Appendix 3-I

Geotechnical Report – Mine Site Infrastructure

KGHM AJAX MINING INC.
AJAX PROJECT





GEOTECHNICAL REPORT – MINE SITE INFRASTRUCTURE
C002-KA39-RPT-10-008

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VA101-246/26-9
Rev 0
June 16, 2015

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ISO 9001 - FS 64925
ISO 14001 - EMS 550121
OHSAS 18001 - OHS 550122

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AJAX PROJECT

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Status	Status Title	Check
A	Approved (No Further Action Required)	X
B	Proceed - (Revise and Resubmit Final)	
C	Do Not Proceed (Revise and Resubmit)	
I	Information Only	
Approver:		Date: 26 June

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Rev	Description	Date
0	Issued in Final	June 16, 2015

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EXECUTIVE SUMMARY

Knight Piésold Ltd. (KP) completed a geotechnical site investigation program from July 14 to November 11, 2014 to evaluate the geotechnical conditions for the mine development layout and to provide data for engineering and environmental studies. The 2014 site investigations, surficial materials and geology onsite have been discussed in a Geotechnical Report – Tailings Storage Facility and Mine Rock Storage Facilities. This report summarizes an interpretation of the geotechnical conditions and material types in a variety of geotechnical subjects including the following:

- Geotechnical foundation conditions and parameters for foundation design for mine site infrastructure areas, including the Primary Crusher, Truck Shop and Explosives Facility.
- Geotechnical conditions along haul and access roads alignments.
- Stability analysis of the Mine Rock Storage Facilities (MRSFs) and topsoil and overburden storage areas.
- Identification of potential on-site construction borrow areas.

Mine Site Infrastructure Foundation Conditions

The geotechnical conditions and material types in the vicinity of the Primary Crusher, Truck Shop, and Explosives Facility were determined along with geotechnical parameters for foundation design. The Primary Crusher is situated at a topographic bedrock high point, between the Open Pit to the north and Peterson Creek to the south. The Primary Crusher is proposed to be 14 m higher than current topography and assumed to be filled with Structural Fill overlying the competent Sugarloaf Diorite bedrock. The Truck Shop is situated on a south facing slopes east of the open pit. Overburden deposits encountered were primarily glacial till up to 61 m thick. Glaciolacustrine deposits were found at depths of approximately 13 m on the east side to the Truck Shop footprint which are unlikely to cause differential settlement as the foundation loading at the Truck Shop will be low. The Explosives Facility is located in a small valley between the Open Pit and the EMRSF. The Explosives Facility is located on thick glacial till deposits. Site investigation program results were used to provide estimates of factored bearing resistance and settlements, relevant geotechnical parameters and factors affecting foundation design.

Haul and Access Road Foundation Conditions

Numerous haul and access roads have been designed by KGHM for the movement of material and access to mine site facilities. The geotechnical conditions encountered along the haul and access roads is predominantly subgrade glacial till deposits. In some sections along the haul and access road alignments bedrock is close to surface. Glaciofluvial and glaciolacustrine deposits were encountered in the valley and terraces on either side of Peterson Creek and smaller drainage creeks. Historic mine rock material was encountered to the north and south of the Open Pit. The site investigation program results provided information for estimating ultimate bearing capacity for Haul Road wearing course, and minimum Haul Road wearing course thickness recommendations based on subgrade type.

Mine Rock Storage Facilities, Topsoil and Overburden Storage Areas Stability Analyses

The geotechnical conditions for the Mine Rock Storage Facilities were summarized in previous reports. Slope stability analyses for the Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF)

were carried out for final design heights, end of construction and post-closure conditions. Stability analyses of topsoil and overburden stockpiles undertaken to determine typical stockpile slopes and maximum stockpile heights.

On-site Construction Borrow Material Evaluation

A preliminary construction borrow source assessment was completed to identify and determine the suitability of potential construction borrow areas. Material types for construction would include low permeability soils for natural soil liners, pipe bedding materials, fine and coarse concreate aggregate, embankment and filter materials. The tailings embankment shells require the largest volume of material at the Project and will be construction using mine rock from Open Pit development. The mine site footprint is compact with limited space for borrow area development, as mine site infrastructure, Tailings Storage Facility (TSF), MRSF's, haul and access roads and the relocation of the Kinder Morgan pipeline have been designated.

Glacial till deposits are required for sub-base, liner and general construction uses. Glacial till borrows areas were identified within the TSF basin and north of the Plant Site. Removal of material interference with the scheduled and coordinated by the mine fleet to avoid tailings embankment lifts, TSF expansion and TSF filling. At other areas glacial till were found to be too thin to recommend as borrow areas.

Glaciofluvial sand and gravel deposits provide construction borrow materials such as filter and bedding material and concrete aggregate. Glaciofluvial deposits were identified within the TSF basin and along Peterson Creek terraces in small volumes. Borrow areas located adjacent to Peterson Creek hold the greatest potential volume.

Potential borrow sources for concrete aggregate can be obtained by quarrying suitable bedrock in the vicinity of the Primary Crusher and southwest of the Plant Site. Re-use of historic mine rock storage facilities should also be considered for aggregate borrow areas.

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ABBREVIATIONS

Ajax	the Project
ASTM	American Society for Testing and Materials
BGC	BGC Engineering Inc.
bgs	below ground surface
C	Celsius
CCFZ	Cherry Creek Fault Zone
GSC	Geological Survey of Canada
GSI	Geological Strength Index
GPa	Gigapascal
El	Elevation
ELFZ	Edith Lake Fault Zone
EMRSF	East Mine Rock Storage Facility
IMH	Iron Mask Hybrid
ISRM	International Society of Rock Mechanics
KGHM	KGHM Ajax Mining Inc.
KP	Knight Piésold Ltd.
kPa	Kilopascal
KN	Kilo newton
m	metre
masl	metre above sea level
MPa	Megapascal
MRSFs	Mine Rock Storage Facilities
NBCC	National Building Code of Canada
NP	Non Plastic
PSA	Particle Size Analysis
PVC	Poly Vinyl Chloride
RMR_{89}	Rock Mass Rating
RST	RST Instruments Ltd.
RTSM	Reconnaissance Terrain Stability Map
RQD	Rock Quality Designation
SMRSF	South Mine Rock Storage Facility
SPT	Standard Penetration Test
WMRSF	West Mine Rock Storage Facility
TSF	Tailings Storage Facility
UCS	Unconfined Compressive Strength
USCS	Unified Soil Classification System

1 – INTRODUCTION

1.1 PROJECT DESCRIPTION

The Ajax Project (the Project) is a copper-gold deposit being developed by KGHM Ajax Mining Inc. (KGHM). The Project is located southwest of the city of Kamloops in south central British Columbia. The proposed mine site facilities will include an Open Pit, Tailings Storage Facility (TSF), Mine Rock Storage Facilities (WMRSF, EMRSF, and SMRSF), Plant Site, Primary Crusher, Conveyor, Truck Shop, and Access and Haul Roads. The preliminary site layout for Year 20 is shown on Figure 1.1.

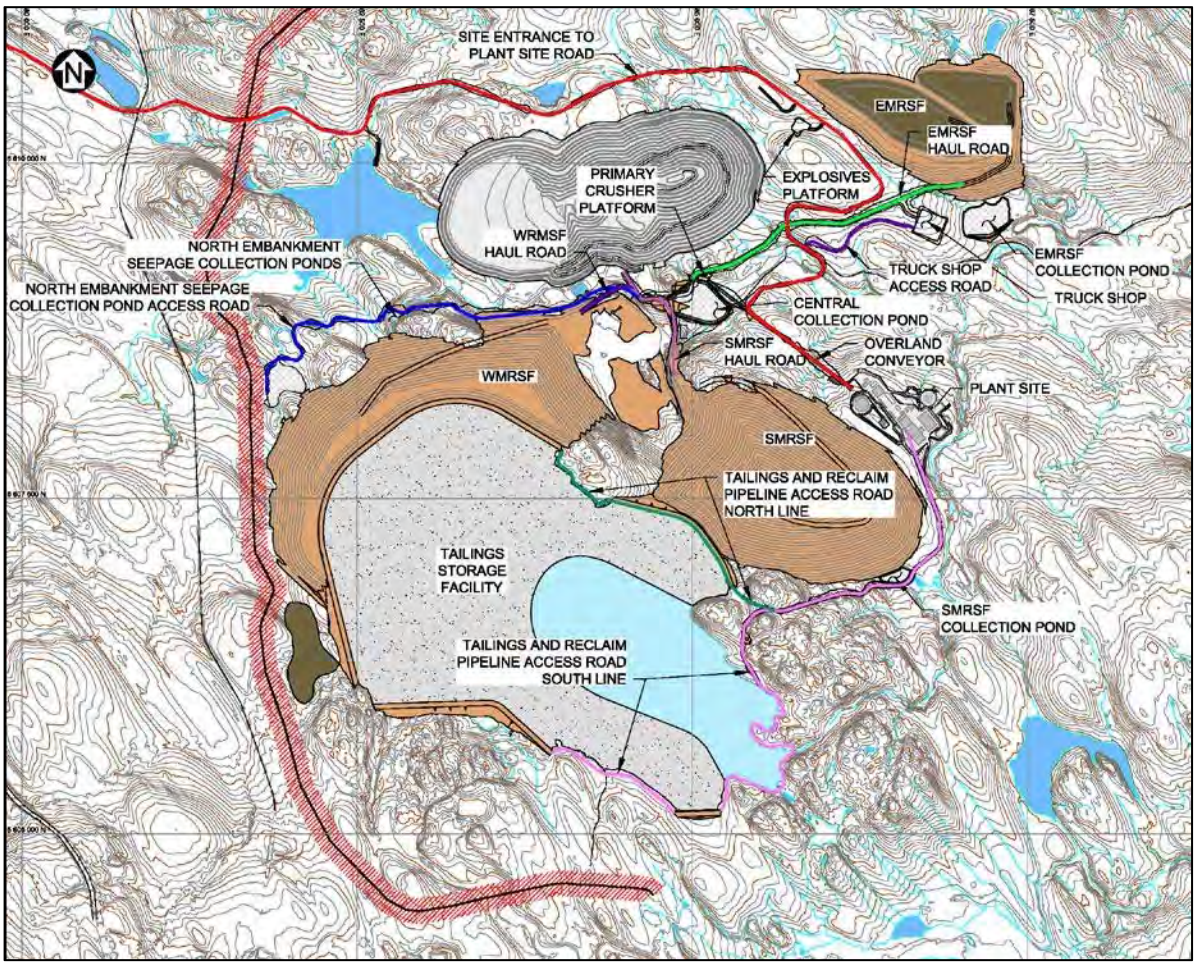


Figure 1.1 Ajax Project General Arrangement

1.2 SCOPE OF WORK

Knight Piésold Ltd. (KP) completed a geotechnical site investigation program from July 14 to November 11, 2014 to evaluate the geotechnical conditions to support the mine development layout. This report summarizes the site investigation program, geological and geotechnical conditions and material types in the vicinity of the mine site infrastructure, the mine rock storage facilities and haul roads.

The report includes descriptions and details for the following:

- Geotechnical foundation conditions and parameters for foundation design for the various mine site infrastructure areas, including the Primary Crusher, Truck Shop and Explosives Facility. Foundation conditions at the proposed Plant Site are included in the Geotechnical Report – Process Plant Site (C002-KA39-RPT-10-009).
- Geotechnical conditions along identified haul and access roads alignments, ultimate bearing capacity calculations for Haul Road wearing course, and minimum Haul Road wearing course thickness recommendations.
- Stability analysis for the Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF). The KP Geotechnical Report – Tailings Storage Facility and Mine Rock Storage Facilities (C002-KA39-RPT-10-007) discusses the results of geotechnical conditions at the MRSF's.
- Stability analyses of the topsoil and overburden storage areas.
- Identification of potential on-site construction borrow areas for aggregate and soil liner materials.

2 – SITE CHARACTERISTICS

2.1 PHYSIOGRAPHY

The Project lies within the Thompson Plateau, a subdivision of the Interior Plateau Physiographic Region. The Thompson Plateau is characterized by gentle undulating uplands with rounded hill tops, separated by large valleys. The Thompson Plateau is a late Tertiary erosional surface dissected by the Thompson River and its tributaries, and by the Similkameen and Okanagan Rivers (Holland, 1976).

The elevation of the Project varies between approximately 850 and 1,100 m above sea level. The slope angles are generally gentle, but typically steeper on the northwest sides of the hills; locally, this creates 'crag and tail' type drumlinized terrain that indicates a direction of ice advance to the southeast. A band of steeper terrain generally follows the Edith Lake Fault Zone (ELFZ) trending along a northwest direction across the Project south of Jacko Lake.

2.2 GEOMORPHOLOGY

The Project is characterized by landforms reflecting the area's history of glaciation. Bedrock was deeply sculpted and gouged by the Pleistocene ice sheet, and the rounded ridge tops suggest the area was once completely overridden by ice. The ice generally flowed across the Project area from the northwest to the southeast while depositing Glacial tillGlacial till at its base.

Deglaciation occurred between approximately 14,000 and 11,000 years ago. The uplands emerged from beneath the ice cover while lobes of ice remained in the valley bottoms. Stagnant ice in the valley bottoms impounded a large but temporary glacial lake along the Thompson, South Thompson, and North Thompson River Valleys called 'Glacial Lake Thompson'. Subglacial and ice-marginal landforms on gently sloped surfaces such as, eskers, kames, meltwater channels, and glaciolacustrine deposits accumulated in depressions in front of the ice margin.

Glaciolacustrine deposits were exposed following the breaching of the ice dam in the South Thompson River valley. These deposits were mobilized by wind and deposited in upslope areas as eolian sediments (loess) during paraglacial periods. Glacial sediments and weathered bedrock have been re-worked on the steeper slopes to form colluvium. Glacial sands and gravels were locally incised by Peterson Creek down cutting and creating terraces. Fluvial sediments continue to be deposited along the active water courses during the post-glacial period.

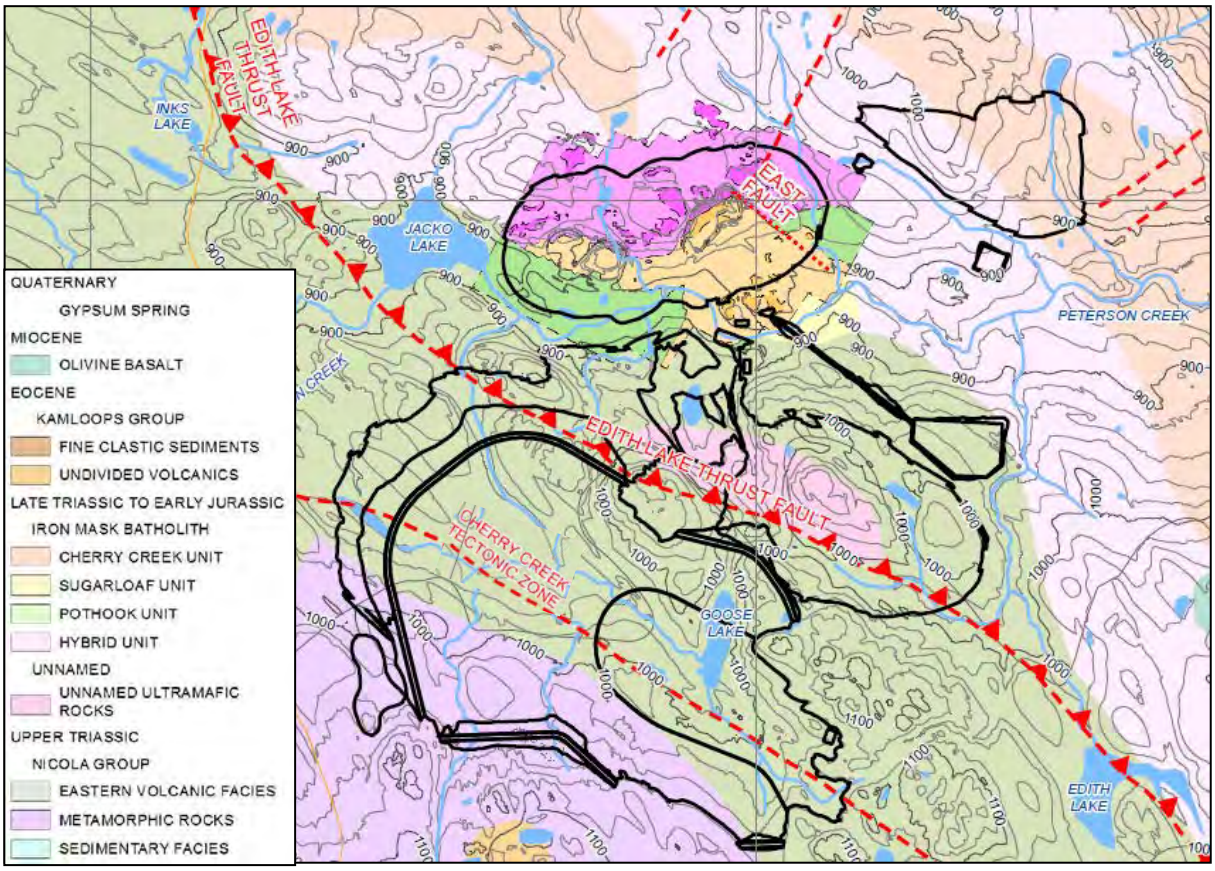
2.3 BEDROCK GEOLOGY

The Project is underlain by Lower Paleozoic to Early Jurassic arc-volcanic, plutonic, and sedimentary rocks. The predominant lithological units are part of the Upper Triassic Nicola Group volcanics and sedimentary units, which include interlayered tuffs, breccias, flows, and flow breccias. These rocks are typically well indurated and weakly metamorphosed (greenschist facies), which gives them a greenish-grey colour.

The Nicola Group volcanics have been intruded by the northwest trending, Late Triassic to Early Jurassic, Iron Mask Batholith, which is up to 34 km long and 5 km wide. Several mineral resources in the Kamloops area are associated with the Iron Mask Batholith including Afton, Ajax East, Ajax West, Crescent, and Pothook. These ore zones are related to the Sugarloaf diorite because it occurs

along the faulted contact of the Nicola Group Volcanics and the Iron Mask Hybrid diorite at the southern limit of the Iron Mask Batholith, as shown on Figure 2.1.

Major faults within the Nicola Group Volcanics and the Iron Mask Batholith follow regional northwest - southeast trends and include the Cherry Creek Tectonic Zone (CCTZ), the Edith Lake Fault Zone (ELFZ), and the East Fault. Other smaller faults related to the contacts between individual geological units such as the contacts between the Iron Mask Batholith and the Nicola Volcanic Group are shown on Figure 2.1 and A1.1.



NOTES:

1. Bedrock geology map complied by BGC (2011) from Geological Survey of British Columbia base map (Logan and Mihalynuk, 2006).

Figure 2.1 Ajax Project Bedrock Geology

3 – 2014 SITE INVESTIGATION PROGRAM

3.1 2014 SITE INVESTIGATIONS

A site investigation program completed by KP evaluated the geotechnical conditions of the proposed TSF, MRSFs, Plant Site and other mine site infrastructure. The site investigation program duration was from July 14 to November 11, 2014 and included test pits, geotechnical drill holes, and seismic refraction lines.

The site investigations at the Mine Site Infrastructure and Haul Road alignments include:

- Excavation and logging of 104 test pits by KP (TP14-003, 057, 061, 062, 067, 071, 074 to 076, 086, 087, 128, 130, 175, 177, 180, 183, 184, 186, 188 to 191, 193, 195, 196, 200, 210, 212, 213, 214, 218, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 241, 244, 245, 247, 252, 262, 264, 278 to 297, 299 to 301, 306 to 309, 319 to 322, 329, 330, 332 to 334, 337 to 339, 343 to 349, 360, 361, 363 to 365, 369, and 376 to 379)
- Drilling and logging of seventeen geotechnical drill holes by KP (DH14-004, 007, 017, 035, 038, 039, 044, 045, 052, 054, 056, 058 to 061, 063, and 065), including:
  - Standard Penetration Testing (SPT)
  - Installation of 2-inch standpipe piezometers
- Laboratory testing of select SPT and test pit overburden samples, and
- Laboratory strength testing of select rock core samples.

Supplemental site investigation information from geotechnical and hydrogeology studies conducted by BGC Engineering Ltd. (BGC) and KGHM's exploration condemnation program were incorporated in this study and include the following:

- Excavation and logging of nineteen test pits (TP-BGC-10-29 to 32, 35, 37 to 39, 61 to 63, 67, TP-BGC-13-17, 18, and 20 to 25)
- Drilling and logging of five geotechnical drill holes (DH-BGC10-ND-01, BGC11-ED-11, 14, 15 and DH-BGC11-PS-20)
- Drilling and logging of ten monitoring wells (BGC13-008 BGC14-001, 002, 003, 007, 013, 014, 015, and 017), and
- A condemnation drill hole by KGHM (KAX-14-127).

The locations of test pits and drill holes are shown on Figure A1.2 and A1.3 respectfully.

3.2 TEST PIT PROGRAM

One Hundred-four test pits were completed in the Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) and Haul Road alignments.

The test pits were excavated using a Cat 320D supplied and operated by Cobra Contracting Ltd. The test pit locations were accessed using existing mine and farm roads, where possible, and care was taken to minimize environmental disturbances. Test pit areas were environmentally and archeologically cleared by KGHM and Keystone Environmental prior to excavation.

The surface organic material and vegetation was stripped and stockpiled separately prior to excavating the test pit. Test pit depths ranged from 0.2 to 5.5 m and were terminated when bedrock was encountered, if the test pit walls were unstable or collapsing, or when the maximum depth of the excavator was attained. The exposed soils in the test pit walls and spoil piles were logged and

sampled by KP field personnel for geotechnical characteristics and samples were collected for laboratory testing. Each test pit was backfilled and re-contoured to match the surrounding ground surface. The final activity at each site was the replacement of the surface organic material to restore the area to pre-investigation conditions.

Coordinates of the test pits were obtained using a Trimble GeoXR GPS in the UTM-NAD83 Zone 10 coordinate system. A test pit summary is presented in Table A2.1 and test pit locations are shown on Figure A1.2. Test pit logs are provided in Appendix B1. Test pit photographs are provided in Appendix B2.

3.3 DRILLING PROGRAM

Seventeen geotechnical drill holes completed were in the vicinity of Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosive Building) and Haul Road alignments. The drilling was completed by Geotech Drilling Services Ltd. (Geotech) using a track-mounted Fraste DR238 drill rig. The drill rig used the ODEX air rotary method in the surficial material and diamond coring to drill the bedrock.

SPTs were conducted in each drill hole except where bedrock was encountered near surface. The drill holes were advanced using water and in some instances biodegradable drill fluids when drill hole conditions necessitated the use of additives. The return water and cuttings were diverted into sumps during the drilling process. All drill holes were logged and sampled by KP field personnel.

Geotechnical drill holes completed in the study area are shown on Figure A1.3 and summarized in Table 3.1 and A2.2. Geotechnical drill hole logs are provided in Appendix C1 and field drill hole logging sheets are provided in Appendix C2. SPT sample photographs are included in Appendix C3. Bedrock core photographs are provided in Appendix C4.

3.3.1 ODEX Drilling

All 2014 drill holes were completed using ODEX air rotary drilling in the surficial materials. The surficial material materials recovered in the ODEX cuttings and SPT samples were characterized according to the KP soil logging procedures. The KP logging procedures combine elements of the Canadian Foundation Engineering Manual and Unified Soil Classification System (American Standard for Testing and Materials (ASTM) D2488-93).

SPTs were conducted in the surficial material at 1.5 m intervals for the first 15 m and then every 3 m thereafter, where ground conditions permitted. SPTs were completed to define the density and/or consistency of the soil and to collect samples for material classification and laboratory testing. The SPTs were performed by recording the number of blows delivered by an automatic hydraulic hammer to advance a split spoon sampler into the ground over four continuous 150 mm increments. The sampler was driven to a total depth of 600 mm, or until refusal. The SPT ‘N’ value was calculated as the number of blows required to advance the sampler from 150 to 450 mm. The following information was routinely recorded for each SPT sample depth test interval; blow counts for each 150 mm interval, SPT ‘N’ value, recovery length, and material description.

Table 3.1 Drill hole Summary Table

Drill hole ID	Location	GPS UTM Coordinates NAD 83			Total Depth	Depth to Bedrock
		Easting	Northing	Elevation		
		(m)	(m)	(m)	(m)	(m)
DH14-004	Access Road	5,609,107	685,738	892.5	109.4	8.0
DH14-007	Conveyor	5,608,679	685,595	945.5	100.0	38.4
DH14-017	Tailings Reclaim Pipeline Road	5,606,963	686,633	978.0	101.0	12.3
DH14-035	Tailings Reclaim Pipeline Road	5,605,627	683,878	1,058.3	37.0	4.1
DH14-038	Tailings Reclaim Pipeline Road	5,605,147	685,215	1,060.6	37.9	14.8
DH14-039	Tailings Reclaim Pipeline Road	5,605,143	684,892	1,057.3	65.2	38.1
DH14-044	Tailings Reclaim Pipeline Road	5,607,909	686,155	1,005.6	35.1	1.7
DH14-045	Tailings Reclaim Pipeline Road	5,607,574	686,420	1,029.6	50.8	45.0
DH14-052	Truck Shop	5,609,681	686,717	925.6	50.6	38.6
DH14-054	Truck Shop	5,609,593	686,930	899.6	52.1	42.7
DH14-056	Truck Shop	5,609,386	686,850	894.5	104.5	61.6
DH14-058	Primary Crusher	5,609,149	685,080	895.8	45.8	3.0
DH14-059	Truck Shop	5,609,481	686,636	905.3	48.8	41.5
DH14-060	Primary Crusher	5,609,206	685,215	914.3	41.1	0.2
DH14-061	Primary Crusher	5,609,257	684,973	912.3	41.3	0.7
DH14-063	Primary Crusher	5,609,154	684,877	923.4	35.3	5.2
DH14-065	Haul Road – Open Pit to SMRSF	5,608,807	684,995	907.2	20.3	11.4

NOTES:
1. KP drill hole coordinates were obtained using a Trimble GeoXR GPS in the UTM-NAD83 Zone 10 coordinate system.

3.3.2 Diamond Drill Coring

The drill rig was converted to diamond coring when bedrock was encountered. Bedrock was cored with an HQ3 diamond drill bit using a standard wireline set-up and a 5 ft. (~1.5 m) triple tube core barrel. KP field personnel logged, photographed, and selectively sampled for laboratory testing.

Detailed geotechnical logging of the bedrock drill core was carried out in all drill holes to characterize the rock mass. The following information was collected per run:

- Run depth interval
- Core recovery
- Rock Quality Designation (RQD)
- Lithological description
- Field estimated Unconfined Compressive Strength (UCS)
- Number of discontinuities
- Discontinuity types, and
- Joint condition of discontinuities (i.e. roughness, aperture, infilling, weathering, etc.).

3.3.3 Rock Mass Classification

The Rock Mass Rating (RMR_{89}) classification system developed by Bieniawski (1989) was used to classify the rock mass. The RMR_{89} logging system is based on field determination of values for five key rock mass parameters:

- Intact rock hardness and UCS – Rock hardness and intact rock strength were estimated in the field using a geological hammer and correlated with laboratory UCS testing of selected core samples.
- RQD – The RQD value was determined for each drilled run by summing the lengths of all intact core pieces greater than 10 cm in length and presenting the value as a percentage of the total run length (Deere & Deere, 1988).
- Discontinuity spacing – Discontinuity spacing was estimated by counting the number of naturally occurring fractures encountered per length of drill run.
- Discontinuity condition – The discontinuity condition rating was determined by evaluating fracture persistence, roughness, infilling, aperture, and weathering. The persistence was conservatively assigned a rating of 0, which is consistent with high persistence. The other four condition parameters were determined by examination of the recovered core run.
- Groundwater condition – A constant groundwater rating of 15, corresponding to dry conditions, was used estimate RMR_{89}. This allows the RMR_{89} values to be consistent with the Geological Strength Index (GSI) classification scheme (Hoek et al, 1995). The GSI calculation has been updated by Hoek, Carter, and Diederichs (2013).

The joint condition and RMR_{89} classification system is presented in Table A2.3. Numerical ratings are applied to each of the five parameters of the RMR_{89} system. The sum of these five ratings is the RMR_{89} value and provides an estimation of rock mass quality. The value ranges from less than 20 to 100 with rock mass quality classifications as follows:

- VERY GOOD rock – RMR_{89}: 81 to 100
- GOOD rock – RMR_{89}: 61 to 80
- FAIR rock – RMR_{89}: 41 to 60
- POOR rock – RMR_{89}: 21 to 40, and
- VERY POOR rock – RMR_{89} less than 20.

3.4 ADDITIONAL WORK BY OTHERS

An additional fifteen historic drill holes and nineteen test pits were completed near Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) and Haul Road alignments. Five geotechnical drill holes (DH-BGC10-ND-01, BGC11-ED-11, 14, 15, and DH-BGC11-PS-20) were drilled as part of previous geotechnical investigation programs. Ten monitoring wells were installed (BGC13-008, BGC14-001, 002, 003, 007, 013, 014, 015, and 017) by BGC to investigate groundwater levels and to evaluate the rock mass permeability as part of a groundwater baseline study. BGC's drill holes were drilled by Geotech using the Fraste ODEX/diamond drill. Monitoring wells were completed with a dual rotary drill operated by JR Drilling. One exploration drill hole (KAX-14-127) was logged by KGHM as part of a condemnation program. The condemnation drill hole was completed using HQ diamond drilling techniques in bedrock. No information for the overburden material beyond its thickness was collected. Nineteen historic test pits (TP-BGC-10-29 to 32, 35, 37 to 39, 61 to 63, 67, TP-BGC-13-17, 18, and 20 to 25) were completed within the Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) and Haul Road alignments by BGC.

Additional works completed by others are shown on Figure A1.1. Test pit logs by BGC are included in Appendix B3 and drill hole logs are included in Appendix C5.

Table 3.2 Drill holes by Others Summary

Drill hole ID	GPS UTM Coordinates NAD 83			Total Depth	Depth to Bedrock
	Easting	Northing	Elevation		
	(m)	(m)	(m)	(m)	(m)
DH-BGC10-ND-01	5,610,698	682,959	907	16.0	5.8
DH-BGC11-ED-11	5,609,914	685,639	936	40.6	29.3
DH-BGC11-ED-14	5,609,281	686,721	888	38.7	27.0
DH-BGC11-ED-15	5,610,569	685,999	963	19.1	8.7
DH-BGC11-PS-20	5,610,729	683,109	914	9.9	1.3
BGC13-008	5,609,618	686,560	914	34.1	24.1
BGC14-001 D/S	5,608,796	682,286	921	29.6	5.2
BGC14-002 D/S	5,608,900	682,756	924	29.9	15.2
BGC14-003 D/S	5,608,858	683,544	894	32.3	22.0
BGC14-007 D/S	5,608,722	685,324	929	29.6	24.4
BGC14-013	5,606,777	686,466	991	30.5	11.3
BGC14-014 D/S	5,607,810	686,672	988	29.6	18.9
BGC14-015 D/S	5,606,920	686,773	991	29.6	11.3
BGC14-016	5,607,041	685,348	1,044	29.6	1.8
KAX14-127	5,609,129	685,154	894	222.2	36.6

NOTES:
1. BGC drill hole coordinates were obtained using a handheld GPS unit; elevations have been adjusted with Lidar data.

3.5 PIEZOMETER INSTALLATIONS

Standpipe piezometers were installed into seven geotechnical drill holes (DH14-004, 035, 038, 045, 052, 056, and 060). Installation of the standpipe piezometers was completed by Geotech under the direction and supervision of KP field personnel. The standpipe piezometer completion zones were installed into zones of interest such as bedrock contacts and/or permeable zones identified during geotechnical logging.

All standpipe piezometers were generally installed as follows:

- Alternating 3 m layers of sand and 1.5 m layers of bentonite were used to backfill the drill hole to the standpipe piezometer installation depth to prevent continuous conduits for groundwater flow. Most installations did not require these alternating layers because the screen was installed close to the total depth of the drill hole.
- An approximately 3 m long, 50 mm diameter, Schedule 80 Poly Vinyl Chloride (PVC) 0.020 inch machine slotted screen (washed and bagged) with a threaded bottom end cap attached was placed in the completion zone and blank riser PVC pipes approximately 3 m long, 50 mm diameter, Schedule 80 were installed to surface above the screen section.
- Filter sand backfilled the annulus around the screened section of the standpipe piezometer, including at least 1 m above the well screen.
- Coated (slow release) 63 mm bentonite pellets were placed above the filter sand to create a seal and isolate the completion zone of the piezometer and separate the filter sand from the cement grout contamination.
- Cement grout was used to backfill the annulus around the standpipe piezometer above the bentonite seal to just below the ground surface.

- Standard PVC well caps and locking protective steel well head covers were installed with a concrete surface pad at each site to direct surface flow away from the installation.
- Installation of the piezometer materials generally took place through the drill rods, with the drill rods extracted as materials were added. The depth of each zone was measured and recorded during the installation using a weighted tape.

Standpipe piezometer completion details are provided in Appendix D and summarized in Table 3.3.

Table 3.3 Standpipe Piezometer Installation Summary

Drill hole ID	Screen Interval		Hole Diameter	Piezometer Diameter	Water Level
	From (m)	To (m)	(mm)	(inch / mm)	(mbgs)
DH14-004	22.9	25.9	HQ / 96.0	2 / 50.8	9.2
DH14-017	94.3	97.3	HQ / 96.0	2 / 50.8	2.0
DH14-035	24.9	28.0	HQ / 96.0	2 / 50.8	4.6
DH14-038	23.4	26.4	HQ / 96.0	2 / 50.8	12.8
DH14-039	43.7	46.8	HQ / 96.0	2 / 50.8	33.0
DH14-045	42.5	48.8	HQ / 96.0	2 / 50.8	24.6
DH14-052	46.0	49.1	HQ / 96.0	2 / 50.8	>30.0
DH14-056	66.5	72.5	HQ / 96.0	2 / 50.8	32.6
DH14-060	23.4	6.5	HQ / 96.0	2 / 50.8	14.8

NOTES:
1. No standpipe installations were installed in DH14-044, 054, 058, 059, 061, 063 and 065.
2. No standpipe installation in DH14-007 due to drill hole collapse.

3.6 HYDRAULIC CONDUCTIVITY TESTS

Hydraulic conductivity of soils and bedrock is not a critical geotechnical parameter for Mine Site Infrastructure and Haul Road alignment design and is not reported. Hydraulic conductivity data is available in KP Geotechnical Report – Tailings Storage Facility and Mine Rock Storage Facilities C002-KA39-RPT-10-007.

3.7 LABORATORY TEST WORK

Selected samples from the drill holes and test pits were collected for geotechnical laboratory testing to characterize material types encountered at the site. Specialized testing was conducted on samples to evaluate the performance of the materials and their suitability for specific end uses.

3.7.1 Surficial Material Testing

Representative surficial material samples were selected from the range of materials encountered. Index testing on the surficial material and SPT samples was carried out at the KP Soils Laboratory in Denver, Colorado. A summary of the off-site tests conducted on these samples is provided below:

- Particle Size Analysis (PSA) – A total of 33 tests were completed to assess the gradation characteristics of the materials. Particle size analyses were carried out in accordance with ASTM D422 procedures. Hydrometer analyses were used to determine the silt and clay fractions for samples containing more than 12% fines content.

- Atterberg Limits – A total of 33 tests were completed in accordance with the ASTM D854 test procedure.
- Compaction Tests – A total of six tests were completed in accordance with the ASTM D698-07 and ASTM D1557 test procedures.

All laboratory test results are provided in Appendix E1 and summarized in Table A2.3.

3.7.2 Rock Strength Testing

Drill core samples representative of the lithologies encountered were selected and tested at the Norman B. Keevil Institute of Mining Engineering Rock Mechanics laboratory at the University of British Columbia. A total of 17 core samples were collected from the 2014 geotechnical drill holes within the Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) and Haul Road alignments for rock strength laboratory testing. The samples were tested using ASTM Method D2166 (UCS) and ASTM D-3148-02 (Young's Modulus and Poisson's Ratio). International Society for Rock Mechanics (ISRM)-1979 (2007) procedures were followed to perform the modulus determinations. The results of laboratory rock testing are summarized in Table 3.4; the detailed tests are included in Appendix E2.

Table 3.4 Summary of 2014 UCS Testing Results

Drill hole ID	Sample ID	Lithology	Depth		UCS	Young's Modulus	Poisson's Ratio	Bulk Specific Gravity
			From (m)	To (m)	MPa	Es (GPa)	v (-)	
DH14-035	UCS#1	Siltstone	13.3	13.6	42	20	0.12	2.750
DH14-035	UCS#2	Siltstone	27.2	27.5	66	51	0.18	2.788
DH14-035	UCS#3	Siltstone	31.5	31.8	106	60	0.20	2.909
DH14-038	UCS#1	Volcaniclastic	18.2	18.5	41	8	0.09	2.679
DH14-038	UCS#2	Volcaniclastic	34.6	34.9	67	51	0.18	2.744
DH14-044 [2]	UCS#1	Volcaniclastic	11.6	11.9	11	35	N/A	2.747
DH14-044	UCS#2	Volcaniclastic	30.6	30.8	60	98	0.13	2.958
DH14-045	UCS#1	Volcaniclastic	46.7	47.0	85	65	0.29	2.901
DH14-054	UCS#1	Sugarloaf	50.7	51.0	26	41	0.12	2.749
DH14-058	UCS#1	Sugarloaf	13.1	134	128	88	0.13	2.859
DH14-058	UCS#2	Sugarloaf	21.3	21.6	152	90	0.23	2.885
DH14-058	UCS#3	Sugarloaf	44.9	45.2	265	75	0.29	2.895
DH14-060	UCS#1	Sugarloaf	28.4	28.7	147	64	0.25	2.834
DH14-060	UCS#2	Sugarloaf	37.7	38.0	229	66	0.24	2.869
DH14-061	UCS#1	Sugarloaf	8.3	8.6	76	91	0.17	2.767
DH14-063 [3]	UCS#1	Sugarloaf	12.8	13.1	152	38	0.20	2.883
DH14-063	UCS#2	Sugarloaf	34.3	34.5	166	76	0.20	2.873

NOTES:

1. Rock core samples were tested at the Norman B. Keevil Institute of Mining Engineering's Rock Mechanics Laboratory at the University of British Columbia.
2. Sample DH14-044 – UCS#1 failed on a pre-existing feature.
3. Sample DH14-063 – UCS#1 failed along a slide plane and not through the core axis.

4 – INITIAL FINDINGS OF MATERIAL TYPES

4.1 SURFICIAL MATERIAL THICKNESS

Bedrock outcrop is rare at the Project and is generally restricted to higher elevations. A band of steeper terrain with bedrock outcrops extends in a northwest direction across the Project, south of Jacko Lake and generally following the ELFZ. The TSF and WMRSF are located between two northwest-southeast oriented bedrock ridges that form Keynes valley. The surficial material thickness is variable within the Project area averaging over 5 m to 10 m thick. Bedrock is deepest along the Keynes Valley bottom, where surficial material is up to 41 m depth. Drill holes and test pits located on the east and west sides of Keynes Valley encountered bedrock at shallow depths.

4.2 SURFICIAL MATERIAL CHARACTERIZATION

The surficial materials have been assessed at the Ajax project using the geological and geotechnical information collected from drill hole and test pit data, laboratory testing, and seismic refraction surveys. The ultimate goal of the subsurface investigations is to develop a geologic model depicting the major subsurface layers and assigning distinct engineering characteristics to these units. The USCS system has been used for describing and categorizing soil to divide materials with distinct soil properties into groups. The USCS classification allows quick correlation for approximate permeability, shear strength, compaction characteristics, workability, and volume change potential of a soil and gives indications of how it will be affected by water, frost, and other physical conditions. Surficial material distributions across the Project were mapped as part of terrain mapping and shown on Figure A1.2.

4.3 SURFICIAL MATERIAL GEOTECHNICAL PROPERTIES

The stratigraphic units outlined in the geologic model have been grouped using the USCS material classification system. The surficial material has been grouped using the following material types:

- Topsoil (OL, Pt)
- Anthropogenic Mine Rock material (GC, GM)
- Colluvium deposits (GC, GM)
- Eolian sediment / Loess deposits (CL-ML)
- Glacial till deposits (SM-SC)
- Glaciofluvial deposits (GW-GM), and
- Glaciolacustrine deposits (CL-ML).

Descriptions of the material properties are provided in the sections below and summarized in Table 4.1.

Table 4.1 Surficial Material Geotechnical Properties

USCS Classification		**GC, GW**	**CL-ML**	**GC, GW**	**SC-SM**	**GW-GM**	**CL-ML**
Geologic Model		**Anthropogenic Material**	**Eolian Sediments**	**Colluvium Deposits**	**Glacial till Deposits**	**Glaciofluvial Deposits**	**Glacio-Lacustrine**
Particle Size Analysis	Gravel %	**65** (55 – 84)	**10** (0 – 22)	**49** (6 – 86)	**26** (13 – 42)	**56** (55 – 84)	**3** (0 – 8)
	Sand %	**30** (15 – 37)	**14** (7 – 30)	**25** (7 – 34)	**32** (23 – 44)	**30** (14 – 37)	**26** (6 – 92)
	Silt %	**4** (1 – 42)	**51** (35 – 74)	**16** (2 – 42)	**24** (14 – 40)	**4** (1 – 6)	**50** (8 – 82)
	Clay %	**1** (1 – 3)	**26** (9 – 46)	**13** (1 – 43)	**18** (7 – 36)	**2** (1 – 2)	**22** (7 – 46)
Moisture Content %		**8** (3 – 18	**26** (10 – 22)	**13** (1 – 43)	**9** (3 – 32)	**4** (2 – 6)	**19** (7 – 30)
Atterberg Limits for <200# Sieve	Liquid Limit	**8** (NP – 30)	**19** (NP – 47)	**10** (NP – 53)	**23** (NP – 36)	**8** (NP – 30)	**28** (19 – 44)
	Plastic Limit	**7** (NP – 26)	**10** (NP – 21)	**6** (NP – 39)	**12** (NP – 21)	**7** (NP – 26)	**14** (12 – 20)
	Plasticity Index	**1** (NP – 4)	**8** (NP – 32)	**4** (NP – 16)	**11** (NP – 21)	**1** (NP – 4)	**13** (1 – 29)
SPT[3]	'N' Values	N/A	2 - 10	N/A	30 – 50+	N/A	N/A
Seismic	Refraction Velocities	N/A	340 – 450 m/s	200 – 800 m/s	800 – 1200 m/s	N/A	N/A

NOTES:

1. Results in bold are weighted average i.e. **12**, and in brackets range of maximum to minimum i.e. (10 – 42).
2. NP – Non Plastic.
3. Total number of SPT tests conducted over the 2014 site investigation program is over 500. Individual outlier results do exist for such a large number of tests.

4.3.1 Topsoil Layer (OL, Pt)

A layer of topsoil of varying thickness is present over the entire project area and is comprised of moist, dark brown, silty sand with organics. The drill hole pad areas and test pit excavations indicate the topsoil layer varies in thickness from 0.1 m to 0.55 m.

Organic swamps and/or wetlands over 1 m thick were mapped, locally, at the sites of the TSF, EMRSF, WMRSF, and SMRSF. The organic swamp deposits were found to generally be comprised of firm, dark grey, wet, fibrous peat. The organic swamps were poorly-drained with standing water present for most of the year. Test pit excavations were only conducted on the outside edges of the areas.

4.3.2 Anthropogenic Mine Rock Material (GC, GM)

Anthropogenic deposits comprised of Mine Rock piles from historical mining are located south of Peterson Creek and within the proposed open pit footprint east of the historical Ajax pits. The USCS designation for these materials is GC and GM. PSA results indicate grain sizes ranging from 55 to 84% gravel, 15 to 37% sand, 1 to 42% silt, and 1 to 3% clay. The Atterberg Limits indicated non-plastic material. A total of eight particle size distribution tests were completed on the Mine Rock material, the distributions are shown in Figure 4.1, and the material properties are summarized in Table 4.1.

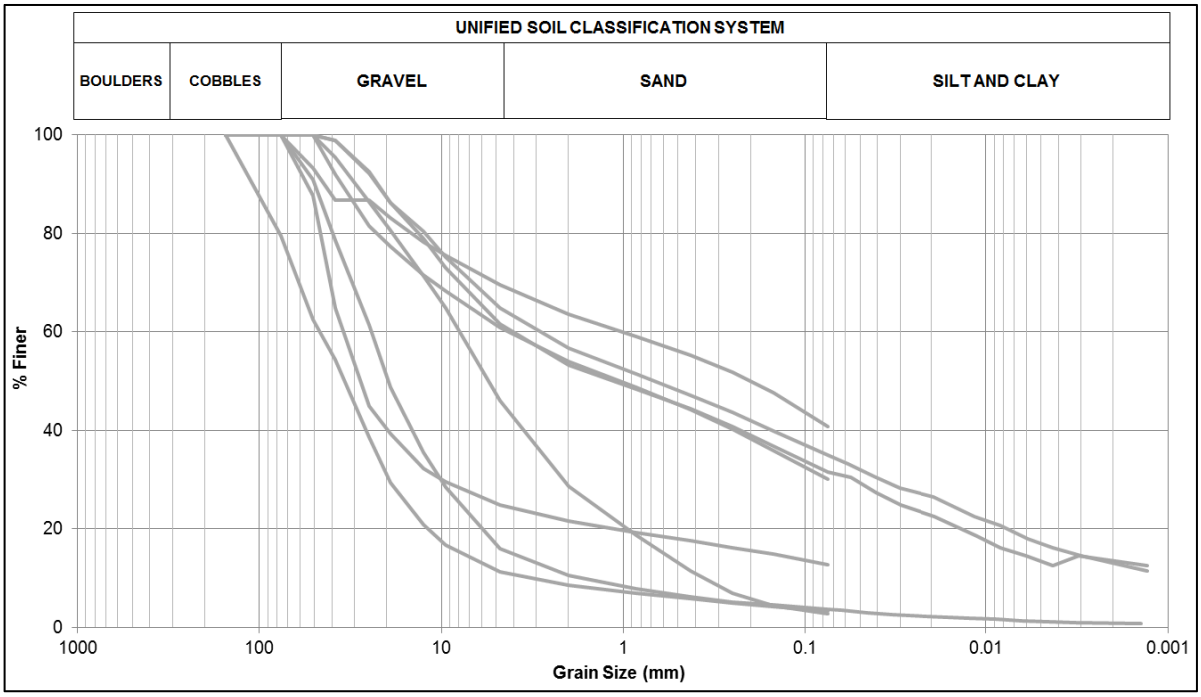


Figure 4.1 Mine Rock Material Grading Summary

4.3.3 Eolian Sediments / Loess Deposits (CL-ML)

Eolian sediments (wind-blown loess) re-worked typically by surface water have been identified locally within the Project area. Eolian sediments are encountered on the flanks of northwest-southeast oriented hills in the Project. The USCS designation for these materials is ML-MH. PSA results indicate the grain size ranges from 0 to 22% gravel, 7 to 30% sand, 35 to 74% silt, and 9 to 46% clay. Natural moisture contents of the eolian sediments were between 10% and 22%. The Atterberg Limits indicated low to medium plasticity materials with liquid limits generally less than 47%, plastic limits from non-plastic (NP) to 21%, and plasticity indices ranging from non-plastic to less than 32%. A total of five particle size distribution tests were completed on the Eolian Sediments deposits, the distributions are shown on Figure 4.2 and the material properties are summarized in Table 4.1. Standard Proctor and Modified Proctor compaction test work is summarized in Table 4.2.

Table 4.2 Compaction Testing Results

Test Pit ID	Material Type	USCS Designation		Standard Proctor	Modified Proctor
TP14-285	Eolian Sediments	CL	Max. Dry Density	2028 kg/m^3	2148 kg/m^3
			Opt. Moisture Content	11%	9%
TP14-153	Glacial till	GW-GM	Max. Dry Density	2131 kg/m^3	2179 kg/m^3
			Opt. Moisture Content	9%	7%
TP14-277	Glacial till	SC	Max. Dry Density	2106 kg/m^3	2255 kg/m^3
			Opt. Moisture Content	10%	8%

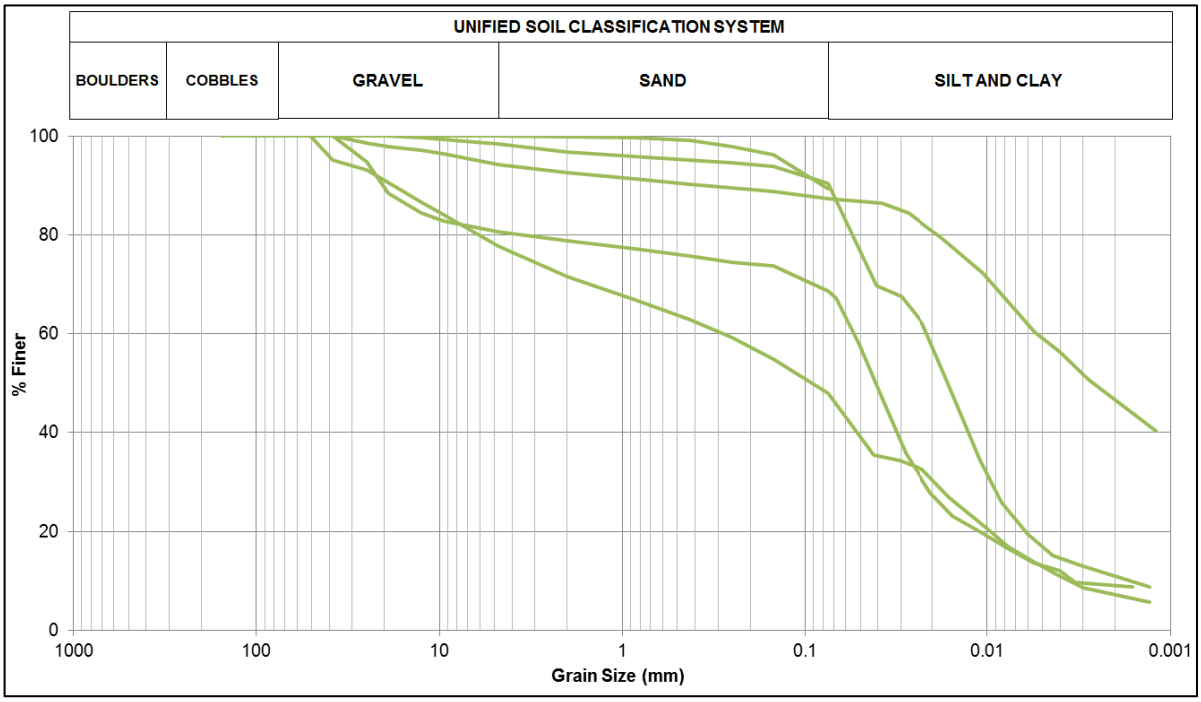


Figure 4.2 Eolian Sediments Grading Summary

4.3.4 Colluvium (GC, GM)

Terrain mapping and test pitting confirmed the presence of a broad area at the base of these outcrops comprised of bedrock outcrops along hill tops with moderately steep colluvial slopes at the base of these outcrops. This area extends in a northwest direction across the Project area and generally follows the ELFZ, including the northeast parts of the MRSF and TSF footprints. Local areas of bedrock exposure were mapped at the sites of the TSF, EMRSF, SMRSF, WMRSF and open pit. A total of five particle size distribution tests were completed for the colluvium deposits. The USCS designation for the materials is classified as GC and GM. PSA results indicate a wide range of grain size, from 6 to 86% gravel, 7 to 34% sand, 2 to 42% silt, and 1 to 43% clay. Natural moisture contents of the colluvium deposits were between 1% and 43%. The Atterberg Limits indicated low plasticity materials with liquid limits up to 53%, plastic limits from non-plastic (NP) to 39%, and plasticity indices ranging from non-plastic to less than 16%. A total of five particle size distribution

tests were completed on the colluvium deposits, the distributions are shown in Figure 4.3, and the material properties are summarized in Table 4.1.

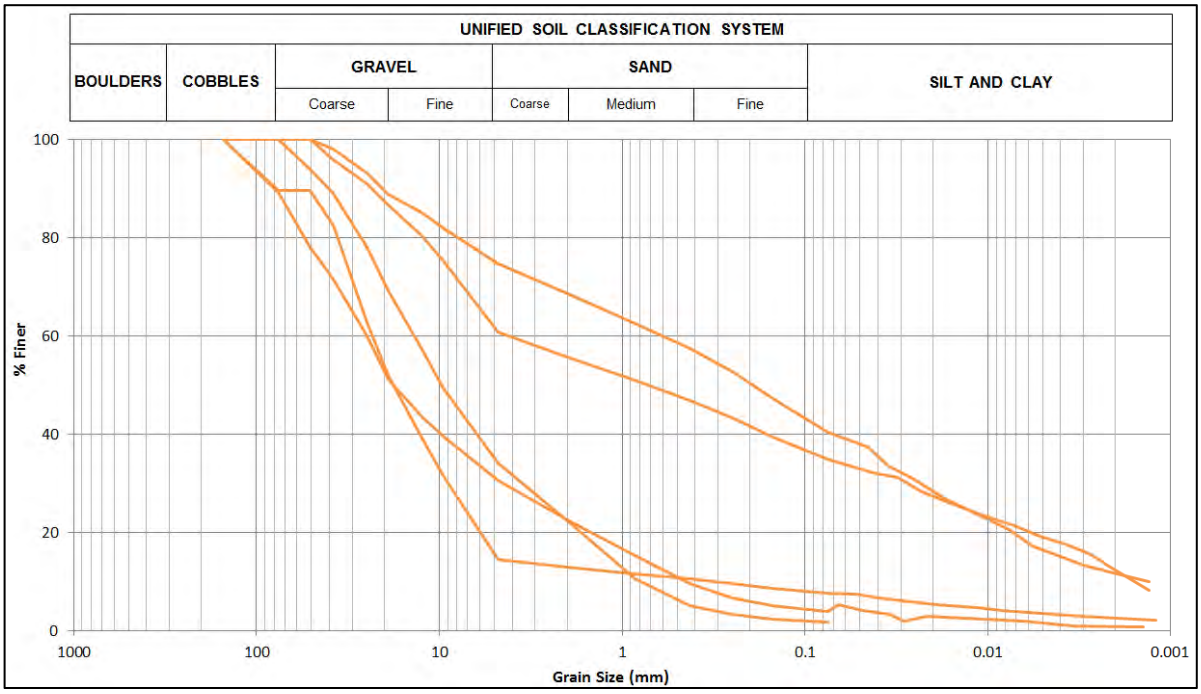
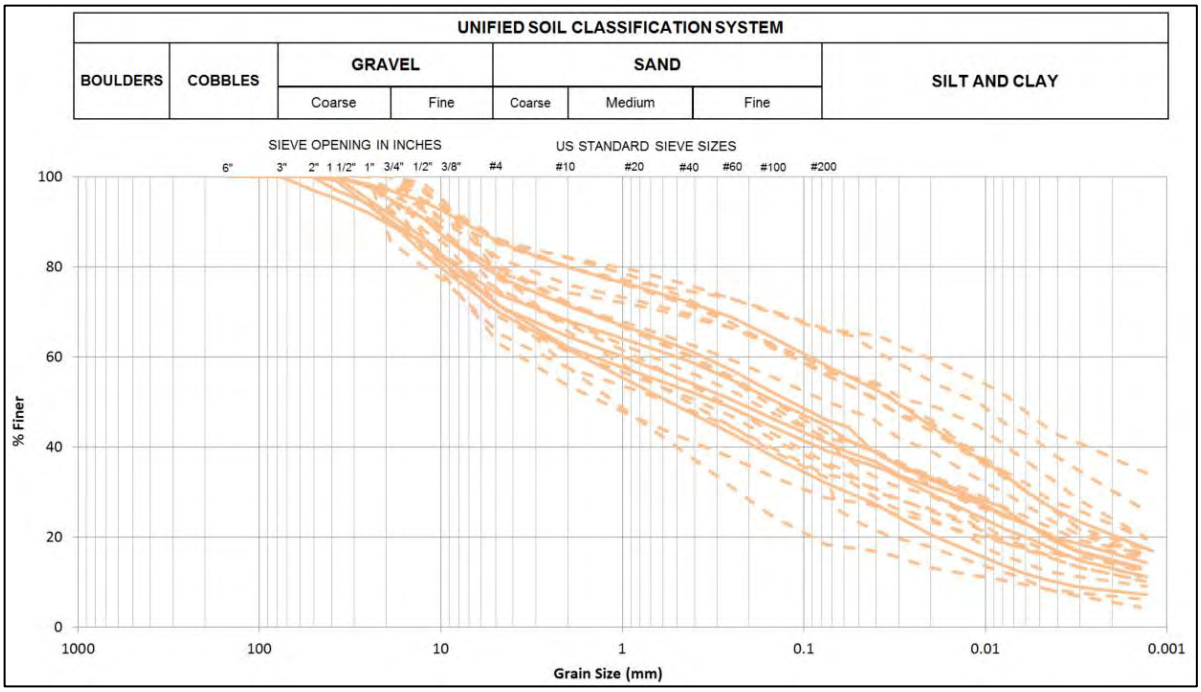


Figure 4.3 Colluvium Deposits Grading Summary

4.3.5 Glacial till (SM-SC to GM-GC)

Glacial till (coarse-grained soils with sand and fines) is the predominant surficial material unit found at the Project. The USCS designation ranges from SM-SC to GM-GC. The material is stiff to hard. The majority of the SPTs were driven to refusal resulting in higher 'N' values of 30 to refusal (50+). PSAs of these samples typically contained in the order of 13 to 42% gravel, 23 to 44% sand, 14 to 40% silt, and 7 to 36% clay. PSA tests were completed on the glacial till deposits and are shown on Figure 4.4 with the material properties summarized in Table 4.1.

Natural moisture contents of the glacial till materials were between 3% and 32%. The Atterberg Limits indicated low plasticity materials with liquid limits less than 36%, plastic limits from non-plastic to 21%, and plasticity indices ranging from NP to less than 21%. The specific gravity of glacial till samples ranged from 2.7 to 2.8. Standard Proctor and Modified Proctor compaction test work is summarized in Table 4.2.



NOTES:
1. Particle Size Analysis shown as solid lines for test pit samples and dashed lines for SPT samples.

Figure 4.4 Glacial Till Deposits Grading Summary

4.3.6 Glaciofluvial Deposits (GW-GM)

Kames and esker deposits were identified locally at the Project. These glaciofluvial landforms are indicative of coarse-grained soils with sands. The USCS designation for these materials is GW to GM. Kame deposits are terraces, terraced deltas, or laterally discontinuous mounds of gravel and sand with trace silt deposited by ice-marginal streams. Glaciofluvial deposits are identified in a northwest-southeast oriented band of kame deposits west and south of Goose Lake within the southern part of the proposed TSF footprint. A narrow band of kame deposits with a northwest-southeast orientation was mapped in the eastern part of the footprint of the EMRSF. Ice-contact kame deposits were also mapped, locally, in the southern part of the SMRSF. Extensive, hummocky, ice-contact kame deposits were identified in the vicinity of Humphrey Creek. Terrain mapping verified this deposit extends upstream on both sides of Peterson Creek from the confluence with Humphrey Creek.

Terrain mapping identified the local presence of glaciofluvial outwash deposits in the vicinity of Peterson Creek. Terrain mapping suggests there are isolated occurrences of outwash sands and gravels on the north side of Peterson Creek, and none in the vicinity of the EMRSF. The furthest downstream location where outwash sands and gravels were identified in the vicinity of Peterson Creek is the northeast part of the study area. Glaciofluvial outwash deposits were mapped within the southwest part of the proposed open pit outline.

PSA results indicate material with approximately 55 to 84% gravel, 14 to 37% sand, and 8% fines. Particle size distribution tests were completed on the glaciofluvial deposits, as shown on Figure 4.5.

The material properties are summarized in Table 4.1. Glaciofluvial samples were typically low plasticity with plasticity indices ranging from non-plastic to 4.

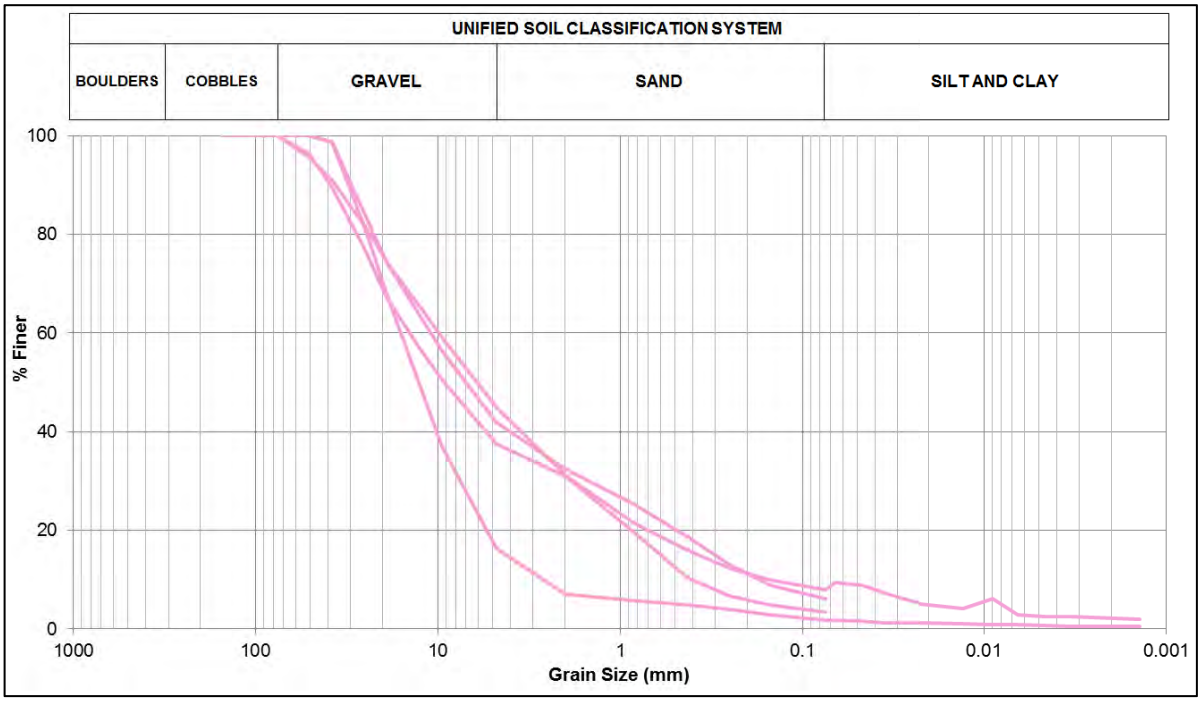
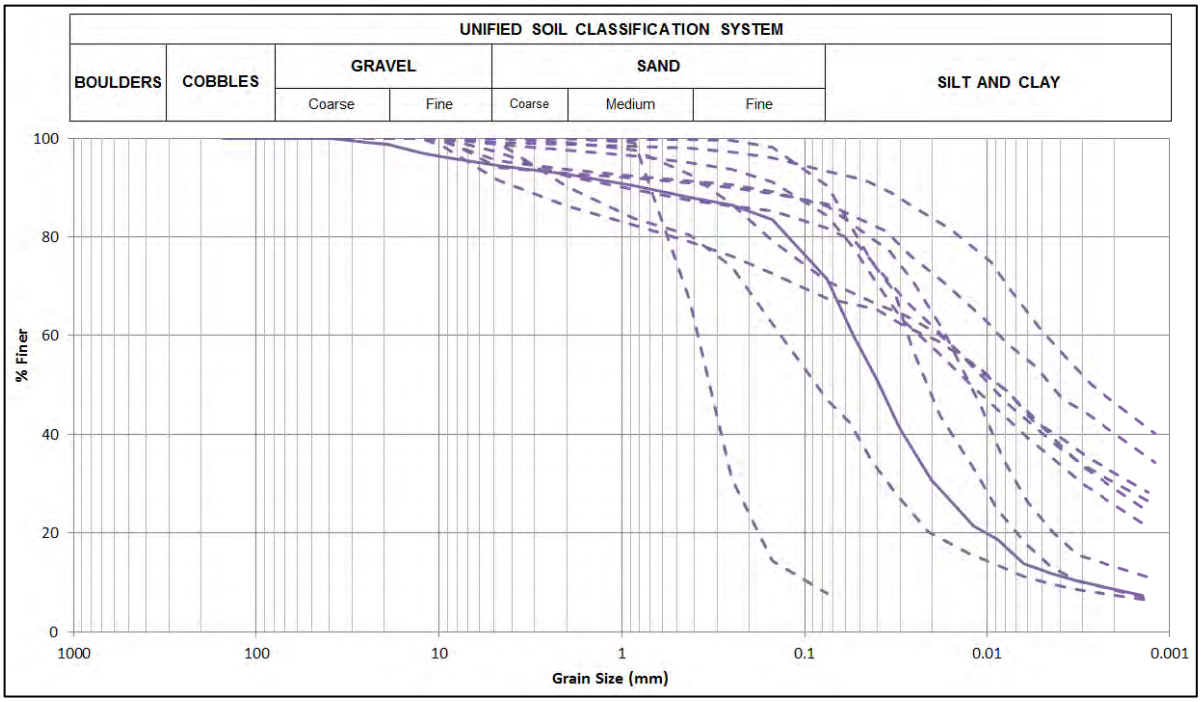


Figure 4.5 Glaciofluvial Deposits Grading Summary

4.3.7 Glaciolacustrine Deposits (CL-ML)

Fine-grained, laminated, glacial lake deposits were mapped in the vicinity of the Peterson Creek aquifer below the EMRSF toe and around the Truck Shop. The overburden materials in the project area reflect the history of glaciation for this region. Although glacial till materials are the predominant overburden material, discontinuous glaciolacustrine deposits have been identified in the project area. These discontinuous units, which may be relatively small in lateral extent, can have low strength parameters.

The PSA results indicate material containing 0 to 8% gravel, 6 to 92% sand, 8 to 82% silt, and 7 to 46% clay. These deposits are classified as CL-ML under the USCS system. A total of eleven particle size distribution tests were completed in the glaciolacustrine deposit, the result summarized on Figure 4.6, and the material properties are summarized in Table 4.1. Atterberg Limit testing indicated a low to medium plasticity material with a liquid limit value of 19 to 44%, plastic limit of 12 to 20%, and plasticity index of 1 to 29%. The natural moisture content was 7 to 30%. The fine grained deposits exhibited fine laminated layers or weaker, clayey laminations in field observations at the toe of the EMRSF and Truck Shop area.



NOTES:
1. Particle Size Analysis shown as solid lines for test pit samples and dashed lines for SPT samples.

Figure 4.6 Glaciolacustrine Deposits Grading Summary

4.4 INTACT BEDROCK GEOTECHNICAL PROPERTIES

The following lithologies are encountered at the site: Nicola Group Volcaniclastic and Sedimentary units, Iron Mask Batholith, and Porphyry intrusions. A surface elevation contour map of the intact bedrock was developed using the drill hole and test pit data as shown on Figure A1.5.

Six rock types encountered during diamond drilling were grouped into the following units as follows:

- The Iron Mask Batholith (Sugarloaf Diorite and Iron Mask Hybrid) were encountered in the majority of the drill holes at the Truck Shop and Primary Crusher (DH14-004, 052, 054, 056, 058, 059, 060, 061, and 063).
- Nicola Group Volcaniclastics encountered in drill holes DH14-017, 038, 044, 045, and 065.
- Nicola Group Sedimentary was encountered in drill holes DH14-035 and 039.
- Picrite was encountered in drill hole DH14-007.

The Nicola Group Volcaniclastics and Sedimentary rock and Iron Mask Batholith units were found to have similar intact strength properties. The Nicola Group Volcaniclastic comprised of Volcaniclastic, Mafic Tuff, and Mafic Volcanic rocks that are light greyish green, fine-grained, and aphanitic. The Nicola Group Sedimentary rocks are comprised of light greyish green, fine-grained, Sandstone. The Iron Mask Batholith is a multi-unit body composed of the Pothook, Iron Mask Hybrid, Cherry Creek, and Sugarloaf units' intrusive igneous rocks. Picrite lava flows are considered part of the Nicola Group Volcaniclastic package however, this unit is typically serpentinized weaker rocks and the RMR_{89} classification is POOR quality rock with weak UCS values. The intact rock properties are summarized in Table 4.3.

Table 4.3 Summary of Rock Mass Properties

Bedrock	Rock Strength (MPa)	Strength Description	Young's Modulus (GPa)	Poisson Ratio	Bulk Density	RQD %	RMR_{89}	RMR_{89} Rating
Nicola Group Volcaniclastic	63 41 – 85	MEDIUM STRONG	44 8 - 98	0.17 0.09 – 0.29	2.82 2.75 – 2.88	64	55 24 - 87	GOOD
Nicola Group Sedimentary	63 42 – 106	MEDIUM STRONG TO STRONG	56 20 - 60	0.17 0.12 – 0.20	2.82 2.75 – 2.91	64	55 24 - 89	GOOD
Iron Mask Batholith	149 26 - 265	STRONG	70 38 - 91	0.20 0.12 – 0.29	2.89 2.75 – 2.88	59	56 25 - 91	GOOD
Picrite	20	WEAK to VERY WEAK	N/A	N/A	N/A	12	30 24 - 64	POOR

NOTES:

1. Samples tested are slightly weathers to fresh.
2. No Picrite samples were tested as competent samples of the correct size were not available.

Laboratory testing conducted at the Mine Site Infrastructure was compared to results from other site investigation programs on the Ajax property. Nicola Group Volcaniclastic and Iron Mask Batholith rocks laboratory results and RMR_{89}/RQD logging were comparable to data collect at the Project. Nicola Group sedimentary rocks laboratory results are tested as medium strong to strong rock slightly higher than elsewhere onsite.

5 – ON-SITE CONSTRUCTION BORROW AREAS

5.1 BORROW AREA INVESTIGATIONS

Terrain mapping and test pit programs were conducted across the project area to investigate potential borrow materials for mine construction. The 384 test pits conducted as part of the 2014 site investigation targeted surficial material identified in the terrain mapping investigations for potential borrow area sources (KP 2014b). Surficial geology terrain mapping and the 2014 test pits are shown on Figure A1.2. Potential borrow material samples were collected for initial grain size testing to identify areas for evaluation. The potential borrow areas identified in this study should be investigated further and testing completed during future work programs.

5.2 CONSTRUCTION BORROW MATERIAL EVALUATION

A preliminary borrow source assessment was completed to determine the suitability of potential construction borrow areas. These potential borrow source locations are identified on Figure A1.3 and the findings are summarized in Table 5.1. Four potential sources of construction materials have been identified at the Project include the following:

- Sub-base, soil liner and embankment material – glacial till deposits.
- Filter and bedding materials and road base – glaciofluvial deposits.
- Aggregate materials – bedrock quarry, mine rock and glaciofluvial deposits.

The tailings embankment shell zones require the largest volume of borrow material and will be constructed using mine rock from Open Pit development.

Table 5.1 Potential Borrow Area Summary

Proposed Borrow Area	Location	Material Type	Material Use	Estimated Volume (Mm^3)
A	TSF basin North Embankment	glacial till	Sub-base, soil liner and embankment material	5.9
B	TSF basin Southeast Embankment	glacial till	Sub-base, soil liner and embankment material	2.7
C	Plant Site	glacial till	Sub-base, soil liner and embankment material	1.0
D	Peterson Creek (after creek diversion)	glaciofluvial	Road base, embankment filter zone	2.0
E	TSF basin	glaciofluvial	Road base, embankment filter zone	1.2
F	Historic mine rock storage facility south of Open Pit	Mine Rock	Bedding material and aggregate	4.2
G	Historic mine rock storage facility north of Open Pit	Mine Rock	Bedding material and aggregate	2.4
H	Primary Crusher	rock	Aggregate	1.0
I	Plant Site	rock	Aggregate	1.0

5.2.1 Glacial Till Borrow Areas

Glacial till deposits are silty sand and silty gravel deposits with greater than 30% fines and trace cobbles and boulders. Materials would be suitable as a sub-base material and TSF embankment construction. Glacial till distribution was mapped within the mine site footprint between 5 m to 15 m thick with some isolated areas of up to approximately 40 m thick. The Project footprint is compact with limited space for sitting borrow as where mine site infrastructure, TSF, MRSF's, haul and access roads and Kinder Morgan pipeline relocation has been designated. Glacial till is found in thicker deposits within the centre of the TSF by the North Embankment (Borrow Area A) and South Embankment (Borrow Area B). At these locations, care should be taken to leave a glacial till layer thick enough for a natural low permeability liner to inhibit seepage from the TSF basin. There is a potential glacial till borrow (Borrow Area C) identified below the Plant Site.

Removal of material in these borrow areas will need to be scheduled and coordinated with the mine fleet to avoid tailings embankment lifts, TSF expansion and TSF filling impacts. Wet weather construction in these deposits is expected to be difficult because of the relatively high fines content. These soil types quickly become saturated and unstable when exposed to precipitation, and operation of equipment becomes difficult when the moisture content is more than a few percent above the optimum moisture content. Eolian sediments were identified within the TSF basin overlying the glacial till deposits. These deposits are unsuitable for construction and will require removal prior to borrow material excavation.

5.2.2 Glaciofluvial Borrow Areas

Glaciofluvial material is suitable as surfacing materials for road base and surfacing materials and for filter (Zone F) and transition (Zone T) for TSF embankment construction. Glaciofluvial deposits are found within the Project in limited areas and volume. Borrow Area D is located within the existing Peterson Creek corridor where the creek is planned to be re-established post closure. This area may be unsuitable from an environmental and closure perspective however it holds the greatest volume for potential sand and gravel borrow material. The volume and quality of borrow materials is approximately estimated at this time due to environmental access constraints and requires additional work during early mine construction.

Glaciofluvial deposits were typically sand and gravel with less than 20% fines. Preliminary laboratory testing on glaciofluvial samples in borrow areas indicated that these deposits will be suitable for bedding and filter material with screening and washing of the fines. The proportion and distribution of boulders, cobbles, gravel and sand size particles was found to vary. This material requires screening and crushing to would produce the specified material types. Excavation depths may be affected by groundwater infiltration.

5.2.3 Historic Mine Rock Storage Borrow Areas

Re-use of historic mine rock sand and gravel should also be considered from borrow areas F and G for use as bedding material and aggregate with screening and washing of the finer material. The proportion and distribution of boulders, cobbles, gravel and sand size particles was found to vary. Crushing and screening of this material, will be necessary produce the specified material types.

5.2.4 Bedrock

Potential borrow sources for concrete aggregate can be obtained by crushing suitable rock in a quarry in the vicinity of the Primary Crusher and southwest of the Plant Site (Borrow areas H and I). Volcanoclastic and/or iron mask batholith intrusion could be utilized. Potential concrete aggregate sources will require further investigation to qualify the aggregate sources for concrete according to CDA aggregate acceptance criteria.

6 – STABILITY ANALYSES OF MINE ROCK STORAGE FACILITIES AND STOCKPILES

6.1 MINE ROCK STORAGE FACILITIES STABILITY ANALYSES

The geotechnical conditions of the Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF) were previously summarized in KP Geotechnical Report – Tailings Storage Facility and Mine Rock Storage Facilities C002-KA39-RPT-10-007.

Slope stability analyses for the Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF) were carried out for final design heights, end of construction and post-closure conditions. The stability analyses for the mine rock storage facilities were carried out for static and pseudo-static conditions using the limit equilibrium computer program SLOPE/W (Geostudio, 2012). Factors of safety were calculated using the Morgenstern-Price method of analysis. Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF) stability analyses results and recommendations are presented in Appendix F.

The Factors of Safety for both static and pseudo-static analyses for each MRSF layouts are presented on Table F4.2. The static stability for each MRSF meet the minimum design Factors of Safety under both short term (end of construction) and long term conditions (post-closure). The deep seated failure surface and Factor of Safety for the end of construction and post-closure is shown on Figures F4.1 to F4.14. Stability results for the MRSFs are summarized in Table 6.1.

Potential deformations resulting from the 1 in 10,000 year earthquake were calculated using the Newmark (1965), Makdisi and Seed (1977) and Bray (2007) methods, and are predicted to be less than 10 cm. Potential crest settlements under seismic loading were estimated to be less than 40 cm using the Swaisgood (2003) method. Deformations resulting from the 1 in 475 year earthquake would be even smaller. The earthquake loading would have negligible impact on the integrity of the stockpile and little, if any, impact on other mine site facilities.

Table 6.1 Stability Results for MRSFs

Section Number	Mine Rock Storage Facility	Slip Surface Direction	Factor of Safety					
			Stability of Dump Surface		Overall Stability (Deep Seated Stability)			
			End of Construction[3]	Post-Closure[4]	End of Construction[3]		Post-Closure[4]	
			Static	Static	Static	Seismic[1]	Static	Seismic[1]
Required Minimum Factor of Safety			**1.0**	**1.2**	**1.3**	**1.1**	**1.5**	**1.1**
1	West	North West	1.48	1.64	1.58	1.30	1.91	1.66
2	South	North West	1.85	1.85	1.31	1.13	1.82	1.58
		South East	1.79	1.78	1.80	1.47	2.36	2.05
3	East	South East	1.57	1.57	1.57	1.36	1.94	1.69
4		South	1.62	1.62	1.83	1.56	2.38	2.03
5	South	Towards Plant Site	1.72	1.86	1.67	1.41	2.32	2.03
		Towards TSF	1.85	1.85	2.25	1.52	2.47	2.16

NOTES:

1. Seismic coefficient of 0.05 used for pseudostatic analysis, which corresponds to a perk ground acceleration of 0.10g (1 in 475 year event, site class C/D).
2. Slip surfaces are a minimum depth of 3 m.
3. End of construction stability assumes excess pore pressures in the fine grained foundation soils, pore pressure response factor, B = 0.4.
4. Post-closure stability assumes the pore pressure in the fine grained foundation soils has dissipated, pore pressure response factor, B = 0.

6.2 OVERBURDEN AND TOPSOIL STOCKPILE STABILITY ANALYSES

Stability analyses were undertaken to determine typical stockpile slopes and maximum stockpile heights. The location of the stockpiles as proposed by KGHM, on top of the East MRSF, will result in double handling of the overburden and topsoil material. Interim stockpile locations are unknown. Overburden and topsoil stockpile stability analyses results and recommendations are presented in Appendix F.

The stability analyses indicate a toe berm is required to improve the stability of the overburden and topsoil stockpiles and allow for efficient storage of the materials. The toe berm is required to achieve the minimum FOS of 1.3 for the End of Construction case based on the assumed phreatic surface. The inclusion of a toe berm also improves the drainage at the toe of the stockpiles which is a critical factor in maintaining the stability of the stockpile. The berm was assumed to be constructed of rockfill 3 m high with 2H:1V slopes.

Overburden stockpiles with a toe berm meet the required Factors of Safety for 3H:1V overall slopes and a maximum height of 15 m. The topsoil stockpile with a toe berm will require construction a 4H:1V overall slope to a maximum height of 10 m to meet the required Factors of Safety.

Stability results for overburden and topsoil stockpiles are summarized in Table 6.2.

Table 6.2 Stability Results for Overburden and Topsoil Stockpiles

	Factor of Safety Overall Stability End of Construction[3]	
	Static	**Seismic[1]**
Required Minimum Factor of Safety	**1.3**	**1.1**
Overburden Stockpile 3H:1V slopes at 25 m high	1.47	1.24
Topsoil Stockpile 4H:1V slopes at 10 m high	1.50	1.23

NOTES:

1. Seismic coefficient of 0.05 used for pseudostatic analysis, which corresponds to a peak ground acceleration of 0.10g (1 in 475 year event, site class C/D).
2. Slip surfaces are a minimum depth of 2 m.
3. End of construction stability assumes excess pore pressures in the fine grained foundation soils, pore pressure response factor, $\dot{B} = 0.4$.

