◎ Table of Contents

APPENDIX 6
2007 GEOTECHNICAL SITE INVESTIGATION REPORT

Rescan™

June 12, 2008

Pacific Booker Minerals Inc.
#1702 – 1166 Alberni Street
Vancouver, British Columbia
V6E 3Z3

Mr. Erik Tornquist
Executive Director

Dear Mr. Tornquist:

Morrison Copper/Gold Project
2007 Geotechnical Site Investigation – Rev. 0

We are pleased to submit our final report for the 2007 Geotechnical Site Investigation for the Morrison Copper Gold Project. This report provides a summary of the data collected during the field drilling, instrumentation, and test pitting program carried out between Nov. 11 and Dec. 17, 2007; and interpretation of the resistivity survey completed by Frontier Geoscience Ltd. in May 2007.

Please contact the undersigned at your convenience if you have any questions or wish to discuss any aspect of this report.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Harvey McLeod, P.Eng.
Project Manager

HM:cw

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PACIFIC BOOKER MINERALS INC.

Morrison Copper/Gold Project

Title: **2007 Geotechnical Site Investigation**

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Klohn Crippen Berger

◎ Table of Contents

EXECUTIVE SUMMARY

The Morrison Copper Gold Project is located approximately 70 km northeast of Smithers, in northern-central British Columbia. The proposed open pit and plantsite are about 4 km south southwest of the proposed tailings storage facility (TSF). The deposit is approximately 500 m by 900 m in plan and extends to a depth of approximately 330 m below ground surface. Material from the mine will be processed at the plant site located adjacent to the open pit. Tailings will be transported via pipeline to the TSF. A portion of the waste rock will be disposed in a surface dump adjacent to the open pit. The remaining waste rock will be disposed in the TSF and submerged by tailings.

This report summarizes the results of fieldwork conducted by Klohn Crippen Berger Ltd. in 2007 for the feasibility level design of the TSF and plantsite foundation design. Fieldwork consisted of geotechnical drilling and testing, test pitting, and a geophysical survey.

Drilling consisted of 15 geotechnical holes at 10 sites, 5 at the TSF and 5 at the plantsite. Testing in drillholes consisted of standard penetration tests (SPT) every 1.5 m to 3 m in overburden, falling head and constant head (packer) tests as required, and the installation of standpipe piezometers. Eight test pits were excavated, 2 at the TSF, and 6 along the current access road between the proposed plantsite and TSF. Six lines of resistivity surveying comprised the geophysical investigation, 1 at the proposed plantsite, and 5 in the TSF. Laboratory testing includes particle size analysis, Atterberg limits, proctor compaction, and moisture content.

Drilling and test pitting revealed a uniform surface cover of glacial till overlying fractured sedimentary bedrock. Glacial till is stiff, clay rich, and of variable thickness, typically between 4 and 20 m. Bedrock is Cretaceous sedimentary and minor volcanic rock with Tertiary block faulting. It is moderately fractured and moderately permeable. Test pitting delineated an area of sand and gravel that could be exploited as a source of aggregate. The geophysical survey revealed that glacial till masks an undulating bedrock surface. Geophysical data allowed the bedrock-till contact to be demarcated between drillholes.

The results of the 2007 site investigation show that the TSF site is feasible. The plantsite layout was adjusted to locate critical buildings on bedrock as shown by drilling and geophysics.

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

(continued)

TABLES

FIGURES

APPENDICES

TABLE OF CONTENTS

(continued)

DRAWINGS

◎ Table of Contents

1. INTRODUCTION

1.1 General

This report summarized the results of the 2007 Site Investigation Program conducted for Pacific Booker Minerals Inc. at the Morrison Copper Gold Project, located north of Morrison Lake, 65 km north east of Smithers, in central British Columbia (D-1001). This work was directed towards the feasibility design of the tailings storage facility and plantsite foundations (D-1002). The investigation consisted of the following components:

- Geophysical survey;
- Borehole and standpipe installation program;
- Hydraulic conductivity testing;
- Test pit program; and
- Laboratory testing.

The site investigation plan is shown in D-1003. Photographs from the investigation program are presented in Appendix I. Borehole logs are presented in Appendix II. Test pit logs are presented in Appendix III. Hydraulic conductivity results interpreted from packer and falling head tests are presented in Appendix IV. The results of the laboratory testing conducted by KCBL are presented in Appendix V. The report on the geophysical survey program from Frontier Geoscience Inc is presented in Appendix VI.

1.2 Background

Over the period of Nov. 11 to Dec. 7, 2007, KCBL carried out a site investigation program for the feasibility design of the tailings facility and plantsite foundations. The investigation program consisted of:

1. a drilling program with 15 boreholes at 10 sites;
2. standard penetration tests (SPT) every 1.5m to 3 m in overburden;
3. installation of 16 standpipe piezometers in 13 boreholes at 8 sites; and
4. excavation of 8 test pits.

The investigation program provides preliminary data for dam and plant foundation designs.

1.3 Limitations and Uses of Report

This report is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of Pacific Booker Minerals Inc. for the specific application to the Morrison Copper Gold Project. The report's contents may not be relied upon by any other party without the express written permission of Klohn Crippen Berger. In this report, Klohn Crippen Berger has endeavoured to comply with generally accepted geotechnical practice common to the local area. Klohn Crippen Berger makes no warranty, express or implied.

The analyses, conclusions and recommendations contained in this report are based on data derived from a limited number of test holes obtained from widely spaced subsurface explorations. The methods used indicate subsurface conditions only at the specific locations where samples were obtained or where in-situ tests would infer, only at the time they were obtained, and only to the depths penetrated. The samples and tests cannot be relied on to accurately reflect the nature and extent of strata variations that usually exist between sampling or testing locations.

The recommendations included in this report have been based in part on assumptions about strata variations between test holes that will not become evident until construction or further investigation. Klohn Crippen Berger cannot assume responsibility or liability for the adequacy of its recommendations when they are used in the field without a qualified geotechnical engineer being retained to observe construction.

