0201-1200173 Date Tested: 05/11/02 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP101
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944709 N, 383553.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDIUUM) – silty, trace of gravel
				– trace to some silt below 0.3 m
1.0		■		
				– coarser gravels, some cobbles present below 1.8 m
2.0				
				BEDROCK (GRANITE) – poor quality, friable
				– more competent with depth
				END OF TESTPIT 2.7 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP102
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944697 N, 383635.9 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				SAND (RESIDIUUM) – silty, trace of gravel
				– trace to some silt below 0.4 m
				– some gravel, fine to medium grained, angular to 0.4 m
1.0				
2.0				BEDROCK (GRANITE) – poor quality, friable
				END OF TESTPIT 2.8 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

EBA Engineering Consultants Ltd.

LOGGED BY: JSB	COMPLETION DEPTH: 2.8 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP103
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944651 N, 383701.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDIUUM) – silty, trace of gravel
				– trace to some silt below 0.4 m – becomes gravelly, well graded, angular below 0.4 m
1.0				– cobbles encountered below 1.0 m – some boulders present below 1.0 m
				BEDROCK (GRANITE) – poor quality, friable around 1.6 m
2.0				END OF TESTPIT 2.0 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP104
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944573 N, 383721.6 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDIUUM) – silty, trace of gravel, well graded sand, fine to medium grained angular gravel, compact, damp, reddish brown – trace to some silt below 0.4 m – becomes gravelly, well graded, angular below 0.4 m – cobbles below 0.7 m
1.0		■		
2.0				
3.0				BEDROCK (GRANITE) – poor quality, friable – more competent with depth
4.0				END OF TESTPIT 3.1 m (REFUSAL)

PLASTIC — M.C. — LIQUID (20 40 60 80)

● PERCENT CLAY ● (10 20 30 40)
▲ PERCENT SILT ▲ (20 40 60 80)
■ PERCENT SAND ■ (20 40 60 80)
◆ PERCENT GRAVEL ◆ (20 40 60 80)

Depth(ft): 0.0, 5.0, 10.0

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LOGGED BY: JSB	COMPLETION DEPTH: 3.1 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP105
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
NW of Minto, YT	6944494 N, 383705.1 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
		■		SAND (RESIDIUUM) – trace to some gravel, well graded sand, fine angular gravel, compact, damp, medium grey – trace to some silt below 0.4 m – becomes gravelly, well graded, angular below 0.4 m – cobbles encountered below 0.6 m
1.0				
				BEDROCK (GRANITE) – poor quality, friable
2.0				END OF TESTPIT 2.0 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP106
Minto Copper Mine	Excovator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944439 N, 383645 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOTMAT
				SAND (RESIDIUUM) – silty, trace of gravel
				– trace to some silt below 0.5 m below 0.5 m – becomes gravelly, well graded, angular
1.0				– gravel content increases with depth around 1.0 m
		■		– cobble sized pieces encountered around 1.5 m
				BEDROCK (GRANITE) – poor quality, friable
2.0				
				END OF TESTPIT 2.7 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

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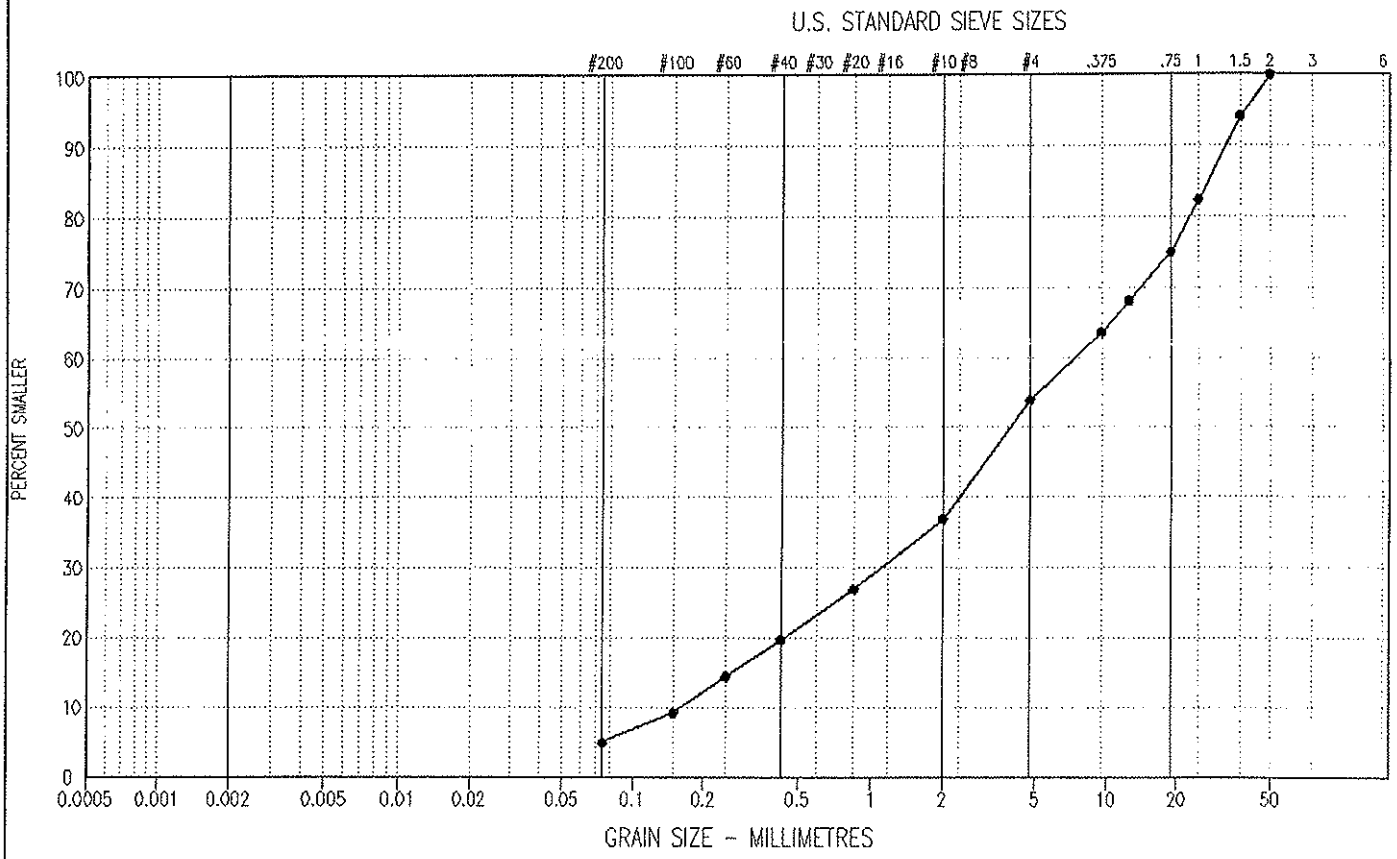
LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:57PM (YUK-TP4)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200173-106	1.50 – 1.70	---	5 ---	48	47	46.7	1.1	SW

Project: 0201-1200173 Date Tested: 11/02/05 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP107
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944403 N, 383570 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE ■ GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOTMAT
		■		SAND – silty, gravelly, well graded sand, well graded angular gravels, compact, damp, reddish brown
				– trace of silt around 0.5 m
1.0				– becomes trace to some fine to medium grained angular gravels around 0.7 m
		■		BEDROCK (GRANITE) – poor quality, friable
				– becomes more competent with depth
2.0		■		
				END OF TESTPIT 2.5 m (REFUSAL)
3.0				
4.0				

PLASTIC — M.C. — LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

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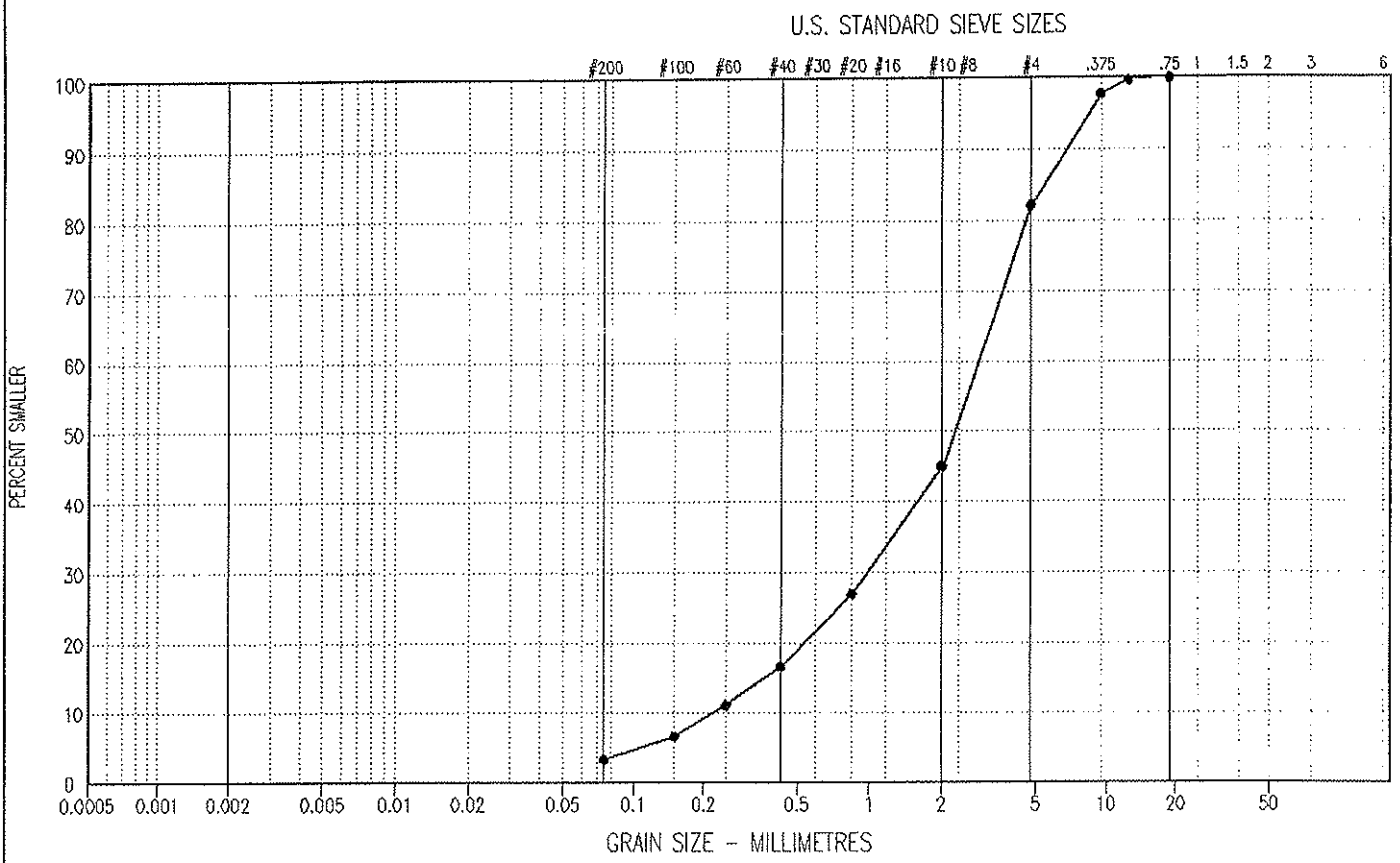
LOGGED BY: JSB	COMPLETION DEPTH: 2.5 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:58PM (YUK-TP4)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200173-107	1.20 – 1.50	---	3 ---	79	18	13.6	1.5	SW

Project: 0201-1200173 Date Tested: 11/02/05 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP108
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944360 N, ~~6944322~~ 385500 E, Z 8	ELEVATION: 0 m
SAMPLE TYPE ■ GRAB		

SOIL DESCRIPTION

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
		■		SAND (RESIDIUUM) – silty, trace of gravel, well graded sand, fine to medium grained angular gravels, reddish brown – trace to some silt below 0.5 m
1.0				– some gravel to gravelly around 1.0 m – 1.5 m
		■		
2.0				BEDROCK (GRANITE) – poor quality, friable below 2.0 m
				END OF TESTPIT 2.4 m (REFUSAL)
3.0				
4.0				

PLASTIC — M.C. — LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

EBA Engineering Consultants Ltd.

LOGGED BY:	COMPLETION DEPTH: 2 m
REVIEWED BY:	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:58PM (YUK-TP4)

Minto Mine Development 2005	Client: Sherwood Mining Corp.	TEST PIT NO: 1200173-TP109
Minto Copper Mine	Excavator: CAT 416C Rubber Tire	PROJECT NO: 1200173
Proposed Overburden Dump	6944322 N, 383427.8 E, Z 8	ELEVATION: 0 m

SAMPLE TYPE GRAB

Depth(m)	SOIL SYMBOL	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION
0.0				ORGANIC ROOT MAT
				SAND (RESIDUUM) – silty, trace to some fine gravel, well graded sand, reddish brown
				– less silt with depth around 0.5 m
1.0				
				– becomes gravelly, coarser grained around 1.2 m
2.0				BEDROCK (GRANITE) – HIGHLY FRACTURED – cobble sized pieces, coarser with depth
				END OF TESTPIT 2.7 m (REFUSAL)
3.0				
4.0				

PLASTIC M.C. LIQUID
20 40 60 80

● PERCENT CLAY ●
10 20 30 40

▲ PERCENT SILT ▲
20 40 60 80

■ PERCENT SAND ■
20 40 60 80

◆ PERCENT GRAVEL ◆
20 40 60 80

Depth(ft)
0.0
5.0
10.0

EBA Engineering Consultants Ltd.

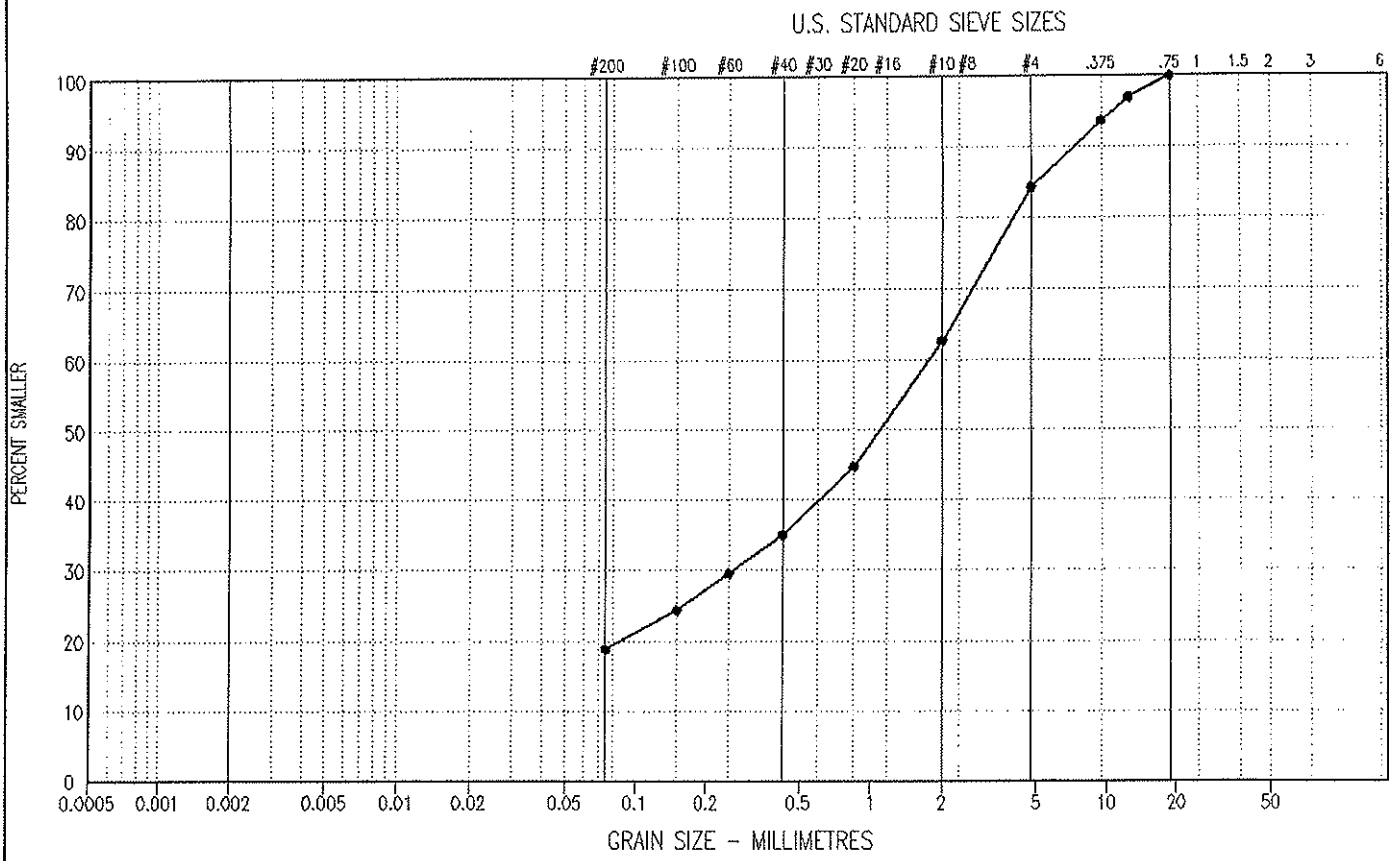
LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
REVIEWED BY: JRT	COMPLETE: 05/10/16
Fig. No:	Page 1 of 1

05/11/28 02:58PM (YUK-TP4)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION CLAY %	SILT %	SAND %	GRAVEL %	Cu	Cc	U.S.C
●	1200173-109	0.50 – 0.70	---	19	---	65	16	–	–

Project: 0201-1200173 Date Tested: 05/11/02 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

SRK Consulting
Engineers and Scientists

BORING LOG

PROJECT:	Minto Overburden Drilling Program 2008
SITE:	Minto Mine Yukon Canada
FILE NO:	MINTO (2CM022 003)
BORING DATE:	2008-02-27 TO 2008-03-06
DATUM:	NAD83 Zone 8V
BOREHOLE:	08SWC270
PAGE:	1 OF 1
DRILL:	Air Rotary
CORE BARREL:	Triple tube (HQ)
COORDINATES:	6944333.00 N 384181.00 E

SAMPLE CONDITION: Remoulded; Undisturbed; Lost; Soil core

TYPE OF SAMPLER: SS Split spoon; ST Thin walled shelby tube; PS Piston sampler; CT Core tube sample

LABORATORY AND IN SITU TEST: PS Particle size analysis; w Water content; D Unit weight (kN/m³); k Permeability (cm/s)

Torvane (Su) intact; (Sur) ◆ remoulded

Ground Temperature

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	TYPE AND NUMBER	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
0	865.40 / 0.00	dark brown, damp, stiff, organic sandy SILT with gravel topsoil, non-plastic	CT-1	9	0	
1	863.88 / 1.52	brown, damp, very stiff, sandy SILT with gravel and weathered bedrock, non-plastic	CT-2	16	0	
3	862.35 / 3.05	brown, moist, soft to moderetley stiff sandy SILT with weathered bedrock particles, non-plastic	CT-3	25	0	w = 17.8%; PS (42.5% < 0.08mm)
4	860.83 / 4.57	gray, saturated, stiff, sandy SILT with gravel, non-plastic	CT-4	33	0	
6	859.30 / 6.10	gray, saturated, very soft, sandy SILT non-plastic with a 2" thick weathered granite cobble	CT-5	42	0	
7	857.78 / 7.62	brown, saturated, very soft, sandy SILT with gravel, non plastic, with some cobbles	CT-6	50	0	
9	856.26 / 9.14	brown, moist, soft, loose, silty SAND with gravel, non-plastic	CT-7	58	0	PS (7.5% < 0.08mm); w = 17.1%
10	854.73 / 10.67	bedrock (switched to NQ)	CT-8	100	0	
12	853.21 / 12.19	bedrock	CT-9	100	0	
			CT-10	100	0	
15	850.16 / 15.24	END OF LOGGING at 15.24m (Borehole depth = 359.66m)				

WATER LEVEL - m: Frozen 0.12m below ground surface

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

F:\06 REFERENCE MATERIAL\... PLOTTED: 2008-05-22 11:09am

SRK Consulting
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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008	BOREHOLE : 08SWC271
SITE : Minto Mine Yukon Canada	PAGE : 1 OF 3
FILE NO : MINTO (2CM022 003)	DRILL : Air Rotary
BORING DATE : 2008-03-06 TO 2008-03-10	CORE BARREL : Triple tube (HQ)
DATUM : NAD83 Zone 8V	COORDINATES : 6944455.00 N 383901 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

Column headings: STRATIGRAPHY (DEPTH - m; ELEVATION - m / DEPTH - m; DESCRIPTION; SYMBOL); WATER LEVEL - m; SAMPLES (TYPE AND NUMBER; CONDITION; RECOVERY %; N or RQD); WATER CONTENT and LIMITS (%) (W_P, W, W_L; 20 40 60 80); LABORATORY and IN SITU TESTS; GROUND TEMPERATURE (°C) (-5 0 5); UNDRAINED SHEAR STRENGTH (kPa) (25 50 75)

Elevation (m)	Depth (m)	Description
849 20	0 00	very dark brown saturated soft organic sandy SILT non-plastic (topsoil)
848 01	1 19	very dark gray moist dense silty SAND with gravel non-plastic
847 68	1 52	very dark gray moist, stiff silty SAND with gravel, non-plastic
847 58	1 62	Not Recovered
846 15	3 05	very dark gray slaurated soft clayey SILT low-plasticity
845 09	4 11	dark gray moist loose silty SAND with sub-angular gravel non-plastic
844 63	4 57	very dark gray saturated firm clayey SILT with sub-angular gravel low plasticity
844 23	4 97	drak brown saturated soft clayey SILT with sub-angular gravel low plasticity
843 10	6 10	very dark gray moist soft sandy SILT with sub-angular gravel and cobbles non-plastic with an 8" rock core
842 22	6 98	dark brown saturated soft clayey SILT with sub-angular gravel and cobbles low plasticity
838 53	10 67	dark brown, moist to saturated soft clayey SILT with sub-angular gravel and cobbles low plasticity
835 48	13 72	Dark grey moist dense silty CLAY with subangular gravel and cobbles
833 96	15 24	Not Recovered
832 44	16 76	Dark grey moist dense silty SAND with traces subangular gravel and clay Very low plasicity Nbn < 5%
829 39		

Water level: frozen from top of pipe

Type and Number	Recovery %	Laboratory and In Situ Tests
CT-1	97	PS (83 0% < 0 08mm) w = 121%
CT-2	6	
CT-3	94	
CT-4	88	PS (38 0% < 0 08mm) w = 10 1%
CT 5	100	
CT 6	92	
CT-7	92	
CT-8	96	
CT-9	96	
CT-10	100	
CT-11	0	
CT-12	100	
CT-13	100	

SRK Consulting
Engineers and Scientists

BORING LOG

PROJECT :	Minto Overburden Drilling Program 2008
SITE :	Minto Mine Yukon, Canada
FILE NO :	MINTO (2CM022.003)
BORING DATE :	2008-03-06 TO 2008-03-10
DATUM :	NAD83 Zone 8V
COORDINATES :	6944455.00 N 383901.00 E
BOREHOLE :	08SWC271
PAGE :	2 OF 3
DRILL :	Air Rotary
CORE BARREL :	Triple tube (HQ)

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST
Remoulded	SS Split spoon	PS Particle size analysis
Undisturbed	ST Thin walled shelby tube	w Water content
Lost	PS Piston sampler	D Unit weight (kN/m³)
Soil core	CT Core tube sample	k Permeability (cm/s)

Torvane (Su) intact; (Sur) ◆ remoulded

Ground Temperature

Columns: DEPTH - m; STRATIGRAPHY (ELEVATION - m / DEPTH - m, DESCRIPTION, SYMBOL); WATER LEVEL - m; SAMPLES (TYPE AND NUMBER, CONDITION, RECOVERY %, N or RQD); WATER CONTENT and LIMITS (%) (W_P W W_L; 20 40 60 80); LABORATORY and IN SITU TESTS; GROUND TEMPERATURE (°C) -5 0 5; UNDRAINED SHEAR STRENGTH (kPa) 25 50 75

ELEVATION - m / DEPTH - m	DESCRIPTION
	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Very low plasicity. Nbn <5%
826.34 / 22.86	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Very low plasicity. No ice content observed
824.82 / 24.38	Dark grey moist dense sandy SILT with clay and subangular gravel. Very low plasicity. No ice content observed
821.77 / 27.43	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Low plasicity
820.55 / 28.65	ICE and SOIL. 50% clear ice
820.24 / 28.96	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Low plasicity. ICE and SOIL. 10% clear ice
818.72 / 30.48	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Low plasicity
817.65 / 31.55	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Low plasicity. Vs 10%
817.20 / 32.00	
816.89 / 32.31	Dark grey moist dense clayey SILT with traces of sand and subangular gravel. Low plasicity
815.67 / 33.53	Dark grey moist dense silty CLAY. Medium plasicity. ICE and SOIL. 15% clear ice
814.15 / 35.05	Dark grey moist dense sandy SILT with clay and subangular gravel. Non plasic. No ice content observed
813.23 / 35.97	Grey moist dense SAND and GRAVEL with silt and traces of clay
812.62 / 36.58	Dark grey moist dense fine SAND with traces gravel and silt. No visible ice content
	Grey moist dense SAND and GRAVEL with silt and traces of silt. No visible ice content
811.10 / 38.10	
810.34 / 38.86	Grey moist firm SAND and GRAVEL. No visible ice content
809.58 / 39.62	Broken Bedrock Bedrock

DEPTH - m (approx.)	TYPE AND NUMBER	RECOVERY %	LABORATORY and IN SITU TESTS
21	CT-14	100	
22	CT-15	100	
24	CT-16	100	
25	CT-17	100	w = 13% PS (46.5% < 0.08mm)
27	CT-18	100	
28	CT-19	100	
30	CT-20	100	
31	CT-21	100	
33	CT-22	100	
34	CT-23	100	
36	CT-24	100	
37	CT-25	100	
39	CT-26	100	

Depth scale: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008
SITE : Minto Mine Yukon, Canada
FILE NO : MINTO (2CM022 003)
BORING DATE : 2008-03-06 TO 2008-03-10
DATUM : NAD83 Zone 8V
COORDINATES : 6944455 00 N 383901 00 E

BOREHOLE : *08SWC271*

DRILL : Air Rotary
CORE BARREL : Triple tube (HQ)

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) Wp W WL 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
					CT-27		100				
41	808 05 / 41 15	END OF LOGGING at 41 15m (Borehole Depth = 242 30m)									
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
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56											
57											
58											
59											

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BORING LOG

PROJECT :	Minto Overburden Drilling Program 2008	BOREHOLE :	08SWC272
SITE :	Minto Mine Yukon, Canada	PAGE :	1 OF 3
FILE NO :	MINTO (2CM022.003)	DRILL :	Air Rotary
BORING DATE :	2008-03-10 TO 2008-03-14	CORE BARREL :	Triple tube (HQ)
DATUM :	NAD83 Zone 8V	COORDINATES :	6944730.00 N 383681.00 E

SAMPLE CONDITION
- Remoulded
- Undisturbed
- Lost
- Soil core

TYPE OF SAMPLER
- SS Split spoon
- ST Thin walled shelby tube
- PS Piston sampler
- CT Core tube sample

LABORATORY AND IN SITU TEST
- PS Particle size analysis
- w Water content
- D Unit weight (kN/m³)
- k Permeability (cm/s)

Torvane (Su) intact; (Sur) ◆ remoulded

Ground Temperature

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	WATER LEVEL - m	TYPE AND NUMBER	RECOVERY %	LABORATORY and IN SITU TESTS
	849.90					
	0.00	very dark brown saturated soft, organic	Frozen at ground surface			
	849.72	sandy SILT non-plastic (topsoil)				
	0.18			CT-1	65	
1	849.66	brownish red saturated soft, silty SAND				
	0.24	non-plastic				
	849.35	dark drown to black, saturated soft				PS (23.5% <
2	0.55	organic sandy SILT with traces of roots				0.08mm)
	849.21	reddish brown saturated, soft SAND		CT-2	28	w = 23.2%
	0.69	with silt, non-plastic				
	848.38					
3	1.52	Not Recovered				
	848.07	dark brown, wet soft SAND with silt				
	1.83	non-plastic				
	847.95			CT-3	0	
4	1.95	dark grey moist unconsolidated silty				
	847.64	SAND				
	2.26	dark grey, moist soft clayey SILT with				
5	846.85	subrounded cobbles, non-plastic				
	3.05			CT-4	55	
	845.33	Not Recovered				
	4.57	Not Recovered				
6	844.54	dark grey moist firm clayey SILT with				
	5.36	subrounded coarse gravel, low plasticity				
	843.80	Not Recovered		CT-5	75	
7	6.10	same as above Ice in corecatcher Nbe				
	842.28	<3%				
	7.62	dark grey wet, soft, sandy gravelly SILT				
8	841.67	with subrounded cobbles no ice				
	8.23	observed		CT-6	90	
9	840.76	dark grey wet soft silty CLAY with fine				
	9.14	sand higly plastic No visible ice				
	840.15	dark grey wet soft gravelly silty SAND				
10	9.75	with clay, non-plastic No visible ice		CT-7	80	
	839.72	dark grey mist, soft gravelly silty SAND				
	10.18					
	839.23	with subrounded pebbles, non-plastic No				
11	10.67	visible ice				
	838.87	dark grey moist stiff clayey silty SAND		CT-8	100	PS (65.5% <
	11.03	with subrounded coarse gravel plastic				0.08mm)
12	837.71	No visible ice				w = 13.7%
	12.19	pinkish white boulder				PI = 5%
		dark grey moist firm silty CLAY with				w = 15.1%
13	836.79	subrounded coarse gravel, medium		CT-9	97	PS (27.5% <
	13.11					
	836.49	plasitcity Nbn				0.08mm)
	13.41	dark grey wet, firm, silty SAND with				
14	836.18	subangular large gravel non-plastic, Nbn				
	13.72	dark grey moist firm sandy GRAVEL		CT-10	100	
	835.96	non-plastic, Nbn				
15	13.94					
	834.66	dark grey moist firm silty SAND				
	15.24	non-plastic, Vs 10%				
16		dark grey moist hard consolidated		CT-11	100	
		sandy silty GRAVEL, rounded				
	833.14	non-plastic, Nbn				
17	16.76	dark grey moist stiff silty SAND with				
		<5% subangular gravel, non-plastic Vx		CT-12	90	
	832.13	50%				
18	17.77	dark grey moist stiff, sandy SILT with				
	831.61					
	18.29	subrounded gravel Nbn 80% Vs20%				
		dark grey moist stiff, silty SAND with				
19	830.85			CT-13	95	
	19.05	subangular cobbles non-plastic Vbn				
		dark grey moist firm sandy SILT with				
	830.09					

WATER CONTENT and LIMITS (%): W_p W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008	BOREHOLE : 08SWC272
SITE : Minto Mine Yukon Canada	PAGE : 2 OF 3
FILE NO : MINTO (2CM022 003)	DRILL : Air Rotary
BORING DATE : 2008-03-10 TO 2008-03-14	CORE BARREL : Triple tube (HQ)
DATUM : NAD83 Zone 8V	COORDINATES : 6944730.00 N 383881.00 E

SAMPLE CONDITION: Remoulded; Undisturbed; Lost; Soil core

TYPE OF SAMPLER: SS Split spoon; ST Thin walled shelby tube; PS Piston sampler; CT Core tube sample

LABORATORY AND IN SITU TEST: PS Particle size analysis; w Water content; D Unit weight (kN/m³); k Permeability (cm/s)

Torvane (Su) intact; (Su) ◆ remoulded; Ground Temperature

STRATIGRAPHY

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION
		dark grey moist stiff sandy clayey SILT non-plastic 50% clear ice
21	828.56 / 21.34	dark grey, moist firm clayey SILT with sand weakly plastic Vs 25%
22, 23	827.04 / 22.86	same as above
	826.43 / 23.47	dark grey moist sandy clayey SILT with subangular gravel weakly plastic Nbn
24	825.52 / 24.38	dark grey moist firm sandy SILT with subangular gravel Nbn
25	824.75 / 25.15	dark grey moist stiff sandy SILT with subrounded gravel, non-plastic Nbn
26	824.30 / 25.60	rock core
	823.99 / 25.91	Not Recovered
27	822.47 / 27.43	dark grey moist firm, sandy gravelly SILT, non-plastic, Nbn
28	821.98 / 27.92	same as above
	821.55 / 28.35	subrounded and subangular coarse gravel and cobbles, no fines
29	820.94 / 28.96	dark grey, moist firm silty CLAY with sand and subangular gravel medium plasticity Nbn
30	819.72 / 30.18	same as above 10% Vx
31	819.42 / 30.48	same as above Nbn
32	817.90 / 32.00	dark grey moist very hard silty CLAY with sand non-plastic, Nbn
33	817.59 / 32.31	dark grey moist very hard gravelly silty CLAY 15% gravel non-plastic Nbn
	816.98 / 32.92	dark grey moist, firm sandy silty CLAY medium plasticity not frozen
34	816.37 / 33.53	dark grey moist hard clayey SILT non-plastic
	816.07 / 33.83	dark grey moist very hard gravelly SILT with 15% gravel non-plastic
35	815.76 / 34.14	dark grey moist very hard sandy SILT with subangular large gravel non-plastic
	815.15 / 34.75	
36	814.85 / 35.05	
	814.36 / 35.54	dark grey moist stiff, sandy SILT with clay, 10% sand, medium plasticity
37	813.63 / 36.27	dark grey moist hard sandy SILT 10% sand, medium plasticity
	813.32 / 36.58	dark grey moist stiff sandy SILT with clay, 10% sand, medium plasticity
38	811.80 / 38.10	dark grey moist hard sandy SILT 10% sand medium plasticity
39	811.19 / 38.71	dark grey moist very hard sandy SILT (5 to 10% sand) with occasional
	810.28 / 39.62	