7 – MINE SITE INFRASTRUCTURE FOUNDATION CONDITIONS

7.1 PROPOSED FACILITIES

This section provides descriptions of the material types and foundation conditions encountered during the site investigation program at the various mine site infrastructure components, including Primary Crusher, Truck Shop, and Explosives Facility, the locations of which are shown on Figure 7.1. The Plant Site geotechnical conditions and parameters are addressed in KP Geotechnical Report – Process Plant Site C002-KA39-RPT-10-009.

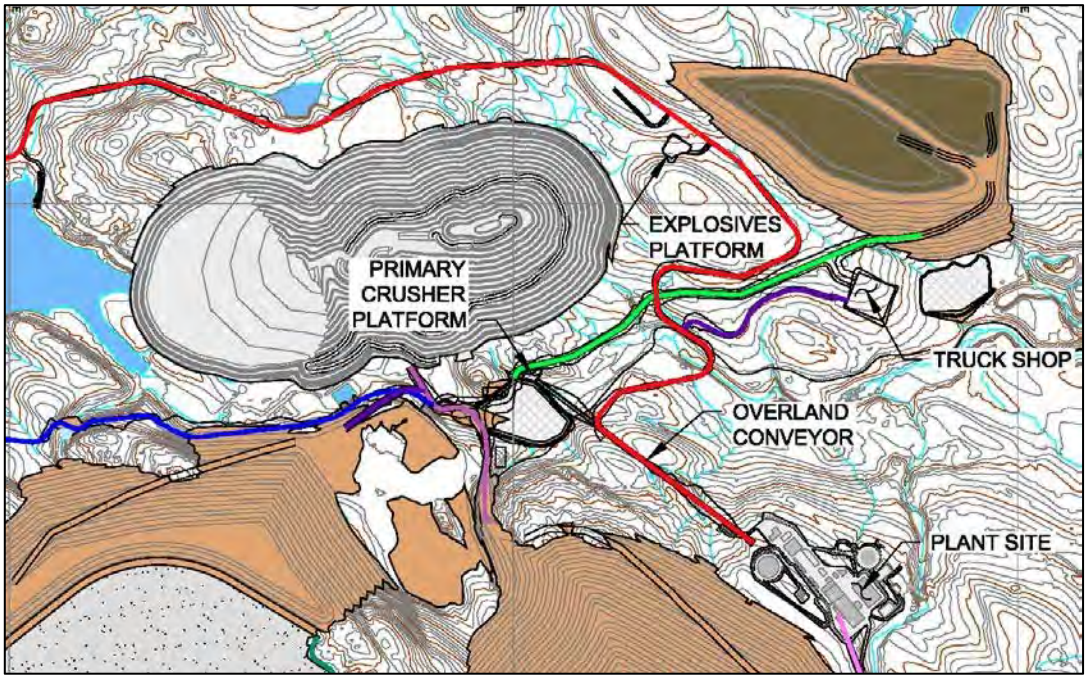


Figure 7.1 Mine Site Infrastructure Locations

Topsoil thicknesses beneath the Primary Crusher, Truck Shop and Explosives Facility vary from 0.2 to 0.3 m thick. Descriptions of the various surficial material, bedrock units and foundation conditions encountered during the site investigation program at the Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) along with the expected stratigraphic sequences are provided in the following sections. Test pits and drill holes located close to relevant structures are summarized in Table 7.1.

Table 7.1 Mine Site Infrastructure and Drill Hole and Test Pit Location Summary

Proposed Structure	Drill holes	Test Pits
Primary Crusher	DH14-058, 060, and 061	TP14-279 and 280
Truck Shop	DH14-052, 054, 056, 059, and BGC13-008	TP-BGC-10-39 and TP-BGC-13- 25
Explosives Facility	-	TP-BGC-13-31

7.2 PRIMARY CRUSHER

The Primary Crusher is situated at a topographic high point, between the Open Pit to the north and Peterson Creek to the south, at a proposed platform elevation (El.) of 910 m (KGHM, December 2, 2014). Three drill holes (DH14-058, DH14-060, and DH14-061) and two test pits (TP14-279 and TP14-280) were completed in the vicinity of the proposed Primary Crusher. The current elevation of the Primary Crusher is proposed to be 14 m higher than the current topography. Detailed descriptions of the material types and near surface foundation conditions at this site are outlined as follows:

- Overburden deposits encountered were primarily glacial till (SM-SC), consisting of silty sand to gravelly silt, less than 3.0 m thick.
- SPT's recorded N values of between N7 and N100[R] indicating loose to very dense glacial till.
- Bedrock is Sugarloaf Diorite, UCS testing has indicated a rock strength grading of R5 (very strong) indicating a compressive strength of between 26 and 265 MPa.
- A mean RMR_{89} value of 70 and mean RQD value of 90%, corresponding to "GOOD" quality rock.
- A Young's Modulus of 70 GPa and Poisson's Ratio, of 0.20.
- Seismic refraction lines were not completed across the Primary Crusher site.

The Primary Crusher's interpreted stratigraphic sequence is summarized in Table 7.2.

Table 7.2 Primary Crusher Stratigraphy Summary

Elevation (m)	Stratigraphy	Compaction/Strength
895.8 to 895.6 (0.2 m thick)	topsoil	
895.6 to 892.6 (3.0 m thick)	glacial till (SM-SC)	Compact to very dense (N7 to N100)
Below 892.6	Sugarloaf Diorite (slightly weathered to fresh)	Very strong (~149 MPa)

7.3 TRUCK SHOP

The foundation elevation of the Truck Shop is approximately El. 910 m (KGHM, August 7, 2014). The Truck Shop area is situated on a south facing gradually sloping hill to the east of the open pit. Four drill holes (DH14-052, DH14-054, DH14-056, and DH14-059) and two test pits (TP-BGC-10-39, and TP-BGC-13-25) were completed in the vicinity of the proposed Truck Shop.

Detailed descriptions of the material types and near surface foundation conditions at this site are outlined as follows:

- Overburden deposits encountered in the drill holes were primarily glacial till (SM-SC) silty sand to gravelly silt up to 61 m thick.
- In drill holes DH14-054 and DH14-059 glaciolacustrine deposits (ML-CL) were found at depths of 14.3 and 12.8, respectfully (El. 885 and 892 m).
- SPT's encountered N values between N7 and N100[R] in the glacial till, indicating loose to very dense.
- SPT's encountered N values of N100[R] in the glaciolacustrine soils indicating hard soils.

- Bedrock investigations encountered Sugarloaf Diorite and Iron Mask Hybrid in the drill holes at depths ranging from 41.5 to 61.6 m depth.
- Seismic refraction lines were not completed across the Truck Shop site.

The Truck Shop interpreted stratigraphic sequence is summarized in Table 7.3.

Table 7.3 Truck Shop Stratigraphy Summary

Elevation (m)	Stratigraphy	Compactness/Strength
905.8 to 905.6 (0.2 m thick)	topsoil	
905.6 to 885.5 (20.1 m thick)	glacial till (SM-SC to GM-GC)	Compact to very dense (N7 to N100)
885.5 to 858.4 (27.1 m thick)	glaciolacustrine (ML-CL)	Very dense (N100)
Below 858.4	Sugarloaf Diorite and Iron Mask Hybrid (fresh to slightly weathered)	Very strong (~150 MPa)

7.4 EXPLOSIVES FACILITY

The foundation elevation for the Explosives Facility is El. 945 m (KGHM, August 7, 2014). The proposed Explosives Facility is located in a small valley to the West of the EMRSF, between the EMRSF and the North East wall of the Open Pit, adjacent to the main haul road. A test pit (TP-BGC-10-31) was completed in the vicinity of the proposed Explosives Facility.

Detailed descriptions of the material types and near surface foundation conditions at this site are outlined as follows:

- Overburden deposits encountered in the test pit was glacial till described as sandy gravel (SM-SC to GM-GC).
- SPT N values were not available.
- Bedrock investigations encountered Iron Mask Hybrid and Picrite in the drill holes, at depths ranging from 8.7 to 29.3 m depth in drill holes over 150 m from the Explosives Facility location.
- Seismic refraction lines were not completed across the Explosives Facility site.

The Explosives Facility interpreted stratigraphic sequence is summarized in Table 7.4.

Table 7.4 Explosives Facility Stratigraphy Summary

Elevation (m)	Stratigraphy	Compactness/Strength
943.0 to 942.8 (0.2 m thick)	topsoil	
942.8 to 931.3 (11.5 m thick)	glacial till (SM-SC to GM-GC)	Dense
Below 931.3	Iron Mask Hybrid and Picrite (moderately to slightly weathered)	Very Strong to Medium Strong

8 – HAUL AND ACCESS ROAD FOUNDATION CONDITIONS

8.1 GENERAL

A number of haul and access roads have been designed by KGHM for the movement of material and access to mine site facilities. These roads are identified on Figure 8.1. Descriptions of the material types and foundation conditions encountered during the site investigation program along Haul and Access Road alignments are provided in the following sections. Test pits and drill holes located close to haul and access roads are summarized in Table 8.1.

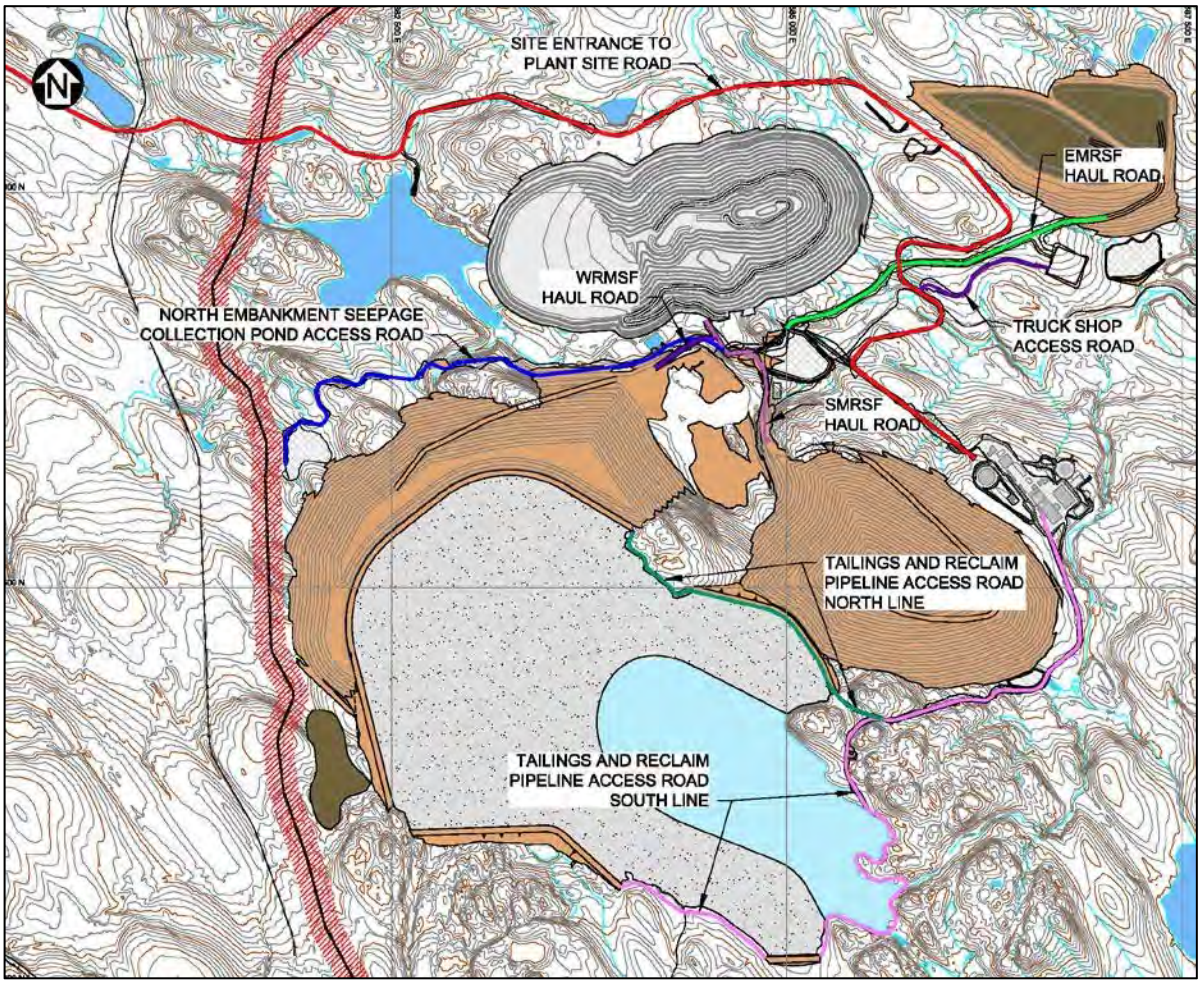


Figure 8.1 Haul and Access Road Alignments

Table 8.1 Drill Hole and Test Pit Location Summary of Haul and Access Roads

Proposed Structure	Drill holes	Test Pits
Site Entrance to Plant Site Road	DH-BGC11-PS-20, DH-BGC10-ND-01, DH14-007 and MW11-04	TP14-376, 377, 378, 379, 369, TP-BGC-10-63, 62, 61, 67, TP14-365, 364, 363, TP-BGC-10-32, TP14-361, TP-BGC-10-35, TP14-339, TP-BGC-13-23, TP14-333, 334, 332, 214, 213, 212, 322, 321, 320, and 319
EMRSF Haul Road from Open Pit to EMRSF	DH14-058 and DH14-060	TP14-283, 282, 280, 279, 278, 333, 337, TP-BGC-13-24, and TP14-343
Truck Shop Access Road	DH14-059 and BGC13-008	TP-BGC-13-24, 39, 37, and TP14-334
SMRSF Haul Road from Open Pit to EMRSF	DH14-065	TP14-283, 282, 218, 226, and 228
WMRSF Haul Road from Open Pit to WMRSF	-	TP14-240 and 234
North Embankment Seepage Collection Pond access road	BGC14-001, BGC14-002, and BGC14-003	TP14-283, 240, 236, 238, 232, 230, 074, 075, 076, 067, 071, 061, 062, 057, and 003
Tailings and Reclaim Pipeline Access Road North Line	BGC14-013, 014, 015, KAX-14-143, 147, DH14-037, DH14-002, 003, 005 and 017	TP14-329, 309, 308, 307, 306, 330, 279, 300, 301, 294, 264, 262, 086, 087, and 252
Tailings and Reclaim Pipeline Access Road South Line	BGC14-013, 014, 015, 017, DH14-017, 035, 038, 039	TP14-329, 309, 308, 307, 306, 330, 279, 300, 301, 177, 295, 296, 175, 180, 188, 186, 183, 184, 297, 189, 190, 191, 193, 195, 196, 200, 130, and 128

8.2 SITE ENTRANCE TO PLANT SITE ROAD

The Site Entrance to the Plant Site Road is approximately 14 km long road that extends from an off ramp on the Coquihalla Highway, along the north side of the Open Pit, crosses Peterson Creek then follows the Conveyor Corridor alignment to the Plant Site (El. 982 m). Twenty-nine test pits, listed in Table 8.1, were completed along the Site Entrance to Plant Site Road Alignment. Detailed descriptions of test pits along the road alignment are summarized in Table A2.5.

The geotechnical conditions encountered along the Site Entrance to Plant Site Road is predominantly glacial till subgrade (SM-SC to GM-GC). Topsoil averaging 0.2 m thick overlies the glacial till. Historic mine rock classified as coarse grained sand and gravel (SW-GW) was encountered to the north of the open pit in test pits TP14-369, TP-BGC-10-62, TP-BGC-10--61, and TP-BGC-10-67. Bedrock is close to surface in several sections (test pits TP14-379, 365, 364, TP-BGC-13-20, TP14-399, 214, and 320). Glaciofluvial (GM-SM) and glaciolacustrine (ML) deposits were encountered in the valley and terraces on either side of Peterson Creek (test pits TP14-214, 213, and 333).

8.3 EAST MRSF HAUL ROAD

The EMRSF haul road is approximately 3 km long and extends from the Open Pit to the EMRSF. Nine test pits, listed in Table 8.1, were completed along the EMRSF haul road alignment. Detailed descriptions of test pits along the road alignment are summarized in Table A2.6. The geotechnical conditions encountered along the EMRSF haul road are predominantly Glacial till subgrade (SM-SC to GM-GC Topsoil averaging 0.2 m thick overlying glacial till. Two test pits, TP14-280 and TP14-278, encountered bedrock at depths of 2.8 and 4.0 m respectfully. Test pits TP14-278 and TP14-333 encountered glaciofluvial deposits (GM-SM) and glaciolacustrine deposits (ML), respectfully.

8.4 TRUCK SHOP ACCESS ROAD

The Truck Shop Access Road is approximately 1 km long and extends from the Site Entrance to the Truck Shop platform. Four test pits, listed in Table 8.1, were completed along the alignment of the Truck Shop Access Road. Detailed descriptions of test pits along the road alignment are summarized in Table A2.7. The geotechnical conditions encountered along the Truck Shop Access Road found dense glacial till subgrade (SM-SC to GM-GC). Topsoil typically comprises a thin layer averaging 0.1 m thick.

8.5 SOUTH MRSF HAUL ROAD

The SMRSF Haul Road is approximately 1 km long and extends from the Open Pit to the SMRSF. Five test pits, listed in Table 8.1, were completed along the alignment of the haul road. Detailed descriptions of test pits along the road alignment are summarized in Table A2.8. The geotechnical conditions encountered along the SMRSF Haul Road are predominantly glacial till subgrade (SM-SC to GM-GC). A thin layer of topsoil averaging 0.2 m thick covers this alignment. One test pit, TP14-218, encountered bedrock at a depth of 0.3 m.

8.6 WEST MRSF HAUL ROAD

The WMRSF haul road is approximately 0.5 km long and extends from the Open Pit to the WMRSF. Two test pits, listed in Table 8.1, were completed along the alignment of the haul road alignment. Detailed descriptions of test pits along the road alignment are summarized in Table A2.9. The WMRSF haul road is located on a historic Mine Rock Storage Facility of predominantly gravel and cobbles (SW-GW).

8.7 NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD

The North Embankment Seepage Collection Pond Access Road is approximately 3.6 km long and extends from the Central Collection Pond along the toe of the WMRSF to the North Embankment Seepage Collection Ponds 1 and 2. Fifteen test pits, listed in Table 8.1, were completed along the North Embankment Seepage Collection Pond Access Road. Detailed descriptions of test pits are summarized in Table A2.10.

The geotechnical conditions encountered along the North Embankment seepage collection pond access road are predominantly Glacial tillGlacial till subgrade (SM-SC to GM-GC). A thin layer of topsoil averaging 0.2 m thick covers the alignment. A short section of the road approximately 1 km between TP14-240 and TP14-230 will be constructed on a historic Mine Rock Storage Facility, consisting of predominantly gravel and cobbles (SW-GW). Bedrock is encountered close to surface

between Seepage Collection Ponds 1 and 2 in test pits TP14-061, TP14-062, and TP14-003 at depths of between 0.6 and 1.3 m.

8.8 TAILINGS AND RECLAIM PIPELINE CORRIDOR ACCESS ROAD

8.8.1 General

The Tailings and Reclaim Pipeline Corridor Access Road extends alongside the tailings distribution pipeline and reclaim pipeline alignments to the TSF embankments to the North and South, and to the Reclaim Barge in the TSF Basin. The road diverges into two lines, a North Line, and a South Line after the Reclaim Water Tank, to the east of the TSF. The geotechnical conditions along these two branches of the Tailings Reclaim Pipeline Corridor Access Road are discussed in the following sections.

8.8.2 Tailings and Reclaim Pipeline Corridor Access Road – North Line

The Tailings and Reclaim Pipeline Corridor Access Road (North Line) is approximately 4.7 km long and follows an alignment from the Plant Site along the toe of the SMRSF to the East Embankment. The road progresses in stages up the hillside as the TSF is filled. Fifteen test pits, listed in Table 8.1, were completed along the Tailings and Reclaim Pipeline Corridor Access Road (North Line). Detailed descriptions of test pits along the road alignment are summarized in Table A2.11.

The geotechnical conditions encountered are mainly glacial till subgrade (SM-SC to GM-GC). A thin layer of topsoil averaging 0.3 m thick was encountered along the road alignment. Bedrock was encountered in several test pits (TP14-299, 300, 301, 294, 024, and 086) between 0.6 and 4.0 m depth. Test pit TP14-306 located in a natural drainage depression encountered glaciofluvial sand and gravel and seeping water.

8.8.3 Tailings and Reclaim Pipeline Corridor Access Road – South Line

The Tailings and Reclaim Pipeline Corridor Access Road (South Line) is approximately 6.5 km long and follows and alignment from the Plant Site along the toe of the SMRSF, across the Southeast Embankment to the South Embankment. Twenty-eight test pits, listed in Table 8.1, were completed along the Tailings and Reclaim Pipeline Corridor Access Road (South Line) alignment. Detailed descriptions of test pits along the road alignment are summarized in Table A2.12.

The geotechnical conditions encountered are mainly glacial till subgrade (SM-SC to GM-GC). A thin layer of topsoil averaging 0.3 m thick was encountered along the road alignment. Bedrock was encountered in several test pits (TP14-299, 300, 301, 297, 189, 196, and 130) between 0.6 and 4.0 m depth. Test pits TP14-306 and TP14-128 located in a natural drainage depressions encountered glaciofluvial sand and gravel and seeping water.

9 – GEOTECHNICAL PARAMETERS FOR FOUNDATION DESIGN

9.1 GENERAL

KP has developed preliminary geotechnical parameters for foundation design. The geotechnical parameters for foundation design are summarized below:

- Shear strength parameters
- Factored bearing resistance pressures
- Settlement calculations
- Estimated depth of frost penetration
- Adfreeze stresses
- Earth pressure coefficients
- Modulus of subgrade reaction, and
- Coefficients of base friction.

Descriptions of the assumptions and methodologies as well as the results are presented in the following sections.

Ongoing monitoring by the on-site Geotechnical Engineer during construction will be required to update and confirm foundation conditions and adapt foundation design as necessary.

For the purposes of calculating Factored Bearing Resistances, Moduli of Subgrade Reaction and estimating Foundation Settlement beneath the Primary Crusher, Truck Shop and Explosives Facility, it has been assumed that the facilities will be founded on glacial till (primary surficial material unit encountered), an engineered Structural Fill, or the respective bedrock unit beneath each structure.

Facilities with an interpreted depth to bedrock of greater than 15 m beneath the building pad surface elevations are considered to have footings on surficial overburden deposits or an engineered Structural Fill, and not on bedrock.

9.2 MATERIALS DESIGN SHEAR STRENGTH PARAMETERS

Shear strength parameters were developed for the various materials found at the sites based on the USCS and USGS classification systems, from typical representative parameters for the individual materials, from field observations and estimates of material properties, and from testing of samples from test pits and drill holes throughout the site. These parameters may be used for both in-situ and compacted materials and represent the lower bound values. The recommended shear strength parameters for soil and rock subgrade materials are summarized in Table 9.1 and Table 9.2.

Table 9.1 Design Shear Strength Parameters for In-Situ Overburden, Waste Rock and Engineered Fill Materials

Material Description	USCS Classification	Unit Weight KN/m^3	Friction Angle (degrees)	Cohesion (c') (kPa)	Poisson's Ratio	Young's Modulus (MPa)
Structural Fill	GW-SW	21.0	36°	0	0.3	100
Anthropogenic Mine Rock	GM	21.5	35°	0	0.3	50
Colluvium	GC-GM	21.5	35°	10	0.3	50
Loess	ML-MH	17.0	30°	15	0.3	15 - 60
Glacial till	SM-SC to GM-GC	21.5	34°	0	0.3	200
Glaciofluvial	GW	21.0	36°	0	0.2	50 - 100
Glaciolacustrine	ML-CL	17.0	26°	25	0.3	20
Haul Road Wearing Course	GP	22.0	45°	0	0.2	100

NOTES:
1. Subgrade materials determined from 2014 site investigation program (VA101-244/26-11 Rev 0 March 23, 2015).
2. Representative shear strength parameter values provided by www.geotechdata.info.
3. Young's Modulus and Poisson's ratio determined from 'Foundation Analysis and Design", 5th edition (Bowles, 1997).

Table 9.2 Design Shear Strength Parameters for Bedrock

Bedrock Lithology	25th Percentile RMR_{89}	Average RQD (%)	GSI	Average UCS $\sigma_{ult\ (r)}$ (MPa)	Intact Rock Modulus E_i (GPa)	Poisson's Ratio υ
Sugarloaf Diorite (Primary Crusher)	67	90	69	150	70	0.20
Picrite (Explosives Facility)	53	61	56	25	3	0.25
Iron Mask Hybrid (Explosives Facility)	46	55	47	150	90	0.27

NOTES:
1. Subgrade materials determined from 2014 site investigation program (VA101-244/26-11 Rev 0 March 23, 2015.
2. RMR_{89} and JCR_{89} values are 25th percentile values from drill hole logs.
3. Representative values for the intact rock modulus, E, determined from "The Deformation Modulus of Rock Masses" (Palmström & Singh, 2001) and laboratory testing data.
4. Typical values for Poisson's ration from "Principles of Engineering Geology" (Johnson & Degraff, 1998) and laboratory testing data.
5. Geological Strength Index (GSI) calculated as per Hoek. et. al (2013).

9.3 FACTORED BEARING RESISTANCE AND ALLOWABLE BEARING PRESSURE

9.3.1 General

Coarse grained soils with fines to fine grained soils are present on site with depths ranging from surface to 46 m (Truck Shop). The following structures will be placed on the subgrade materials

described in Table 9.1 and Table 9.2 based on building pad elevations and preliminary layouts proposed by KGHM:

- Primary Crusher
- Truck Shop
- Explosives Facility
- Mine Haul and Access Roads:
  - Site Entrance to Plant Site Road
  - East MRSF Haul Road
  - South MRSF Haul Road
  - West MRSF Haul Road
  - Truck Shop Access Road
  - North Embankment Seepage Collection Pipeline Access Road
  - Tailings and Reclaim Pipeline Corridor Access Road – North Line, and
  - Tailings and Reclaim Pipeline Corridor Access Road – South Line.

Factored Bearing Resistances for the Primary Crusher, Truck Shop and Explosives Facility foundations on Structural Fill, in-situ Overburden, and Bedrock units are summarized in Sections 9.3.2 and 9.3.3. Ultimate Bearing Capacity for Haul Road Wearing Course material is summarized in Section 9.3.4.

9.3.2 Factored Bearing Resistances and Allowable Bearing Pressures for Foundations on Structural Fill or In-Situ Overburden

The factored bearing resistance pressures, q_F, for various footing geometries placed on compact to very dense in-situ overburden materials were estimated using surficial material shear strength values (as presented in Table 9.1 and a resistance factor, R_F, of 0.5 as outlined in the National Building Code of Canada (NBCC, 2010). Spread, mat, and strip footings with widths varying from 3 m to 18 m were evaluated using the bearing capacity equations as per Vesic (1975).

$$q_{ult} = c' N_c S_c + q_s N_q S_q + \frac{1}{2} \gamma B N_\gamma S_\gamma$$

Where: q_{ult} = Ultimate Bearing Capacity of the subgrade material (MPa)
c' = Cohesion of subgrade material (kPa)
γ = Dry unit weight of subgrade material (kN/m^3)
B = Width of footing (m)
q_s = $\gamma \times D$ (kPa)
D = Embedment depth of the foundation (m)
N_i = Dimensionless bearing capacity factors as per Hansen (1970) & Meyerhof (1963)
S_i = Dimensionless modification factors for foundation shape, inclination, depth, tilt and ground shape, as per Vesic (1975)

Allowable bearing pressures, q_{allow}, were estimated by applying a FOS (estimated to be 1/3) to the ultimate bearing capacities, q_{ult}, for each footing, i.e.

$$q_{allow} = \frac{q_{ult}}{3}$$

The factored bearing resistance values and allowable bearing pressures for the Primary Crusher, Truck Shop and Explosives Facility founded on naturally occurring, in-situ glacial till soils, and on engineered Structural Fill are summarized in Tables G1.1 and G1.8 for embedment depths of D = 0 m to D = 5 m.

Factored bearing resistances, q_F, for foundations on glacial till and Structural Fill, for various footing depths, are summarized in Table 9.3 below, with the lower bound values representing the glacial till, and the upper bound values representing the Structural Fill.

Table 9.3 Factored Bearing Resistances, q_F, for Various Footing Depths

Building Foundation	D = 0 m	D = 1 m	D = 2 m	D = 5 m
Mine Truck Wash Building	<0.5 MPa	~1 MPa	1.5 – 2 MPa	4 – 5 MPa
Mine Truck Shop Building	<0.5 MPa	~1 MPa	1.5 – 2 MPa	4 – 5 MPa
Gate House/Truck Scale	<0.5 MPa	~1 MPa	1.5 – 2 MPa	4 – 5 MPa
Explosives Manufacturing Building	<0.5 MPa	~1 MPa	1.5 – 2 MPa	4 – 5 MPa
Explosives Storage Building	<0.5 MPa	~1 MPa	1.5 – 2 MPa	4.– 5 MPa
Primary Crusher	2 – 2.5 MPa	2 – 3 MPa	3 – 4 MPa	5 – 6 MPa

The maximum anticipated factored foundation load is 0.8 MPa at the centre foundations for the Primary Crusher (Fluor, 2015), thus competent Structural Fill or glacial till is considered suitable to support the foundations for the proposed maximum factored bearing pressures proposed. Settlements below the foundations must also be considered to confirm an acceptable factored bearing pressure for the structures, which is discussed in Section 9.4.1.

9.3.3 Allowable Bearing Pressures for Foundations Placed on Bedrock

The allowable bearing pressures for various footing geometries placed on bedrock have been estimated based on intact rock strength parameters and rock mass quality. 25th percentile RMR_{89}, average RQD and average UCS values have been determined from field estimates and available laboratory testing data and are summarized in Table 9.2. Spread and strip footings with widths varying from 3 m to 4.5 m, and a mat footing of width 18 m were evaluated using the bearing capacity equations of Wyllie (1999).

$$q_{ult} = C_{Fi}\sqrt{S}\,\sigma_{ult}\left[1+\sqrt{\left(\frac{m}{\sqrt{S}}+1\right)}\right] \qquad \text{for D = 0 m}$$

Where: q_{ult} = Ultimate Bearing Capacity of the subgrade material (MPa)
C_{Fi} = Foundation Shape Factor (as per Wyllie, 1999)
σ_{ult} = Unconfined Compressive Strength (UCS) of subgrade material (MPa)
m, S = Empirical geological constants as per Hoek et al (2002)
D = Embedment depth of foundation (m)

Allowable bearing pressures, q_{allow}, were estimated by applying a FOS (estimated to be 1/3) to the ultimate bearing capacities, q_{ult}, for each footing, i.e.

$$q_{allow} = \frac{q_{ult}}{3}$$

The allowable bearing pressures for footings placed on intact bedrock for the various lithologies encountered at the Primary Crusher and the Explosives Facility are summarized in Tables G2.1 to G2.3.

The anticipated average allowable bearing pressures, q_{allow}, of planned foundations are approximately >10 MPa for the Primary Crusher (for a mat foundation on Sugarloaf Diorite), and between 1.5 MPa (for spread foundations on Picrite) and 8 MPa (for spread foundations on Iron Mask Hybrid) for the Explosives Facility components.

Bedrock was encountered at depths of greater than 15 m below natural ground surface at the Truck Shop, and as such these structures were not assessed for factored bearing resistance for foundations placed on bedrock.

9.3.4 Ultimate Bearing Capacity for Haul Road Wearing Course

An equation for calculating the ultimate bearing capacity for wearing courses on mine haul roads was developed by Tannant & Regensburg (2001) combining aspects of bearing capacity equations for undrained conditions from Prandtl (1920), Terzaghi (1943) and Bowles (1984). The equation, as described below, estimates the ultimate bearing capacity by using surficial shear strength values for a crushed gravel material (typical values presented in Table 9.1) in conjunction with vehicle tire properties (as per manufacturers specifications).

$$q_{ult} = 1.3\, c'\, N_c + \gamma\, D\, N_q + 0.6\, \gamma\, R\, N_\gamma$$

Where: D = Footing Depth (m)
R = Footing Radius (m)
γ = Dry Unit Weight of Haul Road Wearing Course Material (kN/m^3)
c' = Cohesion value of Haul Road Wearing Course Material (kPa)
N_i = Terzaghi Bearing Capacity Factors (friction angle, ϕ, dependent) (Bowles, 1984).

For haul roads, the load exerted by a tire can be approximated by a circular footing. For a tire, the footing depth, D, is zero (i.e. contact with haul road wearing course surface) and the footing radius is equal to half of the static loaded width of the largest tire for which the haul road has been designed.

For contractor haul roads, the largest vehicles for which the haul roads have been designed are CAT 777D Haul Trucks (KP, 2014c) and CAT 740 Haul Trucks (KP, 2014c). Bearing capacity calculations estimate a bearing capacity, q_{ult}, of 1,600 kPa is to be expected for a haul road wearing course of compacted gravel for contractor haul roads using tire specification data from the Caterpillar Performance Handbook (CAT, 2014).

A factor of safety, FOS, for bearing capacities on haul roads can be calculated by dividing the ultimate bearing capacity, q_{ult}, by the applied stress which is assumed equal to the maximum tire inflation pressure (Tannant & Regensburg, 2001). Bowles (1984) recommends a minimum factor of safety of 2.0 for cohesionless soils (e.g. compacted gravels).

Factors of Safety for contractor haul roads are approximately 2.0 and 2.7 for CAT 777D and CAT 740 Haul Trucks, respectively, and can therefore be considered acceptable load bearing roads.

For mine haul roads, the largest vehicles for which the haul roads have been designed are assumed to be either CAT 793D Haul Trucks or CAT 797F Haul Trucks. Bearing capacity calculations estimate that bearing capacities, q_{ult}, of 2,525 kPa and 3,300 kPa can be expected for haul road wearing courses for Cat 793D and CAT 797F trucks, respectively, using tire specification data from the Caterpillar Performance Handbook (CAT, 2014).

Factors of Safety for mine haul roads are approximately 3.2 and 4.7 for CAT 793D and CAT 797F Haul Trucks, respectively, and can therefore be considered acceptable load bearing roads.

9.4 ESTIMATED SETTLEMENT

9.4.1 General

The soils encountered in the area are compact to very dense (stiff to hard for fine grained soils). Representative values for Young's Modulus for each subgrade material were selected to estimate the settlement for foundations placed on these materials.

Facilities with an interpreted depth to bedrock of greater than 15 m beneath the building pad surface elevations (Fluor, 2015) are considered to have footings on surficial overburden deposits or an engineered structural fill, and not on bedrock.

9.4.2 Settlement Calculations for Foundations on Structural Fill or In-Situ Overburden

Settlement estimates for various footing geometries with varying compressible thicknesses were completed for footings placed on naturally occurring subgrade soil materials and an engineered Structural Fill using the method recommended by Mayne & Poulos (1999) for spread footings, Poulos & Davis (1974) for circular footings and strip footings, and Timoshenko & Goodier's Theory of Elasticity (1951) for mat footings.

The estimated settlements for the structures for foundations with an embedment depth of D = 2.0 m (recommended embedment depth as per Section 9.5.1) range from 12 mm to 18 mm for foundations on Structural Fill and from 6 mm to 9 mm for foundations on glacial till. Specific footing geometries and estimated foundation settlement for each structure founded on both Structural Fill and glacial till are summarized in Table 9.4, and in greater detail in Tables G1.1 to G1.8, for embedment depths of D = 0 m to D = 5 m. The lower bound values represent foundations on glacial till, and upper bound values representing foundations on Structural Fill.

Table 9.4 Estimated Foundation Settlement, S, for Various Footing Depths

Building Foundation	D = 0 m	D = 1 m	D = 2 m	D = 5 m
Mine Truck Wash Building	8 – 16 mm	8 – 15 mm	8 – 15 mm	8 – 15 mm
Mine Truck Shop Building	8 – 16 mm	8 – 15 mm	8 – 15 mm	8 – 15 mm
Gate House/Truck Scale	9 – 19 mm	9 – 18 mm	9 – 18 mm	9 – 18 mm
Explosives Manufacturing Building	6 – 13 mm	6 – 13 mm	6 – 12 mm	5 – 10 mm
Explosives Storage Building	6 – 13 mm	6 – 13 mm	6 – 12 mm	5 – 10 mm
Primary Crusher	8 – 17 mm	8 – 16 mm	8 – 15 mm	6 – 12 mm

9.4.3 Settlement Calculations for Foundations Placed on Bedrock

Foundation settlement for structures, with various footing geometries, placed on intact bedrock was estimated using the method recommended by Wyllie (1999) and the Canadian Foundation Engineering Manual (2006). The Hoek, E. et al (2006) approach was used to estimate the rock mass elastic modulus from the intact rock strength parameters. Rock mass elastic moduli were estimated from the intact bedrock strength parameters for each bedrock type encountered in the vicinity of the Primary Crusher and the Explosives Facility (as per Section 7).

The total settlement for spread and strip footings for the footing sizes and applied bearing pressures provided by Fluor (2015), placed on intact bedrock or on concrete placed between the foundation and intact bedrock surface were estimated to be < 1mm for the Primary Crusher building foundation on a Sugarloaf Diorite subgrade, approximately 2 mm for the Explosives Facility structures founded on a Picrite subgrade, and <1 mm for the Explosives Facility structures founded on an Iron Mask Hybrid subgrade.

The estimated settlements for the structures are presented in Tables G2.1 to G2.3 for specific footing geometries for the Primary Crusher building foundation on Sugarloaf Diorite and the Explosives Facility foundations on Iron Mask Hybrid and Picrite subgrades respectively.

Bedrock was encountered at depths of greater than 15 m below natural ground surface at the Truck Shop, and as such these structures were not assessed for foundation settlement for foundations placed on bedrock.

9.5 FROST ACTION

Frost heave and frost jacking are the two most troublesome consequences of surficial material freezing. The components which cause surficial material heaving to occur are as follows:

- Freezing temperatures in surficial materials
- A water source, and
- A frost-susceptible surficial material.

Common approaches to mitigate frost heaving in foundations consist of sufficient foundation burial depth below frost penetration depth, over-excavation to estimate frost penetration depth and replacement with non-frost susceptible backfill material and the induction of proper drainage and

thermal protection. The preliminary depth of frost penetration and adfreeze pressure recommendations are provided in the following sections.

9.5.1 Depth of Frost Penetration

Frost penetration estimates have been calculated assuming no snow cover and site specific design freezing indices. Design freezing indices were evaluated using site specific data from National Climate Data Archives and the nearby Ajax Met (AjaxMET) and the Golder and Associates Site Meteorology (GoldMET) stations (located 8.6 km and 8.7 km northwest of the Plant Site at elevations of 950 m and 940 m respectively). The degree days at the site were found to vary from 540 °C-days to 614 °C-days depending on site temperature data from a limited period of record. A mean freezing index of 574°C-days and a mean annual air temperature of 6.3°C was recommended for site conditions for the Ajax Project (KP, 2012).

The frost penetration depth was estimated for the site using the following parameters:

- Freeze degree days index = 574°C -days
- Freeze days = 100 days
- Mean annual temperature = 6.3°C
- Dry backfill surficial material density of 21.5 kN/m^3 with moisture content of 8.6% for glacial till
- Dry backfill surficial material density of 21.0 kN/m^3 with assumed moisture content of 2% for Structural Fill, and
- Frost depth estimates have been calculated assuming that the area is cleared of snow.

The design freezing index used in frost penetration depth estimates is typically derived from averaging the three coldest winters from a consecutive data set of the most 30 years. An alternative approach, in the absence of 30 years of physical data from the site and to avoid speculation on regional values adjusted to site, is to use a factor of safety applied to the frost penetration depth estimates below, which may be as high as 2 based on the level of risk for the structure.

Preliminary frost penetration depths of approximately 2.0 m for glacial till material and approximately 2.5 m for Structural Fill material were estimated for the Project using the methodology provided in the Canadian Foundation Engineering Manual, 4th Edition (2006). The recommendations outlined below provide the foundation designers guidance in preliminary design layouts which can be addressed in more detail based on the risk of the structure and how it will be operated. Preliminary recommendations are as follows:

- Buried services - Assume snow free - Potential to cross cut fine grained and coarse grained soil types where the frost penetration depth varies based on material type and backfill – use 2.5 m burial depth or reduce depth of burial to 2.0 metres with the use of insulation.
- Foundations:
  - Foundations on coarse grained soil use 2.5 m.
  - Foundations on fine grained soils use 2.0 m.
  - Cold and heated buildings – Unheated as above. Heated buildings will require structure specific assessment based on heat transfer from structure to foundation, foundation material, and proposed backfill materials.

The degree of days and estimated frost penetration depths were checked against prescriptive Kamloops standards. Kamloops has the following parameters (from climate data for 1981 to 2010 from the National Climate Data and Information Archive):

- Freeze degree days index = 330°C -days
- Freeze days = 119 days
- Mean annual temperature = 9.3°C

Frost penetration depth estimates of between 1.1 and 1.2 m can be estimated for Kamloops developed from available climate data. The greater freezing degree days observed at the site (as recorded by the AjaxMET and GoldMet stations) account for the deeper frost penetration depths estimated for the Ajax Project Site.

Many factors influence the depth of frost penetration below foundations for heated structures. Some of these factors may include the subgrade condition, moisture condition at or below the foundation grade, temperature inside the building during the cold weather condition, whether the building is permanently heated during the cold weather condition, and the rate of heat transfer from the building to footing grade.

9.5.2 Foundation Protection

Concrete footings should not be placed on frozen surficial material and the surficial material beneath the footings should not be allowed to freeze during or after construction. Concrete footings should be protected from the inclement weather and proper curing conditions should be established as outlined in the Canadian Standards Association concrete specifications (CSA, 2009).

9.5.3 Adfreeze Pressures

Adfreeze pressures against concrete and steel surfaces are affected by the surficial material type, moisture content, surficial material temperature, and rate and magnitude of heave at the surface. Adfreeze stresses are higher against steel relative to soil, wood, and concrete. The surface roughness is a contributing factor to the magnitude of the adfreeze bond. The Canadian Foundation Engineering Manual (2006) suggests average adfreeze bond stresses (determined from field tests) typically range from 65 kPa for fine-grained surficial materials frozen to wood or concrete and up to 100 kPa for fine-grained surficial materials frozen to steel. Adfreeze stresses in saturated very cold, coarse grained surficial materials frozen to steel can reach up to 150 kPa.

9.6 EARTH PRESSURE COEFFICIENTS

The coarse grained soils with fines encountered at the site are highly frost susceptible and therefore not suitable for reuse as structural backfill behind walls. Coefficients of lateral earth pressure have been estimated for subgrade materials as summarized in Table 9.5. The estimates assume a vertical retaining wall with free draining subgrade material placed behind the wall in horizontal lifts.

Table 9.5 Earth Pressure Coefficients for Subgrade Materials

Material Description	Friction Angle (degrees)	Coefficient of Earth Pressure at Rest K_0	Coefficient of Active Earth Pressure K_a	Coefficient of Passive Earth Pressure K_p
Structural Fill	36°	0.41	0.26	3.85
Glacial Till	34°	0.44	0.28	3.54

9.7 MODULUS OF SUBGRADE REACTION

The modulus of subgrade reaction defines the relationship between surficial material pressure and deflection.

9.7.1 Modulus of Subgrade Reaction for Foundations on Structural Fill or In-Situ Overburden

The modulus of subgrade reaction for in-situ overburden and Structural Fill can be estimated for various footings using the formula below:

$$Ks = q/s$$

where Ks = modulus of subgrade reaction (kPa/m).
q = applied pressure
s = settlement of footing under applied pressure q

The modulus of subgrade reaction for a mat foundations bearing on in-situ surficial material or an engineered Structural Fill can be determined by using a formula proposed by Vesic (1961a, 1961b) that simplifies to:

$$k_s = \frac{E_s}{(B \times (1-\mu^2))}$$

where k_s = modulus of subgrade reaction (kPa/m).
E_s = modulus of elasticity (kPa)
B = width of the slab (in metres)
μ = Poisson's ratio

The modulus of subgrade reaction values for the Primary Crusher for footings with an embedment depth of D = 2.0 m (recommended embedment depth as per Section 9.5.1) range from 6 MPa/m for footings on Structural Fill, to 12 MPa/m for footings on glacial till. Moduli of subgrade reaction for the Primary Crusher, Truck Shop and Explosives Facility structures with foundations on Structural Fill and glacial till are summarized in Tables G1.1 to G1.8 for footing embedment depths of D = 0 m and D = 5 m.

9.7.2 Modulus of Subgrade Reaction for Foundations on Bedrock

The modulus of subgrade reaction for a mat foundation on bedrock has been calculated according to the following approximation as per Bowles (1997):

$$k_s = 40(FS)q_{ALLOWABLE}$$

Where: $q_{ALLOWABLE}$ = allowable bearing capacity
FS = 3

Deflections are expected to be small for foundations bearing on rock and an order of magnitude estimate of the modulus of subgrade reaction will be sufficient for the structural analysis of mat foundations. The typical modulus of subgrade reaction for the Primary Crusher building foundation (mat footing) on a Sugarloaf Diorite subgrade is estimated to be approximately 5,000 MPa/m.

9.8 COEFFICIENT OF BASE FRICTION

The coefficient of base friction (tan δ) is a term used in the design of retaining walls and friction between the subgrade material and the base of the wall. In the above term "δ" is the angle of wall friction. The angle of the wall friction (δ) should be in the range of 0.6 to 0.8 of ϕ' (USACE, 1994). The effective friction angle (ϕ') for rough bedrock is 40 degrees. Recommended coefficients of base friction (tan δ) are summarized in Table 9.6.

Table 9.6 Coefficients of Base Friction

Material Description	Friction Angle ϕ' (degrees)	Coefficient of Base Friction Range tan δ	Recommended Value tan δ
Bedrock	40°	0.45 – 0.62	0.5
Structural Fill	36°	0.41 – 0.57	0.5
Glacial till	34°	0.40 – 0.55	0.4

Table 9.6 recommends an overall coefficient of base friction (tan δ) of 0.4 be used for concrete foundations placed on coarse-grained soils with fines (e.g. glacial till), and a coefficient of base friction (tan δ) of 0.5 be used for Structural Fill and for concrete foundations placed on bedrock with rough (non-smooth) surfaces.

10 – SITE GRADING RECOMMENDATIONS

10.1 GENERAL

The material types encountered at the various Mine Site Infrastructure (Primary Crusher, Truck Shop and Explosives Facility) and Haul Road alignments have been grouped into the following categories:

- Topsoil layer (PT)
- Glacial till and other Coarse Grained Soils with Fines (GM-GC, SM-SC)
- Coarse grained soils (GW-GP, GM, SW, SM)
- Fine grained soils (ML, CL)

General recommendations for subgrade preparation, cut slopes for excavation, rippability of bedrock and structural and common fill specifications are presented in the following sections.

10.2 SUBGRADE PREPARATION

All areas to be rough graded must be cleared and grubbed and all organic material and topsoil shall be removed and stockpiled. After the topsoil has been removed in the work area, the in situ soil subgrade material should be scarified and moisture conditioned, if necessary, and compacted to a minimum 95% Standard Proctor maximum dry density. Local soft and/or wet areas material require removal and replacement with Structural Fill as directed by the Geotechnical Engineer.

Foundation subgrade improvement may be required if unsuitable material such as loose/soft surficial material, water softened surficial material (e.g. Colluvium, Loess, Glaciolacustrine soils, etc.), highly weathered bedrock, fractured bedrock zones or any other unsuitable material are encountered at foundation excavation during construction. This likely would consist removing the unsuitable material and replacing with concrete or Structural Fill as recommended by the Geotechnical Engineer.

Ongoing monitoring by the on-site Geotechnical Engineer during construction will be required to update and confirm foundation conditions and adapt foundation design as necessary.

10.3 EXCAVATION

The following are general recommendations for temporary and permanent cut slope angles in soil, rippable rock, and rock.

10.3.1 Cut Slopes in Soils

Temporary cut slopes in natural soils and waste rock materials should be sloped not steeper than 1.5H:1V. Steeper slopes up to 1H:1V may be possible provided the slope height does not exceed the heights stipulated by Worksafe BC regulations.

Permanent cut slopes in natural soils and waste rock materials should not exceed 2H:1V or as required by the Ministry of Energy and Mines permitting requirements and reclamation objectives.

10.3.2 Rippable Bedrock

Rippable rock is defined as material which can be removed by hand or accepted mechanical excavation methods up to and including removal by ripping and bulldozing. The typical machinery used to define rippability is a track mounted dozer, at least equivalent to a Caterpillar D9L in weight and horsepower and equipped with a single tooth articulated ripping attachment or, in confined

areas, by mechanical hydraulic shovel at least equivalent to a Caterpillar 225 fitted with a rock bucket of one cubic meter capacity.

The rippability of a rock mass is dependent on the intact strength of the rock, as well as the persistence, spacing and orientation of any discontinuities. The lithological units encountered beneath the Truck Shop and the Primary Crusher (Sugarloaf Diorite and Iron Mask Hybrid) are not considered to be rippable due to their high intact strength and relative competency of the rock. The Picrite unit encountered beneath the Explosives Facility, while weak and rippable elsewhere on site, has a higher intact strength and higher competency of rock in this location, and as such is not considered rippable.

10.3.3 Cut Slopes in Bedrock

Non-rippable bedrock, defined as material which cannot be removed by methods specified in the previous section, normally requires recognized quarrying methods such as drilling and blasting to excavate. Assuming favourable slope orientation, and no adverse geological condition, permanent cut slopes in rock should be no steeper than 0.5H:1V. Rock slopes exceeding 8 m should include a minimum 4 m wide bench.

10.4 STRUCTURAL FILL

Structural Fill should consist of reasonably well-graded hard, durable, free draining, crushed sands and gravels. It should be free of organics, frozen material and other deleterious debris and should have a Plasticity Index less than 6. The following Structural Fill material gradation specification is recommended:

- Structural Fill should contain between less than 5 percent passing a 0.075 mm sieve and maximum aggregate size not exceeding 100 mm.
- Non-frost susceptible Structural Fill (if required) should have the following gradation limits:

Table 10.1 Non-Frost Susceptible Structural Fill Specifications

Sieve Size or Particle Size(mm)	Percent Passing by Weight
75	100
25	50 - 100
4.75	20 - 60
1.18	10 - 40
0.075	0 - 10

Structural Fill materials should be moisture conditioned for compaction before and/or during placement. The material should be placed, spread, and levelled and compacted in lifts not exceeding 300 mm. Each lift should be compacted to a minimum 98% Standard Proctor Maximum Dry Density (ASTM D698) or 75% of maximum relative density for granular materials.

Where Structural Fill material is used as a foundation under structures, the fill should project a minimum from the edge of the proposed footing at a maximum slope of 1H:1V to allow for distribution of stresses. Fill slopes constructed as described above should be constructed with side slopes of 2H:1V or flatter.

Non-frost susceptible Structural Fill gradation limits are shown on Figure 10.1.

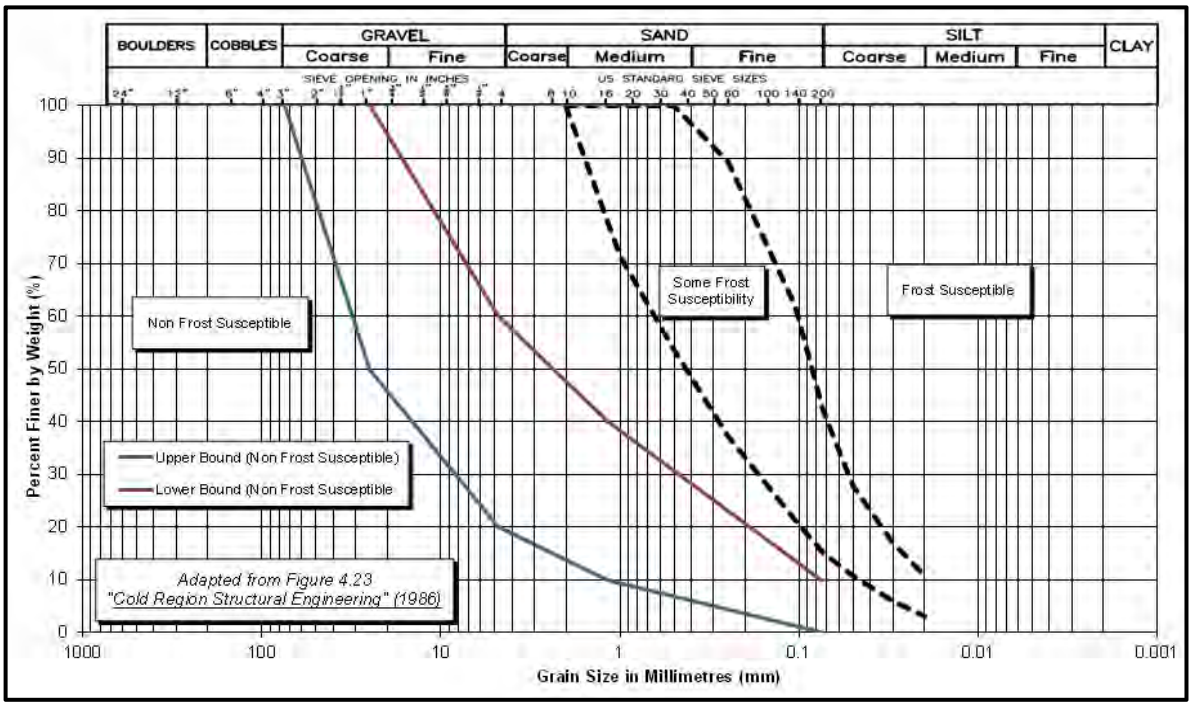


Figure 10.1 Non-Frost Susceptible Structural Fill Gradation Summary

10.5 COMMON FILL

Compacted common fill (coarse grained soils with fines) may be used for general backfill outside of the influence footprint of structures. The common fill maximum particle size should be less than 500 mm and should contain less than 30 percent fines (passing a 0.075 mm sieve). Common fill material should be placed in maximum 500 mm lifts. Each lift of fill should be moisture conditioned prior to compaction to within 2 percent of the optimum moisture content for compaction, and should be compacted to minimum 95% Standard Proctor Maximum Dry Density (ASTM D698). Temporary fill slopes in rockfill material may be constructed to a maximum grade of 1.5H:1V provided the fill is maintained in a free draining condition. The final grade of slopes in common fill should not exceed 2H:1V or as required by the Ministry of Energy and Mines permitting requirements and reclamation objectives.

Common fill gradation limits are shown on Figure 10.2.

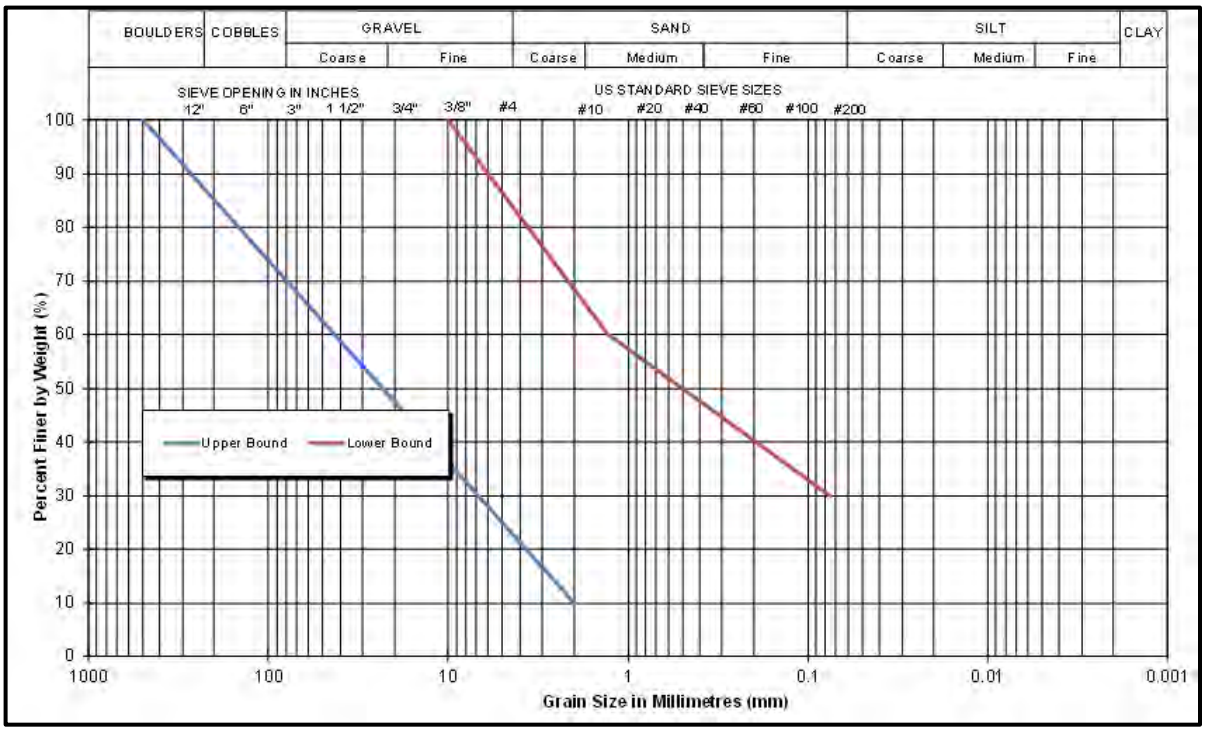


Figure 10.2 Common Fill Gradation Summary

10.6 DESIGN CRITERIA FOR HAUL ROAD CONSTRUCTION

The following haul road design criteria are general and for layout purposes only and will require re-evaluation for site specific conditions, particularly if significant depths of soft ground are encountered. The preliminary design criteria and general recommendations for haul road construction are as follows.

- The subgrade materials expected to be encountered on-site include bedrock outcrops, glacial till, colluvium, glaciofluvial, loess, glaciolacustrine materials and anthropogenic waste rock with minor thicknesses of overlying organic topsoil.
- All organic topsoil and soft superficial materials (e.g. loess, glaciolacustrine deposits) should be stripped prior to sub-base placement.
- In-situ and laboratory testing should be undertaken in indicative subgrade materials to verify adequate subgrade strength prior to road construction.
- Where an overburden subgrade is encountered the strength of the subgrade shall be verified by laboratory CBR or appropriate approved in-situ testing method.
- Where the subgrade CBR is determined to be less than 30, the subgrade shall be removed and replaced with 300 mm clean gravels, clean waste rock or shot rock. Sub-base material should have a maximum particle size of 0.5 m (or 2/3 the thickness of the sub-base layer), and less than 10% fines passing the 75 micron sieve (i.e. Common Fill, in accordance with Figure 10.2).
- CBR testing has not been completed on materials sampled from the site, however, free draining in-situ historic waste rock material can be expected to achieve a soaked CBR value of between 10 to 30%.

- Road fill materials should be compacted with multiple passes of fully loaded mine haul trucks in maximum 500 mm lifts.

Recommended minimum wearing course thicknesses on a minimum subgrade California Bearing Ratio (CBR) for contractor haul/access road (Tannant & Regensburg, 2001) are provided in Table 10.2 below, and are based on the use of a loaded CAT 777D as the design vehicle.

Table 10.2 Recommended Minimum Wearing Course Thickness for Contractor Haul/Access Road Construction

Minimum CBR (%)	Typical Subgrade Material[2]	Minimum Wearing Course Thickness[1] (m)	Minimum Thickness of Subgrade Replacement
N/A	Bedrock	0.15	Subgrade Replacement not required
30	Dense Anthropogenic Waste Rock	0.3	
15	Dense Glacial till, Colluvium, Glaciofluvial	0.45	0.15
10	Loose Waste Rock, Glacial till, etc.	0.6	0.3

NOTES:
1. Minimum cover thickness is inclusive of the sub-base, base course and surface course of the road prism.
2. Soft surficial materials (e.g. loess, glaciolacustrine deposits, organics and topsoil, etc. assumed removed prior to haul road construction).

Recommended minimum wearing course thicknesses on a minimum subgrade California Bearing Ratio (CBR) for mine fleet haul road (Tannant & Regensburg, 2001) are provided in Table 10.3 below, and are based on the use of a loaded CAT 797D as the design vehicle.

Table 10.3 Recommended Minimum Wearing Course Thickness for Mine Fleet Haul Road Construction

Minimum CBR (%)	Typical Subgrade Material[2]	Minimum Wearing Course Thickness[1] (m)	Minimum Thickness of Subgrade Replacement
N/A	Bedrock	0.3	Subgrade Replacement not required
30	Dense Anthropogenic Waste Rock	0.7	
15	Dense glacial till, Colluvium, Glaciofluvial	1.2	0.7
10	Loose Waste Rock, glacial till, etc.	1.7	1.2

NOTES:
1. Minimum cover thickness is inclusive of the sub-base, base course and surface course of the road prism.
2. Soft surficial materials (e.g. loess, glaciolacustrine deposits, organics & topsoil, etc. assumed removed prior to haul road construction).

11 – SUMMARY AND RECOMMENDATIONS

11.1 GENERAL

Knight Piésold Ltd. (KP) completed a geotechnical site investigation program from July 14 to November 11, 2014 to evaluate the geotechnical conditions for the mine development layout and to provide data for engineering and environmental studies. The 2014 site investigations, surficial materials and geology onsite have been discussed in a Geotechnical Report – Tailings Storage Facility and Mine Rock Storage Facilities. This report summarizes an interpretation of the geotechnical conditions and material types in a variety of geotechnical subjects including the following:

- Geotechnical foundation conditions and parameters for foundation design for mine site infrastructure areas, including the Primary Crusher, Truck Shop and Explosives Facility.
- Geotechnical conditions along haul and access roads alignments.
- Stability analysis of the Mine Rock Storage Facilities (MRSF's) and topsoil and overburden storage areas.
- Identification of potential on-site construction borrow areas.

11.2 MINE SITE INFRASTRUCTURE FOUNDATION CONDITIONS

The geotechnical conditions and material types in the vicinity of the Primary Crusher, Truck Shop, and Explosives Facility were determined along the geotechnical parameters for foundation design. The Primary Crusher is situated at a topographic bedrock high point, between the Open Pit to the north and Peterson Creek to the south. The Primary Crusher is proposed to be 14 m higher than current topography and assumed to be filled with Structural Fill overlying the competent Sugarloaf Diorite bedrock. The Truck Shop is situated on a south facing slopes east of the open pit. Overburden deposits encountered were primarily glacial till up to 61 m thick. Glaciolacustrine deposits were found at depths of approximately 13 m on the east side to the Truck Shop footprint which are unlikely to cause differential settlement as the foundation loading at the Truck Shop will be low. The Explosives Facility is located in a small valley between the Open Pit and the EMRSF. The Explosives Facility is located on thick glacial till deposits. Site investigation program results were used to provide estimates of factored bearing resistance and settlements, relevant geotechnical parameters and factors affecting foundation design.

11.3 HAUL AND ACCESS ROAD FOUNDATION CONDITIONS

Numerous haul and access roads have been designed by KGHM for the movement of material and access to mine site facilities. The geotechnical conditions encountered along the haul and access roads is predominantly subgrade glacial till deposits. In some sections along the haul and access road alignments bedrock is close to surface. Glaciofluvial and glaciolacustrine deposits were encountered in the valley and terraces on either side of Peterson Creek and smaller drainage creeks. Historic mine rock material encountered to the north and south of the Open Pit. The site investigation program results provided information for estimating of ultimate bearing capacity for Haul Road wearing course, and minimum Haul Road wearing course thickness recommendations based on subgrade type.

11.4 MINE ROCK STORAGE FACILITIES, TOPSOIL AND OVERBURDEN STORAGE AREAS STABILITY ANALYSES

The geotechnical conditions for the Mine Rock Storage Facilities were summarized in previous reports. Slope stability analyses for the Mine Rock Storage Facilities (WMRSF, SMRSF and EMRSF) were carried out for final design heights, end of construction and post-closure conditions. Stability analyses of topsoil and overburden stockpiles was undertaken to determine typical stockpile slopes and maximum stockpile heights.

11.5 ON-SITE CONSTRUCTION BORROW MATERIAL EVALUATION

A preliminary construction borrow source assessment was completed to identify and determine the suitability of potential construction borrow areas. Material types for construction would include low permeability soils for natural soil liners, pipe bedding materials, fine and coarse concreate aggregate, embankment and filter materials. The tailings embankment shells require the largest volume of material at the Project will be construction using mine rock. The mine site footprint is compact with limited space for borrow area development, as mine site infrastructure, Tailings Storage Facility (TSF), MRSF's, haul and access roads and the relocation of the Kinder Morgan pipeline have been designated.

Glacial till deposits are required for sub-base, liner and general construction uses. Glacial till borrows areas were identified within the TSF basin and north of the Plant Site. Removal of material interference with the scheduled and coordinated by the mine fleet to avoid tailings embankment lifts, TSF expansion and TSF filling. At other areas glacial till were found to be too thin to recommend as borrow areas.

Glaciofluvial sand and gravel deposits are required for on-site construction use as filter and bedding material and concrete aggregate. Glaciofluvial deposits were identified within the TSF basin and along Peterson Creek terraces in small volumes. Borrow areas located adjacent to Peterson Creek hold the greatest potential volume.

Potential borrow sources for concrete aggregate can be obtained by quarrying suitable bedrock in the vicinity of the Primary Crusher and southwest of the Plant Site. Re-use of historic mine rock storage facilities should also be considered as borrow areas.

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13 – CERTIFICATION

This report was prepared and reviewed by the undersigned.

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Geotechnical Engineering

Prepared:

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June 16, 2015

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APPENDIX A

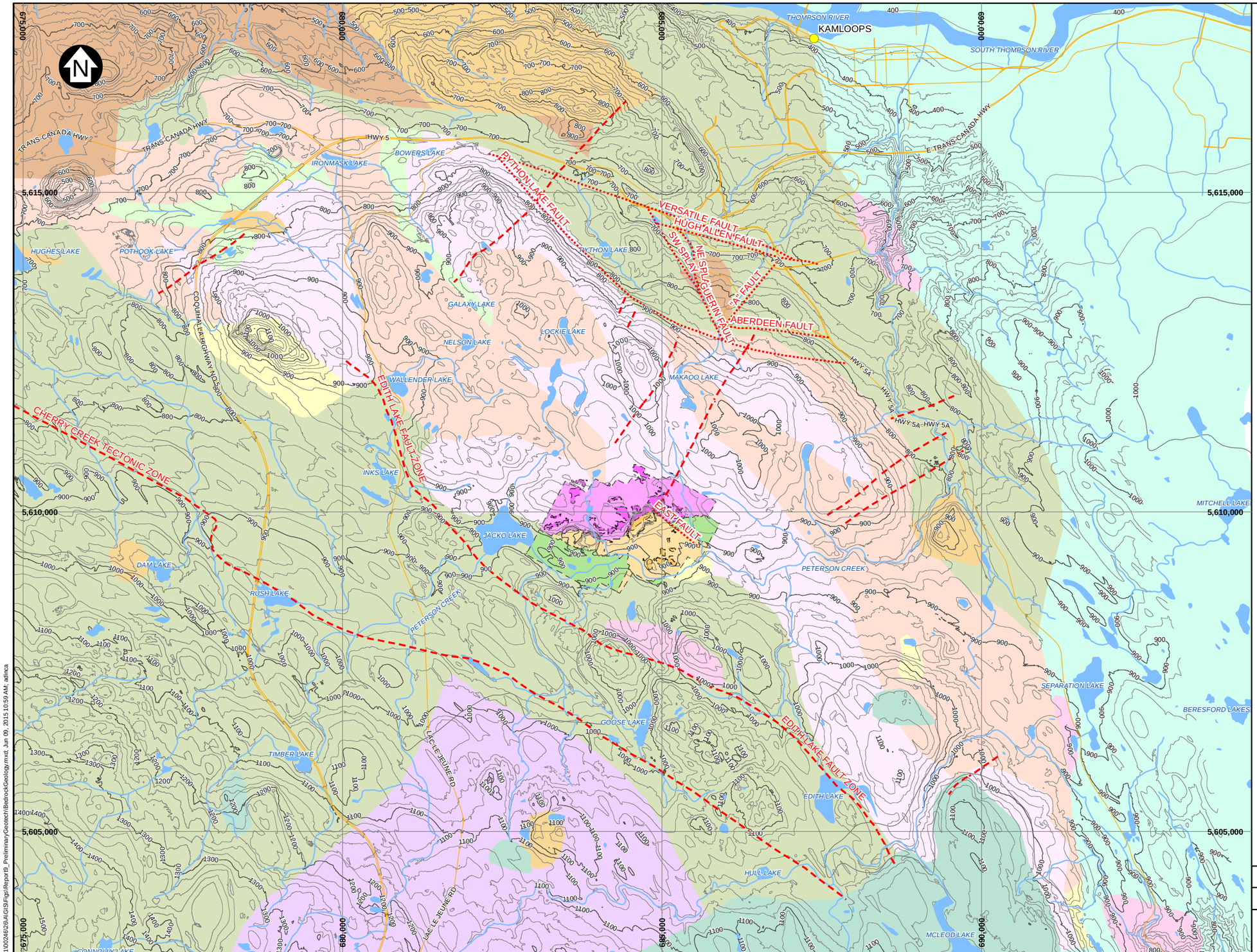
FIGURES AND SUMMARY TABLES

Appendix A1 Figures
Appendix A2 Summary Tables

APPENDIX A1

FIGURES

(Figures A1.1 to A1.6)



LEGEND:

- CITY/TOWN
- KAMLOOPS AREA FAULT
- FAULTS
- TRANSMISSION LINE
- ROAD
- RIVER/CREEK
- LAKE
- PROPOSED MINE SITE FACILITIES

BEDROCK GEOLOGY

- LTrJlC - CHERRY CREEK UNIT
- LTrJlH - HYBRID UNIT
- uTrNE - EASTERN VOLCANIC FACIES
- uTrNml - METAMORPHIC ROCKS
- Mivb - BASALTIC VOLCANIC ROCKS
- LTrJum - UNNAMED ULTRAMAFIC ROCKS
- LTrJlS - SUGARLOAF UNIT DIORITIC INTRUSIVES
- EKav - UNDIVIDED VOLCANICS

NOTES:

1. BASE MAP: NTS 1:250K AND GEOLOGY MAPS.
2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:60,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. CONTOUR INTERVAL IS 100 METRES. DATA SOURCED FROM LIDAR.
5. GEOLOGY DATA FROM BGC 2013, WITH SPECIFIC DATA SOURCES NOTED AS FOLLOWS:
- ABACUS MINING AND EXPLORATION (2013)
- GOLDER (2008)
- BCGS (2005)

SCALE 0.5 0.25 0 0.5 1 1.5 2 2.5 km

KGHM AJAX MINING INC.

AJAX PROJECT

BEDROCK GEOLOGY

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FIGURE A1.1 | REV 0

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682 500 E

695 000 E

687 500 E

5 605 000 N

5 607 500 N

5 605 000 N

TP14-364 TP14-363 TP14-365 TP-BGC-13-17 TP-BGC-13-18 TP14-379 TP14-378 TP14-377 TP-BGC-10-67 TP-BGC-10-63 TP-BGC-10-61 TP14-369 TP-BGC-10-62 TP-BGC-10-64 TP14-376 TP-BGC-10-65 TP-BGC-10-66 TP14-360 TP14-361 TP-BGC-10-31 TP-BGC-10-35 TP-BGC-13-20 TP-BGC-13-21 TP14-339 TP14-349 TP14-348 TP14-343 TP-BGC-13-23 TP14-347 TP-BGC-13-22 TP14-338 TP-BGC-13-24 TP-BGC-10-30 TP-BGC-10-29 TP14-337 TP14-344 TP14-333 TP-BGC-13-27 TP-BGC-10-37 TP-BGC-13-25 TP14-345 TP14-346 TP14-334 TP14-280 TP14-279 TP14-214 TP14-332 TP-BGC-10-38 TP14-238 TP14-236 TP14-240 TP14-283 TP14-224 TP14-213 TP14-067 TP14-075 TP14-074 TP14-281 TP14-282 TP14-071 TP14-230 TP14-216 TP14-222 TP14-322 TP14-076 TP14-232 TP14-234 TP14-062 TP14-061 TP14-321 TP14-226 TP14-320 TP14-228 TP14-241 TP14-210 TP14-319 TP14-057 TP14-323 TP14-003 TP14-247 TP-BGC-10-71 TP14-245 TP14-244 TP14-329 TP14-087 TP14-309 TP14-086 TP14-252 TP14-262 TP14-264 TP14-308 TP14-294 TP14-306 TP14-299 TP14-307 TP14-330 TP14-300 TP14-301 TP14-177 TP14-295 TP14-184 TP14-296 TP14-183 TP14-297 TP14-186 TP14-180 TP14-188 TP14-189 TP14-190 TP14-130 TP14-128 TP14-195 TP14-191 TP14-193 TP14-196 TP14-200

LEGEND:

- ANTHROPOGENIC
- ORGANIC
- EOLIAN SEDIMENT
- COLUVIUM
- ALLUVIUM
- FLUVIAL FAN
- GLACIO FLUVIAL SAND
- LAKE DEPOSIT
- GLACIAL TILL
- WETHERED BEDROCK
- KINDER MORGAN PIPELINE 90m BUFFER
- KP TEST PITS (MINE SITE INFRASTRUCTURE)
- BGC TEST PITS (MINE SITE INFRASTRUCTURE)
- PROPERTY BOUNDARY
- CURRENT ACCESS ROAD

ACCESS AND HAUL ROADS

- SITE ENTRANCE TO PLANTSITE ROAD
- EMRSF HAUL ROAD
- SMRSF HAUL ROAD
- NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD SOUTH LINE
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD NORTH LINE

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10.
2. CONTOUR INTERVAL IS 5 METRES.

250 125 0 250 500 750 1000 1250 m
SCALE A

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KGHM AJAX MINING INC.

AJAX PROJECT

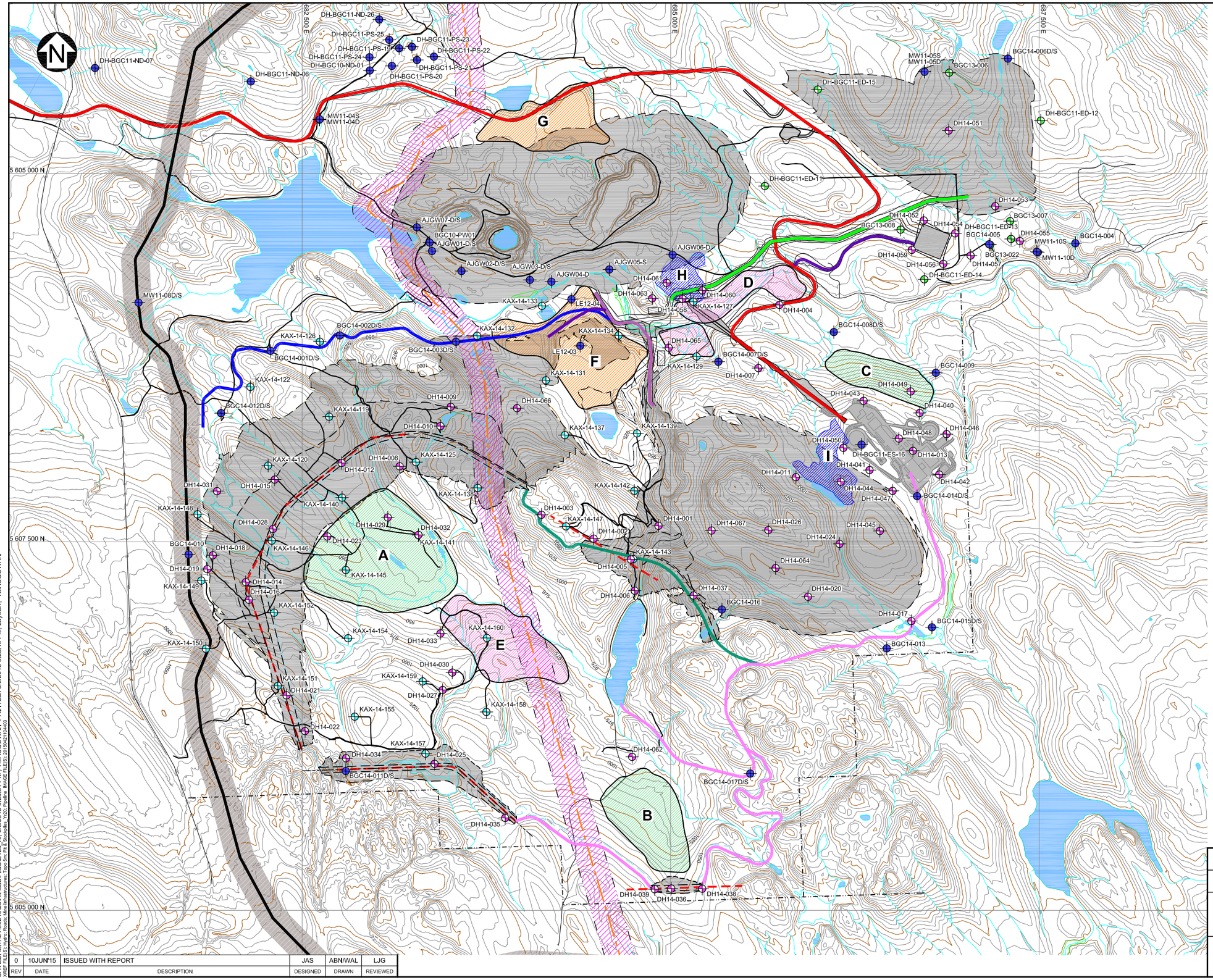
SITE INVESTIGATION
TEST PIT PLAN AND SURFICIAL GEOLOGY

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FIGURE A1.2 | REV 0

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LEGEND:

- KP GEOTECHNICAL DRILLHOLES
- MONITORING WELLS BY OTHERS
- CONDEMNATION DRILLHOLES
- GEOTECHNICAL DRILLHOLES BY OTHERS
- GLACIAL TILL BORROW AREAS
- GLACIOFLUVIAL BORROW AREAS
- MINE ROCK BORROW AREAS
- HISTORIC BEDROCK QUARRY
- MINE SITE INFRASTRUCTURE
- KINDER MORGAN PIPELINE 90m BUFFER
- PROPERTY BOUNDARY
- SEISMIC LINES
- CURRENT ACCESS ROAD

ACCESS AND HAUL ROADS

- SITE ENTRANCE TO PLANT SITE ROAD
- EMRSF HAUL ROAD
- SMRSF HAUL ROAD
- NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD SOUTH LINE
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD NORTH LINE

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10.
2. CONTOUR INTERVAL IS 5 METRES.

SCALE A: 250 125 0 250 500 750 1000 1250 m

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KGHM AJAX MINING INC.