Although Klohn Crippen Berger has explored subsurface conditions as part of this program, Klohn Crippen Berger has conducted limited analytical laboratory testing of samples obtained, but has not evaluated the site for potential presence of contaminated soil, and has not evaluated groundwater geochemical conditions.

2. DRILLING PROGRAM

The drilling program was conducted from Nov. 11 to Dec. 17, 2007, and was completed under the technical supervision of KCBL. All of the sites were drilling using a skidder mounted Mobile B-53, owned and operated by Geotechnical Drilling Services Ltd. (GDSL). The B-53 was capable of ODEX air rotary and mud rotary drilling. All geotechnical testing equipment and supplies for instrument installations were provided by GDSL. Drilling was conducted in one 12 hour shift per day. The drilling program can be summarized as follows:

2.1 Tailings Facility

- 10 boreholes at 5 sites, with one deep and one shallow hole per site.
  - 5 deep boreholes drilled through overburden, between 11 m and 39 m into bedrock, to depths of between 35m and 58m.
  - 5 shallow boreholes drilled into overburden between 11m and 25 m.
- 13 piezometers in 10 boreholes at 5 sites.

2.2 Plantsite

- 5 boreholes at 5 sites drilled into overburden up to 20 m, or 3 m into bedrock if encountered before 20 m.
- 3 piezometers were installed in 3 boreholes.
- 1 borehole was cored 35 m into bedrock to ensure the plantsite area does not contain ore mineralization.

2.3 Drilling Methods

The drill holes were completed using some or all of the following drilling methods, depending on the ground conditions:

- ODEX 90 hammer pushing 4.5” casing in overburden, hole diameter is 123 mm
- HQ triple tube mud rotary diamond drilling in rock, hole diameter is 96 mm.

Once about 1 m of bedrock was encountered during ODEX drilling, mud rotary was implemented by coring through the ODEX HW casing shoe using HQ rods and bit. This was successful at all holes except at borehole DH07-5A, where coring was initiated in highly fractured rock. The hole would not stay open and began collapsing, so the hole was used for the overburden piezometer and DH07-5B was drilled deep to obtain rock core for geotechnical logging. Standard penetration testing is described in the next section. No Shelby tube samples were collected because of the presence of gravel and cobbles in the soil.

The drilling program is summarized in Table 2.1. Borehole logs are presented in Appendix II. Standpipe installation methods are described in Section 2.1 and summarized in Table 2.4.

◎ Table of Contents

Table 2.1 2007 Drilling Program

Drilling Hole ID	Location	Date Started (2007)	Northing (m) #	Easting (m)#	Collar Elevation (m)*	Depth to Bedrock (m)	Hole Depth (m)
DH07-1A	North Dam	Nov. 11	6,125,281	671,989	973	20.44	49.4
DH07-1B	North Dam	Nov. 15	6,125,279	671,996	973		17.4
DH07-2A	North Dam	Nov. 16	6,125,496	671,403	990	23.9	35.1
DH07-2B	North Dam	Nov. 18	6,125,493	671,396	990		11
DH07-3A	Main Dam	Nov. 19	6,123,345	671,446	974	21.9	41.6
DH07-3B	Main Dam	Nov. 22	6,123,335	671,450	974		15.4
DH07-4A	Main Dam	Nov. 23	6,123,637	671,060	960	12.8	46.2
DH07-4B	Main Dam	Nov. 26	6,123,634	671,070	960		11.4
DH07-5A	Main Dam	Nov. 27	6,123,951	670,477	935	19.2	21.5
DH07-5B	Main Dam	Nov. 29	6,123,965	670,477	935	19.2	58.2
DH07-6	Plantsite	Dec. 3	6,120,025	671,245	863		23.2
DH07-7	Plantsite	Dec. 4	6,120,115	671,105	851		22.9
DH07-8	Plantsite	Dec. 5	6,120,422	671,193	877	5.2	9.1
DH07-9	Plantsite	Dec. 5	6,120,197	671,101	841	22.3	25.3
DH07-10	Plantsite	Dec. 6	6,120,299	671,036	845	8.2	47.5

Notes:
Coordinate were determined by handheld Global Positioning System (GPS).
* Elevations were estimated from 2 m contours provided by PBL.
Packer testing was done in bedrock and falling head tests in overburden. See below for details.

2.4 Standard Penetration Testing

Field soil logging was carried out on Standard Penetration Test (SPT) split spoon samples taken every 1.5 m (5 ft). Select samples were submitted to the KCBL soil lab for visual classification, grain size analysis, moisture content and Atterberg Limit tests. Pocket penetrometer readings were taken on “disturbed” split spoon samples in the field. These readings provide a crude measure of the relative consistency of cohesive soils.

The SPT split spoon was 61 cm (24 inch) long with a 5 cm (2 inch) outside diameter. SPT and large penetration test (LPT) split spoons were driven by an automatic (safety) trip hammer. During split-spoon sampling, the blow count for each 5 cm (2 inches) of incremental depth penetration was recorded (Appendix VIII). The automatic hammer was fixed to the drill rig tower and was swung into place over an anvil, which was securely attached to the end of the rods. The rods were attached to the split spoon and lowered into the drill hole. The SPT split spoons were used without liners, and plastic sand catchers were used to help retrieve the sample.

The automatic trip hammer SPT system was last calibrated November 21, 2005, by ConeTec in Vancouver. The results show an average hammer efficiency of 104%.