SAMPLES

TYPE AND NUMBER	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
CT-14	95		
CT-15	100		w = 24.6%; PI = 7%; PS (89.0% < 0.08mm)
CT-16	95		
CT-17	100		PS (41.5% < 0.08mm); w = 13.4%; PI = 4%
CT-18	0		
CT-19	85		
CT-20	95		
CT-21	85		
CT-22	100		
CT-23	100		
CT-24	100		
CT-25	100		
CT-26	100		

WATER CONTENT and LIMITS (%): W_P W W_L; 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008 | BOREHOLE : *08SWC272*
SITE : Minto Mine Yukon Canada | PAGE : 3 OF 3
FILE NO : MINTO (2CM022.003) | DRILL : Air Rotary
BORING DATE : 2008-03-10 TO 2008-03-14 | CORE BARREL : Triple tube (HQ)
DATUM : NAD83 Zone 8V | COORDINATES : 6944730.00 N 383881.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) W_P W W_L 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		5% gravel non-plastic									
	40.23 / 809.36	dark grey wet unconsolidated gravelly			CT-27		100				
41	40.54 / 808.75	SAND with subangular cobbles 10% gravel 25% cobbles									
	41.15	weathered bedrock									
42	807.84 / 42.06	weathered bedrock			CT-28		100				
		black wet consolidated SAND									
43	807.23 / 42.67	weathered bedrock 1" of clear ice									
					CT-29		100				
44	805.70 / 44.20	END OF LOGGING at 44.20m (Borehole Depth = 249.94m)									
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											

PROJECT : Minto Overburden Drilling Program 2008			BOREHOLE : 08SWC273
SITE : Minto Mine, Yukon, Canada			PAGE : 1 OF 3
FILE NO : MINTO (2CM022.003)			DRILL : Air Rotary
BORING DATE : 2008-03-14	TO	2008-03-18	CORE BARREL : Triple tube (HQ)
DATUM : NAD83 Zone 8V	COORDINATES :	6944750.00 N	384150.00 E

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BORING LOG

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

Water level: Frozen 0.12m above ground surface

ELEVATION - m / DEPTH - m	DESCRIPTION	TYPE AND NUMBER	RECOVERY %	LABORATORY and IN SITU TESTS	UNDRAINED SHEAR STRENGTH
835.80 / 0.00	dark brown saturated stiff organic sandy SILT non-plastic temp -1 deg C	CT-1	50	PS (56.5% < 0.08mm) w = 27.2%	
834.28 / 1.52	Same as above				
833.97 / 1.83	brown wet stiff gravelly silty SAND non-plastic	CT-2	70		
832.75 / 3.05	not recoverable	CT-3	0		
831.23 / 4.57	not recoverable	CT-4	0		
829.70 / 6.10	not recoverable	CT-5	0		
828.18 / 7.62	not recoverable	CT-6	0		
826.66 / 9.14	dark grey wet firm sandy clayey SILT weakly plastic temp 8 to 12 deg C	CT-7	30		◆
825.13 / 10.67	dark grey wet soft gravelly sandy SILT 10% gravel moderately plastic temp 8 to 12 deg C	CT-8	50		◆
823.61 / 12.19	Same as above temp 2 to 8 deg C	CT-9	38		◆
822.08 / 13.72	dark grey stiff moist gravelly sandy SILT 15-20 % subangular medium gravel, non-plastic	CT-10	50	PS (63.5% < 0.08mm) w = 16.6%	
821.17 / 14.63	dark grey moist hard sandy SILT non-plastic, temp 2-4 deg C				
820.56 / 15.24	gray sub-rounded cobbles				
820.41 / 15.39	Not Recovered	CT-11	10		
819.04 / 16.76	gray brown sub-rounded cobbles				
818.58 / 17.22	dark gray moist stiff sandy SILT with sub-rounded gravel and cobbles non-plastic	CT-12	60		
818.12 / 17.68	Not Recovered				◆
817.51 / 18.29	gray moist soft sand SILT with sub-rounded gravel and cobbles non-plastic	CT-13	64		
816.84 / 18.96					
816.54 / 19.26	dark gray moist very hard clayey SILT				

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE :	08SWC273
SITE : Minto Mine, Yukon, Canada		PAGE :	2 OF 3
FILE NO : MINTO (2CM022.003)		DRILL :	Air Rotary
BORING DATE : 2008-03-14	TO 2008-03-18	CORE BARREL :	Triple tube (HQ)
DATUM : NAD83 Zone 8V		COORDINATES :	6944750.00 N 384150.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) Wp W WL 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
	19.81	dark gray moist hard clayey SILT with sub-rounded gravel and trace cobbles and sand, low-plasticity, frozen, Nbn			CT-14		94				
21	814.56 / 21.24	Not Recovered									
22	814.46 / 21.34	dark gray moist stiff clayey SILT with sub-rounded gravel low plasticity. Clear ice at 73.5', 3% Vx			CT-15		100			w = 17.5% PI = 12% PS (65.5% < 0.08mm)	
23	812.94 / 22.86	same as above, 2% Vs. Temp range in run=-0.2, -2.2 degrees celcius			CT-16		90				
24	811.57 / 24.23	Not Recovered									
25	811.42 / 24.38	same as 75'-79.5', frozen, Nbn no visible ice, temp range= -0.6, -2.4 degrees celcius			CT-17		90				
26	810.04 / 25.76	Not Recovered									
	809.89 / 25.91	dark brown, moist, very hard, clayey SILT with sub-rounded cobbles and gravel and trace sand, Nbn			CT-18		95				
27	808.44 / 27.36	Not Recovered									
28	808.37 / 27.43	same as 85'-89.75'			CT-19		100				
29	806.84 / 28.96	same as 85'-89.75', 3" elongated smoky ice at 97.5'			CT-20		96				
30	805.38 / 30.42	Not Recovered									
31	805.32 / 30.48	dark gray moist very hard clayey SILT with sand and sub rounded gravel non-plastic, Nbn, no visible ice			CT-21		100				
32	803.80 / 32.00	Same as above									
	803.19 / 32.61	Not Recovered			CT-22		40				
33	802.27 / 33.53	dark gray saturated loose silty SAND with sub-rounded cobbles and gravel, non-plastic, no visible ice, Nbn			CT-23		100				
34	801.51 / 34.29	dark gray moist very hard sandy SILT with sub-rounded cobbles and gravel, no visible ice, Nbn									
35	800.75 / 35.05										
	800.14 / 35.66	dark grey, moist, stiff, silty CLAY with 10-15% coarse sand, ocasional subrounded fine gravel			CT-24		100				
36	799.22 / 36.58	dark grey, moist, stiff, SILT with 5% subangular coarse sand, non-plastic, Nbn			CT-25		80				
37											
38	797.70 / 38.10	same as above dark grey, wet, soft, silty CLAY with sand (<3%), weakly plastic, Nbn			CT-26		80			PS (62.0% < 0.08mm) w = 29.4% PI = 9%	
39	796.18 / 39.62	same as above									

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008
SITE : Minto Mine Yukon, Canada
FILE NO : MINTO (2CM022.003)
BORING DATE : 2008-03-14 TO 2008-03-18
DATUM : NAD83 Zone 8V
COORDINATES : 6944750.00 N 384150.00 E

BOREHOLE : *08SWC273*
PAGE : 3 OF 3
DRILL : Air Rotary
CORE BARREL : Triple tube (HQ)

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

STRATIGRAPHY

ELEVATION - m / DEPTH - m	DESCRIPTION
795.26 / 40.54	dark grey moist stiff clayey sandy SILT 10% sand with subangular coarse gravel mostly Nbn 1% Vs
794.65 / 41.15	dark grey moist firm silty CLAY with sand (<3%) ocasional subangular coarse gravel weakly plastic. Nbn
793.13 / 42.67	same as above
792.21 / 43.59	dark grey moist firm silty CLAY with 10% coarse sand ocasional subangular cobbles non-plastic Nbn
791.60 / 44.20	rock core
791.36 / 44.44	dark grey moist firm silty CLAY with 10% coarse sand ocasional subangular cobbles, non-plastic mostly Nbn 1% Vs
790.99 / 44.81	dark grey moist stiff silty CLAY with sand, weakly plastic ocasional subangular cobbles
790.08 / 45.72	dark grey moist firm silty sandy CLAY with ocasional subangular medium gravel medium plasticity. Nbn
788.56 / 47.24	same as above
787.03 / 48.77	dark grey wet firm silty clayey SAND with subangular cobbles and 5% subangular coarse gravel non-plastic
785.51 / 50.29	same as above
785.05 / 50.75	brownish grey saturated very soft SAND with subangular medium gravel
783.98 / 51.82	weathered bedrock subangular cobbles
782.46 / 53.34	weathered bedrock
780.94 / 54.86	weathered bedrock
779.41 / 56.39	END OF LOGGING at 56.39m (Borehole Depth = 255.42m)

SAMPLES

TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
CT-27	Soil core	100		
CT-28	Soil core	100		
CT-29	Soil core	95		
CT-30	Soil core	100		
CT-31	Soil core	100		
CT-32	Soil core	70		
CT-33	Soil core	50		
CT-34	Soil core	40		PS (7.3% < 0.08mm) w = 17.8%
CT-35	Soil core	40		
CT-36	Soil core	50		
CT-37	Soil core	70		

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

DEPTH - m: 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE : 08SWC274	
SITE : Minto Mine, Yukon, Canada		PAGE : 1 OF 3	
FILE NO : MINTO (2CM022 003)		DRILL : Air Rotary	
BORING DATE : 2008-03-18	TO 2008-03-23	CORE BARREL : Triple tube (HQ)	
DATUM : NAD83 Zone 8V		COORDINATES : 6944630 00 N	384300 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

STRATIGRAPHY

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION
	838 20 / 0 00	dark brown saturated very soft organic sandy SILT non-plastic Nbe
1		
	836 68 / 1 52	Not Recovered
2		
3	835 15 / 3 05	brownish grey moist very soft sandy (10%) clayey SILT non-plastic Non
4	834 39 / 3 81	dark grey moist soft SILT with fine sand <5% Nbe
	833 63 / 4 57	same as above only 4 inches recovered in the core-catcher
5		
6	832 10 / 6 10	dark grey wet soft gravelly sandy SILT non-plastic. Nbn
7	831 80 / 6 40	Not Recovered
	830 58 / 7 62	dark grey wet soft silty sandy subangular GRAVEL with subangular cobbles
8	830 28 / 7 92	Not Recovered
9	829 06 / 9 14	dark grey wet soft silty gravelly SAND with subangular cobbles non-plastic. Nbn
10	828 14 / 10 06	dark grey moist soft, sandy SILT non-plastic, Nbn
	828 07 / 10 13	Not Recovered
11	827 53 / 10 67	dark grey moist soft sandy (3 to 5%) clayey SILT with subangular gravel and occasional subangular cobbles, weakly plastic Nbn
12	826 01 / 12 19	same as above + Vx 3 inches Vs 5 inches
13		
	824 48 / 13 72	Not Recovered
14	823 87 / 14 33	dark grey moist, soft, sandy (3 to 5%) clayey SILT with subangular gravel and occasional subangular cobbles weakly plastic Nbn
15	822 96 / 15 24	dark grey moist, soft (when thawed) clayey SILT with 3 to 5% medium sand Nbn 3mm of clear ice
16		
17	821 44 / 16 76	same as above + occasional subangular cobbles Nbn
18	819 91 / 18 29	same as above + Nbn Vr = 3 inches
19		
	818 39	

WATER LEVEL - m: Frozen 0.12m below ground surface

SAMPLES

TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
CT 1	Soil core	18		
CT 2	Soil core	0		
CT 3	Soil core	90		PS (52 0% < 0 08mm) w = 31 4%
CT 4	Soil core	6		
CT 5	Soil core	20		
CT 6	Soil core	20		
CT 7	Soil core	70		
CT 8	Soil core	100		
CT 9	Soil core	95		
CT 10	Soil core	60		
CT 11	Soil core	86		
CT 12	Soil core	90		
CT 13	Soil core	90		

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008
SITE : Minto Mine, Yukon, Canada
FILE NO : MINTO (2CM022.003)
BORING DATE : 2008-03-18 TO 2008-03-23
DATUM : NAD83 Zone 8V
BOREHOLE : 08SWC274

DRILL : Air Rotary
CORE BARREL : Triple tube (HQ)
COORDINATES : 6944630.00 N 384300.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

Column headings: DEPTH - m; STRATIGRAPHY: ELEVATION - m / DEPTH - m, DESCRIPTION, SYMBOL; WATER LEVEL - m; SAMPLES: TYPE AND NUMBER, CONDITION, RECOVERY %, N or RQD; WATER CONTENT and LIMITS (%) (W_P, W, W_L; 20 40 60 80); LABORATORY and IN SITU TESTS; GROUND TEMPERATURE (°C) (-5 0 5); UNDRAINED SHEAR STRENGTH (kPa) (25 50 75)

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	TYPE AND NUMBER	RECOVERY %	LABORATORY and IN SITU TESTS
21		same as above Nbn	CT-14	100	
22	816.86 / 21.34	same as above + ocasional subrounded coarse gravel Nbn	CT-15	100	w = 14.8% PI = 7% PS (48.0% < 0.08mm)
23	815.34 / 22.86	same as above Nbn	CT-16	50	
24, 25	813.82 / 24.38	same as above Nbn	CT-17	72	
26, 27	812.29 / 25.91	dark grey moist soft (when thawed) SILT interbedded with 5 inch thick layers of sand ocasional sub-angular coarse gravel Nbn	CT-18	75	
28	810.77 / 27.43	dark grey SILT with an occasional cobble (up to 1.5 in long) firm low moisture content no vis Ice Nbn	CT-19	100	
29, 30	809.24 / 28.96	dark grey SILT with occasional small gravel (up to 1 in long) firm crumbles Nbn less than 5% Vx	CT-20	93	
31	807.72 / 30.48	same as above Nbn coarser grained with depth	CT-21	98	
32, 33	806.20 / 32.00	dark grey (browner with depth) sandy SILT crumbles with pick Nbn	CT-22	83	
34	804.67 / 33.53	dark brown and grey with some light brown banding soft clayey SILT Vx <5% Nbn	CT-23	96	
35, 36	803.15 / 35.05	dark grey soft SILT with increasing sand with depth some sand layers, pieces of granitic rock (up to 2 in long) no vis ice Nbn	CT-24	95	w = 17.6% PS (24.5% < 0.08mm)
37	801.62 / 36.58	dark grey SILT with sand soft no vis ice pieces of granitic rock (up to 4 in long) Nbn	CT-25	77	w = 16.8% PS (37.0% < 0.08mm)
38, 39	800.10 / 38.10	dark grey with brown sections browner at depth silty SAND pieces of rock (up to 1 in long) no vis ice Nbn	CT-26	83	
	798.58 / 39.62	med brown to light grey with some darker			

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008
SITE : Minto Mine Yukon Canada
FILE NO : MINTO (2CM022.003)
BORING DATE : 2008-03-18 TO 2008-03-23
DATUM : NAD83 Zone 8V
BOREHOLE : 08SWC274

DRILL : Air Rotary
CORE BARREL : Triple tube (HQ)
COORDINATES : 6944630.00 N 384300.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact; (Sur) ◆ remoulded
Undisturbed	ST Thin walled shelby tube	w Water content	
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) Wp W WL 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		areas, sandy SILT pieces of rock (up to 1.5 in long) no vis ice Nbn			CT-27		95				
41	797.05 / 41.15	same as above with smaller rock pieces									
42					CT-28		90				
43	795.53 / 42.67	same as above									
					CT-29		80				
44	794.00 / 44.20	highly fractured granitic rock SAND with silt and gravel (up to 1 in long)									
45					CT-30		98				
46	792.48 / 45.72	fractured granitic rock veining and staining dark in colour									
					CT-31		100				
47	790.96 / 47.24	same as above									
48					CT-32		100				
49	789.43 / 48.77	END OF LOGGING at 48.77m (Borehole Depth = 368.81m)									
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE :	08SWC275
SITE : Minto Mine Yukon Canada		PAGE :	1 OF 2
FILE NO : MINTO (2CM022 003)		DRILL :	Air Rotary
BORING DATE : 2008-03-20	TO 2008-03-22	CORE BARREL :	Triple tube (HQ)
DATUM : NAD83 Zone 8V		COORDINATES :	6944220.00 N 383890.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

Water level: Frozen at ground surface

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION
	856.60 / 0.00	dark brown organic sandy SILT Vx (50%) with some Vr (up to 1 in long) lots of visible ice roots present pebbles in last 1 ft of run
2	854.42 / 2.18	driller feels it is SAND that has washed away
4	852.33 / 4.27	GRAVEL (subangular to subround 0.25 x 0.5 in to 1.75 x 0.75 in rocks) one 0.5 x 0.5 in piece of ice
6	850.81 / 5.79	grey moist firm sandy SILT with gravel non-plastic Nbn
	850.50 / 6.10	same as above
	848.98 / 7.62	Not Recovered
9	847.46 / 9.14	Not Recovered
	845.93 / 10.67	sub-rounded large GRAVEL and small cobbles no fines
11	845.63 / 10.97	dark grey moist soft sandy SILT with ocasional boulders non-plastic Nbn
12	844.41 / 12.19	dark grey sandy SILT with gravel (subround to subang up to 0.5 in long with one 2 in long) no vis ice Nbe
	842.88 / 13.72	same as above - decreasing sand content with depth
15	841.36 / 15.24	dark grey sandy SILT some small pebbles (up to 0.25 in long) no vis ice Nbn
	839.84 / 16.76	same as above
18	838.31 / 18.29	dark grey clayey SILT with some sandy and gravel layers (3-4 in run)
	836.79	

SAMPLES: TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
CT-1	Soil core	100		
CT-2	Soil core	43		PS (68.0% < 0.08mm) w = 189.7%
CT-3	Soil core	0		
CT-4	Soil core	5		
CT-5	Soil core	90		
CT-6	Soil core	0		
CT-7	Soil core	0		
CT-8	Soil core	90		
CT-9	Soil core	90		
CT-10	Soil core	98		w = 10.1% PS (33.5% < 0.08mm)
CT-11	Soil core	82		
CT-12	Soil core	88		
CT-13	Soil core	100		w = 15.4% PI = 10%

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE : 08SWC275	
SITE : Minto Mine Yukon Canada		PAGE : 2 OF 2	
FILE NO : MINTO (2CM022.003)		DRILL : Air Rotary	
BORING DATE : 2008-03-20	TO 2008-03-22	CORE BARREL : Triple tube (HQ)	
DATUM : NAD83 Zone 8V	COORDINATES :	6944220.00 N	383890.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) W_P W W_L 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		same as above with bigger gravel pieces			CT-14		83				
21	835.26 / 21.34	dark grey moist firm sandy SILT with ocasional sub-angular coarse gravel non-plastic									
22					CT-15		60				
23	833.74 / 22.86	dark grey moist firm sandy SILT with subangular gravel non-plastic									
24					CT-16		100				
25	832.22 / 24.38	same as previous			CT-17		100			PS (56.0% < 0.08mm) w = 9.6%	
26	830.69 / 25.91	angular to subrounded medium to coarse gravel no fines									
27	830.45 / 26.15	dark grey firm moist silty SAND			CT-18		22				
28	829.17 / 27.43	END OF BOREHOLE at 27.43m									
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008 | BOREHOLE : *08SWC277*

SITE : Minto Mine, Yukon, Canada | PAGE : 1 OF 2

FILE NO : MINTO (2CM022.003) | DRILL : Air Rotary

BORING DATE : 2008-03-23 TO 2008-03-26 | CORE BARREL : Triple tube (HQ)

DATUM : NAD 83 Zone 8V | COORDINATES : 6944211.00 N 384090.00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

STRATIGRAPHY

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION
	869.00 / 0.00	Brown, wet, very soft, organic sandy SILT, non-plastic
1	867.48 / 1.52	subangular to subrounded coarse to medium gravel, no fines
3	865.95 / 3.05	Not Recovered
4	864.43 / 4.57	Not Recovered
6	862.90 / 6.10	Not Recovered
7	861.38 / 7.62	Not Recovered
9	859.86 / 9.14	subangular to subrounded coarse gravel, no fines
	859.70 / 9.30	brownish grey, wet, soft, sandy SILT with coarse gravel and subangular cobbles
	859.09 / 9.91	Not Recovered
	858.33 / 10.67	subangular to subrounded fine gravel, no fines, ocasional subangular large gravel
	858.03 / 10.97	dark grey, moist, firm, sandy SILT with subangular gravel and ocasional subangular boulder
	857.42 / 11.58	Not Recovered
	856.81 / 12.19	dark grey, moist, soft to firm sandy gravelly SILT with subangular cobbles non-plastic, not frozen
	855.68 / 13.32	Not Recovered
	855.28 / 13.72	dark grey, moist, firm with narrow soft zones, SILT with 10% sand, non-plastic, not frozen
15	853.76 / 15.24	same as above + ocasional subangular cobbles
	852.24 / 16.76	dark grey, moist, stiff, sandy SILT with 3-5% fine gravel, interbedded with clean subangular, poorly graded, gravel and fine, brownish grey sand
	850.71 / 18.29	grey, wet, soft to stiff silty SAND with angular gravel and cobbles, non-plastic, not frozen
	850.10 / 18.90	Not Recovered
	849.19	

WATER LEVEL - m: *Water 2.1m below ground surface*

SAMPLES

TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD
CT-1	Soil core	37	
CT-2	Soil core	20	
CT-3	Soil core	0	
CT-4	Soil core	0	
CT-5	Soil core	0	
CT-6	Soil core	0	
CT-7	Soil core	50	
CT-8	Soil core	60	
CT-9	Soil core	73	
CT-10	Soil core	90	
CT-11	Soil core	90	
CT-12	Soil core	73	
CT-13	Soil core	37	

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

LABORATORY and IN SITU TESTS (at CT-8): w = 21.2%, PS (1.5% < 0.08mm)

GROUND TEMPERATURE (°C): -5 0 5

UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008
BOREHOLE : 08SWC277
SITE : Minto Mine Yukon Canada

FILE NO : MINTO (2CM022 003)
DRILL : Air Rotary
BORING DATE : 2008-03-23 TO 2008-03-26
CORE BARREL : Triple tube (HQ)
DATUM : NAD 83 Zone 8V
COORDINATES : 6944211 00 N 384090 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) W_P W W_L 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		orange wet angular gravelly SAND								w = 17 3%	
	848 43 / 20 57	non-cohesive Not Recovered			CT-14		48			PS (9 5% < 0 08mm)	
21	847 66 / 21 34	orange wet weakly cemented angular gravelly coarse SAND									
22	846 75 / 22 25	Not Recovered			CT-15		60			w = 11 9% PS (7 0% < 0 08mm)	
23	846 14 / 22 86	orange weathered bedrock			CT-16		100				
24	844 62 / 24 38	bedrock									
25					CT-17		100				
26	843 09 / 25 91	END OF LOGGING at 25 91m (Borehole Depth = 252 98m)									
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE : *08SWC278*	
SITE : Minto Mine Yukon Canada		PAGE : 1 OF 3	
FILE NO : MINTO (2CM022 003)		DRILL : Air Rotary	
BORING DATE : 2008-03-26	TO 2008-03-29	CORE BARREL : Triple tube (HQ)	
DATUM : NAD83 Zone 8V	COORDINATES :	6943900 00 N	383940 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

STRATIGRAPHY — Elevation - m / Depth - m (ground surface 870 10)

Depth - m	Elevation - m / Depth - m	Description
	0 00	orange-brown to brown wet, soft organic sandy SILT non-plastic Nbn
	869 80 / 0 30	Not Recovered
1		
	868 58 / 1 52	brownish grey wet soft silty SAND with inclusions of orange sandy silt non-plastic Nbe
2	868 27 / 1 83	Not Recovered
3	867 05 / 3 05	Not Recovered
4		
	865 53 / 4 57	grey wet soft sandy SILT inclusions of poorly graded medium sand and ocasional subangular medium gravel non-plastic Nbn
5		
6	864 00 / 6 10	grey wet, soft silty fine SAND non-plastic. Nbn
	863 70 / 6 40	subangular coarse GRAVEL with less than 3% fines
7	863 39 / 6 71	Not Recovered
	862 48 / 7 62	brownish-orange poorly graded medium sand, wash-out from hole (no recovery)
8	862 16 / 7 92	grey wet, angular to subrounded well graded GRAVEL (30% coarse, 40 % medium 30 % fine) with traces of sand
9	861 57 / 8 53	
	860 96 / 9 14	no fines not frozen
10	860 19 / 9 91	Not Recovered
	859 43 / 10 67	grey moist loose well graded SAND with traces of silt ad subangular gravel not frozen
11	859 31 / 10 79	Not Recovered
	859 19 / 10 91	grey wet, soft SILT with fine sand weakly plastic, not frozen
12	857 91 / 12 19	grey moist firm fine SAND with 10 % coarse sand and traces of gravel
13		grey moist medium dense SAND with gravel and ocasional cobbles not frozen
14	856 38 / 13 72	same as above
		dark grey moist stiff silty SAND with 5 to 10% subangular gravel non-plastic no ice observed
15	854 86 / 15 24	same as above
16		
17	853 34 / 16 76	same as above + traces of Vs
	852 27 / 17 83	dark grey moist stiff SILT with sand and subangular gravel non-plastic, mainly Nbn, traces of Vs
18	851 81 / 18 29	same as above + traces of Vs
19		
	850 29	

WATER LEVEL - m: Water 0.6m below ground surface

SAMPLES

Depth - m (approx.)	Type and Number	Recovery %
1	CT-1	20
2	CT-2	20
4	CT-3	0
5	CT-4	68
7	CT-5	40
8	CT-6	50
10	CT-7	50
11	CT-8	100
13	CT-9	86
14	CT-10	100
16	CT-11	100
17	CT-12	100
19	CT-13	100

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5 — UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

LABORATORY and IN SITU TESTS

Depth - m (approx.)	Result
0–1	PS (55 0% < 0 08mm) w = 24 9% PI = 5%
8	PS (0 4% < 0 08mm) w = 1 3%
17	PS (36 0% < 0 08mm) w = 7 2%

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BORING LOG

PROJECT : Minto Overburden Drilling Program 2008 | BOREHOLE : 08SWC278
SITE : Minto Mine Yukon Canada | PAGE : 2 OF 3
FILE NO : MINTO (2CM022 003) | DRILL : Air Rotary
BORING DATE : 2008-03-26 TO 2008-03-29 | CORE BARREL : Triple tube (HQ)
DATUM : NAD83 Zone 8V | COORDINATES : 6943900 00 N 383940 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST
Remoulded	SS Split spoon	PS Particle size analysis
Undisturbed	ST Thin walled shelby tube	w Water content
Lost	PS Piston sampler	D Unit weight (kN/m³)
Soil core	CT Core tube sample	k Permeability (cm/s)

Torvane (Su) ○ intact
(Sur) ◆ remoulded
Ground Temperature ⁂——⁂

DEPTH - m	ELEVATION - m / DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	WATER LEVEL - m	SAMPLES TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) W_P W W_L (20 40 60 80)	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		same as above + traces of Vs			CT-14		100				
21	848 76 / 21 34	same as above									
22	847 85 / 22 25	dark grey moist stiff sandy SILT with 5 to 10% subangular gravel non-plastic Nbn traces of Vs			CT-15		100				
23	847 24 / 22 86	same as above + traces of Vs			CT-16		100				
24	845 72 / 24 38	same as above + traces of Vs									
25					CT-17		100				
26	844 19 / 25 91	dark grey clayey SILT some rocks (subrounded up to 2 in long) no vis ice Nbn?? - int temp 10C									
27					CT-18		28				
28	842 67 / 27 43	dark grey SILT with sand and gravel 1 piece granitic rock (~3 in long) 1 25 in ice lens no vis ice Nbn?? - int temp 3C			CT-19		100			w = 8 5% PS (24 0% < 0 08mm)	◆
29	841 14 / 28 96	same as above - less rock 1 piece granitic rock (~ 1 5 in long) no vis ice unfrozen?? - int temp 8C									
30					CT-20		90				
31	839 62 / 30 48	same as above 1 piece of dark rock (mid run ~4 in long) no vis ice unfrozen?? - int temp 8C			CT-21		100				
32	838 10 / 32 00	dark grey sandy SILT/silty SAND less large rocks than above (0 25 0 5 in long) increasing sand with depth									
33	836 57 / 33 53	transition zone btw above and silty sand below			CT-22		100			PS (38 5% < 0 08mm) w = 16 8%	
34		dark grey/black silty SAND progressing to SAND with depth pieces of granitic rock (avg 1 in long 1 piece at end 3 5 in long) unfrozen int temp 8-12C			CT-23		82				
35	835 05 / 35 05	dark grey/black SAND with pieces of granitic rock - int temp 6C									
36					CT-24		98				
37	833 52 / 36 58	interbeded SAND/SILT layers same as above (SAND) 1st foot of run is small rocks (sub ang to sub round) mid run 1 5 ft SILT layer (dark grey) unfrozen int temp 6-8C			CT-25		82				
38	832 00 / 38 10	dark grey interbedded SAND/SILT unfrozen pieces of granitic rock (up to 2 in long) gravel in sand layer - int temp 11-13C									
39	830 48 / 39 62				CT-26		75				

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BORING LOG

PROJECT :	Minto Overburden Drilling Program 2008	BOREHOLE :	08SWC278
SITE :	Minto Mine, Yukon, Canada	PAGE :	3 OF 3
FILE NO :	MINTO (2CM022 003)	DRILL :	Air Rotary
BORING DATE :	2008-03-26 TO 2008-03-29	CORE BARREL :	Triple tube (HQ)
DATUM :	NAD83 Zone 8V	COORDINATES :	6943900 00 N 383940 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) Wp W WL 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
		(same as above) - int temp 11C			CT-27		56			PS (17 8% < 0 08mm) w = 10 8%	
41	828 95 / 41 15	very weathered granitic rock broken down into SAND can break rock pieces with hand unfrozen									
42					CT-28		78				
43	827 43 / 42 67	same as above									
					CT-29		100				
44	825 90 / 44 20	same as above less sand more rock (still very incompetent)									
45					CT-30		97				
46	824 38 / 45 72	same as above - more competent rock little sand									
					CT-31		100				
47	822 86 / 47 24	END OF LOGGING at 47 24m (Borehole Depth = 246 80m)									
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											

SRK Consulting *Engineers and Scientists*	PROJECT : Minto Overburden Drilling Program 2008 — BOREHOLE : *08SWC280*
	SITE : Minto Mine Yukon Canada — PAGE : 1 OF 2
	FILE NO : MINTO (2CM022 003) — DRILL : Air Rotary
	BORING DATE : 2008-03-29 TO 2008-04-01 — CORE BARREL : Triple tube (HQ)
BORING LOG	DATUM : NAD83 Zone 8V — COORDINATES : 6943950 00 N 383671 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

WATER CONTENT and LIMITS (%): W_P W W_L — 20 40 60 80

GROUND TEMPERATURE (°C): -5 0 5 — UNDRAINED SHEAR STRENGTH (kPa): 25 50 75

Water level: Frozen 0.3m above ground surface

STRATIGRAPHY

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION
	873 30 / 0 00	brown moist soft. SILT with traces of sand and gravel non-plastic, non-frozen
1	872 08 / 1 22	Not Recovered
2	871 78 / 1 52	Not Recovered
	871 01 / 2 29	Not Recovered
3	870 25 / 3 05	Not Recovered
4	869 34 / 3 96	brown. moist. soft. SILT with traces of sand and 15% subrounded to subangular gravel non-plastic non frozen
5	868 73 / 4 57	same as above
	868 12 / 5 18	Not Recovered
6	867 81 / 5.49	dark grey. moist soft silty SAND with ocasional subrounded medium gravel non-plastic Nbn
7	867 20 / 6 10	dark grey. moist loose subrounded and rounded coarse SAND with 5 to 10% fines interbedded with dark grey moist soft SILT non-plastic. Nbn. traces of Vs
	866 59 / 6 71	
8	866 29 / 7 01	
	865 68 / 7 62	dark grey moist soft SILT non-plastic traces of Vs Nbn
9	864 46 / 8 84	dark grey. moist soft sandy SILT non-plastic. Nbn
10	864 16 / 9 14	same as above + ocasional angular small cobbles
	862 63	Not Recovered
11	10 67	dark grey moist hard to stiff sandy SILT 20% sand with subangular gravel and occasional cobbles non-plastic Nbn
12		same as above
	861 11 / 12 19	same as above
13	860 50 / 12 80	dark grey moist. hard to stiff silty SAND with subangular gravel and ocasional subangular cobbles. non-plastic
14	859 58 / 13 72	same as above
15	858 06 / 15 24	dark grey moist. hard to stiff silty SAND with subangular cobbles and gravel (25% cobbles 10% gravel)
16	856 99 / 16 31	brownish grey wet loose SAND with subangular gravel. not frozen
17	856 54 / 16 76	alternate layers of grey wet. loose to medium dense coarse and fine SAND traces of gravel. Nbn
18	855 62 / 17 68	Not Recovered
	855.01 / 18 29	brownish grey. moist medium dense SAND with taces of fines and occasional angular cobbles
19	853 79 / 19 51	weathered bedrock