AJAX PROJECT

SITE INVESTIGATION DRILLHOLE PLAN

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FIGURE A1.3 | REV 0

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XREF FILES): Hydro: Roads; New Infrastructure; Topo 5m; Pit & Stockpiles_Yr20; Pipeline IMAGE FILES): 20150421104403

EXPLOSIVES FACILITY
EMRSF
EMRSF HAUL ROAD - FROM OPEN PIT TO EMRSF
PLANT SITE ACCESS ROAD
PRIMARY CRUSHER
TRUCK SHOP ACCESS ROAD
TRUCK SHOP
NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD
WMRSF HAUL ROAD - FROM OPEN PIT TO WMRSF
SMRSF HAUL ROAD - FROM OPEN PIT TO SMRSF
OVERLAND CONVEYOR
TAILINGS AND RECLAIM PIPELINE ACCESS ROAD - NORTH LINE
SMRSF
PLANT SITE
1 A1.5 FIG
2 A1.5 FIG

LEGEND:

- KINDER MORGAN PIPELINE 90m BUFFER
- KP GEOTECHNICAL DRILLHOLES
- MONITORING WELLS BY OTHERS
- CONDEMNATION DRILLHOLES
- GEOTECHNICAL DRILLHOLES BY OTHERS
- KP TEST PITS
- BGC HISTORICAL TEST PITS
- PROPERTY BOUNDARY
- SEISMIC LINES
- CURRENT ACCESS ROAD

ACCESS AND HAUL ROADS

- SITE ENTRANCE TO PLANT SITE ROAD
- EMRSF HAUL ROAD
- SMRSF HAUL ROAD
- NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD SOUTH LINE
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD NORTH LINE

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10.
2. CONTOUR INTERVAL IS 5 METRES.

SCALE A 150 75 0 250 500 750 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	10JUN'15	ISSUED WITH REPORT	JAS	ABN/WAL	LJG

KGHM AJAX MINING INC.

AJAX PROJECT

MINE SITE INFRASTRUCTURE SITE INVESTIGATION PLAN

Knight Piésold CONSULTING

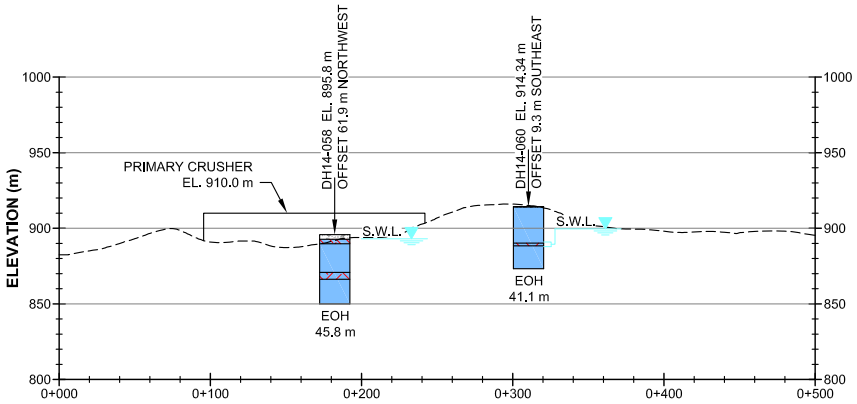
P/A NO. VA101-246/26

REF NO. 9

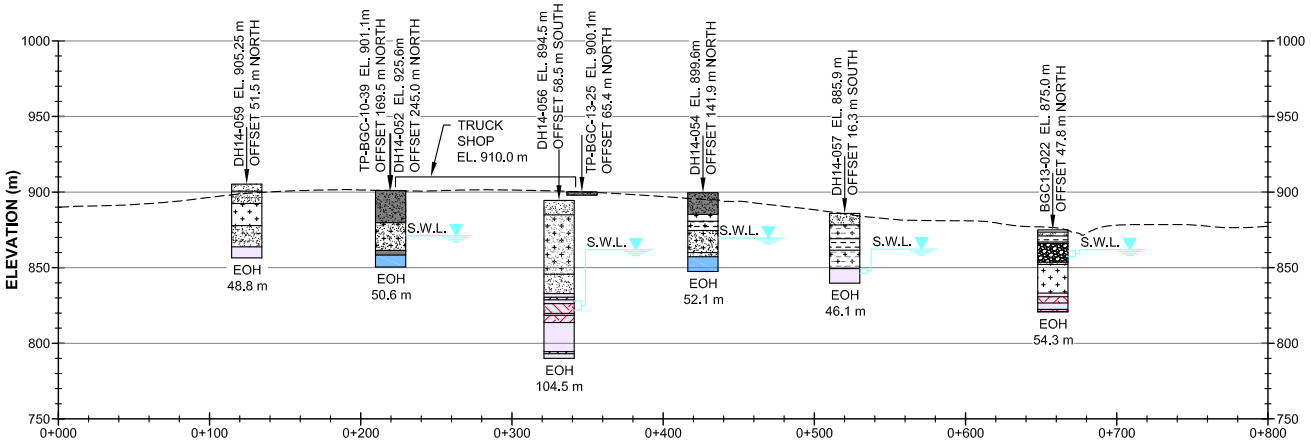
FIGURE A1.4

REV 0

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XREF FILES: Hydro, Roads, Mine Infrastructures, Topo.Shr, Pit & Stockpiles_Y20 IMAGE FILES:



1 A1.4 FIG **SECTION**
SCALE A



2 A1.4 FIG **SECTION**
SCALE A

LEGEND:

- SUGARLOAF DIORITE
- IRON MASK HYBRID
- FRACTURED ZONE
- FAULT ZONE
- CLAY
- SILT
- SAND
- CLAY AND SILT
- GRAVELY SAND
- SILTY SAND
- S.W.L. STATIC WATER LEVEL PIEZOMETERS

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

SCALE A: 50 25 0 50 100 150 200 250 m

KGHM AJAX MINING INC.

AJAX PROJECT

PRIMARY CRUSHER AND TRUCK SHOP GEOTECHNICAL INVESTIGATION SECTIONS

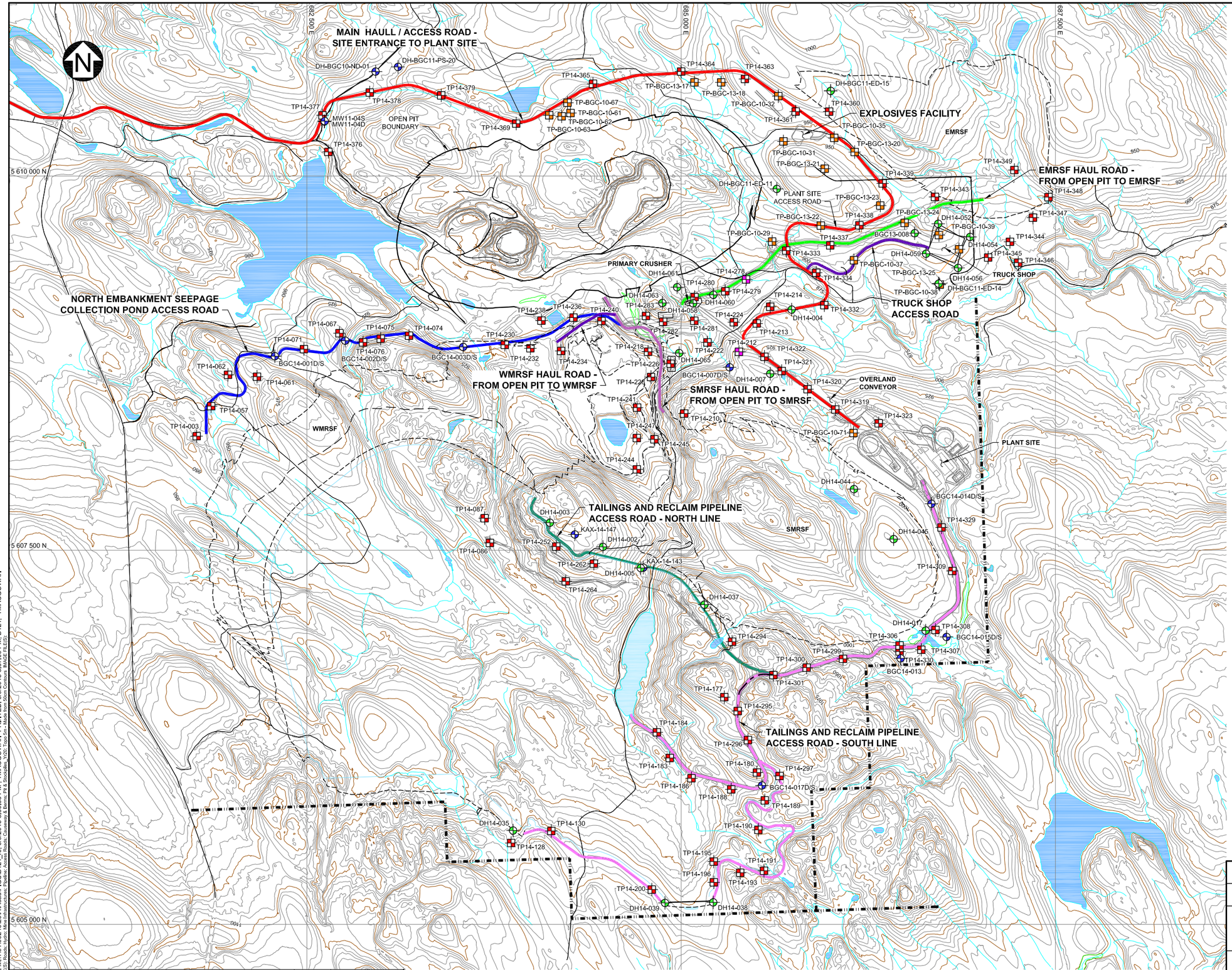
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P/A NO. VA101-246/26 | REF NO. 9

FIGURE A1.5 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	10JUN'15	ISSUED WITH REPORT	JAS	ABN/WAL	BB

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XREF FILE(S): IMAGE FILE(S):



LEGEND:

- KP GEOTECHNICAL DRILLHOLES
- KP TEST PITS
- GEOTECHNICAL DRILLHOLES BY OTHERS
- TEST PITS BY OTHERS
- PROPERTY BOUNDARY
- CURRENT ACCESS ROAD

ACCESS AND HAUL ROADS

- SITE ENTRANCE TO PLANT SITE ROAD
- EMRSF HAUL ROAD
- SMRSF HAUL ROAD
- NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD SOUTH LINE
- TAILINGS AND RECLAIM PIPELINE ACCESS ROAD NORTH LINE

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 10.
2. CONTOUR INTERVAL IS 5 METRES, BASED ON 50 cm LIDAR DATA RECEIVED FROM AIRBORNE IMAGE JULY 2013.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

SCALE A: 250 125 0 250 500 750 1000 1250 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	10JUN'15	ISSUED WITH REPORT	MAP	PP/WAL	BB

KGHM AJAX MINING INC.

AJAX PROJECT

MINE SITE INFRASTRUCTURE ACCESS AND HAUL ROADS PLAN

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P/A NO. VA101-246/26 | REF NO. 9

FIGURE A1.6 | REV 0

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XREF FILES): Roads; Hydro; Mine Infrastructures; Pipeline; Access Roads; Causeway & Berms; PK & Stockpiles_Yr20; Topo 5m - Made from 50cm Contours (IMAGE FILES):

APPENDIX A2

SUMMARY TABLES

(Tables A2.1 to A2.12)

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TABLE A2.1

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TEST PIT SUMMARY - MINE SITE INFASTRUCTURE

Print Apr/30/15 11:22:13

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-003	Seepage Collection Pond 1	681,764	5,608,262	937	0.6	-	Refusal on possible bedrock	-	GRAVEL; trace cobbles [Weathered bedrock]	Not documented	Difficult excavation.
TP14-007	North Embankment	682,219	5,607,606	946	2.8	-	Refusal on bedrock	-	Silty; gravelly; SAND; trace clay [Glacial Till]	Not documented	Walls stable, no groundwater, easy to excavate.
TP14-057	Downstream of North Embankment	681,860	5,608,462	924	1.4	-	Refusal on Weathered Bedrock	-	SAND and GRAVEL [Fluvial] and bedrock	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.4 m	Walls stable, no groundwater, difficult to excavate after 0.4 m.
TP14-061	South of Jacko Lake	682,167	5,608,659	961	1.3	-	Refusal on bedrock	1.0 - 1.3 m	Weathered bedrock	A: 0 - 0.1 m B: None C: None	Walls stable, no groundwater, difficult to excavate.
TP14-062	Downstream of North Embankment	681,973	5,608,672	947	3.7	-	Refusal on dense material	3.5 - 3.7 m	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.4 m	Difficult to excavate 1 m onwards.
TP14-067	South of Jacko Lake	682,718	5,608,950	949	4.3	-	Refusal on dense material	4.0 - 4.3 m	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.6 m	Walls stable, no groundwater, easy to excavate up to 2 m.
TP14-071	South of Jacko Lake	682,481	5,608,843	935	4.9	-	Limit of excavator	4.5 - 4.9 m	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: 0.6 - 0.9 m	Walls stable, no groundwater, easy to excavate.
TP14-074	South of Jacko Lake	683,183	5,608,933	932	4.8	-	Limit of excavator	4.7 - 4.8 m	Gravelly; SILT; some sand; trace cobbles; trace clay [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: 0.6 - 1.0 m	Walls sloughing slightly from 0 - 1.5 m, no groundwater, easy to excavate up to 2 m.
TP14-075	South of Jacko Lake	682,993	5,608,913	955	4.2	-	Limit of excavator	-	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Walls sloughing in from 0 - 1.2 m, no groundwater, easy to excavate.
TP14-076	South of Jacko Lake	682,875	5,608,889	939	5.0	-	Limit of excavator	4.5 - 5.0 m	Silty; SAND and GRAVEL; trace cobbles; trace clay [Glacial Till]	A: 0 - 0.2 m B: None C: None	Walls stable, no groundwater, easy to excavate.
TP14-086	TSF Basin	683,723	5,607,548	965	0.6	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: None	Walls sloughing, no groundwater, difficult to excavate.
TP14-087	TSF Basin	683,687	5,607,713	962	3.7	-	Refusal on dense material	1.4 - 1.5 m 3.5 - 3.7 m	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.5 m	Walls sloughing slightly to 1.5m, no groundwater, difficult to excavate from 1 m onwards.
TP14-128	Downstream of South Embankment	683,865	5,605,543	1067	2.7	-	Wall instability	-	GRAVEL and SILT; trace cobbles [Glaciofluvial]	A: 0 - 0.14 m B: 0.14 - 0.42 m C: None	Walls collapsing beneath A and B horizon.
TP14-130	TSF Basin	684,133	5,605,624	1066	0.7	-	Refusal on Weathered Bedrock	-	Gravelly; SILT [Colluvium]	A: 0 - 0.19 m B: 0.19 - 0.69 m C: None	Walls stable, no groundwater.
TP14-175	TSF Basin	685,274	5,606,353	1061	5.2	-	Limit of excavator	5.0 - 5.2 m	Silty; sandy; GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.5 m C: 0.5 - 1. 1 m	Walls stable; no groundwater, easy to excavate.
TP14-177	TSF Basin	685,288	5,606,518	1091	4.9	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: 0.3 - 0.7 m	Walls stable; no groundwater, difficult to excavate.
TP14-180	TSF Basin	685,506	5,606,014	1058	4.7	-	Limit of excavator	4.5 - 4.7 m	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.6 m C: 0.6 - 1. 1 m	Walls stable; no groundwater, difficult to excavate after 1 m.
TP14-183	TSF Basin	684,924	5,606,111	990	4.7	-	Limit of excavator	4.7 - 4.8 m	Silty; sandy; GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.4 m B: 0.4 - 0.9 m C: 0.9 - 1. 1 m	Walls stable; no groundwater, difficult to excavate.
TP14-184	TSF Basin	684,838	5,606,283	982	4.7	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Walls stable; no groundwater, difficult to excavate after 0.5 m.
TP14-186	TSF Basin	685,069	5,605,976	1002	4.6	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.7 m C: 0.7 - 1.3 m	Walls stable; no groundwater, relatively easy to excavate.
TP14-188	TSF Basin	685,335	5,605,901	1025	4.4	-	Refusal on dense material	4.3 - 4.4 m	Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.5 m B: None C: None	Walls stable; no groundwater, difficult to excavate after 2 m.
TP14-189	TSF Basin	685,559	5,605,828	1051	2.7	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.6 m	Walls stable; no groundwater, easy to excavate.
TP14-190	TSF Basin	685,516	5,605,631	1054	4.9	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Walls stable; no groundwater, easy to excavate.
TP14-191	TSF Basin	685,553	5,605,358	1054	5.4	-	Limit of excavator	5.0 - 5.4 m	SILT and SAND; trace gravel; trace cobbles [Loess]	A: 0 - 0.2 m B: 0.2 - 1 m C: None	Very uniform material and easy to excavate; no groundwater; walls stable.
TP14-193	TSF Basin	685,395	5,605,345	1070	3.1	-	Refusal on bedrock	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.7 m C: None	Walls stable, no groundwater, easy to excavate up to 1 m, bedrock outcrops in area.
TP14-195	TSF Basin	685,218	5,605,419	1050	2.3	-	Refusal on dense material	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: None	Walls stable, no groundwater, difficult to excavate.
TP14-196	TSF Basin	685,218	5,605,280	1058	4.6	-	Limit of excavator	-	SAND; some gravel; some silt; trace cobbles [Loess]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Walls sloughing slightly; no groundwater, very easy to excavate.
TP14-200	Southeast Embankment	684,804	5,605,232	1060	4.6	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: None	Walls stable; no groundwater, easy to excavate up to 2 m, then difficult.
TP14-210	SMRSF Access Road	685,021	5,608,413	984	0.6	-	Refusal on Weathered Bedrock	-	Sandy SILT; some gravel [Colluvium]	A: 0 - 0. 1 m B: 0. 1 - 0.5 m C: None	Walls stable, no groundwater, moderately difficult to excavate, bedrock outcrops visible nearby.
TP14-212	Overland Conveyor	685,386	5,608,826	929	3.6	-	Refusal on dense material	-	Sandy SILT; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.15 m B: 0.15 - 0.45 m C: 0.45 - 0.8 m	Walls stable, no groundwater, difficult to excavate after 3.4 m.
TP14-213	Haul / Access Roads	685,505	5,609,015	906	2.5	-	Refusal on possible bedrock	2.0 - 2.5 m	Sandy; GRAVEL; some silt; some cobbles [Glaciofluvial]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.8 m	Walls stable, no groundwater, easy to excavate.
TP14-214	Haul / Access Roads	685,595	5,609,127	901	1.3	-	Refusal on Weathered Bedrock	-	Sandy; GRAVEL; some silt; some cobbles [Glaciofluvial]	A: 0 - 0.2 m B: None C: 0.2 - 0.7 m	Walls sloughing, no groundwater, easy to excavate.

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TABLE A2.1

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TEST PIT SUMMARY - MINE SITE INFASTRUCTURE

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Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-218	Old Mine Rock Facility / Ore Stockpile	684,779	5,608,826	925	0.3	-	Refusal on Weathered Bedrock	-	Weathered bedrock	Waste Rock Dump	No groundwater.
TP14-224	Haul / Access Roads	685,352	5,609,023	897	3.7	-	Refusal on dense material /boulders	3.5 - 3.7 m	Silty; gravelly; SAND; some cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 1. 1 m	Walls stable, no groundwater
TP14-226	Old Mine Rock Facility / Ore Stockpile	684,930	5,608,746	918	4.3	-	Limit of excavator	-	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.9 m	Walls stable, no groundwater, easy excavation.
TP14-228	Old Mine Rock Facility / Ore Stockpile	684,799	5,608,657	934	4.3	-	Limit of excavator	-	Sandy; gravelly; SILT; trace cobbles [Glacial Till]	A: 0 - 0.15 m B: 0.15 - 0.4 m C: 0.4 - 0.9 m	Walls stable, no groundwater, easy excavation.
TP14-230	WMRSF	683,822	5,608,872	919	2.2	-	Wall instability	-	Sandy; GRAVEL; some silt; some cobbles; some boulders [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate due to boulders and wall stability
TP14-232	WMRSF	683,993	5,608,849	926	4.2	-	Limit of excavator	-	Gravelly; COBBLES and BOULDERS; some sand; trace silt [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate due to boulders and wall stability
TP14-234	Old Mine Rock Facility / Ore Stockpile	684,198	5,608,831	924	4.4	-	Limit of excavator	-	Sandy; gravelly; COBBLES; trace boulders [Waste Rock]	Waste Rock Dump	Walls sloughing slightly, no groundwater, easy excavation.
TP14-236	Old Mine Rock Facility / Ore Stockpile	684,281	5,609,054	909	3.8	-	Wall instability	-	GRAVEL and COBBLES; some silt; some boulders. [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, easy excavation.
TP14-238	Old Mine Rock Facility / Ore Stockpile	684,067	5,609,034	899	4.3	-	Limit of excavator	4.1 - 4.3 m	SILT; some sand; some gravel; trace cobbles [Colluvium]	A: 0 - 0. 1 m B: 0. 1 - 0.25 m C: 0.25 - 0.8 m	Walls stable, no groundwater, easy excavation.

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TABLE A2.1

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TEST PIT SUMMARY - MINE SITE INFASTRUCTURE

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Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-240	Old Mine Rock Facility / Ore Stockpile	684,468	5,609,031	921	3.2	-	Refusal on boulders	-	Silty; SAND and GRAVEL; some cobbles; some boulders [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate.
TP14-241	Old Mine Rock Facility / Ore Stockpile	684,706	5,608,453	937	4.9	-	Limit of excavator	-	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.15 m B: None C: None	Walls stable, no groundwater, easy to excavate.
TP14-244	Old Mine Rock Facility / Ore Stockpile	684,704	5,608,040	937	3.9	-	Limit of excavator	3.7 - 3.9 m	Silty; SAND and GRAVEL; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 1.0 m	Walls stable, no groundwater, easy excavation.
TP14-245	Old Mine Rock Facility / Ore Stockpile	684,821	5,608,241	931	4.4	-	Limit of excavator	4.2 - 4.4 m	Silty; gravelly; SAND; some cobbles; trace clay [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.5 m C: None	Walls stable, no groundwater, difficult to excavate.
TP14-247	Old Mine Rock Facility / Ore Stockpile	684,704	5,608,249	925	4.0	-	Refusal on weathered bedrock	-	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.7 m	Walls stable, no groundwater, difficult to excavate from 1 m onwards.
TP14-252	TSF Basin	684,166	5,607,524	1041	3.8	-	Refusal on dense material	3.6 - 3.8 m	Silty; SAND and GRAVEL; trace; cobbles [Glacial Till?]	A: 0 - 0.5 m B: None C: 0.5 - 0.9 m	Walls stable, no groundwater, easy excavation.
TP14-262	East Embankment	684,417	5,607,410	1032	4.0	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Reworked Glaciofluvial]	A: 0 - 0.4 m B: 0.4 - 0.5 m C: 0.5 - 1.0 m	Walls stable, no groundwater, easy excavation.
TP14-264	TSF Basin	684,229	5,607,292	1011	2.9	-	Refusal on boulders/bedrock	2.7 - 2.9 m	Sandy; gravelly; SILT; trace cobbles [Glacial Till]	A: 0 - 0.25 m B: 0.25 - 0.4 m C: 0.4 - 1.0 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-278	Haul / Access Roads	685,434	5,609,309	883	3.5	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glaciofluvial]	A: 0 - 0.3 m B: 0.3 - 0.4 m C: 0.4 - 0.6 m	Walls sloughing, no groundwater, difficult to excavate due to wall stability.
TP14-279	Haul / Access Roads	685,295	5,609,230	898	4.0	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.8 m	Walls stable, no groundwater, easy excavation.
TP14-280	Central Collection Pond	685,090	5,609,191	898	2.8	-	Refusal on Weathered Bedrock	-	Silty; SAND; some gravel [Loess]	A: 0 - 0. 1 m B: None C: None	Walls stable, no groundwater, easy excavation.
TP14-281	Central Collection Pond	685,088	5,609,033	885	4.2	-	Limit of excavator	3.9 - 4.2 m	SILT and SAND; some gravel; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	No groundwater, possible Waste rock at 0.5 m.
TP14-282	Central Collection Pond	684,880	5,609,026	895	4.6	-	Limit of excavator	-	SILT and SAND; some gravel; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 1. 1 m	Walls stable, no groundwater, easy excavation.
TP14-283	Haul / Access Roads	684,765	5,609,065	891	4.4	-	Limit of excavator	4.2 - 4.4 m	Sand; gravelly; SILT [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.6 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-294	East Embankment - East Abutment	685,340	5,606,888	1041	1.9	-	Refusal on bedrock	-	Silty; SAND; some gravel; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.
TP14-295	Tailings and Reclaim Pipeline Corridor	685,378	5,606,425	1078	2.8	-	Refusal on dense material	2.7 - 2.8 m	SILT; some gravel; some sand; trace boulders; trace cobbles; trace clay [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.9 m	Very difficult to excavate after 1 m, no groundwater, walls stable.
TP14-296	Tailings and Reclaim Pipeline Corridor	685,446	5,606,231	1066	4.1	-	Limit of excavator	-	Gravelly SILT; some silt; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Easy to excavate, no groundwater, walls stable.
TP14-297	Tailings and Reclaim Pipeline Corridor	685,658	5,605,991	1065	1.4	-	Refusal on bedrock	-	SILT and SAND; some gravel; trace cobbles	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.
TP14-299	Tailings and Reclaim Pipeline Corridor	686,081	5,606,774	1023	0.2	-	Refusal on bedrock	-	Weathered Bedrock	None	Bedrock outcrops nearby; bedrock at surface; no groundwater.
TP14-300	Tailings and Reclaim Pipeline Corridor	685,838	5,606,715	1061	2.0	-	Refusal on highly weathered rock	-	Silty; SAND; some gravel; trace cobbles [Colluvium]	A: 0 - 0.9 m B: None C: None	Easy to excavate up to 2 m, no groundwater, walls sloughing slightly.
TP14-301	Tailings and Reclaim Pipeline Corridor	685,616	5,606,665	1077	3.3	2.0	Refusal on highly weathered rock	1.5 - 2 m	SILT; some sand; some gravel; some clay; trace cobbles [Completely weathered rock]	None	Groundwater at 2 m, material at 2 m onwards appears to be completely weathered rock, test pit located in small valley and may not be representative of larger area.
TP14-306	SMRSF Water Management Pond	686,459	5,606,863	978	2.6	2.6	Wall instability / groundwater	2 - 2.5 m	Sandy; GRAVEL; some silt; trace cobbles [Glaciofluvial]	A: 0 - 0.3 m B: 0.3 - 0.5 m C: None	Very easy to excavate, gravel material sloughing beneath topsoil layer.
TP14-307	SMRSF Water Management Pond	686,604	5,606,835	992	0.6	-	Refusal on bedrock	-	Rubblized bedrock, dark grey, very strong, orange and black staining. [Bedrock]	A: 0 - 0.05 m B: 0.05 - 0.3 m C: None	Bedrock outcrops nearby, easy to excavate up to bedrock, no groundwater, walls stable.
TP14-308	SMRSF Water Management Pond	686,699	5,606,967	983	3.2	-	Refusal on bedrock	1.4 - 1.55 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-309	Tailings and Reclaim Pipeline Corridor	686,812	5,607,361	985	3.1	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Difficult to excavate; no groundwater; walls stable.
TP14-319	Conveyor Corridor	686,030	5,608,440	947	3.7	-	Refusal on dense material	-	Sandy; gravelly; SILT; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP14-320	Conveyor Corridor	685,845	5,608,576	941	1.6	-	Refusal on bedrock	-	Sandy; SILT; some gravel; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.
TP14-321	Conveyor Corridor	685,672	5,608,697	932	4.4	-	Limit of excavator	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Relatively easy to excavate, no groundwater, walls stable.
TP14-322	Conveyor Corridor	685,557	5,608,792	929	3.6	-	Refusal on cobbles / boulders	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: None	Easy to excavate up to 3m, no groundwater, walls stable.
TP14-329	Haul Road	686,740	5,607,652	984	3.9	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.5 m	Difficult to excavate, no groundwater, walls stable.
TP14-330	SMRSF Water Management Pond	686,459	5,606,823	980	3.0	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	TP on existing road	Difficult to excavate, no groundwater, walls stable.

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TABLE A2.1

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TEST PIT SUMMARY - MINE SITE INFASTRUCTURE

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Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-332	Potential Borrow Area	685,957	5,609,137	882	3.3	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: 0.3 - 0.7 m	Easy to excavate, no groundwater, walls sloughing slightly.
TP14-333	Potential Borrow Area	685,702	5,609,502	900	5.0	-	Limit of excavator	-	SILT; some clay; trace cobbles and gravel [Glaciolacustrine]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Easy to excavate, no groundwater, walls stable.
TP14-334	Potential Borrow Area	685,902	5,609,354	889	4.4	-	Limit of excavator	-	Sandy; SILT; some cobbles; some gravel [Glacial Till]	A: 0 - 0. 1 m B: None C: None	Easy to excavate, walls sloughing in gravel material from 1.3 m - 2.5 m, no groundwater.
TP14-337	Haul Road	685,996	5,609,537	916	2.9	-	Refusal on dense material	-	Gravelly; SILT; some sand; some cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.4 m C: 0.4 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP14-338	Haul Road	686,191	5,609,671	932	3.5	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP14-339	Haul Road	686,346	5,609,951	945	3.6	-	Refusal on Weathered Bedrock	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.6 m	Difficult to excavate, no groundwater, walls stable.
TP14-343	EMRSF	686,696	5,609,860	930	4.3	-	Refusal on dense material	4.2 - 4.3 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.9 m	Easy to excavate, no groundwater, walls stable.
TP14-344	EMRSF Water Management Pond	687,197	5,609,561	880	3.9	-	Refusal on boulder	3.8 - 3.9 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: None B: 0 - 1 m C: None	Easy to excavate, no groundwater, walls sloughing slightly from 1 m - 1.5 m.

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TABLE A2.1

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TEST PIT SUMMARY - MINE SITE INFASTRUCTURE

Print Apr/30/15 11:22:13

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-345	EMRSF Water Management Pond	687,051	5,609,455	884	4.3	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 1.2 m	Difficult to excavate, no groundwater, walls stable.
TP14-346	EMRSF Water Management Pond	687,252	5,609,421	878	4.7	-	Limit of excavator	4 - 4.5 m	Silty; SAND; trace gravel [Glaciolacustrine]	A: 0 - 0.3 m B: None C: None	Very easy to excavate, no groundwater, walls sloughing from 0.3 m -1.1 m.
TP14-347	EMRSF	687,350	5,609,722	887	3.2	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.05 m B: 0.05 - 0.5 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-348	EMRSF	687,454	5,609,859	903	2.5	-	Refusal on dense material, possibly bedrock	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.4 m B: 0.4 - 0.9 m C: 0.9 - 1. 1 m	Difficult to excavate, no groundwater, walls stable.
TP14-349	EMRSF	687,226	5,610,040	911	4.3	-	Limit of excavator	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-360	EMRSF	685,989	5,610,430	963	4.7	-	Limit of excavator	1.5 - 1.65 m	gravelly SILT; some sand; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0.1 - 0.3 m C: 0.3 - 0.6 m	Difficult to excavate, no groundwater, walls stable.
TP14-361	Haul Road	685,765	5,610,431	960	5.1	-	Limit of excavator	-	gravelly SILT; some sand; trace boulders; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-363	Haul Road	685,426	5,610,649	970	5.0	-	Limit of excavator	-	Sandy Gravelly SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0.1 - 0.3 m C: 0.3 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP14-364	Haul Road	685,000	5,610,698	950	3.0	-	Refusal on bedrock	-	Silt [Loess]; Weathered bedrock	A: 0 - 0.3 m B: 0.3 - 1.4 m C: None	Easy to excavate, no groundwater, walls stable.
TP14-365	Haul Road	684,411	5,610,616	957	2.0	-	Refusal on Weathered Bedrock	-	Weathered bedrock	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Easy to excavate up to 1 m, no groundwater, walls stable.
TP14-369	Sand and Gravel Borrow Area	683,898	5,610,350	968	4.8	-	Limit of excavator	4.5 - 4.8 m	Gravelly; SAND and SILT: trace boulders; trace cobbles [Waste Rock]	A: 0 - 0. 1 m B: None C: None	Located on historic waste rock facility, easy to excavate up to 1 m, no groundwater, walls sloughing.
TP14-376	Haul Road	682,644	5,610,161	903	4.4	-	Limit of excavator	-	SILT; some gravel; some sand; trace boulders; trace cobbles [Glacial Till]	A: 0 - 0.05 m B: None C: None	Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.
TP14-377	Haul Road	682,604	5,610,406	903	4.1	-	Limit of excavator	1.4 - 1.5 m	SILT; some gravel; some sand; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-378	Haul Road	682,920	5,610,558	905	1.6	-	Refusal on bedrock	-	SILT; trace gravel; trace sand [Loess]	A: 0 - 0. 1 m B: 0. 1 - 0.8 m C: None	Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.
TP14-379	Haul Road	683,398	5,610,539	954	3.8	-	Refusal on bedrock	1.5 - 1.65 m	Gravelly Sandy SILT; trace cobbles; trace clay [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.4 m C: None	Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.1 - Test Pit Summary Table.xlsx]Test Pit Summary Table

0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG
	DATE	DESCRIPTION	PREP'D	REV'D

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TABLE A2.2

KGHM AJAX MINING INC.
AJAX PROJECT

2014 GEOTECHNICAL SITE INVESTIGATION
DRILLHOLE SUMMARY TABLE - MINE SITE INFRASTRUCTURE

Print Apr/08/15 8:25:53

Drillhole Designation	Coordinates			Azimuth	Dip	Drilling Technique	Total Depth	Depth to Bedrock	Date Started	Date Completed	Standpipe Piezometer Information				Area
	Easting	Northing	Elevation								Screened Interval		Water Level	Screen Zone Target	
	(m)	(m)	(m)	(°)	(°)		(m)	(m)			From (m)	To (m)	(m)		
DH14-004	685,738.4	5,609,107.4	892.5	-	90	ODEX: 0 - 8.81 HQ3: 8.81 - 109.42	109.42	8.81	25/07/14	28/07/14	22.9	25.9	9.1	Broken / Rubble Zone	General Mine Site Infrastructure
DH14-007	685,595.3	5,608,678.8	945.5	-	90	ODEX: 0 - 38.4 m HQ3: 38.4 - 100.01 m	100.01	39.19	29/07/14	02/07/14	Abandoned standpipe installation due to hole collapse				Conveyor
DH14-017	686,633.2	5,606,962.7	978.0	-	90	ODEX: 0 - 13.34 m HQ3: 13.34 - 101.00 m	101.00	12.34	09/08/14	12/08/14	94.3	97.3	2.0	Fractured Bedrock	SMRSF
DH14-035	683,877.6	5,605,626.6	1,058.3	-	90	ODEX: 0 - 6.10 m HQ3: 6.10 - 37.00 m	37.00	4.11	03/09/14	05/09/14	24.93	27.98	4.60	Fractured Bedrock	South Embankment
DH14-038	685,214.5	5,605,146.5	1,060.6	-	90	ODEX: 0 - 16.37 m HQ3: 16.37 - 37.85 m	37.85	13.32	12/09/14	15/09/14	23.35	26.39	12.82	Fractured Bedrock	Southeast Embankment
DH14-039	684,892.3	5,605,143.1	1,057.3	-	90	ODEX: 0 - 42.70 m HQ3: 42.70 - 65.20 m	65.20	38.10	14/09/14	18/09/14	43.74	46.78	33.01	Fault Zone	Southeast Embankment
DH14-044	686,154.5	5,607,907.8	1,005.6	-	90	ODEX: 0 - 4.22 m HQ3: 4.22 - 35.11 m	35.11	1.7	20/10/14	21/10/14	No Installation		9.50	No Screen Zone	Rock Quarry / SMRSF
DH14-045	686,419.6	5,607,573.9	1,029.6	-	90	ODEX: 0 - 45.71 m HQ3: 45.71 - 50.81 m	50.81	45.0	21/10/14	23/10/14	44.35	47.40	24.60	Bottom of drillhole	Borrow Area
DH14-052	686,717.2	5,609,680.9	925.6	-	90	ODEX: 0 - 44.19 m HQ3: 44.19 - 50.58 m	50.58	38.6	26/10/14	28/10/14	46.02	49.07	>30	Bottom of drillhole	Truck Shop Area
DH14-054	686,930.0	5,609,593.0	899.6	-	90	ODEX: 0 - 45.71 m HQ3: 45.71 - 52.11 m	52.11	42.7	28/10/14	30/10/14	No Installation		>30	No Screen Zone	Truck Shop Area
DH14-056	686,850.0	5,609,386.2	894.5	-	90	ODEX: 0 - 64.00 m HQ3: 64.00 - 104.50 m	104.50	61.60	30/10/14	02/11/14	66.45	72.54	32.60	Broken zone	Truck Shop Area
DH14-058	685,080.4	5,609,149.2	895.8	-	90	ODEX: 0 - 6.07 m HQ3: 6.07 - 45.78 m	45.78	3.00	01/11/14	02/11/14	No Installation		2.78	No Screen Zone	Primary Crusher Area
DH14-059	686,636.0	5,609,480.9	905.3	-	90	ODEX: 0 - 42.67 m HQ3: 42.67 - 48.82 m	48.82	41.50	02/11/14	03/11/14	No Installation		N/A	No Screen Zone	Truck Shop Area
DH14-060	685,215.3	5,609,206.4	914.3	-	90	ODEX: 0 - 1.20 m HQ3: 1.20 - 41.07 m	41.07	0.30	02/11/14	03/11/14	23.43	26.48	14.80	Broken zone	Primary Crusher Area
DH14-061	684,973.2	5,609,257.0	912.2	-	90	ODEX: 0 - 1.44 m HQ3: 1.44 - 41.32 m	41.32	0.70	04/11/14	04/11/14	No Installation		5.07	No Screen Zone	Primary Crusher Area
DH14-063	684,877.1	5,609,153.7	923.4	-	90	ODEX: 0 - 5.40 m HQ3: 5.40 - 35.26 m	35.26	5.20	05/11/14	05/11/14	No Installation		7.13	No Screen Zone	Rock Quarry
DH14-065	684,995.1	5,608,807.2	907.2	-	90	ODEX: 0 - 13.62 m HQ3: 13.62 - 20.29 m	20.29	11.43	05/11/14	06/11/14	No Installation		N/A	No Screen Zone	Borrow Area

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.2 - Drillhole Summary Table.xlsx]Table 1

NOTES:
1. GPS COORDINATES IN UTM NAD83 TAKEN WITH TRIMBLE GEO XR 6000 GPS.

0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG
	DATE	DESCRIPTION	PREP'D	REV'D

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TABLE A2.3

KGHM AJAX MINING INC.
AJAX PROJECT

GEOTECHNICAL FIELD INVESTIGATIONS
SOIL LABORATORY TESTING SUMMARY - MINE SITE INFRASTRUCTURE

Print Apr/30/15 11:27:40

Location	Sample No.	Depth From (mbgs)	Depth To (mbgs)	Material Type	USCS	Grain Size				Atterberg Limits[1,2]			Moisture Content
						% Gravel	% Sand	% Silt	% Clay	%			
										PL	LL	PI	%
TP14-071	TP14-071-1	4.5	9.0	Glacial Till	CL	15	27.3	30.0	28.0	13	30	17	11.3
TP14-087	TP14-087-1	3.5	3.7	Glacial Till	SC	30.2	37.9	21	10.9	14	22	8	7
TP14-183	TP14-183-1	4.7	4.8	Glacial Till	SC	28.7	32.2	20.5	18.6	13	27	14	8.4
TP14-213	TP14-213-1	2.0	2.5	Glaciofluvial	GP	62.5	34.2	3.3		NP	NP	NP	2.1
TP14-295	TP14-295-1	2.7	2.8	Glacial Till	SC	28.9	30.1	19.6	21.4	14	28	14	9.1
TP14-301	TP14-301-1	1.5	2.0	Completely weathered rock	MH	5.9	20.8	42.1	31.2	39	53	14	43.1
TP14-306	TP14-306-1	2.0	2.5	Glaciofluvial	GW	83.8	14.4	1.1	0.7	NP	NP	NP	4.1
TP14-343	TP14-343-1	4.2	4.3	Glacial Till	SC	22.4	31.7	24.4	21.5	14	28	14	10.4
TP14-344	TP14-344-1	3.8	3.9	Glacial Till	SC	26.3	29.1	23.7	20.9	15	27	12	11.1
TP14-346	TP14-346-1	4.0	4.5	Glaciolacustrine	ML	5.6	23	59.3	12.1	20	22	2	7.6
TP14-369	TP14-369-1	4.5	4.8	Anthropogenic Mine Rock	GC	38.5	30	17.9	13.6	13	22	9	6.9
DH14-052	SPT #8	12.2	12.6	Glacial Till	SC	25.6	38.0	24.9	11.5	13	27	14	7.5
DH14-052	SPT #10	15.2	15.5	Glacial Till	GC	35.0	31.3	23.6	10.1	13	24	11	11.7
DH14-052	SPT #14	27.4	28.0	Glacial Till	SC	21.6	45.2	27.6	5.6	12	25	13	10.5
DH14-054	SPT #6	9.1	9.8	Glacial Till	CL	14.2	20.2	35.3	30.3	15	39	24	15.2
DH14-054	SPT #10	15.2	15.9	Glaciolacustrine	CL	6.0	7.4	45.9	40.7	15	35	20	22.6
DH14-054	SPT #12	21.3	21.9	Glacial Till	CL	14.1	29.4	32.6	23.9	14	40	26	16.7
DH14-054	SPT #16	33.5	34.1	Glaciolacustrine	CL	1.2	14.4	59.1	25.3	16	28	12	22.5
DH14-054	SPT #18	39.6	4.2	Glaciolacustrine	ML	0.0	9.6	82.4	8.0	20	21	1	27.7
DH14-056	SPT #4	6.1	6.7	Glacial Till	SC	31.2	33.1	24.1	11.6	14	23	9	6.9
DH14-056	SPT #6	9.1	9.6	Glacial Till	CL	18.2	25.9	37.5	18.4	15	27	12	10
DH14-056	SPT #10	15.2	15.9	Glacial Till	CL	13.9	30.3	32.8	23.0	14	32	18	11.6
DH14-056	SPT #14	27.4	28.0	Glaciolacustrine	CL	2.8	15.5	51.7	30.0	14	36	22	17.9
DH14-056	SPT #18	39.6	40.2	Glaciolacustrine	CL	4.6	9.1	74.2	12.1	20	30	10	22.8
DH14-056	SPT #22	51.8	52.4	Glaciolacustrine	SP-SM	0.0	92.2	7.8		NP	19	NP	19.8
DH14-059	SPT #5	7.6	7.9	appSci12	CL	21.5	21.1	38.7	18.7	15	28	13	10.3
DH14-059	SPT #9	13.7	14.3	Glacial Till	CL	15.1	18.8	28.2	37.9	15	41	26	17.5
DH14-059	SPT #13	24.4	25.0	Glacial Till	GC	37.2	34.2	15.0	13.6	13	30	17	8.2
DH14-059	SPT #15	30.4	31.1	Glacial Till	SC	28.5	53.3	11.4	6.8	13	23	10	9.8
DH14-059	SPT #17	36.6	37.2	Glacial Till	SC	25.1	32.9	24.7	17.3	14	31	17	9.7
DH14-065	SPT #3	4.6	5.2	Glacial Till	CL	23.0	27.0	32.0	18.0	14	28	14	10.3
DH14-065	SPT #5	7.6	8.2	Glacial Till	SC	19.8	37.1	26.6	16.5	13	24	11	9.5
DH14-065	SPT #6	9.1	9.7	Glacial Till	SC	20.6	37.9	28.4	13.1	13	24	11	8.6

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.3 - Soil Laboratory Testing Summary Table_r0.xlsx]Table A2.4

NOTES:

1. PL - PLASTIC LIMIT; LL - LIQUID LIMIT; PI - PLASTICITY INDEX; LI - LIQUIDITY INDEX.
2. "NP" INDICATES THE SAMPLE WAS NON PLASTIC.

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	MAP	LJG

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TABLE A2.4

KGHM AJAX MINING INC.
AJAX PROJECT

2014 GEOTECHNICAL SITE INVESTIGATION
BEDROCK LABORATORY TESTING RESULTS - MINE SITE INFRASTRUCTURE

Print Apr/30/15 11:29:22

Drillhole ID	Depth from (m)	Depth to (m)	Length (m)	Sample Number	Drillhole Location	Lithology Code	Lithology	UCS (MPa)	Youngs Modulus E (GPa)	Poisson Ratio ν	Bulk Specific Gravity
DH14-035	13.30	13.57	0.27	UCS#1	South Embankment	SLTS	Siltstone	41.9	19.6	0.12	2.75
DH14-035	27.20	27.49	0.29	UCS#2	South Embankment	SLTS	Siltstone	66.2	50.5	0.18	2.788
DH14-035	31.47	31.76	0.29	UCS#3	South Embankment	SLTS	Siltstone	106.2	60.2	0.2	2.909
DH14-038	18.17	18.51	0.34	UCS#1	South Embankment	VCLT	Volcaniclastic	41.3	8.3	0.09	2.679
DH14-038	34.60	34.85	0.25	UCS#2	South Embankment	VCLT	Volcaniclastic	66.9	51.4	0.18	2.744
DH14-044	11.61	11.94	0.33	UCS#1	Plant Site	VCLT	Volcaniclastic	10.6	35.2	N/A	2.747
DH14-044	30.61	30.81	0.20	UCS#2	Plant Site	VCLT	Volcaniclastic	60.0	97.9	0.13	2.958
DH14-045	46.66	47.03	0.37	UCS#1	Plant Site	VCLT	Volcaniclastic	84.5	64.5	0.29	2.901
DH14-054	50.71	51.04	0.33	UCS #1	Plant Site	SLD	Sugarloaf Diorite	26.4	40.7	0.12	2.749
DH14-058	13.11	13.37	0.26	UCS#1	Primary crusher	SLD	Sugarloaf Diorite	127.7	87.9	0.13	2.859
DH14-058	21.25	21.56	0.31	UCS#2	Primary crusher	SLD	Sugarloaf Diorite	152.3	89.1	0.23	2.885
DH14-058	44.88	45.17	0.29	UCS#3	Primary crusher	SLD	Sugarloaf Diorite	264.5	75.0	0.29	2.895
DH14-060	28.41	28.67	0.26	UCS#1	Primary crusher	SLD	Sugarloaf Diorite	147.1	63.6	0.25	2.834
DH14-060	37.70	37.96	0.26	UCS#2	Primary crusher	SLD	Sugarloaf Diorite	228.5	66.4	0.24	2.869
DH14-061	8.32	8.61	0.29	UCS#1	Primary crusher	SLD	Sugarloaf Diorite	75.6	91.1	0.17	2.767
DH14-063	12.76	13.11	0.35	UCS#1	Possible quarry	SLD	Sugarloaf Diorite	152.4	37.7	0.20	2.883
DH14-063	34.26	34.49	0.23	UCS#2	Possible quarry	SLD	Sugarloaf Diorite	166.2	75.2	0.20	2.873

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.4 - Rock Laboratory Testing Summary Table.xlsx]Lab results

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.5

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
MAIN HAUL/ACCESS ROAD - SITE ENTRANCE TO PLANT SITE - TEST PIT SUMMARY

Print Apr/30/15 11:30:39

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-376	Haul Road	682,644	5,610,161	903	4.4	-	Limit of excavator	-	SILT; some gravel; some sand; trace boulders; trace cobbles [Glacial Till]	A: 0 - 0.05 m B: None C: None	Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.
TP14-377	Haul Road	682,604	5,610,406	903	4.1	-	Limit of excavator	1.4 - 1.5 m	SILT; some gravel; some sand; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-378	Haul Road	682,920	5,610,558	905	1.6	-	Refusal on bedrock	-	SILT; trace gravel; trace sand [Loess]	A: 0 - 0. 1 m B: 0. 1 - 0.8 m C: None	Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.
TP14-379	Haul Road	683,398	5,610,539	954	3.8	-	Refusal on bedrock	1.5 - 1.65 m	Gravelly Sandy SILT; trace cobbles; trace clay [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.4 m C: None	Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.
TP14-369	Sand and Gravel Borrow Area	683,898	5,610,350	968	4.8	-	Limit of excavator	4.5 - 4.8 m	Gravelly; SAND and SILT: trace boulders; trace cobbles [Waste Rock]	A: 0 - 0. 1 m B: None C: None	Located on historic waste rock facility, easy to excavate up to 1 m, no groundwater, walls sloughing.
TP-BGC-10-63	Main Haul Road	684,119	5,610,406	968	5.0	-	Dense material/difficult excavation	0.7 - 0.9 m 4.8 - 5.0 m	GRAVEL and COBBLES; some silt; some sand; trace boulders [Fill]	-	No water observed, elevation extracted from DEM.
TP-BGC-10-62	Main Haul Road	684,202	5,610,339	977	4.5	-	Dense material/difficult excavation	0.6 - 0.8 m 4.3 - 4.5 m	SILT and GRAVEL; some sand, some cobbles, some boulders [Fill]	-	No water observed, total sulphate ion content 0.01% - 0.47%, elevation extracted from DEM.
TP-BGC-10-61	Main Haul Road	684,261	5,610,421	979	6.0	-	Limit of excavator	0.7 - 0.9 m 5.8 - 6.0 m	GRAVEL; silty to some silt; some sand; cobbley to some cobbles; some boulders [Fill]	-	No water observed, elevation extracted from DEM.
TP-BGC-10-67	Main Haul Road	684,241	5,610,490	970	4.5	-	Walls Sloughing	1.0 - 1.2 m 4.3 - 4.5 m	Gravelly BOULDERS and COBBLES; trace silt [Fill]	-	No water observed, elevation extracted from DEM.
TP14-365	Haul Road	684,411	5,610,616	957	2.0	-	Refusal on Weathered Bedrock	-	Weathered bedrock	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Easy to excavate up to 1 m, no groundwater, walls stable.
TP14-364	Haul Road	685,000	5,610,698	950	3.0	-	Refusal on bedrock	-	Silt [Loess]; Weathered bedrock	A: 0 - 0.3 m B: 0.3 - 1.4 m C: None	Easy to excavate, no groundwater, walls stable.
TP14-363	Haul Road	685,426	5,610,649	970	5.0	-	Limit of excavator	-	Sandy Gravelly SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0.1 - 0.3 m C: 0.3 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP-BGC-10-32	Main Haul Road	685,651	5,610,541	964	4.5	-	Limit of excavator	4.4 - 4.6 m	Silty Gravelly SAND; some cobbles; trace boulders [Glacial Till]	-	No water observed, elevation extracted from DEM.
TP14-361	Haul Road	685,765	5,610,431	960	5.1	-	Limit of excavator	-	Gravelly SILT; some sand; trace boulders; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: None	Difficult to excavate, no groundwater, walls stable.
TP-BGC-10-35	Main Haul Road	686,018	5,610,260	944	5.1	-	Limit of excavator	0.6 - 0.8 m 4.9 - 5.1 m	SILT; some clay; some sand; some gravel; some cobbles [Glacial Till]	-	No water observed, elevation extracted from DEM.
TP14-339	Haul Road	686,346	5,609,951	945	3.6	-	Refusal on Weathered Bedrock	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.6 m	Difficult to excavate, no groundwater, walls stable.
TP-BGC-13-23	Haul Road	686,330	5,609,800	956	2.4	-	Refusal on boulders	0.9 - 1.1 m	SAND and SILT; some gravel; trace clay; trace cobbles [Glacial Till]	-	No water observed.
TP14-338	Haul Road	686,191	5,609,671	932	3.5	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP-BGC-13-22	Main Haul Road	685,933	5,609,669	940	3.9	-	Refusal on dense till	0.9 - 1.0 m 3.6 - 3.7 m	SAND; gravelly; silty; trace cobbles; trace boulders [Glacial Till]	-	No water observed.
TP14-333	Potential Borrow Area	685,702	5,609,502	900	5.0	-	Limit of excavator	-	SILT; some clay; trace cobbles and gravel [Glaciolacustrine]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Easy to excavate, no groundwater, walls stable.
TP14-334	Potential Borrow Area	685,902	5,609,354	889	4.4	-	Limit of excavator	-	Sandy SILT; some cobbles; some gravel [Glacial Till]	A: 0 - 0. 1 m B: None C: None	Easy to excavate, walls sloughing in gravel material from 1.3 m - 2.5 m, no groundwater.
TP14-332	Potential Borrow Area	685,957	5,609,137	882	3.3	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: 0.3 - 0.7 m	Easy to excavate, no groundwater, walls sloughing slightly.
TP14-214	Haul / Access Roads	685,595	5,609,127	901	1.3	-	Refusal on Weathered Bedrock	-	Sandy GRAVEL; some silt; some cobbles [Glaciofluvial]	A: 0 - 0.2 m B: None C: 0.2 - 0.7 m	Walls sloughing, no groundwater, easy to excavate.
TP14-213	Haul / Access Roads	685,505	5,609,015	906	2.5	-	Refusal on possible bedrock	2.0 - 2.5 m	Sandy GRAVEL; some silt; some cobbles [Glaciofluvial]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.8 m	Walls stable, no groundwater, easy to excavate.
TP14-212	Overland Conveyor	685,386	5,608,826	929	3.6	-	Refusal on dense material	-	Sandy SILT; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.15 m B: 0.15 - 0.45 m C: 0.45 - 0.8 m	Walls stable, no groundwater, difficult to excavate after 3.4 m.
TP14-322	Conveyor Corridor	685,557	5,608,792	929	3.6	-	Refusal on cobbles / boulders	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: None	Easy to excavate up to 3m, no groundwater, walls stable.
TP14-321	Conveyor Corridor	685,672	5,608,697	932	4.4	-	Limit of excavator	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Relatively easy to excavate, no groundwater, walls stable.
TP14-320	Conveyor Corridor	685,845	5,608,576	941	1.6	-	Refusal on bedrock	-	Sandy SILT; some gravel; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.
TP14-319	Conveyor Corridor	686,030	5,608,440	947	3.7	-	Refusal on dense material	-	Sandy Gravelly; SILT; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.7 m	Difficult to excavate, no groundwater, walls stable.

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR '15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.6

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
EMRSF HAUL ROAD - FROM OPEN PIT TO EMRSF - TEST PIT SUMMARY

Print Apr/30/15 11:32:45

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-283	Haul / Access Roads	684,765	5,609,065	891	4.4	-	Limit of excavator	4.2 - 4.4 m	Sand; gravelly; SILT [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.6 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-282	Central Collection Pond	684,880	5,609,026	895	4.6	-	Limit of excavator	-	SILT and SAND; some gravel; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 1. 1 m	Walls stable, no groundwater, easy excavation.
TP14-280	Central Collection Pond	685,090	5,609,191	898	2.8	-	Refusal on Weathered Bedrock	-	Silty; SAND; some gravel [Loess]	A: 0 - 0. 1 m B: None C: None	Walls stable, no groundwater, easy excavation.
TP14-279	Haul / Access Roads	685,295	5,609,230	898	4.0	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.8 m	Walls stable, no groundwater, easy excavation.
TP14-278	Haul / Access Roads	685,434	5,609,309	883	3.5	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glaciofluvial]	A: 0 - 0.3 m B: 0.3 - 0.4 m C: 0.4 - 0.6 m	Walls sloughing, no groundwater, difficult to excavate due to wall stability.
TP14-333	Potential Borrow Area	685,702	5,609,502	900	5.0	-	Limit of excavator	-	SILT; some clay; trace cobbles and gravel [Glaciolacustrine]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Easy to excavate, no groundwater, walls stable.
TP14-337	Haul Road	685,996	5,609,537	916	2.9	-	Refusal on dense material	-	Gravelly; SILT; some sand; some cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.4 m C: 0.4 - 0.7 m	Difficult to excavate, no groundwater, walls stable.
TP-BGC-13-24	EMRSF Haul Road	686,491	5,609,699	928	1.9	-	Refusal on dense material	0.9 - 1.0 m	Gravelly SAND and SILT; trace cobbles; trace boulders [Glacial Till]	-	No water observed.
TP14-343	EMRSF	686,696	5,609,860	930	4.3	-	Refusal on dense material	4.2 - 4.3 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.9 m	Easy to excavate, no groundwater, walls stable.

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.7

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TRUCK SHOP ACCESS ROAD - TEST PIT SUMMARY

Print Apr/30/15 11:32:45

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP-BGC-13-24	EMRSF Haul Road	686,491	5,609,699	928	1.9	-	Refusal on dense material	0.9 - 1.0 m	Gravelly SAND and SILT; trace cobbles; trace boulders [Glacial Till]	-	No water observed.
TP-BGC-10-39	Truck Shop	686,713	5,609,617	921	3.3	-	Refusal on bedrock	-	SAND and GRAVEL; some cobbles; trace silt [Glacial Till]	-	No water observed, no samples collected, elevations extracted from DEM.
TP-BGC-10-37	Truck Shop Access Road	686,153	5,609,446	901	5.2	-	Limit of excavator	5.0 - 5.2 m	SAND; some gravel; some cobbles; some boulders; trace to some silt [Glacial Till]	-	No water observed, elevations extracted from DEM.
TP14-334	Potential Borrow Area	685,902	5,609,354	889	4.4	-	Limit of excavator	-	Sandy; SILT; some cobbles; some gravel [Glacial Till]	A: 0 - 0. 1 m B: None C: None	Easy to excavate, walls sloughing in gravel material from 1.3 m - 2.5 m, no groundwater.

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.5 to 12 - Test Pit Summary Tables BY AREA.xlsx]A2.7 Truck Shop Access Road

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.8

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
SMRSF HAUL ROAD - FROM OPEN PIT TO SMRSF - TEST PIT SUMMARY

Print Apr/30/15 11:33:48

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-283	Haul / Access Roads	684,765	5,609,065	891	4.4	-	Limit of excavator	4.2 - 4.4 m	Sand; gravelly; SILT [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.6 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-282	Central Collection Pond	684,880	5,609,026	895	4.6	-	Limit of excavator	-	SILT and SAND; some gravel; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 1. 1 m	Walls stable, no groundwater, easy excavation.
TP14-218	Old Mine Rock Facility / Ore Stockpile	684,779	5,608,826	925	0.3	-	Refusal on Weathered Bedrock	-	Weathered bedrock	Waste Rock Dump	No groundwater.
TP14-226	Old Mine Rock Facility / Ore Stockpile	684,930	5,608,746	918	4.3	-	Limit of excavator	-	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.9 m	Walls stable, no groundwater, easy excavation.
TP14-228	Old Mine Rock Facility / Ore Stockpile	684,799	5,608,657	934	4.3	-	Limit of excavator	-	Sandy; gravelly; SILT; trace cobbles [Glacial Till]	A: 0 - 0.15 m B: 0.15 - 0.4 m C: 0.4 - 0.9 m	Walls stable, no groundwater, easy excavation.

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR '15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.9

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
WMRSF HAUL ROAD - FROM OPEN PIT TO WMRSF - TEST PIT SUMMARY

Print Apr/30/15 11:34:11

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-240	Old Mine Rock Facility / Ore Stockpile	684,468	5,609,031	921	3.2	-	Refusal on boulders	-	Silty; SAND and GRAVEL; some cobbles; some boulders [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate.
TP14-234	Old Mine Rock Facility / Ore Stockpile	684,198	5,608,831	924	4.4	-	Limit of excavator	-	Sandy; gravelly; COBBLES; trace boulders [Waste Rock]	Waste Rock Dump	Walls sloughing slightly, no groundwater, easy excavation.

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.5 to 12 - Test Pit Summary Tables BY AREA.xlsx]A2.9 WMRSF Haul Road (from OP)

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.10

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
NORTH EMBANKMENT SEEPAGE COLLECTION POND ACCESS ROAD - TEST PIT SUMMARY

Print Apr/30/15 11:34:39

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-283	Haul / Access Roads	684,765	5,609,065	891	4.4	-	Limit of excavator	4.2 - 4.4 m	Sand; gravelly; SILT [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.6 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-240	Old Mine Rock Facility / Ore Stockpile	684,468	5,609,031	921	3.2	-	Refusal on boulders	-	Silty; SAND and GRAVEL; some cobbles; some boulders [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate.
TP14-236	Old Mine Rock Facility / Ore Stockpile	684,281	5,609,054	909	3.8	-	Wall instability	-	GRAVEL and COBBLES; some silt; some boulders. [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, easy excavation.
TP14-238	Old Mine Rock Facility / Ore Stockpile	684,067	5,609,034	899	4.3	-	Limit of excavator	4.1 - 4.3 m	SILT; some sand; some gravel; trace cobbles [Colluvium]	A: 0 - 0. 1 m B: 0. 1 - 0.25 m C: 0.25 - 0.8 m	Walls stable, no groundwater, easy excavation.
TP14-232	WMRSF	683,993	5,608,849	926	4.2	-	Limit of excavator	-	Gravelly; COBBLES and BOULDERS; some sand; trace silt [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate due to boulders and wall stability
TP14-230	WMRSF	683,822	5,608,872	919	2.2	-	Wall instability	-	Sandy; GRAVEL; some silt; some cobbles; some boulders [Waste Rock]	Waste Rock Dump	Walls sloughing, no groundwater, difficult to excavate due to boulders and wall stability
TP14-074	South of Jacko Lake	683,183	5,608,933	932	4.8	-	Limit of excavator	4.7 - 4.8 m	Gravelly; SILT; some sand; trace cobbles; trace clay [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: 0.6 - 1.0 m	Walls sloughing slightly from 0 - 1.5 m, no groundwater, easy to excavate up to 2 m.
TP14-075	South of Jacko Lake	682,993	5,608,913	955	4.2	-	Limit of excavator	-	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Walls sloughing in from 0 - 1.2 m, no groundwater, easy to excavate.
TP14-076	South of Jacko Lake	682,875	5,608,889	939	5.0	-	Limit of excavator	4.5 - 5.0 m	Silty; SAND and GRAVEL; trace cobbles; trace clay [Glacial Till]	A: 0 - 0.2 m B: None C: None	Walls stable, no groundwater, easy to excavate.
TP14-067	South of Jacko Lake	682,718	5,608,950	949	4.3	-	Refusal on dense material	4.0 - 4.3 m	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.6 m	Walls stable, no groundwater, easy to excavate up to 2 m.
TP14-071	South of Jacko Lake	682,481	5,608,843	935	4.9	-	Limit of excavator	4.5 - 4.9 m	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: 0.6 - 0.9 m	Walls stable, no groundwater, easy to excavate.
TP14-061	South of Jacko Lake	682,167	5,608,659	961	1.3	-	Refusal on bedrock	1.0 - 1.3 m	Weathered bedrock	A: 0 - 0.1 m B: None C: None	Walls stable, no groundwater, difficult to excavate.
TP14-062	Downstream of North Embankment	681,973	5,608,672	947	3.7	-	Refusal on dense material	3.5 - 3.7 m	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.4 m	Difficult to excavate 1 m onwards.
TP14-057	Downstream of North Embankment	681,860	5,608,462	924	1.4	-	Refusal on Weathered Bedrock	-	SAND and GRAVEL [Fluvial] and bedrock	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.4 m	Walls stable, no groundwater, difficult to excavate after 0.4 m.
TP14-003	Seepage Collection Pond 1	681,764	5,608,262	937	0.6	-	Refusal on possible bedrock	-	GRAVEL; trace cobbles [Weathered bedrock]	Not documented	Difficult excavation.

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.5 to 12 - Test Pit Summary Tables BY AREA.xlsx]A2.10 NESCP Access Road

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

Knight Piésold CONSULTING

TABLE A2.11

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TAILINGS & RECLAIM PIPELINE ACCESS ROAD - NORTH LINE - TEST PIT SUMMARY

Print Apr/30/15 11:35:00

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-329	Haul Road	686,740	5,607,652	984	3.9	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.5 m	Difficult to excavate, no groundwater, walls stable.
TP14-309	Tailings and Reclaim Pipeline Corridor	686,812	5,607,361	985	3.1	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Difficult to excavate; no groundwater; walls stable.
TP14-308	SMRSF Water Management Pond	686,699	5,606,967	983	3.2	-	Refusal on bedrock	1.4 - 1.55 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-307	SMRSF Water Management Pond	686,604	5,606,835	992	0.6	-	Refusal on bedrock	-	Rubblized bedrock, dark grey, very strong, orange and black staining. [Bedrock]	A: 0 - 0.05 m B: 0.05 - 0.3 m C: None	Bedrock outcrops nearby, easy to excavate up to bedrock, no groundwater, walls stable.
TP14-306	SMRSF Water Management Pond	686,459	5,606,863	978	2.6	2.6	Wall instability / groundwater	2 - 2.5 m	Sandy; GRAVEL; some silt; trace cobbles [Glaciofluvial]	A: 0 - 0.3 m B: 0.3 - 0.5 m C: None	Very easy to excavate, gravel material sloughing beneath topsoil layer.
TP14-330	SMRSF Water Management Pond	686,459	5,606,823	980	3.0	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	TP on existing road	Difficult to excavate, no groundwater, walls stable.
TP14-279	Haul / Access Roads	685,295	5,609,230	898	4.0	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.8 m	Walls stable, no groundwater, easy excavation.
TP14-300	Tailings and Reclaim Pipeline Corridor	685,838	5,606,715	1061	2.0	-	Refusal on highly weathered rock	-	Silty; SAND; some gravel; trace cobbles [Colluvium]	A: 0 - 0.9 m B: None C: None	Easy to excavate up to 2 m, no groundwater, walls sloughing slightly.
TP14-301	Tailings and Reclaim Pipeline Corridor	685,616	5,606,665	1077	3.3	2.0	Refusal on highly weathered rock	1.5 - 2 m	SILT; some sand; some gravel; some clay; trace cobbles [Completely weathered rock]	None	Groundwater at 2 m, material at 2 m onwards appears to be completely weathered rock, test pit located in small valley and may not be representative of larger area.
TP14-294	East Embankment - East Abutment	685,340	5,606,888	1041	1.9	-	Refusal on bedrock	-	Silty; SAND; some gravel; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.
TP14-264	TSF Basin	684,229	5,607,292	1011	2.9	-	Refusal on boulders/bedrock	2.7 - 2.9 m	Sandy; gravelly; SILT; trace cobbles [Glacial Till]	A: 0 - 0.25 m B: 0.25 - 0.4 m C: 0.4 - 1.0 m	Walls stable, no groundwater, difficult to excavate due to dense material.
TP14-262	East Embankment	684,417	5,607,410	1032	4.0	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Reworked Glaciofluvial]	A: 0 - 0.4 m B: 0.4 - 0.5 m C: 0.5 - 1.0 m	Walls stable, no groundwater, easy excavation.
TP14-086	TSF Basin	683,723	5,607,548	965	0.6	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: None	Walls sloughing, no groundwater, difficult to excavate.

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TABLE A2.11

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TAILINGS & RECLAIM PIPELINE ACCESS ROAD - NORTH LINE - TEST PIT SUMMARY

Print Apr/30/15 11:35:00

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-087	TSF Basin	683,687	5,607,713	962	3.7	-	Refusal on dense material	1.4 - 1.5 m 3.5 - 3.7 m	Silty; SAND and GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.5 m	Walls sloughing slightly to 1.5m, no groundwater, difficult to excavate from 1 m onwards.
TP14-252	TSF Basin	684,166	5,607,524	1041	3.8	-	Refusal on dense material	3.6 - 3.8 m	Silty; SAND and GRAVEL; trace; cobbles [Glacial Till?]	A: 0 - 0.5 m B: None C: 0.5 - 0.9 m	Walls stable, no groundwater, easy excavation.

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Appendices\Rev 0\A2 - Summary Tables\[Table A2.5 to 12 - Test Pit Summary Tables BY AREA.xlsx]A2.11 Tails & Re. Corridor (N)

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	01APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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TABLE A2.12

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TAILINGS & RECLAIM PIPELINE ACCESS ROAD - SOUTH LINE - TEST PIT SUMMARY

Print Apr/30/15 11:35:33

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-329	Haul Road	686,740	5,607,652	984	3.9	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.5 m	Difficult to excavate, no groundwater, walls stable.
TP14-309	Tailings and Reclaim Pipeline Corridor	686,812	5,607,361	985	3.1	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: None	Difficult to excavate; no groundwater; walls stable.
TP14-308	SMRSF Water Management Pond	686,699	5,606,967	983	3.2	-	Refusal on bedrock	1.4 - 1.55 m	Gravelly Sandy SILT; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Difficult to excavate, no groundwater, walls stable.
TP14-307	SMRSF Water Management Pond	686,604	5,606,835	992	0.6	-	Refusal on bedrock	-	Rubblized bedrock, dark grey, very strong, orange and black staining. [Bedrock]	A: 0 - 0.05 m B: 0.05 - 0.3 m C: None	Bedrock outcrops nearby, easy to excavate up to bedrock, no groundwater, walls stable.
TP14-306	SMRSF Water Management Pond	686,459	5,606,863	978	2.6	2.6	Wall instability / groundwater	2 - 2.5 m	Sandy; GRAVEL; some silt; trace cobbles [Glaciofluvial]	A: 0 - 0.3 m B: 0.3 - 0.5 m C: None	Very easy to excavate, gravel material sloughing beneath topsoil layer.
TP14-330	SMRSF Water Management Pond	686,459	5,606,823	980	3.0	-	Refusal on dense material	-	Gravelly Sandy SILT; trace cobbles [Glacial Till]	TP on existing road	Difficult to excavate, no groundwater, walls stable.
TP14-279	Haul / Access Roads	685,295	5,609,230	898	4.0	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Colluvium]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: 0.3 - 0.8 m	Walls stable, no groundwater, easy excavation.
TP14-300	Tailings and Reclaim Pipeline Corridor	685,838	5,606,715	1061	2.0	-	Refusal on highly weathered rock	-	Silty; SAND; some gravel; trace cobbles [Colluvium]	A: 0 - 0.9 m B: None C: None	Easy to excavate up to 2 m, no groundwater, walls sloughing slightly.
TP14-301	Tailings and Reclaim Pipeline Corridor	685,616	5,606,665	1077	3.3	2.0	Refusal on highly weathered rock	1.5 - 2 m	SILT; some sand; some gravel; some clay; trace cobbles [Completely weathered rock]	None	Groundwater at 2 m, material at 2 m onwards appears to be completely weathered rock, test pit located in small valley and may not be representative of larger area.
TP14-177	TSF Basin	685,288	5,606,518	1091	4.9	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: 0.3 - 0.7 m	Walls stable; no groundwater, difficult to excavate.
TP14-295	Tailings and Reclaim Pipeline Corridor	685,378	5,606,425	1078	2.8	-	Refusal on dense material	2.7 - 2.8 m	SILT; some gravel; some sand; trace boulders; trace cobbles; trace clay [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.2 m C: 0.2 - 0.9 m	Very difficult to excavate after 1 m, no groundwater, walls stable.
TP14-296	Tailings and Reclaim Pipeline Corridor	685,446	5,606,231	1066	4.1	-	Limit of excavator	-	Gravelly SILT; some silt; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Easy to excavate, no groundwater, walls stable.
TP14-175	TSF Basin	685,274	5,606,353	1061	5.2	-	Limit of excavator	5.0 - 5.2 m	Silty; sandy; GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.5 m C: 0.5 - 1. 1 m	Walls stable; no groundwater, easy to excavate.
TP14-180	TSF Basin	685,506	5,606,014	1058	4.7	-	Limit of excavator	4.5 - 4.7 m	Silty; gravelly; SAND; some cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.6 m C: 0.6 - 1. 1 m	Walls stable; no groundwater, difficult to excavate after 1 m.

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TABLE A2.12

KGHM AJAX MINING INC.
AJAX PROJECT

AJAX 2014 SITE INVESTIGATION
TAILINGS & RECLAIM PIPELINE ACCESS ROAD - SOUTH LINE - TEST PIT SUMMARY

Print Apr/30/15 11:35:33

Test Pit ID	Test Pit Location	GPS UTM Coordinates NAD 83			Depth of Excavation	Ground-water	Reason For Termination	Samples Collected	KP Field Description of Main Soil Type	Soil Horizon Depths	Comments
		Easting (m)	Northing (m)	Elevation (m)	(m)	(m)					
TP14-188	TSF Basin	685,335	5,605,901	1025	4.4	-	Refusal on dense material	4.3 - 4.4 m	Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.5 m B: None C: None	Walls stable; no groundwater, difficult to excavate after 2 m.
TP14-186	TSF Basin	685,069	5,605,976	1002	4.6	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.7 m C: 0.7 - 1.3 m	Walls stable; no groundwater, relatively easy to excavate.
TP14-183	TSF Basin	684,924	5,606,111	990	4.7	-	Limit of excavator	4.7 - 4.8 m	Silty; sandy; GRAVEL; trace cobbles [Glacial Till]	A: 0 - 0.4 m B: 0.4 - 0.9 m C: 0.9 - 1. 1 m	Walls stable; no groundwater, difficult to excavate.
TP14-184	TSF Basin	684,838	5,606,283	982	4.7	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Walls stable; no groundwater, difficult to excavate after 0.5 m.
TP14-297	Tailings and Reclaim Pipeline Corridor	685,658	5,605,991	1065	1.4	-	Refusal on bedrock	-	SILT and SAND; some gravel; trace cobbles	A: 0 - 0.2 m B: 0.2 - 0.4 m C: None	Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.
TP14-189	TSF Basin	685,559	5,605,828	1051	2.7	-	Refusal on Weathered Bedrock	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.4 m C: 0.4 - 0.6 m	Walls stable; no groundwater, easy to excavate.
TP14-190	TSF Basin	685,516	5,605,631	1054	4.9	-	Limit of excavator	-	Silty; gravelly; SAND; trace cobbles [Glacial Till]	A: 0 - 0. 1 m B: 0. 1 - 0.3 m C: 0.3 - 0.7 m	Walls stable; no groundwater, easy to excavate.
TP14-191	TSF Basin	685,553	5,605,358	1054	5.4	-	Limit of excavator	5.0 - 5.4 m	SILT and SAND; trace gravel; trace cobbles [Loess]	A: 0 - 0.2 m B: 0.2 - 1 m C: None	Very uniform material and easy to excavate; no groundwater; walls stable.
TP14-193	TSF Basin	685,395	5,605,345	1070	3.1	-	Refusal on bedrock	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: 0.3 - 0.7 m C: None	Walls stable, no groundwater, easy to excavate up to 1 m, bedrock outcrops in area.
TP14-195	TSF Basin	685,218	5,605,419	1050	2.3	-	Refusal on dense material	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.2 m B: 0.2 - 0.6 m C: None	Walls stable, no groundwater, difficult to excavate.
TP14-196	TSF Basin	685,218	5,605,280	1058	4.6	-	Limit of excavator	-	SAND; some gravel; some silt; trace cobbles [Loess]	A: 0 - 0.2 m B: 0.2 - 0.3 m C: None	Walls sloughing slightly; no groundwater, very easy to excavate.
TP14-200	Southeast Embankment	684,804	5,605,232	1060	4.6	-	Limit of excavator	-	Silty; SAND; some gravel; trace cobbles [Glacial Till]	A: 0 - 0.3 m B: None C: None	Walls stable; no groundwater, easy to excavate up to 2 m, then difficult.
TP14-130	TSF Basin	684,133	5,605,624	1066	0.7	-	Refusal on Weathered Bedrock	-	Gravelly; SILT [Colluvium]	A: 0 - 0.19 m B: 0.19 - 0.69 m C: None	Walls stable, no groundwater.
TP14-128	Downstream of South Embankment	683,865	5,605,543	1067	2.7	-	Wall instability	-	GRAVEL and SILT; trace cobbles [Glaciofluvial]	A: 0 - 0.14 m B: 0.14 - 0.42 m C: None	Walls collapsing beneath A and B horizon.