$(N_1)_{60}$ is the SPT blow count normalized to an overburden pressure of 100kPa and a hammer efficiency of 60%. $(N_1)_{60}$ values were calculated with corrections for overburden pressure, hammer efficiency, rod length, and sampling method by using the procedure outlined in National Center for Earthquake Engineering Research (NCEER) Youd et al. (2001). Given the above corrections, the relation between $(N_1)_{60}$ and N_m is:

$$(N_1)_{60} = N_m C_N C_E C_R C_S$$

where
N_m = Measured standard penetration resistance
C_N = Overburden pressure correction factor
C_E = Hammer efficiency correction factor
C_R = Rod length correction factor
C_S = Sampling method correction factor

A hammer efficiency of 60% is generally accepted as the average for most SPTs (Youd et al., 2001). The SPTs at Morrison Copper Gold had an average hammer efficiency of

104%. The C_E correction factor is the measured hammer efficiency divided by 60%, which gives a C_E value of 1.73.

For rod lengths under 10m, the C_R correction factor was taken from Youd et al. (2001) as shown in Table 2.2.

Table 2.2 Rod Length Correction Factor C_R

Rod Length	Correction
<3 m	0.75
3-4 m	0.8
4-6 m	0.85
6-10 m	0.95

Youd et al. (2001) recommends applying a correction factor between 1.1 and 1.3 for the use of samplers without liners. A C_S correction factor of 1.2 was adopted since the SPT sampler used at Morrison Copper Gold had no liner.

For the C_N correction factor for overburden pressure, Youd et al. (2001) recommends using the Liao and Whitman (1986) relationship for effective pressures less than 200 kPa:

$$C_N = (P_a/\sigma'_{vo})^{0.5}$$

Where P_a is atmospheric pressure of approximately 100 kPa, and σ'_{vo} is the effective overburden pressure. For effective overburden pressures between 200 and 300 kPa, Youd et al. (2001) recommends using the Seed and Idriss (1982) relationship:

$$C_N = 2.2/(1.2 + \sigma'_{vo}/P_a)$$

Youd et al. (2001) indicates that the C_N correction factor by either method is uncertain for effective overburden pressures greater than 300 kPa, particularly for the Liao and Whitman (1986) relationship.

We have presented $(N_1)_{60}$ values using C_N predicted by both the Liao and Whitman (1986) and Seed and Idriss (1982) methods in Appendix IX to demonstrate the range of possible $(N_1)_{60}$ values at depth.

A summary of the $(N_1)_{(60)}$ values for each site is included in Table 2.3.

Table 2.3 Standard Penetration Values for Glacial Till

Bore Hole	Number of Tests	N_{60}[1]				$(N_1)_{60}$ (C_N based on Seed and Idriss (1982))				$(N_1)_{60}$ (C_N based on Liao and Whitman (1986))			
	SPT	min	max	mean	median	min	max	mean	median	min	max	mean	median
DH07-01A	13	16	42	27	26	13	57	32	27	13	60	33	27
DH07-02A	13	21	49	30	28	12	62	25	20	14	72	28	21
DH07-03A	12	21	83	44	33	22	58	35	32	22	62	37	35
DH07-04A	8	21	47	32	33	22	62	32	28	22	72	34	28
DH07-05A	12	17	94	65	73	22	82	55	53	25	82	57	57
DH07-6	10	10	63	45	52	14	74	44	46	14	74	45	47
DH07-7	10	7	59	35	39	9	51	35	36	11	53	36	36
DH07-8	3	37	172	115	137	48	197	135	160	56	201	142	169
DH07-9	10	21	47	36	37	20	56	38	38	21	56	39	39
DH07-10	5	26	139	63	45	34	153	72	53	40	153	75	54

NOTES:
1. N_{60}: N_{SPT} corrected for 60% efficiency

2.5 Standpipe Installations

Sixteen standpipe piezometers were installed as summarized in Table 2.4 to monitor groundwater level. At tailings dams, at least two piezometers were installed; one in overburden and one in bedrock. Separate holes were drilled for deep and shallow piezometers, rather than putting both in a single hole, because of the difficulty and expense of sealing the long distance between the bottom of the hole and the base of overburden with bentonite. At selected sites, two piezometers separated by a bentonite seal were installed in a single hole.

1” PVC pipe was used for all installations. Coarse silica sand was placed in the annular space between the borehole wall and piezometer screen to a distance of 0.3 m to 0.6 m above the screen. Approximately 0.6 m to 2 m of bentonite was then placed above the filter sand. The hole was then filled with grout made of a bentonite cement mix to the surface. The grout mix was 100 kg water:34 kg cement:19 kg bentonite for all holes. The grount mix was tremied into the hole from the bottom up. A monument was installed to protect the riser pipe, and concrete was poured around the base to hold it in place.

Static water levels were measured during the 2007 Site Investigation Program, but response times in the overburden were typically much too slow to get an accurate water level. Water level in bedrock responded much more quickly.

Table 2.4 2007 Standpipe Installations[1]