SAMPLES

TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	LABORATORY and IN SITU TESTS
CT-1	Soil core	80		
CT-2	Soil core	0		
CT-3	Soil core	40		w = 10 3% PS (40 0% < 0 08mm)
CT-4	Soil core	90		
CT-5	Soil core	96		
CT-6	Soil core	80		
CT-7	Soil core	100		PS (33 0% < 0 08mm) w = 8 2%
CT-8	Soil core	100		
CT-9	Soil core	100		
CT-10	Soil core	90		
CT-11	Soil core	100		
CT-12	Soil core	60		PS (56 5% < 0 08mm) w = 13 1%
CT-13	Soil core	100		

SRK Consulting
Engineers and Scientists

BORING LOG

PROJECT : Minto Overburden Drilling Program 2008		BOREHOLE :	*08SWC280*
SITE : Minto Mine Yukon Canada		PAGE : 2 OF 2	
FILE NO : MINTO (2CM022 003)		DRILL :	Air Rotary
BORING DATE : 2008-03-29	TO 2008-04-01	CORE BARREL :	Triple tube (HQ)
DATUM : NAD83 Zone 8V	COORDINATES :	6943950 00 N	383671 00 E

SAMPLE CONDITION	TYPE OF SAMPLER	LABORATORY AND IN SITU TEST	
Remoulded	SS Split spoon	PS Particle size analysis	Torvane (Su) intact
Undisturbed	ST Thin walled shelby tube	w Water content	(Sur) ◆ remoulded
Lost	PS Piston sampler	D Unit weight (kN/m³)	Ground Temperature
Soil core	CT Core tube sample	k Permeability (cm/s)	

DEPTH - m	ELEVATION - m / DEPTH - m	DESCRIPTION	SYMBOL	WATER LEVEL - m	TYPE AND NUMBER	CONDITION	RECOVERY %	N or RQD	WATER CONTENT and LIMITS (%) W_P W W_L 20 40 60 80	LABORATORY and IN SITU TESTS	GROUND TEMPERATURE (°C) -5 0 5 / UNDRAINED SHEAR STRENGTH (kPa) 25 50 75
	19 81	weathered bedrock			CT-14	Soil core	100				
21	851 96 / 21 34	weathered bedrock									
22	851 35 / 21 95	competent bedrock			CT-15	Soil core	100				
23	850 44 / 22 86	END OF LOGGING at 22 86m (Borehole Depth = 265 18m)									
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											

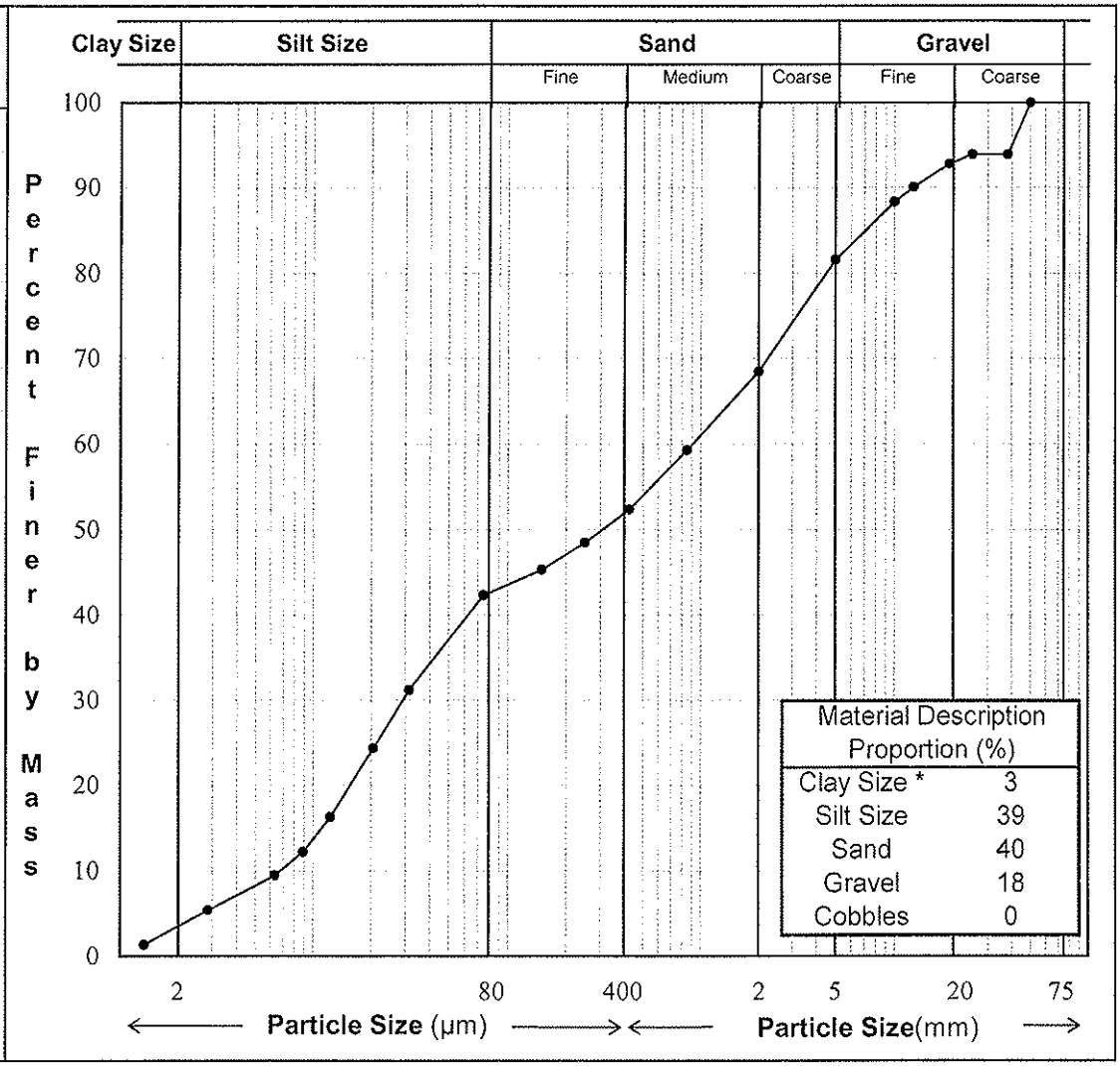
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC270-S1
Sample No.: BH08-SWC270-S1
Depth: 10 - 11 ft
Description**: SAND AND SILT - some gravel, trace silt

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	94
25 mm	94
19 mm	93
13 mm	90
10 mm	88
5 mm	82
2 mm	68
850 µm	59
425 µm	52
250 µm	48
150 µm	45
75 µm	42
31 µm	31
21 µm	24
12 µm	16
9 µm	12
6 µm	9
3 µm	5
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By:

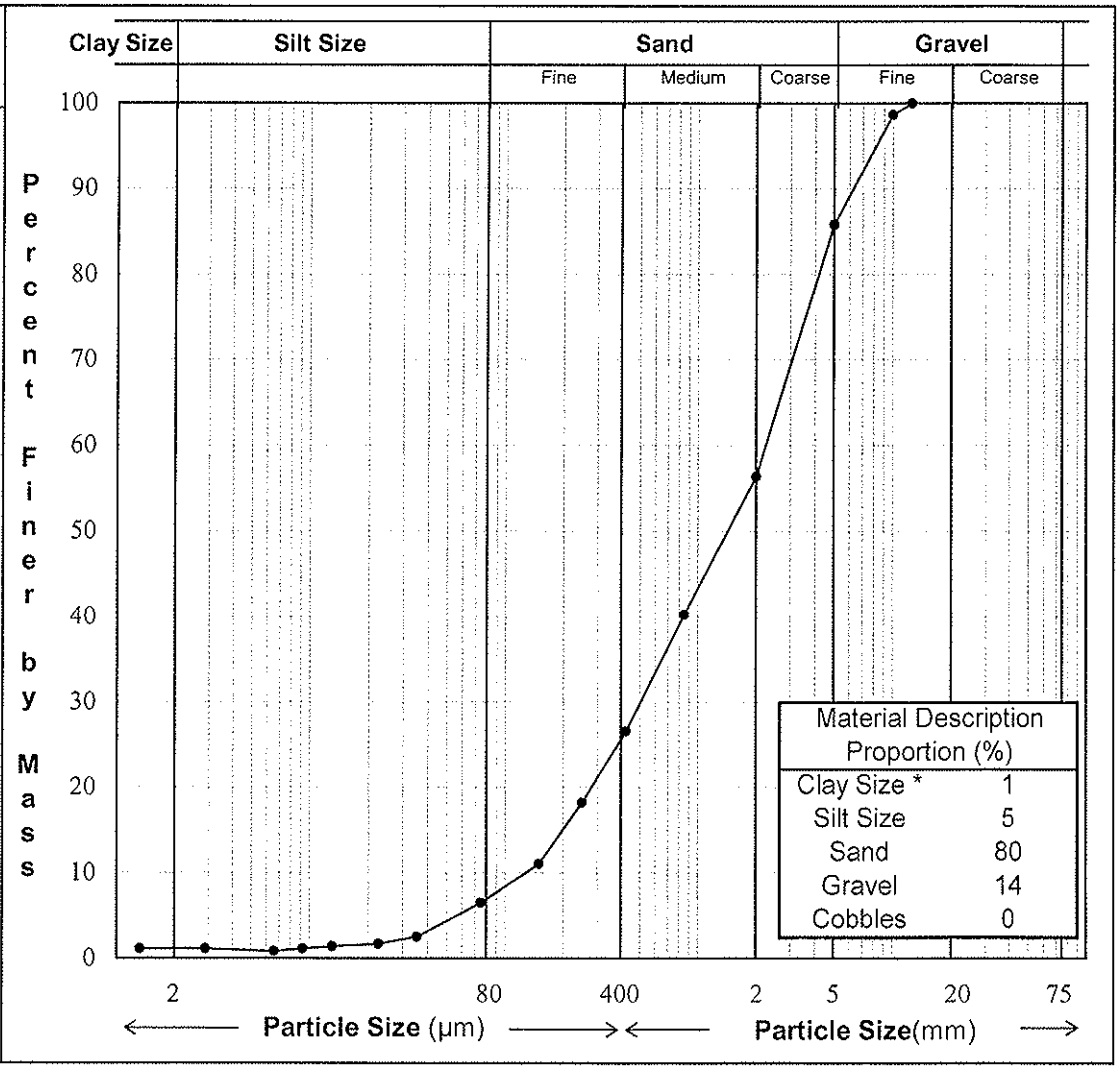
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC270-S2		
Sample No.:	BH08-SWC270-S2		
Depth:	31.2 - 32.2 ft		
Description**:	SAND - some gravel, trace silt, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	100
10 mm	99
5 mm	86
2 mm	56
850 µm	40
425 µm	27
250 µm	18
150 µm	11
75 µm	7
36 µm	3
23 µm	2
13 µm	1
9 µm	1
7 µm	1
3 µm	1
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

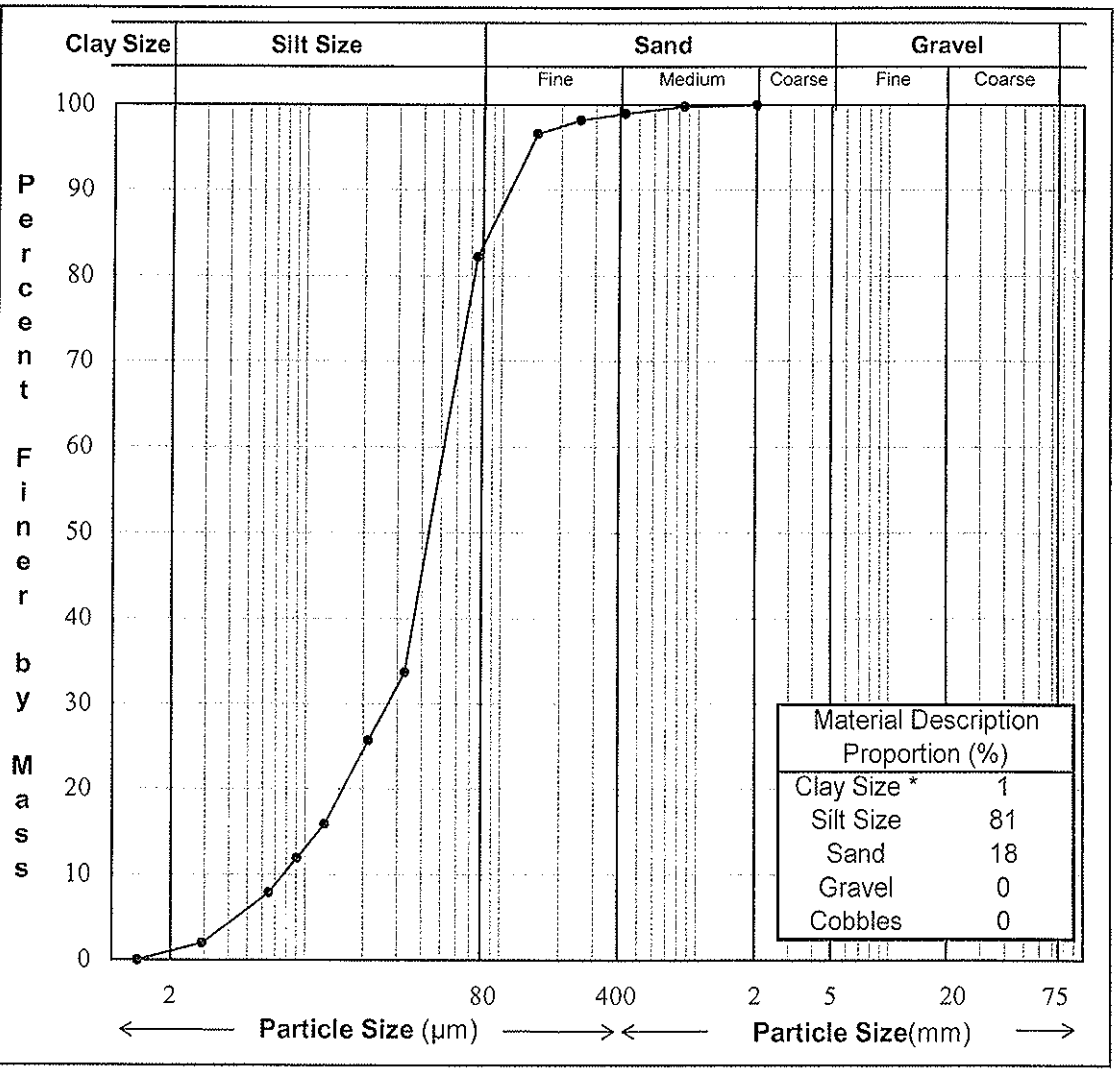
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC271-S1		
Sample No.:	BH08-SWC271-S1		
Depth:	0.8 - 1.5 ft		
Description**:	SILT - some sand, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	
2 mm	100
850 µm	100
425 µm	99
250 µm	98
150 µm	97
75 µm	82
33 µm	34
21 µm	26
13 µm	16
9 µm	12
6 µm	8
3 µm	2
1 µm	0



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

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Reviewed By:

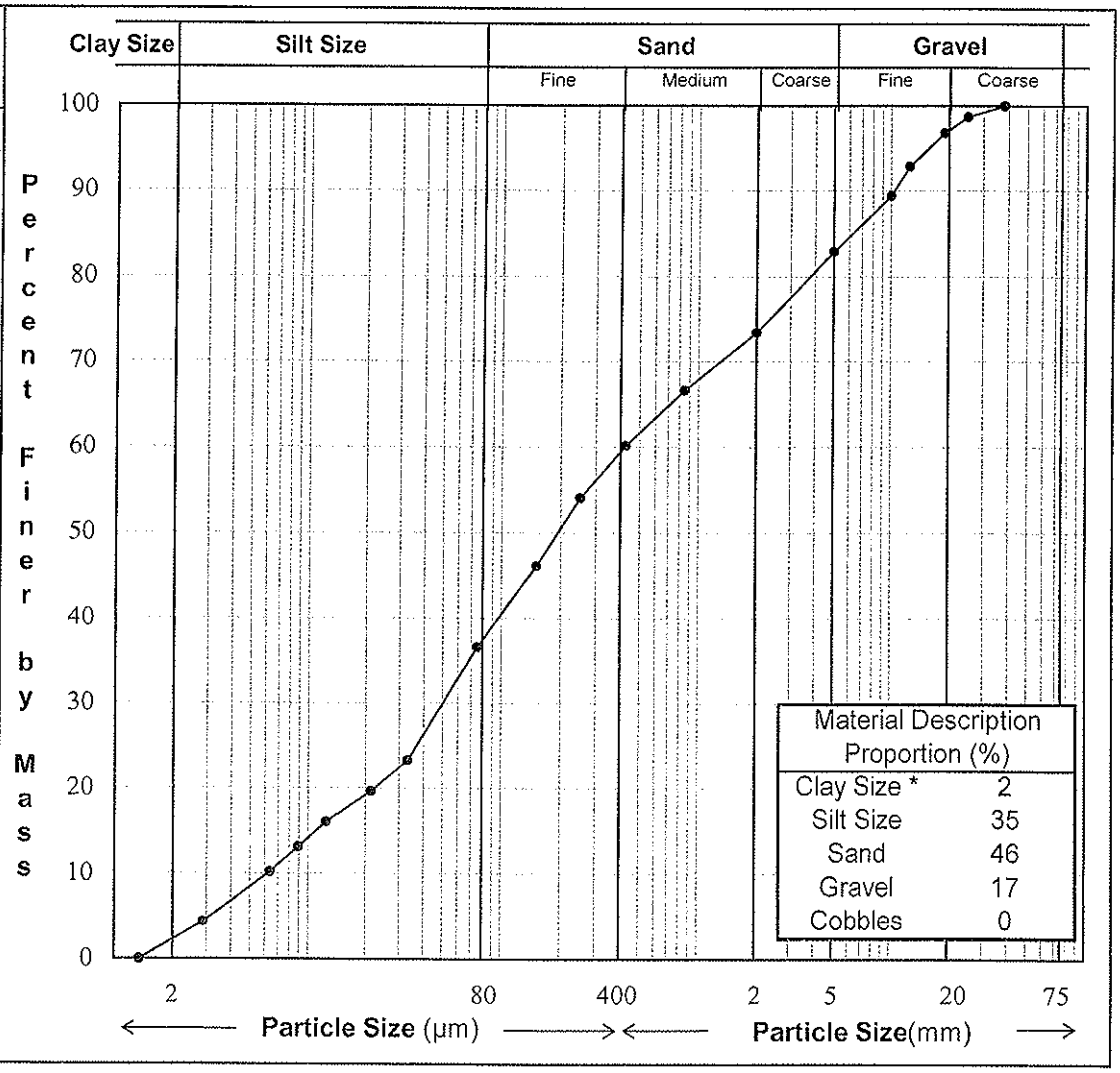
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC271-S4		
Sample No.:	BH08-SWC271-S4		
Depth:	17.5 - 18.5 ft		
Description**:	SAND AND SILT - some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	99
19 mm	97
13 mm	93
10 mm	89
5 mm	83
2 mm	73
850 µm	67
425 µm	60
250 µm	54
150 µm	46
75 µm	37
33 µm	23
21 µm	20
12 µm	16
9 µm	13
6 µm	10
3 µm	4
1 µm	0



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

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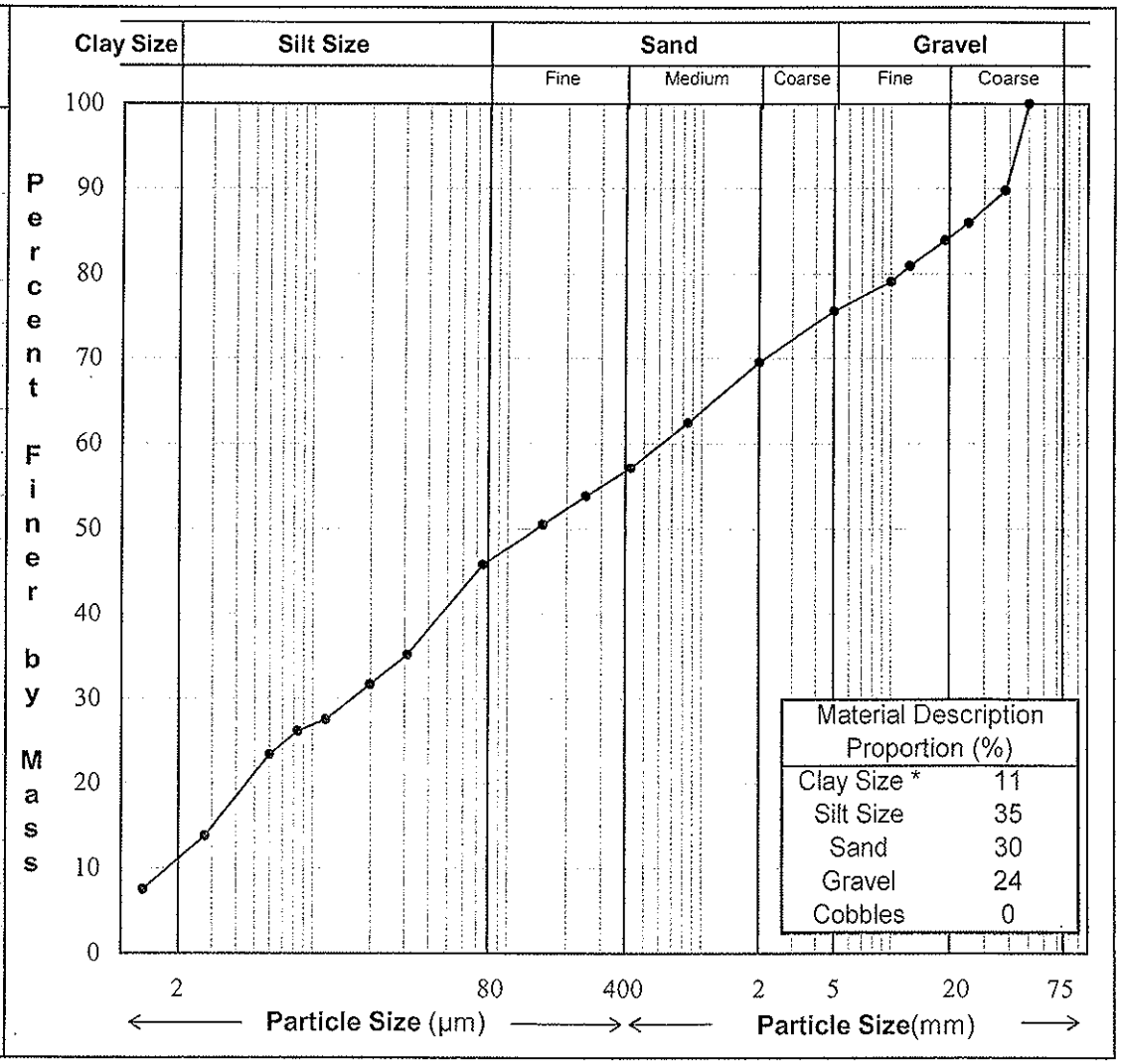
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC271-S9		
Sample No.:	BH08-SWC271-S9		
Depth:	82.5 - 83.5 ft		
Description**:	SILT - sandy, gravelly, some clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	90
25 mm	86
19 mm	84
13 mm	81
10 mm	79
5 mm	76
2 mm	70
850 µm	62
425 µm	57
250 µm	54
150 µm	50
75 µm	46
31 µm	35
20 µm	32
12 µm	28
8 µm	26
6 µm	23
3 µm	14
1 µm	8



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

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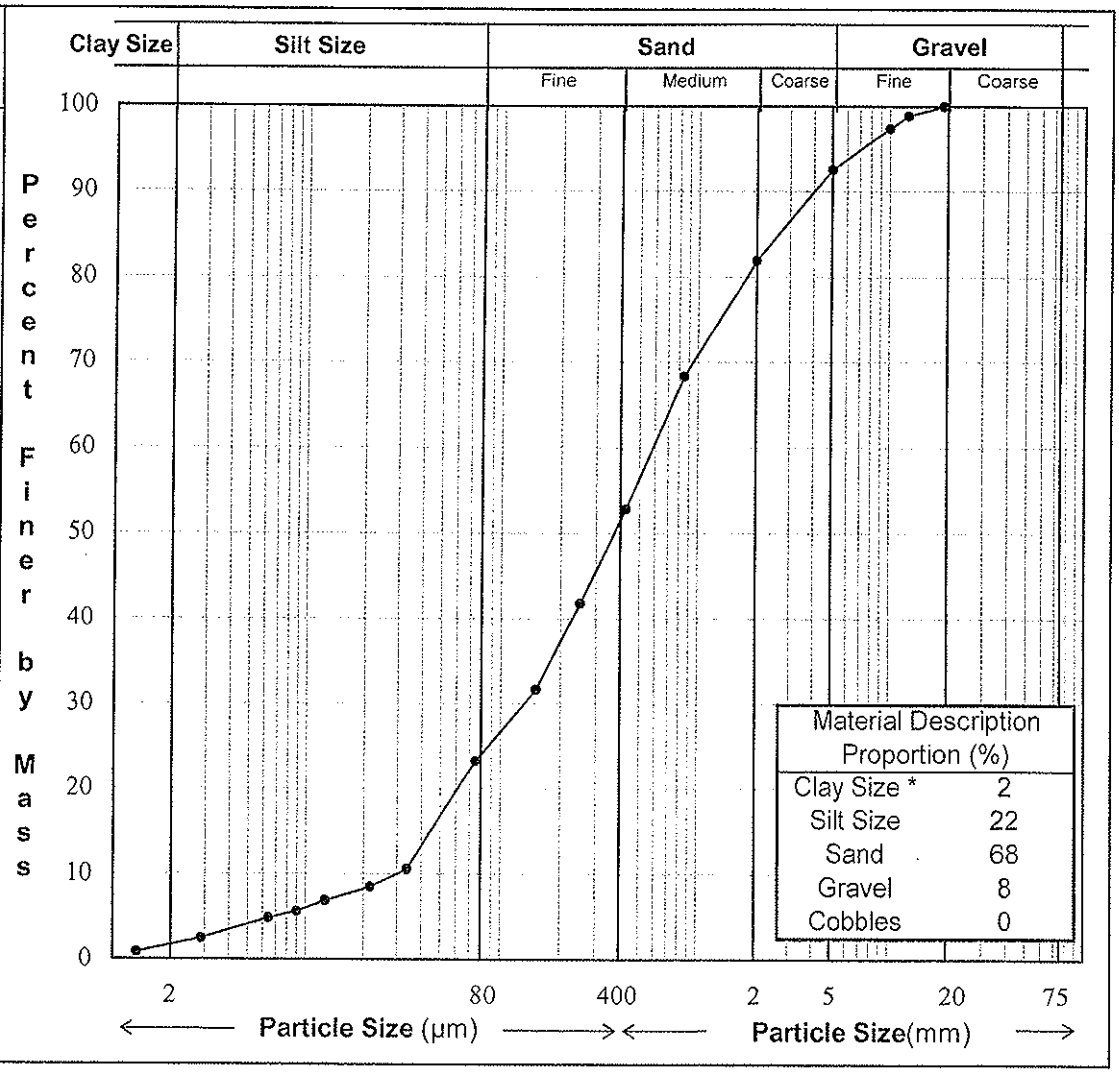
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC272-S1		
Sample No.:	BH08-SWC272-S1		
Depth:	4.0 - 5.0 ft		
Description**:	SAND - silty, trace gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	99
10 mm	97
5 mm	93
2 mm	82
850 µm	68
425 µm	53
250 µm	42
150 µm	32
75 µm	23
34 µm	11
22 µm	9
13 µm	7
9 µm	6
6 µm	5
3 µm	2
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

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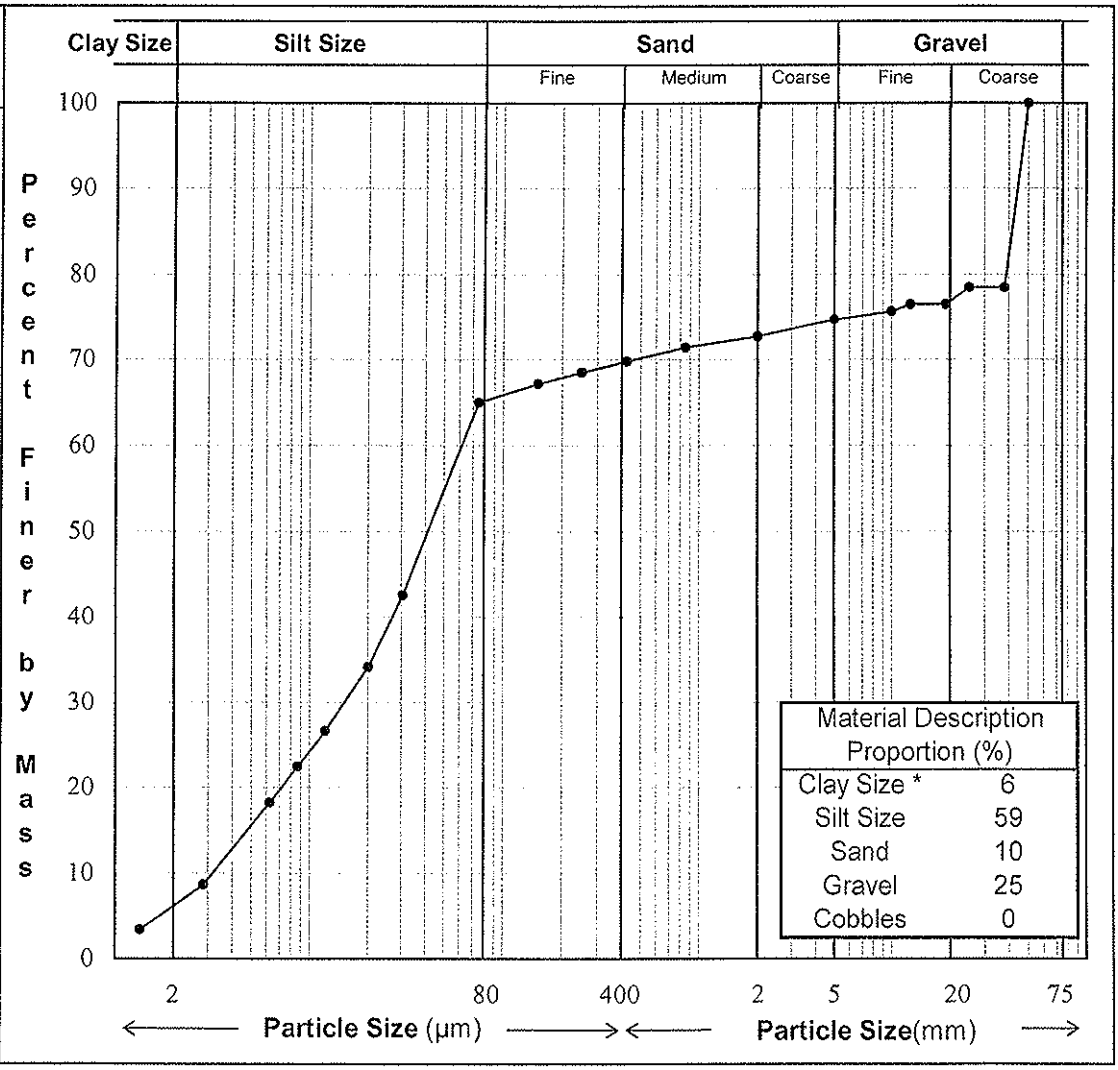
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC272-S4		
Sample No.:	BH08-SWC272-S4		
Depth:	37 - 38 ft		
Description**:	SILT - gravelly, trace sand, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	78
25 mm	78
19 mm	77
13 mm	77
10 mm	76
5 mm	75
2 mm	73
850 µm	71
425 µm	70
250 µm	69
150 µm	67
75 µm	65
31 µm	43
20 µm	34
12 µm	27
9 µm	22
6 µm	18
3 µm	9
1 µm	3