APPENDIX B

TEST PIT DETAILS

Appendix B1 Test Pit Logs
Appendix B2 Test Pit Photographs
Appendix B3 Test Pit Logs By Others

APPENDIX B1

TEST PIT LOGS

(Pages B1-1 to B1-94)

Project: AJAX PROJECT | **Test Pit No.:** TP14-003 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 16 Jul 14

Location: Seepage Collection Pond 1 | Total Depth: 0.61 m | Date Completed: 16 Jul 14

Coordinates: 681,764 E , 5,608,262 N UTM NAD83 ZONE10 | Elevation: 936.8 m | Logged by: MAS/MAP/LEP/LS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	936.8					**TOPSOIL & ORGANICS** (0 to 0.18) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand, subangular, poorly graded, low plasticity, brown to dark brown, dry, loose to compact.	0 m - Soil Horizons Not Documented
						WEATHERED BEDROCK (0.18 to 0.61) Highly weathered bedrock (Mafic Volcanics?), angular to subangular pieces up to 28 cm in diameter, pieces mostly fine to coarse grained gravel sized; trace cobbles, well graded, non plastic, brown with orange/red minor oxidization.	
1.0	936.0					End of Test Pit: 0.61 m Refusal on possible bedrock	
2.0	935.0						
3.0	934.0						
4.0	933.0						
5.0	932.0						
	931.0						

GENERAL REMARKS:
Difficult excavation.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-057 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 30 Jul 14

Location: Downstream of North Embankment | Total Depth: 1.4 m | Date Completed: 30 Jul 14

Coordinates: 681,860 E , 5,608,462 N UTM NAD83 ZONE10 | Elevation: 923.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	923.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS, root mat; and TOPSOIL; Sandy SILT; trace gravel, fine to coarse grained; poorly graded, non plastic, medium dark brown, loose, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.4 m
						SAND AND GRAVEL (0.3 to 0.4) SAND and GRAVEL, fine to coarse grained, angular to sub rounded; some silt; well graded, non plastic, light grey, massive, very dense, dry. [Fluvial]	
1.0						**WEATHERED BEDROCK** (0.4 to 1.4) dark grey, strong, highly fractured, slightly weathered, oxide staining.	
	922.0					End of Test Pit: 1.4 m Refusal on weathered bedrock	
2.0							
	921.0						
3.0							
	920.0						
4.0							
	919.0						
5.0							
	918.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate after 0.4 m.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-2

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-061 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 30 Jul 14

Location: South of Jacko Lake | Total Depth: 1.3 m | Date Completed: 30 Jul 14

Coordinates: 682,167 E , 5,608,659 N UTM NAD83 ZONE10 | Elevation: 960.9 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	960.0					**TOPSOIL/ORGANICS** (0 to 0.1) ORGANICS, root mat; and TOPSOIL; Silty gravelly SAND, fine to coarse grained, angular to sub rounded, poorly graded, non plastic, dark brown, loose, root inclusions, dry.	0 m - A: 0 - 0.1 m
						WEATHERED BEDROCK (0.1 to 1.3) medium greyish brown with some orange oxidization staining, slightly weathered, rubblized by excavation, walls look massive, no layering.	
1.0		GB	TP14-061-1				
						End of Test Pit: 1.3 m Refusal on bedrock	
2.0	959.0						
3.0	958.0						
4.0	957.0						
5.0	956.0						
	955.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-062 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 30 Jul 14

Location: Downstream of North Embankment | Total Depth: 3.7 m | Date Completed: 30 Jul 14

Coordinates: 681,973 E , 5,608,672 N UTM NAD83 ZONE10 | Elevation: 946.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	946.6					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Silty SAND, fine to coarse grained; trace gravel, fine to coarse grained, angular to sub rounded; poorly graded, non plastic, dark brown, loose, root inclusions, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m 0.3 m - C: 0.3 - 0.4 m
	946.0					**SILTY SAND AND GRAVEL** (0.2 to 0.7) Silty SAND and GRAVEL, fine to coarse grained, angular to sub rounded; trace cobbles, angular to sub rounded; well graded, non plastic, medium brown, dense, dry.	
1.0						**SILTY GRAVELLY SAND** (0.7 to 3.7) Silty gravelly SAND, fine to coarse grained, angular to rounded; trace cobbles, angular to rounded; well graded, non plastic, medium greyish brown, massive, very dense, dry [Glacial Till].	
	945.0						
2.0							
	944.0						
3.0							
	943.0	GB	TP14-062-1			End of Test Pit: 3.7 m Refusal on dense material	
4.0							
	942.0						
5.0							
	941.0						

GENERAL REMARKS:

Difficult to excavate 1 m onwards.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-4

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-067 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 31 Jul 14

Location: South of Jacko Lake | Total Depth: 4.3 m | Date Completed: 31 Jul 14

Coordinates: 682,718 E , 5,608,950 N UTM NAD83 ZONE10 | Elevation: 948.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	948.5					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to coarse grained; trace gravel, fine to coarse grained, rounded to sub angular; poorly graded, non plastic, dark/medium brown, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.6 m
	948.0					**SAND AND SILT** (0.2 to 0.4) SILT and SAND, fine to coarse grained; some gravel, fine to coarse grained, sub angular to sub rounded; poorly graded, non plastic, medium brown, massive, dense, dry.	
1.0						**SAND AND GRAVEL** (0.4 to 0.6) SAND and GRAVEL, fine to coarse grained, angular to rounded; some silt; well graded, non plastic, light greyish brown, massive, dense, dry.	
	947.0					**SILTY GRAVELLY SAND** (0.6 to 4.3) Silty gravelly SAND, fine to coarse grained, angular to rounded; trace cobbles, sub angular to sub rounded; well graded, low to no plasticity, cohesive, dark greyish brown, massive, very dense, dry [Glacial Till].	
2.0							
	946.0						
3.0							
	945.0						
4.0		GB	TP14-067-1				
	944.0					End of Test Pit: 4.3 m Refusal on dense material	
5.0							
	943.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy to excavate up to 2 m.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-5

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-071 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 1 Aug 14

Location: South of Jacko Lake | Total Depth: 4.9 m | Date Completed: 1 Aug 14

Coordinates: 682,481 E , 5,608,843 N UTM NAD83 ZONE10 | Elevation: 934.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	934.8					**TOPSOIL/ORGANICS** (0 to 0.6) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to coarse grained; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark to medium brown, loose becoming dense, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.6 m 0.6 m - C: 0.6 - 0.9 m
1.0	934.0					**SILTY SAND** (0.6 to 0.9) Silty SAND, fine to coarse grained; some gravel, fine to coarse grained, angular to rounded; trace cobbles, sub angular to rounded; poorly graded, non plastic, greyish brown, massive, dry.	
						SILTY GRAVELLY SAND (0.9 to 4.9) Silty gravelly SAND, fine to coarse grained, angular to sub rounded; some cobbles, angular to sub rounded; well graded, low plasticity, dark greyish brown, massive, very dense, dry [Glacial Till].	
2.0	933.0						
	932.0						
3.0							
	931.0						
4.0		G B	TP14-071-1				
	930.0					End of Test Pit: 4.9 m Limit of excavator	
5.0							
	929.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy to excavate.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-6

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-074 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 2 Aug 14

Location: South of Jacko Lake | Total Depth: 4.8 m | Date Completed: 2 Aug 14

Coordinates: 683,183 E , 5,608,933 N UTM NAD83 ZONE10 | Elevation: 932.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	932.0					**TOPSOIL/ORGANICS** (0 to 0.6) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to medium grained; trace gravel, fine to medium grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, root inclusions to 0.3 m, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.6 m
1.0	931.0					**GRAVELLY SAND AND SILT** (0.6 to 1) Gravelly SAND and SILT, fine to coarse grained, angular to sub rounded; trace cobbles, angular to sub rounded; well graded, non plastic, greyish brown, massive, dense, dry **GRAVELLY SILT** (1 to 4.8) Gravelly SILT; some sand, fine to coarse grained; trace clay; trace cobbles, sub angular to rounded; well graded, medium plasticity, greyish brown, massive, cohesive, dry [Glacial Till].	0.6 m - C: 0.6 - 1.0 m
2.0	930.0						
3.0	929.0						
4.0	928.0	G B	TP14-074-1				
5.0	927.0					End of Test Pit: 4.8 m Limit of excavator	

GENERAL REMARKS:

Walls sloughing slightly from 0 - 1.5 m, no groundwater, easy to excavate up to 2 m.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-7

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-075 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 2 Aug 14

Location: South of Jacko Lake | Total Depth: 4.2 m | Date Completed: 2 Aug 14

Coordinates: 682,993 E , 5,608,913 N UTM NAD83 ZONE10 | Elevation: 955 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	955.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to coarse grained; trace gravel, fine to coarse grained; sub angular to rounded; trace cobbles up to 15 cm in diameter, sub angular to rounded; poorly graded, non plastic, dark brown, loose, root inclusions to 1.2 m, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m
						SILTY SAND AND GRAVEL (0.3 to 4.2) Silty SAND and GRAVEL, fine to coarse grained, sub angular to rounded; well graded, non plastic, dark greyish brown, not cohesive, massive, dense, dry [Glacial Till].	
1.0	954.0						
2.0	953.0						
3.0	952.0						
4.0	951.0					End of Test Pit: 4.2 m Limit of excavator	
5.0	950.0						

GENERAL REMARKS:

Walls sloughing in from 0 - 1.2 m, no groundwater, easy to excavate.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-8

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-076 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 2 Aug 14

Location: South of Jacko Lake | Total Depth: 5 m | Date Completed: 2 Aug 14

Coordinates: 682,875 E , 5,608,889 N UTM NAD83 ZONE10 | Elevation: 938.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	938.0					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS, root mat; and TOPSOIL; SILT, some sand, fine to coarse grained; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, medium brown, lots, root inclusions to 0.5 m, dry.	0 m - A: 0 - 0.2 m
1.0	937.0					**SILTY SAND AND GRAVEL** (0.2 to 5) Silty SAND and GRAVEL, fine to coarse grained, angular to sub rounded; trace clay; trace cobbles, sub angular to sub rounded; well graded, non plastic, dark greyish brown, dry to moist, cohesive [Glacial Till].	
2.0	936.0						
3.0	935.0						
4.0	934.0	G B	TP14-076-1				
5.0	933.0					End of Test Pit: 5 m Limit of excavator	

GENERAL REMARKS:

Walls stable, no groundwater, easy to excavate.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-9

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-086
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D
Date Started: 5 Aug 14

Location: TSF Basin
Total Depth: 0.6 m
Date Completed: 5 Aug 14

Coordinates: 683,723 E , 5,607,548 N UTM NAD83 ZONE10
Elevation: 964.9 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	964.9					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to coarse grained; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, medium brown, massive, loose, root inclusions, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.6 m
1.0	964.0					**SILTY GRAVELLY SAND** (0.2 to 0.6) Silty gravelly SAND, fine to coarse grained; trace cobbles, angular to sub angular; well graded, non plastic, medium greyish brown, massive, dense, dry, angular cobbles possibly weathered bedrock. [Colluvium]	
2.0	963.0					**WEATHERED BEDROCK** (0.6 to 0.6) dark grey, angular, slightly weathered, strong, minor oxide staining. End of Test Pit: 0.6 m Refusal on weathered bedrock	
3.0	962.0						
4.0	961.0						
5.0	960.0						
	959.0						

GENERAL REMARKS:
Walls sloughing, no groundwater, difficult to excavate.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-10

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-087 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D | Date Started: 5 Aug 14

Location: TSF Basin | Total Depth: 3.7 m | Date Completed: 5 Aug 14

Coordinates: 683,687 E , 5,607,713 N UTM NAD83 ZONE10 | Elevation: 961.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	961.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS, root mat; and TOPSOIL; SILT; some sand, fine to coarse grained; some gravel, fine to coarse grained, angular to sub rounded; well graded, non plastic, medium brown/grey, massive, dense, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.5 m
						SILTY SAND AND GRAVEL (0.3 to 3.7) Silty SAND and GRAVEL, fine to coarse grained, angular to sub rounded; trace cobbles, angular to sub rounded; well graded, low to no plasticity, cohesive, dark grey/brown, massive, very dense, dry. [Glacial Till]	
1.0							
	960.0	G B	GP14-004				
2.0							
	959.0						
3.0							
	958.0	G B	TP14-087-1				
						End of Test Pit: 3.7 m Refusal on dense material	
4.0							
	957.0						
5.0							
	956.0						

GENERAL REMARKS:

GP14-004, walls sloughing slightly to 1.5 m, no groundwater, difficult to excavate from 1 m onwards.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-128 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 15 Aug 14

Location: Downstream of South Embankment | Total Depth: 2.69 m | Date Completed: 15 Aug 14

Coordinates: 683,865 E , 5,605,543 N UTM NAD83 ZONE10 | Elevation: 1067.2 m | Logged by: JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1067.0					**TOPSOIL/ORGANICS** (0 to 0.14) ORGANICS; root mat; and TOPSOIL; SILT; some gravel; fine to coarse grained; low plasticity, sub angular to sub rounded, poorly graded, dark brown, loose, dry.	0 m - A: 0 - 0.14 m 0.14 m - B: 0.14 - 0.42 m
						SILT (0.14 to 0.42) SILT; some gravel; fine to coarse grained; low plasticity, sub angular to sub rounded, poorly graded, medium brown, loose, dry. [Loess]	
1.0	1066.0					**SILT AND GRAVEL** (0.42 to 2.69) SILT and GRAVEL; trace cobbles; fine to coarse grained, non-plastic, sub angular to sub rounded, gap graded, light brown, stratified, dry. Decreasing gravel content with depth. [Glaciofluvial]	
2.0	1065.0						
2.69	1064.5					End of Test Pit: 2.69 m Wall Instability	
3.0	1064.0						
4.0	1063.0						
5.0	1062.0						

GENERAL REMARKS:

Pit walls caving in from beneath topsoil unit. No groundwater.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-12

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT
Test Pit No.: TP14-130
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 15 Aug 14

Location: TSF Basin
Total Depth: 0.69 m
Date Completed: 15 Aug 14

Coordinates: 684,133 E , 5,605,624 N UTM NAD83 ZONE10
Elevation: 1066 m
Logged by: JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.19) ORGANICS; root mat; and TOPSOIL; SILT; some gravel; fine to coarse grained; low plasticity, sub angular to sub rounded, poorly graded, dark brown, dry.	0 m - A: 0 - 0.19 m 0.19 m - B: 0.19 - 0.69 m
						GRAVELLY SILT (0.19 to 0.69) Gravelly; SILT; fine to coarse grained, non-plastic, sub angular to sub rounded, gap graded, medium brown, dry. [Colluvium]	
1.0	1065.0					**WEATHERED BEDROCK** (0.69) Light grey-green, massive, slightly weathered, strong, meta-volcanic. End of Test Pit: 0.69 m Refusal on weathered bedrock	
2.0	1064.0						
3.0	1063.0						
4.0	1062.0						
5.0	1061.0						

GENERAL REMARKS:
Pit walls stable and open. No groundwater.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-13

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-175 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 25 Aug 14

Location: TSF Basin | Total Depth: 5.2 m | Date Completed: 25 Aug 14

Coordinates: 685,274 E , 5,606,353 N UTM NAD83 ZONE10 | Elevation: 1061.3 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1061.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; non-plastic, sub angular to rounded, poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.5 m
						SILT (0.3 to 0.5) SILT; some sand; trace gravel; fine grained; non-plastic, sub angular to rounded, poorly graded, medium brown, massive, moderately dense, moist. [Loess]	0.5 m - C: 0.5 - 1.1 m
1.0	1060.0					**SILTY GRAVELLY SAND** (0.5 to 1.1) Silty gravelly SAND, fine to coarse grained, low plasticity, angular to sub rounded, well graded, light to dark greyish brown, massive, dense, dry.	
						SILTY SANDY GRAVEL (1.1 to 5.2) Silty sandy GRAVEL; trace cobbles; fine to coarse grained, high plasticity, angular to sub rounded, well graded, dark greenish-grey, massive, dense, moist to saturated. [Glacial Till]	
2.0	1059.0						
3.0	1058.0						
4.0	1057.0						
5.0		G B	TP14-175-1				
	1056.0					End of Test Pit: 5.2 m Limit of excavator	

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-14

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-177 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 26 Aug 14

Location: TSF Basin | Total Depth: 4.9 m | Date Completed: 26 Aug 14

Coordinates: 685,288 E , 5,606,518 N UTM NAD83 ZONE10 | Elevation: 1090.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1090.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; sub angular to rounded, poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - C: 0.3 - 0.7 m
						SILTY SANDY GRAVEL (0.3 to 0.7) Silty sandy GRAVEL; trace cobbles; fine to coarse grained, non-plastic, angular to sub rounded, well graded, light grey, massive, dense.	
1.0	1089.0					**SILTY GRAVELLY SAND** (0.7 to 4.9) Silty gravelly SAND, fine to coarse grained, low plasticity, sub angular to sub rounded, well graded, dark greyish brown, massive, very dense, dry to moist. [Glacial Till]	
2.0	1088.0						
3.0	1087.0						
4.0	1086.0						
5.0	1085.0					End of Test Pit: 4.9 m Limit of excavator	

GENERAL REMARKS:

Pit walls stable, no groundwater, slow excavation due to dense material.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-15

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-180 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 26 Aug 14

Location: TSF Basin | Total Depth: 4.7 m | Date Completed: 26 Aug 14

Coordinates: 685,506 E , 5,606,014 N UTM NAD83 ZONE10 | Elevation: 1058.1 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1058.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, massive, loose, dry.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.6 m
						SILTY SAND (0.3 to 0.6) Silty SAND; some gravel; trace cobbles; fine to coarse grained, sub angular to sub rounded; poorly graded, non plastic, medium brown, compact, dry.	0.6 m - C: 0.6 - 1.1 m
1.0	1057.0					**SILTY SAND AND GRAVEL** (0.6 to 1.1) Silty SAND and GRAVEL, fine to coarse grained, angular to sub rounded; well graded, non plastic, light grey, very dense, dry.	
						SILTY GRAVELLY SAND (1.1 to 4.7) Silty gravelly SAND, fine to coarse grained, angular to sub rounded, well graded, low plasticity, dark greyish brown, massive, very dense, moist. [Glacial Till]	
2.0	1056.0						
3.0	1055.0						
4.0	1054.0	G B	TP14-180-1				
						End of Test Pit: 4.7 m Limit of excavator	
5.0	1053.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, difficult to excavate after 1 m.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-16

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-183 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 27 Aug 14

Location: TSF Basin | Total Depth: 4.7 m | Date Completed: 27 Aug 14

Coordinates: 684,924 E , 5,606,111 N UTM NAD83 ZONE10 | Elevation: 990.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	990.0					**TOPSOIL/ORGANICS** (0 to 0.4) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded, poorly graded, non plastic, dark brown, loose, dry.	0 m - A: 0 - 0.4 m
						SILTY SAND (0.4 to 0.9) Silty SAND; some gravel; trace cobbles, fine to coarse grained, angular to rounded, poorly graded, non plastic, medium brown, massive, compact to dense, dry.	0.4 m - B: 0.4 - 0.9 m
1.0	989.0					**SILTY SAND AND GRAVEL** (0.9 to 1.1) Silty sandy GRAVEL; trace cobbles; fine to coarse grained, angular to sub rounded, well graded, non plastic, light grey, massive, dense, dry.	0.9 m - C: 0.9 - 1.1 m
2.0	988.0					**SILTY GRAVELLY SAND** (1.1 to 4.7) Silty gravelly SAND; trace to some cobbles, fine to coarse grained, angular to sub rounded, well graded, low plasticity, dark greyish brown, massive, very dense, moist. [Glacial Till]	
3.0	987.0						
4.0	986.0						
4.7	985.7	G B	TP14-183-1			End of Test Pit: 4.7 m Limit of excavator	
5.0	985.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, difficult to excavate due to dense material.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-17

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-184 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 27 Aug 14

Location: TSF Basin | Total Depth: 4.7 m | Date Completed: 27 Aug 14

Coordinates: 684,838 E , 5,606,283 N UTM NAD83 ZONE10 | Elevation: 982 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.4) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel, fine to coarse grained, sub angular to rounded, poorly graded, non plastic, dark brown, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						SILTY GRAVELLY SAND (0.4 to 4.7) Silty gravelly SAND; trace boulders; trace cobbles, fine to coarse grained, angular to sub rounded, well graded, low plasticity, massive, very dense, moist. [Glacial Till]	
1.0	981.0						
2.0	980.0						
3.0	979.0						
4.0	978.0						
						End of Test Pit: 4.7 m Limit of excavator	
5.0	977.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, difficult to excavate after 0.5 m.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-18

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT
Test Pit No.: TP14-186
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 28 Aug 14

Location: TSF Basin
Total Depth: 4.6 m
Date Completed: 28 Aug 14

Coordinates: 685,069 E , 5,605,976 N UTM NAD83 ZONE10
Elevation: 1001.8 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1001.8					**TOPSOIL/ORGANICS** (0 to 0.7) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.7 m 0.7 m - C: 0.7 - 1.3 m
1.0	1001.0					**SILTY SAND AND GRAVEL** (0.7 to 1.3) Silty SAND and GRAVEL, trace cobbles; fine to coarse grained, sub angular to sub rounded; well graded, non plastic, massive, very dense, dry.	
2.0	1000.0					**SILTY SAND** (1.3 to 4.6) Silty SAND; some gravel; trace cobbles; fine to coarse grained, angular to sub rounded; poorly graded, non plastic, medium brown, dense, dry to moist. [Glacial Till]	
3.0	999.0						
4.0	998.0						
4.6	997.0					End of Test Pit: 4.6 m Limit of excavator	
5.0							
	996.0						

GENERAL REMARKS:
Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-19

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-188 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 28 Aug 14

Location: TSF Basin | Total Depth: 4.4 m | Date Completed: 28 Aug 14

Coordinates: 685,335 E , 5,605,901 N UTM NAD83 ZONE10 | Elevation: 1024.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1024.0					**TOPSOIL/ORGANICS** (0 to 1.1) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, massive, loose, moist.	0 m - A: 0 - 0.5 m
1.0	1023.0					**SILTY GRAVELLY SAND** (1.1 to 4.4) Silty gravelly SAND; trace cobbles; trace boulders; fine to coarse grained, angular to sub rounded, well graded, low plasticity, dark greyish brown, massive, very dense. [Glacial Till]	
2.0	1022.0						
3.0	1021.0						
4.0	1020.0	G B	TP14-188-1			End of Test Pit: 4.4 m Refusal on dense material	
5.0	1019.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult after ~2 - 3 m.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-20

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-189 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 28 Aug 14

Location: TSF Basin | Total Depth: 2.7 m | Date Completed: 28 Aug 14

Coordinates: 685,559 E , 5,605,828 N UTM NAD83 ZONE10 | Elevation: 1051.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1051.0					**TOPSOIL/ORGANICS** (0 to 0.4) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.6 m
						SAND AND GRAVEL (0.4 to 0.6) SAND; and GRAVEL; some silt, fine to coarse grained, angular to sub rounded, non plastic, light grey, massive, dense, dry.	
1.0	1050.0					**SILTY GRAVELLY SAND** (0.6 to 2.7) Silty gravelly SAND; trace cobbles; fine to coarse grained, angular to sub rounded, low plasticity, cohesive, massive, very dense, moist. [Glacial Till]	
2.0	1049.0						
3.0	1048.0					**WEATHERED BEDROCK** (2.7 to 2.7) completely rubblized by excavation, oxidization staining. End of Test Pit: 2.7 m Refusal on weathered bedrock	
4.0	1047.0						
5.0	1046.0						

GENERAL REMARKS:

Pit walls relatively stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-21

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-190 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 29 Aug 14

Location: TSF Basin | Total Depth: 4.9 m | Date Completed: 29 Aug 14

Coordinates: 685,516 E , 5,605,631 N UTM NAD83 ZONE10 | Elevation: 1054.3 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1054.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to medium grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.7 m
						SILTY GRAVELLY SAND (0.3 to 4.9) Silty gravelly SAND; trace cobbles; fine to coarse grained, angular to sub rounded, well graded, non plastic, light to dark greyish brown, massive, very dense, dry. [Glacial Till]	
1.0	1053.0						
2.0	1052.0						
3.0	1051.0						
4.0	1050.0						
4.9						End of Test Pit: 4.9 m Limit of excavator	
5.0	1049.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-22

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-191 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 29 Aug 14

Location: TSF Basin | Total Depth: 5.4 m | Date Completed: 29 Aug 14

Coordinates: 685,553 E , 5,605,358 N UTM NAD83 ZONE10 | Elevation: 1054 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 1 m
						SILT AND SAND (0.2 to 5.4) SILT; and SAND; trace cobbles; trace gravel; trace clay, fine to coarse grained, angular to sub rounded, poorly graded, non to highly plastic with depth, light brownish grey, massive, compact, moist. [Loess]	
1.0	1053.0						
2.0	1052.0						
3.0	1051.0						
4.0	1050.0						
5.0	1049.0	G B	TP14-191-1			End of Test Pit: 5.4 m Limit of excavator	

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-23

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-193 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 29 Aug 14

Location: TSF Basin | Total Depth: 3.1 m | Date Completed: 29 Aug 14

Coordinates: 685,395 E , 5,605,345 N UTM NAD83 ZONE10 | Elevation: 1069.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1069.0					**TOPSOIL/ORGANICS** (0 to 0.7) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.7 m
1.0	1068.0					**SILTY SAND** (0.7 to 3.1) Silty SAND; some gravel, trace cobbles, fine to coarse grained, angular to sub rounded, poorly graded, medium brown, massive, dense, moist. [Glacial Till]	
2.0	1067.0						
3.0	1066.0					**WEATHERED BEDROCK** (3.1 to 3.1) completely rubblized by excavation, oxidization staining. End of Test Pit: 3.1 m Refusal on bedrock	
4.0	1065.0						
5.0	1064.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult after 1 m.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-24

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-195 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 30 Aug 14

Location: TSF Basin | Total Depth: 2.3 m | Date Completed: 30 Aug 14

Coordinates: 685,218 E , 5,605,419 N UTM NAD83 ZONE10 | Elevation: 1049.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1049.0					**TOPSOIL/ORGANICS** (0 to 0.6) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, dark brown, loose to compact, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.6 m
1.0	1048.0					**SILTY SAND** (0.6 to 2.3) Silty SAND; some gravel; trace cobbles; trace boulders, fine to coarse grained, sub angular to rounded, well graded, light greyish brown, massive, very dense, dry. [Glacial Till]	
2.0	1047.0					End of Test Pit: 2.3 m Refusal on dense material	
3.0	1046.0						
4.0	1045.0						
5.0	1044.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult due to very dense material.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-25

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-196 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 30 Aug 14

Location: TSF Basin | Total Depth: 4.6 m | Date Completed: 30 Aug 14

Coordinates: 685,218 E , 5,605,280 N UTM NAD83 ZONE10 | Elevation: 1057.7 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1057.7					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m
						SAND (0.3 to 4.6) SAND; some gravel; some silt; trace cobbles; fine to coarse grained, sub angular to sub rounded, poorly graded, non plastic, cohesive, light greyish brown, massive, compact, dry. [Loess]	
1.0	1057.0						
2.0	1056.0						
3.0	1055.0						
4.0	1054.0						
4.6	1053.0					End of Test Pit: 4.6 m Limit of excavator	
5.0	1052.0						

GENERAL REMARKS:

Pit walls sloughing slightly, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-26

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-200 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 1 Sep 14

Location: Southeast Embankment | Total Depth: 4.6 m | Date Completed: 1 Sep 14

Coordinates: 684,804 E , 5,605,232 N UTM NAD83 ZONE10 | Elevation: 1060.1 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1060.0					**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, sub angular to rounded; poorly graded, non plastic, dark brown, loose, moist.	0 m - A: 0 - 0.3 m
						SILTY SAND (0.3 to 4.6) Silty SAND; some gravel; trace cobbles, fine to coarse grained, angular to sub rounded, gap graded, non to low plasticity, light to dark greyish brown, massive, compact to dense, dry to moist. [Glacial Till]	
1.0	1059.0						
2.0	1058.0						
3.0	1057.0						
4.0	1056.0					End of Test Pit: 4.6 m Limit of excavator	
5.0	1055.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult after 2 m.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-27

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT
Test Pit No.: TP14-210
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 3 Sep 14

Location: SMRSF Access Road
Total Depth: 0.6 m
Date Completed: 3 Sep 14

Coordinates: 685,021 E , 5,608,413 N UTM NAD83 ZONE10
Elevation: 983.6 m
Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	983.6					**TOPSOIL/ORGANICS** (0 to 0.1) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained, non-plastic, sub angular to sub rounded, poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.5 m
	983.0					**SANDY SILT** (0.1 to 0.5) Sandy SILT; some gravel; fine to coarse grained; non-plastic, angular to sub rounded; well graded, light to medium brown, massive, moderately dense, dry. [Colluvium]	
1.0						**WEATHERED BEDROCK** (0.5 to 0.6) Light grey-green, massive, slightly weathered, strong, mafic volcanics ?	
	982.0					End of Test Pit: 0.6 m Refusal on weathered bedrock	
2.0							
	981.0						
3.0							
	980.0						
4.0							
	979.0						
5.0							
	978.0						

GENERAL REMARKS:
No groundwater, difficult excavation due to shallow bedrock, bedrock outcrop surrounding site.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-28

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-212 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 3 Sep 14

Location: Overland Conveyor | Total Depth: 3.6 m | Date Completed: 3 Sep 14

Coordinates: 685,386 E , 5,608,826 N UTM NAD83 ZONE10 | Elevation: 929.3 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	929.0					**TOPSOIL/ORGANICS** (0 to 0.15) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained, non-plastic, sub angular to sub rounded, poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.15 m 0.15 m - B: 0.15 - 0.45 m
						SILT (0.15 to 0.45) SILT; some sand; trace gravel; fine grained, non-plastic, sub angular to sub rounded, poorly graded, light brown, massive, moderately dense, dry. [Loess]	0.45 m - C: 0.45 - 0.8 m
1.0	928.0					**SILTY SAND** (0.45 to 0.8) Silty SAND; some gravel; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, light white-brown, massive, moderately dense, dry.	
						SANDY SILT (0.8 to 3.6) Sandy SILT; some gravel; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, medium brown, massive, dense, moist. [Glacial Till]	
2.0	927.0						
3.0	926.0						
						End of Test Pit: 3.6 m Refusal on dense material	
4.0	925.0						
5.0	924.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult after 3.4 m.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-29

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT
Test Pit No.: TP14-213
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 3 Sep 14

Location: Haul / Access Roads
Total Depth: 2.5 m
Date Completed: 3 Sep 14

Coordinates: 685,505 E , 5,609,015 N UTM NAD83 ZONE10
Elevation: 905.9 m
Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	905.0					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; trace cobbles; fine to coarse grained, sub angular to sub rounded, gap graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.8 m
1.0						**SILT** (0.2 to 0.4) SILT; some sand; trace gravel; trace cobbles; fine to coarse grained, sub angular to sub rounded, gap graded, medium brown, massive, moderately dense, dry. [Loess]	
						SILTY GRAVELLY SAND (0.4 to 0.8) Silty gravelly SAND; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, light greyish-brown, massive, moderately dense, dry to moist.	
	904.0					**SANDY GRAVEL** (0.8 to 2.5) Sandy GRAVEL; some silt; some cobbles; fine to coarse grained, sub angular to rounded, well graded, medium greyish-brown, massive, moderately dense to dense, moist. [Glaciofluvial]	
2.0		G B	TP14-213-1				
	903.0					End of Test Pit: 2.5 m Refusal on possible bedrock	
3.0							
	902.0						
4.0							
	901.0						
5.0							
	900.0						

GENERAL REMARKS:
Pit walls sloughing in, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:
G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-30

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-214
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 4 Sep 14

Location: Haul / Access Roads
Total Depth: 1.3 m
Date Completed: 4 Sep 14

Coordinates: 685,595 E , 5,609,127 N UTM NAD83 ZONE10
Elevation: 900.6 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	900.0					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; non-plastic, sub angular to rounded, poorly graded, dark brown, massive, loose.	0 m - A: 0 - 0.2 m 0.2 m - C: 0.2 - 0.7 m
						SAND (0.2 to 0.7) SAND; some gravel; some cobbles; some silt; fine to coarse grained; non-plastic, sub angular to rounded; gap graded, light greyish-brown, massive, moderately dense, dry.	
1.0	899.0					**SANDY GRAVEL** (0.7 to 1.3) Sandy GRAVEL; some silt; some cobbles; fine to coarse grained, non-plastic, angular to rounded, well graded, medium greyish-brown, massive, moderately dense, moist. [Glaciofluvial]	
2.0	898.0					End of Test Pit: 1.3 m Refusal on weathered bedrock	
3.0	897.0						
4.0	896.0						
5.0	895.0						

GENERAL REMARKS:
Pit walls sloughing in, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-31

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-218 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 5 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 0.25 m | Date Completed: 5 Sep 14

Coordinates: 684,779 E , 5,608,826 N UTM NAD83 ZONE10 | Elevation: 925 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - Old Mine Rock Stockpile
						WEATHERED BEDROCK (0.2 to 0.25) Light grey-green, massive, slightly weathered, strong, mafic volcanics ?	
						End of Test Pit: 0.25 m Refusal on weathered bedrock	
1.0	924.0						
2.0	923.0						
3.0	922.0						
4.0	921.0						
5.0	920.0						

GENERAL REMARKS:

No groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-32

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-224 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 5 Sep 14

Location: Haul / Access Roads | Total Depth: 3.7 m | Date Completed: 5 Sep 14

Coordinates: 685,352 E , 5,609,023 N UTM NAD83 ZONE10 | Elevation: 897 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m 0.3 m - C: 0.3 - 1.1 m
						SANDY SILT (0.2 to 0.3) Sandy SILT; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	896.0					**SAND AND GRAVEL** (0.3 to 1.1) SAND and GRAVEL; some silt; some cobbles; fine to coarse grained; sub angular to rounded; well graded, light white-brown, massive, moderately dense, dry.	
						SILTY GRAVELLY SAND (1.1 to 3.7) Silty gravelly SAND; some cobbles; trace boulders; fine to coarse grained; sub angular to sub rounded; well graded, medium brown, massive, dense, moist. [Glacial Till]	
2.0	895.0						
3.0	894.0	G B	TP14-224-1				
						End of Test Pit: 3.7 m Refusal on dense material/ boulders	
4.0	893.0						
5.0	892.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, excavation difficult due to dense material and boulders.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-33

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-226 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 5 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.3 m | Date Completed: 5 Sep 14

Coordinates: 684,930 E , 5,608,746 N UTM NAD83 ZONE10 | Elevation: 918 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; trace cobbles; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m 0.3 m - C: 0.3 - 0.9 m
						SANDY SILT (0.2 to 0.3) Sandy SILT; trace gravel; trace cobbles; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	917.0					**SILTY GRAVELLY SAND** (0.3 to 0.9) Silty gravelly SAND; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, light white-brown, massive, moderately dense, dry.	
						SILTY SAND AND GRAVEL (0.9 to 4.3) Silty SAND and GRAVEL; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, medium brown, massive, moderately dense to dense, dry to moist with moisture content increasing with depth. [Glacial Till]	
2.0	916.0						
3.0	915.0						
4.0	914.0					End of Test Pit: 4.3 m Limit of excavator	
5.0	913.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-34

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-228 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 5 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.3 m | Date Completed: 5 Sep 14

Coordinates: 684,799 E , 5,608,657 N UTM NAD83 ZONE10 | Elevation: 934 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.15) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.15 m 0.15 m - B: 0.15 - 0.4 m 0.4 m - C: 0.4 - 0.9 m
						SANDY SILT (0.15 to 0.4) Sandy SILT; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	933.0					**SILTY GRAVELLY SAND** (0.4 to 0.9) Silty gravelly SAND; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, light greyish-brown, massive, moderately dense, dry.	
						SANDY GRAVELLY SILT (0.9 to 4.3) Sandy Gravelly SILT; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, medium brown, massive, dense, moist. [Glacial Till]	
2.0	932.0						
3.0	931.0						
4.0	930.0					End of Test Pit: 4.3 m Limit of excavator	
5.0	929.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-35

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-230 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: WMRSF | Total Depth: 2.2 m | Date Completed: 6 Sep 14

Coordinates: 683,822 E , 5,608,872 N UTM NAD83 ZONE10 | Elevation: 919 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	919.0					**SANDY SILT** (0 to 0.2) Sandy SILT; some gravel; fine to coarse grained; sub angular to sub rounded, well graded, medium brown, massive, moderately dense, moist.	0 m - Old Mine Rock Stockpile
						SANDY GRAVEL (0.2 to 2.2) Sandy GRAVEL; some silt; some cobbles; fine to coarse grained, angular to sub angular, well graded, light brownish-grey, massive, moderately dense, dry. [Mine Rock]	
1.0	918.0						
2.0	917.0					End of Test Pit: 2.2 m Wall instability	
3.0	916.0						
4.0	915.0						
5.0	914.0						

GENERAL REMARKS:

Pit walls sloughing in, no groundwater, excavation difficult due to boulders and wall instability.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-36

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-232 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: WMRSF | Total Depth: 4.2 m | Date Completed: 6 Sep 14

Coordinates: 683,993 E , 5,608,849 N UTM NAD83 ZONE10 | Elevation: 926 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						SILTY SAND (0 to 0.6) Silty SAND; some gravel; fine to coarse grained; angular to sub rounded; well graded, medium brown, massive, moderately dense, moist.	0 m - Old Mine Rock Stockpile
1.0	925.0					**GRAVEL COBBLES AND BOULDERS** (0.6 to 4.2) GRAVEL, COBBLES, and BOULDERS; some sand; trace silt; coarse grained, angular, light grey, massive, dense, dry. Increasing moisture content after 2.0 m. [Mine Rock]	
2.0	924.0						
3.0	923.0						
4.0	922.0					End of Test Pit: 4.2 m Limit of excavator	
5.0	921.0						

GENERAL REMARKS:

Pit walls slightly unstable, no groundwater, excavation difficult due to boulders and wall stability.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-37

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-234 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.4 m | Date Completed: 6 Sep 14

Coordinates: 684,198 E , 5,608,831 N UTM NAD83 ZONE10 | Elevation: 924 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						SILTY SAND (0 to 0.5) Silty SAND; some gravel; trace cobbles; fine to coarse grained; angular to sub rounded; well graded, medium brown, massive, moderately dense, moist.	0 m - Old Mine Rock Stockpile
						SANDY GRAVEL (0.5 to 0.6) Sandy GRAVEL; some cobbles; coarse grained, angular to sub angular, poorly graded, light grey, massive, moderately dense, dry.	
1.0	923.0					**SILTY GRAVELLY SAND** (0.6 to 2.6) Silty gravelly SAND; some cobbles; fine to coarse grained; angular to sub rounded, well graded, medium brown, massive, moderately dense, moist. [Mine Rock]	
2.0	922.0						
						SANDY GRAVELLY COBBLES (2.6 to 4.4) Sandy Gravelly; COBBLES; trace boulders; coarse grained, angular to sub angular, medium brownish-grey, massive, loose to moderately dense, moist. [Mine Rock]	
3.0	921.0						
4.0	920.0					End of Test Pit: 4.4 m Limit of excavator	
5.0	919.0						

GENERAL REMARKS:

Pit walls slightly unstable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-38

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-236 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 3.8 m | Date Completed: 6 Sep 14

Coordinates: 684,281 E , 5,609,054 N UTM NAD83 ZONE10 | Elevation: 909 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	909.0					**SILTY SAND** (0 to 0.4) Silty SAND; some gravel; trace cobbles; fine to coarse grained; sub angular to sub rounded; well graded, medium brown, massive, moderately dense, moist.	0 m - Old Mine Rock Stockpile
						GRAVEL AND COBBLES (0.4 to 3.8) GRAVEL and COBBLES; some silt; some sand; some boulders; coarse grained, angular, medium brownish-grey, massive, moderately dense to loose, dry to moist at 2.5 m. [Mine Rock]	
1.0	908.0						
2.0	907.0						
3.0	906.0						
3.8	905.1					End of Test Pit: 3.8 m Wall instability	
4.0	905.0						
5.0	904.0						

GENERAL REMARKS:

Pit walls sloughing in, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-39

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-238 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.3 m | Date Completed: 6 Sep 14

Coordinates: 684,067 E , 5,609,034 N UTM NAD83 ZONE10 | Elevation: 899 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	899.0					**TOPSOIL/ORGANICS** (0 to 0.1) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.25 m 0.25 m - C: 0.25 - 0.8 m
						SANDY SILT (0.1 to 0.25) Sandy SILT; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry.	
1.0	898.0					**SILTY GRAVELLY SAND** (0.25 to 0.8) Silty gravelly SAND; trace cobbles; fine to coarse grained; well graded, light white-brown, massive, moderately dense, dry. [Colluvium]	
						SILT (0.8 to 4.3) SILT; some sand; some gravel; fine to coarse grained; low plasticity, well graded, medium brown, massive, dense, dry to moist at 1.0 m. [Colluvium]	
2.0	897.0						
3.0	896.0						
4.0	895.0	GB	TP14-238-1				
						End of Test Pit: 4.3 m Limit of excavator	
5.0	894.0						

GENERAL REMARKS:

Pit walls stable, no groundwater, no excavation difficulties.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-40

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-240 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 6 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 3.2 m | Date Completed: 6 Sep 14

Coordinates: 684,468 E , 5,609,031 N UTM NAD83 ZONE10 | Elevation: 921 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**SANDY SILT** (0 to 0.4) Sandy SILT; some gravel; trace cobbles; fine to coarse grained; angular to sub rounded; well graded, medium brown, massive, loose, moist.	0 m - Old Mine Rock Stockpile
						SILTY SAND AND GRAVEL (0.4 to 3.2) Silty SAND and GRAVEL; some cobbles; some boulders; fine to coarse grained, angular to sub rounded, medium grey, massive, moderately dense, moist. [Mine Rock]	
1.0	920.0						
2.0	919.0						
3.0	918.0						
						End of Test Pit: 3.2 m Refusal on boulders	
4.0	917.0						
5.0	916.0						

GENERAL REMARKS:

Pit walls unstable due to large particle size, no groundwater, difficult excavation due to boulders.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-41

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-241 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 8 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.9 m | Date Completed: 8 Sep 14

Coordinates: 684,706 E , 5,608,453 N UTM NAD83 ZONE10 | Elevation: 936.7 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	936.0					**TOPSOIL/ORGANICS** (0 to 0.15) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine to coarse grained; sub angular to sub rounded, poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.15 m
						SILTY GRAVELLY SAND (0.15 to 0.9) Silty gravelly SAND; some cobbles; fine to coarse grained; angular to sub rounded, well graded, medium brownish-grey, massive, dense, dry.	
1.0						**SILTY GRAVELLY SAND** (0.9 to 4.9) Silty gravelly SAND; some cobbles; fine to coarse grained; angular to sub rounded, well graded, medium to dark greyish-brown, massive, dense increasing with depth, dry to moist with water content increasing with depth. [Glacial Till]	
2.0	935.0						
3.0	934.0						
4.0	933.0						
5.0	932.0					End of Test Pit: 4.9 m Limit of excavator	
	931.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy to excavate.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-42

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-244 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 8 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 3.9 m | Date Completed: 8 Sep 14

Coordinates: 684,704 E , 5,608,040 N UTM NAD83 ZONE10 | Elevation: 937 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; trace cobbles; fine grained; sub rounded; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 1.0 m
						SANDY SILT (0.2 to 0.4) Sandy SILT; trace gravel; trace cobbles; fine grained; sub rounded; poorly graded, medium brown, massive, loose, dry.	
1.0	936.0					**SILTY GRAVELLY SAND** (0.4 to 1) Silty gravelly SAND; trace cobbles; fine to coarse grained; sub angular to sub rounded, light white-brown, massive, moderately dense, dry.	
						SANDY SILT (1 to 2.5) Sandy SILT; some gravel; trace cobbles; fine to coarse grained, sub angular to sub rounded, medium brown, massive, dense, moist.	
2.0	935.0						
						SILTY SAND AND GRAVEL (2.5 to 3.9) Silty SAND and GRAVEL; some cobbles; coarse grained, angular to sub rounded, medium brown, massive, dense, moist. [Glacial Till]	
3.0	934.0						
		GB	TP14-244-1				
4.0	933.0					End of Test Pit: 3.9 m Limit of excavator	
5.0	932.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-43

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-245 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 8 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4.4 m | Date Completed: 8 Sep 14

Coordinates: 684,821 E , 5,608,241 N UTM NAD83 ZONE10 | Elevation: 930.7 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	930.0					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine to coarse grained; sub angular to rounded; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.5 m
						SANDY SILT (0.2 to 0.5) Sandy SILT; some gravel; fine to coarse grained, angular to sub rounded, poorly graded, medium brown, moderately dense to dense, dry.	
1.0						**SILTY GRAVELLY SAND** (0.5 to 4.4) Silty gravelly SAND; some cobbles; trace clay; fine to coarse grained; angular to sub rounded, low plasticity, gap graded, dark greyish-brown, massive, very dense, moist. [Glacial Till]	
2.0	929.0						
	928.0						
3.0							
	927.0						
4.0		GB	TP14-245-1				
	926.0					End of Test Pit: 4.4 m Limit of excavator	
5.0							
	925.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-44

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-247 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 8 Sep 14

Location: Old Mine Rock Facility / Ore Stockpile | Total Depth: 4 m | Date Completed: 8 Sep 14

Coordinates: 684,704 E , 5,608,249 N UTM NAD83 ZONE10 | Elevation: 924.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	924.6					**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine to coarse grained; sub angular to rounded; non-plastic; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.7 m
	924.0					**SANDY SILT** (0.2 to 0.4) Sandy SILT; some gravel; trace cobbles; fine to coarse grained; sub angular to rounded; non-plastic; poorly graded, medium brown, massive, moderately dense, moist.	
1.0						**SILTY GRAVELLY SAND** (0.4 to 1.3) Silty gravelly SAND; some cobbles; trace clay; fine to coarse grained; angular to sub rounded, well graded, light greyish-brown, massive, dense, dry.	
	923.0					**SILTY GRAVELLY SAND** (1.3 to 4) Silty gravelly SAND; some cobbles; trace clay; fine to coarse grained; angular to sub rounded, well graded, dark greyish-brown, massive, very dense, moist. [Glacial Till]	
2.0							
	922.0						
3.0							
	921.0						
4.0						**WEATHERED BEDROCK** (4) Light grey-green, massive, slightly weathered, strong, mafic volcanics End of Test Pit: 4 m Refusal on weathered bedrock	
	920.0						
5.0							
	919.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate from 1 m onwards.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-45

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-252 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 8 Sep 14

Location: TSF Basin | Total Depth: 3.8 m | Date Completed: 8 Sep 14

Coordinates: 684,166 E , 5,607,524 N UTM NAD83 ZONE10 | Elevation: 1041 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**TOPSOIL/ORGANICS** (0 to 0.5) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; non-plastic, poorly graded, dark brown, massive, loose, spongy, moist.	0 m - A: 0 - 0.5 m
						SILTY GRAVELLY SAND (0.5 to 0.9) Silty gravelly SAND; fine to coarse grained; well graded, light white-brown, massive, moderately dense, dry.	0.5 m - C: 0.5 - 0.9 m
1.0	1040.0					**SILTY SAND AND GRAVEL** (0.9 to 3.8) Silty SAND and GRAVEL; trace cobbles; fine to coarse grained, sub angular to sub rounded, well graded, medium brown, dense, moist. [Glacial Till]	
2.0	1039.0						
3.0	1038.0	G B	TP14-252-1				
4.0	1037.0					End of Test Pit: 3.8 m Refusal on dense material	
5.0	1036.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-46

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-262 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 9 Sep 14

Location: East Embankment | Total Depth: 4 m | Date Completed: 9 Sep 14

Coordinates: 684,417 E , 5,607,410 N UTM NAD83 ZONE10 | Elevation: 1032 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**TOPSOIL/ORGANICS** (0 to 0.4) ORGANICS; root mat; and TOPSOIL; Sandy SILT; some gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.4 m
						SANDY SILT (0.4 to 0.5) Sandy SILT; some gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry.	0.4 m - B: 0.4 - 0.5 m 0.5 m - C: 0.5 - 1.0 m
1.0	1031.0					**SILTY GRAVELLY SAND** (0.5 to 1) Silty gravelly SAND; trace cobbles; fine to coarse grained; sub angular to sub rounded, well graded, light white-brown, massive, moderately dense, dry.	
						SILTY SAND (1 to 4) Silty SAND; some gravel; trace cobbles; fine to coarse grained, sub angular to sub rounded, well graded, medium brown, massive, dense, moist. [Reworked Glaciofluvial]	
2.0	1030.0						
3.0	1029.0						
4.0	1028.0					End of Test Pit: 4 m Limit of excavator	
5.0	1027.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-47

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-264 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 324 | Date Started: 9 Sep 14

Location: TSF Basin | Total Depth: 2.9 m | Date Completed: 9 Sep 14

Coordinates: 684,229 E , 5,607,292 N UTM NAD83 ZONE10 | Elevation: 1011 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.25) ORGANICS; root mat; and TOPSOIL; Sandy SILT; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.25 m 0.25 m - B: 0.25 - 0.4 m 0.4 m - C: 0.4 - 1.0 m
						SANDY SILT (0.25 to 0.4) Sandy SILT; some gravel; some grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	1010.0					**GRAVELLY SILT AND SAND** (0.4 to 1) Gravelly SILT and SAND; trace cobbles; fine to coarse grained, well graded, light white-brown, massive, moderately dense, dry.	
						SANDY GRAVELLY SILT (1 to 2.9) Sandy Gravelly SILT; trace cobbles; fine to coarse grained, sub angular to sub rounded, well graded, medium brown, massive, very dense, moist. [Glacial Till]	
2.0	1009.0						
		GB	TP14-264-1				
3.0	1008.0					End of Test Pit: 2.9 m Refusal on boulders/bedrock	
4.0	1007.0						
5.0	1006.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate due to dense material.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-48

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-278 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 11 Sep 14

Location: Haul / Access Roads | Total Depth: 3.5 m | Date Completed: 11 Sep 14

Coordinates: 685,434 E , 5,609,309 N UTM NAD83 ZONE10 | Elevation: 883 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**TOPSOIL/ORGANICS** (0 to 0.3) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; poorly graded, dark brown, massive, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.4 m 0.4 m - C: 0.4 - 0.6 m
						SILT (0.3 to 0.4) SILT; some sand; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	882.0					**SILT** (0.4 to 0.6) SILT; some sand; trace gravel; fine grained; poorly graded, light white-brown, massive, moderately dense, dry. [Loess]	
						SILTY SAND (0.6 to 1) Silty; fine SAND; trace gravel; fine grained, poorly graded, medium brown, massive, moderately dense, dry. [Glaciofluvial]	
						SAND AND GRAVEL (1 to 1.5) SAND and GRAVEL; some silt; coarse grained, well graded, medium greyish-brown, massive, moderately dense, moist. [Glaciofluvial]	
2.0	881.0					**SILTY SAND** (1.5 to 2.3) Silty SAND; poorly graded, medium brown, massive, moderately dense, moist. [Glaciofluvial]	
						SAND AND GRAVEL (2.3 to 3.5) SAND and GRAVEL; some silt; some cobbles; fine to coarse grained, well graded, medium greyish-brown, stratified moderately dense, moist. [Glaciofluvial]	
3.0	880.0						
						End of Test Pit: 3.5 m Limit of excavator	
4.0	879.0						
5.0	878.0						

GENERAL REMARKS:

Walls sloughing, no groundwater, difficult to excavate due to wall stability.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-49

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-279 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 11 Sep 14

Location: Haul / Access Roads | Total Depth: 4 m | Date Completed: 11 Sep 14

Coordinates: 685,295 E , 5,609,230 N UTM NAD83 ZONE10 | Elevation: 898 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0						**TOPSOIL/ORGANICS** (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; poorly graded, dark brown, massive, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m 0.3 m - C: 0.3 - 0.8 m
						SILTY GRAVELLY SAND (0.2 to 0.3) Silty GRAVEL; some sand; fine to coarse grained; sub angular to sub rounded, well graded, medium brown, massive, moderately dense, dry.	
1.0	897.0					**SILTY GRAVELLY SAND** (0.3 to 4) Silty GRAVEL; some sand; fine to coarse grained; sub angular to sub rounded, well graded, light white-brown, massive, moderately dense, dry. [Colluvium]	
2.0	896.0						
3.0	895.0						
4.0	894.0					**WEATHERED BEDROCK** (4) Light grey-green, massive, slightly weathered, strong, mafic volcanics End of Test Pit: 4 m Refusal on weathered bedrock	
5.0	893.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-50

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-280 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 11 Sep 14

Location: Central Collection Pond | Total Depth: 2.8 m | Date Completed: 11 Sep 14

Coordinates: 685,090 E , 5,609,191 N UTM NAD83 ZONE10 | Elevation: 898 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.1) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; poorly graded, medium to dark brown, massive, loose, dry.	0 m - A: 0 - 0.1 m
						SANDY SILT (0.1 to 1.1) Sandy SILT; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry.	
1.0	897.0						
						SILTY SAND (1.1 to 2.4) Silty SAND; some gravel; poorly graded, sub angular to sub rounded, medium brown, massive, moderately dense, dry. [Loess]	
2.0	896.0						
						WEATHERED BEDROCK (2.4 to 2.8) Light grey-green, massive, highly weathered, weak, mafic volcanics	
						End of Test Pit: 2.8 m Refusal on weathered bedrock	
3.0	895.0						
4.0	894.0						
5.0	893.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-51

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT

Test Pit No.: TP14-281 **Page:** 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 11 Sep 14

Location: Central Collection Pond
Total Depth: 4.2 m
Date Completed: 11 Sep 14

Coordinates: 685,088 E , 5,609,033 N UTM NAD83 ZONE10
Elevation: 885 m
Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; poorly graded, dark brown, massive, loose, spongy, moist.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						SILT (0.2 to 0.4) SILT; some sand; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	884.0					**SILTY SAND AND GRAVEL** (0.4 to 1.1) Silty SAND and GRAVEL; some cobbles; trace boulders; fine to coarse grained, sub angular to sub rounded, well graded, light white-brown, massive, moderately dense, dry.	
						SILT AND SAND (1.1 to 4.2) SILT and fine SAND; some gravel; trace cobbles; trace boulders; fine to coarse grained; well graded, medium greyish-brown, massive, very dense, moist. [Glacial Till]	
2.0	883.0						
3.0	882.0						
4.0	881.0	G B	TP14-281-1				
						End of Test Pit: 4.2 m Limit of excavator	
5.0	880.0						

GENERAL REMARKS:

No groundwater, possible waste rock at 0.5 m.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-52

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-282 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 11 Sep 14

Location: Central Collection Pond | Total Depth: 4.6 m | Date Completed: 11 Sep 14

Coordinates: 684,880 E , 5,609,026 N UTM NAD83 ZONE10 | Elevation: 895 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.2) ORGANICS; root mat; and TOPSOIL; SILT; some sand; trace gravel; fine grained; poorly graded, dark brown, massive, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m 0.3 m - C: 0.3 - 1.1 m
						SILT (0.2 to 0.3) SILT; some sand; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry. [Loess]	
1.0	894.0					**SILTY GRAVELLY SAND** (0.3 to 1.1) Gravelly SILT and SAND; fine to coarse grained; sub angular to sub rounded, well graded, light white-brown, massive, moderately dense, dry.	
						SILT AND SAND (1.1 to 4.6) SILT and fine SAND; some gravel; trace cobbles; trace boulders; fine to coarse grained; sub angular to sub rounded, well graded, medium greyish-brown, massive, very dense, moist. [Glacial Till]	
2.0	893.0						
3.0	892.0						
4.0	891.0						
						End of Test Pit: 4.6 m Limit of excavator	
5.0	890.0						

GENERAL REMARKS:

Walls stable, no groundwater, easy excavation.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-53

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-283 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 12 Sep 14

Location: Haul / Access Roads | Total Depth: 4.4 m | Date Completed: 12 Sep 14

Coordinates: 684,765 E , 5,609,065 N UTM NAD83 ZONE10 | Elevation: 891 m | Logged by: JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
						TOPSOIL/ORGANICS (0 to 0.1) ORGANICS; root mat; and TOPSOIL; sandy SILT; trace gravel; fine grained; poorly graded, medium to dark brown, massive, loose, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.6 m
						SANDY SILT (0.1 to 0.3) Sandy SILT; trace gravel; fine grained; poorly graded, medium brown, massive, moderately dense, dry.	
1.0	890.0					**SILTY GRAVELLY SAND** (0.3 to 0.6) Silty gravelly SAND; fine to coarse grained; sub angular to sub rounded, well graded, light greyish-brown, massive, moderately dense, dry.	
						SILTY GRAVELLY SAND (0.6 to 3.2) Gravelly SILT and SAND; some cobbles; fine to coarse grained; angular to sub rounded, well graded, medium brown, massive, dense, moist. [Glacial Till]	
2.0	889.0						
3.0	888.0						
						GRAVELLY SAND (3.2 to 4.4) Gravelly SAND; some silt; some cobbles; fine to coarse grained; sub angular to rounded, well graded, medium brown, massive, dense, moist. [Glacial Till]	
4.0	887.0	GB	TP14-283-1				
						End of Test Pit: 4.4 m Limit of excavator	
5.0	886.0						

GENERAL REMARKS:

Walls stable, no groundwater, difficult to excavate due to dense material.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-54

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-294 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 16 Oct 14

Location: East Embankment - East Abutment | Total Depth: 1.9 m | Date Completed: 16 Oct 14

Coordinates: 685,340 E , 5,606,888 N UTM NAD83 ZONE10 | Elevation: 1041.3 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1041.0					**TOPSOIL & ORGANICS** (0 to 0.5) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT, trace gravel, fine grained; rounded to subangular, poorly graded, dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.3 m
0.5						**SILTY SAND** (0.5 to 1.9) Silty SAND; some gravel; trace cobbles, fine to coarse grained, angular to subrounded, gap graded, light grey, non plastic, dense, dry, massive. [Colluvium]	
1.0	1040.0						
1.9	1039.4					End of Test Pit: 1.9 m Refusal on bedrock	
2.0	1039.0						
3.0	1038.0						
4.0	1037.0						
5.0	1036.0						

GENERAL REMARKS:

Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-55

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT
Test Pit No.: TP14-295
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 16 Oct 14

Location: Tailings and Reclaim Pipeline Corridor
Total Depth: 2.8 m
Date Completed: 16 Oct 14

Coordinates: 685,378 E , 5,606,425 N UTM NAD83 ZONE10
Elevation: 1078.4 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1078.0					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; rounded to subangular, poorly graded, medium to dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.2 m 0.2 m - C: 0.2 - 0.9 m
						SANDY GRAVEL (0.2 to 0.9) Sandy GRAVEL; some silt; some cobbles; fine to coarse grained, subangular to rounded, well graded, light grey, non plastic, loose, dry.	
1.0	1077.0					**GRAVELLY SILT** (0.9 to 2.8) gravelly SILT; some sand; trace boulders; trace cobbles; trace clay, fine to coarse grained, gap graded, angular to rounded, medium to dark greyish brown, low plasticity, very dense, moist, massive. [Glacial Till]	
2.0	1076.0	G B	TP14-295-1				
3.0	1075.0					End of Test Pit: 2.8 m Refusal on dense material	
4.0	1074.0						
5.0	1073.0						

GENERAL REMARKS:
Very difficult to excavate after 1 m, no groundwater, walls stable.

SAMPLING SYMBOLS:
G B GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-56

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-296 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 16 Oct 14

Location: Tailings and Reclaim Pipeline Corridor | Total Depth: 4.1 m | Date Completed: 16 Oct 14

Coordinates: 685,446 E , 5,606,231 N UTM NAD83 ZONE10 | Elevation: 1065.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1065.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; rounded to subangular, poorly graded, medium brown, non plastic, loose, dry., massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.7 m
						GRAVELLY SAND (0.3 to 0.7) Gravelly SAND; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light to medium greyish brown, loose, dry.	
1.0						**GRAVELLY SILT** (0.7 to 4.1) Gravelly SILT; some sand; trace cobbles; trace boulders; fine to coarse grained, angular to subrounded, gap graded, non plastic, cohesive, dark greyish brown, very dense, dry to moist, massive. [Glacial Till]	
	1064.0						
2.0							
	1063.0						
3.0							
	1062.0						
4.0						End of Test Pit: 4.1 m Limit of excavator	
	1061.0						
5.0							
	1060.0						

GENERAL REMARKS:

Easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-57

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-297 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 16 Oct 14

Location: Tailings and Reclaim Pipeline Corridor | Total Depth: 1.4 m | Date Completed: 16 Oct 14

Coordinates: 685,658 E , 5,605,991 N UTM NAD83 ZONE10 | Elevation: 1065.2 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1065.0					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine grained; subrounded to angular, poorly graded, dark brown, non plastic, loose, dry, massive.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
1.0	1064.0					**SAND AND SILT** (0.2 to 1.4) SILT and SAND; some gravel; trace cobbles; fine to coarse grained, angular to subrounded, gap graded, light greyish brown, non plastic, loose to compact, dry, massive. [Colluvium]	
						End of Test Pit: 1.4 m Refusal on bedrock	
2.0	1063.0						
3.0	1062.0						
4.0	1061.0						
5.0	1060.0						

GENERAL REMARKS:

Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-58

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-299 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 16 Oct 14

Location: Tailings and Reclaim Pipeline Corridor | Total Depth: 0.2 m | Date Completed: 16 Oct 14

Coordinates: 686,081 E , 5,606,774 N UTM NAD83 ZONE10 | Elevation: 1023.2 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1023.0					**TOPSOIL & ORGANICS** (0 to 0.05) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT, trace gravel, fine grained, poorly graded, dark brown, non plastic, loose, dry.	0 m - No Soil Horizons
						WEATHERED BEDROCK (0.05 to 0.2) Moderately weathered, light grey, strong iron oxide staining, strong, moderately fractured.	
						End of Test Pit: 0.2 m Refusal on bedrock	
1.0	1022.0						
2.0	1021.0						
3.0	1020.0						
4.0	1019.0						
5.0	1018.0						

GENERAL REMARKS:

Bedrock outcrops nearby; bedrock at surface; no groundwater.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-59

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-300 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 17 Oct 14

Location: Tailings and Reclaim Pipeline Corridor | Total Depth: 2 m | Date Completed: 17 Oct 14

Coordinates: 685,838 E , 5,606,715 N UTM NAD83 ZONE10 | Elevation: 1061.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1061.0					**TOPSOIL & ORGANICS** (0 to 0.9) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; subrounded to angular, poorly graded, dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.9 m
1.0	1060.0					**SILTY SAND** (0.9 to 2) Silty SAND; some gravel; trace cobbles; fine to coarse grained, angular to subrounded, gap graded, light greyish brown, non plastic, compact, dry, massive. [Colluvium]	
2.0	1059.0					End of Test Pit: 2 m Refusal on highly weathered rock	
3.0	1058.0						
4.0	1057.0						
5.0	1056.0						

GENERAL REMARKS:

Easy to excavate up to 2 m, no groundwater, walls sloughing slightly.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-60

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-301
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 17 Oct 14

Location: Tailings and Reclaim Pipeline Corridor
Total Depth: 3.3 m
Date Completed: 17 Oct 14

Coordinates: 685,616 E , 5,606,665 N UTM NAD83 ZONE10
Elevation: 1076.8 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	1076.8					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; fine grained; subrounded to angular, poorly graded, dark brown to black, non plastic, loose, moist to saturated.	0 m - No Soil Horizons
						SILT (0.2 to 0.3) SILT; some sand; trace gravel; trace clay; fine grained, poorly graded, light grey to white, high plasticity, loose, moist.	
1.0	1076.0					**SAND** (0.3 to 2) SAND; some silt; trace gravel; trace clay; fine to coarse grained, angular to subrounded, poorly graded, dark grey, low plasticity.	
	1075.0	G B	TP14-301-1				
2.0					▼	**SILT SOME SAND, CLAY AND GRAVEL** (2 to 3.3) SILT; some sand; some clay; some gravel; trace cobbles; fine to coarse grained, angular to subrounded, poorly graded, light orangey yellowish brown, medium plasticity, saturated, loose, massive. [Completely Weathered Bedrock]	2 m - Groundwater Seepage at 2.0 m
3.0	1074.0						
	1073.0					End of Test Pit: 3.3 m Refusal on highly weathered rock	
4.0	1072.0						
5.0	1071.0						

GENERAL REMARKS:

Groundwater at 2 m, material at 2 m onwards appears to be completely weathered rock, test pit located in small valley and may not be representative of deeper ground.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-61

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-306 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 17 Oct 14

Location: SMRSF Water Management Pond | Total Depth: 2.6 m | Date Completed: 17 Oct 14

Coordinates: 686,459 E , 5,606,863 N UTM NAD83 ZONE10 | Elevation: 977.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	977.5					**TOPSOIL & ORGANICS** (0 to 0.5) ORGANICS, root inclusions; and TOPSOIL; SILT; trace sand; trace gravel, fine grained, poorly graded, dark brown to black, non plastic, loose, moist.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 0.5 m
1.0	977.0					**SANDY GRAVEL** (0.5 to 2.6) Sandy GRAVEL; some silt; trace cobbles; fine to coarse grained, rounded to subrounded, well graded, grey to brown, non plastic, loose, dry to saturated, massive. [Glaciofluvial]	
2.0	976.0	G B	TP14-306-1				
2.6	975.0					End of Test Pit: 2.6 m Wall instability / groundwater	2.6 m - Groundwater Seepage at 2.6 m
3.0	974.0						
4.0	973.0						
5.0	972.0						

GENERAL REMARKS:

Very easy to excavate, gravel material sloughing beneath topsoil layer.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-62

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-307 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 18 Oct 14

Location: SMRSF Water Management Pond | Total Depth: 0.6 m | Date Completed: 18 Oct 14

Coordinates: 686,604 E , 5,606,835 N UTM NAD83 ZONE10 | Elevation: 991.9 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	991.9					**TOPSOIL & ORGANICS** (0 to 0.05) ORGANICS, root inclusions; and TOPSOIL; SILT; trace sand; trace gravel, fine grained, subangular to rounded, poorly graded, medium to dark brown, non plastic, loose, dry, massive.	0 m - A: 0 - 0.05 m 0.05 m - B: 0.05 - 0.3 m
						SILT (0.05 to 0.3) SILT; trace sand; trace gravel, fine grained, subangular to rounded, poorly graded, medium to dark brown, non plastic, loose, dry, massive.	
1.0	991.0					**WEATHERED BEDROCK** (0.3 to 0.6) Rubblized bedrock, dark grey, very strong, iron oxide staining.	
						End of Test Pit: 0.6 m Refusal on bedrock	
2.0	990.0						
3.0	989.0						
4.0	988.0						
5.0	987.0						
	986.0						

GENERAL REMARKS:

Bedrock outcrops nearby, easy to excavate up to bedrock, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-63

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-308 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 18 Oct 14

Location: SMRSF Water Management Pond | Total Depth: 3.2 m | Date Completed: 18 Oct 14

Coordinates: 686,699 E , 5,606,967 N UTM NAD83 ZONE10 | Elevation: 982.6 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	982.0					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; trace sand; trace gravel, fine grained, poorly graded, dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						SILT (0.4 to 0.8) SILT; trace sand; trace gravel, fine grained, poorly graded, dark brown, non plastic, loose, dry.	
1.0						**GRAVELLY SANDY SILT** (0.8 to 3.2) Gravelly Sandy SILT; trace cobbles, fine to coarse grained, angular to subrounded, gap graded, medium grey, low to no plasticity, very dense, moist, massive. [Glacial Till]	
	981.0	G B	GP14-016				
2.0							
	980.0						
3.0							
						End of Test Pit: 3.2 m Refusal on bedrock	
	979.0						
4.0							
	978.0						
5.0							
	977.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-64

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-309 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 18 Oct 14

Location: Tailings and Reclaim Pipeline Corridor | Total Depth: 3.1 m | Date Completed: 18 Oct 14

Coordinates: 686,812 E , 5,607,361 N UTM NAD83 ZONE10 | Elevation: 985.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	985.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; trace sand; trace gravel, fine grained, poorly graded, dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m
						GRAVELLY SANDY SILT (0.3 to 3.1) Gravelly Sandy SILT; trace cobbles, fine to coarse grained, angular to subrounded, gap graded, dark greyish brown, non plastic, very dense, moist, massive. [Glacial Till]	
1.0	984.0						
2.0	983.0						
3.0	982.0					End of Test Pit: 3.1 m Refusal on dense material	
4.0	981.0						
5.0	980.0						

GENERAL REMARKS:

Difficult to excavate; no groundwater; walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-65

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-319 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 20 Oct 14

Location: Conveyor Corridor | Total Depth: 3.7 m | Date Completed: 20 Oct 14

Coordinates: 686,030 E , 5,608,440 N UTM NAD83 ZONE10 | Elevation: 946.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	946.5					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; trace sand, fine grained; subangular to rounded, poorly graded, dark brown, loose, dry, massive.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.7 m
	946.0					**GRAVELLY SAND** (0.4 to 0.7) Gravelly SAND; some silt; trace cobbles; fine to coarse grained, angular to subrounded, well graded, light grey, non plastic, dense, dry, massive.	
1.0						**SANDY, GRAVELLY, SILT** (0.7 to 3.7) Sandy gravelly SILT; some to trace cobbles; fine to coarse grained, angular to subrounded, well graded, dark greyish brown, low to no plasticity, moist, very dense, moist, massive. [Glacial Till]	
	945.0						
2.0							
	944.0						
3.0							
	943.0						
3.7						End of Test Pit: 3.7 m Refusal on dense material	
4.0							
	942.0						
5.0							
	941.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-66

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-320 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 20 Oct 14

Location: Conveyor Corridor | Total Depth: 1.6 m | Date Completed: 20 Oct 14

Coordinates: 685,845 E , 5,608,576 N UTM NAD83 ZONE10 | Elevation: 940.9 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	940.9					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; subangular to rounded, poorly graded, medium to dark brown, non plastic, loose to compact, dry, massive.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
1.0	940.0					**SANDY SILT** (0.4 to 1.6) Sandy SILT; some gravel; trace cobbles; fine to coarse grained, angular to subrounded, well graded, medium greyish brown, non plastic, very dense, dry, massive. [Colluvium]	
2.0	939.0					**WEATHERED BEDROCK** (1.6 to 1.6) Medium to dark grey, strong, fresh to slightly weathered, calcite on surfaces. End of Test Pit: 1.6 m Refusal on bedrock	
3.0	938.0						
4.0	937.0						
5.0	936.0						
	935.0						

GENERAL REMARKS:

Bedrock outcrops nearby, easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-67

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-321 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 21 Oct 14

Location: Conveyor Corridor | Total Depth: 4.4 m | Date Completed: 21 Oct 14

Coordinates: 685,672 E , 5,608,697 N UTM NAD83 ZONE10 | Elevation: 931.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	931.8					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; subangular to subrounded, poorly graded, dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						GRAVELLY SANDY SILT (0.4 to 4.4) Gravelly Sandy SILT; trace boulders; trace cobbles, fine to coarse grained, gap graded, angular to subrounded, medium greyish brown, medium plasticity, dense, moist, massive. [Glacial Till]	
1.0	931.0						
2.0	930.0						
3.0	929.0						
4.0	928.0						
5.0	927.0					End of Test Pit: 4.4 m Limit of excavator	
	926.0						

GENERAL REMARKS:

Relatively easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-68

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-322 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 21 Oct 14

Location: Conveyor Corridor | Total Depth: 3.6 m | Date Completed: 21 Oct 14

Coordinates: 685,557 E , 5,608,792 N UTM NAD83 ZONE10 | Elevation: 928.7 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	928.7					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained; subangular to rounded, poorly graded, medium to dark brown, non plastic, loose, dry.	0 m - A: 0 - 0.3 m
	928.0					**SILTY SAND** (0.3 to 0.6) Silty SAND; trace cobbles; trace gravel; fine to coarse grained, subangular to subrounded, poorly graded, medium greyish brown, non plastic, dense, dry, massive.	
1.0						**GRAVELLY SANDY SILT** (0.6 to 3.6) Gravelly Sandy SILT; trace boulders; trace cobbles, fine to coarse grained, gap graded, angular to subrounded, medium greyish brown, medium plasticity, dense, moist, massive. [Glacial Till]	
	927.0						
2.0							
	926.0						
3.0							
	925.0					End of Test Pit: 3.6 m Refusal on cobbles / boulders	
4.0							
	924.0						
5.0							
	923.0						

GENERAL REMARKS:

Easy to excavate up to 3 m, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-69

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-329 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 22 Oct 14

Location: Haul road | Total Depth: 3.9 m | Date Completed: 22 Oct 14

Coordinates: 686,740 E , 5,607,652 N UTM NAD83 ZONE10 | Elevation: 983.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	983.8					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark to medium brown, loose to compact, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.2 m 0.2 m - C: 0.2 - 0.5 m
						SAND (0.2 to 0.6) SAND; some gravel; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light grey, non plastic, dense, dry.	
1.0	983.0					**GRAVELLY SANDY SILT** (0.6 to 3.9) Gravelly Sandy SILT: trace cobbles; fine to coarse grained, angular to subrounded, poorly graded, low to medium plasticity, very dense, moist, massive. [Glacial Till]	
2.0	982.0						
3.0	981.0						
4.0	980.0					End of Test Pit: 3.9 m Refusal on dense material	
5.0	979.0						
	978.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-70

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-330 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 22 Oct 14

Location: SMRSF Water Management Pond | Total Depth: 3 m | Date Completed: 22 Oct 14

Coordinates: 686,459 E , 5,606,823 N UTM NAD83 ZONE10 | Elevation: 979.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	979.0					**SAND** (0 to 1) SAND; some silt; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, light brown, loose to compact, dry, massive.	0 m - TP on Existing Road
1.0						**GRAVELLY SANDY SILT** (1 to 3) Gravelly Sandy SILT; trace boulders; trace cobbles, fine to coarse grained, angular to subrounded, poorly graded, dark grey/brown, medium plasticity, very dense, massive. [Glacial Till]	
2.0	978.0						
3.0	977.0					End of Test Pit: 3 m Refusal on dense material	
4.0	976.0						
5.0	975.0						
	974.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-71

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-332 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 22 Oct 14

Location: Potential Borrow Area | Total Depth: 3.3 m | Date Completed: 22 Oct 14

Coordinates: 685,957 E , 5,609,137 N UTM NAD83 ZONE10 | Elevation: 882.1 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	882.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, poorly graded, medium brown, loose, dry.	0 m - A: 0 - 0.3 m 0.3 m - C: 0.3 - 0.7 m
						GRAVELLY SAND (0.3 to 0.7) Gravelly SAND; some silt; some to trace cobbles; fine to coarse grained, angular to rounded, well graded, light grey, non plastic, dense, dry, massive.	
1.0	881.0					**GRAVELLY SANDY SILT** (0.7 to 3.3) Gravelly Sandy SILT; trace cobbles; fine to coarse grained, subangular to rounded, poorly graded, dark greyish brown, low to medium plasticity, very dense, moist, massive. [Glacial Till]	
2.0	880.0						
3.0	879.0					End of Test Pit: 3.3 m Refusal on dense material	
4.0	878.0						
5.0	877.0						

GENERAL REMARKS:

Easy to excavate, no groundwater, walls sloughing slightly.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-72

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-333 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 23 Oct 14

Location: Potential Borrow Area | Total Depth: 5 m | Date Completed: 23 Oct 14

Coordinates: 685,702 E , 5,609,502 N UTM NAD83 ZONE10 | Elevation: 899.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	899.0					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine grained, subangular to rounded, poorly graded, medium brown, non plastic, loose, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						SANDY SILT (0.2 to 0.9) Sandy SILT; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium brown, non plastic, compact, dry.	
1.0	898.0					**GRAVELLY SILT** (0.9 to 2) Gravelly SILT; some sand; some cobbles, fine to coarse grained, angular to subrounded, well graded, medium greyish brown, dense, non plastic, moist, massive. [Glacial Till]	
2.0	897.0					**SILT** (2 to 5) SILT; some clay; trace cobbles; fine grained, poorly graded, medium grey, dense, moist, stratified. [Glaciolacustrine]	
3.0	896.0						
4.0	895.0						
5.0	894.0					End of Test Pit: 5 m Limit of excavator	

GENERAL REMARKS:

Easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-73

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-334 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 23 Oct 14

Location: Potential Borrow Area | Total Depth: 4.4 m | Date Completed: 23 Oct 14

Coordinates: 685,902 E , 5,609,354 N UTM NAD83 ZONE10 | Elevation: 889.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	889.5					**TOPSOIL & ORGANICS** (0 to 0.1) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine grained, subangular to rounded, poorly graded, medium brown, non plastic, loose, dry.	0 m - A: 0 - 0.1 m
	889.0					**SILT** (0.1 to 1.3) SILT; trace sand; trace gravel; trace cobbles; fine to coarse grained, subangular to subrounded, poorly graded, medium brown, non plastic, loose to compact, dry, massive. [Loess]	
1.0							
	888.0					**SANDY GRAVEL** (1.3 to 2.5) Sandy GRAVEL; some cobbles; some silt; fine to coarse grained, subangular to rounded, well graded, medium brown, non plastic, compact, dry, massive. [Glaciofluvial]	
2.0							
	887.0					**SANDY SILT** (2.5 to 4.4) Sandy SILT; some gravel; some cobbles, fine to coarse grained, subangular to subrounded, poorly graded, dark greyish brown, low to medium plasticity, dense, moist, massive. [Glacial Till]	
3.0							
	886.0						
4.0							
	885.0					End of Test Pit: 4.4 m Limit of excavator	
5.0							
	884.0						

GENERAL REMARKS:

Easy to excavate, walls sloughing in gravel material from 1.3 - 2.5 m, no groundwater.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-74

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT
Test Pit No.: TP14-337
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 23 Oct 14

Location: Haul Road
Total Depth: 2.9 m
Date Completed: 23 Oct 14

Coordinates: 685,996 E , 5,609,537 N UTM NAD83 ZONE10
Elevation: 915.6 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	915.6					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT; trace cobbles; trace gravel, fine to coarse grained, angular to subrounded, poorly graded, medium brown, non plastic, compact, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.4 m 0.4 m - C: 0.4 - 0.7 m
	915.0					**GRAVELLY SAND** (0.4 to 0.7) Gravelly SAND; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light grey, dense, dry, massive.	
1.0						**GRAVELLY SILT** (0.7 to 2.9) Gravelly SILT; some cobbles; some sand, fine to coarse grained, subangular to subrounded, well graded, medium brown, non plastic, very dense, dry, massive. [Glacial Till]	
	914.0						
2.0							
	913.0						
3.0						End of Test Pit: 2.9 m Refusal on dense material	
	912.0						
4.0							
	911.0						
5.0							
	910.0						

GENERAL REMARKS:
Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-75

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-338 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 23 Oct 14

Location: Haul Road | Total Depth: 3.5 m | Date Completed: 23 Oct 14

Coordinates: 686,191 E , 5,609,671 N UTM NAD83 ZONE10 | Elevation: 932.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	932.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, angular to subrounded, poorly graded, medium brown, non plastic, loose, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.7 m
						GRAVELLY SAND (0.3 to 0.9) Gravelly SAND; some silt; trace cobbles, fine to coarse grained, subangular to rounded, well graded, light grey, non plastic, dense, dry.	
1.0	931.0					**GRAVELLY SANDY SILT** (0.9 to 3.5) Gravelly Sandy SILT: trace cobbles, fine to coarse grained, subangular to subrounded, poorly graded, non plastic, very dense, dry. [Glacial Till]	
2.0	930.0						
3.0	929.0					End of Test Pit: 3.5 m Refusal on dense material	
4.0	928.0						
5.0	927.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-76

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-339 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 24 Oct 14

Location: Haul Road | Total Depth: 3.6 m | Date Completed: 24 Oct 14

Coordinates: 686,346 E , 5,609,951 N UTM NAD83 ZONE10 | Elevation: 944.7 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	944.7					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, gap graded, dark brown, loose, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.2 m 0.2 m - C: 0.2 - 0.6 m
	944.0					**SILTY SAND** (0.2 to 0.6) Silty SAND; some gravel; trace cobbles; fine to coarse grained, angular to subrounded, well graded, medium greyish brown, non plastic, dense, dry, massive.	
1.0						**GRAVELLY SANDY SILT** (0.6 to 3) gravelly Sandy SILT; trace cobbles; fine to coarse grained, angular to subrounded, poorly graded, dark greyish brown, non plastic, very dense, dry to moist, massive.	
	943.0						
2.0							
	942.0						
3.0						**WEATHERED BEDROCK** (3 to 3.6) Dark grey/orange, very strong, oxidization of joint surfaces, moderately weathered.	
	941.0					End of Test Pit: 3.6 m Refusal on weathered bedrock	
4.0							
	940.0						
5.0							
	939.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-77

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-343
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 24 Oct 14

Location: EMRSF
Total Depth: 4.3 m
Date Completed: 24 Oct 14

Coordinates: 686,696 E , 5,609,861 N UTM NAD83 ZONE10
Elevation: 930.2 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	930.0					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark brown, loose to compact, dry.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m 0.4 m - C: 0.4 - 0.9 m
						GRAVELLY SAND (0.4 to 0.9) Gravelly SAND; some silt; trace cobbles; fine to coarse grained, angular to subrounded, well graded, dense, light grey, non plastic, dry.	
1.0	929.0					**GRAVELLY SANDY SILT** (0.9 to 4.3) Gravelly Sandy SILT; trace cobbles; fine to coarse grained, angular to rounded, poorly graded, dark greyish brown, very dense, moist, massive. [Glacial Till]	
2.0	928.0						
3.0	927.0						
4.0	926.0	G B	TP14-343-1			End of Test Pit: 4.3 m Refusal on dense material	
5.0	925.0						

GENERAL REMARKS:
Easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-78

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT

Test Pit No.: TP14-344 **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. Equipment Used: CAT 320D L Date Started: 24 Oct 14

Location: EMRSF Water Management Pond Total Depth: 3.9 m Date Completed: 24 Oct 14

Coordinates: 687,197 E , 5,609,561 N UTM NAD83 ZONE10 Elevation: 880.3 m Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	880.0					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark brown, loose to compact, dry.	0 m - A: None 0.1 m - B: 0 - 1 m
						SILT (0.2 to 1) SILT; some sand, poorly graded, brown, medium plasticity, dense, massive. [Loess]	
1.0	879.0					**SANDY GRAVEL** (1 to 1.5) Sandy GRAVEL; some silt; trace cobbles, fine to coarse grained, subangular to rounded, well graded, grey/brown, loose, dry. [Glaciofluvial]	
						GRAVELLY SANDY SILT (1.5 to 3.9) Gravelly Sandy SILT; trace cobbles, fine to coarse grained, subangular to rounded, poorly graded, dark brown, low to medium plasticity, very dense, moist, massive. [Glacial Till]	
2.0	878.0						
3.0	877.0	G B	TP14-344-1				
4.0	876.0					End of Test Pit: 3.9 m Refusal on boulder	
5.0	875.0						

GENERAL REMARKS:

Easy to excavate, no groundwater, walls sloughing slightly from 1 - 1.5 m.