Drilling Hole ID	Nested Piezo	Location	Installation Date (2007)	Total Hole Depth (mbg[2])	Piezo Stickup (mags[3])	Screen Depth (mbg[2])	Filter Pack Interval (m)	Geologic Unit at Screen Depth	Static Water Level (mbg[2])[5]	Static Water Level (mbTOC[4])[6]
DH07-1A		North Dam	Nov. 15	49.4	0.90	43.1 - 49.2	42.8 – 49.4	Sandstone and siltstone	-4.5 (artesian)	(artesian)
DH07-1B		North Dam	Nov. 16	17.4	0.83	14.2 - 17.2	13.6 – 17.4	Gravelly clay/silt (TILL)	unknown	frozen
DH07-2A		North Dam	Nov. 18	35.1	0.97	31.7 - 34.7	31.1 – 35.1	Siltstone	27.7	28.71
DH07-2B		North Dam	Nov. 19	11	0.93	7.6 - 10.7	7 – 11	Gravelly clay (TILL)	unknown	7.25
DH07-3A		Main Dam	Nov. 22	41.6	0.92	38.4 - 41.5	37.8 – 41.6	Siltstone	10.7	9.51
DH07-3B		Main Dam	Nov. 23	15.4	0.86	12 - 15.1	11.6 – 15.4	Gravelly clay (TILL)	unknown	11.58
DH07-4A	S1	Main Dam	Nov. 25	46.2	0.82	43 - 46	42.5 – 46.2	Siltstone	9.7	11.1
DH07-4A	S2	Main Dam	Nov. 25	46.2	0.84	33.4 - 36.4	32.9 – 36.7	Sandy siltstone	10.5	11.78
DH07-4B	S1	Main Dam	Nov. 26	11.4	0.90	9.8 - 11.3	9.4 – 11.4	Gravelly clay (TILL)	unknown	11.67
DH07-4B	S2	Main Dam	Nov. 26	11.4	0.92	3 - 4.6	2.7 – 4.7	Gravelly clay (TILL)	unknown	4.96
DH07-5A	S1	Main Dam	Nov. 28	21.5	0.85	19.2 - 21.3	19.1 – 21.5	Volcaniclastic	9.3	12.32
DH07-5A	S2	Main Dam	Nov. 28	21.5	0.87	13.7 - 15.2	13.6 – 15.4	Gravel and clay (TILL)	10	11.49
DH07-5B		Main Dam	Dec. 2	58.2	0.88	55 - 58.1	54.3 – 58.2	Sandstone	unknown	12.38
DH07-6		Plantsite	Dec. 3	23.2	0.86	21 - 22.6	20.7 – 23.2	Silty clay (TILL)	unknown	
DH07-7		Plantsite	Dec. 4	22.9	0.91	21 - 22.6	20.7 – 22.9	Clay, some gravel (TILL)	unknown	
DH07-9		Plantsite	Dec. 6	25.3	0.91	18.3 - 19.8	18 – 19.8	Silty clay (TILL)	unknown	

Notes:
1. Pipe diameter: 26 mm.
2. mbg – meters below ground.
3. mags – metres above ground surface.
4. mbTOC – metres below top of casing/pipe.
5. Static water levels measured from Nov. 15 to Dec. 6, 2007 during the drilling program.
6. Static water levels measured on April 6 2008 by Rescan

3. HYDAULIC CONDUCTIVITY TESTS

The foundation materials below the tailings facility will likely become saturated as the facility fills with tailings. 10 packer tests and 2 falling head tests were performed in bedrock in 5 open boreholes. In overburden, 2 falling head tests were conducted in standpipes, and 3 were done in open boreholes. These tests were used to estimate the saturated hydraulic conductivity (K) of the foundation glacial till and bedrock.

3.1 Packer Tests

Packer testing was done in the bedrock using a single and double packer system. The single packer tests were from the packer to the base of the hole, and in double packer tests an additional packer was used to seal the base of the tested rock interval. Tests were performed in HQ drill holes at depths selected by the engineer, specifically for good rock quality so that the packer would be inflated against sound rock. Prior to testing, the drill rods were raised several metres to expose the desired test interval. The packer system was lowered down the hole such that the lower inflatable section was seated against sound bedrock below the drill bit. An upper packer was inflated within the drill rods. The test zone was always located below the lower packer. A Lugeon test procedure was used, whereby the rods and test interval were filled with water, the packers were inflated, and then water was pumped into the test interval in at least three ascending stages and at least two descending stages of pressure. Flow and pressure readings were recorded throughout the duration of the test.

Packer tests were performed in DH07-01A, DH07-02A, DH07-03A, DH07-4A, and DH07-5B with the test zone ranging from 3 m to 6.4 m in length. Packer test results are summarized in Table 3.1, and presented in Appendix IV.

Table 3.1 Packer Testing and Hydraulic Conductivity (K)

Drill hole	Test Interval (mbg)		K (m/s)	Geologic Unit	Confidence
	Top	Bottom	Average		
DH07-1A	23.35	35.66	**6.0E-07**	Sandstone/mudstone	Good
DH07-1A	35.51	49.38	**7.0E-08**	Sandstone/mudstone	Good
DH07-2A	26.20	35.10	**2.4E-07**	Siltstone	Fair
DH07-3A	24.23	35.51	**1.6E-06**	Sandstone	Very good
DH07-3A	35.51	41.61	**1.8E-06**	Sandstone/siltstone	Very good
DH07-4A	15.54	27.89	**3.2E-07**	Sandstone/siltstone	Very good
DH07-4A	36.12	46.18	**2.3E-07**	Siltstone	Good
DH07-4A	27.89	36.12	**1.5E-07**	Sandstone/siltstone	Good
DH07-5B	26.37	42.98	**9.2E-07**	Volcaniclastic	Poor
DH07-5B	45.26	58.22	**6.6E-08**	Siltstone/Sandstone Cong.	Fair

Notes:
1. mbg – meters below ground

3.2 Falling Head Tests

Falling head tests involved taking an initial static water level reading, filling the standpipe or cased open hole full of water, and periodically measuring the water level until it returned to the static level. The Bouwer and Rice (1976) solution was used to calculate the saturated K value for falling head tests. The falling head test data is presented in Appendix IV, and summarized in Table 3.2.

Table 3.2 Falling Head Testing and Hydraulic Conductivity (K)

Drill hole	Test Interval (mbg)		K (m/s)	Geologic Unit	Confidence
	Top	Bottom			
DH07-1A	2.7	5.8	**4.7E-11**	Till	Poor
DH07-2B	7.6	10.7	**1.4E-10**	Till	Poor
DH07-3A	8.8	18.0	**Insuf. data**	Till	None
DH07-3A	24.2	35.5	**2.2E-06**	Sandstone	Poor
DH07-3B	12.0	15.1	**3.1E-10**	Till	Poor
DH07-5A	10.4	18.0	**Insuf. data**	Till	None
DH07-5B	26.4	43.0	**6.2E-07**	Volcaniclastic	Poor

Notes:
1. mbg – meters below ground

3.3 Hydraulic Conductivity Results

Falling head and constant head test results were given a confidence rating (good, fair, poor) based on field test observations, quantity of data, and whether it was in the expected range of permeabilities for the lithology.