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

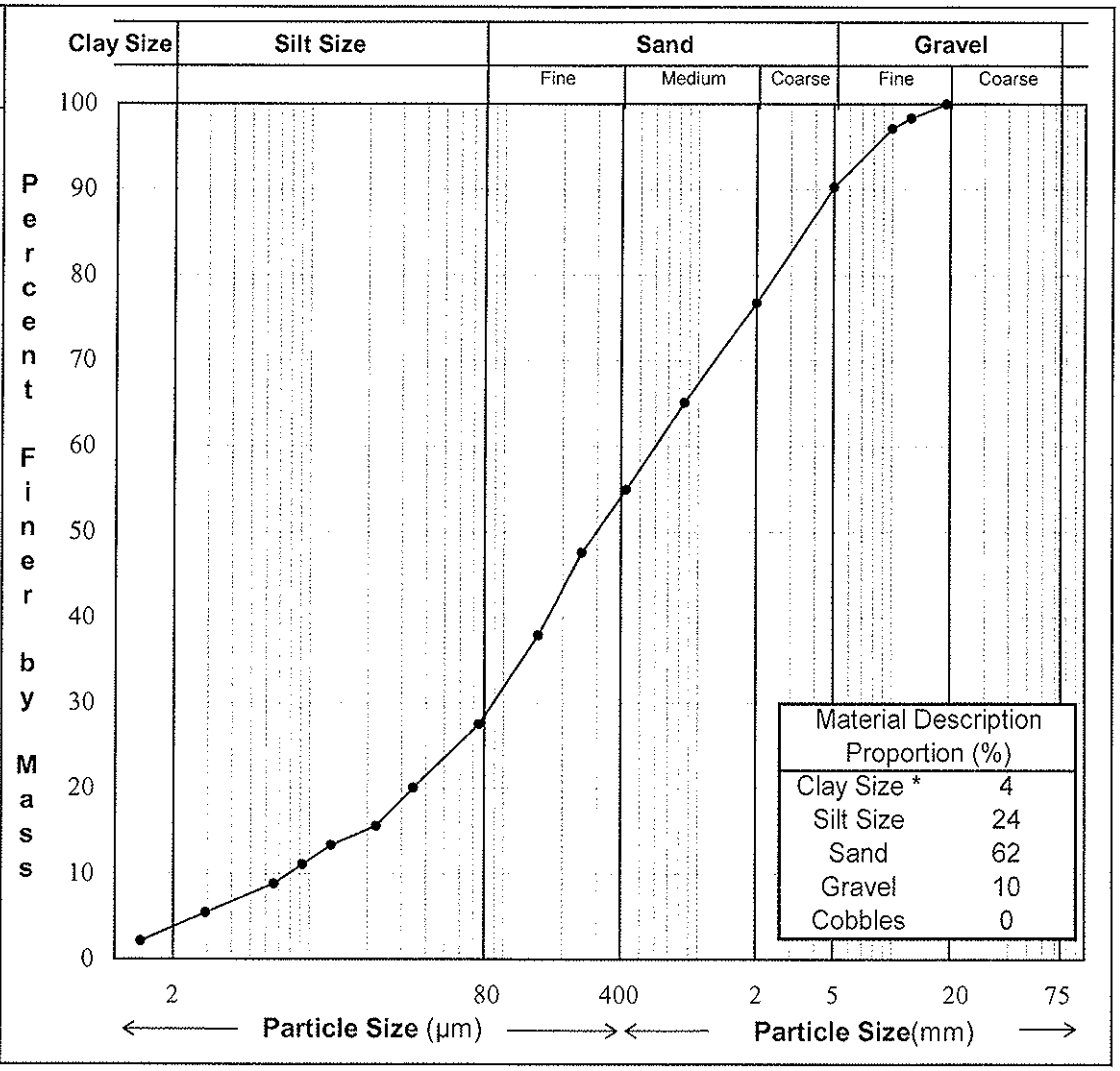
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC272-S5		
Sample No.:	BH08-SWC272-S5		
Depth:	40 - 41 ft		
Description**:	SAND - silty, some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	98
10 mm	97
5 mm	90
2 mm	77
850 µm	65
425 µm	55
250 µm	48
150 µm	38
75 µm	27
35 µm	20
22 µm	16
13 µm	13
9 µm	11
7 µm	9
3 µm	5
1 µm	2



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

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Reviewed By:

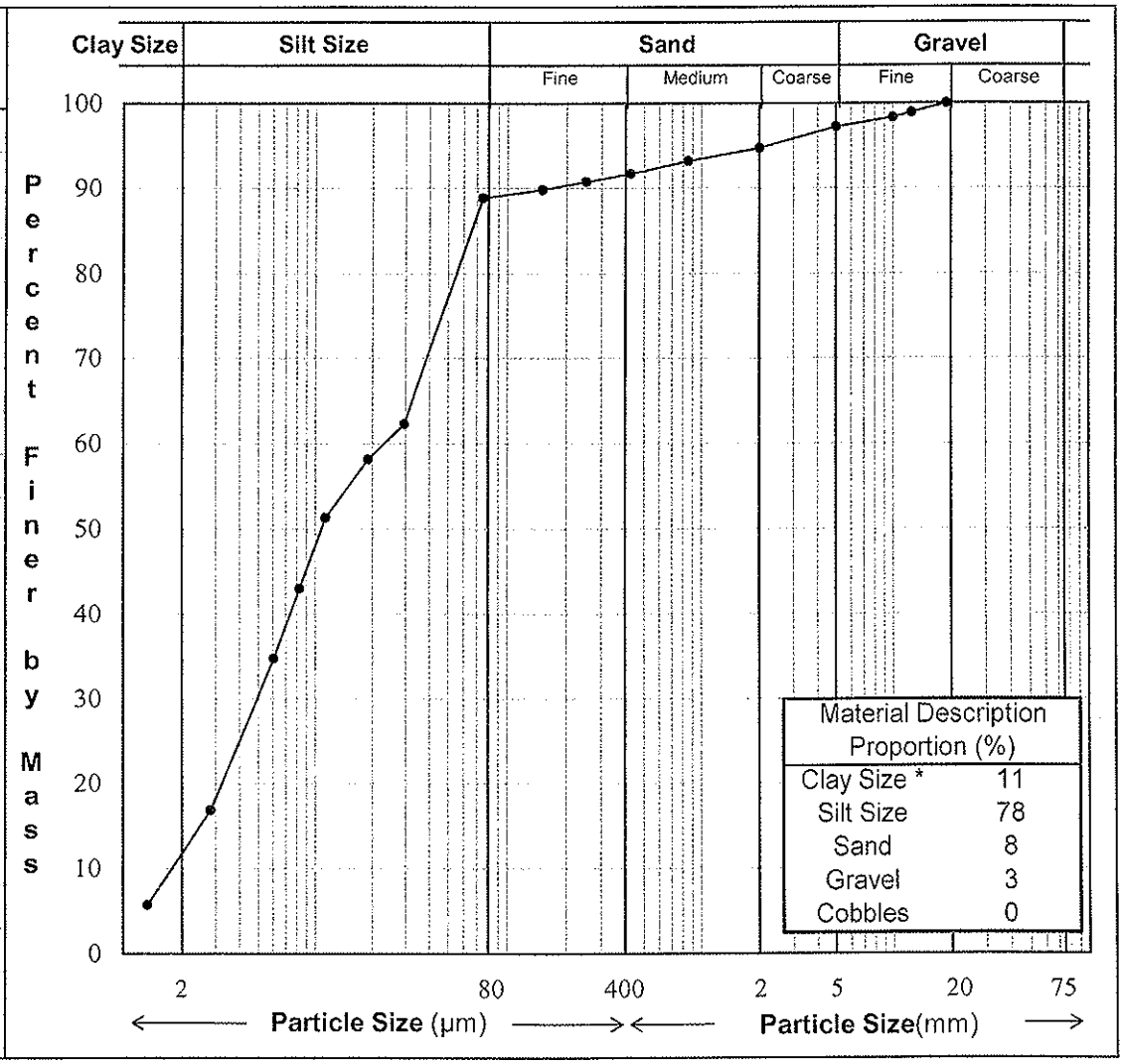
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC272-S9		
Sample No.:	BH08-SWC272-S9		
Depth:	72 - 73 ft		
Description**:	SILT - trace sand, some clay, trace gravel		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	99
10 mm	98
5 mm	97
2 mm	95
850 µm	93
425 µm	92
250 µm	91
150 µm	90
75 µm	89
30 µm	62
19 µm	58
11 µm	51
8 µm	43
6 µm	35
3 µm	17
1 µm	6



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

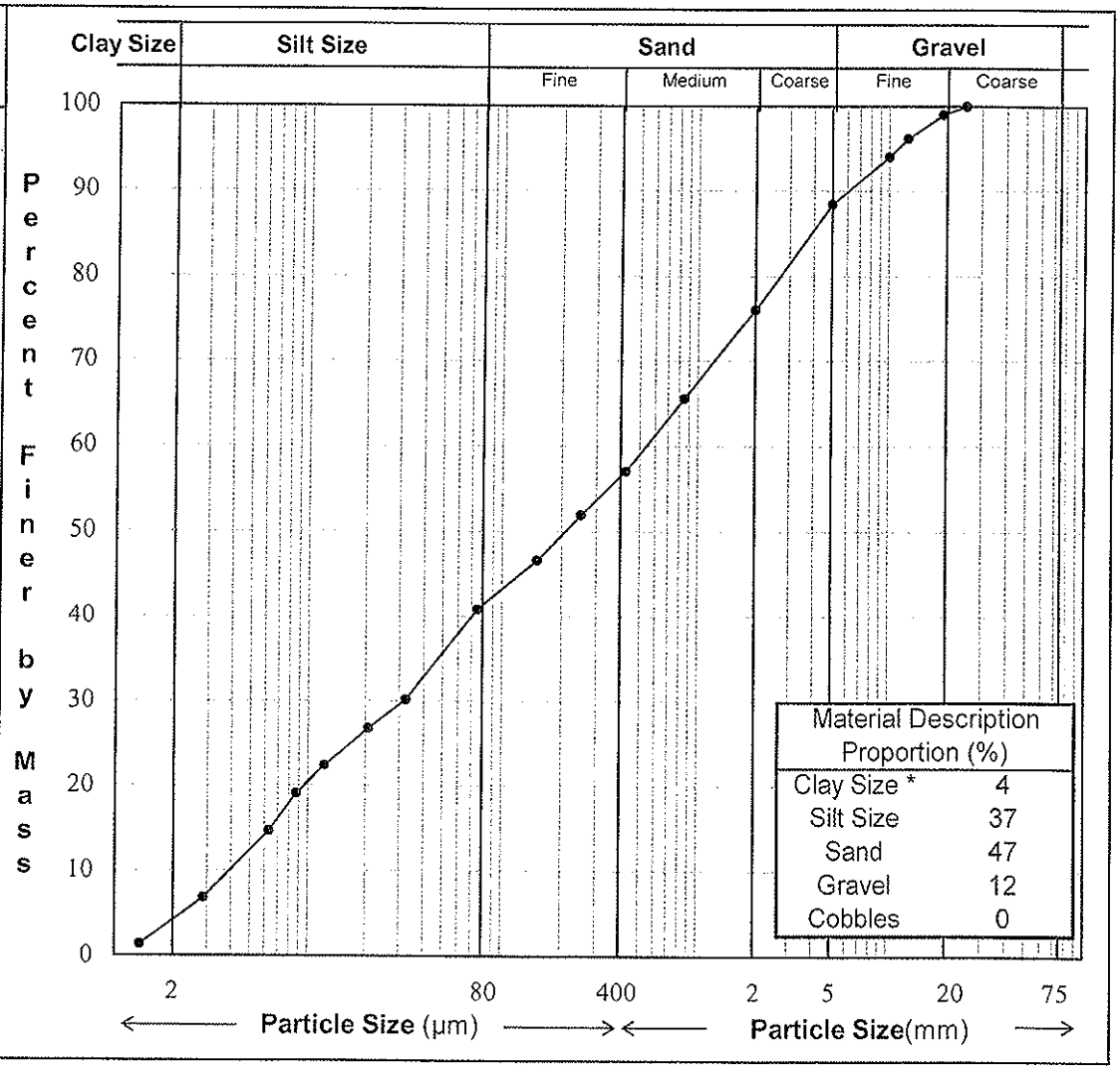
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC272-S11		
Sample No.:	BH08-SWC272-S11		
Depth:	83 - 84 ft		
Description**:	SAND AND SILT - some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	100
19 mm	99
13 mm	96
10 mm	94
5 mm	88
2 mm	76
850 µm	66
425 µm	57
250 µm	52
150 µm	47
75 µm	41
32 µm	30
21 µm	27
12 µm	22
9 µm	19
6 µm	15
3 µm	7
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

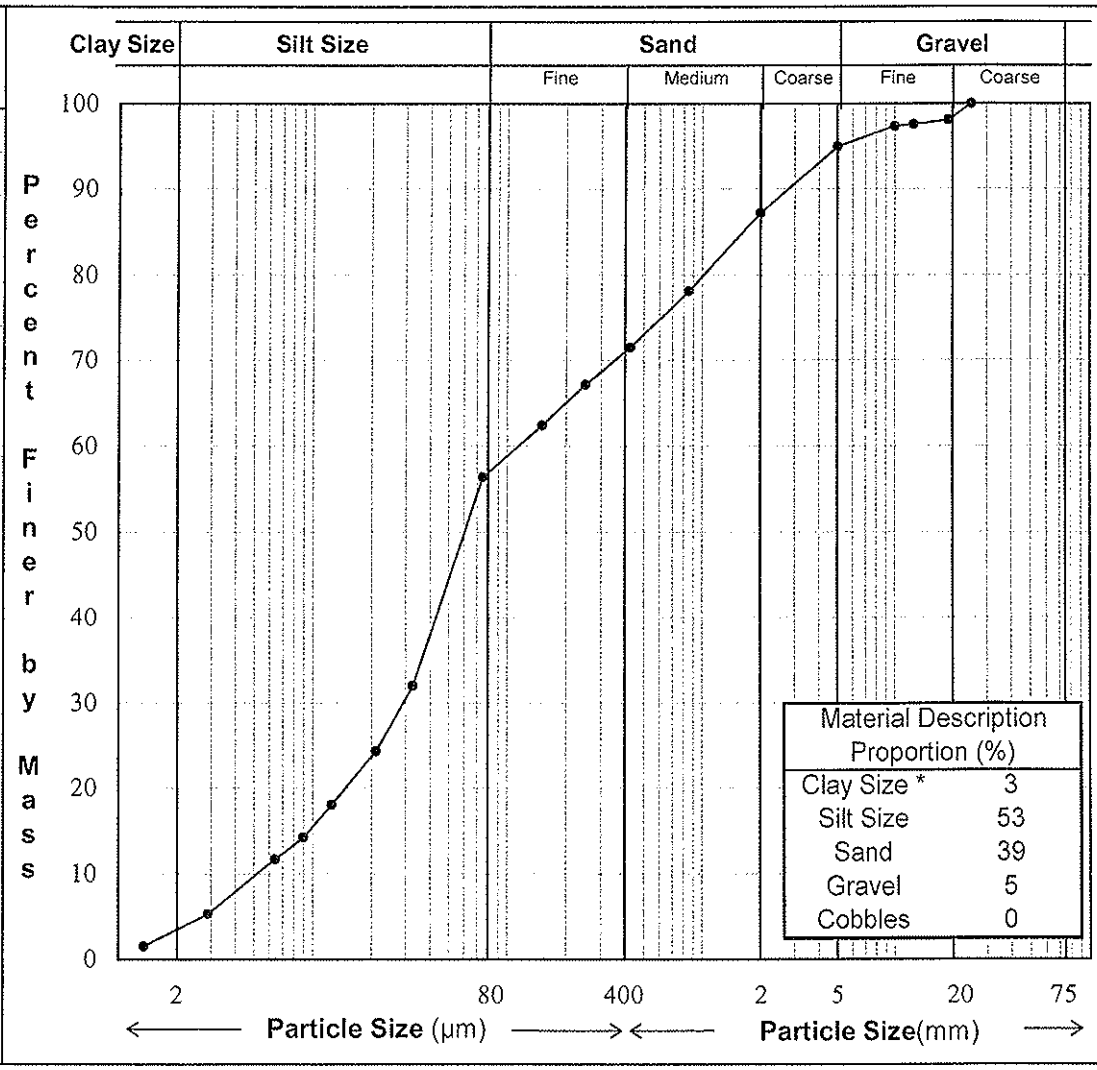
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC273-S1		
Sample No.:	BH08-SWC273-S1		
Depth:	2.5 - 3.0 ft		
Description**:	SILT AND SAND - trace gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	100
19 mm	98
13 mm	98
10 mm	97
5 mm	95
2 mm	87
850 µm	78
425 µm	72
250 µm	67
150 µm	62
75 µm	56
33 µm	32
21 µm	24
13 µm	18
9 µm	14
6 µm	12
3 µm	5
1 µm	2



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

EBA Engineering Consultants Ltd.

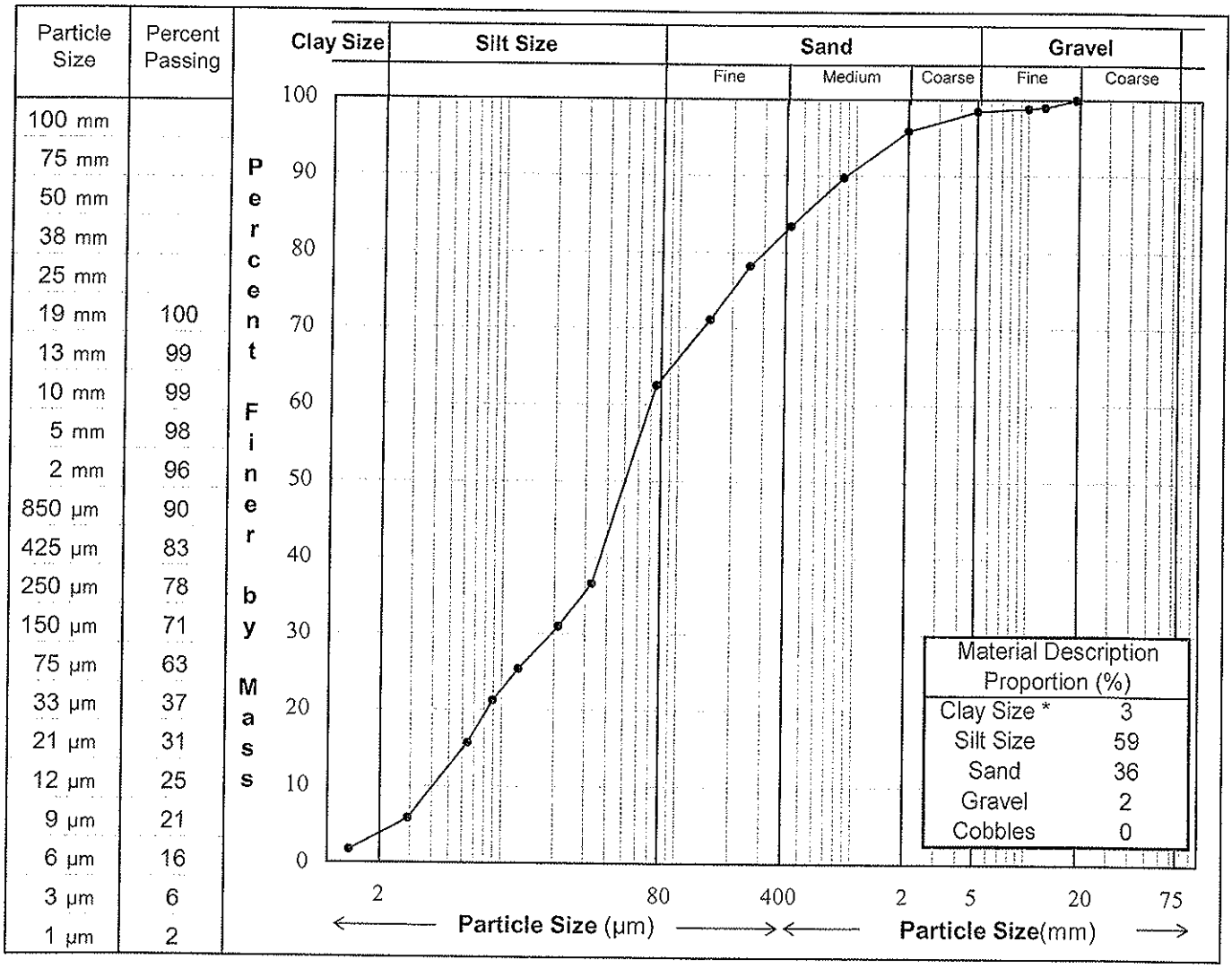
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC273-S5
Sample No.: BH08-SWC273-S5
Depth: 48 - 48.5 ft
Description**: SILT AND SAND - trace clay, trace gravel

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	99
10 mm	99
5 mm	98
2 mm	96
850 µm	90
425 µm	83
250 µm	78
150 µm	71
75 µm	63
33 µm	37
21 µm	31
12 µm	25
9 µm	21
6 µm	16
3 µm	6
1 µm	2



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
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Reviewed By:

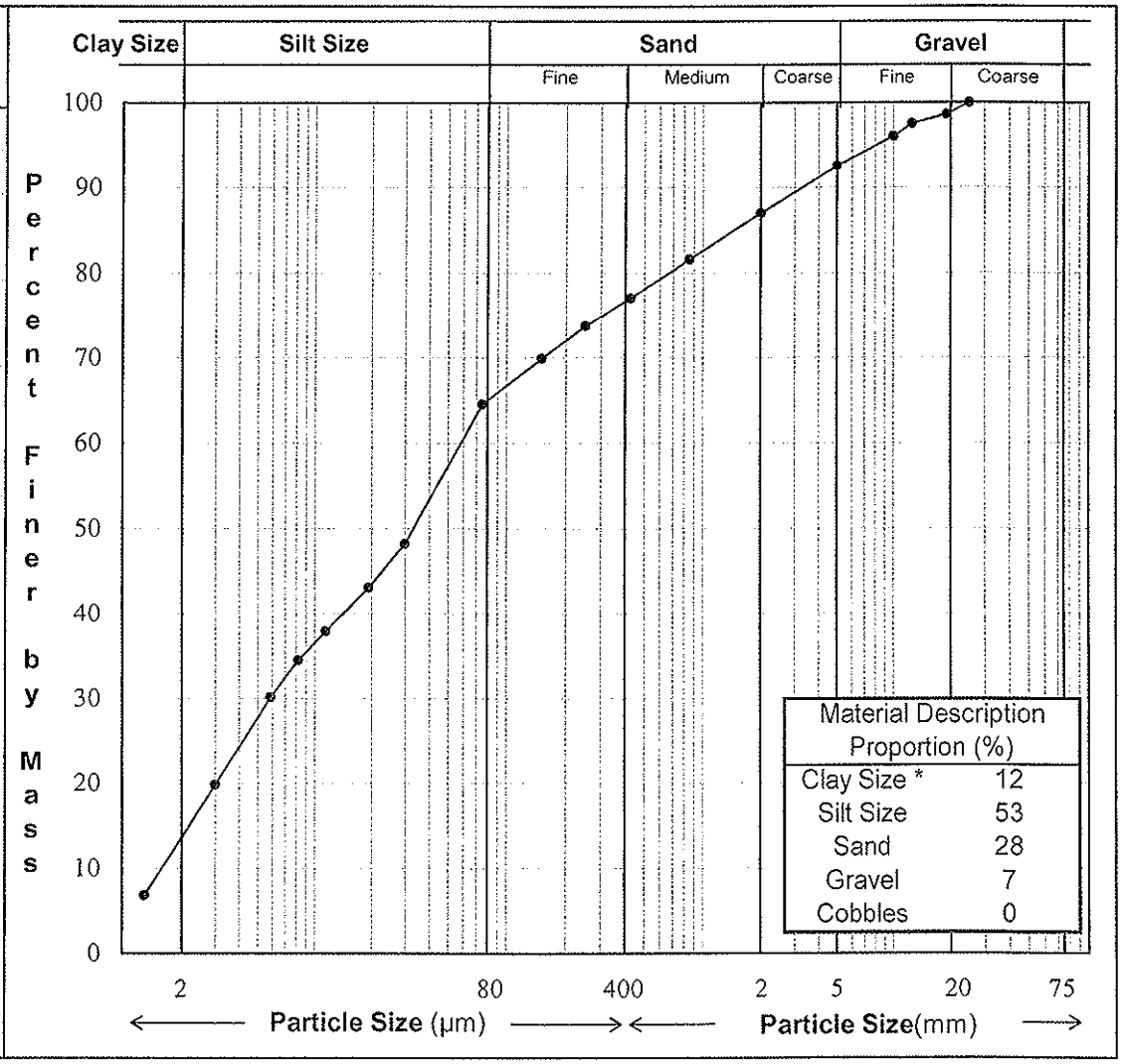
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC273-S8		
Sample No.:	BH08-SWC273-S8		
Depth:	73 - 74 ft		
Description**:	SILT - sandy, some clay, trace gravel		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	100
19 mm	99
13 mm	98
10 mm	96
5 mm	93
2 mm	87
850 µm	82
425 µm	77
250 µm	74
150 µm	70
75 µm	65
30 µm	48
19 µm	43
11 µm	38
8 µm	34
6 µm	30
3 µm	20
1 µm	7



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd. eba

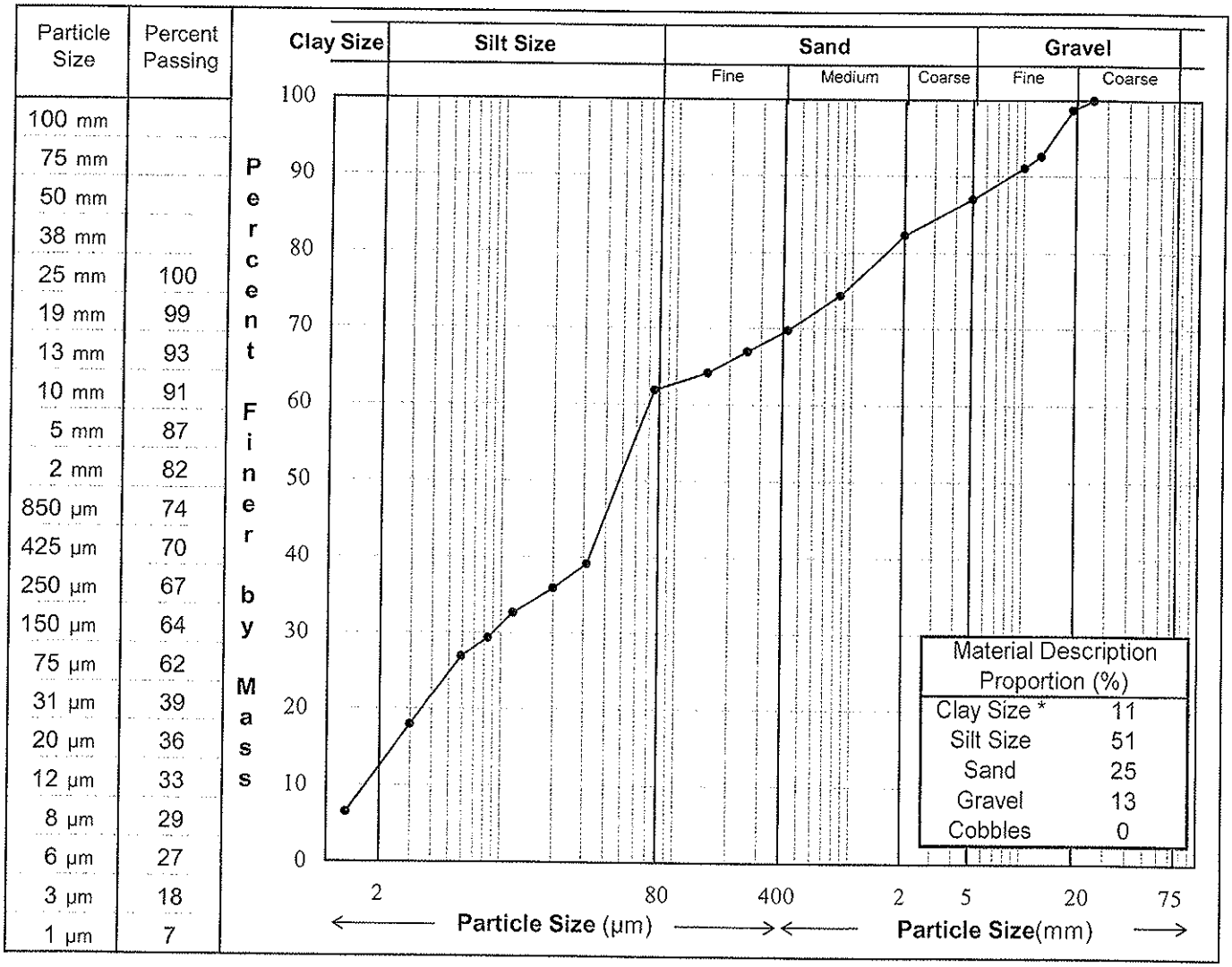
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC273-S14
Sample No.: BH08-SWC273-S14
Depth: 126 - 127 ft
Description**: SILT - sandy, some gravel, some clay

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	100
19 mm	99
13 mm	93
10 mm	91
5 mm	87
2 mm	82
850 µm	74
425 µm	70
250 µm	67
150 µm	64
75 µm	62
31 µm	39
20 µm	36
12 µm	33
8 µm	29
6 µm	27
3 µm	18
1 µm	7



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd.