SAMPLING SYMBOLS:

G B GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-79

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT

Test Pit No.: TP14-345 **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. Equipment Used: CAT 320D L Date Started: 25 Oct 14

Location: EMRSF Water Management Pond Total Depth: 4.3 m Date Completed: 25 Oct 14

Coordinates: 687,051 E , 5,609,455 N UTM NAD83 ZONE10 Elevation: 883.5 m Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	883.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium to dark brown, non plastic, compact, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 1.2 m
1.0	882.0					**GRAVELLY SAND** (0.3 to 1.2) Gravelly SAND; trace cobbles; trace sand, fine to coarse grained, angular to subrounded, well graded, light greyish brown, non plastic, dense, dry, massive.	
2.0	881.0					**GRAVELLY SANDY SILT** (1.2 to 4.3) Gravelly Sandy SILT; trace cobbles, fine to coarse grained, subangular to rounded, poorly graded, dark greyish brown, very dense, low to medium plasticity, moist, massive. [Glacial Till]	
3.0	880.0						
4.0	879.0					End of Test Pit: 4.3 m Refusal on dense material	
5.0	878.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-80

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-346 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 25 Oct 14

Location: EMRSF Water Management Pond | Total Depth: 4.7 m | Date Completed: 25 Oct 14

Coordinates: 687,252 E , 5,609,421 N UTM NAD83 ZONE10 | Elevation: 878 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	878.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium to dark brown, non plastic, compact, dry.	0 m - A: 0 - 0.3 m
						GRAVEL (0.3 to 1.1) GRAVEL; some sand; some silt; trace cobbles, subangular to rounded, well graded, grey, compact, dry, massive, trace organics.	
1.0	877.0					**SILTY SAND** (1.1 to 4.7) Silty SAND; trace gravel, fine grained, poorly graded, light greyish brown, non plastic, compact, dry, massive. [Glaciolacustrine]	
2.0	876.0						
3.0	875.0						
4.0	874.0	G B	TP14-346-1				
						End of Test Pit: 4.7 m Limit of excavator	
5.0	873.0						

GENERAL REMARKS:

Very easy to excavate, no groundwater, walls sloughing from 0.3 - 1.1 m.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-81

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT
Test Pit No.: TP14-347
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 25 Oct 14

Location: EMRSF
Total Depth: 3.2 m
Date Completed: 25 Oct 14

Coordinates: 687,350 E , 5,609,722 N UTM NAD83 ZONE10
Elevation: 886.8 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	886.8					**TOPSOIL & ORGANICS** (0 to 0.5) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, gap graded, medium brown, compact, dry, massive.	0 m - A: 0 - 0.05 m 0.05 m - B: 0.05 - 0.5 m
1.0	886.0					**GRAVELLY SANDY SILT** (0.5 to 3.2) Gravelly Sandy SILT; trace cobbles; trace boulders, fine to coarse grained, angular to rounded, poorly graded, medium greyish brown, very dense, dry. [Glacial Till]	
2.0	885.0						
3.0	884.0						
3.2	883.6					End of Test Pit: 3.2 m Refusal on dense material	
4.0	883.0						
5.0	882.0						
	881.0						

GENERAL REMARKS:
Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-82

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-348
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 25 Oct 14

Location: EMRSF
Total Depth: 2.5 m
Date Completed: 25 Oct 14

Coordinates: 687,454 E , 5,609,859 N UTM NAD83 ZONE10
Elevation: 902.7 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	902.0					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, gap graded, dark brown, non plastic, compact, dry.	0 m - A: 0 - 0.4 m 0.4 m - B: 0.4 - 0.9 m
						SILT (0.4 to 0.9) SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, gap graded, medium brown, non plastic, compact to dense, dry.	0.9 m - C: 0.9 - 1.1 m
1.0						**GRAVELLY SAND** (0.9 to 1.1) Gravelly SAND; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light grey, non plastic, dense, dry.	
	901.0					**GRAVELLY SANDY SILT** (1.1 to 2.5) Gravelly Sandy SILT: trace cobbles; trace boulders, fine to coarse grained, angular to rounded, well graded, dark greyish brown, non plastic, very dense, dry, massive. [Glacial Till]	
2.0							
	900.0					End of Test Pit: 2.5 m Refusal on dense material, possibly bedrock	
3.0							
	899.0						
4.0							
	898.0						
5.0							
	897.0						

GENERAL REMARKS:
Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-83

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-349
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 25 Oct 14

Location: EMRSF
Total Depth: 4.3 m
Date Completed: 25 Oct 14

Coordinates: 687,226 E , 5,610,040 N UTM NAD83 ZONE10
Elevation: 910.5 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	910.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; trace gravel; trace sand, fine grained, subangular to rounded, poorly graded, medium brown, non plastic, loose to compact, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m
						GRAVELLY SANDY SILT (0.3 to 4.3) Gravelly Sandy SILT: trace cobbles; trace boulders, gap graded, dark greyish brown, very dense, low to medium plasticity, moist, massive. [Glacial Till]	
1.0	909.0						
2.0	908.0						
3.0	907.0						
4.0	906.0					End of Test Pit: 4.3 m Limit of excavator	
5.0	905.0						

GENERAL REMARKS:
Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-84

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

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Project: AJAX PROJECT | **Test Pit No.:** TP14-360 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 30 Oct 14

Location: EMRSF | Total Depth: 4.7 m | Date Completed: 30 Oct 14

Coordinates: 685,989 E , 5,610,430 N UTM NAD83 ZONE10 | Elevation: 962.5 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	962.0					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT; trace cobbles; trace gravel, fine to coarse grained, angular to subrounded, poorly graded, dark to medium brown, non plastic, loose to compact, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m 0.3 m - C: 0.3 - 0.6 m
						SAND (0.3 to 0.6) SAND; some gravel; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light greyish brown, dense, dry, massive.	
1.0						**GRAVELLY SILT** (0.6 to 4.7) gravelly SILT; some sand; trace cobbles, fine to coarse grained, angular to subrounded, gap graded, dark greyish brown, low to no plasticity, very dense, moist, massive. [Glacial Till]	
	961.0	G B	GP14-017				
2.0							
	960.0						
3.0							
	959.0						
4.0							
	958.0						
4.7						End of Test Pit: 4.7 m Limit of excavator	
5.0							
	957.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-85

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-361 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 30 Oct 14

Location: Haul Road | Total Depth: 5.1 m | Date Completed: 30 Oct 14

Coordinates: 685,765 E , 5,610,431 N UTM NAD83 ZONE10 | Elevation: 959.9 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	959.9					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark to medium brown, non plastic, compact to loose, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.2 m
						SANDY SILT (0.2 to 0.8) Sandy SILT; trace cobbles; trace gravel, fine to coarse grained, angular to subrounded, poorly graded, non plastic, medium brown, dense, dry.	
1.0	959.0					**GRAVELLY SILT** (0.8 to 5.1) gravelly SILT; some sand; trace boulders; trace cobbles, fine to coarse grained, angular to subrounded, poorly/gap graded, dark greyish brown, very dense, moist, low to medium plasticity, massive. [Glacial Till]	
2.0	958.0						
3.0	957.0						
4.0	956.0						
5.0	955.0					End of Test Pit: 5.1 m Limit of excavator	
	954.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-86

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-363
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 30 Oct 14

Location: Haul Road
Total Depth: 5 m
Date Completed: 30 Oct 14

Coordinates: 685,426 E , 5,610,649 N UTM NAD83 ZONE10
Elevation: 969.9 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	969.9					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, gap graded, dark brown, non plastic, compact, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1-0.3 m 0.3 m - C: 0.3 - 0.7 m
						SAND (0.3 to 0.7) SAND; some gravel; some silt; trace cobbles, fine to coarse grained, angular to subrounded, well graded, light grey, non plastic, dense, dry, massive. [Loess]	
1.0	969.0					**SANDY GRAVELLY SILT** (0.7 to 5) Sandy Gravelly SILT; trace cobbles; fine to coarse grained, angular to subrounded, poorly graded, dark greyish brown, dense, moist, massive. [Glacial Till]	
2.0	968.0						
3.0	967.0						
4.0	966.0						
5.0	965.0					End of Test Pit: 5 m Limit of excavator	
	964.0						

GENERAL REMARKS:
Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-87

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-364 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 30 Oct 14

Location: Haul Road | Total Depth: 3 m | Date Completed: 30 Oct 14

Coordinates: 685,000 E , 5,610,698 N UTM NAD83 ZONE10 | Elevation: 950.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	950.0					**TOPSOIL & ORGANICS** (0 to 0.5) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark brown, non plastic, loose to compact, dry to moist, massive.	0 m - A: 0 - 0.3 m 0.3 m - B: 0.3 - 1.4 m
1.0	949.0					**SILT** (0.5 to 3) SILT; some sand; trace cobbles; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium brown, dense, dry. [Loess]	
2.0	948.0						
3.0	947.0					**WEATHERED BEDROCK** (3 to 3) Dark grey/green, strong, slightly weathered, chlorite/calcite on surfaces. End of Test Pit: 3 m Refusal on bedrock	
4.0	946.0						
5.0	945.0						

GENERAL REMARKS:

Easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-88

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-365
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 31 Oct 14

Location: Haul Road
Total Depth: 2 m
Date Completed: 31 Oct 14

Coordinates: 684,411 E , 5,610,617 N UTM NAD83 ZONE10
Elevation: 956.8 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	956.8					**TOPSOIL & ORGANICS** (0 to 0.3) ORGANICS, root inclusions; and TOPSOIL; SILT and SAND; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark greyish brown, non plastic, loose, dry.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.3 m
						SAND AND SILT (0.3 to 0.8) SAND and SILT; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium greyish brown, non plastic, compact, dry.	
	956.0					**WEATHERED BEDROCK** (0.8 to 2) Highly to completely weathered bedrock, light grey to white, some chlorite/calcite infill and minor iron oxide staining, weak.	
1.0							
	955.0						
2.0						End of Test Pit: 2 m Refusal on weathered bedrock	
	954.0						
3.0							
	953.0						
4.0							
	952.0						
5.0							
	951.0						

GENERAL REMARKS:
Easy to excavate up to 1 m, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-89

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-369 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 31 Oct 14

Location: Sand and Gravel Borrow Area | Total Depth: 4.8 m | Date Completed: 31 Oct 14

Coordinates: 683,899 E , 5,610,350 N UTM NAD83 ZONE10 | Elevation: 968.1 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	968.0					**TOPSOIL & ORGANICS** (0 to 0.2) ORGANICS, root inclusions; and TOPSOIL; Sandy; SILT; trace gravel, fine to coarse grained, angular to subrounded, poorly graded, medium brown, non plastic, loose, dry.	0 m - A: 0 - 0.1 m
						GRAVELLY SAND (0.2 to 4.8) Gravelly SAND; trace cobbles; trace boulders; fine to coarse grained, angular to subrounded, well graded, light greyish brown, non plastic, compact, dry, massive. [Mine Rock]	
1.0	967.0						
2.0	966.0						
3.0	965.0						
4.0	964.0	G B	TP14-369-1				
						End of Test Pit: 4.8 m Limit of excavator	
5.0	963.0						

GENERAL REMARKS:

Located on historic waste rock facility, easy to excavate up to 1 m, no groundwater, walls sloughing.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-90

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT
Test Pit No.: TP14-376
Page: 1 of 1

Contractor: Cobra Contracting Ltd.
Equipment Used: CAT 320D L
Date Started: 1 Nov 14

Location: Haul Road
Total Depth: 4.4 m
Date Completed: 1 Nov 14

Coordinates: 682,644 E , 5,610,161 N UTM NAD83 ZONE10
Elevation: 902.6 m
Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	902.0					**TOPSOIL & ORGANICS** (0 to 0.05) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, medium brown, loose, dry.	0 m - A: 0 - 0.05 m
						GRAVELLY SAND (0.05 to 1) Gravelly SAND; some silt; some cobbles; fine to coarse grained, angular to subrounded, well graded, light grey, non plastic, dense, dry.	
1.0						**GRAVELLY SILT** (1 to 4.4) Gravelly SILT; some sand; trace boulders; trace cobbles, fine to coarse grained, angular to rounded, well graded, medium orangey brown, dense, moist, low plasticity, massive. [Glacial Till]	
	901.0						
2.0							
	900.0						
3.0							
	899.0						
4.0							
	898.0					End of Test Pit: 4.4 m Limit of excavator	
5.0							
	897.0						

GENERAL REMARKS:
Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:
GB GRAB BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-91

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
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Project: AJAX PROJECT | **Test Pit No.:** TP14-377 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 1 Nov 14

Location: Haul Road | Total Depth: 4.1 m | Date Completed: 1 Nov 14

Coordinates: 682,604 E , 5,610,406 N UTM NAD83 ZONE10 | Elevation: 903.1 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	903.0					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark to medium brown, non plastic, loose to compact, dry, massive.	0 m - A: 0 - 0.2 m 0.2 m - B: 0.2 - 0.4 m
						GRAVELLY SAND (0.4 to 1.5) gravelly SAND; some silt; trace cobbles, fine to coarse grained, angular to subrounded, poorly graded, light greyish brown, non plastic, dense, dry, massive.	
1.0	902.0	G B	GP14-018				
						GRAVELLY SILT (1.5 to 4.1) gravelly SILT; some sand; trace cobbles; fine to coarse grained, angular to subrounded, poorly graded, dark greyish brown, very dense, moist, massive. [Glacial Till]	
2.0	901.0						
3.0	900.0						
4.0	899.0					End of Test Pit: 4.1 m Limit of excavator	
5.0	898.0						

GENERAL REMARKS:

Difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-92

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-378 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 1 Nov 14

Location: Haul Road | Total Depth: 1.6 m | Date Completed: 1 Nov 14

Coordinates: 682,920 E , 5,610,558 N UTM NAD83 ZONE10 | Elevation: 904.8 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	904.0					**TOPSOIL & ORGANICS** (0 to 0.8) ORGANICS, root inclusions; and TOPSOIL; SILT; trace gravel; trace sand; fine to coarse grained, subrounded to rounded, poorly graded, dark brown, non plastic, compact, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.8 m
1.0						**SILT** (0.8 to 1.6) SILT; trace gravel; trace sand; fine to coarse grained, subrounded to rounded, poorly graded, dark brown, medium plasticity, compact, moist, massive. [Loess]	
2.0	903.0					**WEATHERED BEDROCK** (1.6 to 1.6) Dark grey, strong, minimal weathering or staining. End of Test Pit: 1.6 m Refusal on bedrock	
3.0	902.0						
4.0	901.0						
5.0	900.0						
	899.0						

GENERAL REMARKS:

Bedrock outcrops nearby, very easy to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

GB GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-93

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: AJAX PROJECT | **Test Pit No.:** TP14-379 | **Page:** 1 of 1

Contractor: Cobra Contracting Ltd. | Equipment Used: CAT 320D L | Date Started: 3 Nov 14

Location: Haul Road | Total Depth: 3.8 m | Date Completed: 3 Nov 14

Coordinates: 683,398 E , 5,610,539 N UTM NAD83 ZONE10 | Elevation: 954.4 m | Logged by: MAP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	SAMPLES	SAMPLE NO.	GRAPHIC LOG	WATER LEVEL	MATERIAL DESCRIPTION	COMMENTS
0	954.0					**TOPSOIL & ORGANICS** (0 to 0.4) ORGANICS, root inclusions; and TOPSOIL; SILT; some sand; trace gravel, fine to coarse grained, subangular to rounded, poorly graded, dark to medium brown, non plastic, loose to dense, dry, massive.	0 m - A: 0 - 0.1 m 0.1 m - B: 0.1 - 0.4 m
						GRAVELLY SANDY SILT (0.4 to 3.8) Gravelly Sandy SILT; trace cobbles; trace clay; fine to coarse grained, angular to rounded, poorly graded, dark greyish brown, very dense, low plasticity. [Glacial Till]	
1.0	953.0	G B	GP14-019				
2.0	952.0						
3.0	951.0						
4.0	950.0					End of Test Pit: 3.8 m Refusal on bedrock	
5.0	949.0						

GENERAL REMARKS:

Bedrock outcrops nearby, difficult to excavate, no groundwater, walls stable.

SAMPLING SYMBOLS:

G B GRAB ■ BLOCK

KGHM AJAX MINING INC.
AJAX PROJECT

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
101-00246/26	9	0

FIGURE B1-94

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX TEST PITS REPORT 9.GPJ
M:\1\01\00246\26\AIDATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, TEST PIT LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

APPENDIX B2

TEST PIT PHOTOGRAPHS

(Pages B2-1 to B2-94)



PHOTO 1 - TP14-003 - 0 - 0.7 m



PHOTO 2 - TP14-003 - Looking North

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AJAX PROJECT



PHOTO 3 - TP14-057 - 0 - 1.4 m

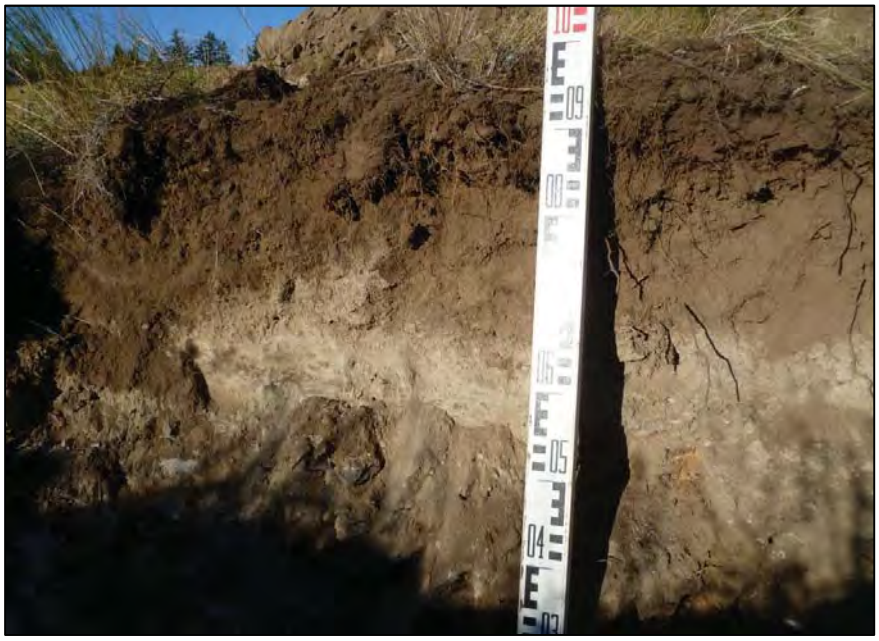


PHOTO 4 - TP14-057 - 0 - 1.4 m



PHOTO 5 - TP14-061 - 0 - 1.3 m



PHOTO 6 - TP14-061 - 0 - 1.3 m



PHOTO 7 - TP14-062 - 0 - 3.7 m



PHOTO 8 - TP14-062 - 0 - 3.7 m



PHOTO 9 - TP14-067 - 0 - 4.3 m



PHOTO 10 TP14-067 - 0 - 4.3 m



PHOTO 11 TP14-071 - 0 - 4.9 m



PHOTO 12 TP14-071 - 0 - 4.9 m



PHOTO 13 TP14-074 - 0 - 4.8 m



PHOTO 14 TP14-074 - 0 - 4.8 m



PHOTO 15 TP14-075 - 0 - 4.2 m



PHOTO 16 TP14-075 - Spoil Pile



PHOTO 17 TP14-076 - 0 - 5.0 m



PHOTO 18 TP14-076 - 0 - 5.0 m



PHOTO 19 TP14-086 - 0 - 0.6 m



PHOTO 20 TP14-086 - 0 - 0.6 m



PHOTO 21 TP14-087 - 0 - 3.7 m



PHOTO 22 TP14-087 - Spoil Pile



PHOTO 23 TP14-128 - 0 - 2.69 m



PHOTO 24 TP14-128 - 0 - 2.69 m



PHOTO 25 TP14-130 - 0 - 0.69 m



PHOTO 26 TP14-130 - Looking South



PHOTO 27 TP14-175 - 0 - 5.2 m



PHOTO 28 TP14-175 - 0 - 5.2 m



PHOTO 29 TP14-177 - 0 - 4.9 m



PHOTO 30 TP14-177 - 0 - 4.9 m



PHOTO 31 TP14-180 - 0 - 4.7 m



PHOTO 32 TP14-180 - 0 - 4.7 m



PHOTO 33 TP14-183 - 0 - 4.8 m



PHOTO 34 TP14-183 - 0 - 4.8 m



PHOTO 35 TP14-184 - 0 - 4.7 m



PHOTO 36 TP14-184 - 0 - 4.7 m



PHOTO 37 TP14-186 - 0 - 4.6 m



PHOTO 38 TP14-186 - Material at 4.6 m



PHOTO 39 TP14-188 - 0 - 4.4 m



PHOTO 40 TP14-188 - 0 - 4.4 m



PHOTO 41 TP14-189 - 0 - 2.7 m



PHOTO 42 TP14-189 - 0 - 2.7 m



PHOTO 43 TP14-190 - 0 - 4.9 m



PHOTO 44 TP14-190 - 0 - 4.9 m



PHOTO 45 TP14-191 - 0 - 5.4 m



PHOTO 46 TP14-191 - 0 - 5.4 m



PHOTO 47 TP14-193 - 0 - 3.1 m



PHOTO 48 TP14-193 - 0 - 3.1 m



PHOTO 49 TP14-195 - 0 - 2.3 m



PHOTO 50 TP14-195 - 0 - 2.3 m



PHOTO 51 TP14-196 - 0 - 4.6 m



PHOTO 52 TP14-196 - Spoil Pile



PHOTO 53 TP14-200 - 0 - 4.6 m



PHOTO 54 TP14-200 - Spoil Pile



PHOTO 55 TP14-210 - 0 - 0.6 m



PHOTO 56 TP14-210 - Topsoil



PHOTO 57 TP14-212 - 0 - 3.6 m



PHOTO 58 TP14-212 - 0 - 3.6 m



PHOTO 59 TP14-213 - 0 - 2.5 m



PHOTO 60 TP14-213 - 0 - 2.5 m



PHOTO 61 TP14-214 - 0.0 - 1.4 m



PHOTO 62 TP14-214 - Spoil Pile



PHOTO 63 TP14-218 - 0 - 0.25 m



PHOTO 64 TP14-218 - 0 - 0.25 m



PHOTO 65 TP14-224 - Spoil Pile



PHOTO 66 TP14-224 - 0 - 3.7 m



PHOTO 67 TP14-226 - 0 - 4.3 m



PHOTO 68 TP14-226 - 0 - 4.3 m



PHOTO 69 TP14-228 - Spoil Pile



PHOTO 70 TP14-228 - 0 - 4.3 m



PHOTO 71 TP14-230 - Spoil Pile



PHOTO 72 TP14-230 - 0 - 2.2 m



PHOTO 73 TP14-232 - 0 - 4.2 m



PHOTO 74 TP14-232 - 0 - 4.2 m



PHOTO 75 TP14-234 - Spoil Pile



PHOTO 76 TP14-234 - 0 - 4.4 m



PHOTO 77 TP14-236 - Spoil Pile



PHOTO 78 TP14-236 - 0 - 3.8 m



PHOTO 79 TP14-238 - Spoil Pile



PHOTO 80 TP14-238 - 0 - 4.3 m



PHOTO 81 TP14-240 - Spoil Pile



PHOTO 82 TP14-240 - 0 - 3.2 m



PHOTO 83 TP14-241 - 0 - 4.9 m



PHOTO 84 TP14-241 - 0 - 4.9 m



PHOTO 85 TP14-244 - Spoil Pile



PHOTO 86 TP14-244 - 0 - 3.9 m



PHOTO 87 TP14-245 - 0 - 4.4 m



PHOTO 88 TP14-245 - Spoil Pile



PHOTO 89 TP14-247 - 0 - 4 m



PHOTO 90 TP14-247 - 0 - 4 m



PHOTO 91 TP14-252 - Spoil Pile



PHOTO 92 TP14-252 - 0 - 3.8 m



PHOTO 93 TP14-262 - Spoil Pile



PHOTO 94 TP14-262 - 0 - 4 m



PHOTO 95 TP14-264 - 0 - 1.3m



PHOTO 96 TP14-264 - 0 - 1.3 m

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PHOTO 97 TP14-278 - 0 - 3.5 m



PHOTO 98 TP14-278 - 0 - 3.5 m



PHOTO 99 TP14-279 - 0 - 4 m



PHOTO 100 TP14-279 - 0 - 4 m



PHOTO 101 TP14-280 - Spoil Pile



PHOTO 102 TP14-280 - 0 - 2.8 m



PHOTO 103 TP14-281 - Spoil Pile



PHOTO 104 TP14-281 - 0 - 4.2 m



PHOTO 105 TP14-282 - Spoil Pile



PHOTO 106 TP14-282 - 0 - 4.6 m



PHOTO 107 TP14-283 - Spoil Pile

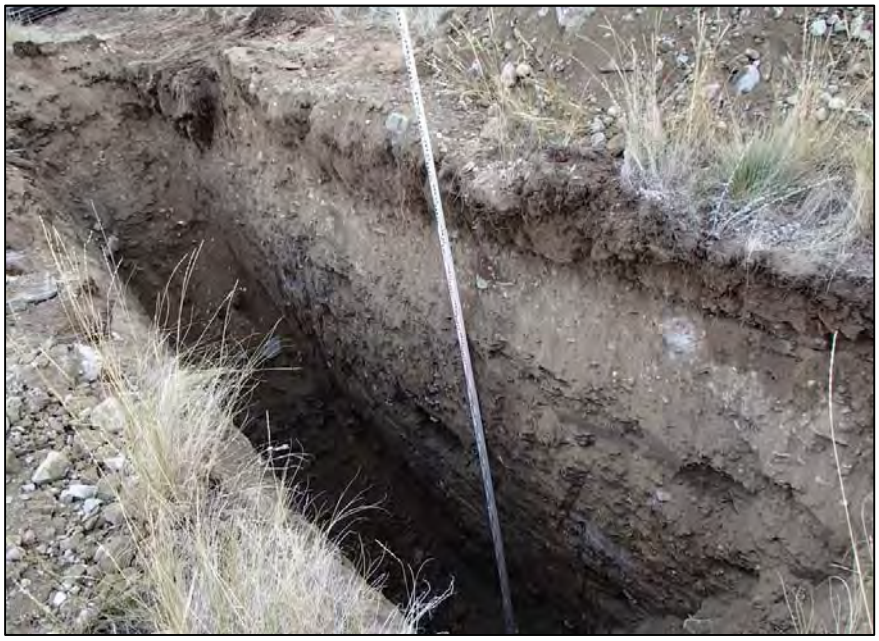


PHOTO 108 TP14-283 - 0 - 4.4 m



PHOTO 109 TP14-294 - 0 - 1.9 m

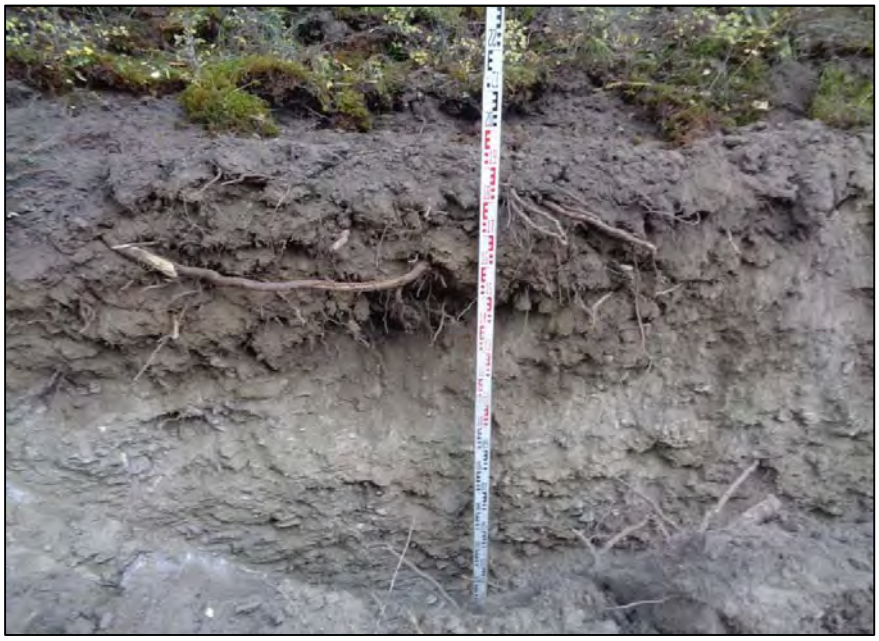


PHOTO 110 TP14-294 - 0 - 1.9 m



PHOTO 111 TP14-295 - 0 - 1.7 m



PHOTO 112 TP14-295 - Spoil Pile



PHOTO 113 TP14-296 - 0 - 4.1 m



PHOTO 114 TP14-296 - Spoil Pile



PHOTO 115 TP14-297 - 0 - 1.4 m



PHOTO 116 TP14-297 - 0 - 1.4 m



PHOTO 117 TP14-299 - 0 - 0.2 m



PHOTO 118 TP14-299 - 0 - 0.2 m

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PHOTO 119 TP14-300 - 0 - 2 m



PHOTO 120 TP14-300 - 0 - 2 m



PHOTO 121 TP14-301 - 0 - 2 m



PHOTO 122 TP14-301 - 0 - 3.3 m



PHOTO 123 TP14-306 - 0 - 2.6 m



PHOTO 124 TP14-306 - 0 - 2.6 m



PHOTO 125 TP14-307 - 0 - 0.6 m



PHOTO 126 TP14-307 - 0 - 0.6 m



PHOTO 127 TP14-308 - 0 - 1.4 m



PHOTO 128 TP14-308 - 0 - 3.2 m



PHOTO 129 TP14-309 - 0 - 3.1 m



PHOTO 130 TP14-309 - Spoil Pile



PHOTO 131 TP14-319 - 0 - 3.7 m



PHOTO 132 TP14-319 - 0 - 3.7 m



PHOTO 133 TP14-320 - 0 - 1.4 m



PHOTO 134 TP14-320 - 0 - 1.4 m



PHOTO 135 TP14-321 - 0 - 4.4 m



PHOTO 136 TP14-321 - Spoil Pile



PHOTO 137 TP14-322 - 0 - 3.6 m



PHOTO 138 TP14-322 - 0 - 3.6 m



PHOTO 139 TP14-329 - 0 - 4.3 m



PHOTO 140 TP14-329 - Spoil Pile



PHOTO 141 TP14-330 - 0 - 3 m



PHOTO 142 TP14-330 - Spoil Pile



PHOTO 143 TP14-332 - 0 - 3.3 m



PHOTO 144 TP14-332 - Spoil Pile



PHOTO 145 TP14-333 - 0 - 5 m



PHOTO 146 TP14-333 - 0 - 5 m



PHOTO 147 TP14-334 - 0 - 4.4 m



PHOTO 148 TP14-334 - 0 - 4.4 m



PHOTO 149 TP14-337 - 0 - 2.9 m



PHOTO 150 TP14-337 - 0 - 2.9 m



PHOTO 151 TP14-338 - 0 - 3.5 m



PHOTO 152 TP14-338 - Spoil Pile



PHOTO 153 TP14-339 - 0 - 3.6 m



PHOTO 154 TP14-339 - 0 - 3.6 m



PHOTO 155 TP14-343 - 0 - 4.3 m



PHOTO 156 TP14-343 - Spoil Pile



PHOTO 157 TP14-344 - 0 - 3.9 m



PHOTO 158 TP14-344 - Spoil Pile



PHOTO 159 TP14-345 - 0 - 4.3 m



PHOTO 160 TP14-345 - 0 - 4.3 m



PHOTO 161 TP14-346 - 0 - 4.7 m



PHOTO 162 TP14-346 - 0 - 4.7 m



PHOTO 163 TP14-347 - 0 - 3.2 m



PHOTO 164 TP14-347 - 0 - 3.2 m



PHOTO 165 TP14-348 - 0 - 2.5 m



PHOTO 166 TP14-348 - 0 - 2.5 m



PHOTO 167 TP14-349 - 0 - 4.3 m



PHOTO 168 TP14-349 - 0 - 4.3 m



PHOTO 169 TP14-360 - 0 - 4.7 m



PHOTO 170 TP14-360 - 0 - 4.7 m



PHOTO 171 TP14-361 - 0 - 5.1 m



PHOTO 172 TP14-361 - 0 - 5.1 m



PHOTO 173 TP14-363 - 0 - 5 m



PHOTO 174 TP14-363 - 0 - 5 m



PHOTO 175 TP14-364 - 0 - 3 m



PHOTO 176 TP14-364 - 0 - 3 m



PHOTO 177 TP14-365 - 0 - 2.0 m



PHOTO 178 TP14-365 - 0 - 2.0 m



PHOTO 179 TP14-369 - 0 - 4.8 m



PHOTO 180 TP14-369 - Spoil Pile



PHOTO 181 TP14-376 - 0 - 4.4 m



PHOTO 182 TP14-376 - Spoil Pile



PHOTO 183 TP14-377 - 0 - 4.1 m



PHOTO 184 TP14-377 - Spoil Pile



PHOTO 185 TP14-378 - 0 - 1.6 m



PHOTO 186 TP14-378 - 0 - 1.6 m



PHOTO 187 TP14-379 - 0 - 3.8 m



PHOTO 188 TP14-379 - Spoil Pile

APPENDIX B3

TEST PIT LOGS BY OTHERS

(Pages B3-1 to B3-19)

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-29

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 685608E, 5609562N
Ground Elevation: 905
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 27 Oct 10
Finish Date : 27 Oct 10
Final Depth of Pit (m) : 5.1
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Rootmat, grass, dark brown topsoil
					SAND (SP) Fine grained, some gravel, some cobbles, trace silt, compact, maximum particle size 200 mm, subrounded to subangular, light brown, dry, homogeneous, weak cementation. [TILL]
1					
2					
					2.5 m - moderate cementation, gravelly, dense.
3					
4					
5					END OF TEST PIT AT 5.1 m (maximum reach of excavator)
					Notes: 1. Scraping on highly weathered bedrock, orange. 2. No water observed. 3. No samples collected. 4. Elevation was extracted from DEM
6					
7					
8					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-31

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 685682E, 5610240N
Ground Elevation: 945
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 27 Oct 10
Finish Date : 27 Oct 10
Final Depth of Pit (m) : 5.1
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Grass, rootmat, dark brown, silty topsoil.
1	G	M1			SAND (SW) Gravelly, some silt, trace cobbles, trace boulders, well graded, dense, maximum particle size 250 mm, subangular to subrounded, light brown, dry, moderate cementation. [TILL]
2					1.5 m - medium brown, difficult digging
3					
4					
5					END OF TEST PIT AT 5.1 m (maximum reach of excavator)
6					Notes: 1. No water observed. 2. Elevation was extracted from DEM
7					
8					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-32

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 685651E, 5610541N
Ground Elevation: 964
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 27 Oct 10
Finish Date : 27 Oct 10
Final Depth of Pit (m) : 6.2
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Grass, rootmat, topsoil, dark brown, silty.
					SILT (ML) Sandy (fine), trace gravel, trace cobbles, low plasticity, loose to compact, maximum particle size 100 mm, light brown, dry, homogeneous, weak to moderate cementation.
2					SAND (SM) Fine grained, silty, gravelly, some cobbles, trace boulders, well graded, compact to dense, maximum particle size 300 mm, subangular to subrounded, medium brown, damp to moist, homogeneous, weak to moderate comentation. [TILL]
4	G	M1			
6					6.0 to 6.2 m - grey brown, trace clay with silt.
					END OF TEST PIT AT 6.2 m (maximum reach of excavator). Notes: 1. No water observed. 2. Elevation was extracted from DEM
8					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-35

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 686018E, 5610260N
Ground Elevation: 944
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 29 Oct 10
Finish Date : 29 Oct 10
Final Depth of Pit (m) : 5.1
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Grass, rootmat, dark brown, topsoil.
	G	M1			SILT (ML) Clayey, some sand, low plasticity, loose to compact, light brown, dry, homogeneous, weak cementation. 0.6 m - Grain Size Analysis: 11% Sand, 62% Silt, 27% Clay
1					
2					SILT (ML) Some clay, some sand, some gravel, some cobbles, high plasticity, very stiff, medium brown, moist, homogeneous. [TILL]
3					
4					
5	G	M2			END OF TEST PIT AT 5.1 m (maximum reach of excavator) Notes: 1. No water observed. 2. Elevation was extracted from DEM
6					
7					
8					

Su - kPa: 40, 80, 120, 160

VANE PEAK ◆ ■ ▲ UC/2
REMOLD ◇ □ △ Pocket Pen /2

★ % Fines

Moisture Content
W_P% × — — — ○ — — — × W_L%
20, 40, 60, 80

○ ★ ○

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-37

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 686153E, 5609446N
Ground Elevation: 901
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 29 Oct 10
Finish Date : 29 Oct 10
Final Depth of Pit (m) : 5.2
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Grass, rootmat, dark brown, silty topsoil.
					SAND (SW) Fine grained, some gravel, some cobbles, some boulders, trace to some silt, well graded, compact, maximum particle size 300 mm, subangular to subrounded, light brown, dry, homogeneous, weak cementation. [TILL]
4					4.0 m - damp
5	G	M1			
					END OF TEST PIT AT 5.2 m (maximum reach of excavator) Notes: 1. No water observed. 2. Elevation was extracted from DEM

Su - kPa: 40, 80, 120, 160

VANE PEAK ◆ ■ ▲ UC/2
REMOLD ◇ □ △ Pocket Pen /2

★ % Fines

Moisture Content: W_P% × — — — ○ — — — × W_L%; W%: 20, 40, 60, 80

○

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-38

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 686717E, 5609280N
Ground Elevation: 888
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 29 Oct 10
Finish Date : 29 Oct 10
Final Depth of Pit (m) : 3.5
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0	G	M1			GRAVEL (GW) and SAND Some cobbles, loose, maximum particle size 100 mm, rounded to subrounded, brown, moist, layered, no cementation. [FILL] 0.5 m - Grain Size Analysis: 53% Gravel, 44% Sand, 3% Fines
2					SAND (SW) Trace to some gravel, trace cobbles, well graded, loose, medium brown, moist, homogeneous. [FILL]
3	G	M2			
3.5					END OF TEST PIT AT 3.5 m (test pit sloughing) Notes: 1. No water observed. 2. Elevation was extracted from DEM

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines

Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-39

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 686713E, 5609617N
Ground Elevation: 921
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 29 Oct 10
Finish Date : 29 Oct 10
Final Depth of Pit (m) : 3.3
Logged by : MM
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Grass, rootmat, dark brown, silty topsoil.
					SAND (SW) and GRAVEL Some cobbles, trace silt, well graded, compact, maximum particle size 150 mm, subrounded to subangular, light brown, dry, homogeneous, weak cementation. [TILL]
3					END OF TEST PIT AT 3.3 m (refusal on bedrock?) Notes: 1. No water observed. 2. No samples collected. 3. Elevation was extracted from DEM

Su - kPa: 40, 80, 120, 160

VANE FIELD LAB — UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2

★ % Fines

Moisture Content
W_P% × — — — — ○ — — — — × W_L%
20, 40, 60, 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-61

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 684261E, 5610421N
Ground Elevation: 979
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 05 Nov 10
Finish Date : 05 Nov 10
Final Depth of Pit (m) : 6.0
Logged by : CJB
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Topsoil, trace amounts of topsoil and vegetation on surface of stockpile. Silty, sandy, roots, and rootlets. [TOP SOIL]
1	G	M1			GRAVEL (GW) Some silt, some sand, some cobbles, some boulders, well graded, very dense, maximum particle size 1100 mm, angular to subangular, brown, dry, trace organics. Very difficult digging due to density and oversize material. [FILL] 0.7 m - Grain Size Analysis: 75% Gravel, 12% Sand, 13% Fines.
2					
3					
4					Gravel (GW) Silty, some sand, cobbley, some boulders, well graded, very dense, maximum particle size 1100 mm, angular, brown, dry. [FILL]
5					
6	G	M2			END OF TEST PIT AT 6.0 m (maximum reach of excavator). Notes: 1. No water observed. 2. Elevation was extracted from DEM
7					
8					

Su - kPa
40 80 120 160

VANE	FIELD	LAB		
PEAK	◆	■	▲	UC/2
REMOLD	◇	□	△	Pocket Pen /2

★ % Fines

Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-62

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 684202E, 5610399N
Ground Elevation: 977
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 05 Nov 10
Finish Date : 05 Nov 10
Final Depth of Pit (m) : 4.5
Logged by : CJB
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Topsoil, trace amounts of topsoil and vegetation on surface of stockpile.
	G	M1			SILT (ML) and GRAVEL Some sand, some cobbles, some boulders, loose to compact, maximum particle size 500 mm, subrounded, brown, dry, trace organics. [FILL]
3					GRAVEL (GW) Cobbley, silty, some boulders, very dense, maximum particle size 500 mm, angular, brown, dry [FILL]
4	G	M2			
					END OF TEST PIT AT 4.5 m
5					Notes: 1. No water observed. 2. Total Sulphate Ion Content: M1 = 0.01%, M2 = 0.47% 3. Elevation was extracted from DEM
8					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-63

Location :

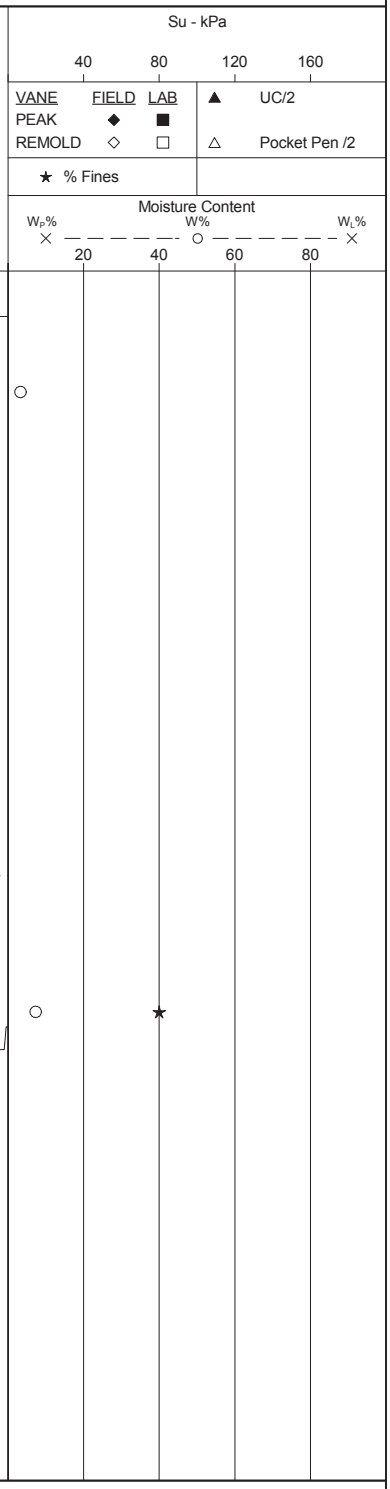
Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 684119E, 5610406N
Ground Elevation: 968
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 06 Nov 10
Finish Date : 06 Nov 10
Final Depth of Pit (m) : 5.0
Logged by : CJB
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Topsoil and organics, silty, some gravel, rootlets, brown, no odor, dry.
	G	M1			GRAVEL (GP) and COBBLES Some silt, some sand, trace boulders, well graded, loose, maximum particle size 300 mm, angular, brown-grey, dry, trace rootlets. [FILL]
4					SILT (ML) Gravelly, some sand, some cobbles, trace boulders, dense to very dense, maximum particle size 500 mm, brown, no odor, dry to damp, no structure, no cementation. [FILL]
5	G	M2			5.0 m - Grain Size Analysis: 31% Gravel, 27% Sand, 42% Fines. END OF TEST PIT AT 5.0 m (very difficult digging) Notes: 1. No water observed. 2. Test pit located at edge of second bench of stockpile. 3. Elevation was extracted from DEM



AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 7/28/11

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: Ajax Project Feasibility Study

TEST PIT # TP-BGC10-67

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m): 684241E, 5610490N
Ground Elevation: 970
Datum : NAD83

Excavator : Cat 320DL
Operator : Roland

Start Date : 06 Nov 10
Finish Date : 06 Nov 10
Final Depth of Pit (m) : 4.5
Logged by : CJB
Reviewed by : PQ

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					Topsoil, silty, sandy, dark brown, dry, rootlets/organics.
					SAND (SM) and GRAVEL Fine grained, silty, some cobbles, trace boulders, well graded, subrounded to subangular, brown, dry, rootlets. [FILL]
1	G	M1			1.0 m - Grain Size Analysis: 39% Gravel, 31% Sand, 30% Fines.
					BOULDERS and COBBLES Gravelly, trace silt, poorly graded (mostly coarse grained), angular, brownish grey, dry, rootlets. [ROCKFILL - SUGARLOAF DIORITE]
4	G	M2			
					END OF TEST PIT AT 4.5 m Notes: 1. No water observed. 2. Test pit located on slope of bottom bench of stockpile. 3. Test pit sloughing 4. Elevation was extracted from DEM
8					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-17

Location : North Wall Dam

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 685,089E, 5,610,634N
Ground Elevation (m): 950
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 10 May 13
Finish Date : 10 May 13
Final Depth of Pit (m) : 1.83
Logged by : JW
Reviewed by : TWC

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Sandy, fine, some silt, dark brown, organic odour, dry, trace rootlets.
1		G1 G2			SILT (ML) Clayey, sandy, trace gravel, trace cobbles, well graded, no to low plasticity, firm, medium brown, homogeneous, weak cementation, slow dilatancy, gravel is fine to coarse, maximum particle size is 180 mm, subrounded to subangular, sand is fine to coarse. [TILL]
2		G3			At 0.64 m - sand seam, approximately 70 mm thick, coarse, poorly graded, loose, angular, grey to green, dry, no cementation. From 0.75 to 0.85 m - Hydrometer Analysis: 6% gravel, 21% sand, 73% fines.
3					SILT (ML) Sandy, some gravel, trace cobbles, well graded, low plasticity, stiff, medium brown, no odour, dry, mottled texture (occasional), moderate to strong cementation, low toughness, slow dilatancy, sand is fine to medium, gravel is fine to coarse, maximum particle size is 320 mm, subrounded to subangular. [TILL]
4					BEDROCK Light grey, coarse grained, medium strong to strong (R3-R4), fresh and unweathered to slightly weathered (W1-W2), rips to 150 mm angular fragments. [IRON MASK HYBRID]
5					END OF HOLE AT 1.83 m Notes: 1. Refusal at 1.83 m on bedrock. 2. No groundwater seepage observed.
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines

Moisture Content
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-18

Location : North Wall Dam

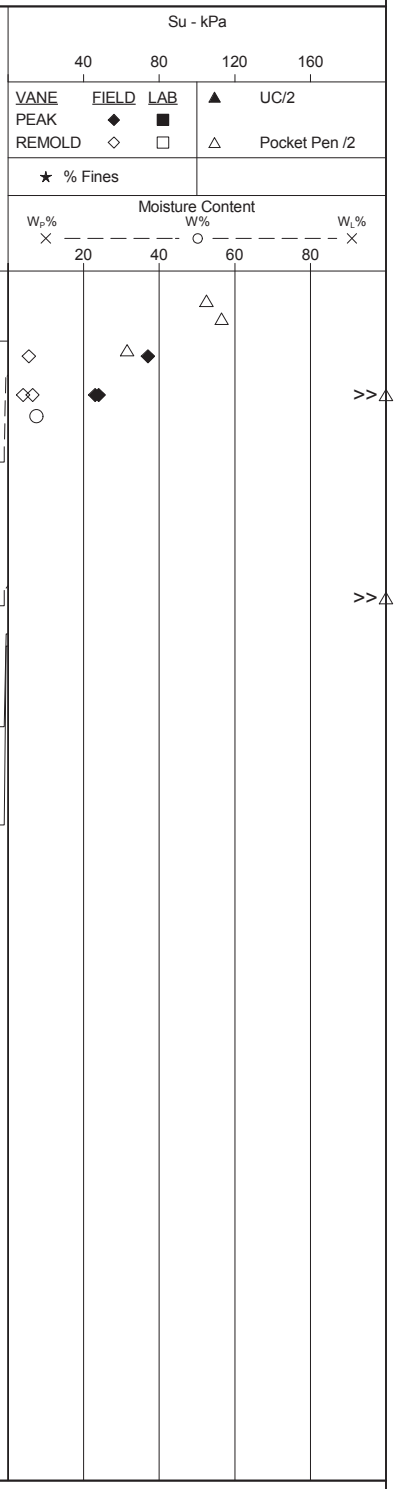
Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 685,272E, 5,610,628N
Ground Elevation (m): 946
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 10 May 13
Finish Date : 10 May 13
Final Depth of Pit (m) : 3.10
Logged by : JW
Reviewed by : TWC

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Sandy, fine, some silt, dark brown, no odour, moist, trace rootlets.
1		G1			SAND (SM) Fine to medium, silty, trace gravel, gap graded, compact, maximum particle size is 160 mm, moist, weak to moderate cementation, silt has low plasticity, no dilatancy, gravel is medium to coarse. [TILL]
		G2			
2					SAND (SM) Fine to medium, gravelly, silty, trace clay, trace cobbles, well graded, dense, maximum particle size is 240 mm, elongated, subrounded, moist, weak to moderate cementation. [TILL] From 1.20 to 1.30 m - Hydrometer Analysis: 27% gravel, 42% sand, 30% fines.
3		G3			SILT (ML) Sandy, some gravel, trace cobbles, low to medium plasticity, stiff, brown, homogeneous, moderate cementation, slow dilatancy, sand is fine, maximum particle size is 180 mm. [TILL]
4					BEDROCK Medium to coarse grained, medium strong to strong (R3-R4), slightly to moderately weathered (W2-W3), rips to 140 mm fragments. [IRON MASK HYBRID]
5					END OF HOLE AT 3.10 m Notes: 1. Refusal at 3.10 m on bedrock. 2. No groundwater seepage observed.
6					
7					
8					
9					
10					



AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-20

Location : EWRSA

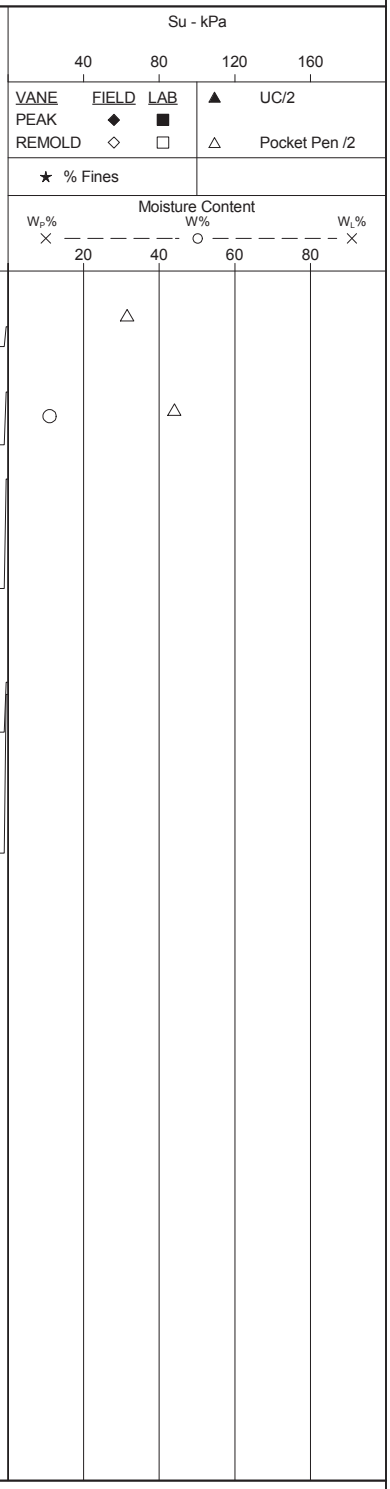
Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 686,163E, 5,610,164N
Ground Elevation (m): 946
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 3.40
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Sandy, loose, dark brown, dry to moist, trace rootlets. Circular clumps of white "talc-like" clay sized material.
1		G1			SAND (SM) Fine, silty, trace gravel, poorly graded, compact, maximum particle size is 110 mm, dry to moist, homogeneous, weak cementation. [TILL]
		G2			
2		G3			SAND (SC-SM) Silty, clayey, gravelly, trace cobbles, trace boulders, compact, brown, moist, homogeneous, moderate cementation. [TILL] From 1.20 to 1.30 m - Particle Size Analysis: 22% gravel, 37% sand, 41% fines.
3					GRAVEL and SAND (GP) Gravel is fine to coarse, sand is medium to coarse, gap graded, compact, maximum particle size is 320 mm, elongated, subrounded to subangular, moist, homogeneous. Gravel consists of slightly weathered fragments of bedrock. [WEATHERED BEDROCK]
4					BEDROCK Dark grey, blocky, weak to medium strong (R2-R3), fresh and unweathered to slightly weathered (W1-W2), iron oxidation present, rips to 150 mm angular fragments. [IRON MASK HYBRID]
5					END OF HOLE AT 3.40 m
6					Notes: 1. Refusal at 3.40 m on bedrock. 2. Groundwater seepage observed at 3.25 m. 3. Walls of test pit caved while photos were being taken.
7					
8					
9					
10					



BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-21

Location : EWRSA

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 685,959E, 5,610,049N
Ground Elevation (m): 974
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 2.80
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Some sand, some silt, dark brown, no odour, trace rootlets.
1		G1			GRAVEL (GC) Silty, sandy, gravelly, trace cobbles, compact to dense, brown, dry to moist, homogeneous, moderate cementation. [TILL] From 1.00 to 1.10 m - Particle Size Analysis: 46% gravel, 25% sand, 29% fines. Below 1.56 m - increase in gravel content to some, subangular.
2					
3					END OF HOLE AT 2.80 m Notes: 1. Refusal at 2.80 m on dense till. 2. No groundwater seepage observed.
4					
5					
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines

Moisture Content
W_P% W% W_L%
20 40 60 80

○

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-22

Location : EWRSA

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 685,933E, 5,609,669N
Ground Elevation (m): 940
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 3.58
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Some sand, some silt, dark brown, no odour, dry, trace rootlets. Layer of cobbles at contact with lower layer.
1		G1			SAND (SP) Fine to coarse, some gravel, trace silt, trace cobbles, poorly graded, maximum particle size is 220 mm, angular, dry to moist, no cementation, gravel is fine to coarse, subangular. [TILL]
2					SAND (SM) Fine to coarse, gravelly, silty, trace cobbles, trace boulders, well graded, dense, maximum particle size is 480 mm, subangular, moist, homogeneous, no to weak cementation, silty matrix has low plasticity, gravel is fine to coarse. [TILL]
3		G2			
4					END OF HOLE AT 3.85 m Notes: 1. Refusal at 3.85 m on dense till. 2. No groundwater seepage observed.
5					
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

△ (40)

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-23

Location : EWRSA

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 686,330E, 5,609,800N
Ground Elevation (m): 956
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 2.35
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Silty, loose, dark brown, no odour, dry, trace rootlets.
1		G1			SAND and SILT (SM) Sand is fine, some gravel, trace clay, trace cobbles, well graded, medium plasticity, firm, maximum particle size is 180 mm, brown, dry to moist, homogeneous, weak cementation, rapid dilatancy, gravel is fine to coarse, elongated, subangular. [TILL]
2					
					END OF HOLE AT 2.35 m
3					Notes: 1. Refusal at 2.35 m on boulders. 2. No groundwater seepage observed.
4					
5					
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-24

Location : EWRSA

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 686,491E, 5,609,699N
Ground Elevation (m): 928
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 1.90
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Some silt, trace gravel, trace boulders, loose to compact, dark brown, organic odour, dry.
1		G1			SAND and SILT (SM) Fine to coarse, gravelly, trace cobbles, trace boulders, well graded, dense, maximum particle size is 260 mm, subangular, dry, homogeneous, weak to moderate cementation, silty matrix has no to low plasticity, gravel is medium to coarse, subrounded. [TILL] From 0.90 to 1.00 m - Particle Size Analysis: 29% gravel, 33% sand, 38% fines.
2					END OF HOLE AT 1.90 m Notes: 1. Refusal at 1.90 m on dense till and cobbles. 2. No groundwater seepage observed.
3					
4					
5					
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

○ △

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

Project: AJAX MEMA Support

TEST PIT # TP-BGC13-25

Location : EWRSA

Project No. : 1125-003

Survey Method : Handheld GPS
Co-ordinates (m): : 686,852E, 5,609,521N
Ground Elevation (m): 904
Datum : NAD83

Excavator : Hitachi, 200 LC
Operator : Grant, KIB

Start Date : 11 May 13
Finish Date : 11 May 13
Final Depth of Pit (m) : 2.11
Logged by : JW
Reviewed by : BMM

Depth (m)	Sample Type	Sample No.	Weathering Grade	Symbol	Lithologic Description
0					ORGANICS Silty, loose, dark brown, no odour, dry, trace rootlets.
1		G1			SILT (ML) Sandy, some gravel, trace cobbles, trace boulders, nonplastic, hard, dry, slight fissured texture (breaks into 15 mm thick layers), moderate to strong cementation, gravel is fine to coarse, rounded, subangular. [TILL] From 1.30 to 1.40 m - Particle Size Analysis: 11% gravel, 32% sand, 57% fines.
2					END OF HOLE AT 2.11 m Notes: 1. Refusal at 2.11 m on dense till. 2. No groundwater seepage observed.
3					
4					
5					
6					
7					
8					
9					
10					

Su - kPa
40 80 120 160
VANE FIELD LAB ▲ UC/2
PEAK ◆ ■
REMOLD ◇ □ △ Pocket Pen /2
★ % Fines
Moisture Content
W_P% W% W_L%
20 40 60 80

AJAX (TESTPIT) AJAX_SOIL.GDL BGC.GDT 9/26/13

BGC ENGINEERING INC.
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Client: KGHM International Ltd.

APPENDIX C

DRILL HOLE DETAILS

Appendix C1	Geotechnical Drill Hole Logs
Appendix C2	Geotechnical RMR/RQD Sheets
Appendix C3	SPT Photographs
Appendix C4	Core Photographs
Appendix C5	Drill hole Logs by Others

APPENDIX C1

GEOTECHNICAL DRILL HOLE LOGS

(Pages C1-1 to C1-54)

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - General Mine Site Infrastructure

Coordinates: 685,738 E , 5,609,107 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 8.81, HQ3: 8.81 - 109.42

Drillhole No.: DH14-004

Drill Type: Fraste DR238

Total Depth: 109.42 m

Elevation: 892.5 m

Azimuth , Inclination: 0 , -90

Page: 1 of 5

Date Started: 25 Jul 14

Date Completed: 28 Jul 14

Logged by: LS/JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
0	892.5		**SILTY, GRAVELLY SAND** (0 to 8) Fine to coarse grained sand; subrounded to subangular gravel clasts (<4 cm diameter); trace clay; well graded, low plasticity, brown, massive, moist.		SPT #1	100		12/22/20	42			
					SPT #2	100		12/16/32	48			
5	890.0				SPT #3	100		11/20/25	45			
					SPT #4	100		11/18/22	40			
	885.0				SPT #5	100		13/24/22	46			
			NO RECOVERY (8 to 8.8) Bedrock contact at 8.0 mbgs.		SPT #6	0		50+	R			SPT refusal on bedrock
10			**SUGARLOAF DIORITE** (8.8 to 13.8) Blue-grey, medium grained, xenolithic, moderately weathered, fractured, iron oxide staining on joint surfaces, 0.1% chalcopyrite.	94								
				100				R5				
	880.0				TRI#1							12.31 - 26.21 m - Lugeon Packer Test #1 - K = 2E-08 m/s
				100				R5				
15			**MAFIC VOLCANIC** (13.8 to 20.1) Blue-grey, fine grained, moderately weathered, fractured, iron oxide staining on joint surfaces, 2% irregular whispy calcite stringers 0.1% disseminated pyrite and 0.5% pyrite stringers.	100				R4				
				100				R5				
	875.0			100				R5				
				99				R5				
20			**SUGARLOAF DIORITE** (20.1 to 64.3) Blue to greenish-grey, medium grained, xenolithic, slightly weathered, some fracturing, calcite, epidote and chlorite, veining of magnetite and pyrite locally up to 80% over a few cms.	100				R5				
	870.0			90				R5				
				100				R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - General Mine Site Infrastructure

Coordinates: 685,738 E , 5,609,107 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 8.81, HQ3: 8.81 - 109.42

Drillhole No.: DH14-004

Drill Type: Fraste DR238

Total Depth: 109.42 m

Elevation: 892.5 m

Azimuth , Inclination: 0 , -90

Date Started: 25 Jul 14

Date Completed: 28 Jul 14

Logged by: LS/JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
30	865.0		**SUGARLOAF DIORITE** (20.1 to 64.3) Blue to greenish-grey, medium grained, xenolithic, slightly weathered, some fracturing, calcite, epidote and chlorite, veining of magnetite and pyrite locally up to 80% over a few cms.	100				R5				
				100				R5				26.03 - 41.39 m - Lugeon Packer Test #2 - K = 1E-08 m/s
				100	UCS#2			R5				
	860.0			99				R5				
				100				R5				
				95				R5				
35				100				R5				
				97				R5				
	855.0			99				R5				
				98				R5				
40				99				R5				
				99				R5				41.26 - 56.69 m - Lugeon Packer Test #3 - K = 4E-07 m/s
	850.0			99				R5				
				95				R5				
45				100	UCS#1			R5				
	845.0			100				R5				
				100				R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - General Mine Site Infrastructure

Coordinates: 685,738 E , 5,609,107 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 8.81, HQ3: 8.81 - 109.42

Drillhole No.: DH14-004

Drill Type: Fraste DR238

Total Depth: 109.42 m

Elevation: 892.5 m

Azimuth , Inclination: 0 , -90

Page: 3 of 5

Date Started: 25 Jul 14

Date Completed: 28 Jul 14

Logged by: LS/JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
55	840.0		**SUGARLOAF DIORITE** (20.1 to 64.3) Blue to greenish-grey, medium grained, xenolithic, slightly weathered, some fracturing, calcite, epidote and chlorite, veining of magnetite and pyrite locally up to 80% over a few cms.	99				R5				
				100				R5				
				99				R5				
				100				R5				
	835.0			100				R5				56.50 - 91.70 m - Falling Head Packer Test #1 - K = 7E-08 m/s
60				100				R5				
				100				R5				
	830.0			100				R5				
				100				R5				
65			**PICRITE** (64.3 to 66.8) Blue-grey, Fine grained, aphanitic, slight to moderate weathering, whispy calcite veinlets and infill, trace magnetite veins and blebby pyrite locally, minor irregular serpentinite stringers, rare gypsum vein.	100				R5				
				100				R5				
	825.0		**FAULT ZONE** (66.8 to 72.4) Fractured and broken rubble zone within picrite unit.	100				R5				
70				74				R5				
				59				R4				
	820.0			81				R4				
				94				R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - General Mine Site Infrastructure

Coordinates: 685,738 E , 5,609,107 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 8.81, HQ3: 8.81 - 109.42

Drillhole No.: DH14-004

Drill Type: Fraste DR238

Total Depth: 109.42 m

Elevation: 892.5 m

Azimuth , Inclination: 0 , -90

Page: 4 of 5

Date Started: 25 Jul 14

Date Completed: 28 Jul 14

Logged by: LS/JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			PICRITE (72.4 to 81.2) Blue-grey, Fine grained, aphanitic, slight to moderate weathering, whispy calcite veinlets and infill, trace magnetite veins and blebby pyrite locally, minor irregular serpentinite stringers, rare gypsum vein.	97				R5				
	815.0			100	UCS#3			R5				
				100				R5				
80				93				R5				
			FAULT ZONE (81.2 to 82.6) Faulted contact with picrite unit.	93				R5				
	810.0		**PICRITE** (82.6 to 84.9) Dark greenish grey, fine to coarse grained, brecciated, matrix supported, moderately weathered, calcite veins and calcite and chlorite on joints, minor irregular serpentinite stringers, dissolution locally.	100				R4				
85				100				R5				
			PICRITE (84.9 to 88.3) Dark to light grey with some greenish zones, fine to medium grained, aphanitic to porphyritic, slightly to highly weathered, calcite, clay and chlorite on joints, local dissolution.	97				R4				
	805.0			100				R4				
			FAULT ZONE (88.3 to 96.8) Faulted contact with mafic tuff.	99				R2				
90				76				R2				
	800.0			100				R2				
				99				R2				
95				99				R4				
				100				R4				
	795.0		**PICRITE** (96.8 to 100.8) Dark to light grey, fine to coarse grained, brecciated, slight to moderate weathering, some irregular calcite stringers, minor irregular serpentinite stringers.	100				R5				
				97	UCS#4			R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - General Mine Site Infrastructure

Coordinates: 685,738 E , 5,609,107 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 8.81, HQ3: 8.81 - 109.42

Drillhole No.: DH14-004

Drill Type: Fraste DR238

Total Depth: 109.42 m

Elevation: 892.5 m

Azimuth , Inclination: 0 , -90

Page: 5 of 5

Date Started: 25 Jul 14

Date Completed: 28 Jul 14

Logged by: LS/JEF

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
105	790.0		**PICRITE** (100.8 to 109.4) Dark to light grey with some greenish zones, fine to medium grained, aphanitic to porphyritic, moderately weathered, calcite and chlorite on joints, minor irregular serpentinite stringers.	99				R5				
				100				R5				
				100				R4				
				99				R4				
	785.0			100				R4				
110				100				R4				
			End of Drillhole: 109.42 m Reached Target Depth									
	780.0											
115												
	775.0											
120												
	770.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-1

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - Conveyor Corridor

Coordinates: 685,595 E , 5,608,679 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 38.4 m, HQ3: 38.4 - 100.00 m

Drillhole No.: DH14-007

Drill Type: Fraste DR238

Total Depth: 99.50 m

Elevation: 945.5 m

Azimuth , Inclination: 0 , -90

Page: 1 of 4

Date Started: 29 Jul 14

Date Completed: 2 Aug 14

Logged by: LS/WBG/JAS/MEA

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
	945.0		**SILTY, GRAVELLY SAND** (0 to 6) Trace clay, some cobbles, trace boulders, fine to coarse grained, subrounded to subangular clasts up to 50cm, mostly range from 2 to 15cm, well graded, low plasticity, brown, compact to dense, massive, damp.		SPT #1	79		12/21/25	46		
					SPT #2	100		10/17/32	49		
					SPT #3	92		13/17/18	35		
5.0	940.0				SPT #4	100		30/19/17	36		
			SANDY SILT (6 to 22.4) Trace to some gravel, some clay, fine to coarse grained, subrounded to subangular clasts up to 5cm, gap graded, low to medium plasticity, brown, massive, dense, damp to moist.		SPT #5	100		7/34/19	53		
					SPT #6	100		12/50+	R		SPT refusal on coarse material
10.0	935.0				SPT #7	100		6/11/15	26		
					SPT #8	100		10/18/24	42		
					SPT #9	80		6/18/13	31		
15.0	930.0				SPT #10	62		12/15/15	30		
					SPT #11	69		6/6/10	16		
					SPT #12	70		8/15/17	32		
20.0	925.0				SPT #13	100		6/9/15	24		
					SPT #14	100		20/20/25	45		
			SILT (22.4 to 39.19) Some gravel, trace sand and clay, fine to medium grained, subrounded to subangular clasts, gap graded, low to medium plasticity, grey, massive, dense, moist		SPT #15	100		5/8/15	23		
					SPT #16	100		9/11/13	24		

GENERAL REMARKS:

Hole collapsed during installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-2

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - Conveyor Corridor

Coordinates: 685,595 E , 5,608,679 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 38.4 m, HQ3: 38.4 - 100.00 m

Drillhole No.: DH14-007

Drill Type: Fraste DR238

Total Depth: 99.50 m

Elevation: 945.5 m

Azimuth , Inclination: 0 , -90

Page: 2 of 4

Date Started: 29 Jul 14

Date Completed: 2 Aug 14

Logged by: LS/WBG/JAS/MEA

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
	920.0		**SILT** (22.4 to 39.19) Some gravel, trace sand and clay, fine to medium grained, subrounded to subangular clasts, gap graded, low to medium plasticity, grey, massive, dense, moist		SPT #17	51		9/16/17	33		
					SPT #18	100		5/11/13	24		
					SPT #19	100		7/12/14	26		
30.0	915.0				SPT #20	89		7/12/15	27		
					SPT #21	100		13/20/26	46		
					SPT #22	100		6/10/13	23		
35.0	910.0				SPT #23	100		6/13/36	49		SPT refusal on coarse material
					SPT #24	100		8/17/27	44		
					SPT #25	100		9/5/31	36		SPT refusal on bedrock
40.0	905.0		**SHEAR ZONE** (39.19 to 47.2) Greenish grey, fine to coarse grained, porphyritic, shear zone containing gouge from 39.19 - 47.2m, marks contact with lower unit.	48				R3			
				67				R2			
				99				R2			
				95				R2			
45.0	900.0			0				R2			
				79				R2			
			PICRITE (47.2 to 78.9) Greenish grey, fine to coarse grained, porphyritic, some irregular calcite veinlets, trace irregular stringers of epidote and chlorite, selective chlorite alteration and hematite fracture infill, trace feature filling pyrite and chalcopyrite locally	80				R3			
				86				R3			

GENERAL REMARKS:

Hole collapsed during installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-2

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Cicada Study - Conveyor Corridor
Coordinates: 685,595 E , 5,608,679 N
Coordinate System: UTM NAD83 Zone 10
Hole Size ODEX: 0 - 38.4 m, HQ3: 38.4 - 100.00 m

Drillhole No.: DH14-007
Drill Type: Fraste DR238
Total Depth: 99.50 m
Elevation: 945.5 m
Azimuth , Inclination: 0 , -90

Page: 3 of 4
Date Started: 29 Jul 14
Date Completed: 2 Aug 14
Logged by: LS/WBG/JAS/MEA
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
55.0	895.0		**PICRITE** (47.2 to 78.9) Greenish grey, fine to coarse grained, porphyritic, some irregular calcite veinlets, trace irregular stringers of epidote and chlorite, selective chlorite alteration and hematite fracture infill, trace feature filling pyrite and chalcopyrite locally.	81				R3			
				80				R3			51.79 - 66.96 m - Falling Head Test #1 - K = 3E-07 m/s
				73				R3			
60.0	890.0			100				R3			
				93	UCS#1			R3			
				97				R3			
	885.0			82				R4			
				100				R3			
65.0				100				R4			
	880.0			100				R3			
				80	TRI#1			R4			
				97				R4			66.69 - 81.84 m - Lugeon Packer Test #2 - K = <1E-08 m/s
70.0				95				R4			
	875.0			98				R4			
				87				R4			
				99				R4			

GENERAL REMARKS:
Hole collapsed during installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-2

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study - Conveyor Corridor

Coordinates: 685,595 E , 5,608,679 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 38.4 m, HQ3: 38.4 - 100.00 m

Drillhole No.: DH14-007

Drill Type: Fraste DR238

Total Depth: 99.50 m

Elevation: 945.5 m

Azimuth , Inclination: 0 , -90

Page: 4 of 4

Date Started: 29 Jul 14

Date Completed: 2 Aug 14

Logged by: LS/WBG/JAS/MEA

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	UCS GRADE / BLOW COUNTS (PER 6")
80.0	865.0	**PICRITE** (47.2 to 78.9) Greenish grey, fine to coarse grained, porphyritic, some irregular calcite veinlets, trace irregular stringers of epidote and chlorite, selective chlorite alteration and hematite fracture infill, trace feature filling pyrite and chalcopyrite locally.	94	UCS#2	R4
			92		R4
			97		R4
		SUGARLOAF DIORITE (78.9 to 80) Medium greenish grey, fine grained, porphyritic, some calcite veinlets, minor epidote and carbonate alteration on joints.	98	TRI#2	R5
			100	UCS#3	R4
		MAFIC VOLCANIC (80 to 81.1) Medium grey, very fine grained, aphanitic, some calcite veinlets.	81		R4
			75		R4
85.0	860.0	**PICRITE** (81.1 to 81.9) Medium grey, very fine grained, aphanitic, slight weathering, some epidote fracture infill.	95		R4
		MAFIC VOLCANIC (81.9 to 85.7) Medium grey, very fine grained, aphanitic, some calcite veinlets, trace blebby pyrite locally.	94		R4
		SUGARLOAF DIORITE (85.7 to 97.5) Grey to green, Medium grained, heterogeneous, fractured, fresh to slightly weathered, patchy epidote and k-feldspar alteration, minor blebby pyrite.	100		R4
			92		R4
90.0	855.0		91		R4
			91		R4
			95		R4
95.0	850.0		55		R4
			91		R4
			100		R4
		PICRITE (97.5 to 99) Light to dark green, fine grained, aphanitic, fresh, pervasive chlorite alteration, a short faulted interval from 98.49 - 98.58 m.	99		R5
			100		R5
		End of Drillhole: 99.5 m Reached Target Depth			

SPT 'N' VALUE

RQD

SPT TEST 'N' VALUES - ×

20 40 60 80

81.02 - 99.0 m - Lugeon Packer Test #3 - K = 4E-08 m/s

GENERAL REMARKS:

Hole collapsed during installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-2

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study / ELFZ? - SMRSF

Coordinates: 686,633 E , 5,606,963 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 13.34 m, HQ3: 13.34 - 101.00 m

Drillhole No.: DH14-017

Drill Type: Fraste DR238

Total Depth: 101.00 m

Elevation: 978 m

Azimuth , Inclination: 0 , -90

Page: 1 of 5

Date Started: 9 Aug 14

Date Completed: 12 Aug 14

Logged by: MEA/WBG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			CLAYEY SILT (0 to 2.7) Some gravel, some cobbles, subangular to subrounded up to 4cm, medium brown, low plasticity, compact, gap graded, compact, moist.		SPT #1	79		8/12/12	24			
	975.0		**GRAVELLY SILT** (2.7 to 4.2) Some sand, some clay, subangular to subrounded clasts to 3cm, medium brown, gap graded, low to medium plasticity, compact to dense, moist.		SPT #2	100		9/16/18	34			
5			**CLAYEY SILT** (4.2 to 7.3) Trace cobble, some sand, medium brown, gap graded, medium plasticity, dense, wet, low recovery likely due to a boulder or cobble.		SPT #3	28		3/50/22	72			
					SPT #4	100		8/20/25	45			
	970.0		**GRAVELLY SILT** (7.3 to 10.3) Some sand, some cobbles, angular reddish clasts up to 4cm, brown, gap graded, low medium plasticity, dense, wet-saturated.		SPT #5	85		12/18/31	49			
10					SPT #6	70		19/21/34	55			
			SILTY CLAY (10.3 to 12.4) Some gravel, trace sand, greyish brown, gap-graded, medium to high plasticity, dense, wet to saturated.		SPT #7	100		9/19/19	38			
					SPT #8	96		11/11/22	33			
	965.0		**MAFIC VOLCANIC** (12.4 to 45.9) Medium greenish grey, very fine to fine grained, aphanitic, fresh to slightly weathered, trace irregular calcite stringers with secondary hematite alteration, moderate to strong chlorite, hematite and epidote alteration throughout, some gouge infill.									SPT refusal on bedrock
				62				R4				
15				27				R4				14.6 - 29.0 m - lugeon packer test #1 = 3 x 10-8 m/s
				87				R4				
	960.0			81				R4				
				79				R4				
20				100				R4				
				94				R4				
	955.0			78				R4				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study / ELFZ? - SMRSF

Coordinates: 686,633 E , 5,606,963 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 13.34 m, HQ3: 13.34 - 101.00 m

Drillhole No.: DH14-017

Drill Type: Fraste DR238

Total Depth: 101.00 m

Elevation: 978 m

Azimuth , Inclination: 0 , -90

Page: 2 of 5

Date Started: 9 Aug 14

Date Completed: 12 Aug 14

Logged by: MEA/WBG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
30	950.0		**MAFIC VOLCANIC** (12.4 to 45.9) Medium greenish grey, very fine to fine grained, aphanitic, fresh to slightly weathered, trace irregular calcite stringers with secondary hematite alteration, moderate to strong chlorite, hematite and epidote alteration throughout, some gouge infill.	95	TRI#1			R4				
				94				R4				
				97				R4				
				85				R3				28.8 - 44.0 m - lugeon packer test #2 = <1 x 10-8 m/s
				67				R3				
35	945.0			100				R5				
				81				R4				
				100				R4				
				100	UCS#1			R4				
40	940.0			94				R4				
				100				R4				
				100				R5				
	935.0			100				R4				
45				100				R4				43.8 - 59.0 m - lugeon packer test #3 = <1 x 10-8 m/s
			FAULT ZONE (45.9 to 52.3) Fractured and broken zone within Mafic Volcanic unit.	93				R5				
	930.0			92				R5				
				86				R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study / ELFZ? - SMRSF

Coordinates: 686,633 E , 5,606,963 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 13.34 m, HQ3: 13.34 - 101.00 m

Drillhole No.: DH14-017

Drill Type: Fraste DR238

Total Depth: 101.00 m

Elevation: 978 m

Azimuth , Inclination: 0 , -90

Page: 3 of 5

Date Started: 9 Aug 14

Date Completed: 12 Aug 14

Logged by: MEA/WBG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			FAULT ZONE (45.9 to 52.3) Fractured and broken zone within Mafic Volcanic unit.	77				R5				
				66				R5				
				100				R4				
			VOLCANICLASTIC (52.3 to 70.4) Light to medium greenish grey, very fine to medium grained, heterogeneous, fresh to moderately weathered, trace irregular calcite stringers with secondary hematite alteration, moderate pervasive chlorite alteration and hematite fracture infill throughout	97				R5				
	925.0			74				R5				
				78				R5				
55				100				R5				
				100				R5				
				100				R5				
	920.0			100				R5				58.8 - 74.0 m - lugeon packer test #4 = no take
				98				R5				
60				99				R5				
				99				R5				
	915.0			100				R5				
				75				R2				
65				89				R4				
				100				R2				
			(66.3) 20 cm gouge and gravel zone within unit.	92				R4				
	910.0			100				R4				
70				85				R4				
			FAULT ZONE (70.4 to 72.1) Fractured and gouge filled zone within Volcaniclastic unit.	100				R1				
			VOLCANICLASTIC (72.1 to 74.7)									
	905.0		Light to medium greenish grey, very fine to medium grained, heterogeneous, fresh to moderately weathered, trace irregular calcite stringers with secondary hematite alteration, moderate pervasive chlorite alteration and hematite fracture infill	85				R4				
				100				R4				73.8 0 89.0 m - lugeon packer test #5 = 1 x 10-8 m/s

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study / ELFZ? - SMRSF

Coordinates: 686,633 E , 5,606,963 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 13.34 m, HQ3: 13.34 - 101.00 m

Drillhole No.: DH14-017

Drill Type: Fraste DR238

Total Depth: 101.00 m

Elevation: 978 m

Azimuth , Inclination: 0 , -90

Page: 4 of 5

Date Started: 9 Aug 14

Date Completed: 12 Aug 14

Logged by: MEA/WBG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			throughout	85				R2				
			FAULT ZONE (74.7 to 78.1) Gouge rich fault zone within volcaniclastic unit.	93	UCS#2			R4				
	900.0			93				R2				
80			**VOLCANICLASTIC** (78.1 to 80.9) Light to medium greenish grey, very fine to medium grained, heterogeneous, fresh to moderately weathered, trace irregular calcite stringers with secondary hematite alteration, moderate pervasive chlorite alteration and hematite fracture infill throughout	100				R4				
				100				R4				
			FAULT ZONE (80.9 to 87) Fault zone within volcaniclastic unit, healed faults noted from 80.9 - 83.0m and 84.23 - 87.0m bounding more broken fault and marks contact with lower mafic unit, weak patchy epidote alteration throughout.	91				R4				
	895.0			76				R4				
85				100				R5				
				100				R5				
			MAFIC VOLCANIC (87 to 88.5) Medium greenish grey, very fine to fine grained, aphanitic, minor irregular calcite (rusty and oxidized) veins, moderate oxidation on fracture planes.	87				R5				
	890.0			100				R5				
				100				R5				
			MAFIC VOLCANIC (88.5 to 90.1) Light to medium greenish grey, coarse grained, porphyritic, strong pervasive epidote alteration with oxidation in fractures and irregular calcite stringers throughout.	100	UCS#3			R5				88.8 - 101.0 m - lugeon packer test #6 = 5 x 10-8 m/s
90				35				R5				
			MAFIC VOLCANIC (90.1 to 101) Medium greenish grey, very fine to fine grained, aphanitic, minor irregular calcite (rusty and oxidized) veins, moderate persistent epidote and chlorite alteration with moderate oxidation on fracture planes.	59				R5				
	885.0			100				R5				
				100				R5				
95				81				R5				
				66				R5				
	880.0			100				R4				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Cicada Study / ELFZ? - SMRSF