North Dam

DH07-1A, 1B, 2A, and 2B are within the footprint of the north dam (D-1002). Till was practically impervious (10^{-10} m/s to 10^{-11} m/s). Rock in 1A and 2A had low to moderate permeabilities (10^{-7} m/s to 10^{-8} m/s), decreasing with depth in 1A. This is on the low end of the expected range for sandstone and jointed igneous rocks (Franklin and Dussealt, 1989). DH07-1A showed artesian flow from the bedrock, with 4.5 m of head and about 0.05 L/s of flow.

Main Dam

DH07-3A, 3B, 4A, 4B, 5A, and 5B are within the footprint of the main dam (D-1002). In till, only a single falling head test at 3B provided enough data to calculate K (10^{-10} m/s), however, other falling head tests confirmed that glacial till is homogenous and practically impermeable. Bedrock at DH07-3A had moderate permeability (10^{-6} m/s), and DH07-4A and 5B had low permeability (10^{-7} m/s to 10^{-8} m/s). All sites had decreasing permeability with depth. Falling head tests in bedrock at DH07-3A and 5B correlated very closely to K values obtained with packer testing.

4. TEST PIT PROGRAM

The test pit program consisted of 8 test pits and was conducted from Dec. 5 to Dec. 7, 2007. A 345 Cat excavator supplied by Babine Barge was used to dig the test pits. Test pit depth ranged from 0.8 m to 11.0 m. Grab samples were taken for moisture content, grain size, and Atterberg testing. The test pit program is summarized in Table 4.1. The test pit logs are presented in Appendix III.

Table 4.1 2007 Test Pit Program

Test Pit	Date (2007)	Northing	Easting	Elevation (m)	Depth (m)	Depth to Bedrock (m)	Surface Material
TP07-1	Dec. 5	6,120,423	670,641	821	5		Glacial Till
TP07-2	Dec. 6	6,121,305	670,015	795	6		Sand and Gravel
TP07-3	Dec. 6	6,121,117	669,994	795	6		Sand and Gravel
TP07-4	Dec. 6	6,120,999	669,939	789	6		Sand and Gravel
TP07-5	Dec. 5	6,120,486	670,347	828	6		Glacial Till
TP07-6	Dec. 6	6,120,827	669,928	776	6		Glacial Till
TP07-7	Dec. 7	6,123,188	672,197	1,040	2	1	Glacial Till
TP07-8	Dec. 7	6,123,524	672,499	1,025	3.4	2.4	Glacial Till

5. LABORATORY TESTING

5.1 General

Geotechnical testing of selected representative soil samples was performed in Klohn Crippen Berger's Vancouver laboratory. Grab samples were collected from test pit excavations, and SPT split spoon samples were obtained at regular intervals in overburden boreholes. Photographs of the SPT samples, taken in the laboratory and in the field, are shown in Appendix I.

5.2 Geotechnical Tests

A suite of geotechnical laboratory tests was performed on selected soil samples to characterize gradation and plasticity properties. The following is a summary of the tests performed:

- 104 moisture content tests (ASTM D2216) to determine in situ moisture contents;
- 21 washed sieve analyses (ASTM D422) to determine gradation;
- 10 hydrometer analyses (ASTM D422) to determine gradation of the fine portion;
- 10 Atterberg Limit tests (ASTM D4318) to assess the soil classification of the fine portion; and
- 2 Standard Proctor tests (ASTM D698) to determine a moisture-density relationship.

All the test results are presented in Appendix V. Moisture contents, fines contents and Atterberg Limits are also presented on the borehole logs in Appendix II. Table 5.1 shows a summarized tabulation of the pertinent properties for each tested sample. Figure 5.1 shows the water content of each SPT sample.

Table 5.1 Laboratory Test Results

TEST HOLE LOCATION	SAMPLE No.	DEPTH (m)	W (%)	WL (%)	WP (%)	IP (%)	% GRAVEL	% SAND	% FINES	Material Type
DH07-1A	SPT 4	5.8	13	32	13	19	32	31	38	GLACIAL TILL
DH07-1A	SPT 13	19.5	26	45	17	28	10	23	67	GLACIAL TILL
DH07-2A	SPT 4	5.8	14	34	14	20	18	32	50	GLACIAL TILL
DH07-2A	SPT 10	14.9	14				23	31	46	GLACIAL TILL
DH07-3A	SPT 4	5.8	11	33	13	20	17	33	49	GLACIAL TILL
DH07-3A	SPT 11	18.0	19	30	18	11	0	20	80	GLACIAL TILL
DH07-4A	SPT 4	5.8	12	36	13	23	23	28	49	GLACIAL TILL
DH07-5A	SPT 3	4.3	13	32	13	18	15	30	55	GLACIAL TILL
DH07-5A	SPT 4	5.8	9				20	43	37	GLACIAL TILL
DH07-5A	SPT 11	16.5	11	36	13	23	23	26	51	GLACIAL TILL
DH07-6	SPT 3	4.3	10	28	13	15	22	35	42	GLACIAL TILL
DH07-7	SPT 3	4.3	15				12	35	53	GLACIAL TILL
DH07-8	SPT 3	4.3	10				1	59	39	GLACIAL TILL
DH07-9	SPT 3	4.3	12				19	36	45	GLACIAL TILL
DH07-10	SPT 2	2.7	11	34	14	20	23	35	42	GLACIAL TILL
TP07-2		3.0					47	46	7	GRAVEL
TP07-2		5.8					22	73	5	SAND
TP07-3		3.0					61	36	3	GRAVEL
TP07-4		3.0					54	43	3	GRAVEL
TP07-7		0.6					21	32	47	GLACIAL TILL
TP07-8		1.2					30	29	41	GLACIAL TILL

W – Natural water content
W_L – Liquid Limit
W_P – Plastic Limit
I_P – Plasticity Index