PARTICLE SIZE DISTRIBUTION

ASTM C136 & D422

Project: **Proposed Valley Dump**

Project Number: W14101068.006

Date Tested: 4/23/2008

Borehole Number: 08-SWC273-S20

Depth: 169.5 - 170.1 ft

Soil Description: SAND - gravelly, trace silt

Cu: N/A

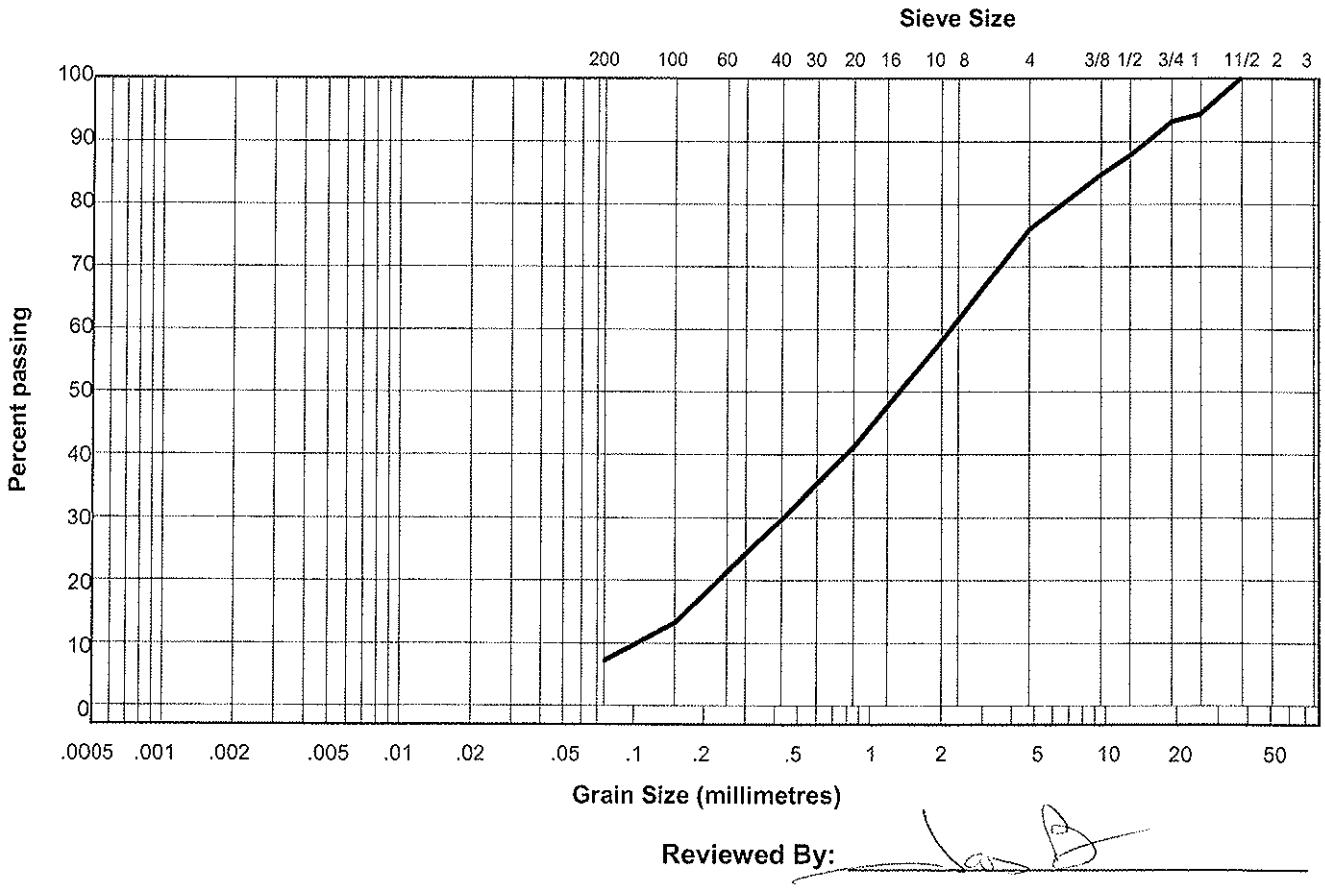
Cc: N/A

Natural Moisture Content: 17.8%

Remarks:

Sieve Size	Percent Passing
50.000	#N/A
37.500	100
25.000	94
19.000	93
12.500	88
9.500	85
4.750	76
2.000	58
0.850	41
0.425	30
0.250	21
0.150	13
0.075	7.3

Clay	Silt	Sand			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



Reviewed By:

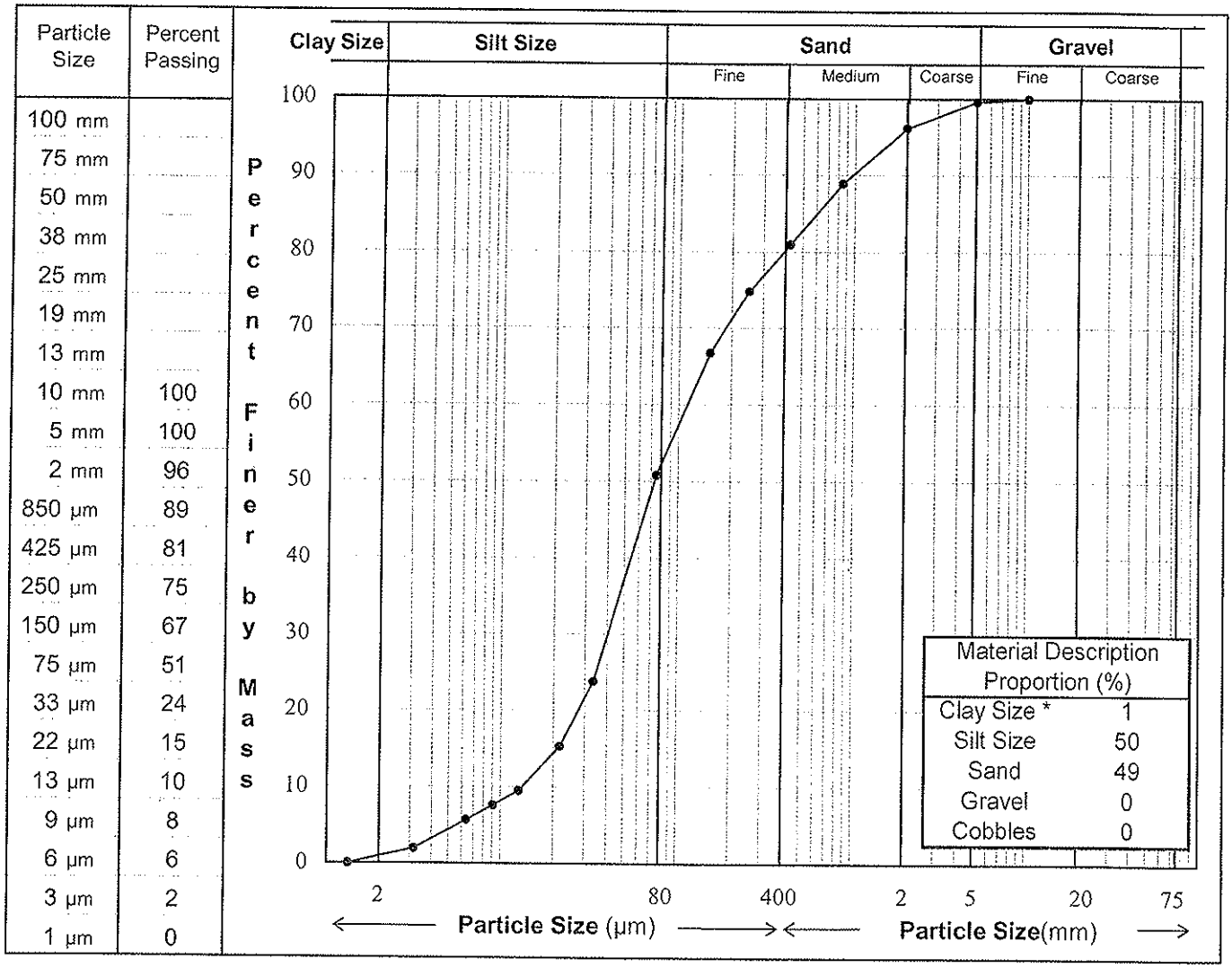
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC274-S1		
Sample No.:	BH08-SWC274-S1		
Depth:	10 - 11 ft		
Description**:	SAIL AND SAND - trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	100
5 mm	100
2 mm	96
850 µm	89
425 µm	81
250 µm	75
150 µm	67
75 µm	51
33 µm	24
22 µm	15
13 µm	10
9 µm	8
6 µm	6
3 µm	2
1 µm	0



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

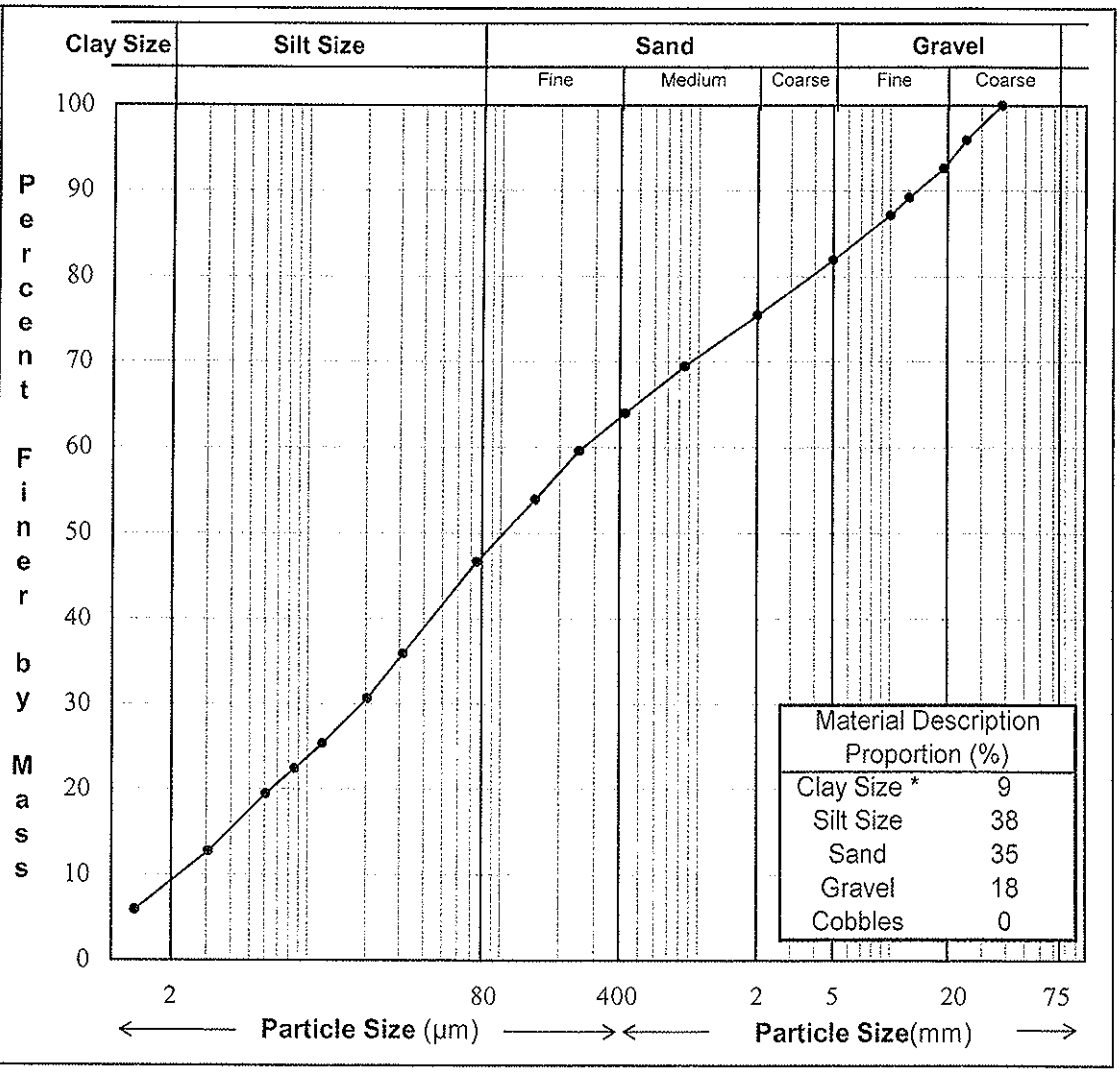
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC274-S8		
Sample No.:	BH08-SWC274-S8		
Depth:	71 - 72 ft		
Description**:	SILT AND SAND - some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	96
19 mm	93
13 mm	89
10 mm	87
5 mm	82
2 mm	75
850 µm	69
425 µm	64
250 µm	60
150 µm	54
75 µm	47
31 µm	36
20 µm	31
12 µm	25
9 µm	22
6 µm	19
3 µm	13
1 µm	6



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

EBA Engineering Consultants Ltd.

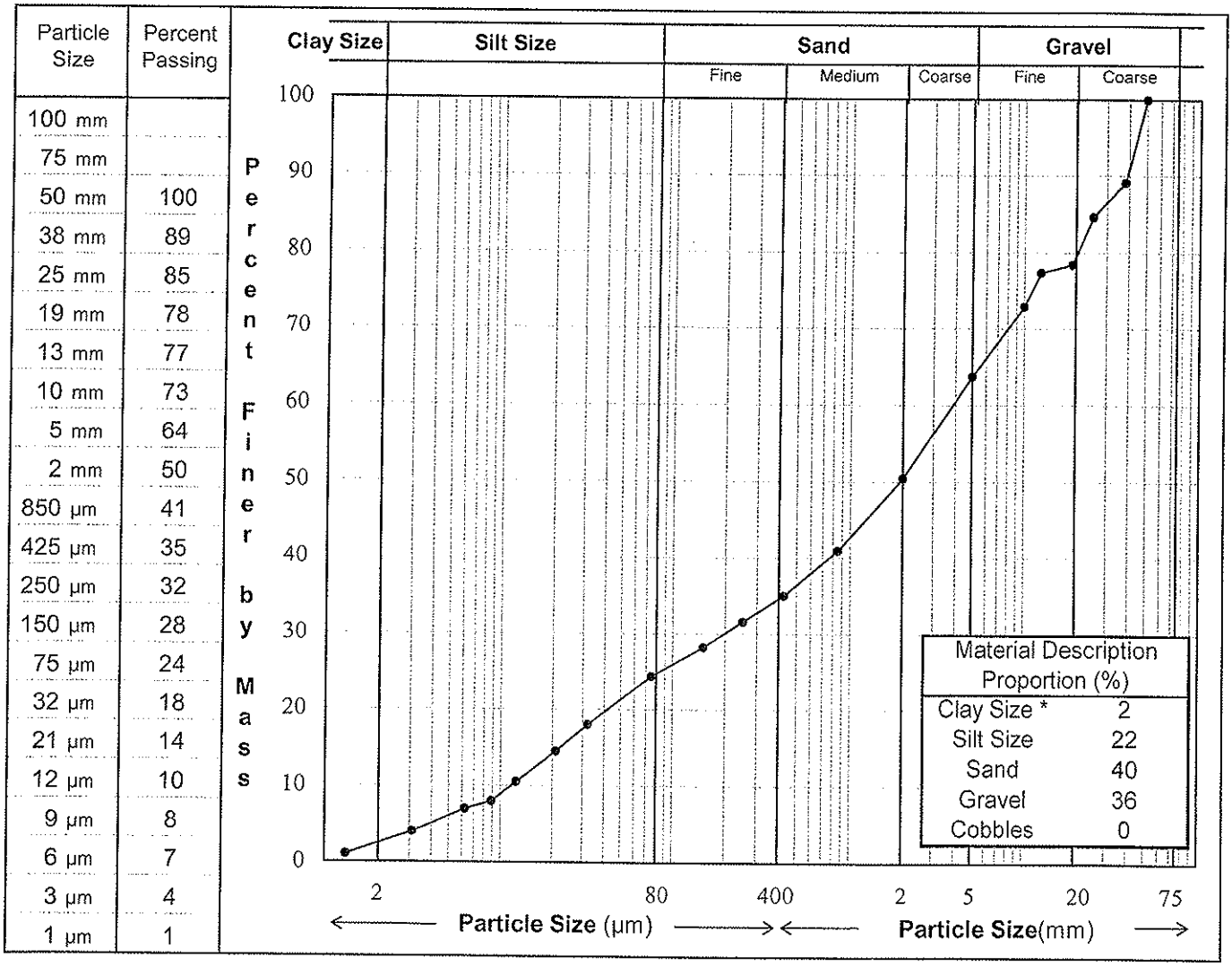
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC274-S18
Sample No.: BH08-SWC274-S18
Depth: 115 - 116 ft
Description**: SAND AND GRAVEL - silty, trace clay

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	89
25 mm	85
19 mm	78
13 mm	77
10 mm	73
5 mm	64
2 mm	50
850 µm	41
425 µm	35
250 µm	32
150 µm	28
75 µm	24
32 µm	18
21 µm	14
12 µm	10
9 µm	8
6 µm	7
3 µm	4
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By:

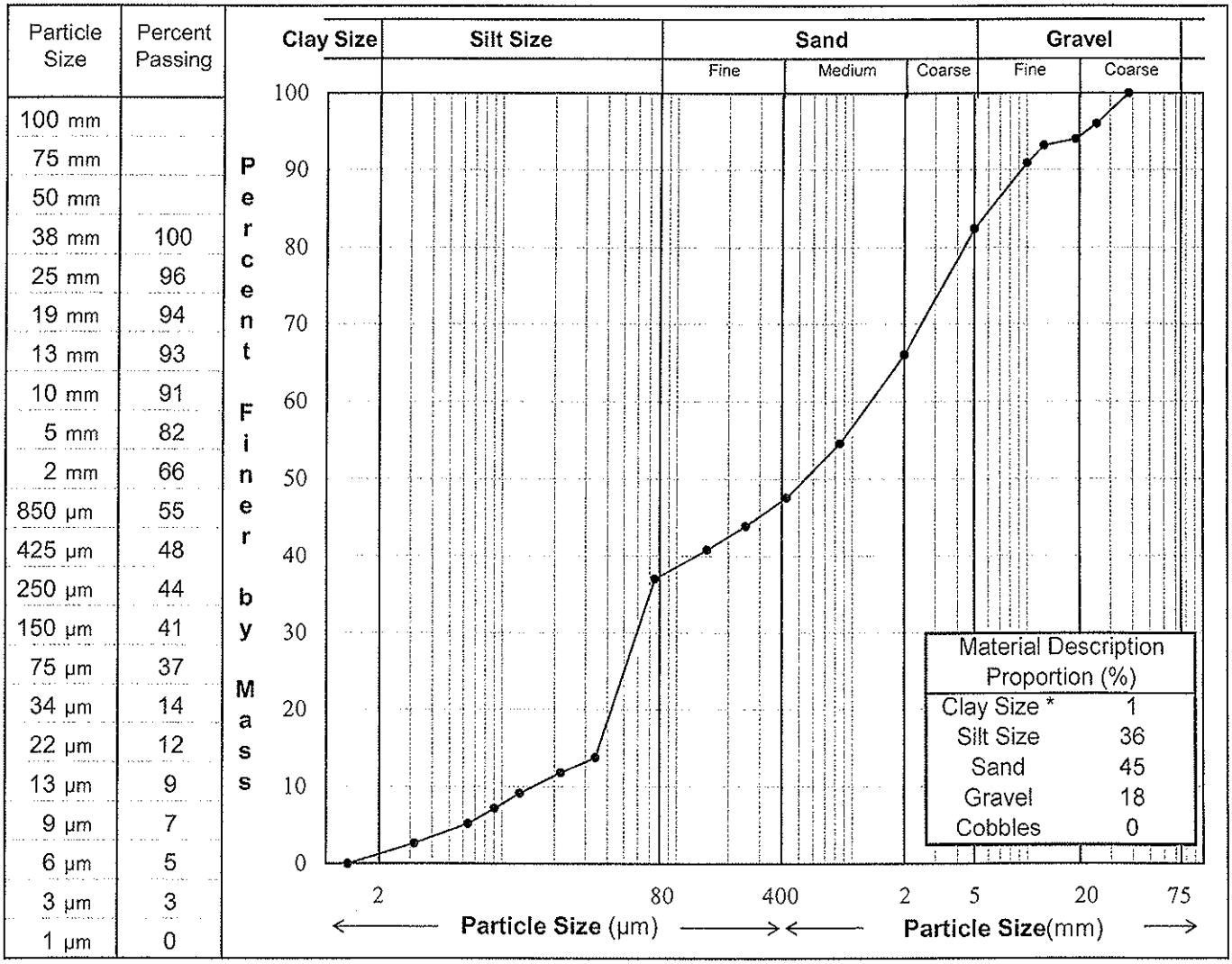
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC274-S20		
Sample No.:	BH08-SWC274-S20		
Depth:	126 - 124 ft		
Description**:	SAND AND SILT - some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	96
19 mm	94
13 mm	93
10 mm	91
5 mm	82
2 mm	66
850 µm	55
425 µm	48
250 µm	44
150 µm	41
75 µm	37
34 µm	14
22 µm	12
13 µm	9
9 µm	7
6 µm	5
3 µm	3
1 µm	0



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

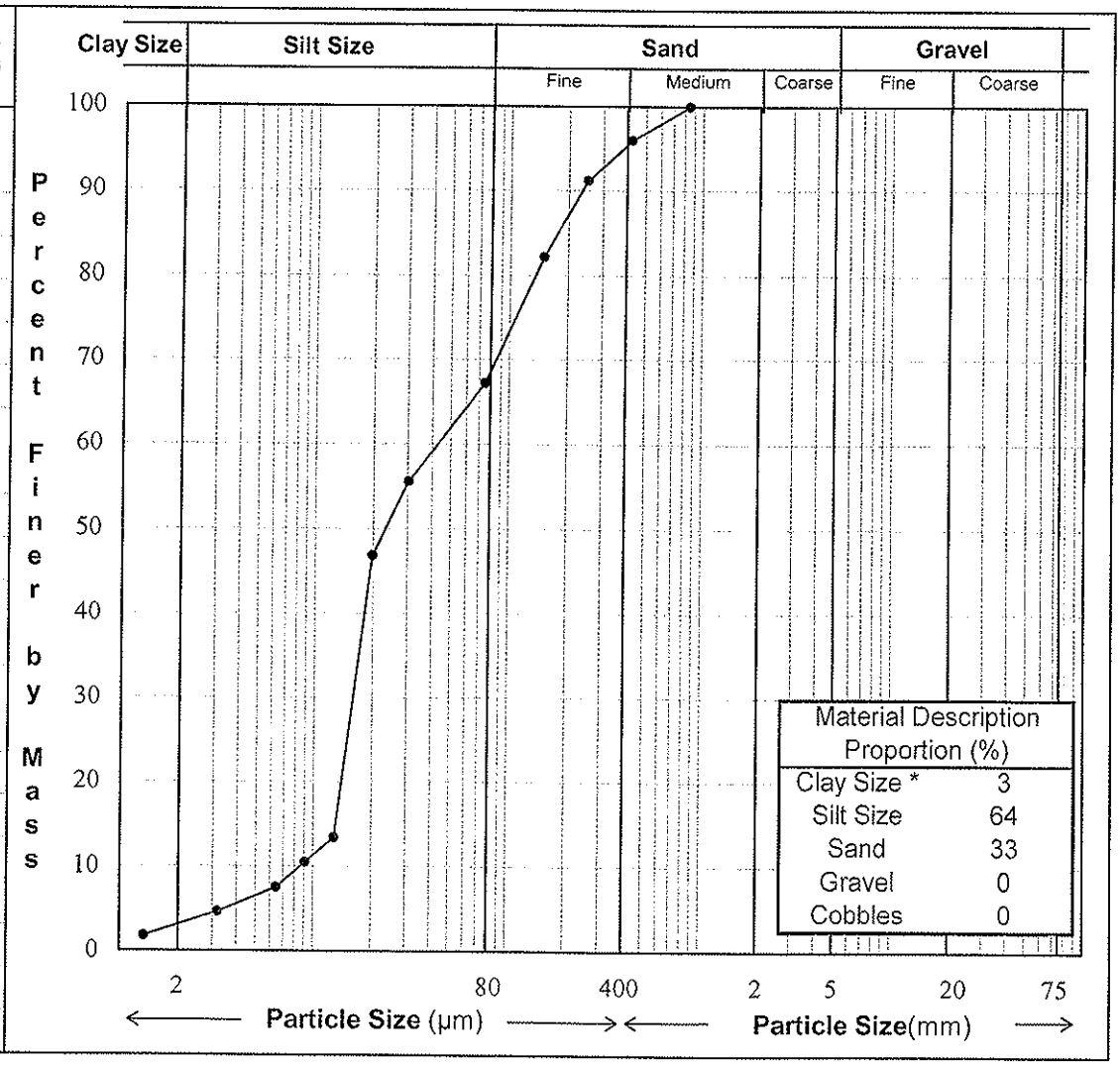
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC275-S2		
Sample No.:	BH08-SWC275-S2		
Depth:	5 - 6 ft		
Description**:	SILT - sandy, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	
2 mm	
850 µm	100
425 µm	96
250 µm	91
150 µm	82
75 µm	67
30 µm	56
20 µm	47
13 µm	13
9 µm	10
6 µm	8
3 µm	5
1 µm	2



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd. eba

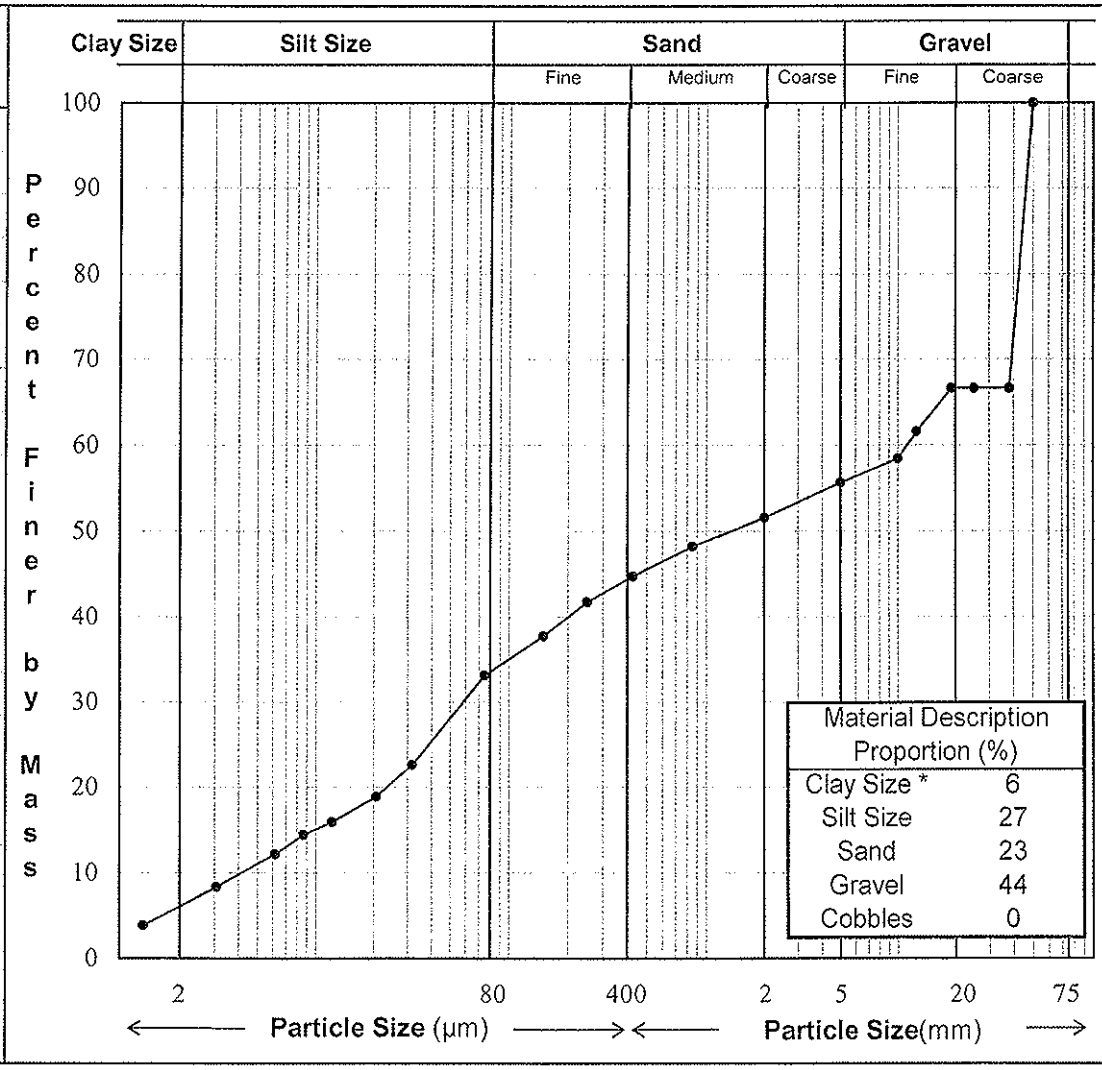
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC275-S9
Sample No.: BH08-SWC275-S9
Depth: 44 - 45 ft
Description**: GRAVEL - silty, sandy, trace clay

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	67
25 mm	67
19 mm	67
13 mm	62
10 mm	58
5 mm	56
2 mm	52
850 µm	48
425 µm	45
250 µm	42
150 µm	38
75 µm	33
32 µm	23
21 µm	19
12 µm	16
9 µm	14
6 µm	12
3 µm	8
1 µm	4



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

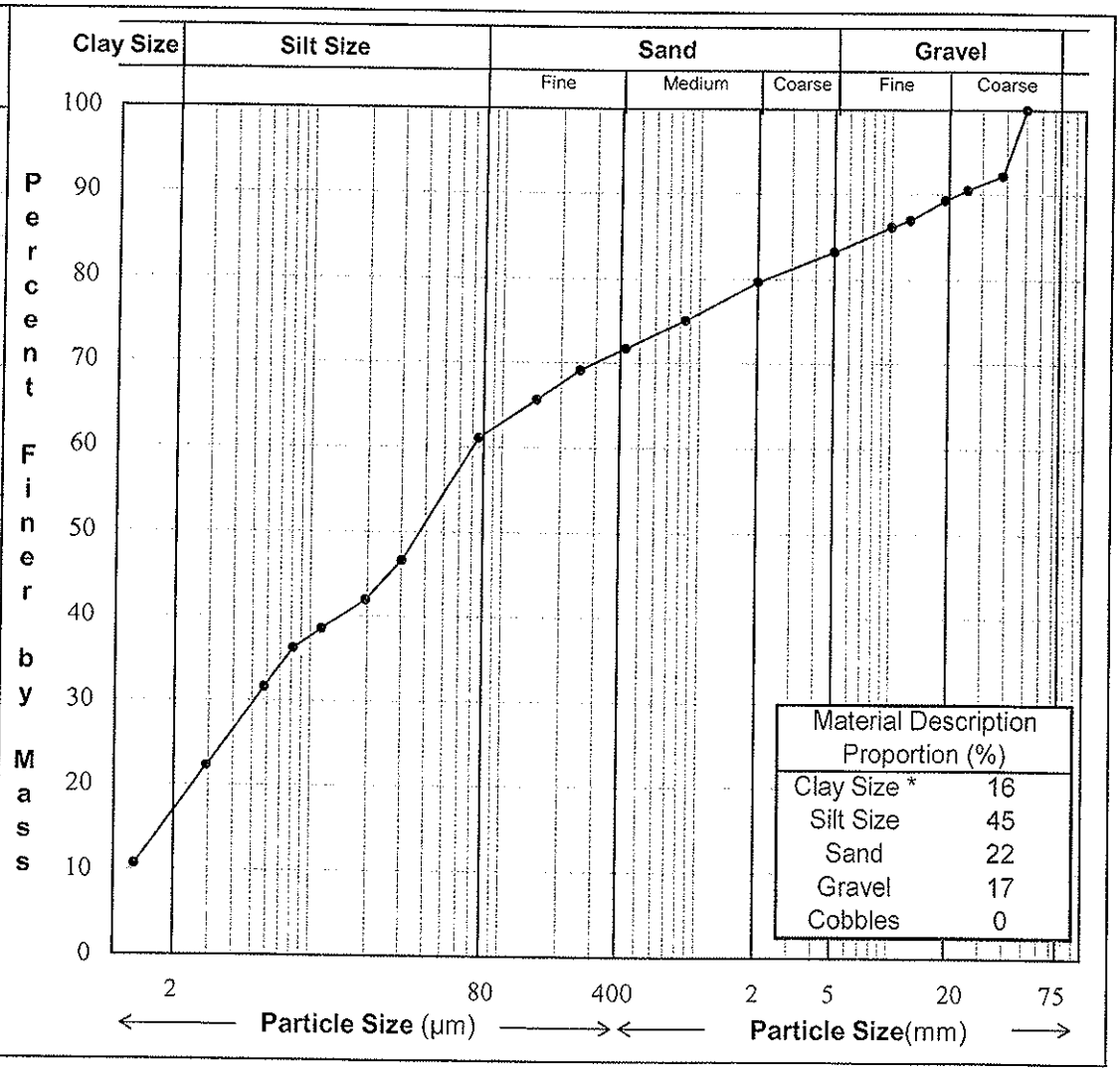
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC275-S14		
Sample No.:	BH08-SWC275-S14		
Depth:	64 - 65 ft		
Description**:	SILT - sandy, some gravel, some clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	92
25 mm	91
19 mm	89
13 mm	87
10 mm	86
5 mm	83
2 mm	80
850 µm	75
425 µm	72
250 µm	69
150 µm	66
75 µm	61
30 µm	47
20 µm	42
11 µm	38
8 µm	36
6 µm	32
3 µm	22
1 µm	11



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

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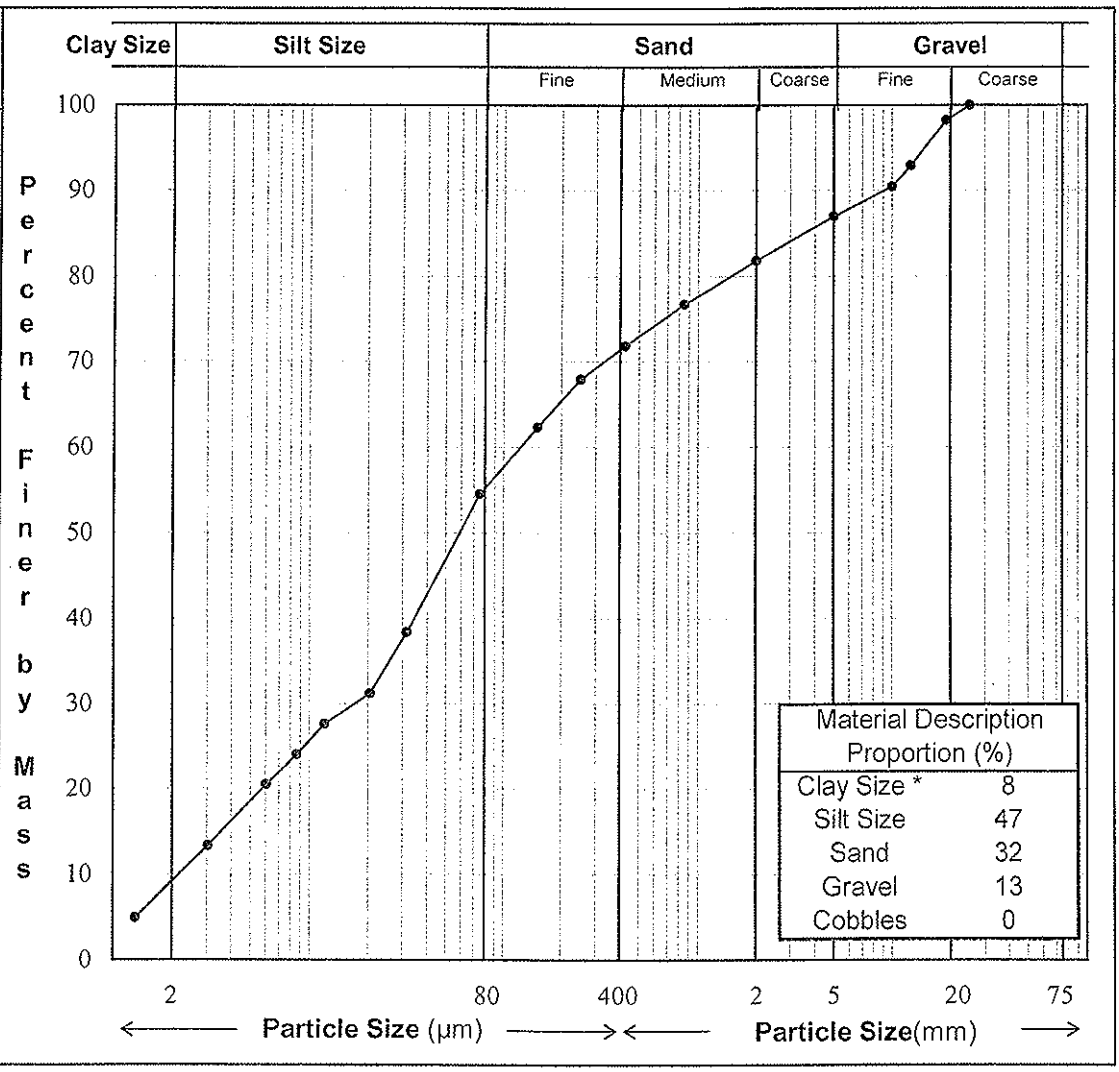
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC275-S17		
Sample No.:	BH08-SWC275-S17		
Depth:	82 - 83 ft		
Description**:	SILT - sandy, some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	100
19 mm	98
13 mm	93
10 mm	90
5 mm	87
2 mm	82
850 µm	77
425 µm	72
250 µm	68
150 µm	62
75 µm	54
31 µm	38
20 µm	31
12 µm	28
9 µm	24
6 µm	20
3 µm	13
1 µm	5