Coordinates: 686,633 E , 5,606,963 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 13.34 m, HQ3: 13.34 - 101.00 m

Drillhole No.: DH14-017

Drill Type: Fraste DR238

Total Depth: 101.00 m

Elevation: 978 m

Azimuth , Inclination: 0 , -90

Page: 5 of 5

Date Started: 9 Aug 14

Date Completed: 12 Aug 14

Logged by: MEA/WBG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
				100				R4				
			End of Drillhole: 101 m Reached Target Depth									
105	875.0											
110	870.0											
115	865.0											
120	860.0											
	855.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-3

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: South Embankment

Coordinates: 683,878 E , 5,605,627 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 6.10 m, HQ3: 6.10 - 37.00 m

Drillhole No.: DH14-035

Drill Type: Fraste DR238

Total Depth: 37.00 m

Elevation: 1058.3 m

Azimuth , Inclination: 0 , -90

Page: 1 of 2

Date Started: 3 Sep 14

Date Completed: 5 Sep 14

Logged by: JBC/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
		SILT (0 to 1.52) Trace gravel, fine grained, subangular to angular; trace sand, fine grained; trace clay, poorly graded, non plastic to low plasticity, brown to greyish brown, loose, dry to moist.		SPT #1	100		20/18/24	42			No water used for drilling
	1055.0	**SILT** (1.52 to 4.11) Some clay; trace gravel, fine grained, subangular to angular; trace sand, fine grained, well graded, low plasticity, brown, loose, moist.		SPT #2	100		14/11/15	26			No water used for drilling
5		**WEATHERED BEDROCK** (4.11 to 6.1) Grey to ash grey angular fragments (sand and gravel sized)		SPT #3	0		50+	R			No water used for drilling, SPT refusal on weathered bedrock
		SILTSTONE (6.1 to 10) Medium to dark greenish grey, foliated, fine to coarse grained, inequigranular, medium strength, moderately fractured with calcite, chlorite and FeO infilling. Trace calcite veins and veinlets and some quartz banding. Slightly weathered.	87				R4				
			57				R4				
	1050.0		87				R4				7.68 - 25.00 m - Lugeon Packer Test #1 - K = 2E-07 m/s 8.28 - 13.00 m - Falling Head Packer Test #1 - K = 2E-07 m/s
10		**BROKEN ZONE** (10 to 13) Medium to dark greenish grey, foliated, fine to coarse grained, inequigranular, medium strength, highly fractured with horizontal and subvertical fracturing - trace clay infill, several small, rubbly zones over interval.	51				R3				
			75				R3				
	1045.0	**SILTSTONE** (13 to 17.9) Medium to dark grey, fine to coarse grained, foliated, medium strength, moderately fractured, no infill along joints, some calcite veinlets and quartz banding, disseminated fine to coarse grained sulphides throughout rock, strong, slightly weathered.	100	UCS#1			R4				
15			99				R4				14.28 - 19.00 m - Falling Head Packer Test #2 - K = 9E-07 m/s
			99				R5				
	1040.0	**BROKEN ZONE** (17.9 to 22) Medium to dark greenish grey, foliated, fine to coarse grained, inequigranular, medium strength, highly fractured with horizontal and subvertical fracturing - trace clay, calcite and FeO infill, several small, rubbly zones over interval. Disseminated sulphides throughout rock, quartz banding, moderately strong and moderately weathered.	73				R5				17.28 - 25.00 m - Falling Head Packer Test #3 - K = 1E-07 m/s
20			87				R3				
			98				R4				
			100				R5				
	1035.0		92				R4				23.28 - 31.00 m - Lugeon Packer Test #2 - K = 1E-06 m/s

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-4

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: South Embankment

Coordinates: 683,878 E , 5,605,627 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 6.10 m, HQ3: 6.10 - 37.00 m

Drillhole No.: DH14-035

Drill Type: Fraste DR238

Total Depth: 37.00 m

Elevation: 1058.3 m

Azimuth , Inclination: 0 , -90

Page: 2 of 2

Date Started: 3 Sep 14

Date Completed: 5 Sep 14

Logged by: JBC/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
30	1030.0		**SILTSTONE** (22 to 37) Medium to dark grey, fine to medium grained, inequigranular, weak foliation, medium strength, moderately fractured with heavy fracturing over 23.5 to 24.5 m, FeO, calcite and trace clay infill along joints, some calcite veinlets and quartz banding, trace disseminated fine to coarse grained sulphides throughout rock, strong, slightly weathered.	100				R4				
				100	UCS#2			R4				
				99				R4				
				100				R4				
35	1025.0			100	UCS#3			R4				30.88 - 37.00 m - Lugeon Packer Test #3 - K = 3E-08 m/s
				97				R3				
				100				R4				
				98				R4				
40	1020.0		End of Drillhole: 37 m Reached Target Depth									
45	1015.0											
	1010.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-4

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Southeast Embankment

Coordinates: 685,215 E , 5,605,147 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 16.37 m, HQ3: 16.37 - 37.85 m

Drillhole No.: DH14-038

Drill Type: Fraste DR238

Total Depth: 37.85 m

Elevation: 1060.6 m

Azimuth , Inclination: 0 , -90

Page: 1 of 2

Date Started: 12 Sep 14

Date Completed: 15 Sep 14

Logged by: GNH

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
0	1060.0		**SILT** (0 to 13.32) Sandy to some sand, fine to medium grained; some gravel, fine to medium grained, subangular to subrounded; poorly graded, low plasticity to non-plastic, light brown to brown, loose to compact, dry, some clasts up to 2 cm in diameter.		SPT #1	92		16/15/23	38			SPT refusal on dense material
					SPT #2	100		14/21/28	49			
					SPT #3	100		29/41/33	R			
5	1055.0				SPT #4	100		17/28/50+	R			SPT refusal on dense material
					SPT #5	100		37/47/50+	R			
					SPT #6	100		8/29/42	71			SPT refusal on dense material SPT refusal on dense material
10	1050.0				SPT #7	100		34/48/50+	R			SPT refusal on dense material
					SPT #8	100		21/25/23	48			
			WEATHERED BEDROCK (13.32 to 16.37) Orange-brown to white; fine to medium grained, inequigranular; impossible to determine structure from ODEX chips; highly weathered; chips are uniform, up to 1 cm in diameter.		SPT #9	71		50+	R			SPT refusal on bedrock
15	1045.0		**VOLCANICLASTIC** (16.37 to 23.2) Pinkish grey with light green crystals; fine to medium grained; inequigranular, weak, massive; slightly to moderately weathered; healed joints throughout; strong, quartz and calcite veins and veinlets, minor vuggy textures, local rubble and clay-rich zones towards end of zone.	100				R4				
				100	UCS#1			R4				
20	1040.0			99				R4				19.57 m - 25.85 m - Lugeon Packer Test #1 - no take 19.57 m - 25.85 m - Falling Head Packer Test #1 - K = 2E-05 m/s
				33				R4				
				90				R4				
				63				R4				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-5

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Southeast Embankment

Coordinates: 685,215 E , 5,605,147 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 16.37 m, HQ3: 16.37 - 37.85 m

Drillhole No.: DH14-038

Drill Type: Fraste DR238

Total Depth: 37.85 m

Elevation: 1060.6 m

Azimuth , Inclination: 0 , -90

Page: 2 of 2

Date Started: 12 Sep 14

Date Completed: 15 Sep 14

Logged by: GNH

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
	1035.0		**FAULT ZONE** (23.2 to 27.9) Pink-grey; fine grained; inequigranular, massive; intensely fractured; moderately to slightly weathered; poor recovery due to faulted and fractured rock; vuggy textures, quartz and calcite veins and veinlets, FeO staining on joint surfaces, some local broken and rubble zones.	101				R4				
				100				R5				
			VOLCANICLASTIC (27.9 to 31.85) Dark grey with white, orange and brown zones; fine grained; inequigranular, massive; slightly weathered; healed joints throughout; strong, local clay rich zones, FeO staining on joint surfaces, quartz and carbonate veinlets.	100				R4				
30	1030.0			101				R4				
			VOLCANICLASTIC (31.85 to 37.85) Dark greenish grey; fine grained; inequigranular, massive; slightly weathered; strong, FeO staining on joint surfaces, calcite coating on some joints, quartz and carbonate veinlets throughout.	101	TRI#1			R5				
				100				R5				
35	1025.0			100	UCS#2			R5				
				100				R5				
			End of Drillhole: 37.85 m Reached Target Depth									
40	1020.0											
45	1015.0											

INSTRUMENTATION / WELL DETAILS: 25.57 m - 31.85 m - Lugeon Packer Test #2 - no take; 25.57 m - 31.85 m - Falling Head Packer Test #2 - K = 2E-07 m/s

DRILLING NOTES: 31.57 m - 37.85 m - Lugeon Packer Test #3 - K = 4E-07 m/s; 31.57 m - 37.85 m - Falling Head Packer Test #3 - K = 2E-06 m/s

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-5

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Southeast Embankment

Coordinates: 684,892 E , 5,605,143 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 42.70 m, HQ3: 42.70 - 65.20 m

Drillhole No.: DH14-039

Drill Type: Fraste DR238

Total Depth: 65.20 m

Elevation: 1057.3 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 14 Sep 14

Date Completed: 18 Sep 14

Logged by: LEP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SILTY SAND (0 to 12.19) Fine to medium grained; trace clay; well graded, non-plastic, brown to greyish brown, compact to dense, dry to moist.,		SPT #1	100		11/12/13	25			
	1055.0				SPT #2	100		10/15/17	32			
5					SPT #3	100		9/16/15	31			
					SPT #4	100		7/17/14	31			
	1050.0				SPT #5	100		6/8/9	17			
10					SPT #6	100		21/15/42	57			
					SPT #7	100		19/26/16	42			
	1045.0		**SILTY SAND WITH GRAVEL** (12.19 to 38.19) Fine to medium grained; trace gravel, fine to medium grained, angular to subrounded; well graded, non-plastic, brown to greyish brown, compact to dense, dry to moist, some clasts up to 2 cm in diameter.		SPT #8	100		11/13/11	24			Start injecting water for drilling
15					SPT #9	80		12/12/11	23			
					SPT #10	80		8/14/15	29			
	1040.0				SPT #11	89		20/35/25	60			
20					SPT #12	100		18/35/32	67			SPT refusal on dense material
	1035.0				SPT #13	100		6/11/14	25			

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-6

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Southeast Embankment
Coordinates: 684,892 E , 5,605,143 N
Coordinate System: UTM NAD83 Zone 10
Hole Size ODEX: 0 - 42.70 m, HQ3: 42.70 - 65.20 m

Drillhole No.: DH14-039
Drill Type: Fraste DR238
Total Depth: 65.20 m
Elevation: 1057.3 m
Azimuth , Inclination: 0 , -90

Page: 2 of 3
Date Started: 14 Sep 14
Date Completed: 18 Sep 14
Logged by: LEP
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
	1030.0		**SILTY SAND WITH GRAVEL** (12.19 to 38.19) Fine to medium grained; trace gravel, fine to medium grained, angular to subrounded; well graded, non-plastic, brown to greyish brown, compact to dense, dry to moist, some clasts up to 2 cm in diameter.		SPT #14	100		11/15/26	41			
30					SPT #15	96		45/50+	R			SPT refusal on coarse/ dense material
	1025.0				SPT #16	100		29/42/50	R			SPT refusal on cobble or boulder
35												
	1020.0				SPT #17	100		50+	R			SPT refusal on cobble or boulder
			WEATHERED BEDROCK (38.19 to 41.2) Grey to dark grey with some white and pinkish grey fragments; angular sand and fine grained gravel sized fragments returned from ODEX drilling; some clay and calcite pieces in ODEX return.		SPT #18	100		50+	R			SPT refusal on cobble or boulder
40			**FAULT ZONE** (41.2 to 47.2) Sandstone; grey to dark grey; clay throughout, fine to coarse grained gravel sized fragments, no sign of oxidation.	20				R1				
	1015.0			33				R1				
45				63				R2				
				23				R2				
	1010.0		**SANDSTONE** (47.2 to 53.2) Grey to dark grey; fine to medium grained; porphyritic, massive; fresh; healed joints throughout; medium strong; discontinuous calcite veins, trace clay infill.	100				R3				48.31 m - 54.70 m - Lugeon Packer Test #1 - K = 1E-09 m/s 48.31 m - 54.70 m - Falling
				99				R3				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-6

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Southeast Embankment

Coordinates: 684,892 E , 5,605,143 N

Coordinate System: UTM NAD83 Zone 10

Hole Size ODEX: 0 - 42.70 m, HQ3: 42.70 - 65.20 m

Drillhole No.: DH14-039

Drill Type: Fraste DR238

Total Depth: 65.20 m

Elevation: 1057.3 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 14 Sep 14

Date Completed: 18 Sep 14

Logged by: LEP

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SANDSTONE (47.2 to 53.2) Grey to dark grey; fine to medium grained; porphyritic, massive; fresh; healed joints throughout; medium strong; discontinuous calcite veins, trace clay infill.	100				R3				Head Packer Test #1 - K = 3E-07 m/s
	1005.0			100				R3				
			SHEAR ZONE (53.2 to 56.2) Mudstone; grey to dark grey; fine grained; porphyritic, massive; fault zone; very weak, abundant clay gouge and rubble, calcite veins.	93				R1				53.01 m - 60.70 m - Lugeon Packer Test #2 - K = 2E-08 m/s
55				76				R1				
			MUDSTONE (56.2 to 59.55) Grey to dark grey; fine grained; porphrytic, weakly foliated; moderately to slightly weathered; healed fractures throughout; medium strong, clay seams, calcite veins, calcite infill.	100				R3				
	1000.0			100				R4				
60			**QUARTZ FELDSPAR PORPHYRY** (59.55 to 65.2) Light greenish brownish grey to reddish greenish brown; fine to coarse grained; porphyritic, almost brecciated; moderately weathered; many healed fractures, some joints dipping at 15° to core axis; weak to medium strong, clay and calcite infilling.	96				R3				59.01 m - 65.20 m - Lugeon Packer Test #3 - K = 2E-09 m/s
				97				R3				
	995.0			100				R3				
				100				R3				
65			End of Drillhole: 65.2 m Reached Target Depth									
	990.0											
70												
	985.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE C1-6

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Rock Quarry / SMRSF

Coordinates: 686,155 E , 5,607,908 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 4.22m, HQ3 to 35.11m

Drillhole No.: DH14-044

Drill Type: Fraste DR239

Total Depth: 35.11 m

Elevation: 1005.6 m

Azimuth , Inclination: 0 , -90

Page: 1 of 2

Date Started: 20 Oct 14

Date Completed: 21 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
0.0	1005.0	**SILT AND GRAVEL** (0 to 1.7) Some sand, trace cobbles. Fine to coarse grained, subangular to subrounded, poorly graded, high plasticity, medium brown, compact, massive, wet.		SPT #1	100		22/50+	R		SPT refusal on bedrock
		WEATHERED BEDROCK (1.7 to 4.22) Bedrock contact at approximately 1.70 mbgs. ODEX drilling to 4.22 to confirm bedrock - volcaniclastic chip samples.								
		WEATHERED BEDROCK (4.22 to 5.11) Medium greenish grey, fine grained, inequigranular, weak, highly weathered, heavily fractured, joints infilled with chlorite and FeO.	35				R4			
5.0	1000.0	**VOLCANICLASTIC** (5.11 to 12.91) Medium greenish grey, fine grained, inequigranular, medium strong to strong, slightly weathered along joints, moderately fractured with some healed fractures, massive. Some calcite veins and veinlets throughout.	100				R4			
			100				R2			
			100				R3			
10.0	995.0		93				R4			
			41	UCS #1			R4			
		VOLCANICLASTIC (12.91 to 35.11) Medium to light greenish grey with reddish purple clasts, fine to coarse grained, inequigranular, medium strong to strong, slightly weathered along joints, moderately fractured with some healed fractures, massive. Some calcite veins and veinlets throughout.	97				R4			
15.0	990.0		100				R4			
			100				R4			
			100				R4			
			100				R4			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-7

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Rock Quarry / SMRSF

Coordinates: 686,155 E , 5,607,908 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 4.22m, HQ3 to 35.11m

Drillhole No.: DH14-044

Drill Type: Fraste DR239

Total Depth: 35.11 m

Elevation: 1005.6 m

Azimuth , Inclination: 0 , -90

Page: 2 of 2

Date Started: 20 Oct 14

Date Completed: 21 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
	985.0		**VOLCANICLASTIC** (12.91 to 35.11) Medium to light greenish grey with reddish purple clasts, fine to coarse grained, inequigranular, medium strong to strong, slightly weathered along joints, moderately fractured with some healed fractures, massive. Some calcite veins and veinlets throughout.	100				R4			
				100				R4			
				100				R4			
25.0	980.0			100				R4			
				100				R4			
				100				R4			
30.0	975.0			100				R4			
				99	UCS #2			R4			
				100				R4			
35.0				100				R4			
	970.0		End of Drillhole: 35.11 m Reached Target Depth								

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-7

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Borrow Area

Coordinates: 686,420 E , 5,607,574 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 45.71m, HQ3 to 50.81m

Drillhole No.: DH14-045

Drill Type: Fraste DR239

Total Depth: 50.81 m

Elevation: 1029.6 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 21 Oct 14

Date Completed: 23 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
0			**SANDY SILT** (0 to 12.19) Some gravel, trace cobbles, fine to medium grained, subangular to subrounded, well graded, medium plasticity, brown, compact, massive, moist.		SPT #1	100		14/24/50+	R			SPT refusal on coarse material
					SPT #2	100		11/12/15	27			
5	1025.0				SPT #3	100		7/16/17	33			
					SPT #4	100		9/14/17	31			
					SPT #5	95		16/32/26	58			Start injecting water for drilling
10	1020.0				SPT #6	23		37/31/30	61			
					SPT #7	100		18/23/50+	R			SPT refusal on coarse material
			SILTY, SANDY GRAVEL (12.19 to 18.28) Trace cobbles, fine to coarse grained, subangular to subrouned, well graded, low plasticity, brown with multicoloured gravel, compact, massive, wet.		SPT #8	100		15/22/34	56			
					SPT #9	100		12/18/30	48			
15	1015.0				SPT #10	98		18/33/27	60			
					SPT #11	15		18/30/37	67			
	1010.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-8

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Borrow Area

Coordinates: 686,420 E , 5,607,574 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 45.71m, HQ3 to 50.81m

Drillhole No.: DH14-045

Drill Type: Fraste DR239

Total Depth: 50.81 m

Elevation: 1029.6 m

Azimuth , Inclination: 0 , -90

Page: 2 of 3

Date Started: 21 Oct 14

Date Completed: 23 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SILTY SAND (18.28 to 28.04) Trace clay, trace gravel, fine to medium grained, angular to subangular, poorly graded, high plasticity, medium greyish brown, compact to dense, massive, moist to wet.		SPT #12	100		9/15/28	43			
25	1005.0				SPT #13	85		9/14/23	37			
					SPT #14	100		13/14/17	31			
30	1000.0		**SANDY, GRAVELLY SILT** (28.04 to 34.14) Trace clay, fine grained, angular to subangular, well graded, grey with multicoloured gravel, medium to high plasticity, stiff, massive, moist to wet.		SPT #15	20		15/23/30	53			
					SPT #16	8		16/18/24	42			
35	995.0		**SILTY SAND** (34.14 to 45.71) Some gravel, trace clay, fine to medium grained, angular to subrounded, poorly graded, high plasticity, grey with multicoloured gravel, dense, massive, moist.		SPT #17	39		9/15/18	33			
	990.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-8

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Borrow Area

Coordinates: 686,420 E , 5,607,574 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 45.71m, HQ3 to 50.81m

Drillhole No.: DH14-045

Drill Type: Fraste DR239

Total Depth: 50.81 m

Elevation: 1029.6 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 21 Oct 14

Date Completed: 23 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SILTY SAND (34.14 to 45.71) Some gravel, trace clay, fine to medium grained, angular to subrounded, poorly graded, high plasticity, grey with multicoloured gravel, dense, massive, moist.		SPT #18	100		5/16/18	34			
					SPT #19	100		8/14/19	33			
45	985.0											
			VOLCANICLASTIC (45.71 to 50.81) Greenish grey, fine grained, medium strong, mostly fresh with weathering along joints (FeO staining) - no infill, some calcite veins and veinlets throughout; some dissolution weathering as vugs at 48.20 m.	100	SPT #20	0		50+	R			SPT refusal on bedrock
				100	UCS #1			R4				
				100				R4				
50	980.0			100				R4				
			End of Drillhole: 50.81 m Reached Target Depth									
55	975.0											
	970.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-8

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,717 E , 5,609,681 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 44.19m, HQ3 to 50.58m

Drillhole No.: DH14-052

Drill Type: Fraste DR238

Total Depth: 50.58 m

Elevation: 925.6 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 26 Oct 14

Date Completed: 28 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
0	925.0		**GRAVELLY SAND** (0 to 21.34) Fine to coarse grained, some silt, angular to subangular, well graded, non-plastic, greyish brown, very dense, massive, moist to wet.		SPT #1	67		12/34/30	64			
					SPT #2	100		22/50+	R			SPT refusal on coarse material
5	920.0				SPT #3	100		50+	R			Water injected from approximately 4.00m to end of run. SPT refusal on coarse material
					SPT #4	100		50+	R			SPT refusal on coarse material
					SPT #5	100		50+	R			Water used to drill from 7.62m to end of hole. SPT refusal on coarse material
10	915.0				SPT #6	100		50+	R			SPT refusal on dense material
					SPT #7	100		50+	R			
					SPT #8	100		26/38/50+	R			SPT refusal on dense material
					SPT #9	100		25/50+	R			SPT refusal on dense material
15	910.0				SPT #10	75		41/50+	R			SPT refusal on dense material
					SPT #11	96		19/50+	R			

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-9

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,717 E , 5,609,681 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 44.19m, HQ3 to 50.58m

Drillhole No.: DH14-052
Drill Type: Fraste DR238
Total Depth: 50.58 m
Elevation: 925.6 m
Azimuth , Inclination: 0 , -90

Page: 2 of 3
Date Started: 26 Oct 14
Date Completed: 28 Oct 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
	905.0											
			SILTY SAND (21.34 to 30.47) Some gravel, fine to coarse grained, angular to subangular, well graded, low plasticity, brownish grey matrix with lithic clasts, very dense, massive, moist.		SPT #12	100		16/27/46	73			
					SPT #13	100		25/21/31	52			
25	900.0				SPT #14	100		17/33/41	74			
30	895.0		**SANDY SILT** (30.47 to 39.62) Some gravel, fine to coarse grained, angular to subrounded, well graded, medium plasticity, brownish grey matrix with lithic clasts, compact, massive, moist.		SPT #15	100		8/25/26	51			SPT refusal on dense material
					SPT #16	100		37/50+	R			SPT refusal on dense material
35	890.0				SPT #17	0		44/50+	R			SPT refusal on coarse material
					SPT #18	0		50+	R			SPT refusal on bedrock

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-9

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,717 E , 5,609,681 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 44.19m, HQ3 to 50.58m

Drillhole No.: DH14-052

Drill Type: Fraste DR238

Total Depth: 50.58 m

Elevation: 925.6 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 26 Oct 14

Date Completed: 28 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
	885.0	**GRAVELLY SAND** (39.62 to 42.66) Some silt, grey, wet; gravel is fine grained, angular to subangular.									
		WEATHERED BEDROCK (42.66 to 44.19) Silty GRAVEL, grey, wet; gravel is fine grained, angular to subangular; bedrock chips from ODEX drilling, bedrock contact at approximately 42.66 mbgs.		SPT #19	0		50+	R			
			66.67				R3				
45	880.0	**SUGARLOAF DIORITE** (44.19 to 47.08) Light greenish grey, fine to medium grained, inequigranular, weak, moderately weathered; highly fractured and rubbleized in parts; FeO staining along fractures; some calcite and chlorite infill along fractures.	73.33				R3				
			100				R4				
		SUGARLOAF DIORITE (47.08 to 50.58) Light grey to greenish grey, fine to medium grained, inequigranular, weak, slightly weathered; highly fractured and rubbleized in parts; some calcite and chlorite infill along fractures.	80				R3				
50			94				R3				
	875.0	End of Drillhole: 50.58 m Reached Target Depth									
55	870.0										

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-9

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,930 E , 5,609,593 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 45.71m, HQ3 to 52.11m

Drillhole No.: DH14-054

Drill Type: Fraste DR238

Total Depth: 52.11 m

Elevation: 899.6 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 28 Oct 14

Date Completed: 30 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
			GRAVELLY SAND (0 to 3.05) Trace silt, fine to coarse grained, subangular to subrounded, poorly graded, non-plastic, brown, dense, massive, dry.		SPT #1	100		21/27/26	53		
	895.0		**GRAVELLY SILT** (3.05 to 14.33) Trace fine sand, fine to coarse grained, subangular to subrounded, gap graded, low to medium plasticity, compact, massive, moist.		SPT #2	100		6/11/11	22		
5.0					SPT #3	52		10/31/22	53		
					SPT #4	100		12/26/30	56		
					SPT #5	100		7/12/20	32		
	890.0				SPT #6	100		8/12/14	26		
10.0					SPT #7	100		12/19/25	44		
					SPT #8	100		7/11/14	25		
					SPT #9	100		7/12/12	24		
	885.0		**SILT** (14.33 to 18.9) Some clay, trace sand, trace gravel, fine to medium grained, subangular to subrounded, poorly graded, high plasticity, brownish-grey, compact, stiff, moist.								
15.0					SPT #10	100		8/11/14	25		Start injecting water for drilling
					SPT #11	100		8/6/10	16		
	880.0										

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-10

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,930 E , 5,609,593 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 45.71m, HQ3 to 52.11m

Drillhole No.: DH14-054
Drill Type: Fraste DR238
Total Depth: 52.11 m
Elevation: 899.6 m
Azimuth , Inclination: 0 , -90

Page: 2 of 3
Date Started: 28 Oct 14
Date Completed: 30 Oct 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
			CLAYEY SAND (18.9 to 24.99) Fine to coarse grained, trace gravel, fine grained, trace silt. Angular to subangular, gap graded, high plasticity, brownish grey, stiff, massive, moist.		SPT #12	100		4/7/9	16		
25.0	875.0		**SILTY SAND** (24.99 to 39.62) Trace clay, trace gravel, fine to medium grained, angular to subangular, poorly graded, medium plasticity, brownish-grey, very dense, massive, moist.		SPT #13	100		6/4/12	16		
					SPT #14	44		17/31/40	71		
30.0	870.0				SPT #15	100		12/11/19	30		
					SPT #16	100		6/12/25	37		
35.0	865.0				SPT #17	100		17/26/50+	R		SPT refusal on dense material
	860.0										

GENERAL REMARKS:
No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-10

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,930 E , 5,609,593 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 45.71m, HQ3 to 52.11m

Drillhole No.: DH14-054

Drill Type: Fraste DR238

Total Depth: 52.11 m

Elevation: 899.6 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 28 Oct 14

Date Completed: 30 Oct 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
			SAND (39.62 to 42.66) Medium grained, trace gravel, angular to subangular, poorly graded, non-plastic, loose, massive, moist.		SPT #18	100		10/23/40	63		
			WEATHERED BEDROCK (42.66 to 45.71) Gravelly SAND, medium to coarse grained, angular, orangey brown - bedrock confirmed at 44.71 m.		SPT #19	100		22/50+	R		SPT refusal on bedrock
45.0	855.0		**SUGARLOAF DIORITE** (45.71 to 52.11) Greenish grey, fine to medium grained, equigranular, massive, strong, slightly weathered; some healed joints; some calcite and FeO infill; trace sulphides.	52				R4			
				97				R4			
				100				R4			
50.0	850.0			97				R4			
				100	UCS #1			R4			
			End of Drillhole: 52.11 m Reached Target Depth								
55.0	845.0										
	840.0										

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-10

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,850 E , 5,609,386 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 64.00m, HQ3 to 104.50m

Drillhole No.: DH14-056
Drill Type: Fraste DR238
Total Depth: 104.50 m
Elevation: 894.5 m
Azimuth , Inclination: 0 , -90

Page: 1 of 6
Date Started: 30 Oct 14
Date Completed: 2 Nov 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SAND (0 to 9.55) Trace silt, trace gravel, fine to medium grained, angular to subangular, poorly graded, non-plastic, greyish brown, very dense, massive, dry to moist.		SPT #1	72		13/14/12	26	×		
					SPT #2	100		19/50+	R	●		SPT refusal on coarse material
5	890.0				SPT #3	100		26/46/50+	R	●		SPT refusal on coarse material
					SPT #4	100		33/40/42	R	●		
					SPT #5	100		46/50+	R	●		SPT refusal on coarse material
10	885.0		**SANDY SILT** (9.55 to 13.72) Trace clay, trace gravel, fine to medium grained, angular to subangular, poorly graded, high plasticity, brownish grey, very stiff, massive, moist.		SPT #6	100		21/35/50+	R	●		SPT refusal on dense material Start injecting water for drilling
					SPT #7	100		18/23/35	58	×		
					SPT #8	100		10/29/43	72	×		
15	880.0		**SILTY SAND** (13.72 to 18.29) Trace clay, trace gravel, fine grained, angular to subangular, poorly graded, high plasticity, very dense, massive, moist.		SPT #9	100		10/21/32	53	×		
					SPT #10	74		16/28/43	71	×		
	875.0		**SANDY SILT** (18.29 to 24.43) Some clay, trace gravel, fine grained, angular to subangular, poorly graded, high plasticity, grey, very stiff, laminated, moist.		SPT #11	100		10/25/25	50	×		

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,850 E , 5,609,386 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 64.00m, HQ3 to 104.50m

Drillhole No.: DH14-056

Drill Type: Fraste DR238

Total Depth: 104.50 m

Elevation: 894.5 m

Azimuth , Inclination: 0 , -90

Page: 2 of 6

Date Started: 30 Oct 14

Date Completed: 2 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SANDY SILT (18.29 to 24.43) Some clay, trace gravel, fine grained, angular to subangular, poorly graded, high plasticity, grey, very stiff, laminated, moist.		SPT #12	100		20/26/39	65			
25	870.0		**SILTY SAND** (24.43 to 39.62) Trace clay, trace gravel, fine to medium grained, angular to subangular, poorly graded, medium to high plasticity, very dense, laminated, moist.		SPT #13	100		16/22/38	60			
					SPT #14	100		8/11/27	38			
30	865.0				SPT #15	100		13/43/30	73			
					SPT #16	100		13/25/35	60			
35	860.0				SPT #17	100		18/21/25	46			
	855.0				SPT #18	100		19/31/49	80			

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,850 E , 5,609,386 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 64.00m, HQ3 to 104.50m

Drillhole No.: DH14-056

Drill Type: Fraste DR238

Total Depth: 104.50 m

Elevation: 894.5 m

Azimuth , Inclination: 0 , -90

Page: 3 of 6

Date Started: 30 Oct 14

Date Completed: 2 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SILTY SAND (39.62 to 48.77) Some silt, trace gravel, fine to coarse grained, angular to subangular, poorly graded, non-plastic, greyish brown, loose, massive, wet.									
					SPT #19	100		10/37/50+	R			SPT refusal on dense material
45	850.0				SPT #20	100		8/24/30	54			
			SAND (48.77 to 61.6) Trace gravel, fine grained; subangular gravel, poorly graded; non-plastic, orangey brown, loose to compact, massive, wet.		SPT #21	79		4/10/17	27			
50	845.0				SPT #22	100		7/13/20	33			
55	840.0											SPT not performed due to heaving sands
	835.0											SPT not performed due to heaving sands

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project | **Drillhole No.:** DH14-056 | **Page:** 4 of 6

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 30 Oct 14

Location: Truck Shop Area | Total Depth: 104.50 m | Date Completed: 2 Nov 14

Coordinates: 686,850 E , 5,609,386 N | Elevation: 894.5 m | Logged by: LEP/MAS

Coordinate System: UTM NAD 83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS

Hole Size HWT to 64.00m, HQ3 to 104.50m

DEPTH - (m)	ELEVATION - (m)	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE
		WEATHERED BEDROCK (61.6 to 64.04) Greenish grey, angular rock chips - bedrock contact at 61.6 m.						
	830.0	**IRON MASK HYBRID** (64.04 to 65.7) Greenish grey fault gouge, moderately to heavily weathered.		SPT #23	20		50+	R
65			57				R1	
		IRON MASK HYBRID (65.7 to 100) Greenish grey, fine to coarse grained, equigranular, weak to medium strong, moderately weathered to fresh, massive; some healed joints throughout; calcite infilling along joints; quartz and calcite veins and veinlets throughout; chlorite alteration; trace sulphides. **FRACTURED ZONE** (68.25 to 74.65) Highly fractured, greenish grey bedrock unit, weak.	73				R3	
			90				R3	
	825.0		79				R3	
70			87				R3	
			95				R3	
			99				R3	
	820.0		100				R3	
75			100				R3	
			97				R3	
	815.0		100				R3	

RQD

SPT TEST 'N' VALUES - × 20 40 60 80

INSTRUMENTATION / WELL DETAILS

DRILLING NOTES

SPT not performed due to heaving sands

SPT refusal on bedrock

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,850 E , 5,609,386 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 64.00m, HQ3 to 104.50m

Drillhole No.: DH14-056

Drill Type: Fraste DR238

Total Depth: 104.50 m

Elevation: 894.5 m

Azimuth , Inclination: 0 , -90

Page: 5 of 6

Date Started: 30 Oct 14

Date Completed: 2 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
85	810.0		**IRON MASK HYBRID** (65.7 to 100) Greenish grey, fine to coarse grained, equigranular, weak to medium strong, moderately weathered to fresh, massive; some healed joints throughout; calcite infilling along joints; quartz and calcite veins and veinlets throughout; chlorite alteration; trace sulphides. **FRACTURED ZONE** (76 to 80.8) Highly fractured, greenish grey bedrock unit, weak.	100				R3				
				100				R4				
				100	UCS #1			R4				
				100				R4				
				100				R4				
				99				R4				
90	805.0			100				R4				
				99				R4				
				100				R4				
95	800.0			100				R4				
				100				R4				
				98	UCS #2			R4				
	795.0			100				R4				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,850 E , 5,609,386 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 64.00m, HQ3 to 104.50m

Drillhole No.: DH14-056

Drill Type: Fraste DR238

Total Depth: 104.50 m

Elevation: 894.5 m

Azimuth , Inclination: 0 , -90

Page: 6 of 6

Date Started: 30 Oct 14

Date Completed: 2 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			IRON MASK HYBRID (100 to 101.4) Highly fractured, greenish grey bedrock unit, weak, some fault gouge at (101 - 101.11 m).	93				R2				
			IRON MASK HYBRID (101.4 to 104.5) Greenish grey, fine to coarse grained, equigranular, medium strong, fresh, massive; some healed joints throughout; calcite infilling along joints; quartz and calcite veins and veinlets throughout; chlorite alteration; trace sulphides.	97				R4				
				100				R4				
	790.0		End of Drillhole: 104.5 m Reached Target Depth									
105												
	785.0											
110												
	780.0											
115												
	775.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-11

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 685,080 E , 5,609,149 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 6.07m, HQ3 to 45.78m

Drillhole No.: DH14-058

Drill Type: Fraste DR238

Total Depth: 45.78 m

Elevation: 895.8 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 1 Nov 14

Date Completed: 2 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
	895.0		**SILTY SAND** (0 to 3.04) Trace gravel, fine to medium grained, poorly graded, angular to subrounded, non-plastic, medium orange-brown, loose, massive, dry.		SPT #1	20		2/3/4	7		
			WEATHERED BEDROCK (3.04 to 6.07) Light brownish grey rock chips with sand - bedrock contact at 3.04 mbgs.		SPT #2	0		50+	R		SPT refusal on bedrock
5.0	890.0		**SUGARLOAF DIORITE** (6.07 to 13.75) Dark greenish grey, fine to coarse grained, massive, strong with several fracture zones, moderately weathered; FeO staining along fractures; weak chlorite alteration; calcite infill along joints and in fractures with trace dissolution weathering as vugs; trace disseminated sulphides.	97				R4			
				100				R4			
				100				R5			
10.0	885.0			99				R4			
				100				R4			
				100	UCS #1			R5			
15.0	880.0		**SUGARLOAF DIORITE** (13.75 to 45.78) Dark greenish grey, fine to coarse grained, massive, strong, moderately weathered; FeO staining along fractures; weak chlorite alteration; calcite infill along joints and in fractures with trace dissolution weathering as vugs; trace disseminated sulphides.	101				R5			
				101				R5			
				102				R5			
				100				R5			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-12

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 685,080 E , 5,609,149 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 6.07m, HQ3 to 45.78m

Drillhole No.: DH14-058

Drill Type: Fraste DR238

Total Depth: 45.78 m

Elevation: 895.8 m

Azimuth , Inclination: 0 , -90

Page: 2 of 3

Date Started: 1 Nov 14

Date Completed: 2 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
	875.0		**SUGARLOAF DIORITE** (13.75 to 45.78) Dark greenish grey, fine to coarse grained, massive, strong, moderately weathered; FeO staining along fractures; weak chlorite alteration; calcite infill along joints and in fractures with trace dissolution weathering as vugs; trace disseminated sulphides.	102	UCS #2			R5			
				101				R5			
				100				R5			
25.0											
	870.0		**FRACTURE ZONE** (25.01 to 29.51) Moderately to highly fractured zone, some brecciation, vuggy calcite in fractures.	101				R5			
				100				R5			
				102				R5			
30.0											
	865.0			101				R5			
				96				R5			
				97				R5			
				101				R5			
35.0											
	860.0			98				R5			
				101				R5			
				100				R5			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-12

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Drillhole No.: DH14-058
Page: 3 of 3

Contractor: Geotech Drilling Services Ltd.
Drill Type: Fraste DR238
Date Started: 1 Nov 14

Location: Primary Crusher Area
Total Depth: 45.78 m
Date Completed: 2 Nov 14

Coordinates: 685,080 E , 5,609,149 N
Elevation: 895.8 m
Logged by: GNH/JAG

Coordinate System: UTM NAD 83 Zone 10
Azimuth , Inclination: 0 , -90
Reviewed by: JAS

Hole Size HWT to 6.07m, HQ3 to 45.78m

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
	855.0		**SUGARLOAF DIORITE** (13.75 to 45.78) Dark greenish grey, fine to coarse grained, massive, strong, moderately weathered; FeO staining along fractures; weak chlorite alteration; calcite infill along joints and in fractures with trace dissolution weathering as vugs; trace disseminated sulphides.	100				R6			
				100				R6			
				100				R5			
45.0				101	UCS #3			R5			
	850.0		End of Drillhole: 45.78 m Reached Target Depth								
50.0											
	845.0										
55.0											
	840.0										

GENERAL REMARKS:
No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-12

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,636 E , 5,609,481 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 42.67m, HQ3 to 48.82m

Drillhole No.: DH14-059
Drill Type: Fraste DR238
Total Depth: 48.82 m
Elevation: 905.3 m
Azimuth , Inclination: 0 , -90

Page: 1 of 3
Date Started: 2 Nov 14
Date Completed: 3 Nov 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
	905.0		**SAND** (0 to 4.57) Some silt, some gravel, fine to coarse grained, subangular to subrounded, well graded, non-plastic, greyish brown, loose, massive, dry to moist.		SPT #1	100		12/18/19	37		
					SPT #2	98		19/28/35	63		
5.0	900.0		**SANDY SILT** (4.57 to 12.8) Some multicoloured gravel, fine to coarse grained, angular to subrounded, well graded, medium to high plasticity, greyish brown, dense, massive, dry to moist.		SPT #3	100		29/50+	R		SPT refusal on coarse material
					SPT #4	0		50+	R		SPT refusal on coarse material
					SPT #5	100		15/50+	R		SPT refusal on coarse material
10.0	895.0				SPT #6	100		30/37/46	R		
					SPT #7	100		22/20/23	43		
					SPT #8	64		13/30/37	67		
			SILT (12.8 to 27.43) Some gravel, trace clay, trace sand, fine to medium grained, subangular to angular, well graded, medium to high plasticity, dense, massive, moist.		SPT #9	100		6/15/21	36		
15.0	890.0				SPT #10	100		20/26/36	62		
					SPT #11	100		4/6/13	19		

GENERAL REMARKS:
No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-13

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Truck Shop Area

Coordinates: 686,636 E , 5,609,481 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 42.67m, HQ3 to 48.82m

Drillhole No.: DH14-059

Drill Type: Fraste DR238

Total Depth: 48.82 m

Elevation: 905.3 m

Azimuth , Inclination: 0 , -90

Page: 2 of 3

Date Started: 2 Nov 14

Date Completed: 3 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
	885.0		**SILT** (12.8 to 27.43) Some gravel, trace clay, trace sand, fine to medium grained, subangular to angular, well graded, medium to high plasticity, dense, massive, moist.								
					SPT #12	100		13/36/47	83		
25.0	880.0				SPT #13	100		16/41/37	78		
			SILTY SAND (27.43 to 31.09) Trace gravel, fine to medium grained, subangular to angular, well graded, non-plastic, greyish brown, compact, massive, wet.		SPT #14	100		8/17/16	33		
30.0	875.0				SPT #15	25		12/12/16	28		
			SANDY SILT (31.09 to 41.5) Trace clay, trace grave, fine to medium grained, angular to subangular, well graded, low plasticity, greyish brown, very stiff, massive, moist.		SPT #16	100		5/11/13	24		
35.0	870.0				SPT #17	100		8/12/27	39		Start injecting water for drilling
					SPT #18	100		17/48/50+	R		SPT refusal on dense material

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-13

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,636 E , 5,609,481 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 42.67m, HQ3 to 48.82m

Drillhole No.: DH14-059
Drill Type: Fraste DR238
Total Depth: 48.82 m
Elevation: 905.3 m
Azimuth , Inclination: 0 , -90

Page: 3 of 3
Date Started: 2 Nov 14
Date Completed: 3 Nov 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
	865.0										
			WEATHERED BEDROCK (41.5 to 42.67) Grey sand and bedrock chips from ODEX drilling - bedrock contact at 41.5 mbgs.	80				R4			
45.0	860.0		**IRON MASK HYBRID** (42.67 to 48.82) Grey to greenish grey, fine to coarse grained, inequigranular, porphyritic, strong with some local, moderately fractured zones, moderately weathered with some FeO staining and trace clay infill along some joints; quartz and calcite veins and veinlets throughout.	97				R4			
				100				R4			
				88				R4			
				100				R4			
50.0	855.0		End of Drillhole: 48.82 m Reached Target Depth								
55.0	850.0										

GENERAL REMARKS:
No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-13

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 685,215 E , 5,609,206 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.2m, HQ3 to 41.07m

Drillhole No.: DH14-060

Drill Type: Fraste DR238

Total Depth: 41.07 m

Elevation: 914.3 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 2 Nov 14

Date Completed: 3 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
0			**SANDY GRAVEL** (0 to 0.3) Trace silt; gravel is medium to coarse grained, poorly graded, angular to sub-angular; silt is non-plastic, light to medium grey, dry.									
			SUGARLOAF DIORITE (0.3 to 1.2) Light to medium grey, angular rock chips form ODEX - bedrock contact at 0.3 mbgs.	87				R5				No SPT conducted due to shallow bedrock
			SUGARLOAF DIORITE (1.2 to 24.2) Dark grey, fine to coarse grained, mottled, massive, strong, moderately weathered with FeO staining along fractures; minor fracturing; some calcite and quartz veinlets.	100				R5				
	910.0			100				R5				
5				102				R5				
				101				R5				
	905.0			100				R5				
10				100				R5				
				100				R5				
	900.0			102				R5				
15				101				R5				
				102				R5				
				101				R5				
	895.0			99				R5				

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-14

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 685,215 E , 5,609,206 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.2m, HQ3 to 41.07m

Drillhole No.: DH14-060

Drill Type: Fraste DR238

Total Depth: 41.07 m

Elevation: 914.3 m

Azimuth , Inclination: 0 , -90

Page: 2 of 3

Date Started: 2 Nov 14

Date Completed: 3 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
			SUGARLOAF DIORITE (1.2 to 24.2) Dark grey, fine to coarse grained, mottled, massive, strong, moderately weathered with FeO staining along fractures; minor fracturing; some calcite and quartz veinlets.	97				R5				
				102				R5				
				100				R5				
	890.0		**SUGARLOAF DIORITE** (24.2 to 25.67) Dark grey, fine to coarse grained, mottled, massive, strong, moderately weathered with FeO staining along fractures; moderately fractured over this interval with local rubble zones; some calcite and quartz veinlets.	2				R5				
25			**SUGARLOAF DIORITE** (25.67 to 41.07) Dark grey, fine to coarse grained, mottled, massive, strong, moderately weathered with FeO staining along fractures; minor fracturing; some calcite and quartz veinlets.	100				R5				
				100	UCS #1			R5				
	885.0			101				R5				
30				99				R5				
				101				R5				
	880.0			99				R5				
35				99				R5				
				100				R5				
					UCS #2							
				98				R5				
	875.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-14

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 685,215 E , 5,609,206 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.2m, HQ3 to 41.07m

Drillhole No.: DH14-060

Drill Type: Fraste DR238

Total Depth: 41.07 m

Elevation: 914.3 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 2 Nov 14

Date Completed: 3 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	INSTRUMENTATION / WELL DETAILS	DRILLING NOTES
				100				R5				
			End of Drillhole: 41.07 m Reached Target Depth									
45	870.0											
50	865.0											
55	860.0											
	855.0											

GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-14

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL DRILLHOLE LOG, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 684,973 E , 5,609,257 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.44m, HQ3 to 41.32m

Drillhole No.: DH14-061

Drill Type: Fraste DR238

Total Depth: 41.32 m

Elevation: 912.2 m

Azimuth , Inclination: 0 , -90

Page: 1 of 3

Date Started: 4 Nov 14

Date Completed: 4 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
			SANDY SILT (0 to 0.7) Trace gravel, fine grained, poorly graded, angular to subrounded, non-plastic, light brown, loose, dry; trace organics.								
	910.0		**SUGARLOAF DIORITE** (0.7 to 1.44) Light to medium grey, angular rock chips form ODEX - bedrock contact at 0.7 mbgs.	60				R4			No SPT conducted due to shallow bedrock
			SUGARLOAF DIORITE (1.44 to 4.02) Light to medium grey, fine to medium grained, inequigranular, strong, moderately weathered, highly fractured; FeO staining along joints and; quartz and calcite veins and veinlets throughout.	70				R4			
5.0				100				R4			
	905.0		**SUGARLOAF DIORITE** (4.02 to 41.32) Medium grey, fine to medium grained, inequigranular, strong to very strong, massive, slightly weathered; healed joints throughout; quartz and calcite veinlets; minor FeO staining.	100				R4			
				100	UCS #1			R5			
10.0				97				R5			
	900.0			100				R5			
				100				R5			
15.0				100				R5			
	895.0			99				R5			
				101				R5			
				100				R5			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-15

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 684,973 E , 5,609,257 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.44m, HQ3 to 41.32m

Drillhole No.: DH14-061

Drill Type: Fraste DR238

Total Depth: 41.32 m

Elevation: 912.2 m

Azimuth , Inclination: 0 , -90

Page: 2 of 3

Date Started: 4 Nov 14

Date Completed: 4 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
			SUGARLOAF DIORITE (4.02 to 41.32) Medium grey, fine to medium grained, inequigranular, strong to very strong, massive, slightly weathered; healed joints throughout; quartz and calcite veinlets; minor FeO staining.	100				R5			
	890.0			100				R5			
				100				R5			
25.0				99				R5			
	885.0			98				R5			
				100				R5			
30.0				97				R5			
				100				R5			
	880.0			98				R5			
				100				R5			
35.0				102				R5			
	875.0			100				R5			
				100				R5			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-15

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Primary Crusher Area

Coordinates: 684,973 E , 5,609,257 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 1.44m, HQ3 to 41.32m

Drillhole No.: DH14-061

Drill Type: Fraste DR238

Total Depth: 41.32 m

Elevation: 912.2 m

Azimuth , Inclination: 0 , -90

Page: 3 of 3

Date Started: 4 Nov 14

Date Completed: 4 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
				100				R5			
45.0	870.0		End of Drillhole: 41.32 m Reached Target Depth								
50.0	865.0										
55.0	860.0										
	855.0										

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-15

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Rock Quarry

Coordinates: 684,877 E , 5,609,154 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 5.4m, HQ3 to 35.26m

Drillhole No.: DH14-063

Drill Type: Fraste DR238

Total Depth: 35.26 m

Elevation: 923.4 m

Azimuth , Inclination: 0 , -90

Page: 1 of 2

Date Started: 5 Nov 14

Date Completed: 5 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
			SANDY, GRAVELLY SILT (0 to 3.04) Gravel is fine to coarse grained, well graded, angular to subangular; silt is low plasticity, medium brown, dense, massive, moist.		SPT #1	80		9/18/23	41		
	920.0		**GRAVELLY SILT** (3.04 to 5.2) Some sand; fine to coarse grained, well graded, low plasticity, medium brown and orange, dense, massive, moist.		SPT #2	52		10/15/25	40		
5.0					SPT #3	86		6/15/15	30		
			SUGARLOAF DIORITE (5.2 to 35.26) Dark greenish grey, fine to coarse grained, mottled, massive, very strong, slightly weathered; some FeO staining along joints and fractures; minor fracturing; chlorite and epidote alteration; trace calcite veinlets; trace sulphides.	100				R5			
				100				R5			
	915.0			101				R5			
10.0				98				R5			
				91				R5			
				97	UCS #1			R5			
	910.0			100				R5			
15.0				99				R5			
				97				R5			
	905.0			100				R5			

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-16

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Rock Quarry

Coordinates: 684,877 E , 5,609,154 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 5.4m, HQ3 to 35.26m

Drillhole No.: DH14-063

Drill Type: Fraste DR238

Total Depth: 35.26 m

Elevation: 923.4 m

Azimuth , Inclination: 0 , -90

Page: 2 of 2

Date Started: 5 Nov 14

Date Completed: 5 Nov 14

Logged by: GNH/JAG

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - × (20 40 60 80)	DRILLING NOTES
0	900.0		**SUGARLOAF DIORITE** (5.2 to 35.26) Dark greenish grey, fine to coarse grained, mottled, massive, very strong, slightly weathered; some FeO staining along joints and fractures; minor fracturing; chlorite and epidote alteration; trace calcite veinlets; trace sulphides.	100				R5			
				101				R5			
				99				R5			
25.0				100				R5			
	895.0			100				R5			
				100				R5			
30.0				99				R5			
				100				R5			
	890.0			99				R5			
35.0				100	UCS #2			R5			
			End of Drillhole: 35.26 m Reached Target Depth								
	885.0										

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-16

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Potential Borrow Area
Coordinates: 684,995 E , 5,608,807 N
Coordinate System: UTM NAD 83 Zone 10
Hole Size HWT to 13.62m, HQ3 to 20.29m

Drillhole No.: DH14-065
Drill Type: Fraste DR238
Total Depth: 20.29 m
Elevation: 907.2 m
Azimuth , Inclination: 0 , -90

Page: 1 of 2
Date Started: 5 Nov 14
Date Completed: 6 Nov 14
Logged by: LEP/MAS
Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
			SILTY SAND (0 to 4.57) Some gravel. Fine to medium grained, angular to subangular, well graded, low plasticity, brown, compact, massive, moist.								
	905.0				SPT #1	3		10/25/30	55		
					SPT #2	87		12/17/16	33		
5.0			**SANDY SILT** (4.57 to 7.62) Some gravel, trace clay. Fine to coarse grained, angular to subrounded, well graded, low plasticity, brown with slightly weathered clasts, dense, massive, moist.		SPT #3	100		7/9/11	20		
					SPT #4	87		6/12/13	25		
	900.0		**SILTY SAND** (7.62 to 10.67) Some gravel. Fine to coarse grained, subangular to subrounded, well graded, low plasticity, grey with some slightly weathered clasts, dense, massive, moist.		SPT #5	77		7/16/27	43		
10.0					SPT #6	100		11/23/23	46		
			SILTY GRAVEL (10.67 to 11.43) Some sand. Fine to coarse grained, subangular to subrounded, well graded, low plasticity, brown with light grey clasts, dense, massive, moist.		SPT #7	61		37/12/24	36		
	895.0		**BEDROCK** (11.43 to 13.62) Grey, angular rock chips from ODEX drilling - bedrock at 11.43 mbgs.								
			VOLCANICLASTIC (13.62 to 20.29) Grey, fine to coarse grained, equigranular, porphyritic, medium strong, fresh to slightly weathered; some calcite veins and veinlets throughout.	55				R3			
15.0				100	UCS #1			R3			
			BROKEN ZONE (16.35 to 16.6) Highly fractured with some clay infill.	99				R3			
	890.0			100				R3			
				100				R3			

GENERAL REMARKS:
No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-17

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project

Contractor: Geotech Drilling Services Ltd.

Location: Potential Borrow Area

Coordinates: 684,995 E , 5,608,807 N

Coordinate System: UTM NAD 83 Zone 10

Hole Size HWT to 13.62m, HQ3 to 20.29m

Drillhole No.: DH14-065

Drill Type: Fraste DR238

Total Depth: 20.29 m

Elevation: 907.2 m

Azimuth , Inclination: 0 , -90

Page: 2 of 2

Date Started: 5 Nov 14

Date Completed: 6 Nov 14

Logged by: LEP/MAS

Reviewed by: JAS

DEPTH - (m)	ELEVATION - (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	RUN RECOVERY (%)	SAMPLE NO.	SAMPLE REC. (%)	SAMPLE TYPE	UCS GRADE / BLOW COUNTS (PER 6")	SPT 'N' VALUE	RQD / SPT TEST 'N' VALUES - 20 40 60 80	DRILLING NOTES
			End of Drillhole: 20.29 m Reached Target Depth								
	885.0										
25.0											
	880.0										
30.0											
	875.0										
35.0											
	870.0										

GENERAL REMARKS:

No piezometer installation.

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE C1-17

Logging conducted according to a combination of the ASTM 2488 standard and the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\AI\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, GEOTECHNICAL LOG - NO INSTALLATION, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

APPENDIX C2

GEOTECHNICAL RMR/RQD SHEETS

(Pages C2-1 to C2-40)

GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-004

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour rock	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	892.53	8.81	883.7	8.81	0.0	0	0										OVERBURDEN - ODEX											
8.81	883.72	10.33	882.2	1.52	1.43	94	0.44	29	Max	5	75	R4	SLD	Blue-grey	Medium grained, equigranular	Massive	Moderately weathered; highly fractured and rubblized; iron oxide staining, blocked three times and changed bit while drilling. First 0.60 m is rubble.	0	1	3	2	3	9	15	Rub	FeO		**43**
10.33	882.20	12.50	880.0	2.17	2.17	100	1.59	73	16	128	175	R5	SLD	Blue-grey	Medium grained, equigranular, slightly porphyritic	Massive	Moderately weathered; fractured; very strong, iron oxide staining on joint surfaces. Run is longer in an attempt to get back to whole numbers and line up with stickup.	0	4	3	2	3	12	15	FeO			**61**
12.50	880.03	14.02	878.5	1.52	1.52	100	0.99	65	Max	5	150	R5	SLD	Blue-grey	Medium grained, equigranular	Massive	Moderately weathered; fractured; very strong, iron oxide staining on joint surfaces, core in shoe is highly fractured and rubblized, and fell apart when removing from shoe, entire run fractured more when transferring to core box. Last 10 cm is rubble.	0	4	3	2	3	12	15	FeO	rub		**57**
14.02	878.51	15.54	877.0	1.52	1.52	100	0.11	7	Max	5	75	R4	MAFV	Blue-grey	Medium grained, equigranular	Massive	Moderately weathered; fractured and rubblized; strong, iron oxide staining, some soft crushed rock/gouge infill on some joints, silvery sulphide veinlets towards end of run.	0	1	3	2	3	9	15	FeO	gg	sul	**40**
15.54	876.99	17.06	875.5	1.52	1.52	100	0.60	39	Max	5	125	R5	MAFV	Blue-grey	Medium grained, equigranular	Massive	Moderately weathered; fractured and rubblized; strong, iron oxide staining, some soft crushed rock/gouge infill on some joints, trace pyrite and sulphide flecks, silvery sulphide veinlets throughout. 31 cm Shear/Fault zone from 16.40 m to 16.71 m.	0	4	3	2	3	12	15	FeO	gg	sul	**51**
17.06	875.47	18.59	873.9	1.53	1.53	100	1.38	90	12	118	150	R5	MAFV	Greenish blue-grey	Fine to medium grained, equigranular	Massive	Moderately weathered; fractured; very strong, calcite infill, trace sulphides, one joint rubblized.	0	4	3	2	3	12	15	cc	sul	rub	**64**
18.59	873.94	20.11	872.4	1.52	1.51	99	1.13	74	11	126	150	R5	MAFV	Dark blue-grey	Medium grained, equigranular	Massive	Slightly weathered; very strong, some calcite infill, sulphide veining, trace pyrite flecks and pyrite infill.	0	4	3	2	5	14	15	cc	sul	py	**62**
20.11	872.42	21.64	870.9	1.53	1.53	100	1.28	84	7	191	125	R5	SLD	Greenish blue-grey	Medium grained, equigranular	Massive	Slightly weathered, very strong, some calcite infill, veins & veinlets, top of run has mottled texture.	0	4	3	2	5	14	15	cc			**64**
21.64	870.89	23.16	869.4	1.52	1.37	90	0.62	41	Max	5	125	R5	SLD	Greenish blue-grey	Medium grained, equigranular	Massive	Slightly weathered, very strong, some calcite infill, veins, & veinlets, chlorite presence, last 0.25 m is a broken zone, possibly drill induced.	0	4	3	2	5	14	15	cc	rub	chl	**53**
23.16	869.37	24.68	867.9	1.52	1.52	100	1.08	71	14	101	125	R5	SLD	Blue-grey	Medium grained, equigranular	Massive	Slightly weathered, very strong, trace calcite and iron oxide infill, more porphyritic than previous runs.	0	4	3	2	5	14	15	cc	FeO		**60**
24.68	867.85	26.21	866.3	1.53	1.53	100	0.89	58	Max	5	125	R5	SLD	Blue-grey	Medium grained, equigranular	Massive	Slightly weathered, very strong, trace calcite and iron oxide infill, some small (< 5 cm) rubble zones present.	0	4	3	2	5	14	15	Rub	FeO	cc	**56**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour rock	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition						Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
																		Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)					
26.21	866.32	27.73	864.8	1.52	1.52	100	1.24	82	11	127	150	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	Slightly weathered; very strong, trace iron oxide staining on joint surfaces, one joint is sheared, one bleb of limonite (?).	0	4	3	2	5	14	15	FeO	rub	lim	**64**
27.73	864.80	29.25	863.3	1.52	1.52	100	1.13	74	8	169	150	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	Slightly weathered; very strong, trace iron oxide staining on joint surfaces, 0.14 m section of purple altered rock at 28.63 m with small (< 10 cm) fault zones above and below altered section.	0	4	3	2	5	14	15	FeO	rub	gg	**63**
29.25	863.28	30.78	861.8	1.53	1.52	99	1.42	93	7	190	200	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	Slightly weathered; very strong, iron oxide and limonite staining, thin calcite infill.	0	4	3	2	5	14	15	FeO	lim	cc	**69**
30.78	861.75	32.30	860.2	1.52	1.52	100	1.46	96	7	190	200	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	Slightly weathered; very strong, iron oxide and trace limonite staining, thin calcite infill.	0	4	3	2	5	14	15	FeO	cc	lim	**70**
32.30	860.23	33.83	858.7	1.53	1.46	95	1.07	70	13	104	200	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	Very strong, iron oxide staining, more fractured than previous.	0	4	3	2	6	15	15				**64**
33.83	858.70	35.35	857.2	1.52	1.52	100	1.26	83	13	109	200	R5	SLD	Blue-grey	Medium grained, equigranular, porphyritic	Massive	As above.	0	4	5	2	5	16	15				**68**
35.35	857.18	36.88	855.7	1.53	1.48	97	1.15	75	12	114	175	R5	SLD	Greenish blue-grey	Medium grained, equigranular, porphyritic	Massive	Fresh, very strong, iron oxide and yellow/green staining (epidote?).	0	4	5	2	6	17	15				**67**
36.88	855.65	38.40	854.1	1.52	1.51	99	1.03	68	15	94	175	R5	SLD	Greenish blue-grey	Medium grained, equigranular, porphyritic	Massive	As above, many healed fractures, slightly weathered, sulphide veining.	0	4	5	2	5	16	15				**64**
38.40	854.13	39.93	852.6	1.53	1.50	98	1.35	88	7	188	100	R5	SLD	Dark grey to greenish grey, some brownish zones.	Fine to coarse grained, porphyritic	Massive	Medium strong to strong, moderately to slightly weathered, massive, veining ranging from 70 to 90 degrees to core axis, pyrite veins up to 1cm thick, calcite on joints, iron oxide on joints.	0	4	3	2	3	12	15	cc	fex		**61**
39.93	852.60	41.45	851.1	1.52	1.50	99	1.40	92	10	136	120	R5	SLD	Dark grey to greenish grey, some brownish zones.	Fine to coarse grained, porphyritic	Massive	As above, drillers had trouble getting it out of the tube, hammered, some mechanical breaks, slight discolouration, not as many pyrite veins.	0	4	3	2	5	14	15	cc	fex		**65**
41.45	851.08	42.97	849.6	1.52	1.50	99	0.60	39	13	107	150	R5	SLD	Dark grey to light greenish grey, white to black phenocrysts	Fine to coarse grained, porphyritic	Massive	Dark vein with pyrite blebs 13cm wide, possible intrusion?, slightly weathered, massive, calcite, iron oxide on joint surfaces, moderately fractured.	0	1	3	2	5	11	15	cc	fex	py	**53**
42.97	849.56	44.50	848.0	1.53	1.52	99	1.21	79	7	190	120	R5	SLD	Dark grey to light greenish grey, white to black phenocrysts	Fine to coarse grained, porphyritic	Massive	As above, more competent, less veining, epidote and pyrite veins, some half open fractures, competent.	0	4	3	2	5	14	15	epi	cc	py	**63**
44.50	848.03	46.02	846.5	1.52	1.45	95	0.78	51	9	145	120	R5	SLD	Greenish grey, white to black phenocrysts	Fine to coarse grained, porphyritic	Massive	Pyrite and calcite veins up to 2cm wide, strong, slightly weathered, massive, greenish mineral, calcite, pyrite on joints, competent.	0	4	3	2	5	14	15	cc	py		**57**
46.02	846.51	47.55	845.0	1.53	1.53	100	1.31	86	6	219	120	R5	SLD	Greenish grey, white to black phenocrysts	Fine to coarse grained, porphyritic	Massive	As above, competent, one joint with large infill, one small vein with pyrite, bornite?, calcite, chlorite, shiny silver material.	0	1	3	0	5	9	15	py	cc	chl	**59**
47.55	844.98	49.07	843.5	1.52	1.52	100	0.65	43	11	127	150	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	Calcite and iron oxide on joints, very strong, slightly weathered, massive, calcite veins, some dissolution along veins, mostly competent.	0	4	3	2	5	14	15	cc			**57**
49.07	843.46	50.59	841.9	1.52	1.52	100	1.20	79	8	169	100	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	As above, more competent, no dissolution, pyrite veins up to 0.5cm, calcite, iron oxide, pyrite on joints.	0	4	3	2	5	14	15	cc	fex	py	**61**

DRILL RUN DATA													GEOLOGY - COMMENTS				DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour rock	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition						Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
																		Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)					
50.59	841.94	52.12	840.4	1.53	1.52	99	0.91	59	6	217	100	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	As above, subvertical fractures, calcite, epidote, chlorite, and pyrite on joint surfaces.	0	4	3	2	5	14	15	cc	chl	py	**58**
52.12	840.41	53.64	838.9	1.52	1.52	100	1.07	70	8	169	100	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	Strong, slightly weathered, massive, calcite veins, pyrite, calcite, chlorite, and a blueish mineral on joints.	0	4	3	2	5	14	15	cc	chl	py	**59**
53.64	838.89	55.17	837.4	1.53	1.52	99	1.14	75	9	152	120	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	As above, some pyrite veins, pyrite, calcite, iron oxide, epidote, and chlorite on joints, no split tube in the core tube for this run.	0	4	3	2	5	14	15	py	cc	fex	**61**
55.17	837.36	56.69	835.8	1.52	1.52	100	0.97	64	11	127	120	R5	SLD	Dark grey to greenish grey, white to black phenocrysts.	Fine to coarse grained, porphyritic	Massive	Strong, slightly weathered, massive, calcite and pyrite veins, chlorite, calcite, pyrite, and iron oxide on joints, one broken zone for 5cm, otherwise competent.	0	1	3	2	5	11	15	chl	cc	py	**56**
56.69	835.84	58.21	834.3	1.52	1.52	100	1.13	74	13	109	120	R5	SLD	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; strong, calcite veinlets and infill, pyrite flecks, one small (< 5 cm) broken zone.	0	1	3	2	5	11	15	cc	py		**58**
58.21	834.32	59.73	832.8	1.52	1.52	100	1.26	83	8	169	150	R5	SLD	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; more competent; very strong, cc veinlets and infill, trace pyrite and FeO presence.	0	4	3	2	5	14	15	cc	py	FeO	**65**
59.73	0.00	61.26	831.3	1.53	1.53	100	1.08	71	12	118	120	R5	SLD	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; multiple healed joints; strong, hematite staining on joint surfaces and on core surface towards end of run, end piece from shoe is heavily mineralized with calcite and pyrite.	0	4	3	2	5	14	15	hem	py	cc	**60**
61.26	831.27	62.78	829.8	1.52	1.52	100	1.25	82	Max	5	120	R5	SLD	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Moderately weathered; strong, chlorite presence, 12 cm rubble zone towards end of run (loss of circulation).	0	1	3	2	3	9	15	chl	py	cc	**56**
62.78	829.75	64.30	828.2	1.52	1.52	100	1.23	81	9	152	120	R5	SLD	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; healed joints throughout; strong, calcite infill and veinlets, pyrite flecks.	0	4	3	2	5	14	15	cc	py		**63**
64.30	828.23	65.83	826.7	1.53	1.53	100	0.59	39	20	73	120	R5	PICR	Dark blue-grey	Fine to medium grained, porphyritic	Massive	Slightly weathered; strong; mottled texture to rock, calcite veinlets and infill.	0	4	3	2	5	14	15	cc			**54**
65.83	826.70	67.35	825.2	1.52	1.52	100	0.46	30	26	56	100	R5	PICR	Blue-grey	Fine to medium grained, porphyritic	Massive	Slightly weathered; intensely fractured; strong, heavy calcite presence.	0	4	3	2	5	14	15	cc			**51**
67.35	825.18	68.87	823.7	1.52	1.52	100	0.62	41	23	63	120	R5	PICR	Blue-grey	Fine to medium grained, porphyritic	Massive	Slightly weathered; intensely fractured; strong, heavy calcite presence.	0	4	3	2	5	14	15	cc			**54**
68.87	823.66	70.40	822.1	1.53	1.13	74	0.25	16	Max	5	120	R5	PICR	Blue-grey	Fine to medium grained	Massive	Slightly weathered; intensely fractured and rubblized; strong, heavy pyrite mineralization, one large (~12 cm) rubble zone.	0	1	3	2	5	11	15	rub	py	cc	**47**
70.40	822.13	71.93	820.6	1.53	0.91	59	0.00	0	Max	5	75	R4	PICR	Blue-grey	Fine to medium grained	Massive	Predominantly rubble, no intact core fragments. Redrilled 0.61 m to correct for metric drill rods but had no recovery.	0	0	3	2	3	8	15	rub	cc	py	**39**
71.93	820.60	73.45	819.1	1.52	1.23	81	0.25	16	Max	5	75	R4	PICR	Blue-grey	Fine to medium grained	Massive	Moderately weathered; many healed fractures; strong, calcite infill, first half of run is rubblized, into more competent rock from 0.67 m onwards.	0	1	3	2	3	9	15	rub	cc		**42**
73.45	819.08	74.98	817.6	1.53	1.44	94	0.82	54	13	103	100	R5	PICR	Grey	Fine to medium grained, equigranular	Massive	Moderately weathered; many healed fractures; strong, chlorite presence, calcite veinlets and infill.	0	4	3	2	3	12	15	cc	chl		**53**

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Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour rock	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition						Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
																		Persis-P	Apert-A	Rough R	Infill I	Weath W	TOTAL (RMR)					
74.98	817.55	76.50	816.0	1.52	1.48	97	1.34	88	7	185	120	R5	PICR	Grey	Fine to medium grained, equigranular	Massive	Moderately weathered; many healed fractures; strong, chlorite presence, calcite veinlets and infill, more competent than previous.	0	4	3	2	5	14	15	cc	chl		**65**
76.50	816.03	78.02	814.5	1.52	1.52	100	1.13	74	10	138	120	R5	PICR	Blue-grey	Fine to medium grained, equigranular	Massive	Slightly weathered; strong, calcite veinlets & infill.	0	4	3	2	5	14	15	cc			**61**
78.02	814.51	79.55	813.0	1.53	1.53	100	1.26	82	7	191	120	R5	PICR	Blue-grey with white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; many healed fractures; strong, bottom half of run has multiple spidery calcite veinlets, calcite as infill also, some reddish alteration from 78.72 m to 78.77 m, end piece of run destroyed when removing from shoe.	0	4	3	2	5	14	15	cc			**63**
79.55	812.98	81.08	811.5	1.53	1.42	93	1.25	82	8	158	150	R5	PICR	Dark grey with black & white phenocrysts	Fine to coarse grained, porphyritic	Massive	Slightly weathered; many healed joints, one joint rubblized; very strong, calcite infill and veinlets.	0	4	3	2	5	14	15	cc	rub		**64**
81.08	811.45	82.60	809.9	1.52	1.42	93	1.04	68	8	158	150	R5	PICR	Dark greenish grey	Fine to coarse grained, porphyritic	Massive	Brecciated; slightly weathered; very strong, abundant calcite veining, calcite infill, trace pyrite, heavily chloritized, lots of dissolution.	0	4	3	2	5	14	15	cc	chl	py	**62**
82.60	809.93	84.12	808.4	1.52	1.52	100	0.34	22	8	169	80	R4	PICR	Grey with bright green and brown in the matrix.	Fine to coarse grained, porphyritic, brecciated	Massive	Brecciated, fragments range from 0.5 to 10cm, matrix supported, some porphyritic zones throughout run, dissolution/vesicles in some zones, rock above seems like a brecciated basalt? Calcite veins, calcite and chlorite on joints, medium strong to strong, slightly to moderately weathered.	0	1	3	2	5	11	15	cc	chl		**47**
84.12	808.41	85.64	806.9	1.52	1.52	100	1.20	79	6	217	100	R5	PICR	Brownish grey matrix with dark greenish grey clasts, then Dark grey to black with greenish zones.	Fine to coarse grained, brecciated.	Massive	Breccia, top of run is brownish grey matrix with dark greenish grey clasts, 90% matrix, 10% clasts, then at 84.7m, the clasts increase to 50%, rock changes at 84.8m to clast supported breccia and dark grey to black with greenish zones, medium strong to strong, slightly to moderately weathered, massive, broken zone at top of run, lots of calcite veins after 84.8m, calcite and chlorite on joints.	0	1	3	2	3	9	15	cc	chl		**57**
85.64	806.89	87.17	805.4	1.53	1.48	97	0.87	57	6	211	80	R4	PICR	Dark grey to black with greenish zones.	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	Medium strong to strong, slightly to moderately weathered, massive, chlorite and calcite on discontinuities.	0	1	1	2	3	7	15	chl	cc		**49**
87.17	805.36	88.69	803.8	1.52	1.52	100	0.72	47	9	152	50	R4	PICR	Dark grey to black with greenish zones.	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	As above, slightly more competent, dissolution, broken zone at end of run with greenish clay.	0	1	1	2	3	7	15	cly	cc	chl	**44**
88.69	803.84	90.22	802.3	1.53	1.52	99	0.24	16	Max	5	5	R2	PICR	Dark to light grey with some greenish and black zones.	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	Fault Breccia? Diorite?, very weak, moderately to highly weathered, massive, grey clay, calcite and clay on discontinuities.	0	1	1	0	1	3	15	cly	cc		**29**
90.22	802.31	91.74	800.8	1.52	1.16	76	0.10	7	Max	5	5	R2	PICR	Light grey with some greenish zones	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	As above, poor recovery, clay zones washed away, calcite, chlorite, and clay on joints, rubble, breccia zones with soft clay matrix.	0	1	1	0	1	3	15	cly	cc		**28**

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																	Joint Condition										
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91.74	800.79	92.66	799.9	0.92	0.92	100	0.00	0	Max	5	5	R2	PICR	Dark to light grey with some greenish and black zones.	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	Fault Breccia; highly weathered; very weak, mostly clay matrix with some minor breccia zones, first 0.36 m is slough material (assumed).	0	1	1	0	1	3	15	cly	rub		**28**
92.66	799.87	94.18	798.4	1.52	1.51	99	0.63	41	Max	5	5	R2	PICR	Dark to light grey with some greenish and black zones.	Fine to medium grained, porphyritic to aphanitic with some breccia zones	Massive	Fault Breccia; highly weathered; very weak, mostly clay matrix with some minor breccia zones, some sections of more competent rock.	0	1	1	0	1	3	15	cly	cc	rub	**33**
94.18	798.35	95.71	796.8	1.53	1.52	99	1.29	84	6	217	75	R4	MTUF	Dark grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; moderately weathered; strong, lots of dissolution, calcite veinlets and infill, rubble infill on first two joints (end of fault zone).	0	4	3	2	3	12	15	cc	rub		**59**
95.71	796.82	97.23	795.3	1.52	1.52	100	1.41	93	6	217	75	R4	MTUF	Dark greenish grey to light grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; moderately weathered; strong, dissolution in calcite veinlets, calcite infill, transition to massive light grey section at 96.75 m.	0	4	3	2	3	12	15	cc			**61**
97.23	795.30	98.76	793.8	1.53	1.53	100	1.52	99	2	510	125	R5	MTUF	Dark to light grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; moderately weathered; competent; very strong, surface of core is moderately weathered.	0	4	3	6	3	16	15				**73**
98.76	793.77	100.28	792.3	1.52	1.48	97	1.43	94	2	493	125	R5	MTUF	Dark to light grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; slightly weathered; competent; very strong.	0	4	3	6	5	18	15				**73**
100.28	792.25	101.80	790.7	1.52	1.50	99	1.30	86	5	250	150	R5	PICR	Dark to light grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; slightly weathered; very strong, calcite veining and infill, dissolution, some reddish alteration at 102.25 m.	0	4	3	2	5	14	15	cc			**66**
101.80	790.73	103.33	789.2	1.53	1.53	100	1.53	100	3	383	150	R5	PICR	Dark to light grey	Fine to coarse grained, porphyritic to aphanitic	Massive	Brecciated; slightly weathered; very strong; abundant calcite veinlets; calcite infill; some chloritization and dissolution.	0	4	3	2	5	14	15	cc	chl		**71**
103.33	789.20	104.85	787.7	1.52	1.52	100	0.42	28	13	109	80	R4	PICR	Dark grey to black	Fine to coarse grained, porphyritic	Massive	Medium strong to strong, slightly weathered, calcite veins up to 5mm wide, calcite and chlorite on joints, moderately fractured.	0	4	3	2	5	14	15	cc	chl		**50**
104.85	787.68	106.38	786.2	1.53	1.52	99	0.00	0	Max	5	50	R4	PICR	Dark grey to black	Fine to coarse grained, porphyritic	Massive	As above, only sheared in some zones, highly to moderately fractured, calcite and chlorite on joints, calcite veins throughout.	0	1	1	2	3	7	15	cc	chl		**36**
106.38	786.15	107.90	784.6	1.52	1.52	100	0.44	29	10	138	50	R4	PICR	Dark grey to black with greenish zones.	Fine to medium grained, porphyritic	Massive	Medium strong, moderately weathered, calcite and chlorite veins throughout, moderately fractured, some redrill at the top of the run, shiny joint surfaces.	0	1	1	2	3	7	15	cc	chl		**41**
107.90	784.63	109.42	783.1	1.52	1.52	100	0.66	43	12	117	50	R4	PICR	Dark grey to black with greenish zones.	Fine to medium grained, porphyritic	Massive	As above, only more competent, some greenish zones, calcite veins, calcite and chlorite on joints.	0	4	1	2	3	10	15	cc	chl		**46**