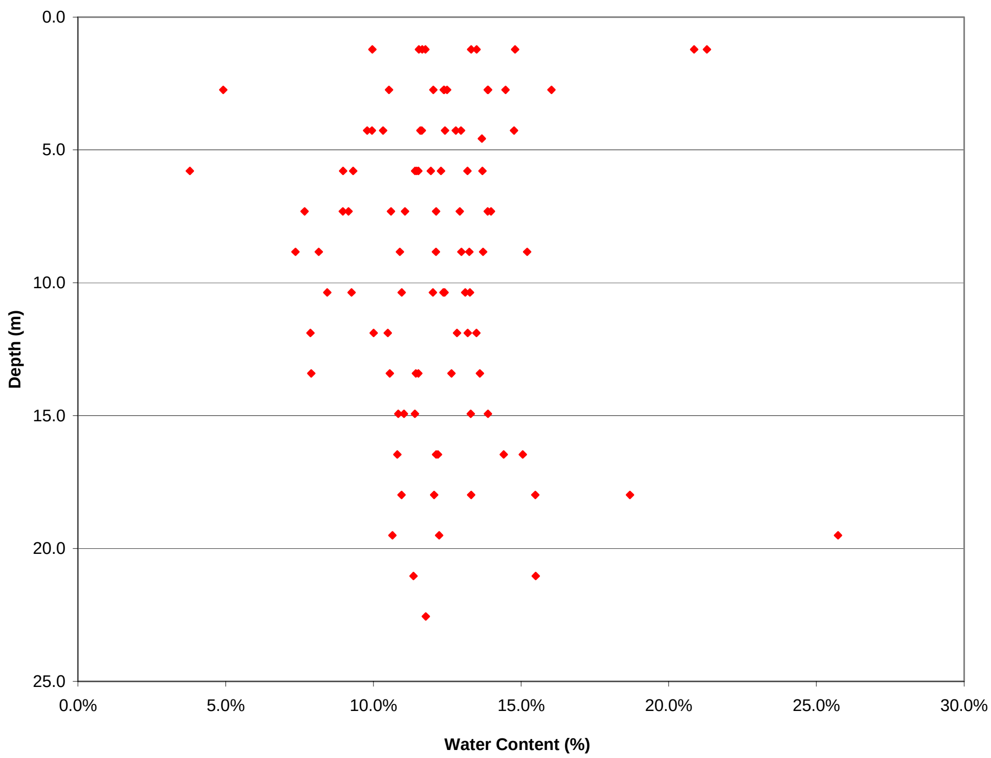


Figure 5.1 SPT Sample Water Contents

6. GEOPHYSICS PROGRAM

Six electrical resistivity lines totaling approximately 9.5 km were surveyed between May 4 and June 12, 2007 by Frontier Geosciences Inc. under subcontract to KCBL. Lines were located as shown in D-1003. Data processing and inversion was done by Frontier. The survey methodology and data processing for the geophysics program are described in Appendix VI.

The inverted resistivity sections were interpreted by KCBL. The interpreted resistivity sections are presented in Appendix VII.

In general, the interpreted resistivity sections correlate well with drillhole data and available regional structural data suggesting that data quality is good. Three main units were identified; conductive overburden, resistive bedrock and conductive bedrock. The conductive overburden unit is interpreted to be till, and typically has resistivity values ranging between 0 ohm·m and 150 ohm·m. Highly conductive areas (<50 ohm·m) likely correspond to regions with higher moisture content, while resistive layers (>100 ohm·m) are interpreted to be layers of coarse material within the till. The extent and thickness of the overburden unit varies across the site. The northwest region covered by RL-KC07-4A and RL-KC07-4B shows only small patches of overburden with a maximum thickness of approximately 10 m, while the other areas show large extents of overburden, averaging approximately 15 m thick but in places showing >30 m (greater than the depth of the survey). Given that the resolution of the resistivity data is approximately 2 m vertical and 5 m horizontal, it is not suitable for identifying small or thin features and thus the till appears relatively homogeneous.

Limited geology data and rock drilling data was available to assist interpretation of the underlying rock units, and so the bedrock was broadly classified into two types, resistive and conductive. Bedrock regions with resistivities generally between 200 ohm·m and 400 ohm·m were identified as conductive bedrock and interpreted to be siltstone or other fine grained sedimentary rock, while regions with resistivity greater than 400 ohm·m were generally identified as resistive bedrock and interpreted to be sandstone. The highly resistive bedrock (600 ohm·m to 1200 ohm·m) on lines RL-KC07-4A and RL-KC07-4B could be sandstone, but given the resistivity values and local geology observations, is more likely to be basalt.

Several faults were interpreted on the inverted resistivity sections. Some, such as the one at the NW end of RL-KC07-1B are interpreted based on a sudden, large change in resistivity which indicates that two different materials are in contact. This could simply be due to steeply dipping beds of sedimentary material, but given the common occurrence of faults in the area, it is more likely associated with faulting. Other faults have been interpreted in places where there is a linear conductive anomaly. Faults often produce brecciated zones that promote weathering, alteration and fluid flow, all factors that typically result in increased conductivity.

7. GEOLOGY

7.1 General

The Morrison deposit is located in the Intermontane Belt of central British Columbia, in the Stikine volcanic arc terrane near its northern margin with the Cache Creek terrane (Schiarizza and MacIntyre 1999; Gabrielse and Yorath, 1989).

The topography is controlled by northwesterly trending block faulting related to Eocene extension (Figure 7.1). The block faulting has resulted in older Hazelton Group (Lower to Middle Jurassic) volcanic and sedimentary rock being exposed in uplands, and younger Bowser Lake Group (Middle to Upper Jurassic) sedimentary rocks exposed in lowlands, in the areas surrounding Morrison Lake (MacIntyre 2001).