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

EBA Engineering Consultants Ltd. eba

PARTICLE SIZE DISTRIBUTION

ASTM C136 & D422

Project: **Proposed Valley Dump**

Project Number: W14101068.006

Date Tested: 4/23/2008

Borehole Number: 08-SWC277-S3

Depth: 36 - 36.5 ft

Soil Description: GRAVEL AND SAND - trace silt

Cu: N/A

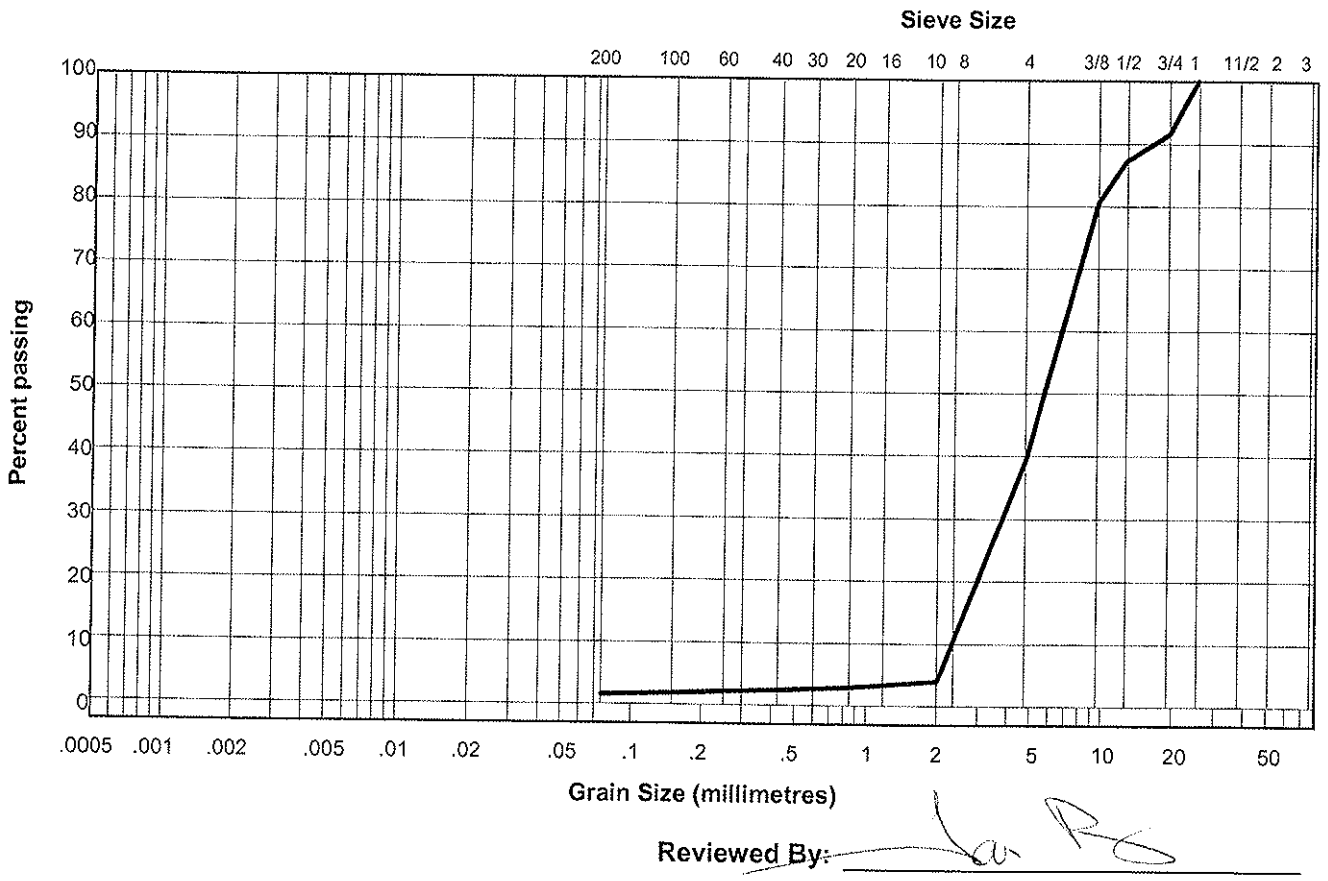
Cc: N/A

Natural Moisture Content: 21.2%

Remarks:

Sieve Size	Percent Passing
50.000	#N/A
37.500	#N/A
25.000	100
19.000	92
12.500	87
9.500	81
4.750	39
2.000	4
0.850	3
0.425	2
0.250	2
0.150	2
0.075	1.5

Clay	Silt	Sand			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



Reviewed By:

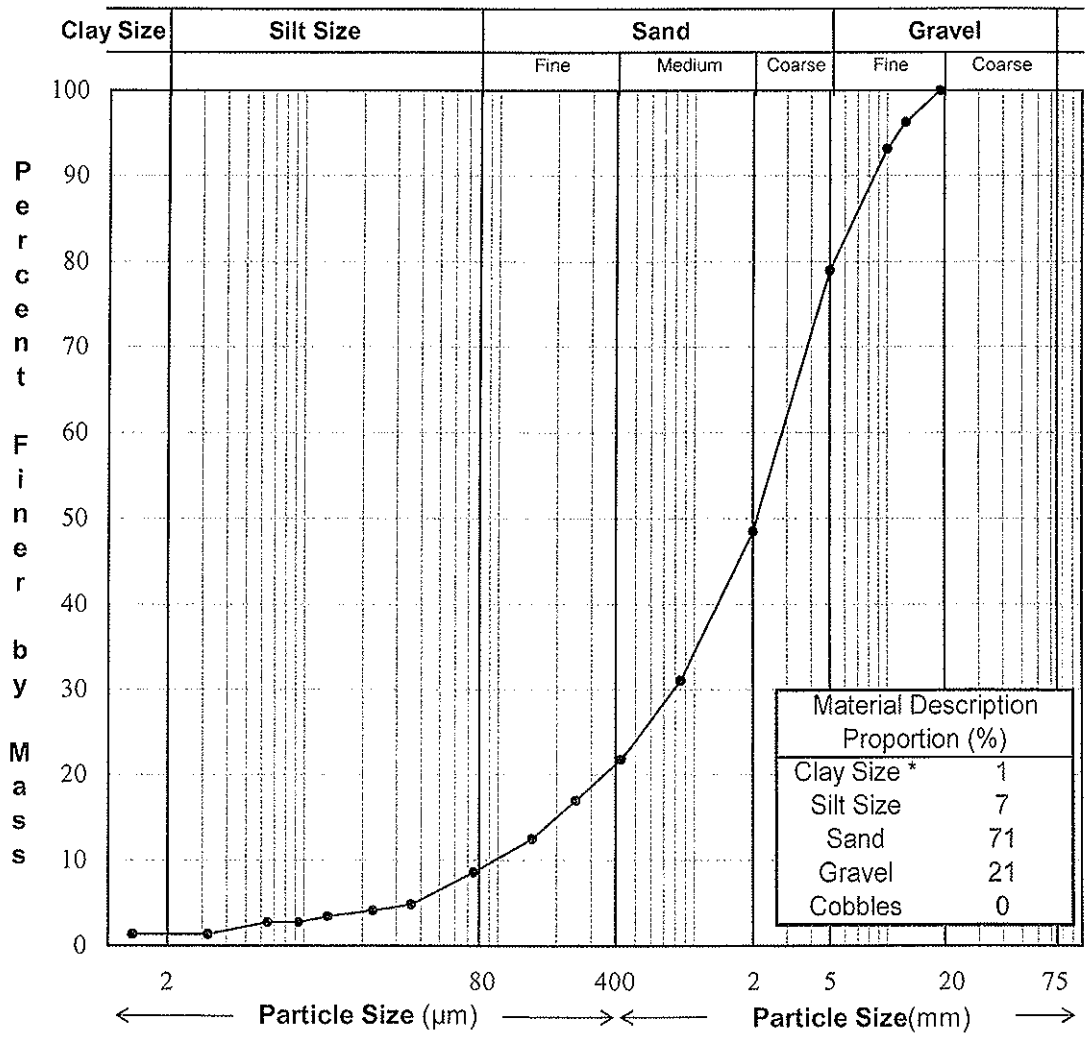
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC277-S9		
Sample No.:	BH08-SWC277-S9		
Depth:	65 - 66 ft		
Description**:	SAND - gravelly, trace silt, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	96
10 mm	93
5 mm	79
2 mm	48
850 µm	31
425 µm	22
250 µm	17
150 µm	13
75 µm	9
36 µm	5
23 µm	4
13 µm	3
9 µm	3
6 µm	3
3 µm	1
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

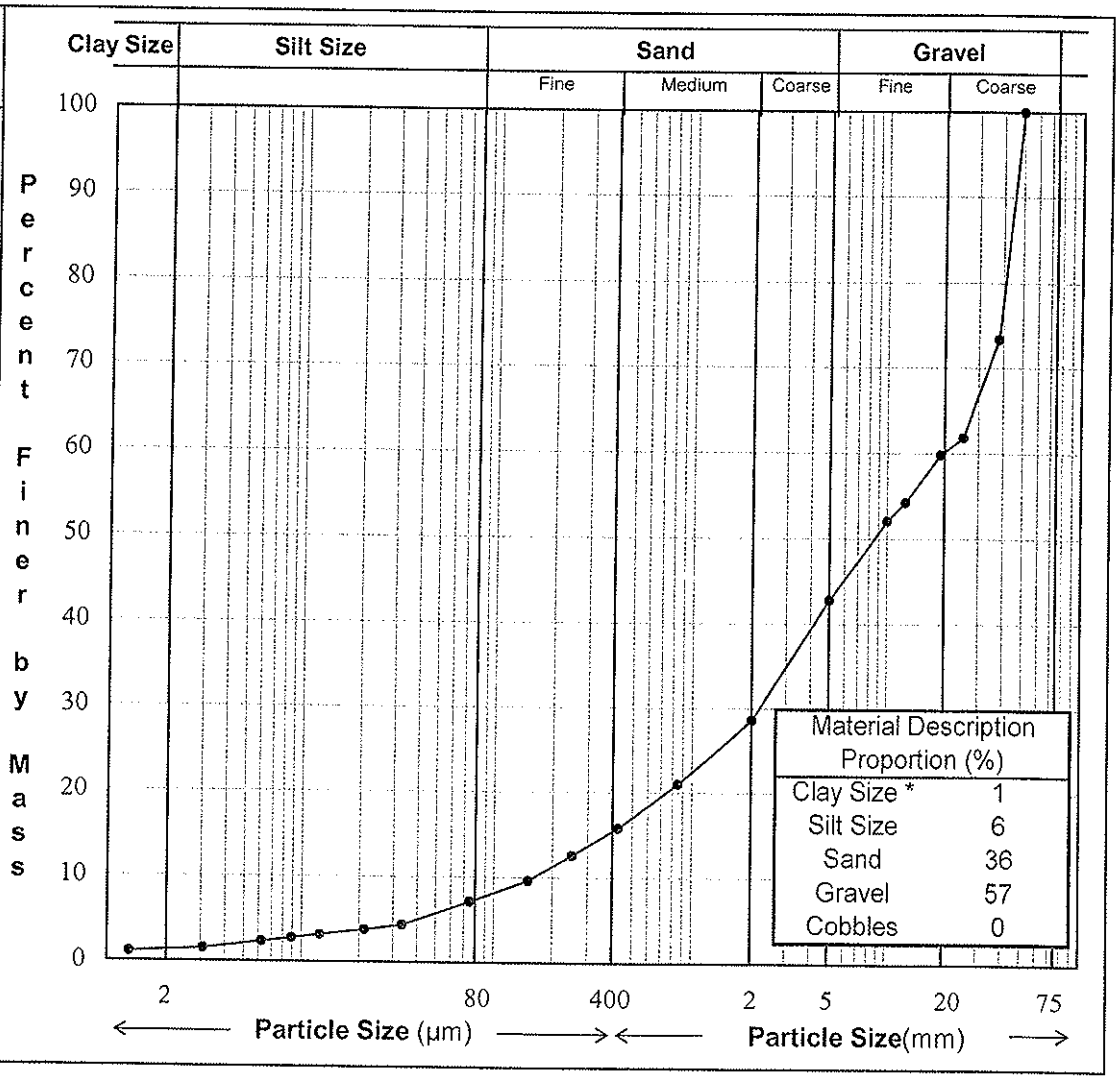
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC277-S10		
Sample No.:	BH08-SWC277-S10		
Depth:	71 - 72 ft		
Description**:	GRAVEL AND SAND - trace silt, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	73
25 mm	62
19 mm	60
13 mm	54
10 mm	52
5 mm	43
2 mm	29
850 µm	21
425 µm	16
250 µm	13
150 µm	10
75 µm	7
33 µm	4
21 µm	4
12 µm	3
9 µm	3
6 µm	2
3 µm	1
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

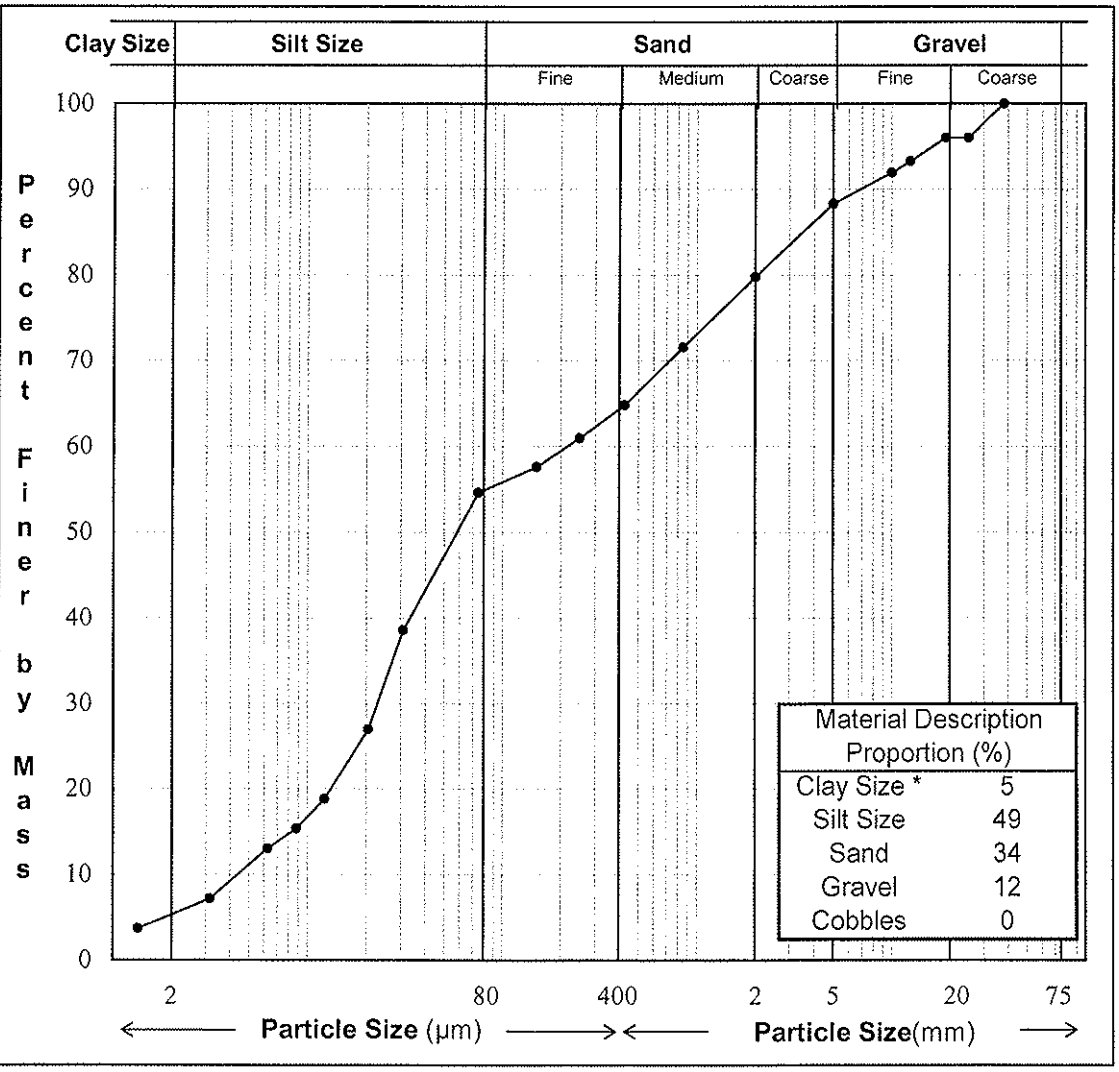
EBA Engineering Consultants Ltd. eba

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC278-S2		
Sample No.:	BH08-SWC278-S2		
Depth:	0.0 - 1.0 ft		
Description**:	SILT - sandy, some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	96
19 mm	96
13 mm	93
10 mm	92
5 mm	88
2 mm	80
850 µm	72
425 µm	65
250 µm	61
150 µm	58
75 µm	55
31 µm	39
21 µm	27
12 µm	19
9 µm	15
6 µm	13
3 µm	7
1 µm	4



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd.

PARTICLE SIZE DISTRIBUTION

ASTM C136 & D422

Project: **Proposed Valley Dump**

Project Number: W14101068.006

Date Tested: 4/23/2008

Borehole Number: 08-SWC278-S4

Depth: 26 - 26.5 ft

Soil Description: GRAVEL - trace sand

Cu: N/A

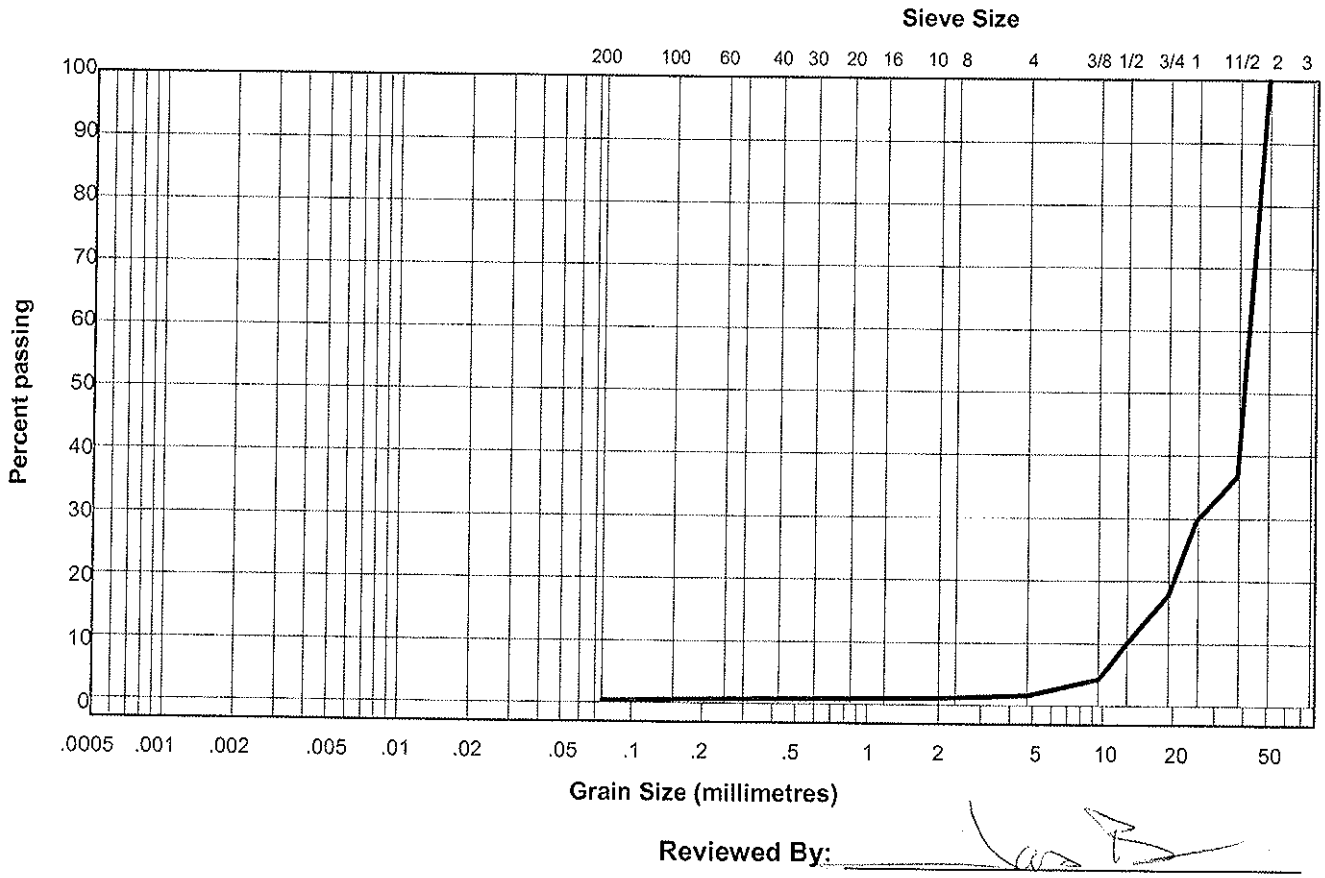
Cc: N/A

Natural Moisture Content: 1.3%

Remarks:

Sieve Size	Percent Passing
50.000	100
37.500	37
25.000	30
19.000	18
12.500	10
9.500	4
4.750	2
2.000	1
0.850	1
0.425	1
0.250	1
0.150	1
0.075	0.4

Clay	Silt	Sand			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



Reviewed By:

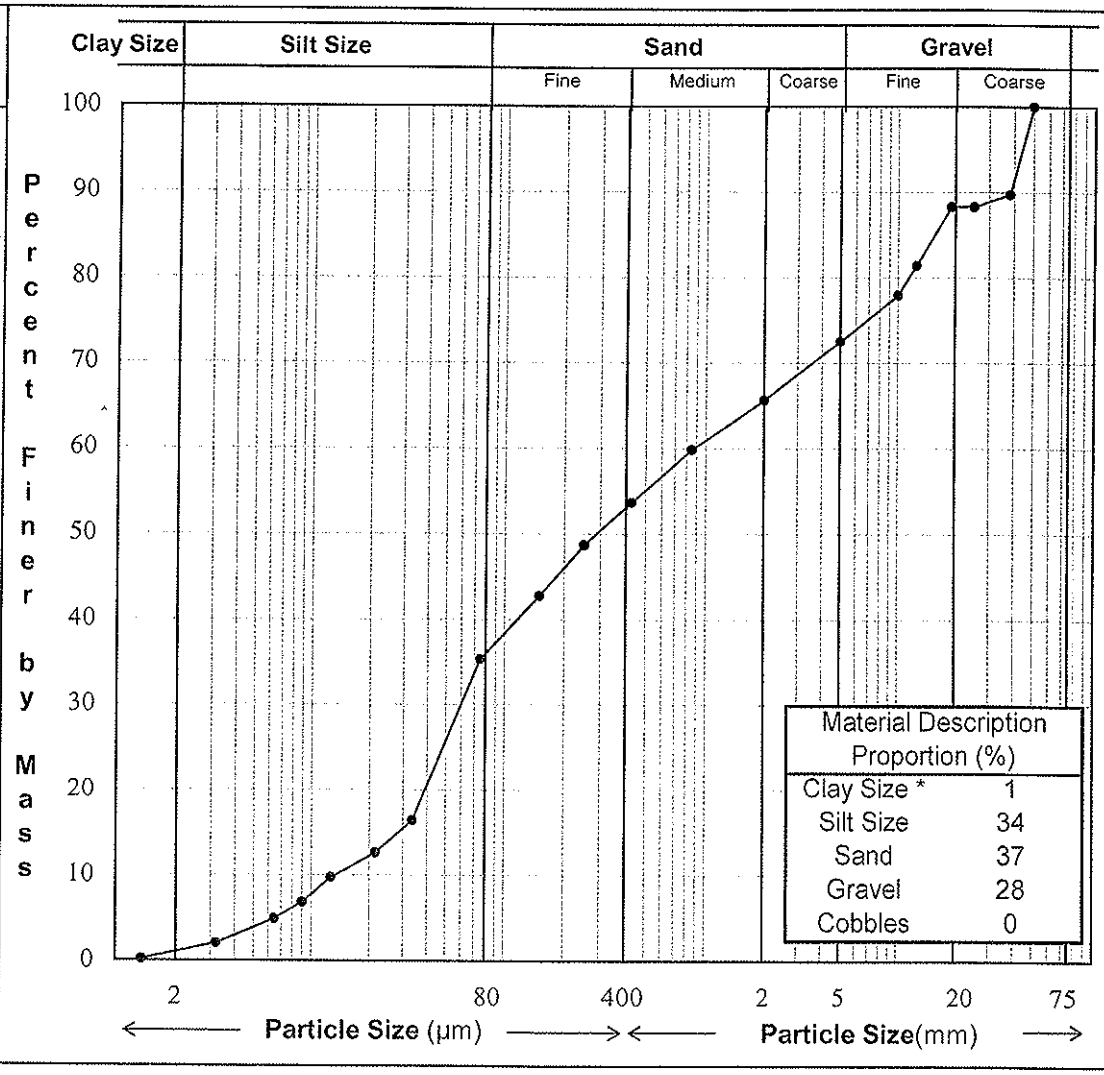
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC278-S7		
Sample No.:	BH08-SWC278-S7		
Depth:	54 - 55 ft		
Description**:	SAND - silty, gravelly, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	90
25 mm	88
19 mm	88
13 mm	81
10 mm	78
5 mm	73
2 mm	66
850 µm	60
425 µm	54
250 µm	49
150 µm	43
75 µm	35
33 µm	16
22 µm	13
13 µm	10
9 µm	7
6 µm	5
3 µm	2
1 µm	0



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

EBA Engineering Consultants Ltd.

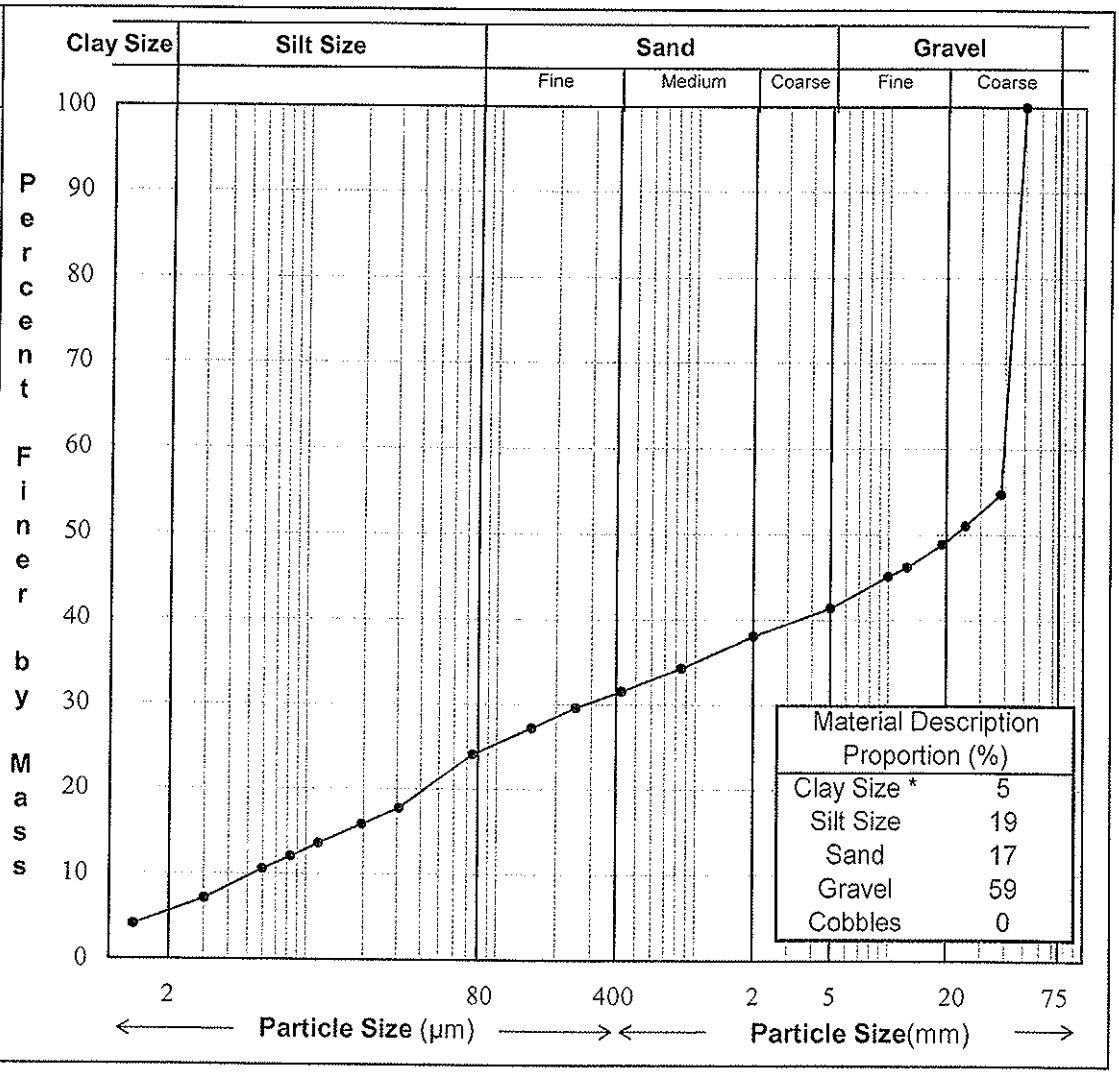
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC278-S12
Sample No.: BH08-SWC278-S12
Depth: 89 - 90 ft
Description**: GRAVEL - some silt, some sand, trace clay

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	55
25 mm	51
19 mm	49
13 mm	46
10 mm	45
5 mm	41
2 mm	38
850 µm	34
425 µm	32
250 µm	30
150 µm	27
75 µm	24
31 µm	18
20 µm	16
12 µm	14
8 µm	12
6 µm	11
3 µm	7
1 µm	4



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd.