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

Print: 4/7/2015 2:44 PM

GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-007

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
																		Joint Condition						Water	Fill.	Fill.	Fill.	RMR-89
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Rating	Type 1 (see Leg)	Type 2 (see Leg)	Type 3 (see Leg)	Total Average
0.00	945.46	39.19	906.3	39.19	0.0	0	0										overburden, not recovered											
39.19	906.27	39.60	905.9	0.41	0.38	93		0	max	5	25	R3	PICR	Greenish Grey	Fine grained	Massive to foliated	Heavily weathered, light greenish grey to dark grey, fine grained, soft, lots of chlorite and calcite, logged as rubble.	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**30**
39.60	905.86	41.12	904.3	1.52	1.02	67	0.00	0	max	5	10	R2	PICR	Greenish Grey	Fine grained	Massive to foliated	Heavily rubblized, heavily weathered, greenish grey, 10 cm section of soft clay can be indented by thumb, possibly shear zone material, possibly just completely weathered. Logged under fault conditions due to bad condition of core.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**25**
41.12	904.34	42.64	902.8	1.52	1.50	99	0.00	0	max	5	5	R2	PICR	Greenish Grey	Fine grained	Massive to foliated	Same as previous, including clay material.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**25**
42.64	902.82	44.16	901.3	1.52	1.44	95	0.00	0	max	5	5	R2	PICR	Greenish Grey	Fine grained	Massive to foliated	Same material as above, but very washed, and lots of redrilled pieces. Fine grained, greenish grey rubblized. Heavily weathered, chlorite clay. Potentially poor return with lots of sloughed material. Could indicate that the runs are being washed away due to very poor rock quality.	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**29**
44.16	901.30	45.68	899.8	1.52	0.00	0	0.00	0	max	5	5	R2	PICR	Greenish Grey	Fine grained	Massive to foliated	NO RECOVERY likely due to poor quality of rock, or large section of completely weathered material. Joint condition assumed from recovery above and below this run.	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**29**
45.68	899.78	47.20	898.3	1.52	1.20	79	0.00	0	max	5	10	R2	PICR	Greenish Grey	Fine grained	Massive to foliated	Heavily weathered, light greenish grey to dark grey, fine grained, soft, lots of chlorite and calcite. Calcite veins and veinlets pervasive, soft sections able to indent with thumb, hard sections can be peeled with knife.	0	0	1	0	1	2	15				**27**
47.20	898.26	48.72	896.7	1.52	1.21	80	0.00	0	max	5	25	R3	PICR	Greenish Grey	Fine grained	Massive to foliated	Moderately weathered, greenish grey, foliated with white bands and veinlets, Dissolution along foliation and veinlets, Joints are clean to <2mm infill soft, aperture is relatively open, also due to washing, joints slightly rough, low recovery, check with driller to confirm depth.	0	2	3	2	3	10	15				**36**
48.72	896.74	50.24	895.2	1.52	1.30	86	0.00	0	max	5	25	R3	PICR	Greenish Grey	Fine grained	Massive to foliated	Same as previous. Some loss of recovery again, again confirmed depth with driller.	0	2	3	2	3	10	15				**36**
50.24	895.22	51.76	893.7	1.52	1.23	81	0.56	37	5	205	40	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Greenish grey with black inequigranular phenocrysts, minor iron oxide staining, calcite and quartz veins visible.	0	4	3	2	5	14	15				**49**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
51.76	893.70	53.28	892.2	1.52	1.21	80	1.06	70	2	403	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	As above, fresh, no infilling.	0	4	3	6	6	19	15				**61**
53.28	892.18	54.80	890.7	1.52	1.11	73	1.11	73	0	1110	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Greenish grey with black inequigranular phenocrysts, no infilling.	0	6	6	6	6	24	15				**72**
54.80	890.66	56.32	889.1	1.52	1.52	100	0.94	62	4	304	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	As above, 5cm thick broken/rubble zone at 56.07m. Does not appear to be mechanical.	0	1	3	6	6	16	15				**55**
56.32	889.14	57.84	887.6	1.52	1.42	93	1.42	93	2	473	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Greenish grey with black inequigranular phenocrysts, no infilling.	0	4	5	2	6	17	15				**65**
57.84	887.62	59.36	886.1	1.52	1.48	97	1.48	97	2	493	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	As above, small amount of soft grey infill (could be clay, or cuttings), trace calcite infilling.	0	4	1	2	6	13	15	cc	cly		**62**
59.36	886.10	60.88	884.6	1.52	1.25	82	1.25	82	2	417	50	R4	PICR	Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with black inequigranular phenocrysts, trace calcite infilling.	0	4	5	2	6	17	15				**64**
60.88	884.58	62.40	883.1	1.52	1.52	100	0.90	59	6	217	25	R3	PICR	Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with black inequigranular phenocrysts, trace calcite infilling.	0	1	5	2	5	13	15	cc			**51**
62.40	883.06	63.92	881.5	1.52	1.52	100	1.36	89	4	304	50	R4	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with black inequigranular phenocrysts, trace calcite infilling.	0	4	5	6	6	21	15	cc			**68**
63.92	881.54	65.44	880.0	1.52	1.52	100	1.26	83	6	217	25	R3	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with black inequigranular phenocrysts, trace calcite infilling.	0	4	3	2	6	15	15	cc			**58**
65.44	880.02	66.96	878.5	1.52	1.21	80	1.07	70	2	403	50	R4	PICR	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Dark phenocrysts, minor calcite veinlets throughout, short fault zone (8cm) at 66.51m (could be where the loss of recovery occurred)	0	1	3	2	6	12	15	cc			**56**
66.85	878.61	68.35	877.1	1.50	1.46	97	1.08	72	10	133	50	R4	PICR	Dark Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, strong, fresh, tight joints with no infill, chlorite alteration on joint surfaces, sparse calcite veinlets, trace chalcopyrite	0	4	1	6	5	16	15				**58**
68.35	877.11	69.85	875.6	1.50	1.42	95	1.02	68	5	237	50	R4	PICR	Dark Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, strong, fresh, tight joints with hard infill, chlorite-sericite alteration on joint surfaces, sparse calcite veinlets, trace chalcopyrite	0	4	1	4	5	14	15				**56**
69.85	875.61	71.35	874.1	1.50	1.47	98	0.89	59	12	113	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Flow Banded	hornblende in microcrystalline matrix, flow banded with aphanitic basalt, strong, fresh, partly open joints with hard infill, chlorite-sericite alteration on joint surfaces, intermittent calcite veinlets	0	4	1	3	5	13	15				**54**
71.35	874.11	72.85	872.6	1.50	1.30	87	1.30	87	4	260	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, fresh, strong, partly open joints with no infill, minor chlorite-sericite alteration on joints, sparse calcite veinlets, basalt banding at 72.58m	0	5	1	6	5	17	15				**65**
72.85	872.61	74.35	871.1	1.50	1.49	99	1.34	89	6	213	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Brecciated	hornblende in microcrystalline matrix, brecciated by basalt flows, fresh, strong, wide joints with soft infill, chlorite-sericite alteration on joints, short sections of heavy calcite veinlets	0	1	1	0	5	7	15				**55**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
74.35	871.11	75.85	869.6	1.50	1.41	94	1.21	81	9	141	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, fresh, strong, partly open joints with calcite infill, minor chlorite-sericite alteration on joints, intermitted calcite veinlets, sparse basalt bands	0	4	1	2	5	12	15				**57**
75.85	869.61	77.35	868.1	1.50	1.38	92	1.29	86	4	276	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, fresh, strong, partly open joints with no infill, minor sericite alteration on joints, intermitted calcite veinlets	0	4	1	6	5	16	15				**64**
77.35	868.11	78.85	866.6	1.50	1.46	97	1.38	92	4	292	75	R4	PICR	Medium Greenish Grey	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, fresh, strong, tight joints with hard infill, minor chlorite alteration on joints, intermittent quartz-calcite veining, gougey/rubbly last 5cm of run	0	5	1	4	5	15	15				**65**
78.85	866.61	80.09	865.4	1.24	1.22	98	1.20	97	5	203	100	R5	SLD	Medium Grey	Fine to coarse crystalline/ Porphyritic	Massive	chlorite-pyroxene, chalcopyrite phyric in microcrystalline matrix, fresh, strong, tight joints with fine gravel infill, minor chlorite alteration on joints, prevalent calcite veinlets	0	5	1	4	5	15	15				**66**
80.09	865.37	80.35	865.1	0.26	0.26	100	0.16	62	3	65	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Fresh, strong, partly open joints with fine gravel infill, calcite-veined brecciated zone for first 7cm	0	4	1	3	5	13	15				**54**
80.35	865.11	81.15	864.3	0.80	0.80	100	0.80	100	3	200	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Flow banded with the hornblende volcanic from above, tight joints with hard infill, intermittent calcite veinlets	0	5	1	4	5	15	15				**65**
81.15	864.31	81.85	863.6	0.70	0.57	81	0.57	81	1	285	75	R4	PICR	Dark Greyish Green	Fine to coarse crystalline/ Porphyritic	Massive	hornblende in microcrystalline matrix, tight joints with no infill, white alteration on joint	0	5	1	6	5	17	15				**64**
81.85	863.61	83.35	862.1	1.50	1.12	75	0.90	60	6	160	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Fresh, strong, tight joints with no infill, slight reddish orange weathering on joint surfaces, some blocky sections, intermittent calcite veins, trace pyrite	0	5	1	6	5	17	15				**59**
83.35	862.11	84.85	860.6	1.50	1.43	95	1.25	83	10	130	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Fresh, strong, partly open joints with calcite infill, chlorite alteration on joint surfaces, quartz-chlorite vein zone from 83.84-83.94m, sparse quartz and calcite veinlets	0	4	1	3	5	13	15				**57**
84.85	860.61	86.35	859.1	1.50	1.41	94	1.19	79	9	141	50	R4	MAFV	Medium Grey	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Fresh strong, partly open joints with no infill, minor red weathering on joint surfaces, prevalent chlorite and calcite veining, trace chalcopyrite	0	4	1	6	5	16	15				**59**
86.35	859.11	87.85	857.6	1.50	1.50	100	1.06	71	10	136	75	R4	SLD	Medium Grey	Fine to Coarse/Porphyritic	Massive	quartz-plagioclase-hornblende-phyric in microcrystalline matrix, slightly weathered, strong, open joints with gravel infill, dark red staining on joint surfaces, chlorite alteration on joints, heavy quartz and chlorite veining carrying pyrite	0	4	1	3	5	13	15				**56**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
87.85	857.61	89.37	856.1	1.52	1.40	92	0.65	43	12	108	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Quart-plagioclase-hornblende phyric in aphanitic matrix, strong, slightly weathered, highly fractured interval with chlorite and epidote alteration on joint surfaces and fracture infill. Fractures also contain sulphide (pyrite).	0	1	4	4	5	14	15				**52**
89.37	856.09	90.89	854.6	1.52	1.39	91	0.39	26	12	107	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Quart-plagioclase-hornblende phyric in aphanitic matrix, strong, slightly weathered, highly fractured interval with chlorite and epidote alteration on joint surfaces and fracture infill. Fractures also contain sulphide (pyrite).	0	1	3	4	5	13	15				**48**
90.89	854.57	92.41	853.1	1.52	1.39	91	0.40	26	12	107	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Quart-plagioclase-hornblende phyric in aphanitic matrix, Still mainly porphyritic with smaller hornblende crystals than previous intervals, strong, slightly weathered, highly fractured interval with chlorite and epidote alteration on joint surfaces and fracture infill. Sulphide also visible in fracture infill and fresh fracture surfaces.	0	1	3	4	5	13	15				**48**
92.41	853.05	93.93	851.5	1.52	1.45	95	0.34	22	12	112	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Quart-plagioclase-hornblende phyric in aphanitic matrix, Still mainly porphyritic with smaller hornblende crystals than previous intervals, strong, slightly weathered, highly fractured interval with chlorite and epidote alteration on joint surfaces and fracture infill. Sulphide also visible in fracture infill and fresh fracture surfaces.	0	1	3	4	5	13	15				**48**
93.93	851.53	95.45	850.0	1.52	0.84	55	0.36	24	max	5	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Continuation of above unit, however, not a good interval for geotechnical logging. Interval was stuck in core barrel and very beaten up, made up of a number of rounded pieces of core. It was retrieved after numerous attempts pulling the tube and finally pulling all of the rods. Low recovery not necessary for this predominantly competent rock type.	0	BROKEN	BROKEN	3	5	9	15				**43**
95.45	850.01	96.97	848.5	1.52	1.39	91	0.26	17	max	5	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Strong, fresh to slightly weathered, highly fractured with epidote and pyrite along fracture faces and infill. Rubble at start of interval, likely part of previous run.	0	1	5	4	5	15	15				**48**
96.97	848.49	97.44	848.0	0.47	0.47	100	0.47	100	1	235	75	R4	SLD	Grey to green	Very Fine to Medium/Aphanitic to Porphyritic	Massive	Strong, fresh to slightly weathered, continuation of previous lithology but more competent above contact seen at 97.44m.	0	4	3	4	6	17	15				**68**
97.44	848.02	98.49	847.0	1.05	1.04	99	0.76	72	1	520	100	R5	PICR	Light to dark green	Very fine to medium crystalline, aphanitic with coarse dark hornblende phenocrysts	Massive with slight foliation	Minor calcite veinlets throughout interval and trace dissolution locally visible near bottom of interval.	0	1	3	2	6	12	15				**62**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
98.49	846.97	100.01	845.5	1.52	1.52	100	1.17	77	12	117	100	R5	PICR	Light to dark green	Very fine to medium crystalline, aphanitic with coarse dark hornblende phenocrysts	Massive with slight foliation	Minor calcite veinlets throughout interval and trace dissolution locally visible near bottom of interval.	0	1	3	2	6	12	15				58
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-017

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS								INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	978.03	13.34	964.69	13.34	0.0	0	0										overburden, not recovered (ODEX and SPT)											
13.34	964.69	14.00	964.0	0.66	0.41	62	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Rubble; coarse, angular to subangular; intact rock is slightly weathered, strong, surficial chlorite alteration	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**33**
14.00	964.03	15.50	962.5	1.50	0.40	27	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	Rubble; medium to coarse, angular to subangular; intact rock is quartz veined, fresh, strong, with minor surficial chlorite alteration	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**33**
15.50	962.53	17.00	961.0	1.50	1.30	87	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	very heavily fractured/rubbly; slightly weathered, strong; joints with purple or orange staining, gouge infill	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**33**
17.00	961.03	18.50	959.5	1.50	1.22	81	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	very heavily fractured/rubbly; slightly weathered, strong; joints with purple or orange staining, gouge infill	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**33**
18.50	959.53	20.00	958.0	1.50	1.19	79	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	very heavily fractured/rubbly; slightly weathered, strong; joints with dull purple or heavy bright orange staining, no infill; heavy vuggy calcite veining at top of run	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15				**33**
20.00	958.03	21.50	956.5	1.50	1.50	100	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	very heavily fractured but not rubbly; slightly weathered, strong; joints with heavy dark orange staining, no alteration, gouge infill	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15				**33**
21.50	956.53	23.00	955.0	1.50	1.41	94	0.80	53	max	5	50	R4	MAFV	Medium Grey	Very Fine to Medium/Aphanitic and Porphyritic	Massive	moderately fractured; slightly weathered, strong; joints with dark orange and purple staining	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15				**40**
23.00	955.03	24.50	953.5	1.50	1.17	78	0.00	0	max	5	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	very heavily fractured; slightly weathered, strong; joint surfaces with heavy dark purple staining	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15				**33**
24.50	953.53	26.00	952.0	1.50	1.42	95	1.13	75	9	142	50	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	trace black porphyroblasts; fresh, strong; joint surfaces with minor dark purple staining, clay alteration; minor quartz and hematite, veining causing brecciation	0	1	1	6	5	13	15				**55**
26.00	952.03	27.50	950.5	1.50	1.41	94	1.35	90	10	128	50	R4	MAFV	Medium Grey	Fine/Aphanitic	Massive	fresh, strong; joint surfaces with dark purplish red or pale purple staining; 7cm band of breccia at 27.23m with gradational contacts	0	1	1	6	5	13	15				**58**
27.50	950.53	29.00	949.0	1.50	1.45	97	0.81	54	10	132	50	R4	MAFV	Medium Grey	Fine/Aphanitic	Massive	fresh, strong; joint surfaces with trace dark purplish red staining; trace quartz veins up to 1cm thick; 15cm-thick gougey and fine to medium gravel section at bottom of run	0	1	1	6	5	13	15				**51**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
29.00	949.03	30.50	947.5	1.50	1.28	85	0.00	0	max	5	25	R3	MAFV	Medium Greenish Grey	Fine/Aphanitic	Massive	heavily fractured to rubbly and gougey; intact rock is moderately weathered and medium strong; fracture surfaces have strong dark red or strong dark purple staining	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**26**
30.50	947.53	32.00	946.0	1.50	1.01	67	0.31	21	max	5	25	R3	MAFV	Medium Greenish Grey	Fine/Aphanitic	Massive	heavily fractured to rubbly and gougey; intact rock is moderately weathered and medium strong; fracture surfaces have strong dark red or strong dark purple staining	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**29**
32.00	946.03	33.50	944.5	1.50	1.50	100	1.50	100	7	188	100	R5	MAFV	Medium Grey	Fine/Aphanitic	Massive	fresh, strong; joints with minor dark purple staining. Flow banding from 32.92-33.50m	0	1	1	6	5	13	15				**65**
33.50	944.53	35.00	943.0	1.50	1.21	81	0.81	54	8	134	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	fresh, strong; joints with moderate dark purplish red staining; trace quartz veinlets; rubbly section from 33.5-33.8m, hence low recovery	0	1	1	6	5	13	15				**53**
35.00	943.03	36.50	941.5	1.50	1.50	100	1.19	79	6	214	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	fresh, strong; joints with minor dark purplish red staining; trace quartz veinlets;	0	2	1	6	5	14	15				**60**
36.50	941.53	38.00	940.0	1.50	1.50	100	1.32	88	7	188	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	flow banded in sections; fresh, strong; joints with trace dark purplish red staining; trace quartz veinlets; 1cm-thick vuggy calcite vein parallel TCA from 37.75-38.00m	0	4	1	6	5	16	15				**64**
38.00	940.03	39.50	938.5	1.50	1.41	94	0.26	17	max	5	75	R4	MAFV	Medium Grey	Very Fine/Aphanitic	Massive	heavily fractured, fresh, strong; joints with trace dark purple staining; trace quartz veinlets; 15cm rubbly/gougey section at 39.1m	0	4	1	6	5	16	15				**49**
39.50	938.53	41.00	937.0	1.50	1.50	100	0.44	29	20	71	75	R4	MAFV	Medium Grey	Very Fine to Medium/Aphanitic and Porphyritic	Massive	fresh, strong; joints with splotchy maroon staining; trace calcite veinlets	0	3	1	6	5	15	15				**50**
41.00	937.03	42.50	935.5	1.50	1.50	100	1.36	91	7	188	100	R5	MAFV	Medium Grey	Fine to Medium/ Porphyritic	Massive	fresh, strong; joints with splotchy maroon staining; trace calcite veinlets, sometimes causing brecciation	0	4	1	6	5	16	15				**66**
42.50	935.53	44.00	934.0	1.50	1.50	100	0.74	49	max	5	75	R4	MAFV	Medium Grey	Very Fine to Medium/Aphanitic and Porphyritic	Massive	2mm-2cm subangular to angular clasts; fresh, strong; joints with dark purple staining, quartz infill; moderate quartz veining; 3cm-thick band of fine to medium crystalline porphyritic rock at 43.92m	0	1	1	3	5	10	15				**48**
44.00	934.03	45.50	932.5	1.50	1.50	100	1.06	71	max	5	75	R4	MAFV	Medium Greenish Grey	Very fine to fine/ aphanitic	Massive	strong, fresh, minor calcite veinlets, more fractured and jointed at bottom of interval.	0	1	5	1	6	13	15				**54**
45.50	932.53	47.00	931.0	1.50	1.39	93	0.77	51	max	5	100	R5	MAFV	Medium green to red	Very fine to fine/ aphanitic	Massive	Recrystallized fault breccia, mostly broken and fractured, some minor gouge, some hard reddish hematite, altered fracture infill, many quartz-calcite veinlets and fracture infill.	0	1	5	3	5	14	15				**54**
47.00	931.03	48.50	929.5	1.50	1.38	92	0.34	23	max	5	100	R5	MAFV	Medium Green	Very fine to fine/ aphanitic	Massive	Recrystallized fault breccia, highly broken from 47.00-47.29m and 47.80-47.87m, the interval between these zones recrystallized with clasts up to 7cm supported by quartz-calcite fracture infill, trace red altered clasts and infill from 47.63-47.80m.	0	1	6	3	5	15	15				**50**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
48.50	929.53	50.00	928.0	1.50	1.29	86	0.17	11	max	5	100	R5	MAFV	Medium Green	Very fine to fine/ aphanitic	Massive	Recrystallized fault breccia, more faulted with gouge and rubble dominating interval, slightly more competent over bottom 10cm.	0	1	5	1	5	12	15				**46**
50.00	928.03	51.50	926.5	1.50	1.15	77	0.76	51	5	192	100	R5	MAFV	Light to medium greenish grey	Very fine to coarsely crystalline/ porphyritic	Massive	strong, more competent to 30cm from bottom of interval which is broken and rubbly, fresh to slightly weathered, minor quartz-calcite veinlets, (poor recovery).	0	1	3	2	5	11	15				**53**
51.50	926.53	52.15	925.9	0.65	0.43	66	0.22	34	2	143	100	R5	MAFV	Light to medium greenish grey	Very fine to fine/ aphanitic	Massive	Top of interval broken and rubbly and missing recovery (could be from drilling), remainder relatively competent, many quartz-calcite veinlets, throughout, strong, slightly weathered with yellow-brown limonite. Staining on broken fracture faces, (poor recovery)	0	1	3	2	3	9	15				**48**
52.15	925.88	52.41	925.6	0.26	0.26	100	0.00	0	Max	5	50	R4	VCLT	Reddish brown, light green and white	Very Fine/Aphanitic	Massive	Gouge rich fault zone, brecciated clasts in aphanitic gougey matrix, moderately weathered	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**29**
52.41	925.62	53.00	925.0	0.59	0.57	97	0.00	0	max	5	100	R5	VCLT	Light green	Very fine to coarse/ brecciated	Massive	Fractured breccia, clasts up to 2cm in aphanitic matrix, strong, fresh to slightly weathered.	0	1	5	2	5	13	15				**45**
53.00	925.03	53.85	924.2	0.85	0.63	74	0.25	29	max	5	100	R5	VCLT	Light to medium greenish grey	Very fine to fine/ aphanitic	Massive	fractured and broken, strong, slight to moderate weathering, (poor recovery).	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15				**40**
53.85	924.18	54.50	923.5	0.65	0.51	78	0.00	0	max	5	100	R5	VCLT	Medium green	Very Fine to Medium/Aphanitic and Porphyritic	Massive	Fractured and broken, strong, moderately weathered with red-brown colouring on fracture planes, (poor recovery).	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15				**36**
54.50	923.53	56.00	922.0	1.50	1.50	100	1.10	73	7	188	100	R5	VCLT	Light- medium green	Very Fine to Medium/Aphanitic and Porphyritic	Massive to slightly interbedded	strong, competent, fresh, trace disseminated sulphides	0	1	5	2	6	14	15				**60**
56.00	922.03	57.50	920.5	1.50	1.50	100	0.82	55	6	214	100	R5	VCLT	Light- medium green	Very fine to coarse/ brecciated	Massive	Fractured by primarily competent, some pale green infill locally in a few fractures, minor quartz-calcite veinlets, strong, fresh to slightly weathered, trace disseminated sulphides.	0	1	3	2	5	11	15				**54**
57.50	920.53	57.95	920.1	0.45	0.45	100	0.45	100	1	225	100	R5	VCLT	Light- medium green	Very fine to coarse/ brecciated	Massive	Fractured by primarily competent, some pale green infill locally in a few fractures, minor quartz-calcite veinlets, strong, fresh to slightly weathered, trace disseminated sulphides, contact at 57.95m.	0	3	1	2	6	12	15				**64**
57.95	920.08	59.00	919.0	1.05	1.05	100	1.00	95	3	263	100	R5	VCLT	Light to medium greenish grey	Very fine to fine/ aphanitic	Massive	Strong, competent, minor fracturing, fresh	0	3	3	2	6	14	15				**66**
59.00	919.03	60.50	917.5	1.50	1.47	98	1.11	74	8	163	100	R5	VCLT	Medium greenish grey	Very Fine/Aphanitic	Massive	fresh, strong; joints with brownish orange (FeO) staining, no infill, minor chlorite alteration; minor quartz veining	0	1	1	6	5	13	15				**59**
60.50	917.53	62.00	916.0	1.50	1.49	99	1.05	70	11	124	100	R5	VCLT	Medium greenish grey	Fine to Medium/ Porphyritic	Massive	sulphide-carrying moderate quartz and calcite veining; fresh, strong; joint surfaces with moderate dark purplish red and reddish orange staining and trace chlorite alteration	0	1	1	6	5	13	15				**58**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
62.00	916.03	63.50	914.5	1.50	1.49	99	1.21	81	10	135	100	R5	VCLT	Medium greenish grey	Fine to Medium/ Porphyritic	Massive	slightly weathered, strong; joint surfaces with dark purple staining, quartz infill, and chlorite alteration; heavily quartz- and calcite-veined with accompanying sulphides; veins causing moderate chlorite alteration fully penetrating core in 25cm-thick band at 62.6m	0	1	1	3	5	10	15				**57**
63.50	914.53	64.40	913.6	0.90	0.90	100	0.62	69	8	100	100	R5	VCLT	Medium greenish grey	Fine to Medium/ Porphyritic	Massive	fresh, strong; joints with trace dark purple staining, calcite infill; moderate quartz veining	0	1	1	3	5	10	15				**54**
64.40	913.63	65.00	913.0	0.60	0.45	75	0.00	0	max	5	20	R2	VCLT	Medium greenish grey	Fine to Medium/ Porphyritic	Massive	highly weathered, weak; heavily fractured, rubbly, gougey; potential fault zone	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**26**
65.00	913.03	66.14	911.9	1.14	1.02	89	0.44	39	15	64	50	R4	VCLT	Medium greenish grey	Fine to Medium/ Porphyritic	Massive	slightly weathered, strong; moderately fractured; moderate chlorite alteration visible in core	0	1	1	6	5	13	15				**48**
66.14	911.89	66.82	911.2	0.68	0.68	100	0.00	0	max	5	5	R2	VCLT	Dark greenish grey	Fine to Medium/ Porphyritic	Massive	Gougey, fine to coarse, subangular	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**25**
66.82	911.21	68.00	910.0	1.18	1.08	92	0.24	20	max	5	50	R4	VCLT	Light to Medium greenish grey	Fine to Medium/ Porphyritic	Massive	light green chlorite-altered intrusions; heavily fractured, slightly weathered, strong; joints with brownish orange FeO staining	0	4	1	2	5	12	15				**43**
68.00	910.03	69.50	908.5	1.50	1.50	100	0.74	49	18	79	50	R4	VCLT	Light to Medium greenish grey	Fine to Medium/ Porphyritic	Massive to Flow Banded	15cm light green chlorite-altered intrusion; Flow banding in 0.5-1cm layers begins at 68.93m; slightly weathered, strong; joints with splotchy dark purple staining	0	4	1	3	5	13	15				**50**
69.50	908.53	71.00	907.0	1.50	1.28	85	0.56	37	max	5	50	R4	VCLT	Medium greenish grey	Very Fine to Fine/Aphanitic	Massive	slightly weathered, strong, heavily fractured, some brecciation due to quartz veining; joints with some dark purple staining and gouge infill	0	1	1	2	5	9	15				**43**
71.00	907.03	72.50	905.5	1.50	1.50	100	0.00	0	max	5	1	R1	VCLT	Medium greenish grey	Very Fine to Fine/Brecciated	Massive	fault breccia of fine to coarse subangular to angular clasts in gouge matrix bounded by slightly more competent heavily fractured sections	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**24**
72.50	905.53	74.00	904.0	1.50	1.28	85	0.12	8	max	5	50	R4	VCLT	Medium greenish grey	Very Fine to Fine/Aphanitic	Massive	heavily fractured; slightly weathered, strong; joint surfaces with trace purplish red staining; some quartz veining causing brecciation	0	1	1	3	5	10	15				**40**
74.00	904.03	74.69	903.3	0.69	0.69	100	0.50	72	max	5	75	R4	VCLT	Medium greenish grey	Very Fine to Fine/Aphanitic	Massive	slightly weathered, strong; joints with splotchy pinkish red staining, gouge infill, no alteration	0	4	1	3	5	13	15				**55**
74.69	903.34	75.50	902.5	0.81	0.69	85	0.00	0	max	5	5	R2	VCLT	Medium greenish grey	Very Fine to Fine/Brecciated	Massive	fault breccia with fine to coarse subrounded to subangular clasts in gouge matrix; trace quartz veining; heavily weathered, weak	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**25**
75.50	902.53	77.00	901.0	1.50	1.39	93	0.87	58	10	126	50	R4	VCLT	Medium Greyish Green	Very Fine to Coarse/Brecciated	Massive	matrix-supported breccia, porphyritic metavolcanic, and massive plagioclase clasts in indistinguishable microcrystalline matrix; slightly weathered, strong; joints with some dark reddish purple staining; trace quartz and calcite veining	0	4	1	6	5	16	15				**55**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
77.00	901.03	78.50	899.5	1.50	1.40	93	0.00	0	max	5	10	R2	VCLT	Medium greenish grey	Very Fine to Fine/Brecciated	Massive	fault breccia with fine to coarse subangular to subrounded clasts in gouge or quartz matrix; highly weathered, weak	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**25**
78.50	899.53	80.00	898.0	1.50	1.50	100	1.22	81	10	136	75	R4	VCLT	Medium Greyish Green	Very Fine to Coarse/Brecciated	Massive	matrix-supported breccia with fine to coarse, subrounded to subangular clasts, in indistinguishable microcrystalline matrix; moderately weathered, strong; joints with moderate orange staining, some gouge infill; trace quartz and calcite veining; heavily fractured to rubbly last 10cm of run	0	1	1	3	5	10	15				**55**
80.00	898.03	81.50	896.5	1.50	1.50	100	1.29	86	7	188	75	R4	VCLT	Medium Greyish Green	Very Fine to Coarse/Brecciated	Massive	matrix-supported breccia with fine to coarse, subrounded to subangular clasts, in indistinguishable microcrystalline matrix; moderately weathered, strong; joints with moderate orange staining, some gouge infill; trace quartz and calcite veining.	0	1	3	3	5	12	15				**59**
81.50	896.53	83.00	895.0	1.50	1.37	91	0.86	57	max	5	50	R4	VCLT	Medium Greyish Green	Very Fine to Coarse/Brecciated	Massive	Aphanitic matrix and gouge supported fault breccia, continuation of above interval with more fractures and gouge present to ~82.90m	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**37**
83.00	895.03	84.50	893.5	1.50	1.14	76	0.31	21	max	5	50	R4	VCLT	Medium Greyish Green	Very Fine to Coarse/Brecciated	Massive	Aphanitic matrix and gouge supported fault breccia, continuation of above interval rubbly and broken to 83.83m with brownish-red clay alteration and gouge from 83.50-83.83m, last 31cm competent with many quartz-calcite veinlets throughout.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**31**
84.50	893.53	86.00	892.0	1.50	1.50	100	1.50	100	1	750	100	R5	VCLT	Medium green	Very Fine to Fine/Aphanitic	Massive	Recrystallized fault zone, strong, moderate weathering, many quartz-calcite veinlets throughout, some with yellow infill, some with reddish-brown and some unaltered, appears flow like with no clear flow direction, has an appearance of recrystallized gouge.	0	1	6	0	3	10	15				**67**
86.00	892.03	86.86	891.2	0.86	0.86	100	0.83	97	3	215	100	R5	VCLT	Medium green	Very Fine to Coarse/Brecciated	Massive	Recrystallized fault breccia, same properties as above interval with more discernable clasts within an aphanitic matrix up to 4cm.	0	1	5	2	5	13	15				**65**
86.90	891.13	87.50	890.5	0.60	0.52	87	0.28	47	5	87	100	R5	MAFV	Light to medium greenish grey	Very Fine to Fine/Aphanitic	Massive	fractured, many quartz-calcite veinlets, minor yellow-brown infill, strong, moderate weathering on fracture planes and in veinlets.	0	1	3	2	5	11	15				**51**
87.50	890.53	88.39	889.6	0.89	0.89	100	0.89	100	7	111	100	R5	MAFV	Light to medium greenish grey	Very Fine to Fine/Aphanitic	Massive	fractured, many quartz-calcite veinlets, minor yellow-brown infill, strong, moderate weathering on fracture planes and in veinlets.	0	1	5	2	5	13	15				**64**
88.39	889.64	89.00	889.0	0.61	0.61	100	0.33	54	1	305	100	R5	MAFV	Light to medium greenish grey	Very fine to coarse crystalline/ porphyritic	Massive	Porphyritic, strong, moderate weathering with yellow-brown staining on fractures, minor calcite veinlets.	0	1	3	1	5	10	15				**54**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Joint Condition: Apert- A	Joint Condition: Rough R	Joint Condition: Infill I	Joint Condition: Weath W	Joint Condition: TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
89.00	889.03	90.25	887.8	1.25	1.25	100	0.92	74	5	208	100	R5	MAFV	Light to medium greenish grey	Very fine to coarse crystalline/ porphyritic	Massive	Porphyritic, strong, moderate weathering with yellow-brown staining on fractures, minor calcite veinlets, above contact with lower unit at 90.25m there is some clay and yellow brown staining over the lower 20cm.	0	1	3	2	3	9	15				**56**
90.25	887.78	90.50	887.5	0.25	0.25	100	0.23	92	1	125	100	R5	MAFV	Medium Greenish Grey	Very Fine to Fine/Aphanitic	Massive	Aphanitic, strong, fresh, minor calcite veinlets.	0	1	5	2	5	13	15				**62**
90.50	887.53	92.00	886.0	1.50	0.52	35	0.00	0	0	520	100	R5	MAFV	Medium Greenish Grey	Very Fine to Fine/Aphanitic	Massive	Aphanitic, strong, fresh, minor calcite veinlets. Not a good sample for geotechnical logging, the lifting spring did not work and what core was recovered was broken and ground but should be competent, (logged as though it is a continuation of above unit.)	0	0	0	2	5	7	15				**45**
92.00	886.03	93.50	884.5	1.50	0.89	59	0.70	47	3	223	100	R5	MAFV	Medium Greenish Grey	Very Fine to Fine/Aphanitic	Massive	Aphanitic, strong, fresh, minor calcite veinlets, redrilled and broken again (could be from drilling?).	0	1	5	2	5	13	15				**55**
93.50	884.53	94.34	883.7	0.84	0.84	100	0.27	32	max	5	100	R5	MAFV	Medium Greenish Grey	Very Fine to Fine/Aphanitic	Massive	Aphanitic, strong, fresh, broken along fracture and joint planes from 93.50-93.89m and 94.2-94.34m.	0	1	5	2	5	13	15				**50**
94.34	883.69	95.00	883.0	0.66	0.66	100	0.66	100	1	330	100	R5	MAFV	Medium green	Very Fine/Aphanitic	Massive	Highly fractured and jointed continuation of above unit but remains competent, some yellow staining in joints, strong, moderate weathering.	0	1	3	2	3	9	15				**62**
95.00	883.03	96.50	881.5	1.50	1.22	81	0.64	43	max	5	100	R5	MAFV	Medium green	Very Fine/Aphanitic	Massive	Highly fractured and broken to 95.42m, pale green clay infill and minor dissolution from 96.08 to 96.50m, some yellow staining in joints, strong, moderate weathering.	0	1	5	2	3	11	15				**49**
96.50	881.53	98.00	880.0	1.50	0.99	66	0.44	29	Max	5	100	R5	MAFV	Medium green	Very Fine/Aphanitic	Massive	Continuation of above and again poor recovery due to highly fractured and broken rock into pebble/cobble size angular pieces. No additives are being used to help lifting of broken core so only what is getting trapped above competent intervals is being removed, the rest is falling through the lifter spring and out the tube.	0	1	5	2	3	11	15				**47**
98.00	880.03	99.50	878.5	1.50	1.50	100	0.88	59	12	115	75	R4	MAFV	Medium Greyish Green	Very Fine to Fine/Brecciated	Massive	matrix supported breccia with fine to coarse subangular clasts of basalt in quartz matrix; slightly weathered, strong; joint surfaces are moderately weathered with orange staining	0	1	1	3	3	8	15				**49**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
99.50	878.53	101.00	877.0	1.50	1.50	100	1.28	85	8	167	50	R4	MAFV	Medium Grey	Very Fine/Brecciated	Massive	matrix supported breccia with fine to coarse subangular clasts of basalt in quartz matrix; slightly weathered, strong; joint surfaces are moderately weathered with orange staining, some gravel infill	0	1	1	3	3	8	15				53
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-035

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis-P	Apert-A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	1058.34	6.10	1052.2	6.10	0.0	0	0										overburden, not recovered											
6.10	1052.24	7.00	1051.3	0.90	0.78	87	0.64	71	7	98	50	R4	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Foliated	Light to dark grey, medium strength, Slightly weathered, inequigranular, volcanics? Relatively competent for the top of hole. No rubble or weak zones. Calcite and iron oxide veinlets and coatings.	0	4	3	2	5	14	15	FeO	cc		**55**
7.00	1051.34	8.50	1049.8	1.50	0.86	57	0.80	53	5	143	50	R4	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Foliated	As above, helper forgot to add cap, some rock dropped in hole, poor recovery, good quality rock. Iron rich (heavy), with quartz bands and calcite veinlets. No infill, Slightly weathered. Spun joints	0	4	3	6	5	18	15	cc			**56**
8.50	1049.84	10.00	1048.3	1.50	1.30	87	0.90	60	6	186	50	R4	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Light to dark grey, medium strength, slightly weathered, inequigranular, gneiss? Thinly bedded to foliated, quart banding, minor calcite veinlets and chlorite and calcite infill. Soft and green. No iron oxides.	0	4	3	2	5	14	15	chl	cc		**54**
10.00	1048.34	11.50	1046.8	1.50	0.76	51	0.00	0	max	5	35	R3	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Very poor recovery due to rubble. Potentially a fault zone. Rubble is clean (no clay coatings) and angular to subrounded. Likely washed and gravel structure not intact. Medium strength, rubble.	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15	Rub			**31**
11.50	1046.84	13.00	1045.3	1.50	1.13	75	0.00	0	max	5	35	R3	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Same as above, poor recovery, rubble structure intact, recovered as gravel, and held together with green clay. Potential shear zone. Subvertical fractures	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15	Rub			**31**
13.00	1045.34	14.50	1043.8	1.50	1.50	100	0.41	27	20	71	50	R4	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Grey, heavy gneiss, medium strong, sulphide rich, clean no infill, subvertical fractures following veinlets, doesn't follow fabric.	0	4	3	6	5	18	15				**51**
14.50	1043.84	16.00	1042.3	1.50	1.48	99	1.32	88	7	185	50	R4	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Light grey to dark grey, heavy, sulphide rich gneiss, pyrite crystals present, strong, no infill, joints slightly rough, fresh, competent, some calcite veinlets	0	4	3	6	6	19	15				**65**
16.00	1042.34	17.50	1040.8	1.50	1.48	99	1.27	85	8	164	100	R5	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Competent dark grey, strong, calcite veinlets, sulphide rich, fine grained to coarse grained, foliated, quartz bands, green staining (chlorite?) but no infill.	0	4	3	6	5	18	15				**66**
17.50	1040.84	19.00	1039.3	1.50	1.10	73	0.43	29	14	73	100	R5	SLTS	Light grey to dark grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	As above. But rubbly with clay infill, minor iron oxides, staining, clean, broken material, recovery and RQD poor, strong heavy with sulphides	0	0	1	0	3	4	15	cly	Rub		**41**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
19.00	1039.34	20.50	1037.8	1.50	1.30	87	0.00	0	max	5	30	R3	SLTS	Dark grey to black	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Rock is mostly rubble to broken, sulphide rich, slightly weathered, gravel sized fragments (5 to 11 cm diameter), potential shear zone, quartz eyes	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15	Rub			**31**
20.50	1037.84	22.00	1036.3	1.50	1.47	98	0.00	0	20	70	50	R4	SLTS	Dark grey to black	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Strong, calcite and iron oxide infilling, moderately fractured, sulphides and quartz bands throughout, some rubble zone, subvertical fractured	0	0	1	0	3	4	15	Rub	FeO		**34**
22.00	1036.34	23.50	1034.8	1.50	1.50	100	0.67	45	16	88	100	R5	SLTS	Grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Moderately weathered, calcite and quartz veins, strong, some chlorite, rich in sulphides, foliated, iron oxide infilling	0	0	1	2	3	6	15	FeO	chl		**46**
23.50	1034.84	25.00	1033.3	1.50	1.38	92	0.28	19	max	5	50	R4	SLTS	Light grey	Fine to coarse grained, inequigranular	Thickly foliated to thinly banded	Heavily fractured, medium strong, mafic volcanics, sulphides throughout, quartz bands and calcite veinlets, chlorite, iron oxide and calcite infilling (up to 2 mm and soft), some rubble at the beginning of the run (up to 10 cm thick).	0	0	1	2	3	6	15	chl	cc	FeO	**37**
25.00	1033.34	26.50	1031.8	1.50	1.50	100	1.18	79	7	188	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Calcite/quartz veins along foliation, competent, strong, iron oxide and calcite infilling, moderately weathered	0	1	3	2	3	9	15	FeO	cc		**53**
26.50	1031.84	28.00	1030.3	1.50	1.50	100	1.05	70	11	125	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Calcite/quartz veins along foliation, competent, strong, calcite infilling, trace clay	0	1	3	2	5	11	15	cc		cly	**52**
28.00	1030.34	29.50	1028.8	1.50	1.48	99	1.34	89	3	370	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Discontinuous calcite/quartz veins, competent, strong, calcite infilling	0	4	3	4	5	16	15	cc			**64**
29.50	1028.84	31.00	1027.3	1.50	1.50	100	1.03	69	4	300	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Discontinuous calcite/quartz veins, competent, strong, calcite infilling, some vuggy texture	0	4	3	4	5	16	15	cc			**59**
31.00	1027.34	32.50	1025.8	1.50	1.50	100	1.11	74	5	250	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Calcite veinlets and infill, some 40cm+ long calcite veinlets running 0 to 10 degrees.	0	4	3	2	5	14	15	cc			**57**
32.50	1025.84	34.00	1024.3	1.50	1.46	97	0.82	55	6	209	25	R3	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	Calcite veinlets and infill, soft dark grey infilling at end of run, looks like a mixture of clay and weathered rock (looks like pencil lead).	0	0	3	0	5	8	15	cc	cly		**45**
34.00	1024.34	35.50	1022.8	1.50	1.50	100	0.94	63	6	214	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	As above, calcite and chlorite infilling, calcite veinlets and quartz bands up to 5mm thick, trace pyrite visible.	0	4	3	2	6	15	15	cc	chl		**56**
35.50	1022.84	37.00	1021.3	1.50	1.47	98	0.48	32	11	123	50	R4	SLTS	Grey to dark grey	Fine to medium grained, inequigranular	Slightly foliated	As above, calcite and chlorite infilling, calcite veinlets and quartz bands up to 5mm thick, trace pyrite visible.	0	1	3	2	6	12	15	cc	chl		**46**

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0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-038

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
																		Joint Condition						Water	Fill.	Fill.	Fill.	
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Rating	Type 1 (see Leg)	Type 2 (see Leg)	Type 3 (see Leg)	**RMR-89 Total** Average
0.0	1060.59	16.37	1044.2	16.37	0.0	0	0										overburden, not recovered											
16.37	1044.22	17.87	1042.7	1.50	1.50	100	0.42	28	16	88	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	Diorite, quartz +/- carbonate veins and veinlets, minor vuggy texture. More competent downhole.	0	1	3	0	5	9	15			cc	**45**
17.87	1042.72	19.37	1041.2	1.50	1.50	100	0.92	61	18	79	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, with light green, fine grained crystals, quartz carbonate veins and veinlets. Healed joints throughout.	0	4	3	2	5	14	15			cc	**55**
19.37	1041.22	20.87	1039.7	1.50	1.48	99	0.84	56	11	123	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, healed joints and local rubble zones, clay rich zones downhole.	0	4	3	0	3	10	15	cly			**51**
20.87	1039.72	22.37	1038.2	1.50	0.50	33	0.00	0	max	5	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	Volcaniclastic, felsic, intensely fractured. Poor recovery due to fault.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15				**31**
22.37	1038.22	23.87	1036.7	1.50	1.35	90	0.20	13	11	113	50	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, altered volcaniclastic. Healed joints throughout, vuggy textures. Large quartz vein downhole. Iron oxide staining on fractures.	0	1	3	2	3	9	15			FeO	**41**
23.87	1036.72	25.85	1034.7	1.98	1.25	63	0.47	24	10	114	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	As before, healed joints throughout, quartz +/- calcite veins/veinlets. Local fractured and rubble zones.	0	4	3	2	5	14	15	cc			**49**
25.85	1034.74	27.35	1033.2	1.50	1.51	101	0.48	32	max	5	80	R4	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	Volcaniclastic, felsic, quartz +/- carbonate veins and veinlets. Local rubble zones. Healed joints throughout.	0	1	3	4	5	13	15				**48**
27.35	1033.24	28.85	1031.7	1.50	1.50	100	0.71	47	12	115	100	R5	VCLT	Pinkish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, gradual transition to a dark grey volcaniclastic. Local clay rich zones. Competent and strong.	0	4	3	2	5	14	15	cly			**54**
28.85	1031.74	30.35	1030.2	1.50	1.50	100	0.00	0	max	5	80	R4	VCLT	Grey	Fine to Medium Grained/Inequigranular	Massive	Volcaniclastic, mafic with iron oxide staining and quartz+/-carbonate veinlets.	0	4	3	2	5	14	15			FeO	**45**
30.35	1030.24	31.85	1028.7	1.50	1.52	101	0.10	7	30	49	80	R4	VCLT	Dark Grey	Fine to Medium Grained/Inequigranular	Massive	Volcaniclastic, mafic, dark grey with white orange and brown zones, quartz veins. Iron oxide staining.	0	4	3	4	5	16	15			FeO	**48**
31.85	1028.74	33.35	1027.2	1.50	1.52	101	1.32	88	12	117	100	R5	VCLT	Dark Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, dark greenish grey, calcite coating, quartz+/-carbonate veinlets.	0	4	3	2	5	14	15	cc		FeO	**62**
33.35	1027.24	34.85	1025.7	1.50	1.50	100	1.28	85	8	167	100	R5	VCLT	Dark Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, iron oxide staining, calcite+/-quartz veinlets.	0	4	3	2	5	14	15	cc		FeO	**62**
34.85	1025.74	36.35	1024.2	1.50	1.50	100	1.50	100	4	300	100	R5	VCLT	Dark Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Mafic volcaniclastic, quartz carbonate veinlets, minor iron oxide staining.	0	5	3	6	5	19	15			FeO	**72**
36.35	1024.24	37.85	1022.7	1.50	1.50	100	1.39	93	9	150	100	R5	VCLT	Dark Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, competent and strong.	0	4	3	2	5	14	15			FeO	**64**
EOH																												

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-039

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	1057.33	41.20	1016.1	41.20	0.0	0	0										overburden, not recovered.											
41.20	1016.13	42.70	1014.6	1.50	0.30	20	0.00	0	max	5	1	R1	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Grey, some dark grey, fine to coarse grained gravel sized pieces of rock with clay throughout.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly			**24**
42.70	1014.63	44.20	1013.1	1.50	0.50	33	0.00	0	max	5	1	R1	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Grey, some dark grey, fine to coarse grained gravel sized pieces of rock with clay throughout.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly			**24**
44.20	1013.13	45.70	1011.6	1.50	0.95	63	0.00	0	max	5	10	R2	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	As above, becoming slightly more competent.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly			**25**
45.70	1011.63	47.20	1010.1	1.50	0.35	23	0.00	0	max	5	10	R2	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Abundant fault gouge, many fine to coarse grained size pieces, circulation changes from grey to dark grey at approximately 46.20m.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly			**25**
47.20	1010.13	48.70	1008.6	1.50	1.50	100	0.97	65	4	300	25	R3	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Discontinuous calcite veins throughout, trace clay infilling.	0	4	3	2	6	15	15	cly			**55**
48.70	1008.63	50.20	1007.1	1.50	1.48	99	0.60	40	10	135	25	R3	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Discontinuous calcite veins and healed fractures throughout, clay infilling.	0	4	5	6	6	21	15	cly			**55**
50.20	1007.13	51.70	1005.6	1.50	1.50	100	1.12	75	5	250	25	R3	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Fresh, no infilling.	0	4	3	6	6	19	15				**60**
51.70	1005.63	53.20	1004.1	1.50	1.50	100	1.40	93	2	500	25	R3	SNDS	Grey	Fine to Medium Grained/ Porphyritic	Massive	Fresh, no infilling.	0	4	3	6	6	19	15				**67**
53.20	1004.13	54.70	1002.6	1.50	1.40	93	0.19	13	max	5	1	R1	MDST	Grey	Fine to Medium Grained/ Porphyritic	Massive	Grey to dark grey, calcite veins and abundant clay gouge throughout.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly			**26**
54.70	1002.63	56.20	1001.1	1.50	1.14	76	0.36	24	max	5	1	R1	MDST	Grey/Dark Grey	Fine to Medium Grained/ Porphyritic	Massive	Very weak, abundant clay and rubble throughout.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly	Rub		**27**
56.20	1001.13	57.70	999.6	1.50	1.50	100	0.61	41	15	94	25	R3	MDST	Grey/Dark Grey	Fine Grained/ Porphyritic	Weakly Foliated	Weakly foliated, clay seams, calcite veins, and healed fractures throughout.	0	0	3	0	3	6	15	cly		cc	**39**
57.70	999.63	59.20	998.1	1.50	1.50	100	1.15	77	4	300	50	R4	MDST	Dark Grey	Fine Grained/ Porphyritic	Weakly Foliated	Dark grey with some grey colouring, many calcite veins and healed fractures throughout, calcite infilling.	0	4	5	2	5	16	15	cc			**60**
59.20	998.13	59.55	997.8	0.35	0.35	100	0.35	100	1	175	50	R4	QFP	Dark Grey	Fine Grained/ Porphyritic	Weakly Foliated	Dark grey with some grey colouring, many calcite veins and healed fractures throughout, calcite infilling.	0	4	5	2	5	16	15	cc			**64**
59.55	997.78	60.70	996.6	1.15	1.10	96	0.34	30	3	275	25	R3	QFP	Light Greenish/ Brownish Grey	Fine to Coarse Grained/ Porphyritic	Massive	Light greenish/brownish grey, weak, many healed fractures, appears slightly brecciated, calcite and clay infilling, long fractures running 0 to 15 degrees to core axis.	0	0	3	0	3	6	15	cc	cly		**40**
60.70	996.63	62.20	995.1	1.50	1.45	97	0.71	47	8	161	25	R3	QFP	Light Greenish/ Brownish Grey	Fine to Coarse Grained/ Porphyritic	Massive	Light greenish/brownish grey, weak, many healed fractures, appears slightly brecciated, calcite and clay infilling, long fractures running 0 to 15 degrees to core axis.	0	1	3	0	3	7	15	cc	cly		**42**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
62.20	995.13	63.70	993.6	1.50	1.50	100	0.76	51	10	136	25	R3	QFP	Light Greenish/ Brownish Grey	Fine to Coarse Grained/ Porphyritic	Massive	As above, turning reddish/greenish brown, many healed fractures, calcite and clay infilling.	0	1	3	2	3	9	15	cc	cly		**44**
63.70	993.63	65.20	992.1	1.50	1.50	100	0.38	25	10	136	25	R3	QFP	Light Greenish/ Brownish Grey	Fine to Coarse Grained/ Porphyritic	Massive	As above, long fractures running 0 to 15 degrees along core axis.	0	1	3	2	3	9	15	cc	cly		**40**
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-044

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
																		Joint Condition						Water	Fill.	Fill.	Fill.	
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Rating	Type 1 (see Leg)	Type 2 (see Leg)	Type 3 (see Leg)	RMR-89 Total Average
0.00	1005.59	4.22	1001.4	4.22	0.0	0	0										overburden/ODEX - not recovered											
4.22	1001.37	5.11	1000.5	0.89	0.31	35	0.00	0	max	5	50	R4	VCLT	Greenish grey to grey	Fine grained, inequigranular	Massive	Medium greenish grey, moderately weathered with rusty oxidation, heavily fractured to rubble (very angular chips), some chlorite infill, massive, fine grained.	RUBBLE	RUBBLE	RUBBLE	RUBBLE	RUBBLE	4	15	Feo	cc	chl	**33**
5.11	1000.48	6.61	999.0	1.50	1.50	100	0.98	65	15	94	50	R4	VCLT	Greenish grey to grey	Fine grained, inequigranular	Massive	Fine grained, medium grey with white cc veinlets pervasive throughout, mostly healed. Some iron staining, joints are slightly rough on average, some soft infill, but mostly clean with some staining.	0	4	3	2	5	14	15	Feo	cc	chl	**54**
6.61	998.98	8.11	997.5	1.50	1.50	100	0.97	65	9	150	20	R2	VCLT	Orange/white and greenish grey	Fine grained, inequigranular	Massive	Same as above, but large (1m) orange and white vein/altered zone, weaker UCS, some infill >2mm, , moderately weathered.	0	4	3	0	3	10	15	Feo	cc	chl	**48**
8.11	997.48	9.61	996.0	1.50	1.50	100	0.87	58	12	115	25	R3	VCLT	Orange and grey	Fine to coarse grained, porphyritic	Massive	moderately weathered, fine to coarse grained, grey rock, with orange weathering/alteration, Joints all contain staining/FeO oxide infill. Joints are weakened by alteration, some small cc veinlets.	0	4	1	0	3	8	15	FeO	cc		**44**
9.61	995.98	11.11	994.5	1.50	1.40	93	0.84	56	10	127	50	R4	VCLT	Grey with some orange and red oxidation	Fine to coarse grained, porphyritic	Massive	Greenish grey with orange and reddish purple staining and grains, Joints have iron oxide infill to staining, healed calcite veinlets. Medium strong.	0	4	3	6	5	18	15				**56**
11.11	994.48	12.61	993.0	1.50	0.61	41	0.61	41	5	102	50	R4	VCLT	Grey with some orange and red oxidation	Fine to coarse grained, porphyritic	Massive	Same as above; low recovery due to lifter casing slip. .	0	4	3	6	5	18	15				**53**
12.61	992.98	14.11	991.5	1.50	1.46	97	0.84	56	7	183	50	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	Greenish grey with some brownish red spots, calcite veins and veinlets visible, iron oxide staining on joint faces.	0	4	3	4	5	16	15	FeO			**55**
14.11	991.48	15.61	990.0	1.50	1.50	100	1.41	94	5	250	50	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	As above, iron oxide and calcite infilling.	0	4	3	2	5	14	15	FeO	cc		**62**
15.61	989.98	17.11	988.5	1.50	1.50	100	0.88	59	7	188	75	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	Greenish grey with brownish red spots throughout, almost appears as a conglomerate, calcite veins visible, iron oxide and calcite infilling.	0	4	3	2	5	14	15	FeO	cc		**56**
17.11	988.48	18.61	987.0	1.50	1.50	100	1.10	73	6	214	75	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	As above, iron oxide infilling.	0	4	3	4	5	16	15	FeO			**61**
18.61	986.98	20.11	985.5	1.50	1.50	100	1.50	100	3	375	75	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	As above, clasts of brownish red up to 4cm in diameter, fresh, no infilling.	0	4	3	6	6	19	15				**71**
20.11	985.48	21.61	984.0	1.50	1.50	100	1.50	100	2	500	75	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	As above, clasts up to 7cm in diameter.	0	4	3	2	6	15	15	cc			**68**
21.61	983.98	23.11	982.5	1.50	1.50	100	1.24	83	4	300	75	R4	VCLT	Greenish grey	Fine to coarse grained, porphyritic	Massive	Greenish grey with multi-coloured clasts up to 8cm in diameter, trace calcite veinlets, no infilling.	0	4	3	6	6	19	15				**67**
23.11	982.48	24.61	981.0	1.50	1.50	100	1.18	79	3	375	75	R4	VCLT	Greenish grey	Fine to medium grained/ porphyritic	Massive	Calcite infilling.	0	4	3	2	6	15	15	cc			**63**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
24.61	980.98	26.11	979.5	1.50	1.50	100	1.50	100	1	750	75	R4	VCLT	Greenish grey	Fine to medium grained/ porphyritic	Massive	Trace calcite veinlets, fine to coarse grained becoming fine grained downhole, no infilling, fresh.	0	4	3	6	6	19	15				**75**
26.11	979.48	27.61	978.0	1.50	1.50	100	1.50	100	0	1500	75	R4	VCLT	Greenish grey	Fine grained/ porphyritic	Massive	Trace calcite veinlets, trace light grey clasts.	0	6	6	6	6	24	15				**84**
27.61	977.98	29.11	976.5	1.50	1.50	100	1.50	100	1	750	75	R4	VCLT	Greenish grey	Fine grained/ porphyritic	Massive	As above.	0	4	3	6	6	19	15				**75**
29.11	976.48	30.61	975.0	1.50	1.50	100	1.40	93	5	250	75	R4	VCLT	Greenish grey	Fine grained/ porphyritic	Massive	As above, calcite and trace iron oxide infilling.	0	4	3	2	6	15	15	cc	FeO		**64**
30.61	974.98	32.11	973.5	1.50	1.48	99	1.48	99	2	493	75	R4	VCLT	Greenish grey	Fine grained/ porphyritic	Massive	As above.	0	4	3	6	6	19	15				**72**
32.11	973.48	33.61	972.0	1.50	1.50	100	1.04	69	5	250	75	R4	VCLT	Greenish grey	Fine to coarse grained/ porphyritic	Massive	Greenish grey diorite, fine to coarse grained with fine grained grey clasts up to 13cm in diameter, trace calcite veinlets, fresh, no infilling.	0	4	3	6	6	19	15				**63**
33.61	971.98	35.11	970.5	1.50	1.50	100	1.45	97	2	500	75	R4	VCLT	Greenish grey	Fine to coarse grained/ porphyritic	Massive	As above.	0	4	3	6	6	19	15				**72**
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-045

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	1029.60	45.71	983.9	45.71	0.0	0	0										overburden, not recovered											
45.71	983.89	46.31	983.3	0.60	0.60	100	0.53	88	max	5	50	R4	VCLT	Greenish grey	Fine grained, equigranular	Massive	Greenish grey, medium strength rock, some calcite veinlets, joints are smooth and contain minor iron oxide staining, Slightly weathered, competent.	0	4	1	6	5	16	15			FeO	**59**
46.31	983.29	47.81	981.8	1.50	1.50	100	1.40	93	6	214	50	R4	VCLT	Greenish grey	Fine grained, equigranular	Massive	Same as above, but fresh rock with some calcite and iron oxide infill.	0	4	1	2	6	13	15	FeO	cc		**60**
47.81	981.79	49.31	980.3	1.50	1.50	100	1.50	100	4	300	50	R4	VCLT	Greenish grey	Fine grained, equigranular	Massive	Same as above, but fresh rock with some calcite and iron oxide infill; minor open crystal.	0	4	1	2	6	13	15	FeO	cc		**62**
49.31	980.29	50.81	978.8	1.50	1.50	100	1.50	100	4	300	50	R4	VCLT	Greenish grey	Fine grained, equigranular	Massive	Greenish grey, some white mottled calcitic zones, some calcite veinlets, smooth with iron oxide and calcite infill <2mm and soft, fresh, medium strength, massive, fine grained, equigranular.	0	4	1	2	6	13	15	FeO	cc		**62**
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-052

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	925.64	44.19	881.5	44.19		0											overburden/ODEX - not recovered, bedrock at 38.6m											
44.19	881.45	44.58	881.1	0.39	0.26	67	0.00	0	7	33	25	R3	SLD	Light Grey	Fine to medium grained/ Porphyritic	Massive	Heavily fractured and moderately weathered throughout, iron oxide and calcite infilling.	0	4	3	2	3	12	15	FeO	cc		**39**
44.58	881.06	46.08	879.6	1.50	1.10	73	0.00	0	max	5	25	R3	SLD	Light Grey	Fine to medium grained/ Porphyritic	Massive	As above, heavily fractured, driller notes that water pressure was high, could mean clay in fractures.	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15	FeO			**30**
46.08	879.56	47.58	878.1	1.50	1.50	100	0.25	17	22	65	50	R4	SLD	Light Grey	Fine to medium grained/ Porphyritic	Massive	Highly fractured, iron oxide staining throughout, calcite and trace chlorite infilling visible as well.	0	1	3	2	3	9	15	FeO	cc	chl	**41**
47.58	878.06	49.08	876.6	1.50	1.20	80	0.17	11	15	75	25	R3	SLD	Light Grey	Fine to medium grained/ Porphyritic	Massive	As above, less iron oxide staining.	0	4	3	2	3	12	15	FeO	cc	chl	**41**
49.08	876.56	50.58	875.1	1.50	1.41	94	0.35	23	16	83	25	R3	SLD	Light Grey	Fine to medium grained/ Porphyritic	Massive	Light grey to grey, trace green chlorite staining, rock noticeably weakened from weathering, localized rubble zones up to 10cm thick, iron oxide and calcite infilling.	0	1	3	2	5	11	15	FeO	cc		**41**
EOH																												

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-054

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.0	899.60	45.8	853.82	45.78		0											Overburden/ODEX - not recovered, bedrock at 42.7m											
45.8	853.82	46.11	853.49	0.33	0.17	52	0.16	48	1	85	50	R4	SLD	Greenish grey	Medium/equigranular	Massive	Greenish grey, medium grained, massive, calcite veinlets (healed), strong clean joints, minor chlorite alteration and iron oxides infill.	0	4	3	6	5	18	15	FeO			**55**
46.11	853.49	47.61	851.99	1.50	1.45	97	0.55	37	13	104	50	R4	SLD	Greenish grey	Medium/equigranular	Massive	Greenish grey, medium grained, massive, calcite veinlets (healed), strong clean joints, minor chlorite alteration and iron oxides infill, sulphides present along veinlets, minor broken zones.	0	4	3	2	5	14	15	FeO			**49**
47.61	851.99	49.11	850.49	1.50	1.50	100	0.97	65	7	188	50	R4	SLD	Greenish grey	Medium/equigranular	Massive	Greenish grey, medium grained, massive, calcite veinlets (healed), strong clean joints, minor chlorite alteration and iron oxides infill, sulphides present along veinlets, minor broken zones.	0	4	3	2	5	14	15	FeO			**55**
49.11	850.49	50.61	848.99	1.50	1.45	97	0.98	65	12	112	50	R4	SLD	Greenish grey	Medium/equigranular	Massive	Greenish grey, medium grained, massive, calcite veinlets (healed), strong clean joints, minor chlorite alteration and iron oxides infill, sulphides present along veinlets, minor broken zones.	0	4	3	2	5	14	15	FeO			**54**
50.61	848.99	52.11	847.49	1.50	1.50	100	0.96	64	10	136	50	R4	SLD	Greenish grey	Medium/equigranular	Massive	Greenish grey, medium grained, massive, calcite veinlets (healed), strong clean joints, minor chlorite alteration and iron oxides infill, sulphides present along veinlets, minor broken zones.	0	4	3	2	5	14	15	FeO			**54**
EOH																												

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-056

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS								INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	894.51	64.00	830.5	64.00		0											overburden/ODEX - not recovered, bedrock at 61.61m											
64.00	830.51	65.50	829.0	1.50	0.86	57	0.00	0	max	5	1	R1	CLAY	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Highly to completely weathered, abundant fault gouge, weathered rock breaks apart into sand.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cc	cly		**24**
65.50	829.01	67.00	827.5	1.50	1.10	73	0.00	0	13	79	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Top 0.15m very clay rich, calcite infilling.	0	0	1	0	1	2	15	cc	cly		**30**
67.00	827.51	68.50	826.0	1.50	1.35	90	0.35	23	13	96	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Rock more competent, but still highly weathered, trace calcite veins and disseminated pyrite, calcite and chlorite infilling.	0	4	3	2	1	10	15	cc	chl		**41**
68.50	826.01	70.00	824.5	1.50	1.18	79	0.00	0	max	5	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Broken zone, trace calcite and clay infill, moderate to highly weathered.	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15		cc	cly	**30**
70.00	824.51	71.50	823.0	1.50	1.30	87	0.00	0	19	65	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Greenish grey turning brownish grey at approximately 72.10m, highly fractured, calcite infilling, two localized rubble zones less than 10cm thick.	0	0	3	2	3	8	15	cc	Rub		**35**
71.50	823.01	73.00	821.5	1.50	1.42	95	0.30	20	14	95	25	R3	IMH	Grey	Fine to medium grained/ Porphyritic	Massive	As above, grey.	0	0	3	2	3	8	15	cc	Rub		**38**
73.00	821.51	74.50	820.0	1.50	1.48	99	0.12	8	20	70	25	R3	IMH	Grey	Fine to medium grained/ Porphyritic	Massive	Grey with some green chlorite staining visible throughout, highly fractured, trace calcite infilling.	0	4	3	2	3	12	15		cc	chl	**40**
74.50	820.01	76.00	818.5	1.50	1.50	100	0.95	63	8	167	25	R3	IMH	Grey	Fine to medium grained/ Porphyritic	Massive	Grey with green staining throughout, calcite veins, calcite and chlorite infilling.	0	4	3	2	5	14	15	cc	chl		**52**
76.00	818.51	77.50	817.0	1.50	1.50	100	0.80	53	11	125	25	R3	IMH	Grey	Fine to medium grained/ Porphyritic	Massive	As above, calcite infilling, small amount of soft purplish red material visible in joints as well.	0	4	3	2	3	12	15	cc		FeO	**48**
77.50	817.01	79.00	815.5	1.50	1.45	97	0.38	25	17	81	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	Highly fractured, calcite infilling.	0	1	3	2	3	9	15	cc			**40**
79.00	815.51	80.50	814.0	1.50	1.50	100	0.26	17	15	94	25	R3	IMH	Greenish Grey	Fine to medium grained/ Porphyritic	Massive	As above, calcite infilling.	0	4	3	2	3	12	15	cc			**42**
80.50	814.01	82.00	812.5	1.50	1.50	100	0.57	38	14	100	25	R3	IMH	Greenish Grey	fine to coarse grained, porphyritic	Massive	As above, but to coarse grained, minor sulphides.	0	4	1	2	3	10	15	cc			**43**
82.00	812.51	83.50	811.0	1.50	1.50	100	1.50	100	3	375	50	R4	IMH	Grey to greenish grey	fine to coarse grained, porphyritic	Massive	Greenish grey to grey, calcite infilling, minor sulphides along calcite veinlets (some opened, some healed). Greenish grey and minor rusty coloured weathering.	0	4	3	2	5	14	15	cc		FeO	**64**
83.50	811.01	85.00	809.5	1.50	1.50	100	1.24	83	5	250	50	R4	IMH	Grey to greenish grey	fine to coarse grained, porphyritic	Massive	Same as previous.	0	4	3	2	5	14	15	cc		FeO	**59**
85.00	809.51	86.50	808.0	1.50	1.50	100	1.25	83	5	250	50	R4	IMH	Grey to greenish grey	fine to coarse grained, porphyritic	Massive	Grey to greenish grey, healed calcite veinlets and calcite infill, minor sulphides, moderate to low fracturing, fine to coarse grained, equigranular and porphyritic, slightly weathered.	0	4	3	2	5	14	15	cc			**59**
86.50	808.01	88.00	806.5	1.50	1.50	100	1.04	69	10	136	50	R4	IMH	Grey to greenish grey	fine to coarse grained, porphyritic	Massive	Same as previous.	0	4	1	2	5	12	15	cc			**53**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
88.00	806.51	89.50	805.0	1.50	1.49	99	0.53	35	8	166	50	R4	IMH	Grey	fine to coarse grained, porphyritic	Massive	Grey, calcite infill and veinlets, Quartz vein and a vertical fracture, Slightly weathered, slight amount of purplish material .	0	4	3	2	5	14	15	cc			**49**
89.50	805.01	91.00	803.5	1.50	1.50	100	1.45	97	4	300	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Same as previous with white quartz rich zone.	0	4	1	2	6	13	15	cc			**62**
91.00	803.51	92.50	802.0	1.50	1.48	99	0.64	43	15	93	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Heavily fractures, grey to greenish grey, fine to coarse grained, calcite veinlets, slightly weathered, calcite infill and veinlets, minor sulphides.	0	4	1	2	5	12	15	cc			**48**
92.50	802.01	94.00	800.5	1.50	1.50	100	1.28	85	max	5	50	R4	IMH	Grey to greenish grey with white	fine to coarse grained, porphyritic	Massive	Grey to greenish grey, no weathering, calcite veinlets promote jointing, quartz disseminated through rock, minor sulphides, broken zones, smooth joints present.	0	4	1	2	6	13	15			cc	**56**
94.00	800.51	95.50	799.0	1.50	1.50	100	1.20	80	10	136	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Same as previous, but with minor broken zone at top of run.	0	4	3	2	6	15	15			cc	**58**
95.50	799.01	97.00	797.5	1.50	1.50	100	0.67	45	12	115	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Grey with white, fine to coarse grained, porphyritic, moderately fractured, equigranular, minor sulphides, green mineral disseminated in rock, calcite veinlets and infill, slightly rough, strong.	0	4	3	2	6	15	15	cc			**51**
97.00	797.51	98.50	796.0	1.50	1.47	98	1.34	89	7	184	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Same as previous.	0	4	3	2	6	15	15	cc			**61**
98.50	796.01	100.00	794.5	1.50	1.50	100	0.99	66	6	214	50	R4	IMH	Grey with white	fine to coarse grained, porphyritic	Massive	Same as previous.	0	4	3	2	5	14	15	cc			**55**
100.00	794.51	101.50	793.0	1.50	1.40	93	0.80	53	max	5	10	R2	IMH	Grey and white	fine to coarse grained, porphyritic	Massive	40 cm clay gouge in middle of the run, very weak rock, poorly healed and very weak rock due to potential shear zone.	FAULT	FAULT	FAULT	FAULT	FAULT	0	15	cly	gg	cc	**33**
101.50	793.01	103.00	791.5	1.50	1.45	97	1.40	93	11	121	50	R4	IMH	Grey, minor green	fine to coarse grained, porphyritic	Massive	Grey with white, fine to coarse grained, porphyritic, moderately fractured, equigranular, minor sulphides, green mineral disseminated in rock, calcite veinlets and infill, slightly rough, strong.	0	4	3	0	6	13	15	cc			**59**
103.00	791.51	104.50	790.0	1.50	1.50	100	1.35	90	6	214	50	R4	IMH	Grey with white, minor green	fine to coarse grained, porphyritic	Massive	Same as previous, but less infill and no broken zones.	0	4	3	2	6	15	15	cc			**61**
EOH																												

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-058

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	895.79	6.07	889.7	6.07	0.0	0	0										overburden, not recovered											
6.07	889.72	7.01	888.8	0.94	0.91	97	0.20	21	Max	5	75	R4	SLD	Dark Grey with Orange	Fine to Coarse Grained, Mottled	Massive	Many small broken zones, moderately weathered, with iron oxide deposited on fractures. Minor epidote alteration.	BROKEN	BROKEN	BROKEN	BROKEN	BROKEN	4	15	FeO			**37**
7.01	888.78	8.51	887.3	1.50	1.50	100	1.16	77	12	115	75	R4	SLD	Dark Grey with Orange	Fine to Coarse Grained, Mottled	Massive	Many small broken zones, moderately weathered, with iron oxide deposited on fractures. Minor epidote alteration and calcite infill.	0	4	3	4	3	14	15	FeO	cc		**58**
8.51	887.28	10.01	885.8	1.50	1.50	100	1.39	93	5	250	100	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Epidote alteration and disseminated pyrite. Hematite and calcite on fractures. Calcite veinlets throughout, slightly weathered. Minorly fractured.	0	4	3	2	5	14	15	FeO	cc		**65**
10.01	885.78	11.51	884.3	1.50	1.49	99	0.91	61	12	115	75	R4	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately fractured, many calcite veinlets, weathered with iron oxide staining and hydrothermal alteration along veinlets and fractures. Disseminated pyrite. Vugs in some calcite veinlets.	0	1	5	2	1	9	15	FeO	cc		**50**
11.51	884.28	13.01	882.8	1.50	1.50	100	1.30	87	8	167	75	R4	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately fractured, many calcite veinlets, weathered with iron oxide staining and hydrothermal alteration along veinlets and fractures. Disseminated pyrite. Vugs in some calcite veinlets.	0	1	5	3	1	10	15	FeO	cc		**57**
13.01	882.78	14.51	881.3	1.50	1.50	100	1.07	71	8	167	100	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately fractured, many calcite veinlets, slightly weathered with iron oxide staining and hydrothermal alteration along veinlets and fractures. Disseminated pyrite. Chlorite alteration along some fractures.	0	4	3	2	5	14	15	FeO	cc	chl	**60**
14.51	881.28	16.01	879.8	1.50	1.51	101	1.37	91	6	216	100	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Subvertical calcite veinlets with vugs, fresh to slightly weathered, chlorite and epidote alteration, disseminated pyrite, minor fracturing.	0	1	5	2	6	14	15	chl	cc		**64**
16.01	879.78	17.51	878.3	1.50	1.51	101	1.51	100	4	302	175	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, trace chlorite and epidote alteration, trace calcite on fractures.	0	5	3	6	5	19	15	cc	chl		**76**
17.51	878.28	19.01	876.8	1.50	1.53	102	1.26	84	6	219	200	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, trace chlorite and epidote alteration, trace calcite on fractures.	0	5	3	2	6	16	15	cc	chl		**70**
19.01	876.78	20.51	875.3	1.50	1.50	100	1.50	100	3	375	200	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, trace chlorite and epidote alteration, trace calcite on fractures.	0	5	5	6	5	21	15	cc	chl		**80**
20.51	875.28	22.01	873.8	1.50	1.53	102	1.53	100	2	510	200	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, trace chlorite and epidote alteration, trace calcite on fractures. Highly competent.	0	5	3	6	4	18	15	cc	chl		**78**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Joint Condition: Apert- A	Joint Condition: Rough R	Joint Condition: Infill I	Joint Condition: Weath W	Joint Condition: TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
22.01	873.78	23.51	872.3	1.50	1.52	101	1.35	90	6	217	175	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, trace chlorite and epidote alteration, trace calcite on fractures. Highly competent.	0	5	3	6	4	18	15	cc	chl		**72**
23.51	872.28	25.01	870.8	1.50	1.50	100	1.21	81	7	188	175	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, epidote alteration, calcite veinlets, chlorite and calcite on fracture faces with trace hematite.	0	5	3	2	6	16	15	cc	chl	FeO	**68**
25.01	870.78	26.51	869.3	1.50	1.52	101	1.52	100	7	190	175	R5	SLD	Dark Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, epidote alteration, calcite veinlets, chlorite and calcite on fracture faces.	0	5	3	2	6	16	15	cc	chl		**72**
26.51	869.28	28.01	867.8	1.50	1.50	100	0.65	43	11	125	100	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Diorite intruded by breccia, moderately to highly fractured, slightly weathered. Calcite and chlorite on fractures. Intruded material is very weak, host rock is strong.	0	0	5	0	5	10	15	cc	chl		**50**
28.01	867.78	29.51	866.3	1.50	1.53	102	1.20	80	15	96	125	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately fractured, slightly weathered, vuggy calcite on fractures with hematite, chlorite and epidote alteration. With disseminated pyrite.	0	0	5	0	5	10	15	cc	chl	FeO	**58**
29.51	866.28	31.01	864.8	1.50	1.51	101	1.51	100	2	503	200	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Highly competent, minor fracturing, calcite and chlorite along fractures, with disseminated pyrite.	0	5	5	2	6	18	15	cc	chl		**78**
31.01	864.78	32.28	863.5	1.27	1.22	96	1.20	94	2	407	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Minor quartz+/-calcite veinlets, sericitic alteration, very competent calcite coating on joints.	0	5	5	2	5	17	15	cc	ser	chl	**75**
32.28	863.51	33.78	862.0	1.50	1.48	99	1.46	97	2	493	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic alteration, calcite coating on fractures.	0	5	5	2	5	17	15	cc	ser		**75**
33.78	862.01	35.28	860.5	1.50	1.51	101	1.54	100	4	302	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets throughout, sericitic alteration haloes. Trace to minor disseminated pyrite.	0	4	5	2	5	16	15	cc	qtz		**72**
35.28	860.51	36.78	859.0	1.50	1.48	99	1.37	91	2	493	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, calcite coating on fractures. Sericitic alteration haloes. Minor quartz+/-calcite veinlets.	0	5	3	2	5	15	15	ser	cc	qtz	**71**
36.78	859.01	38.28	857.5	1.50	1.52	101	1.01	67	6	217	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, local fractured zone downhole. Calcite coating on joints. Sericitic alteration, quartz+/-calcite veinlets throughout.	0	4	3	2	5	14	15	ser	cc	qtz	**62**
38.28	857.51	39.78	856.0	1.50	1.50	100	1.49	99	3	375	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic and potassic alteration haloes.	0	4	5	2	5	16	15	ser	cc	qtz	**75**
39.78	856.01	41.28	854.5	1.50	1.50	100	1.50	100	0	1500	250	R6	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	No fractures/joints. Quartz+/-calcite veinlets, sericitic alteration. Very strong.	0	6	6	6	6	24	15	ser	cc	qtz	**91**
41.28	854.51	42.78	853.0	1.50	1.50	100	1.35	90	4	300	250	R6	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets, calcite coating. Sericitic alteration.	0	4	3	2	5	14	15	ser	cc	qtz	**71**
42.78	853.01	44.28	851.5	1.50	1.50	100	1.32	88	3	375	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets, sericitic alteration, calcite coating on fractures.	0	4	5	2	5	16	15	ser	cc	qtz	**72**

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
44.28	851.51	45.78	850.0	1.50	1.52	101	1.40	93	6	217	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, with sericitic alteration and quartz+/-calcite veinlets. Calcite coating on joint surfaces.	0	5	3	2	5	15	15	ser	cc	qtz	**71**
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-059

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis-P	Apert-A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	905.25	42.67	862.6	42.67	0.0	0	0										overburden/ODEX - not recovered, bedrock at 41.5m											
42.67	862.58	42.82	862.4	0.15	0.12	80	0.12	80	0	120	75	R4	IMH	Grey	Fine to coarse grained/ Porphyritic	Massive	Moderately weathered, no infilling.	0	6	6	6	3	21	15				**66**
42.82	862.43	44.32	860.9	1.50	1.46	97	0.90	60	7	183	75	R4	IMH	Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with greenish staining throughout, quartz bands up to 2cm thick and calcite veinlets visible, soft brownish red iron oxide staining and clay infilling.	0	4	5	2	3	14	15	FeO	cly		**56**
44.32	860.93	45.82	859.4	1.50	1.50	100	0.50	33	10	136	75	R4	IMH	Grey	Fine to coarse grained/ Porphyritic	Massive	Grey with greenish staining throughout, quartz bands up to 2cm thick and calcite veinlets visible, soft brownish red iron oxide staining and clay infilling.	0	4	5	2	3	14	15	FeO	cly		**51**
45.82	859.43	47.32	857.9	1.50	1.32	88	0.74	49	6	189	75	R4	IMH	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	Small amount of calcite infilling.	0	1	3	2	3	9	15			cc	**49**
47.32	857.93	48.82	856.4	1.50	1.50	100	1.25	83	5	250	75	R4	IMH	Greenish Grey	Fine to coarse grained/ Porphyritic	Massive	As above.	0	4	3	2	3	12	15			cc	**59**
EOH																												