7.2 Bedrock Geology

In the vicinity of the Tailings Facility, the Ashman Formation is the only Bowser Lake Group rocks exposed. Hazelton Group rocks exposed around the site include Smithers Formation, Nilkitkwa Formation, Telkwa Formation, and Saddle Hill volcanics (Table 7.1). Eocene intrusive rocks are also present, and are host to the Morrison ore deposit. However, as these intrusive rocks were not observed in the vicinity of the tailings facility, they are not described here.

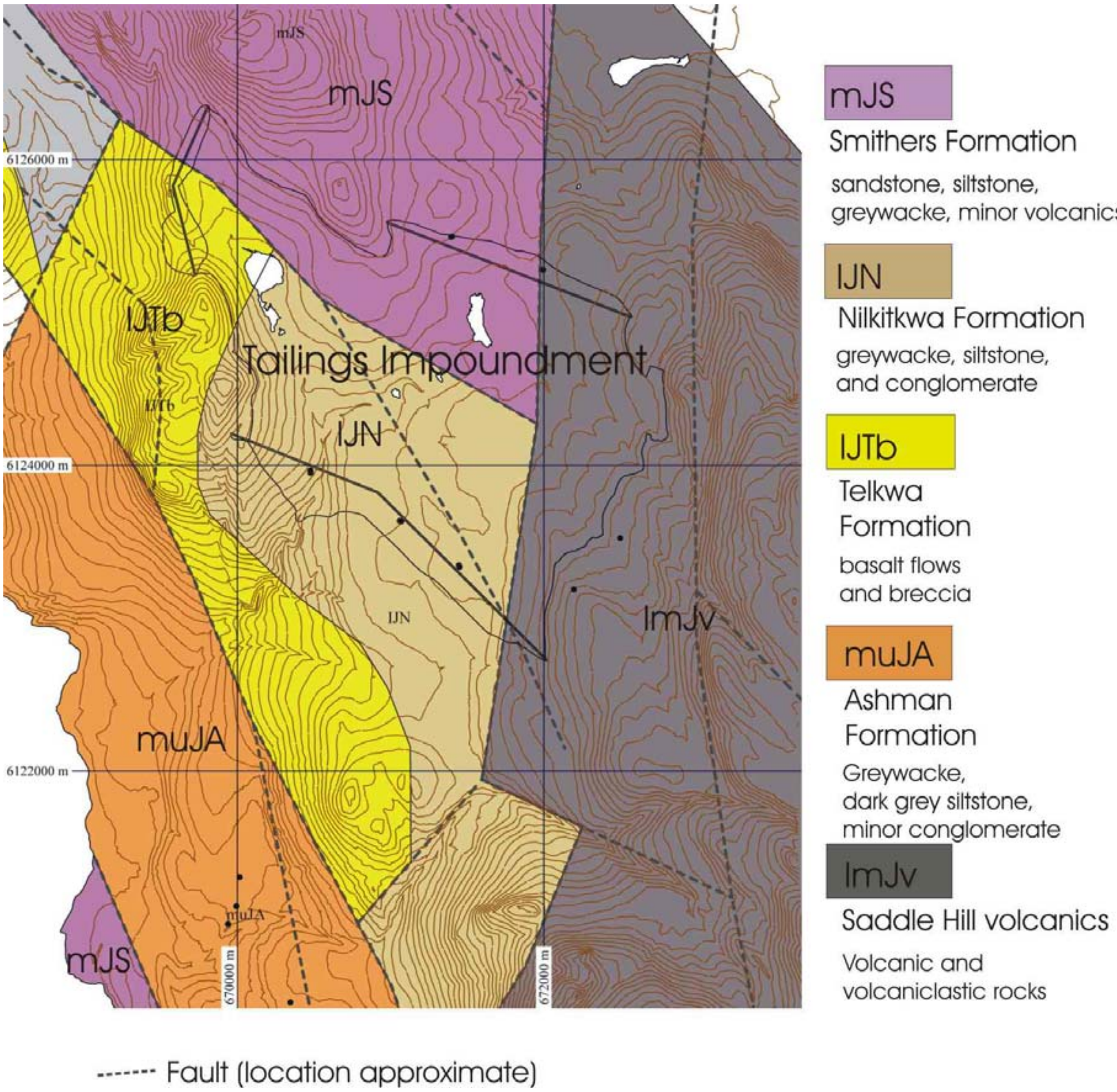
Table 7.1 Rock Types Within the Tailings Storage Facility Footprint.

Group	Formation	Description
Bowser Lake Group	Ashman Formation	Dark grey siltstone, silty and sandy argillite, minor granule to pebble conglomerate, thin to medium bedded, locally fossiliferous.
Hazelton Group	Smithers Formation	Greenish grey to maroon, well-bedded, fossiliferous, sandstone, siltstone, wacke and volcanic pebble conglomerate. Locally glauconitic.
	Saddle Hill volcanics	Brown weathering, greenish grey to green basalt flows, breccias, and tuffs. Locally amygdaloidal and vesicular, with minor volcaniclastic rocks.
	Nilkitkwa Formation	Dark grey, well bedded sand and siltstones, greywacke, with minor pebble conglomerate. Overlies Telkwa Formation.
	Telkwa Formation	Maroon to greenish grey amygdaloidal basalt flows and breccias. Calcite and chlorite filled amygdules. Underlies Nilkitkwa Formation.

(Based on MacIntyre et al. 1997 and MacIntyre 2001).

Varying degrees of alteration have occurred throughout the rocks of the area, resulting in enrichment in carbonate especially, with lesser chlorite, and biotite. Intense clay carbonate alteration is primarily associated with faults and related shears.

◎ Table of Contents



(Based on MacIntyre 2001)

Figure 7.1 Bedrock Geology Of The Tailings Impoundment

7.3 Structural Geology

Four major tectonic events have been documented in the region (MacIntyre et al. 1997). Mid to Late Jurassic folding and uplift was followed by mid Cretaceous contraction that produced northwest trending folds and northeast directed thrusts. Crustal extension in

Late Eocene time produced north trending grabens and horsts. The youngest tectonic event was during the Miocene, resulting in tilted fault blocks.