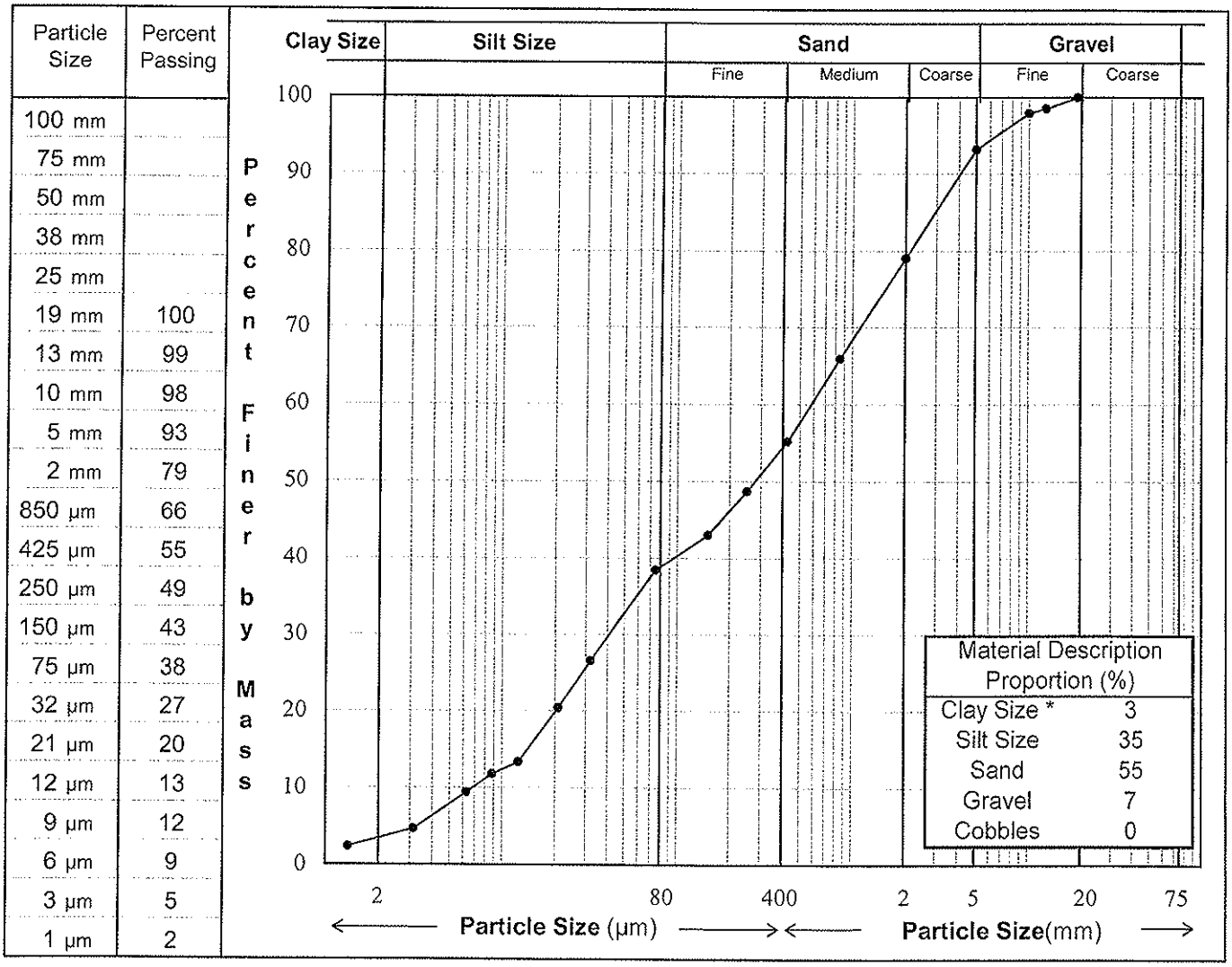
PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: **Proposed Valley Dump**
Client: SRK Consulting Inc
Project No.: W14101068.006
Location: BH08-SWC278-S17
Sample No.: BH08-SWC278-S17
Depth: 108 - 109 ft
Description**: SAND AND SILT - trace gravel, trace clay

Date Tested: 2008/04/23

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	100
13 mm	99
10 mm	98
5 mm	93
2 mm	79
850 µm	66
425 µm	55
250 µm	49
150 µm	43
75 µm	38
32 µm	27
21 µm	20
12 µm	13
9 µm	12
6 µm	9
3 µm	5
1 µm	2



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.
** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

EBA Engineering Consultants Ltd.

PARTICLE SIZE DISTRIBUTION

ASTM C136 & D422

Project: **Proposed Valley Dump**

Project Number: W14101068.006

Date Tested: 4/23/2008

Borehole Number: 08-SWC278-S23

Depth: 132 - 133 ft

Soil Description: GRAVEL AND SAND - some silt

Cu: N/A

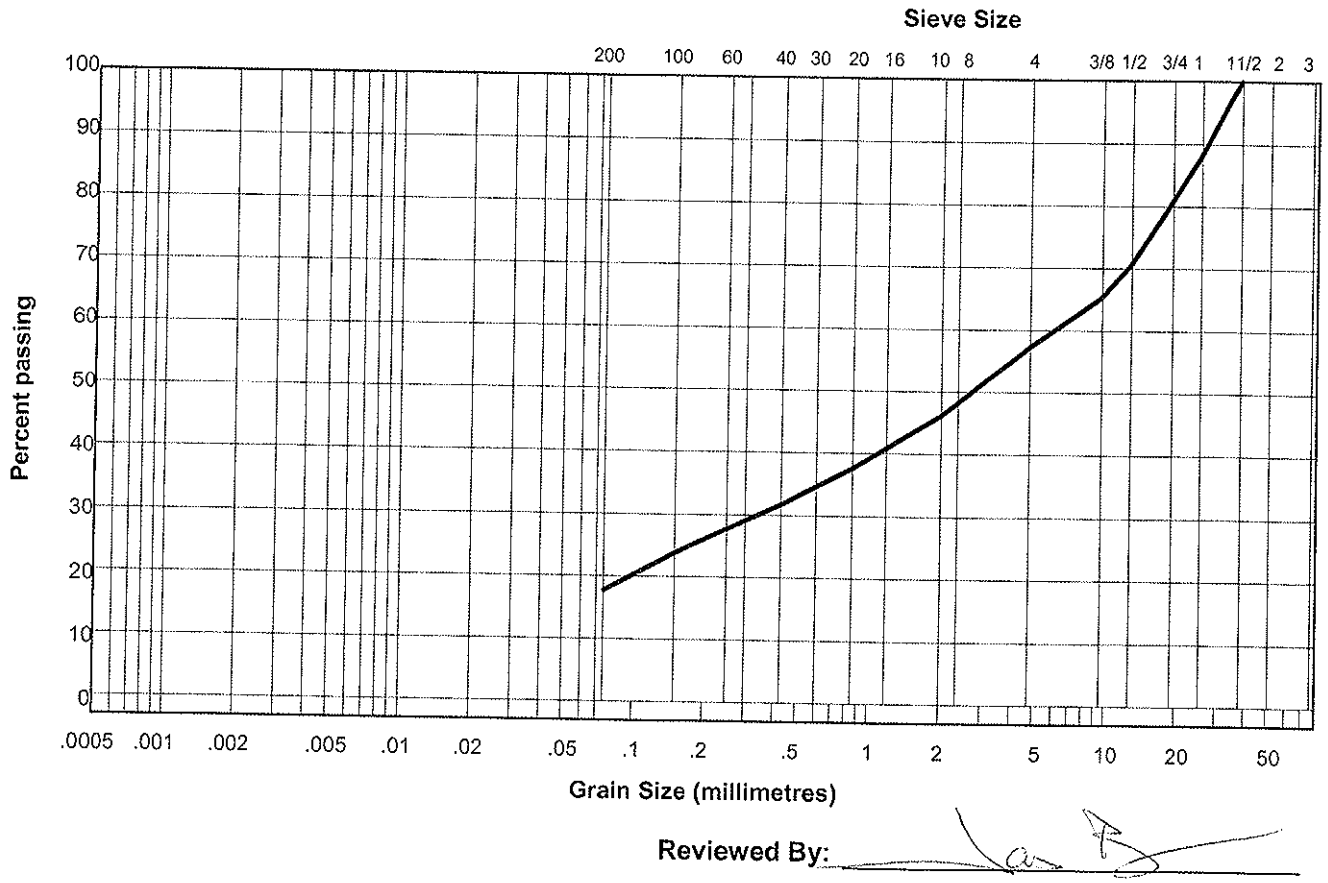
Cc: N/A

Natural Moisture Content: 10.8%

Remarks:

Sieve Size	Percent Passing
50.000	#N/A
37.500	100
25.000	88
19.000	81
12.500	70
9.500	65
4.750	57
2.000	46
0.850	38
0.425	32
0.250	28
0.150	24
0.075	17.8

Clay	Silt	Sand			Gravel	
		Fine	Medium	Coarse	Fine	Coarse



Reviewed By:

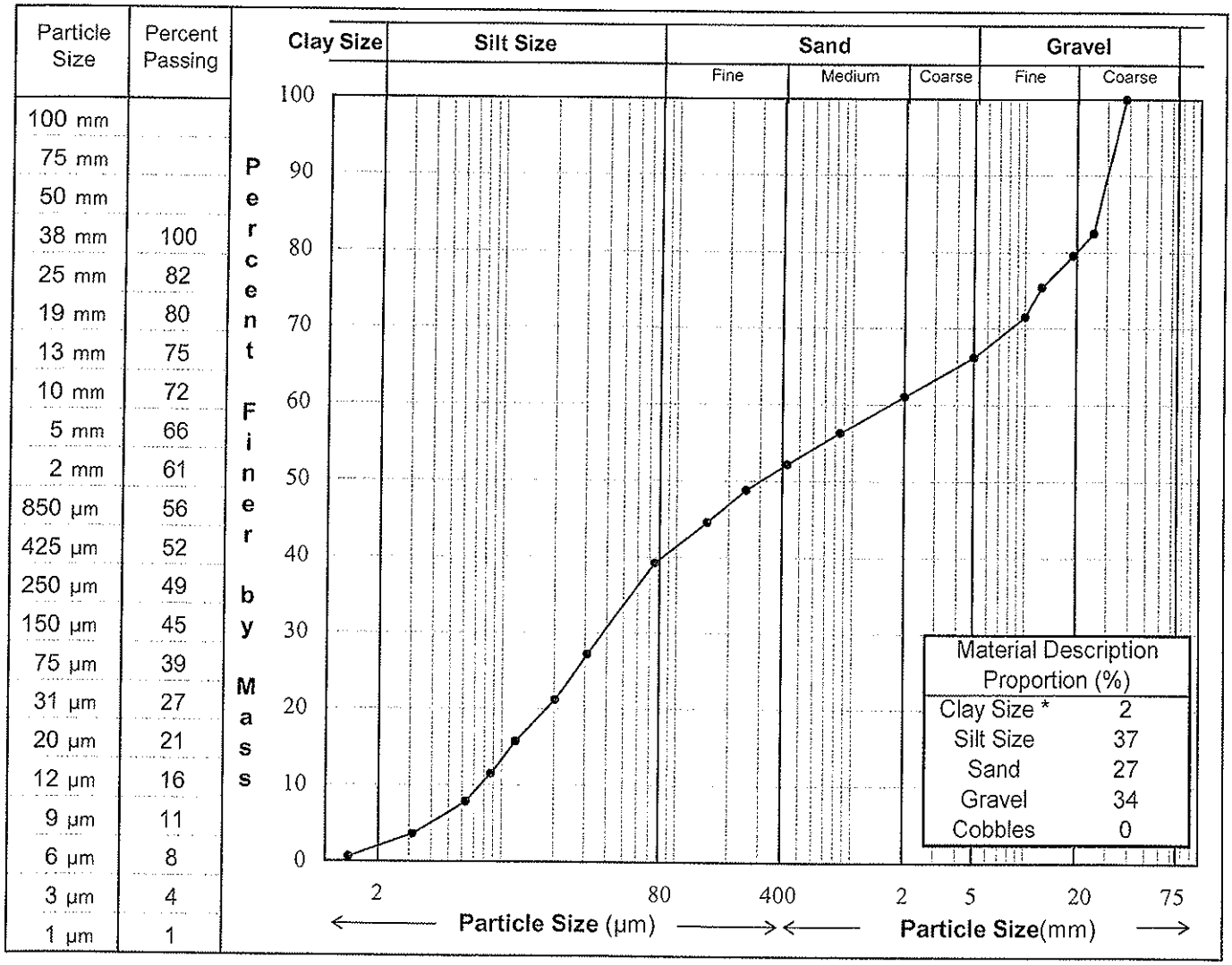
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC280-S3		
Sample No.:	BH08-SWC280-S3		
Depth:	14 - 15 ft		
Description**:	SILT - gravelly, sandy, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	82
19 mm	80
13 mm	75
10 mm	72
5 mm	66
2 mm	61
850 µm	56
425 µm	52
250 µm	49
150 µm	45
75 µm	39
31 µm	27
20 µm	21
12 µm	16
9 µm	11
6 µm	8
3 µm	4
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

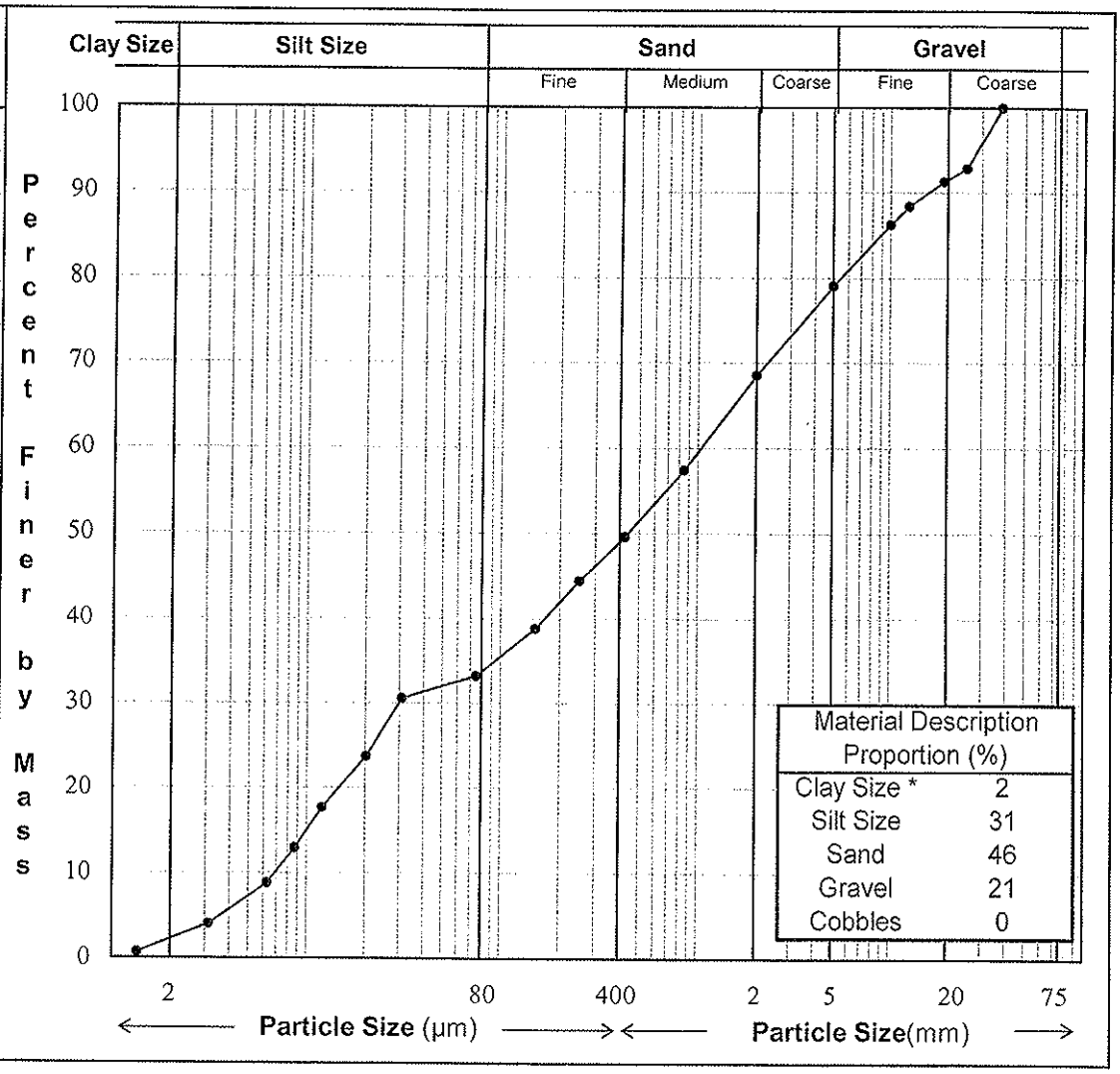
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC280-S5		
Sample No.:	BH08-SWC280-S5		
Depth:	31 - 32 ft		
Description**:	SAND - silty, gravelly, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	93
19 mm	91
13 mm	88
10 mm	86
5 mm	79
2 mm	69
850 µm	57
425 µm	50
250 µm	44
150 µm	39
75 µm	33
31 µm	31
20 µm	24
12 µm	18
9 µm	13
6 µm	9
3 µm	4
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By: _____

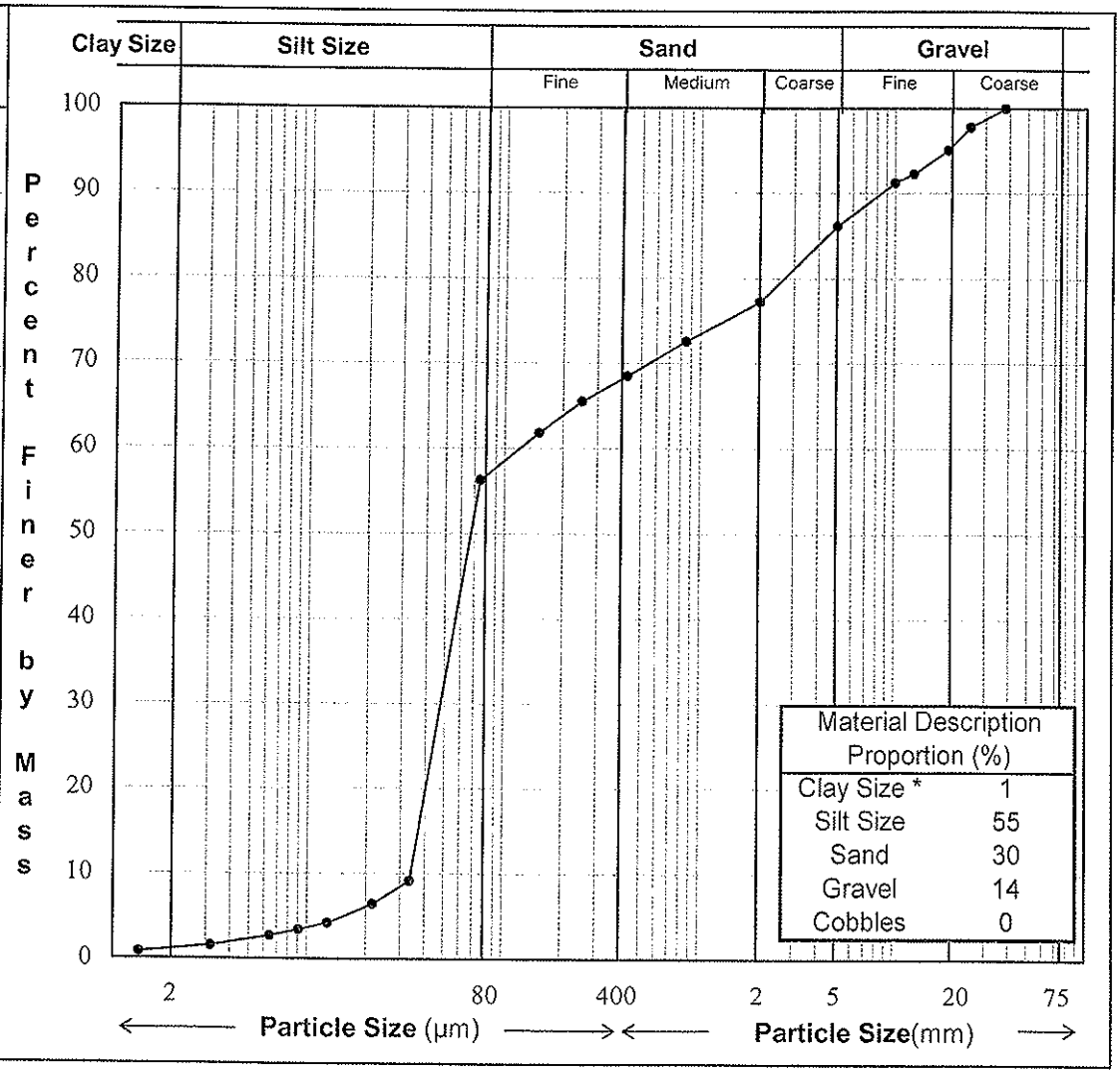
EBA Engineering Consultants Ltd.

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	**Proposed Valley Dump**	Date Tested:	2008/04/23
Client:	SRK Consulting Inc		
Project No.:	W14101068.006		
Location:	BH08-SWC280-S8		
Sample No.:	BH08-SWC280-S8		
Depth:	59 - 60 ft		
Description**:	SILT - sandy, some gravel, trace clay		

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	100
25 mm	98
19 mm	95
13 mm	92
10 mm	91
5 mm	86
2 mm	77
850 µm	73
425 µm	68
250 µm	66
150 µm	62
75 µm	56
33 µm	9
22 µm	7
13 µm	4
9 µm	3
6 µm	3
3 µm	2
1 µm	1



Remarks: * The upper clay size of 2 µm, per the Canadian Foundation Engineering Manual.

** The description is visually based & subject to EBA description protocols.

Reviewed By:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

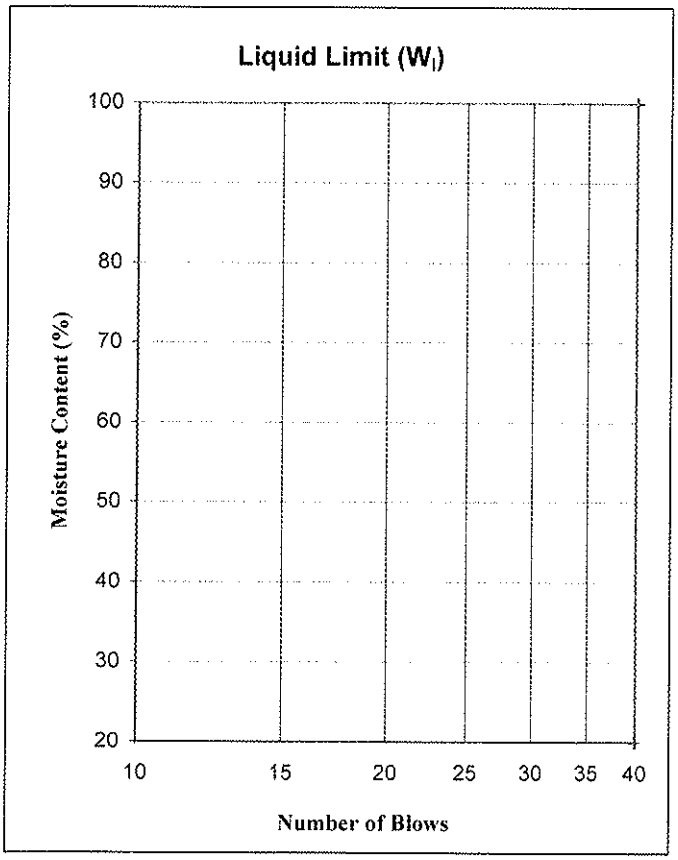
Project:	Proposed Valley Dump	Sample Number:	08-SWC271-S4
		Borehole Number:	08-SWC271-S4
Project Number:	W14101068.006	Depth:	17.5 - 18.5 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	JP

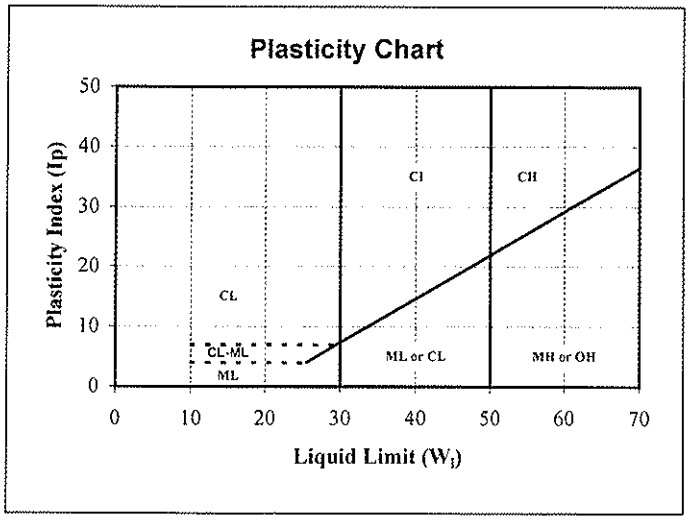
Plastic Limit Test

Trial Number	1	2	3
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	
Wt. of Dry Soil	0.00	0.00	
Moisture Content (%)	#DIV/0!	#DIV/0!	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows			
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	0.00
Wt. of Dry Soil	0.00	0.00	0.00
Moisture Content (%)	#DIV/0!	#DIV/0!	#DIV/0!





LIQUID LIMIT (%) _____

PLASTIC LIMIT (%) #DIV/0!

PLASTICITY INDEX (%) #DIV/0!

Soil Description: Non-plastic

USCS Symbol: _____

Remarks: Non-plastic

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

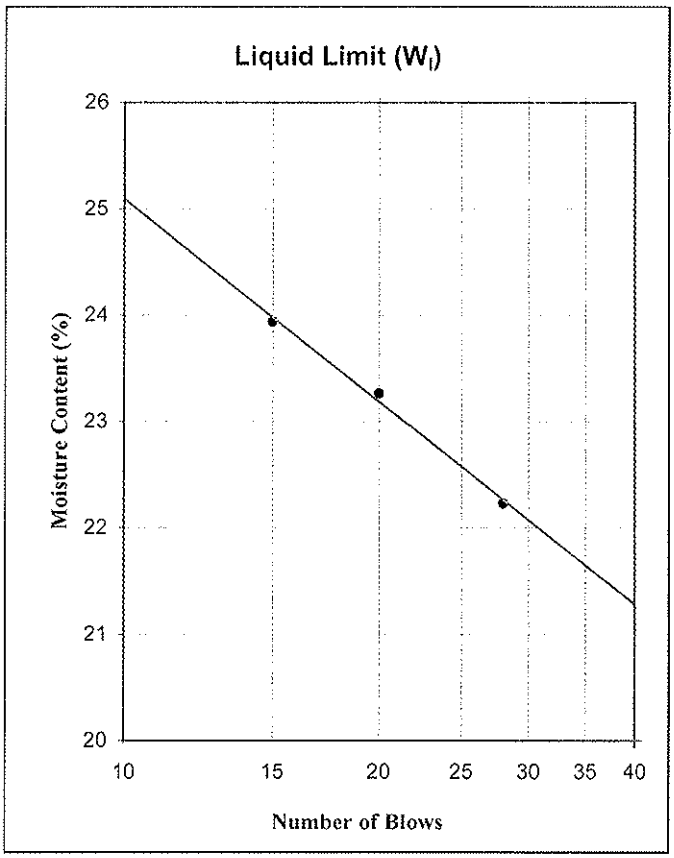
Project:	Proposed Valley Dump	Sample Number:	08-SWC272-S4
		Borehole Number:	08-SWC272-S4
Project Number:	W14101068.006	Depth:	37 - 38 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	JP

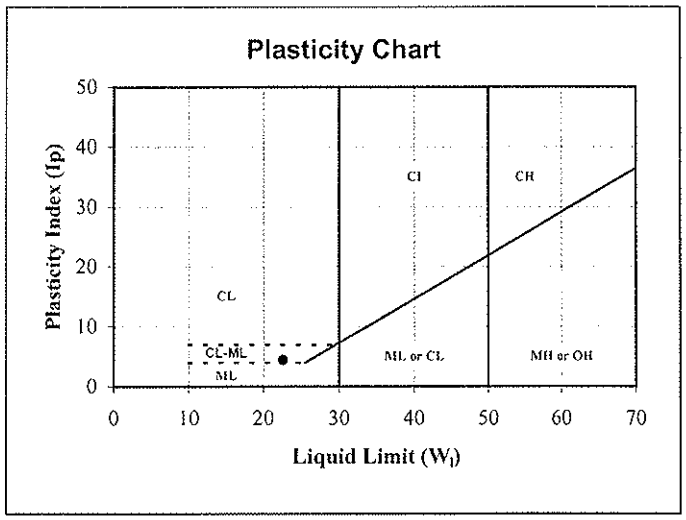
Plastic Limit Test

Trial Number	1	2	3
Tare Number			
Wt. Wet Soil + Tare	7.19	6.78	
Wt. Dry Soil + Tare	6.71	6.33	
Wt. of Tare	4.08	3.83	
Wt. of Water	0.48	0.45	
Wt. of Dry Soil	2.63	2.50	
Moisture Content (%)	18.3	18.0	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	15	20	28
Tare Number	A-1	A-2	A-3
Wt. Wet Soil + Tare	37.48	31.59	41.98
Wt. Dry Soil + Tare	31.00	26.36	35.10
Wt. of Tare	3.93	3.88	4.15
Wt. of Water	6.48	5.23	6.88
Wt. of Dry Soil	27.07	22.48	30.95
Moisture Content (%)	23.9	23.3	22.2





LIQUID LIMIT (%)	23
PLASTIC LIMIT (%)	18
PLASTICITY INDEX (%)	4

Soil Description: Low Plasticity

USCS Symbol: CL

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

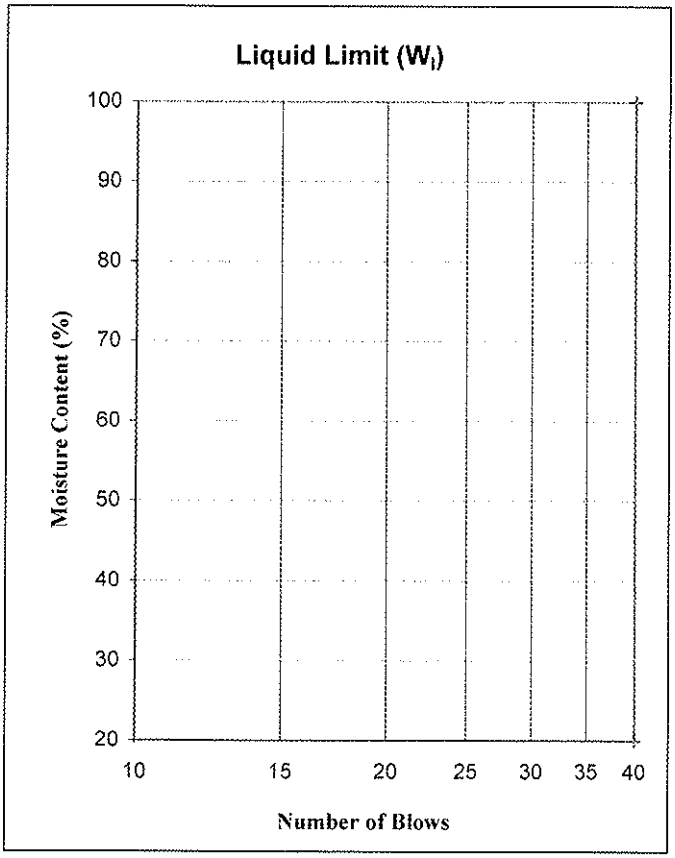
Project:	Proposed Valley Dump	Sample Number:	08-SWC272-S5
		Borehole Number:	08-SWC272-S5
Project Number:	W14101068.006	Depth:	40 - 41 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	JP

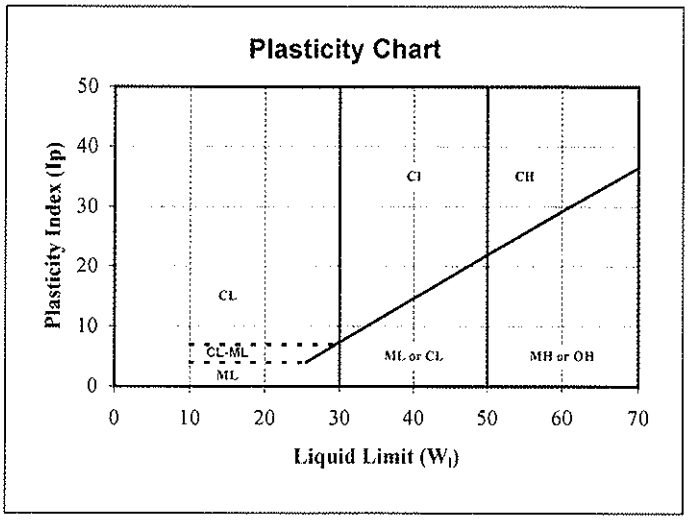
Plastic Limit Test

Trial Number	1	2	3
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	
Wt. of Dry Soil	0.00	0.00	
Moisture Content (%)	#DIV/0!	#DIV/0!	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows			
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	0.00
Wt. of Dry Soil	0.00	0.00	0.00
Moisture Content (%)	#DIV/0!	#DIV/0!	#DIV/0!





LIQUID LIMIT (%)	
PLASTIC LIMIT (%)	#DIV/0!
PLASTICITY INDEX (%)	**#DIV/0!**

Soil Description: Non-plastic

USCS Symbol:

Remarks: Non-plastic

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

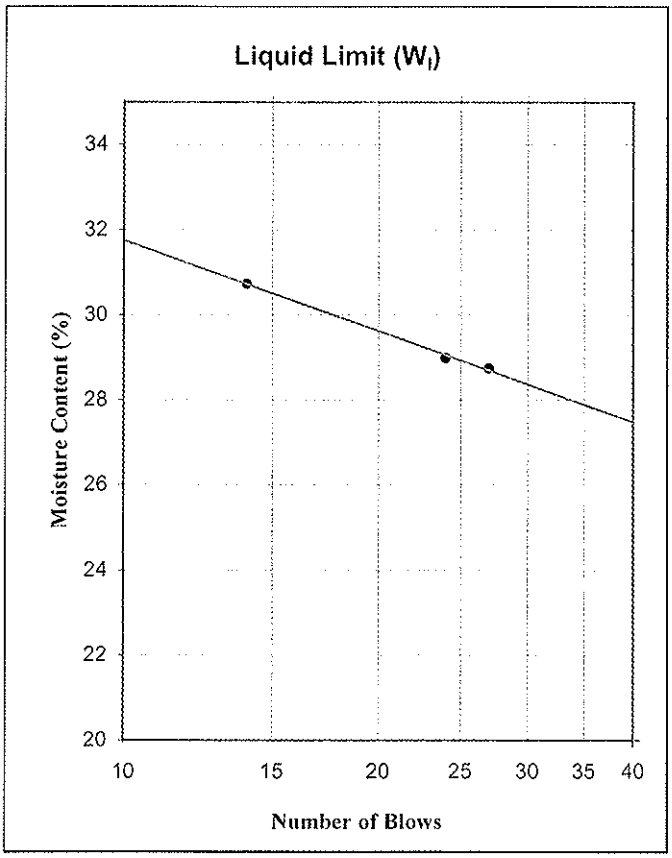
Project:	Proposed Valley Dump	Sample Number:	08-SWC272-S9
		Borehole Number:	08-SWC272-S9
Project Number:	W14101068.006	Depth:	72 - 73 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	RC

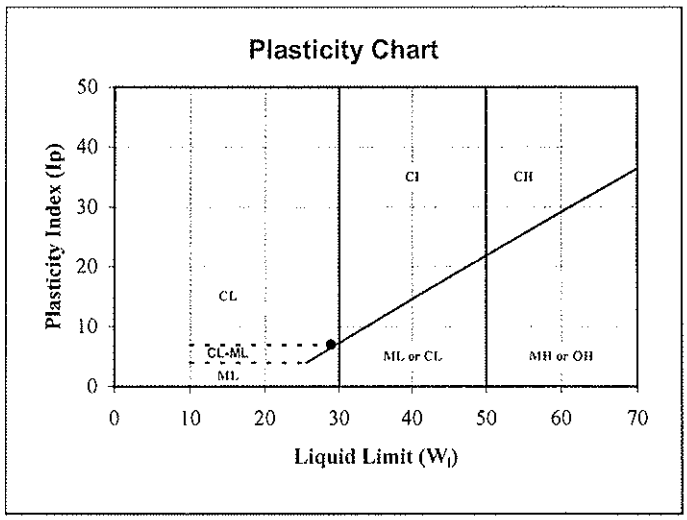
Plastic Limit Test

Trial Number	1	2	3
Tare Number	PL3	PL4	
Wt. Wet Soil + Tare	2.78	4.98	
Wt. Dry Soil + Tare	2.54	4.31	
Wt. of Tare	1.38	1.41	
Wt. of Water	0.24	0.67	
Wt. of Dry Soil	1.16	2.90	
Moisture Content (%)	20.7	23.1	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	14	24	27
Tare Number	U-1	U-2	U-3
Wt. Wet Soil + Tare	23.02	21.41	23.72
Wt. Dry Soil + Tare	18.53	17.49	19.29
Wt. of Tare	3.92	3.97	3.88
Wt. of Water	4.49	3.92	4.43
Wt. of Dry Soil	14.61	13.52	15.41
Moisture Content (%)	30.7	29.0	28.7





LIQUID LIMIT (%)	29
PLASTIC LIMIT (%)	22
PLASTICITY INDEX (%)	**7**

Soil Description: Low Plasticity

USCS Symbol: CL

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

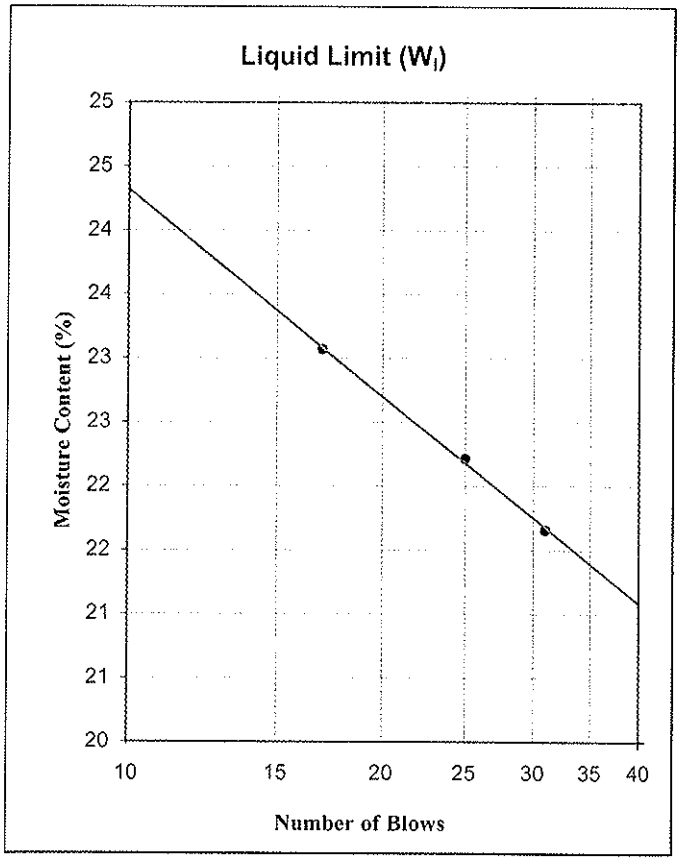
Project:	Proposed Valley Dump	Sample Number:	08-SWC272-S11
		Borehole Number:	08-SWC272-S11
Project Number:	W14101068.006	Depth:	83 - 84 ft
Sample Description:		Date Tested:	7/5/2008
		Tested By:	RC

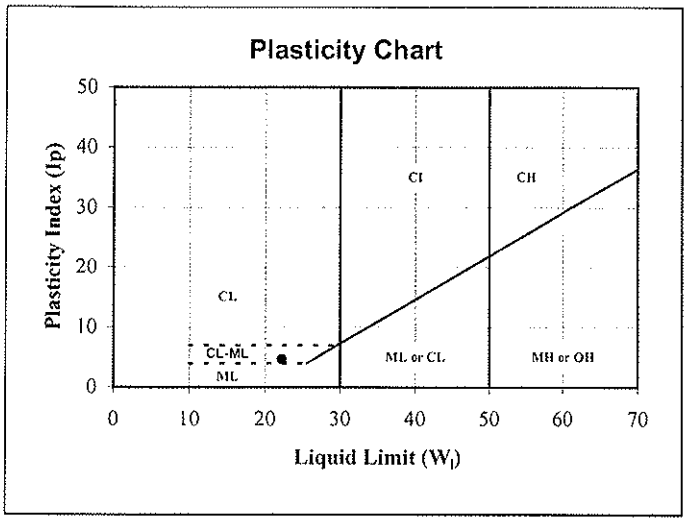
Plastic Limit Test

Trial Number	1	2	3
Tare Number	PL1	PL2	
Wt. Wet Soil + Tare	5.31	6.92	
Wt. Dry Soil + Tare	4.73	6.11	
Wt. of Tare	1.43	1.47	
Wt. of Water	0.58	0.81	
Wt. of Dry Soil	3.30	4.64	
Moisture Content (%)	17.6	17.5	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	17	25	31
Tare Number	U-1	U-2	U-3
Wt. Wet Soil + Tare	31.97	20.79	19.57
Wt. Dry Soil + Tare	26.71	17.70	16.80
Wt. of Tare	3.91	3.79	4.01
Wt. of Water	5.26	3.09	2.77
Wt. of Dry Soil	22.80	13.91	12.79
Moisture Content (%)	23.1	22.2	21.7





LIQUID LIMIT (%)	22
PLASTIC LIMIT (%)	18
PLASTICITY INDEX (%)	**5**

Soil Description: Low Plasticity

USCS Symbol: CL

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

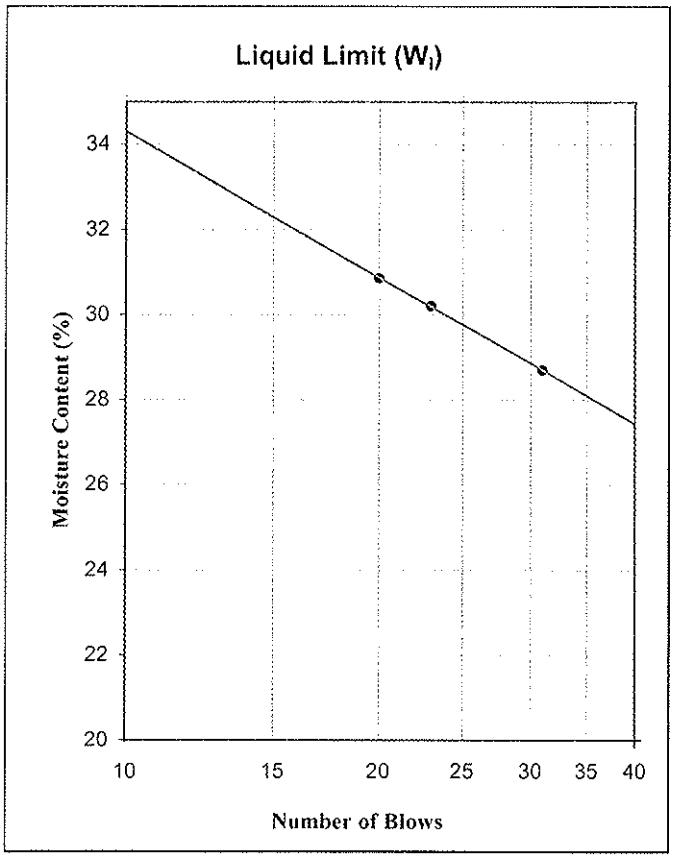
Project:	Proposed Valley Dump	Sample Number:	08-SWC273-S8
		Borehole Number:	08-SWC273-S8
Project Number:	W14101068.006	Depth:	73 - 74 ft
Sample Description:		Date Tested:	5/5/2008
		Tested By:	JP

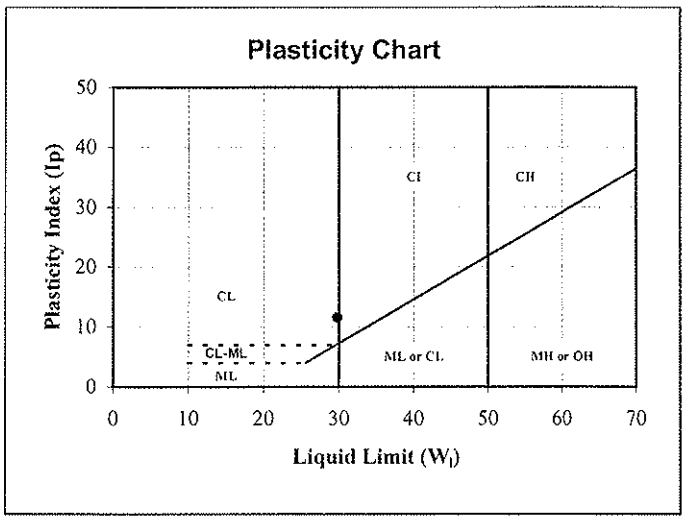
Plastic Limit Test

Trial Number	1	2	3
Tare Number			
Wt. Wet Soil + Tare	5.21	5.10	
Wt. Dry Soil + Tare	5.01	4.92	
Wt. of Tare	3.93	3.92	
Wt. of Water	0.20	0.18	
Wt. of Dry Soil	1.08	1.00	
Moisture Content (%)	18.5	18.0	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	20	23	31
Tare Number	c	d	e
Wt. Wet Soil + Tare	13.02	18.37	20.09
Wt. Dry Soil + Tare	10.86	15.05	16.50
Wt. of Tare	3.86	4.06	3.99
Wt. of Water	2.16	3.32	3.59
Wt. of Dry Soil	7.00	10.99	12.51
Moisture Content (%)	30.9	30.2	28.7





LIQUID LIMIT (%)	30
PLASTIC LIMIT (%)	18
PLASTICITY INDEX (%)	**12**

Soil Description: Medium Plasticity

USCS Symbol: CI

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

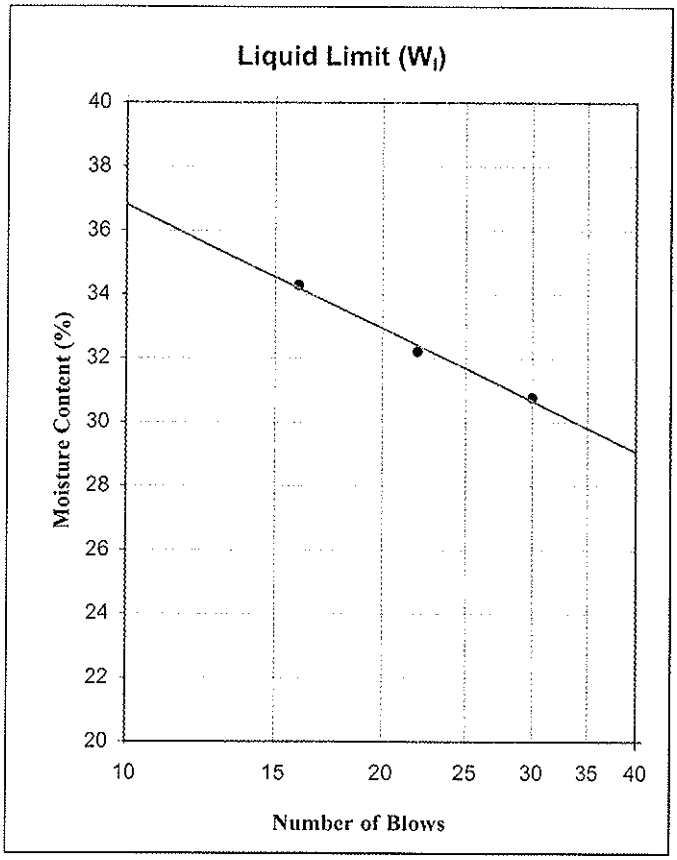
Project:	Proposed Valley Dump	Sample Number:	08-SWC273-S14
		Borehole Number:	08-SWC273-S14
Project Number:	W14101068.006	Depth:	126 - 127 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	RC

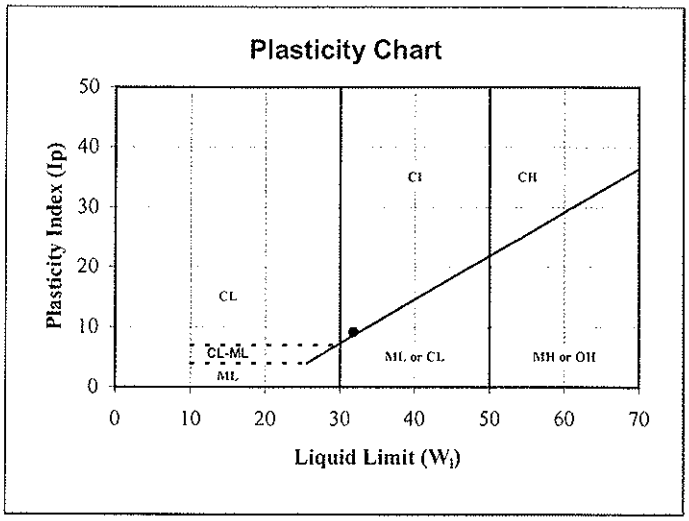
Plastic Limit Test

Trial Number	1	2	3
Tare Number	PL1	PL2	
Wt. Wet Soil + Tare	3.68	6.02	
Wt. Dry Soil + Tare	3.25	5.16	
Wt. of Tare	1.34	1.39	
Wt. of Water	0.43	0.86	
Wt. of Dry Soil	1.91	3.77	
Moisture Content (%)	22.5	22.8	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	22	30	16
Tare Number	A-1	A-2	A-3
Wt. Wet Soil + Tare	28.33	34.48	29.52
Wt. Dry Soil + Tare	22.42	27.32	22.98
Wt. of Tare	4.07	4.06	3.91
Wt. of Water	5.91	7.16	6.54
Wt. of Dry Soil	18.35	23.26	19.07
Moisture Content (%)	32.2	30.8	34.3





LIQUID LIMIT (%)	32
PLASTIC LIMIT (%)	23
PLASTICITY INDEX (%)	**9**

Soil Description: Medium Plasticity

USCS Symbol: CI

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

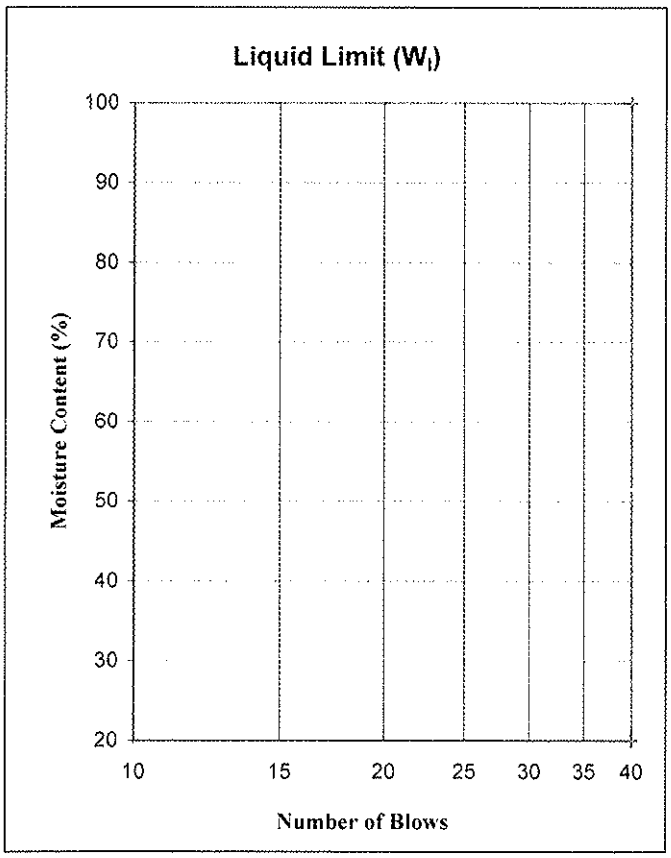
Project:	Proposed Valley Dump	Sample Number:	08-SWC274-S1
		Borehole Number:	08-SWC274-S1
Project Number:	W14101068.006	Depth:	10 - 11 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	JP

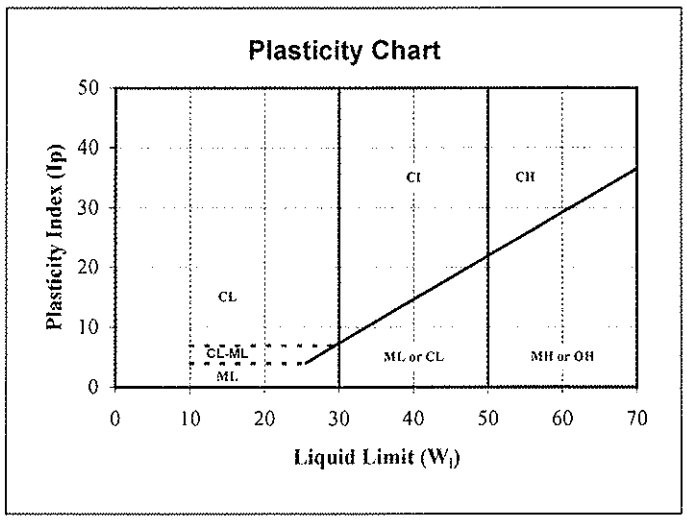
Plastic Limit Test

Trial Number	1	2	3
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	
Wt. of Dry Soil	0.00	0.00	
Moisture Content (%)	#DIV/0!	#DIV/0!	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows			
Tare Number			
Wt. Wet Soil + Tare			
Wt. Dry Soil + Tare			
Wt. of Tare			
Wt. of Water	0.00	0.00	0.00
Wt. of Dry Soil	0.00	0.00	0.00
Moisture Content (%)	#DIV/0!	#DIV/0!	#DIV/0!





LIQUID LIMIT (%)	
PLASTIC LIMIT (%)	#DIV/0!
PLASTICITY INDEX (%)	**#DIV/0!**

Soil Description: Non-plastic

USCS Symbol:

Remarks: Non-plastic

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

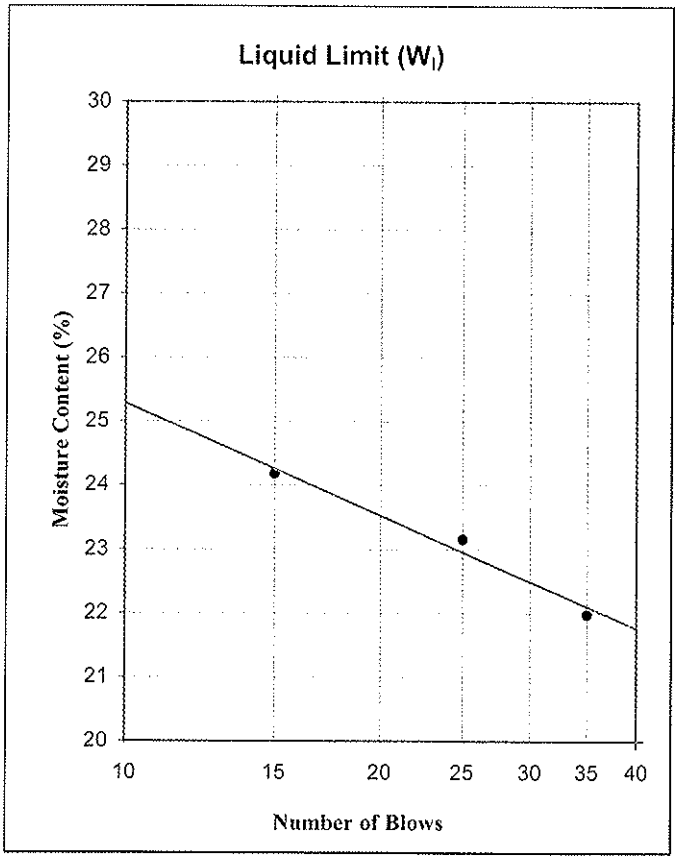
Project:	Proposed Valley Dump	Sample Number:	08-SWC274-S8
		Borehole Number:	08-SWC274-S8
Project Number:	W14101068.006	Depth:	71 - 72 ft
Sample Description:		Date Tested:	6/5/2008
		Tested By:	JP

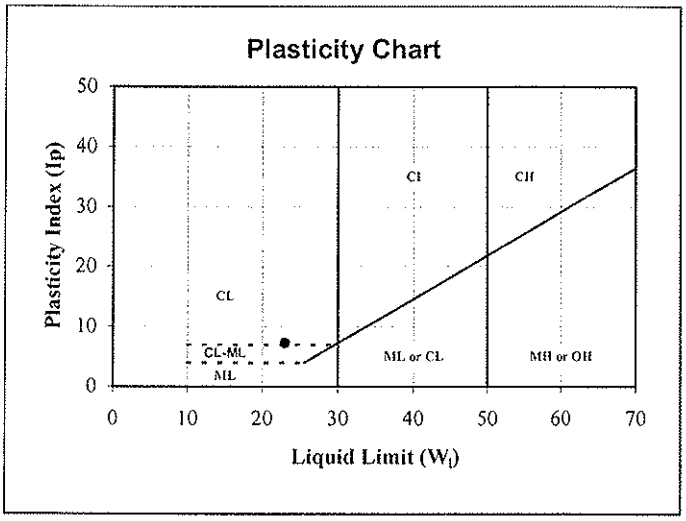
Plastic Limit Test

Trial Number	1	2	3
Tare Number	A-4	A-5	
Wt. Wet Soil + Tare	5.25	6.06	
Wt. Dry Soil + Tare	5.07	5.79	
Wt. of Tare	3.97	4.00	
Wt. of Water	0.18	0.27	
Wt. of Dry Soil	1.10	1.79	
Moisture Content (%)	16.4	15.1	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	15	25	35
Tare Number	A-1	A-2	A-3
Wt. Wet Soil + Tare	27.73	28.53	29.23
Wt. Dry Soil + Tare	23.10	23.91	24.67
Wt. of Tare	3.95	3.96	3.93
Wt. of Water	4.63	4.62	4.56
Wt. of Dry Soil	19.15	19.95	20.74
Moisture Content (%)	24.2	23.2	22.0





LIQUID LIMIT (%)	23
PLASTIC LIMIT (%)	16
PLASTICITY INDEX (%)	7

Soil Description: Low Plasticity

USCS Symbol: CL

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

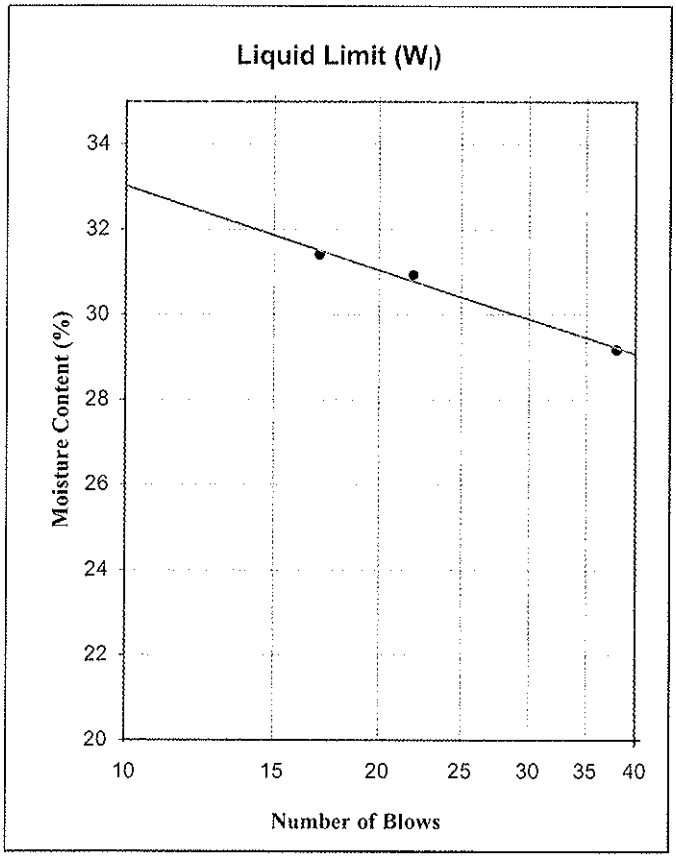
Project:	Proposed Valley Dump	Sample Number:	08-SWC275-S14
		Borehole Number:	08-SWC275-S14
Project Number:	W14101068.006	Depth:	64 - 65 ft
Sample Description:		Date Tested:	5/5/2008
		Tested By:	JP

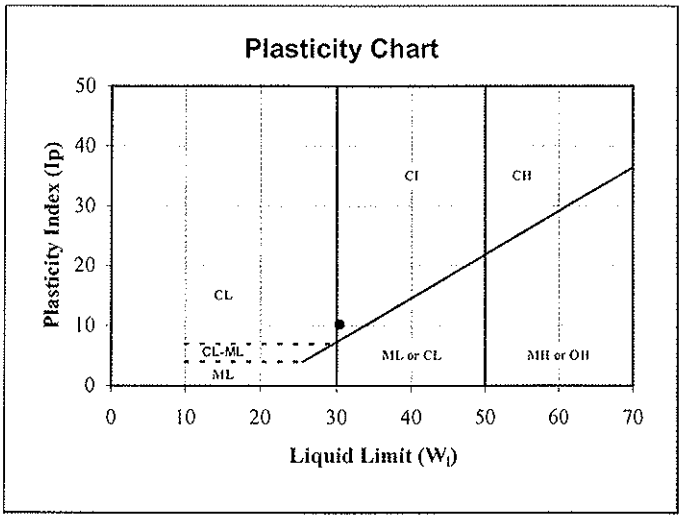
Plastic Limit Test

Trial Number	1	2	3
Tare Number	A-4	A-5	
Wt. Wet Soil + Tare	5.69	5.62	
Wt. Dry Soil + Tare	5.38	5.34	
Wt. of Tare	3.89	3.91	
Wt. of Water	0.31	0.28	
Wt. of Dry Soil	1.49	1.43	
Moisture Content (%)	20.8	19.6	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	17	22	38
Tare Number	A-1	A-2	A-3
Wt. Wet Soil + Tare	24.59	25.69	27.79
Wt. Dry Soil + Tare	19.68	20.57	22.41
Wt. of Tare	4.05	4.02	3.97
Wt. of Water	4.91	5.12	5.38
Wt. of Dry Soil	15.63	16.55	18.44
Moisture Content (%)	31.4	30.9	29.2





LIQUID LIMIT (%)	30
PLASTIC LIMIT (%)	20
PLASTICITY INDEX (%)	**10**

Soil Description: Medium Plasticity

USCS Symbol: CI

Remarks:

EBA Engineering Consultants Ltd.

Atterberg Limits Test Form

ASTM D4318

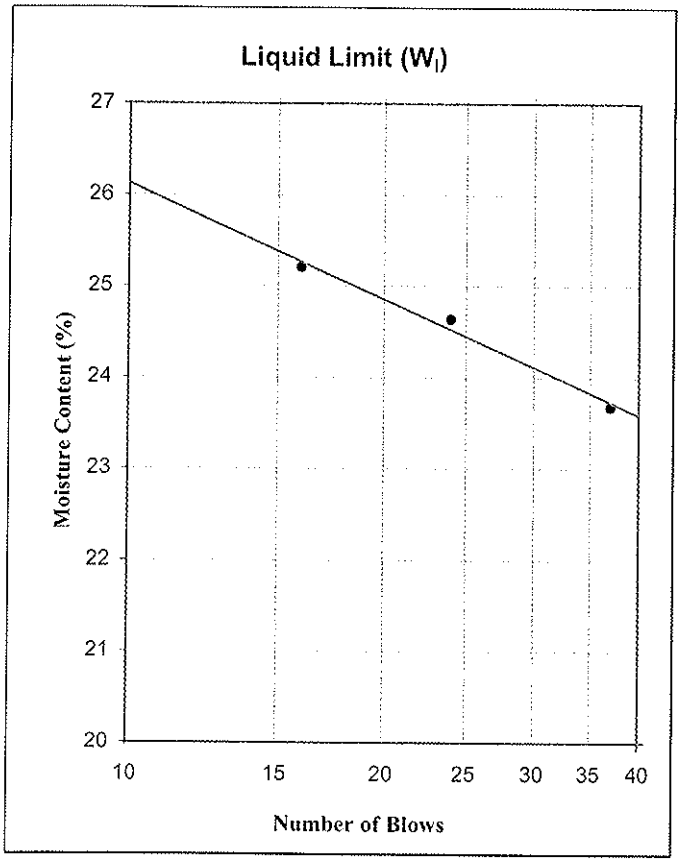
Project:	Proposed Valley Dump	Sample Number:	08-SWC278-S2
		Borehole Number:	08-SWC278-S2
Project Number:	W14101068.006	Depth:	0.0 - 0.1 ft
Sample Description:		Date Tested:	5/5/2008
		Tested By:	JP

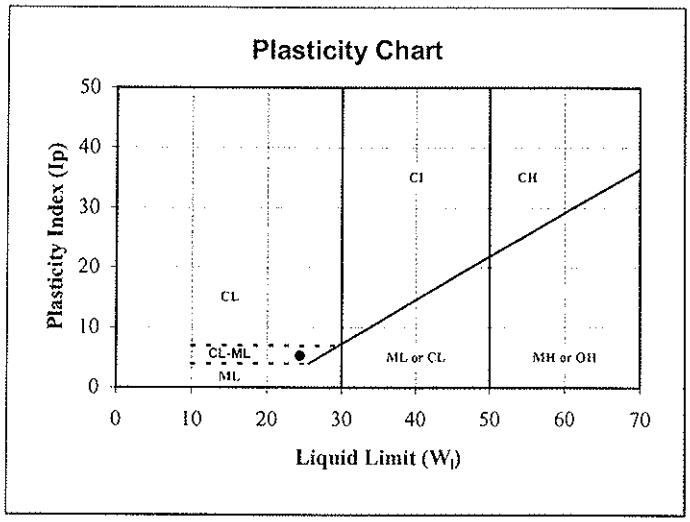
Plastic Limit Test

Trial Number	1	2	3
Tare Number	A-4	A-5	
Wt. Wet Soil + Tare	6.22	5.89	
Wt. Dry Soil + Tare	5.83	5.59	
Wt. of Tare	3.86	3.96	
Wt. of Water	0.39	0.30	
Wt. of Dry Soil	1.97	1.63	
Moisture Content (%)	19.8	18.4	

Liquid Limit Test

Trial Number	1	2	3
No. of Blows	16	24	37
Tare Number	A-1	A-2	A-3
Wt. Wet Soil + Tare	14.40	26.46	25.15
Wt. Dry Soil + Tare	12.31	22.02	21.11
Wt. of Tare	4.02	4.00	4.05
Wt. of Water	2.09	4.44	4.04
Wt. of Dry Soil	8.29	18.02	17.06
Moisture Content (%)	25.2	24.6	23.7





LIQUID LIMIT (%)	24
PLASTIC LIMIT (%)	19
PLASTICITY INDEX (%)	**5**

Soil Description: Low Plasticity

USCS Symbol: CL

Remarks:

EBA Engineering Consultants Ltd.