The most prominent structural feature is the northwest trending Morrison Fault, which dextrally disrupted the porphyry system, with displacement estimated at 300 m (Kimura, 2003). Smaller dextral en echelon-oriented faults lie sub-parallel to the Morrison Fault (Simpson, 2007). Intense clay carbonate alteration is associated with fault zones. Mineralized fractures 2 to 10 cm apart are visible in trenches and outcrops. The fractures have orientations in all directions but mostly dip steeply and trend northerly, parallel to the strike of the Morrison fault. At the northern end of the deposit, the strikes of the fractures swing to the east and northeast (Carter, 1973; Richards, 1974).

7.4 Surficial Geology and Geomorphology

The current landscape is the result of the most recent geologic process, erosion and deposition by the Cordilleran Ice Sheet, which likely covered the Nechako Plateau several times during the Pleistocene. The most recent glacial event is known as the Fraser Glaciation, which reached it maximum ice extent between 25,000 and 12,000 years ago. The surficial material in the study area appears to have been deposited during this glaciation and in the post-glaciation period.

Surficial materials include glacial till, glaciofluvial gravels, colluvium, and organics. Silt/clay glacial till is by far the most common unit, and overlies fractured fine grained sedimentary and volcanic rocks. Steeper slopes are typically covered by a thin veneer of glacial till or colluvium overlying bedrock, and flat areas between northwesterly trending ridges have a thicker cover of glacial till. The impermeability of glacial till creates poor drainage and wet conditions in flat areas where till has filled depressions in the bedrock.

Flat areas are poorly drained, and tend to be swampy with accumulations of organic sediments of 1 to 2 metres. Organics present the biggest challenge to pioneering roads.

Well developed flutings and drumlins oriented parallel to Morrison Lake are a dominant feature of the area, and are the result of ice flowing southeastward from the Coast Mountains (Levson 2002). Below about 950 m elevation, glaciolacustrine sediments are widespread to the south around Babine Lake, but are rare around Morrison Lake. Glaciofluvial deposits are present in isolated fan-deltas at elevations of about 800 m, and may be present at lower elevations as well.

Detailed surficial mapping and terrain stability mapping could not be conducted during the 2007 site investigation due to heavy snow and ice. Previous terrain mapping covering the project site was undertaken for British Columbia Ministry of Forests by Klohn Crippen (1998). This mapping was done at Terrain Survey Intensity Level (TSIL) D (BC Ministry of Environment 1995). This mapping assessed terrain stability at a reconnaissance scale, and identified unstable and possibly unstable areas.

Main Dam Foundation:
The main dam straddles a broad flat area for much of its length, with steeper terrain at the right (west) and left (east) abutments. The central flat area is underlain by clayey glacial till varying in thickness from 0 m to 21 m. Glacial till masks the undulating bedrock, in the rolling plateau topography (see RL-KC07-1A). Bedrock was observed to outcrop at the crest of small slopes separating flat areas. Water saturated organic silt and peat fill the poorly drained areas between the small steps, and are between 1 m and 2 m thick. The right (west) abutment is a moderately sloping gully, transitioning into a bedrock controlled slope rising to the west. In the vicinity of the gully, coarser fluvial and glaciofluvial sediments overlie glacial till. Post-glacial fluvial sediments appear to be thin

and restricted to the modern channel. The bedrock controlled slope has a decreasing thickness of glacial till with increasing elevation, and accumulations of colluvium (reworked glacial till) were seen in the resistivity profile at the toe of steeper slopes.

North Dam Foundation:

The north dam straddles a saddle separating southward drainage towards Morrison Lake and the Skeena River, from northward drainage towards Nakinilerak Lake and the Fraser River. Topography in the vicinity of the saddle is subdued with generally gentle slopes. The right (east) abutment has a thin cover of glacial till between 2 m and 5 m thick, and the left (west) abutment has a variable thickness of glacial till between 1 m and 24 m thick. Glacial till was the only surficial sediment observed besides very thin and localized fluvial and organic sediments. Glacial till is very similar to that observed at the Main Dam foundation. An exception is clay with no stones observed just above the bedrock contact in DH07-1A.

West Dam Foundation:

No drilling was performed at the West Dam, however, resistivity data show a very thin cover of surficial material over bedrock, typically less than 2 m thick.

The overburden deposits at each of the dam sites were classified into three generalized units based on physical and depositional characteristics, such as method of deposition, gradation, and permeability. These soil units are classified and described as follows:

- Water saturated surface organics;
- Permeable glaciofluvial sand and gravel; and
- Dense impermeable glacial till.

◎ Table of Contents

7.5 Surficial Material Types

Water Saturated Surface Organics

At surface is: PEAT (PT), dark brown, moist to wet, fine to coarse fibrous, some silt. At >0.3m depth is: ORGANIC SILT (OL), low plasticity, soft, dark brown, wet, massive, low dry strength, rapid dilatancy, organics are amorphous to fine fibrous.
Pockets of organics are located in flat poorly drained areas.

Permeable Glaciofluvial Sand and Gravel

GRAVEL (GW), fine to medium grained, fine to coarse sandy to some sand, loose, rounded, brownish grey, up to trace cobbles, no fines, moist, glaciofluvial. Glaciofluvial sediments were not observed within the footprint of the TSF, but are suspected within the gully of the Main Dam.

Impermeable Glacial Till

Sandy Lean CLAY (CI), trace to some gravel, low to intermediate plasticity, firm to stiff, brown, no odour, moist, uncemented, very high dry strength, slow dilatancy, glacial till. Till is uniform and structureless, with rare lenses of gravel and sand, usually mixed with fines. It is widespread.

KLOHN CRIPPEN BERGER LTD.

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