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-060

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	914.34	1.20	914.3	1.20	0.0	0	0										overburden, not recovered											
1.20	914.34	2.29	914.3	1.09	0.95	87	0.90	83	4	190	110	R5	SLD	Dark Grey with Orange	Fine to Coarse Grained, Mottled	Massive	Moderately weathered, with iron oxide staining on fractures. Fine calcite veinlets throughout. Minor fracturing.	0	4	5	6	3	18	15	FeO			**67**
2.29	914.34	3.79	914.3	1.50	1.50	100	1.46	97	8	167	110	R5	SLD	Dark Grey with Orange	Fine to Coarse Grained, Mottled	Massive	Moderately weathered, with iron oxide staining on fractures. Fine calcite veinlets throughout. Minor fracturing.	0	4	5	4	3	16	15	FeO			**68**
3.79	914.34	5.29	914.3	1.50	1.50	100	1.50	100	3	375	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately weathered, with iron oxide staining on fractures. Fine calcite veinlets throughout. Minor fracturing. With epidote alteration.	0	4	5	6	3	18	15	FeO			**73**
5.29	914.34	6.79	914.3	1.50	1.53	102	1.53	100	5	255	150	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Iron oxide staining on fractures, epidote alteration. Minor fracturing. Strong.	0	4	5	6	5	20	15	FeO			**75**
6.79	914.34	8.29	914.3	1.50	1.52	101	1.39	93	7	190	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Iron oxide staining on fractures, epidote alteration. Minor fracturing. Strong. Moderately weathered. 1 cm halos of iron oxide alteration around some fractures. Highly altered zones with increased iron oxide and some white clay-like mineral.	0	4	5	6	1	16	15	wcl	FeO		**67**
8.29	914.34	9.79	914.3	1.50	1.50	100	1.38	92	8	167	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Iron oxide staining on fractures, epidote alteration. Minor fracturing. Strong. Moderately weathered. 1 cm halos of iron oxide alteration around some fractures. Highly altered zones with increased iron oxide and some white clay-like mineral.	0	4	5	6	1	16	15	wcl	FeO		**67**
9.79	914.34	11.29	914.3	1.50	1.50	100	1.39	93	7	188	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Moderately weathered, iron oxide staining on fractures and epidote alteration throughout. Strong, minor fracturing.	0	4	3	6	3	16	15	FeO			**67**
11.29	914.34	12.79	914.3	1.50	1.50	100	1.36	91	8	167	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	As above, one ~5cm heavily oxidized and altered zone with partial dissolution along fracture.	0	1	5	2	1	9	15	FeO			**59**
12.79	914.34	14.29	914.3	1.50	1.53	102	1.18	79	9	153	110	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Diorite, hydrothermal alteration. Iron oxide staining on fractures. Strong, moderately fractured.	0	4	3	6	3	16	15	FeO			**64**
14.29	914.34	15.79	914.3	1.50	1.52	101	1.38	92	8	169	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets, iron oxide staining on joints. Strong.	0	4	3	6	5	18	15	FeO			**71**
15.79	914.34	17.07	914.3	1.28	1.30	102	1.13	88	6	186	200	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above.	0	4	3	6	5	18	15	FeO			**72**
17.07	914.34	18.57	914.3	1.50	1.52	101	1.34	89	6	217	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, iron oxide staining on fractures. Quartz+/-calcite veinlets, and calcite coating on joints.	0	4	3	2	5	14	15	cc	FeO		**67**
18.57	914.34	20.07	914.3	1.50	1.49	99	1.36	91	6	213	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above.	0	4	3	2	5	14	15	cc	FeO		**67**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
20.07	914.34	21.57	914.3	1.50	1.50	100	1.46	97	5	250	200	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, healed joints, strong and competent.	0	4	3	2	5	14	15	cc	FeO		**71**
21.57	914.34	23.07	914.3	1.50	1.51	101	1.52	100	5	252	200	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, with quartz+/-calcite veinlets, minor healed joints, iron oxide staining.	0	5	3	2	5	15	15	cc	FeO		**72**
23.07	914.34	24.57	914.3	1.50	1.50	100	1.25	83	10	136	200	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, oxidized downhole, healed joints and local rubble zones.	0	4	5	2	5	16	15	FeO			**68**
24.57	914.34	26.07	914.3	1.50	1.53	102	0.74	49	13	109	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, oxidized with quartz+/-calcite veinlets and veins. Local rubble zone at the start of run, more competent downhole.	0	4	3	2	5	14	15	FeO			**58**
26.07	914.34	27.57	914.3	1.50	1.50	100	1.50	100	2	500	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic alteration.	0	4	3	6	6	19	15			FeO	**77**
27.57	914.34	29.07	914.3	1.50	1.50	100	1.38	92	4	300	150	R5	SLD	Grey	Fine to Medium Grained, Inequigranular	Massive	As above, contact with a fine grained diorite at 27.77m, sericitic alteration, healed joints and calcite coating on joint surfaces.	0	4	3	2	5	14	15	cc	FeO		**68**
29.07	914.34	30.57	914.3	1.50	1.52	101	1.41	94	4	304	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	healed joints, calcite + quartz veinlets, pyrite blebs throughout (<2%).	0	4	3	6	6	19	15				**76**
30.57	914.34	32.07	914.3	1.50	1.49	99	1.49	99	4	298	200	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, iron oxide staining on joints.	0	5	3	2	5	15	15	FeO			**73**
32.07	914.34	33.57	914.3	1.50	1.52	101	1.52	100	2	507	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets and calcite coating on joints.	0	4	3	2	5	14	15	cc			**72**
33.57	914.34	35.07	914.3	1.50	1.48	99	1.48	99	3	370	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets and calcite coating on joints.	0	4	3	2	5	14	15	cc			**71**
35.07	914.34	36.57	914.3	1.50	1.49	99	1.49	99	2	497	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets and calcite coating on joints.	0	4	3	2	5	14	15	cc			**72**
36.57	914.34	38.07	914.3	1.50	1.50	100	1.45	97	2	500	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets and calcite coating on joints.	0	4	3	2	5	14	15	cc			**71**
38.07	914.34	39.57	914.3	1.50	1.47	98	1.32	88	5	245	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets, pyrite veinlets downhole and blebby pyrite on joints.	0	4	5	6	5	20	15				**73**
39.57	914.34	41.07	914.3	1.50	1.50	100	1.38	92	7	188	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets and calcite coating on joints.	0	4	3	6	5	18	15	cc			**71**
EOH																											

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-061

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	912.25	1.44	910.8	1.44	0.0	0	0										OVB to ~0.7m, HWT casing set at 1.44m											
1.44	910.81	2.32	909.9	0.88	0.53	60	0.00	0	Max	5	50	R4	SLD	Dark Grey	Fine to Medium Grained/Inequigranular	Massive	Iron oxide staining, quartz+/-calcite veinlets.	0	0	3	6	5	14	15			FeO	**43**
2.32	909.93	3.82	908.4	1.50	1.05	70	0.00	0	Max	5	50	R4	SLD	Dark Grey	Fine to Medium Grained/Inequigranular	Massive	As above with sericitic alteration and iron oxide staining on joints.	0	4	3	2	5	14	15			FeO	**43**
3.82	908.43	5.32	906.9	1.50	1.50	100	1.27	85	7	188	80	R4	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	Iron oxide staining on joints. Minor healed joints and quartz+/-calcite infill.	0	4	3	2	5	14	15	cc	qtz	FeO	**61**
5.32	906.93	6.82	905.4	1.50	1.50	100	1.38	92	8	167	80	R4	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, more competent	0	4	3	2	5	14	15	cc	qtz	FeO	**63**
6.82	905.43	8.32	903.9	1.50	1.50	100	1.33	89	6	214	80	R4	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	diorite with sericitic alteration and iron oxide staining.	0	4	3	2	5	14	15			FeO	**62**
8.32	903.93	9.82	902.4	1.50	1.50	100	1.50	100	1	750	100	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above. Minor healed joints and iron oxide staining.	0	4	3	2	5	14	15			FeO	**71**
9.82	902.43	11.32	900.9	1.50	1.45	97	1.28	85	5	242	150	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	Healed joints, quartz+/-calcite veinlets. Minor iron oxide staining.	0	4	3	6	5	18	15			FeO	**70**
11.32	900.93	12.82	899.4	1.50	1.50	100	1.50	100	1	750	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, iron oxide staining, sericitic alteration, healed joints and carbonate veinlets.	0	4	3	2	5	14	15	FeO			**76**
12.82	899.43	14.32	897.9	1.50	1.50	100	1.50	100	1	750	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, very competent diorite, sericitic alteration haloes and quartz+/-calcite veinlets. Vuggy textures.	0	5	3	2	5	15	15			FeO	**77**
14.32	897.93	15.82	896.4	1.50	1.50	100	1.48	99	3	375	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	Quartz+/-carbonate veinlets, iron oxide staining. Sericitic alteration.	0	4	3	2	5	14	15			FeO	**73**
15.82	896.43	17.32	894.9	1.50	1.48	99	1.48	99	1	740	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, minor quartz+/-carbonate veinlets and sericitic alteration.	0	5	5	6	6	22	15			FeO	**84**
17.32	894.93	18.82	893.4	1.50	1.52	101	1.37	91	3	380	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, quartz+/-carbonate veinlets, sericitic alteration, iron oxide staining.	0	4	3	6	5	18	15			FeO	**75**
18.82	893.43	20.32	891.9	1.50	1.50	100	1.50	100	2	500	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	Healed joints, calcite infill and coating on joints.	0	4	3	6	5	18	15	cc		FeO	**78**
20.32	891.93	21.82	890.4	1.50	1.50	100	1.26	84	8	167	150	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, local broken zone, competent downhole. Sericitic and potassic alteration.	0	1	5	2	5	13	15			FeO	**64**
21.82	890.43	23.32	888.9	1.50	1.50	100	1.45	97	3	375	150	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, quartz+/-carbonate veinlets, sericitic alteration and minor iron oxide staining.	0	4	3	2	5	14	15			FeO	**70**
23.32	888.93	24.82	887.4	1.50	1.50	100	1.50	100	1	750	200	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, competent with sericitic alteration haloes. Healed joints and quartz+/-carbonate veinlets.	0	4	3	2	5	14	15				**76**
24.82	887.43	26.32	885.9	1.50	1.49	99	1.49	99	2	497	180	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	Iron oxide staining, sericitic alteration.	0	4	3	2	5	14	15			FeO	**73**
26.32	885.93	27.82	884.4	1.50	1.47	98	1.28	85	4	294	180	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above, massive pyrite + pyrrhotite downhole (~10-15% of run). Sulphides associated with sericitic and potassic alteration.	0	5	3	2	5	15	15				**69**
27.82	884.43	29.32	882.9	1.50	1.50	100	1.50	100	4	300	180	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above.	0	5	3	2	5	15	15				**72**
29.32	882.93	30.82	881.4	1.50	1.46	97	1.46	97	2	487	180	R5	SLD	Grey	Fine to Medium Grained/Inequigranular	Massive	As above.	0	5	3	6	5	19	15				**78**
30.82	881.43	32.32	879.9	1.50	1.50	100	1.42	95	5	250	200	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Sericitic alteration, healed joints, quartz+/carbonate veinlets.	0	5	3	6	5	19	15				**75**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition: Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
32.32	879.93	33.82	878.4	1.50	1.47	98	1.47	98	2	490	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Sericitic alteration, healed joints, quartz+/carbonate veinlets.	0	5	3	2	5	15	15				**73**
33.82	878.43	35.32	876.9	1.50	1.51	101	1.50	100	2	503	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Quartz+/-carbonate veinlets, calcite coating on joints, iron oxide staining.	0	4	3	2	5	14	15	cc		FeO	**72**
35.32	876.93	36.82	875.4	1.50	1.53	102	1.55	100	3	383	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Quartz+/-carbonate veinlets, calcite coating on joints, iron oxide staining.	0	4	3	2	5	14	15	cc		FeO	**71**
36.82	875.43	38.32	873.9	1.50	1.52	101	1.40	93	2	507	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	Quartz+/-carbonate veinlets, calcite coating on joints, iron oxide staining.	0	4	3	2	5	14	15	cc		FeO	**71**
38.32	873.93	39.82	872.4	1.50	1.50	100	1.50	100	1	750	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, some quartz+/-calcite veinlets. Minor sericitic alteration.	0	5	5	6	5	21	15				**81**
39.82	872.43	41.32	870.9	1.50	1.50	100	1.36	91	3	375	150	R5	SLD	Greenish Grey	Fine to Medium Grained/Inequigranular	Massive	As above, some quartz+/-calcite veinlets. Minor sericitic alteration.	0	5	5	6	5	21	15				**76**
EOH																											

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REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-063

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
0.00	923.38	5.40	918.0	5.40	0.0	0	0										overburden, not recovered											
5.40	917.98	6.76	916.6	1.36	1.36	100	1.36	100	4	272	150	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, slightly weathered, with iron oxide staining, chlorite and epidote alteration. Few calcite veinlets. Intact rock is very hard.	0	5	5	6	5	21	15	FeO		chl	**77**
6.76	916.62	8.26	915.1	1.50	1.50	100	1.50	100	5	250	150	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, slightly weathered, with iron oxide staining, chlorite and epidote alteration. Few calcite veinlets. Intact rock is very hard. Disseminated pyrite throughout.	0	5	3	6	5	19	15	FeO		chl	**74**
8.26	915.12	9.76	913.6	1.50	1.52	101	1.52	100	5	253	150	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, slightly weathered, with iron oxide staining, chlorite and epidote alteration. Few calcite veinlets. Intact rock is very hard. Disseminated pyrite throughout. Calcite infill on select fractures.	0	5	3	2	5	15	15	cc	FeO		**70**
9.76	913.62	11.26	912.1	1.50	1.47	98	1.37	91	4	294	150	R5	SLD	Dark Greenish Grey	Fine to Coarse Grained, Mottled	Massive	Minor fracturing, slightly weathered, with iron oxide staining, chlorite and epidote alteration. Few calcite veinlets. Intact rock is very hard. Disseminated pyrite throughout.	0	5	3	6	3	17	15	FeO		chl	**71**
11.26	912.12	12.76	910.6	1.50	1.37	91	1.37	91	2	457	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Quartz+/-calcite veinlets and minor healed joints. Minor iron oxide staining.	0	5	3	6	5	19	15			FeO	**75**
12.76	910.62	14.26	909.1	1.50	1.46	97	1.46	97	1	730	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericite alteration, healed joints. Iron oxide staining on joints.	0	4	3	6	5	18	15			FeO	**78**
14.26	909.12	15.76	907.6	1.50	1.50	100	1.50	100	2	500	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, calcite coating. Minor iron oxide staining, blebby pyrite.	0	4	3	2	5	14	15	cc		FeO	**72**
15.76	907.62	17.26	906.1	1.50	1.48	99	1.46	97	3	370	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic alteration. Iron oxide staining on joints.	0	4	3	2	5	14	15			FeO	**70**
17.26	906.12	18.76	904.6	1.50	1.46	97	1.46	97	4	292	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, healed joints and iron oxide staining, pyrite and pyrrhotite stringers.	0	5	3	6	5	19	15			FeO	**74**
18.76	904.62	20.26	903.1	1.50	1.50	100	1.50	100	4	300	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, healed joints, quartz+/-calcite veins with vugs.	0	5	3	6	5	19	15				**75**
20.26	903.12	21.76	901.6	1.50	1.50	100	1.37	91	6	214	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic alteration. Healed joints.	0	4	3	2	5	14	15				**67**
21.76	901.62	23.26	900.1	1.50	1.52	101	1.52	100	3	380	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	Healed joints, calcite coating and sericitic alteration.	0	5	3	2	5	15	15	cc			**72**
23.26	900.12	24.76	898.6	1.50	1.48	99	1.40	93	4	296	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, iron oxide staining on joints.	0	5	3	6	5	19	15			FeO	**74**
24.76	898.62	26.26	897.1	1.50	1.50	100	1.44	96	3	375	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, iron oxide staining on joints. Blebby pyrrhotite present.	0	4	3	2	5	14	15			FeO	**70**
26.26	897.12	27.76	895.6	1.50	1.50	100	1.50	100	2	500	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, micro-fractures with iron oxide staining.	0	5	3	6	5	19	15				**77**

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DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Joint Condition Persis- P	Apert- A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	RMR-89 Total Average
27.76	895.62	29.26	894.1	1.50	1.50	100	1.47	98	5	250	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, sericitic alteration, minor iron oxide staining.	0	4	3	6	5	18	15			FeO	**73**
29.26	894.12	30.76	892.6	1.50	1.49	99	1.36	91	4	298	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets.	0	4	3	6	5	18	15				**72**
30.76	892.62	32.26	891.1	1.50	1.50	100	1.50	100	3	375	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above.	0	4	3	6	5	18	15				**75**
32.26	891.12	33.76	889.6	1.50	1.49	99	1.46	97	1	745	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets, pyrrhotite veinlets.	0	5	3	6	5	19	15				**79**
33.76	889.62	35.26	888.1	1.50	1.50	100	1.50	100	1	750	150	R5	SLD	Greenish Grey	Fine to Medium Grained, Inequigranular	Massive	As above, quartz+/-calcite veinlets and minor healed joints.	0	5	3	6	5	19	15				**79**
EOH																											

M:\1\01\00246\26\A\Data\Task 200 - Geotechnical Site Investigation\SI DATA WORK FILE\RMR log review\Report 9\[DH14-063 Logging.xlsm]Data - Logging Sheet

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR'15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

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GEOTECHNICAL DRILLHOLE LOGGING DATA SHEET
ROCK MASS CLASSIFICATION - RMR 1989
DRILLHOLE I.D. DH14-065

DRILL RUN DATA													GEOLOGY - COMMENTS					DISCONTINUITY DATA - RATING SYSTEMS							INFILL			RMR
																		Joint Condition										
Depth From (m)	Elev. From (m)	Depth To (m)	Elev. to (m)	Run Length (m)	Recov. Length (m)	Recov. (%)	RQD Length (m)	RQD (%)	# of Fractures	Average Fracture Spac. (mm)	UCS (Est.) (MPa)	ROCK CLASS.	Lithology (Client)	Rock Colour	Rock Grain Size / Texture	Structure	Other Notes	Persis-P	Apert-A	Rough R	Infill I	Weath W	TOTAL (RMR)	Water Rating	Fill. Type 1 (see Leg)	Fill. Type 2 (see Leg)	Fill. Type 3 (see Leg)	**RMR-89 Total** Average
0.00	907.19	13.62	907.2	13.62	0.00	0	0.00										overburden, not recovered. Bedrock at 11.4 m.											
13.62	907.19	14.29	907.2	0.67	0.37	55	0.37	55	4	74	30	R3	VCLT	Dark grey	fine to coarse grained/porphyritic	massive	fine to coarse grained, porphyritic, grey, massive, joints are fresh with minor calcite infill, rock slightly weathered, minor calcite veinlets	0	4	3	6	5	18	15			cc	**54**
14.29	907.19	15.79	907.2	1.50	1.50	100	1.31	87	12	115	30	R3	VCLT	Dark grey	fine to coarse grained/porphyritic	massive	Same as previous, high calcite vein concentration causing a minor broken zone midway through run	0	4	3	2	5	14	15			cc	**57**
15.79	907.19	17.29	907.2	1.50	1.48	99	0.91	61	14	99	30	R3	VCLT	Dark grey	fine to coarse grained/porphyritic	massive	Same as previous, slightly weathered with minor broken calcite veinlet zone midway down the run, calcite and clay infill, with reddish purple alteration	0	4	3	2	5	14	15	cc	cly	FeO	**51**
17.29	907.19	18.79	907.2	1.50	1.50	100	1.50	100	3	375	30	R3	VCLT	Dark grey	fine to coarse grained/porphyritic	massive	fine to coarse grained, porphyritic, grey, massive, joints are fresh with minor calcite, rock fresh, no weathering, trace calcite veinlets	0	4	3	6	6	19	15			cc	**67**
18.79	907.19	20.29	907.2	1.50	1.50	100	1.21	81	6	214	30	R3	VCLT	Dark grey	fine to coarse grained/porphyritic	massive	Same as previous, stick rock	0	4	3	6	6	19	15			cc	**62**
EOH																												

M:\1\01\00246\26\A\Data\Task 200 - Geotechnical Site Investigation\SI DATA WORK FILE\RMR log review\Report 9\[DH14-065 Logging.xlsm]Data - Logging Sheet

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	02APR15	ISSUED WITH REPORT VA101-246/26-9	JAS	LJG

Print: 4/7/2015 3:04 PM

APPENDIX C3

SPT PHOTOGRAPHS

(Pages C3-1 to C3-90)

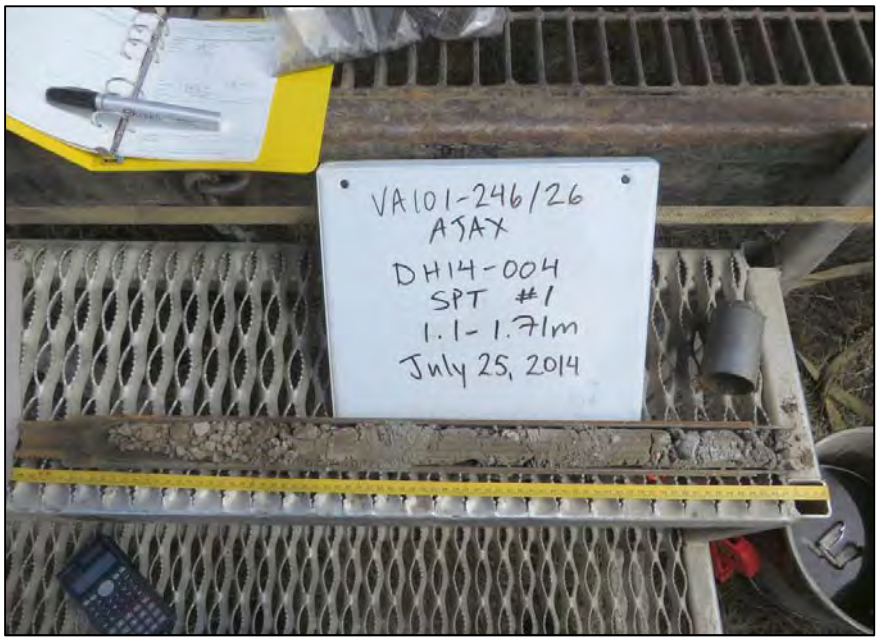


PHOTO 1 - DH14-004 SPT#01 1.10 - 1.71 m

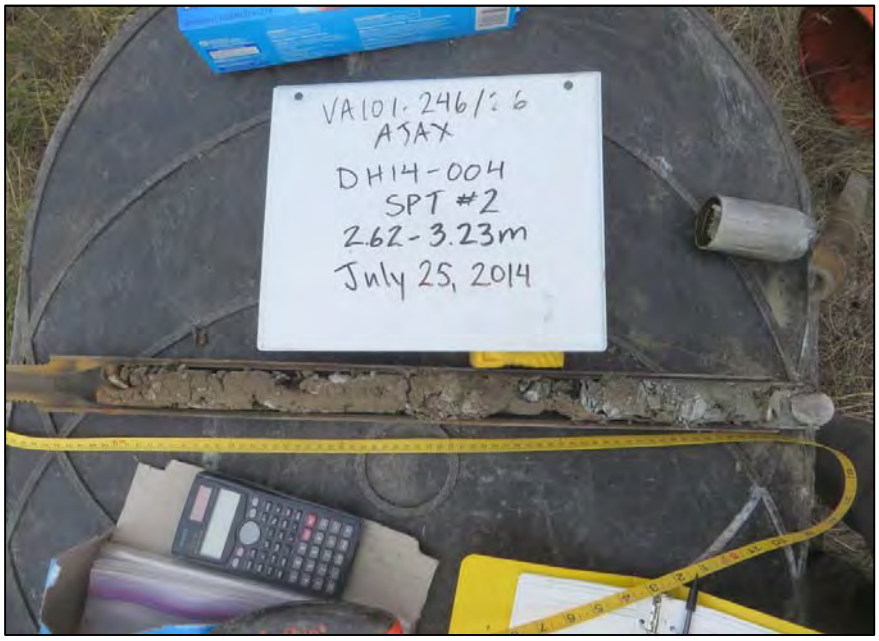


PHOTO 2 - DH14-004 SPT#02 2.62 - 3.23 m

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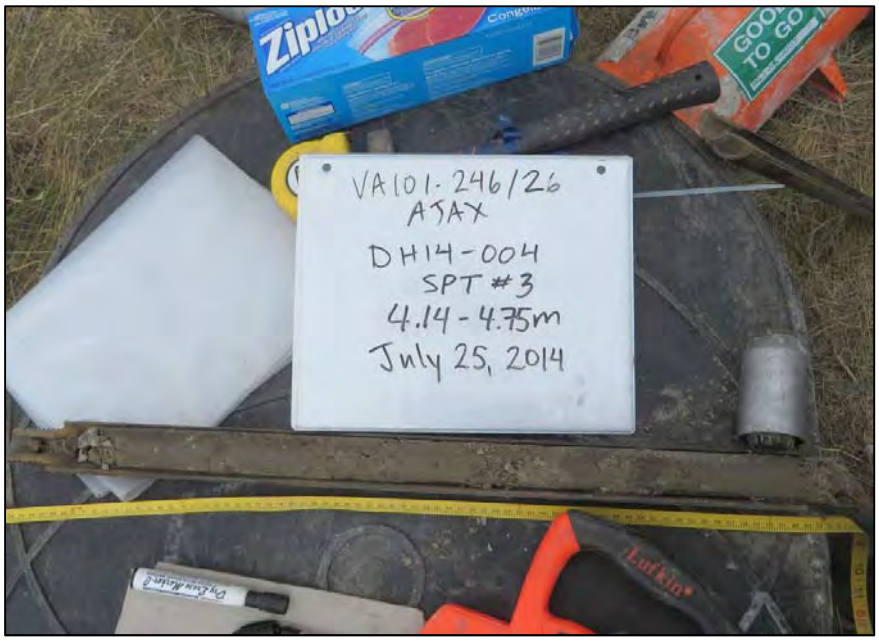


PHOTO 3 - DH14-004 SPT#03 4.14 - 4.75 m



PHOTO 4 - DH14-004 SPT#04 5.66 - 6.27 m

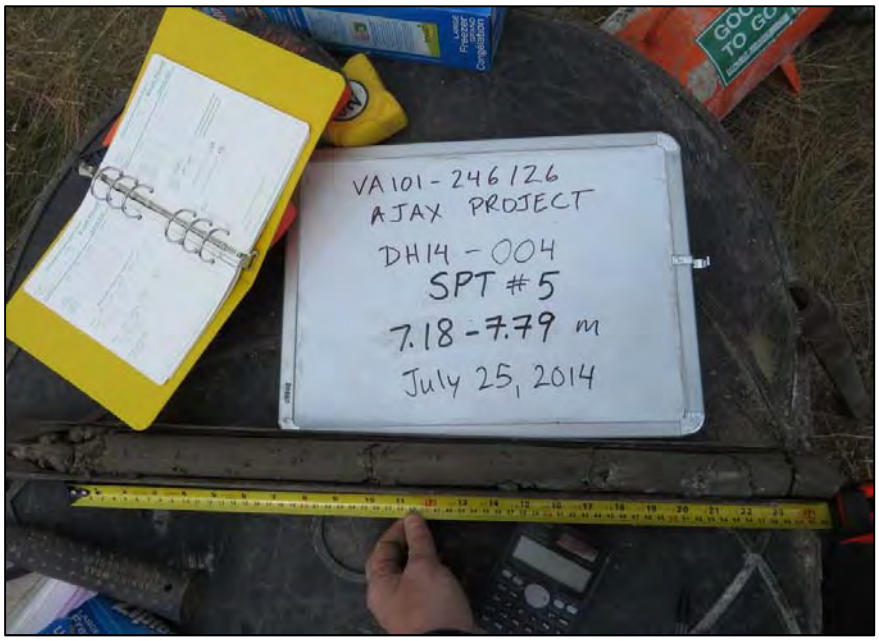


PHOTO 5 - DH14-004 SPT#05 7.18 - 7.79 m

No Photo Available

PHOTO 6 - DH14-004 SPT#06 8.70 - 8.70 m - No Photo Available

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PHOTO 7 - DH14-007 SPT#01 1.12 - 1.73 m



PHOTO 8 - DH14-007 SPT#02 2.64 - 3.25 m

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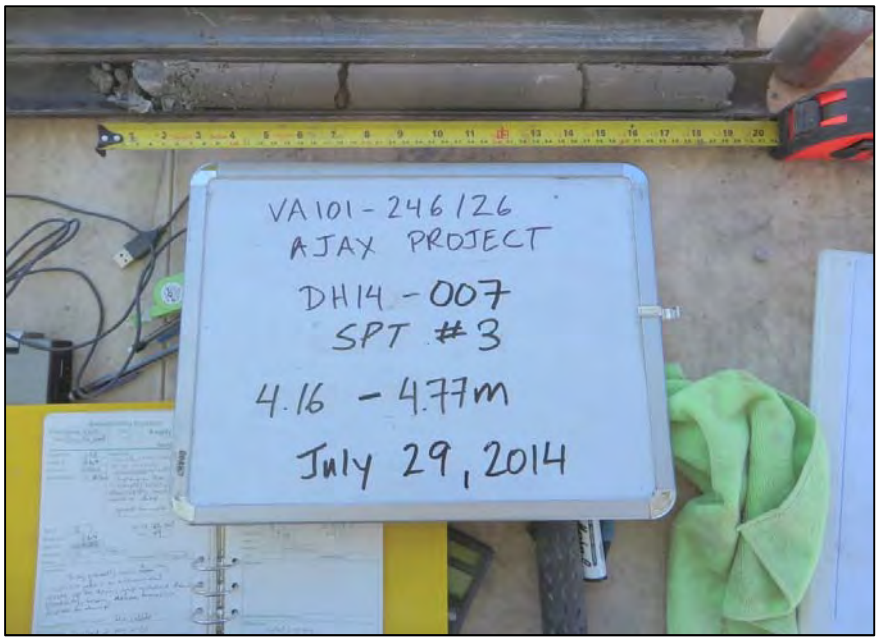


PHOTO 9 - DH14-007 SPT#03 4.16 - 4.77 m



PHOTO 10 DH14-007 SPT#04 5.68 - 6.29 m



PHOTO 11 DH14-007 SPT#05 7.20 - 7.81 m



PHOTO 12 DH14-007 SPT#06 8.72 - 9.33 m



PHOTO 13 DH14-007 SPT#07 10.24 - 10.85 m



PHOTO 14 DH14-007 SPT#08 11.76 - 12.37 m



PHOTO 15 DH14-007 SPT#09 13.28 - 13.89 m



PHOTO 16 DH14-007 SPT#10 14.80 - 15.41 m

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PHOTO 17 DH14-007 SPT#11 16.32 - 16.93 m

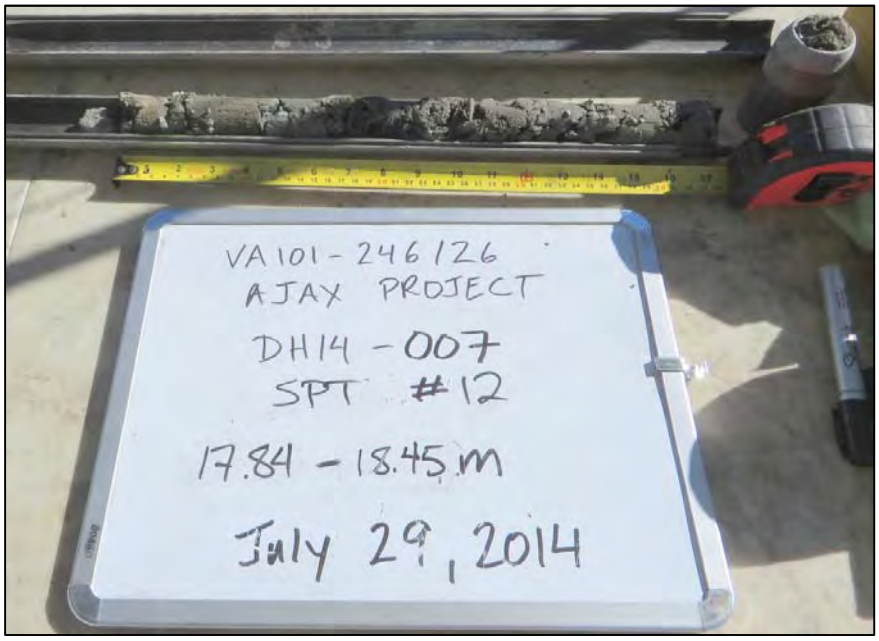


PHOTO 18 DH14-007 SPT#12 17.84 - 18.45 m

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PHOTO 19 DH14-007 SPT#13 19.36 - 19.97 m



PHOTO 20 DH14-007 SPT#14 20.88 - 21.99 m

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PHOTO 21 DH14-007 SPT#15 22.40 - 23.01 m

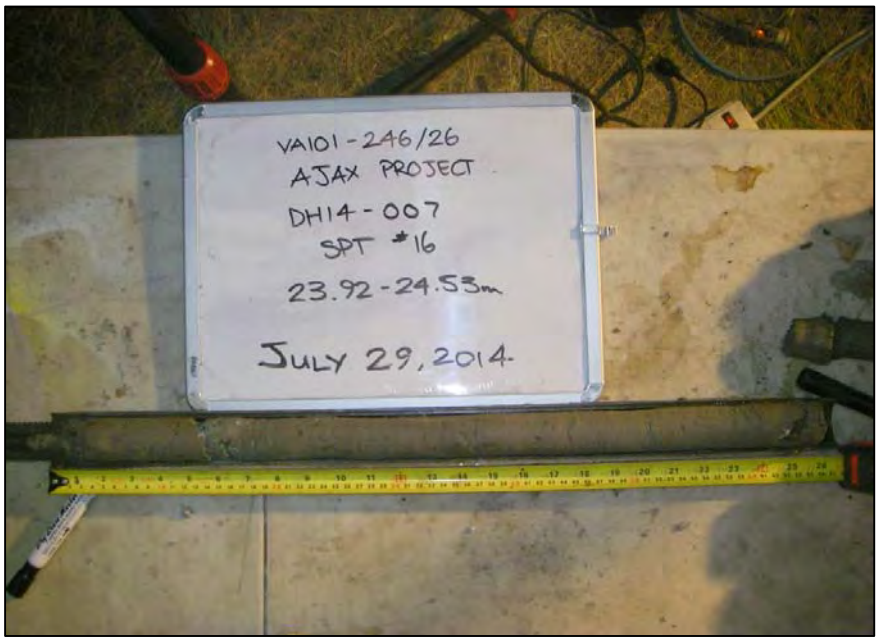


PHOTO 22 DH14-007 SPT#16 23.92 - 24.53 m

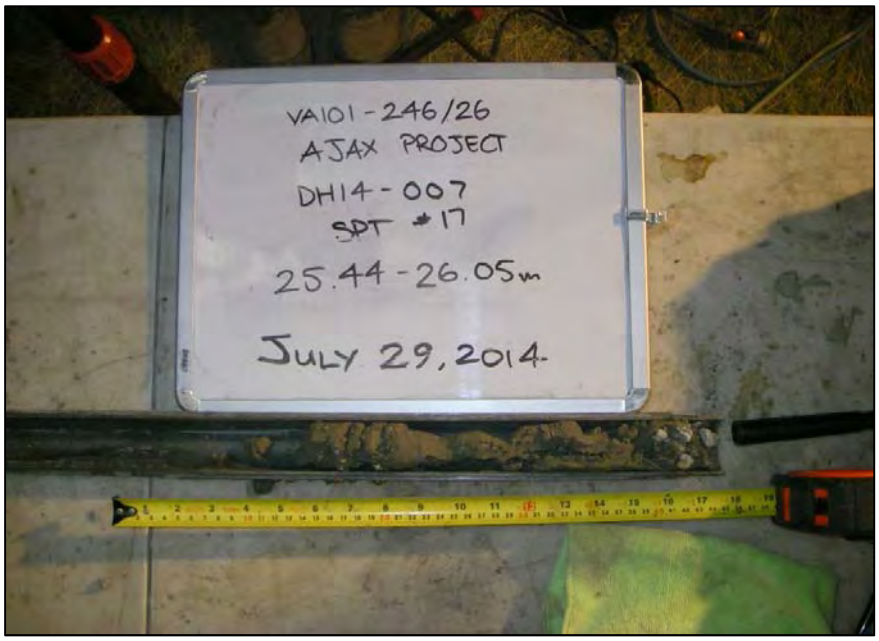


PHOTO 23 DH14-007 SPT#17 25.44 - 26.05 m

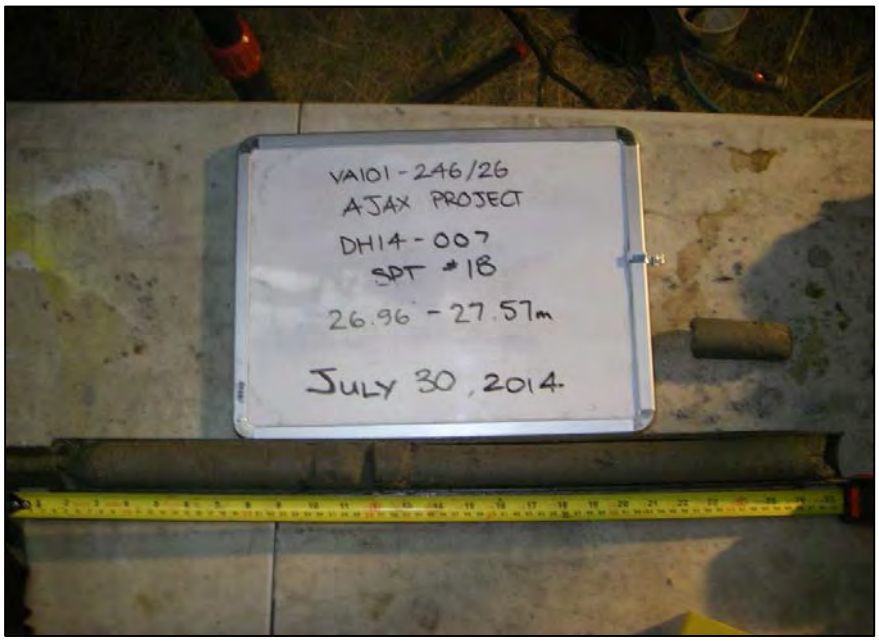


PHOTO 24 DH14-007 SPT#18 26.96 - 27.57 m

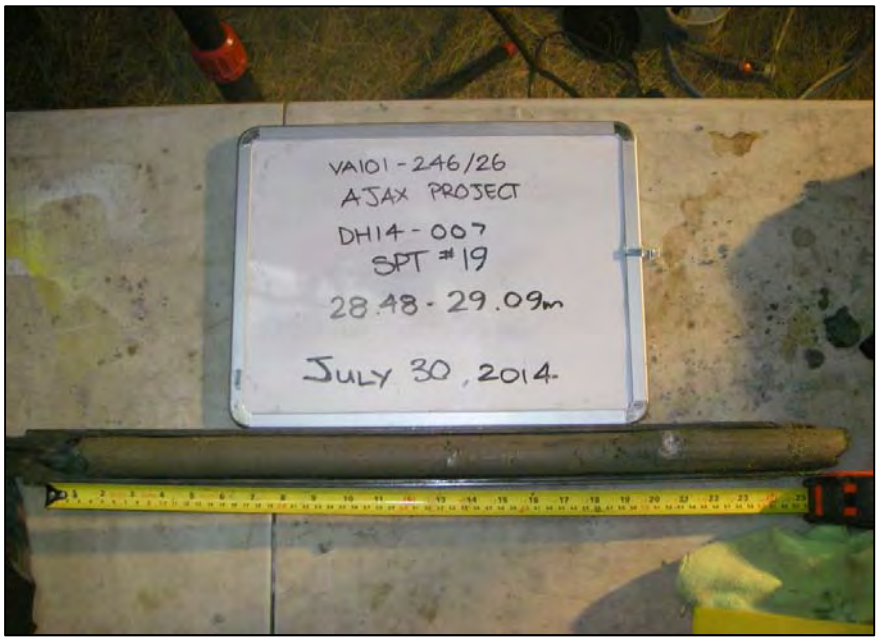


PHOTO 25 DH14-007 SPT#19 28.48 - 29.09 m

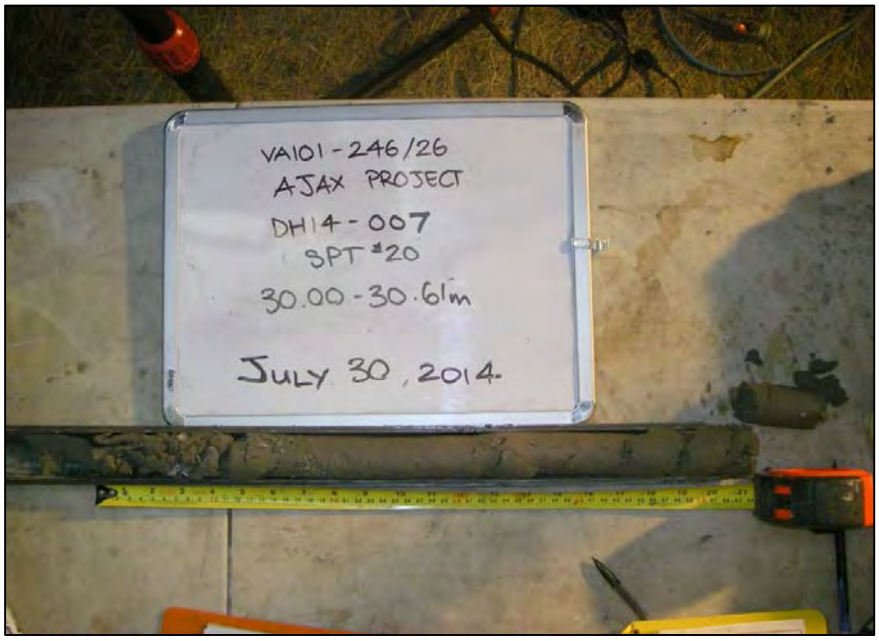


PHOTO 26 DH14-007 SPT#20 30.00 - 30.61 m

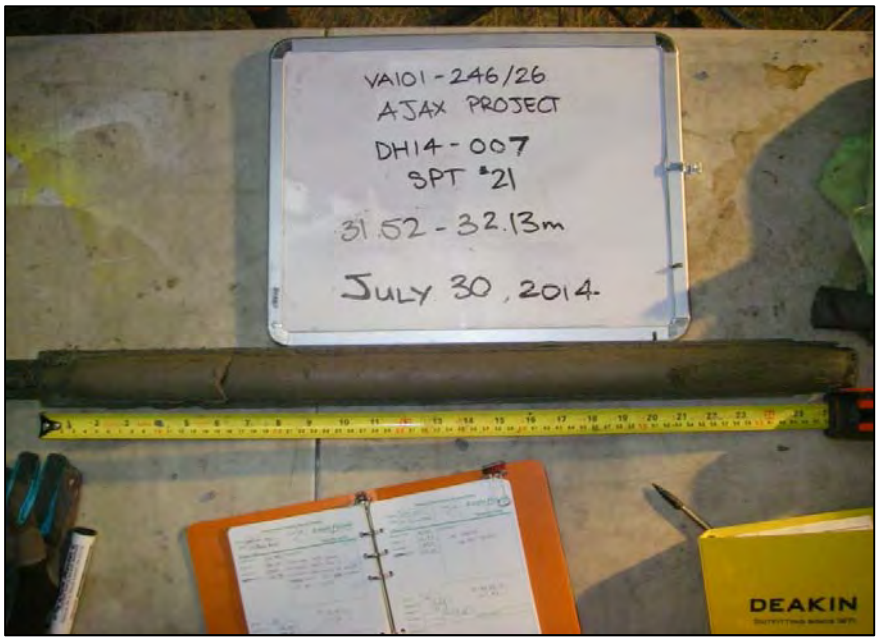


PHOTO 27 DH14-007 SPT#21 31.52 - 32.13 m



PHOTO 28 DH14-007 SPT#22 33.04 - 33.65 m



PHOTO 29 DH14-007 SPT#23 34.56 - 35.17 m



PHOTO 30 DH14-007 SPT#24 36.08 - 36.69 m

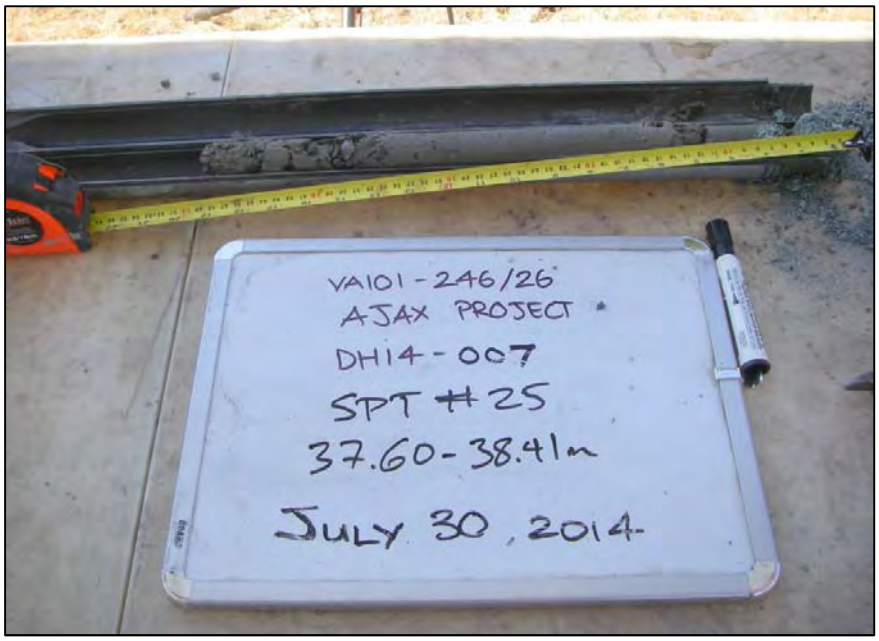


PHOTO 31 DH14-007 SPT#25 37.60 - 38.41 m



PHOTO 32 DH14-017 SPT#01 1.18 - 1.79 m



PHOTO 33 DH14-017 SPT#02 2.70 - 3.31 m



PHOTO 34 DH14-017 SPT#03 4.33 - 4.83 m

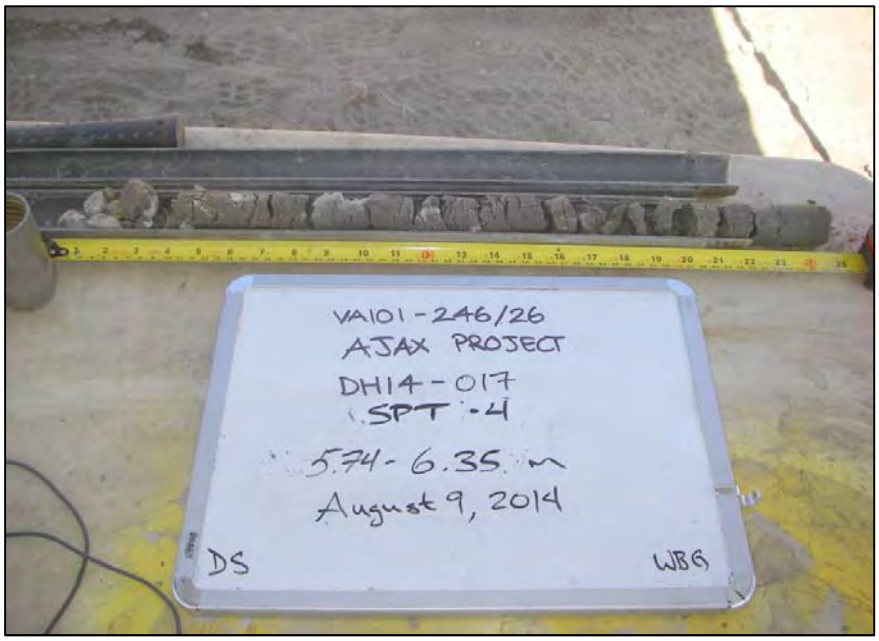


PHOTO 35 DH14-017 SPT#04 5.74 - 6.35 m



PHOTO 36 DH14-017 SPT#05 7.26 - 7.87 m

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PHOTO 37 DH14-017 SPT#06 8.78 - 9.39 m



PHOTO 38 DH14-017 SPT#07 10.30 - 10.91 m



PHOTO 39 DH14-017 SPT#08 11.82 - 12.43 m



PHOTO 40 DH14-035 SPT#01 1.52 - 2.13 m



PHOTO 41 DH14-035 SPT#02 3.05 - 3.66 m



PHOTO 42 DH14-035 SPT#03 4.57 - 4.57 m



PHOTO 43 DH14-038 SPT#01 1.16 - 1.77 m

No Photo Available

PHOTO 44 DH14-038 SPT#02 2.68 - 2.68 m - No Photo Available

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PHOTO 45 DH14-038 SPT#03 4.20 - 4.81 m



PHOTO 46 DH14-038 SPT#04 5.72 - 6.15 m



PHOTO 47 DH14-038 SPT#05 7.24 - 7.67 m



PHOTO 48 DH14-038 SPT#06 7.76 - 8.29 m



PHOTO 49 DH14-038 SPT#07 10.28 - 10.74 m



PHOTO 50 DH14-038 SPT#08 11.80 - 12.41 m



PHOTO 51 DH14-038 SPT#09 13.32 - 13.39 m



PHOTO 52 DH14-039 SPT#01 1.52 - 2.13 m



PHOTO 53 DH14-039 SPT#02 3.05 - 3.66 m



PHOTO 54 DH14-039 SPT#03 4.57 - 5.18 m



PHOTO 55 DH14-039 SPT#04 6.10 - 6.71 m



PHOTO 56 DH14-039 SPT#05 7.62 - 8.23 m



PHOTO 57 DH14-039 SPT#06 9.14 - 9.75 m



PHOTO 58 DH14-039 SPT#07 10.67 - 11.28 m



PHOTO 59 DH14-039 SPT#08 12.19 - 12.80 m



PHOTO 60 DH14-039 SPT#09 13.72 - 14.33 m

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PHOTO 61 DH14-039 SPT#10 15.24 - 15.85 m



PHOTO 62 DH14-039 SPT#11 18.29 - 18.90 m



PHOTO 63 DH14-039 SPT#12 21.33 - 21.91 m



PHOTO 64 DH14-039 SPT#13 24.38 - 24.99 m



PHOTO 65 DH14-039 SPT#14 27.43 - 28.04 m



PHOTO 66 DH14-039 SPT#15 30.48 - 30.73 m



PHOTO 67 DH14-039 SPT#16 33.53 - 34.13 m



PHOTO 68 DH14-039 SPT#17 36.57 - 36.67 m



PHOTO 69 DH14-039 SPT#18 39.62 - 39.70 m



PHOTO 70 DH14-044 SPT#01 1.52 - 1.70 m



PHOTO 71 DH14-045 SPT#01 1.52 - 1.74 m



PHOTO 72 DH14-045 SPT#02 3.05 - 3.66 m



PHOTO 73 DH14-045 SPT#03 4.57 - 5.18 m



PHOTO 74 DH14-045 SPT#04 6.10 - 6.71 m



PHOTO 75 DH14-045 SPT#05 7.62 - 8.21 m



PHOTO 76 DH14-045 SPT#06 9.14 - 9.75 m



PHOTO 77 DH14-045 SPT#07 10.67 - 11.11 m



PHOTO 78 DH14-045 SPT#08 12.19 - 12.80 m



PHOTO 79 DH14-045 SPT#09 13.72 - 14.33 m



PHOTO 80 DH14-045 SPT#10 15.24 - 15.85 m



PHOTO 81 DH14-045 SPT#11 18.28 - 18.89 m



PHOTO 82 DH14-045 SPT#12 21.33 - 21.94 m



PHOTO 83 DH14-045 SPT#13 24.38 - 24.99 m



PHOTO 84 DH14-045 SPT#14 27.43 - 28.04 m



PHOTO 85 DH14-045 SPT#15 30.47 - 31.08 m



PHOTO 86 DH14-045 SPT#16 33.53 - 34.14 m



PHOTO 87 DH14-045 SPT#17 36.57 - 37.18 m



PHOTO 88 DH14-045 SPT#18 39.62 - 40.13 m



PHOTO 89 DH14-045 SPT#19 42.66 - 43.27 m



PHOTO 90 DH14-052 SPT#01 1.52 - 2.13 m



PHOTO 91 DH14-052 SPT#02 3.05 - 3.23 m



PHOTO 92 DH14-052 SPT#03 4.57 - 4.71 m



PHOTO 93 DH14-052 SPT#04 6.10 - 6.23 m



PHOTO 94 DH14-052 SPT#05 7.62 - 7.75 m



PHOTO 95 DH14-052 SPT#06 9.14 - 9.27 m



PHOTO 96 DH14-052 SPT#07 10.67 - 10.95 m



PHOTO 97 DH14-052 SPT#08 12.19 - 12.62 m



PHOTO 98 DH14-052 SPT#09 13.72 - 14.00 m



PHOTO 99 DH14-052 SPT#10 15.24 - 15.52 m



PHOTO 100 DH14-052 SPT#11 18.29 - 18.54 m



PHOTO 101 DH14-052 SPT#12 21.34 - 21.92 m



PHOTO 102 DH14-052 SPT#13 24.38 - 24.99 m



PHOTO 103 DH14-052 SPT#14 27.43 - 27.95 m



PHOTO 104 DH14-052 SPT#15 30.47 - 31.08 m



PHOTO 105 DH14-052 SPT#16 33.52 - 33.82 m



PHOTO 106 DH14-052 SPT#17 36.57 - 36.83 m



PHOTO 107 DH14-052 SPT#18 39.62 - 39.62 m



PHOTO 108 DH14-052 SPT#19 42.66 - 42.66 m



PHOTO 109 DH14-054 SPT #01 1.52 - 2.13 m



PHOTO 110 DH14-054 SPT #02 3.05 - 3.66 m



PHOTO 111 DH14-054 SPT #03 4.57 - 5.18 m



PHOTO 112 DH14-054 SPT #04 6.10 - 6.71 m



PHOTO 113 DH14-054 SPT #05 7.62 - 8.23 m



PHOTO 114 DH14-054 SPT #06 9.14 - 9.75 m



PHOTO 115 DH14-054 SPT #07 10.67 - 11.28 m



PHOTO 116 DH14-054 SPT #08 12.19 - 12.80 m



PHOTO 117 DH14-054 SPT #09 13.72 - 14.33 m



PHOTO 118 DH14-054 SPT #10 15.24 - 15.85 m



PHOTO 119 DH14-054 SPT #11 18.29 - 18.90 m



PHOTO 120 DH14-054 SPT #12 21.33 - 21.94 m



PHOTO 121 DH14-054 SPT #13 24.38 - 24.99 m



PHOTO 122 DH14-054 SPT #14 27.43 - 28.04 m



PHOTO 123 DH14-054 SPT #15 30.48 - 31.09 m



PHOTO 124 DH14-054 SPT #16 33.53 - 34.14 m



PHOTO 125 DH14-054 SPT #17 36.57 - 36.95 m



PHOTO 126 DH14-054 SPT #18 39.62 - 40.20 m



PHOTO 127 DH14-054 SPT #19 42.66 - 42.96 m



PHOTO 128 DH14-056 SPT #01 1.52 - 2.13 m



PHOTO 129 DH14-056 SPT #02 3.05 - 3.33 m



PHOTO 130 DH14-056 SPT #03 4.57 - 4.98 m



PHOTO 131 DH14-056 SPT #04 6.10 - 6.71 m



PHOTO 132 DH14-056 SPT #05 7.62 - 7.87 m



PHOTO 133 DH14-056 SPT #06 9.14 - 9.55 m



PHOTO 134 DH14-056 SPT #07 10.67 - 11.28 m



PHOTO 135 DH14-056 SPT #08 12.19 - 12.80 m



PHOTO 136 DH14-056 SPT #09 13.72 - 14.33 m



PHOTO 137 DH14-056 SPT #10 15.24 - 15.85 m



PHOTO 138 DH14-056 SPT #11 18.29 - 18.90 m



PHOTO 139 DH14-056 SPT #12 21.33 - 21.94 m



PHOTO 140 DH14-056 SPT #13 24.38 - 24.98 m



PHOTO 141 DH14-056 SPT #14 27.43 - 28.04 m



PHOTO 142 DH14-056 SPT #15 30.47 - 31.08 m



PHOTO 143 DH14-056 SPT #16 33.53 - 34.14 m



PHOTO 144 DH14-056 SPT #17 36.57 - 37.13 m



PHOTO 145 DH14-056 SPT #18 39.62 - 40.18 m



PHOTO 146 DH14-056 SPT #19 42.67 - 43.08 m

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PHOTO 147 DH14-056 SPT #20 45.72 - 46.18 m



PHOTO 148 DH14-056 SPT #21 48.77 - 48.38 m



PHOTO 149 DH14-056 SPT #22 51.81 - 52.42 m

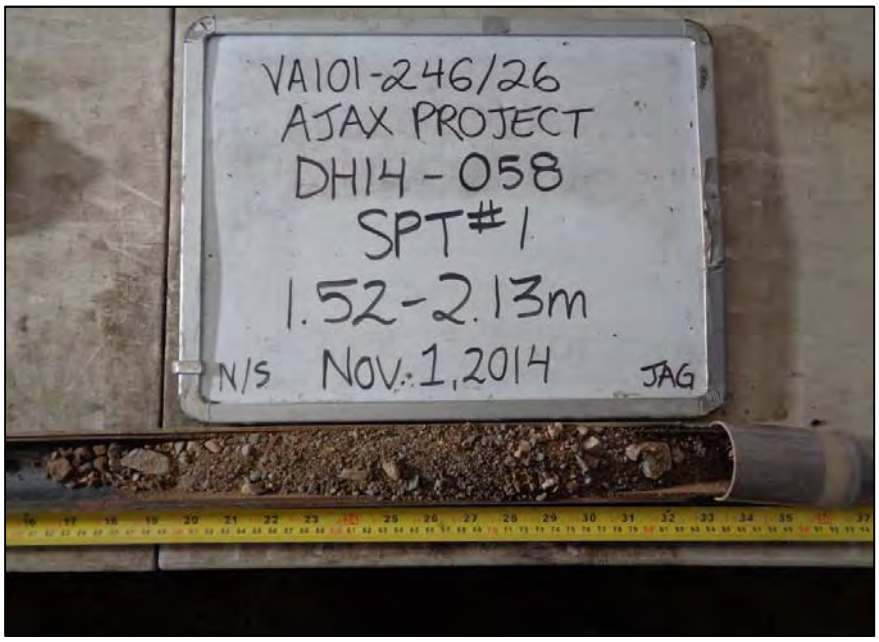


PHOTO 150 DH14-058 SPT#01 1.52 - 2.13 m



PHOTO 151 DH14-058 SPT#02 3.04 - 3.65 m



PHOTO 152 DH14-059 SPT#01 1.52 - 2.13 m



PHOTO 153 DH14-059 SPT#02 3.05 - 3.60 m



PHOTO 154 DH14-059 SPT#03 4.57 - 4.84 m



PHOTO 155 DH14-059 SPT#04 6.10 - 6.10 m



PHOTO 156 DH14-059 SPT#05 7.62 - 7.89 m

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PHOTO 157 DH14-059 SPT#06 9.14 - 9.71 m



PHOTO 158 DH14-059 SPT#07 10.67 - 11.28 m



PHOTO 159 DH14-059 SPT#08 12.19 - 12.80 m



PHOTO 160 DH14-059 SPT#09 13.72 - 14.33 m

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PHOTO 161 DH14-059 SPT#10 15.24 - 15.85 m



PHOTO 162 DH14-059 SPT#11 18.29 - 18.90 m



PHOTO 163 DH14-059 SPT#12 21.33 - 21.94 m



PHOTO 164 DH14-059 SPT#13 24.28 - 24.99 m



PHOTO 165 DH14-059 SPT#14 27.43 - 28.04 m



PHOTO 166 DH14-059 SPT#15 30.48 - 31.09 m

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AJAX PROJECT



PHOTO 167 DH14-059 SPT#16 33.53 - 34.14 m



PHOTO 168 DH14-059 SPT#17 36.57 - 37.18 m



PHOTO 169 DH14-059 SPT#18 39.62 - 40.03 m



PHOTO 170 DH14-063 SPT#01 1.52 - 2.13 m

KGHM AJAX MINING INC.
AJAX PROJECT



PHOTO 171 DH14-063 SPT#02 3.04 - 3.65 m



PHOTO 172 DH14-063 SPT#03 4.56 - 5.17 m

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PHOTO 173 DH14-065 SPT#01 1.52 - 3.00 m



PHOTO 174 DH14-065 SPT#02 3.05 - 3.66 m



PHOTO 175 DH14-065 SPT#03 4.57 - 5.18 m



PHOTO 176 DH14-065 SPT#04 6.10 - 6.71 m



PHOTO 177 DH14-065 SPT#05 7.62 - 8.23 m

No Photo Available

PHOTO 178 DH14-065 SPT#06 9.14 - 9.75 m - No Photo Available



PHOTO 179 DH14-065 SPT#07 10.67 - 11.21 m

KGHM AJAX MINING INC.
AJAX PROJECT

APPENDIX C4

CORE PHOTOGRAPHS

(Pages C4-1 to C4-44)



PHOTO 1 - DH14-004 Box 01 - 02 - 8.81 - 17.07 m



PHOTO 2 - DH14-004 Box 03 - 04 - 17.07 - 25.47 m

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PHOTO 3 - DH14-004 Box 05 - 06 - 25.47 - 33.83 m



PHOTO 4 - DH14-004 Box 07 - 08 - 33.83 - 42.00 m



PHOTO 5 - DH14-004 Box 09 - 10 - 42.00 - 50.39 m



PHOTO 6 - DH14-004 Box 11 - 12 - 50.39 - 58.51 m

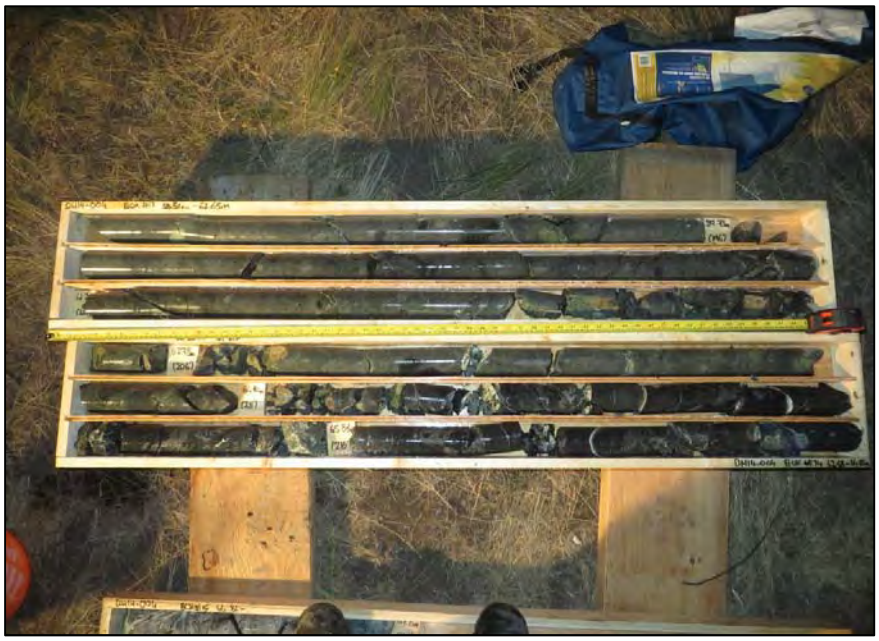


PHOTO 7 - DH14-004 Box 13 - 14 - 58.51 - 66.82 m

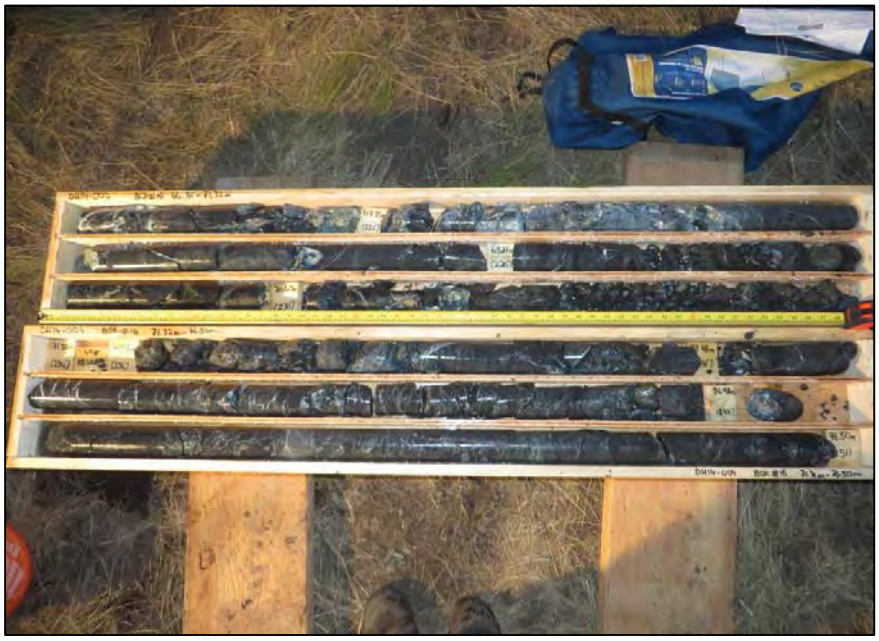


PHOTO 8 - DH14-004 Box 15 - 16 - 66.82 - 76.50 m



PHOTO 9 - DH14-004 Box 17 - 18 - 76.50 - 84.80 m



PHOTO 10 - DH14-004 Box 19 - 20 - 84.80 - 93.40 m



PHOTO 11 - DH14-004 Box 21 - 22 - 93.40 - 102.10 m



PHOTO 12 - DH14-004 Box 23 - 24 - 102.10 - 109.42 m EOH



PHOTO 13 - DH14-007 Box 01 - 02 - 39.19 -51.46 m



PHOTO 14 - DH14-007 Box 03 - 04 - 51.46 - 59.66 m



PHOTO 15 - DH14-007 Box 05 - 06 - 59.66 - 66.71 m



PHOTO 16 - DH14-007 Box 07 - 08 - 66.71 - 73.24 m



PHOTO 17 - DH14-007 Box 09 - 10 - 73.24 - 80.09 m



PHOTO 18 - DH14-007 Box 11 - 12 - 80.09 - 86.82 m



PHOTO 19 - DH14-007 Box 13 - 14 - 86.82 - 93.69 m



PHOTO 20 - DH14-007 Box 15 - 16 - 93.69 - 100.01 m EOH



PHOTO 21 - DH14-017 Box 01 - 02 - 13.34 - 20.65 m



PHOTO 22 - DH14-017 Box 03 - 04 - 20.65 - 27.80 m



PHOTO 23 - DH14-017 Box 05 - 06 - 27.80 - 35.00 m

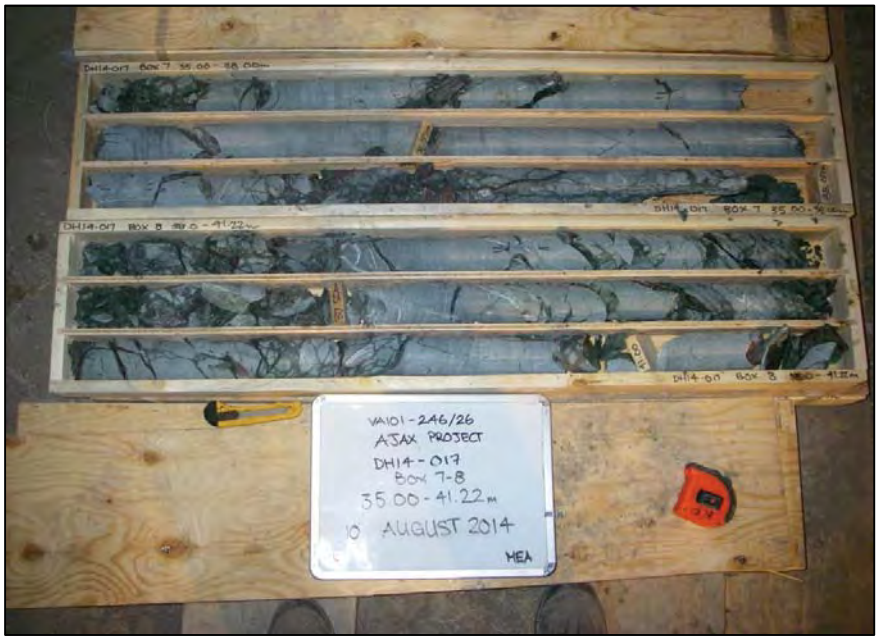


PHOTO 24 - DH14-017 Box 07 - 08 - 35.00 - 41.22 m



PHOTO 25 - Dh14-017 Box 09 - 10 - 41.22 - 47.81 m



PHOTO 26 - DH14-017 Box 11 - 12 - 47.81 - 55.45 m



PHOTO 27 - DH14-017 Box 13 - 14 - 55.45 - 61.82 m



PHOTO 28 - DH14-017 Box 15 - 16 - 61.82 - 68.09 m



PHOTO 29 - DH14-017 Box 17 - 18 - 68.09 - 74.55 m



PHOTO 30 - DH14-017 Box 19 - 20 - 74.55 - 81.17 m



PHOTO 31 - DH14-017 Box 21 - 22 - 81.17 - 88.15 m



PHOTO 32 - DH14-017 Box 23 - 24 - 88.15 - 95.93 m



PHOTO 33 - DH14-017 Box 25 - 26 - 95.93 - 101.00m EOH



PHOTO 34 - DH14-035 Box 01 - 02 - 6.10 - 14.10 m



PHOTO 35 - DH14-035 Box 03 - 04 - 14.10 - 20.50 m



PHOTO 36 - DH14-035 Box 05 - 06 - 20.50 - 26.50 m



PHOTO 37 - DH14-035 Box 07 - 08 - 26.50 - 32.75 m



PHOTO 38 - DH14-035 Box 09 - 10 - 32.75 - 37.00 m EOH



PHOTO 39 - DH14-038 Box 01 - 02 - 16.37 - 23.77 m



PHOTO 40 - DH14-038 Box 03 - 04 - 23.77 - 30.35 m



PHOTO 41 - DH14-038 Box 05 - 06 - 30.35 - 36.20 m



PHOTO 42 - DH14-038 Box 07 - 36.20 - 37.85 m EOH



PHOTO 43 - DH14-039 Box 01 - 02 - 41.20 - 50.64 m



PHOTO 44 - DH14-039 Box 03 - 04 - 50.64 - 57.11 m



PHOTO 45 - DH14-039 Box 05 - 06 - 57.11 - 63.20 m



PHOTO 46 - DH14-039 Box 07 - 63.20 - 65.20 m EOH



PHOTO 47 - DH14-044 Box 01 - 02 4.22 - 11.11 m



PHOTO 48 - DH14-044 Box 03 - 04 11.11 - 20.11 m



PHOTO 49 - DH14-044 Box 05 - 06 20.11 - 28.90 m



PHOTO 50 - DH14-044 Box 07 - 08 28.90 - 35.11 m EOH



PHOTO 51 - DH14-045 Box 01 - 02 45.71 - 50.81 m EOH



PHOTO 52 - DH14-052 Box 01 - 02 44.19 - 50.58 m EOH



PHOTO 53 - DH14-054 Box 01 - 02 45.78 - 52.11 m EOH



PHOTO 54 - DH14-056 Box 01 - 02 64.00 - 71.50 m



PHOTO 55 - DH14-056 Box 03 - 04 71.50 - 77.83 m



PHOTO 56 - DH14-056 Box 05 - 06 77.83 - 83.90 m



PHOTO 57 - DH14-056 Box 07 - 08 83.90 - 90.15 m



PHOTO 58 - DH14-056 Box 09 - 10 - 90.15 - 96.50 m



PHOTO 59 - DH14-056 Box 11 - 12 96.50 - 102.75 m



PHOTO 60 - DH14-056 Box 13 102.75 - 104.50 m EOH



PHOTO 61 - DH14-058 Box 01 - 02 6.07 - 12.28 m



PHOTO 62 - DH14-058 Box 03 - 04 12.28 - 18.66 m



PHOTO 63 - DH14-058 Box 05 - 06 18.66 - 25.01 m



PHOTO 64 - DH14-058 Box 07 - 08 25.01 - 31.13 m



PHOTO 65 - DH14-058 Box 09 - 10 31.13 - 39.83 m



PHOTO 66 - DH14-058 Box 11 - 12 39.83 - 44.18 m



PHOTO 67 - DH14-058 Box 13 44.18 - 45.78 m EOH



PHOTO 68 - DH14-059 Box 01 - 02 42.67 - 48.82 m EOH



PHOTO 69 - DH14-060 Box 01 - 02 1.20 - 7.40 m



PHOTO 70 - DH14-060 Box 03 - 04 7.40 - 13.91 m



PHOTO 71 - DH14-060 Box 05 - 06 13.91 - 20.00 m



PHOTO 72 - DH14-060 Box 07 - 08 20.00 - 26.15 m



PHOTO 73 - DH14-060 Box 09 - 10 26.15 - 32.49 m



PHOTO 74 - DH14-060 Box 11 - 12 32.49 - 38.81 m



PHOTO 75 - DH14-060 Box 13 38.81 - 41.07 m EOH



PHOTO 76 - DH14-061 Box 01 - 02 1.44 - 8.20 m



PHOTO 77 - DH14-061 Box 03 - 04 8.20 - 14.44 m



PHOTO 78 - DH14-061 Box 05 - 06 14.44 - 20.72 m



PHOTO 79 - DH14-061 Box 07 - 08 20.72 - 26.92 m



PHOTO 80 - DH14-061 Box 09 - 10 26.92 - 33.44 m



PHOTO 81 - DH14-061 Box 11 - 12 33.44 - 39.82 m



PHOTO 82 - DH14-061 Box 13 39.82 - 41.32 m EOH



PHOTO 83 - DH14-063 Box 01 - 02 5.40 - 12.16 m



PHOTO 84 - DH14-063 Box 03 - 04 12.16 - 18.60 m



PHOTO 85 - DH14-063 Box 05 - 06 18.60 - 24.65 m



PHOTO 86 - DH14-063 Box 07 - 08 24.65 - 30.76 m



PHOTO 87 - DH14-063 Box 09 - 10 30.76 - 35.26 m EOH



PHOTO 88 - DH14-065 Box 01 - 02 13.62 - 20.19 m EOH

APPENDIX C5

DRILL HOLE LOGS BY OTHERS

(Pages C5-1 to C5-73)

Survey Method : Handheld GPS
Co-ordinates (m) : 682,959.E, 5,610,698.N
Ground Elevation (m) : 907
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : B-47
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 5.80

Start Date : 13 Dec 10
Finish Date : 15 Dec 10
Final Depth of Hole (m): : 16.0
Depth to Top of Rock (m) : 5.79
Logged by : AR
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
0		M1		SILT (OL) Non plastic, stiff, brown, organic odour, dry to moist, homogeneous, trace roots. [TOPSOIL]			3 6 7
1		M2		SILT (ML) Clayey, trace gravel, low plasticity, stiff to very stiff, brown, no odour, moist, no structure, weak to moderate cementation, no to slow dilatancy, trace oxidation staining. [TILL]			6 6 7
		M3					6 5 6
2		M4		2.13 m - Grain Size Analysis: 1% Gravel, 6% Sand, 76% Silt, 17% Clay			3 6 6
3		M5					3 7 10
4		M6		3.65 m - some gravel. 3.65 m - Grain Size Analysis: 23% Gravel, 20% Sand, 34% Silt, 23% Clay			5 6 7
		M7					4 7 6
5							
6				Rock encountered at 5.79 m depth. See DH-BGC10-ND-01 rock log.			
7							
8							

Su - kPa: 40, 80, 120, 160
VANE PEAK / FIELD ◆ / LAB ■ / REMOLD ◇ □
▲ UC/2
△ Pocket Pen /2
★ % Fines
Hydraulic Conductivity (m/sec) 10^{-8} 10^{-6} 10^{-4} 10^{-2}
DCT (blows/300mm)
● SPT (blows/300mm)
Core Recovery: 20, 40, 60, 80
Moisture Content & SPT N
W_P% W% W_L%: 20, 40, 60, 80

DRILL HOLE # DH-BGC10-ND-01

CO-ORDINATES : 682,959.E, 5,610,698.N
GROUND ELEVATION (m) : 907
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : B-47
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 5.80

START DATE : 13 Dec 10
FINISH DATE : 15 Dec 10
FINAL DEPTH (m) : 16.0
DEPTH TO TOP OF ROCK (m) : 5.8
LOGGED BY : AR
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION	CORE RECOVERY % / RQD % (20 40 60 80)	WEATHERING GRADE (2 3 4 5)	POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5	FRACTURE FREQUENCY (FF/M) (10 20 30 40)	Joint Condition (Jc) (5 10 15 20)	RMR (20 40 60 80)	DEPTH (m)
0										0
1										1
2										2
3			0 to 5.79 m - See DH-BGC10-ND-01 soil log.							3
4										4
5										5
6		V V	BEDROCK Intrusive, light grey with some green, medium grained, massive, medium strong (R3), slightly weathered (W2), two joint sets (30°-35°, 50-60° from core axis), joint surfaces are moderately strong, close spacing, little infill, planar, some chlorite and epidote, quartz and calcite veins throughout, contains magnetic black minerals, some oxidized red minerals. [IRON MASK HYBRID]							6
7		V V								7
8		V V								8

(CONTINUED ON NEXT PAGE)

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: : 7/26/2011

PROJECT: Ajax Project Feasibility Study

PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC10-ND-01

CO-ORDINATES : 682,959.E, 5,610,698.N
GROUND ELEVATION (m) : 907
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : B-47
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 5.80

START DATE : 13 Dec 10
FINISH DATE : 15 Dec 10
FINAL DEPTH (m) : 16.0
DEPTH TO TOP OF ROCK (m) : 5.8
LOGGED BY : AR
REVIEWED BY : HWN

DEPTH (m) | INSTRUMENT DETAILS | SYMBOL | CORE DESCRIPTION | CORE RECOVERY % / RQD % (20 40 60 80) | WEATHERING GRADE (2 3 4 5) | POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5 | FRACTURE FREQUENCY (FF/M) (10 20 30 40) | Joint Condition (Jc) (5 10 15 20) | RMR (20 40 60 80) | DEPTH (m)

8.3 to 8.45 m - Microfractures

8.67 to 9.24 m - Broken rock, 5 cm blocks

10.47 m - Fault, 160 mm aperture, broken and crushed rock

12.4 m - Colour changes to green.

14.65 m - Colour changes to light grey.

15.33 to 15.67 m - Microfractured

(CONTINUED ON NEXT PAGE)

CLIENT: Abacus Mining and Exploration Corporation

PRINT DATE: : 7/26/2011

PROJECT: Ajax Project Feasibility Study

PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC10-ND-01

CO-ORDINATES : 682,959.E, 5,610,698.N
GROUND ELEVATION (m) : 907
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : B-47
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 5.80

START DATE : 13 Dec 10
FINISH DATE : 15 Dec 10
FINAL DEPTH (m) : 16.0
DEPTH TO TOP OF ROCK (m) : 5.8
LOGGED BY : AR
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION	CORE RECOVERY % / RQD % (20 40 60 80)	WEATHERING GRADE (2 3 4 5)	POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5	FRACTURE FREQUENCY (FF/M) (10 20 30 40)	Joint Condition (Jc) (5 10 15 20)	RMR (20 40 60 80)	DEPTH (m)
16			END OF HOLE AT 16.00 m Notes: 1. Drill hole backfilled with bentonite chips 2. All SPT's completed using autotrip hammer weighing 140lbs dropped from 30 inches 3. Elevation was extracted from DEM							16
17										17
18										18
19										19
20										20
21										21
22										22
23										23
24										24

CLIENT: Abacus Mining and Exploration Corporation

PRINT DATE: : 7/26/2011

Project: Ajax Project Feasibility Study

DRILL HOLE # DH-BGC11-ED-11

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m) : 685,639.E, 5,609,914.N
Ground Elevation (m) : 936
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 30.25

Start Date : 07 Feb 11
Finish Date : 09 Feb 11
Final Depth of Hole (m): : 40.6
Depth to Top of Rock (m) : 29.25
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No	Symbol	Lithologic Description
0				Silt, brown, frozen, grass, rootlets [TOPSOIL]
1				SAND (SM) Fine grained, silty, some gravel, trace cobbles, compact, poorly graded, max particle size 20mm, angular to sub rounded, brown, dry, homogeneous, weak cementation. [TILL]
1		M1		
2				
3		M2		2.85 m - Boulder
4				
4		M3		GRAVEL (GM) Sandy, silty, compact to dense, well graded, sub angular to subrounded, homogeneous, brown, damp. [TILL]
5				
6		M4		
7				
7		M5		7.40 m - sand content decreases
8				

Instrument Details

DCT Blows per 300mm

SPT Blows per 150mm: 12, 16, 40 (M1); R (M2); 13, 13, 20 (M3); 8, 12, 14 (M4); 7, 12, 14 (M5)

Su - kPa: 40, 80, 120, 160
VANE PEAK REMOLD — FIELD ◆ ◇ — LAB ■ □
UC/2 ▲
Pocket Pen /2 △
DCT (blows/300mm)
SPT (blows/300mm) ●
★ % Fines
Hydraulic Conductivity (m/sec) 10^{-6} 10^{-5} 10^{-4} 10^{-3}
Core Recovery 20 40 60 80
Moisture Content & SPT N
W_P% W% W_L%
20 40 60 80

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

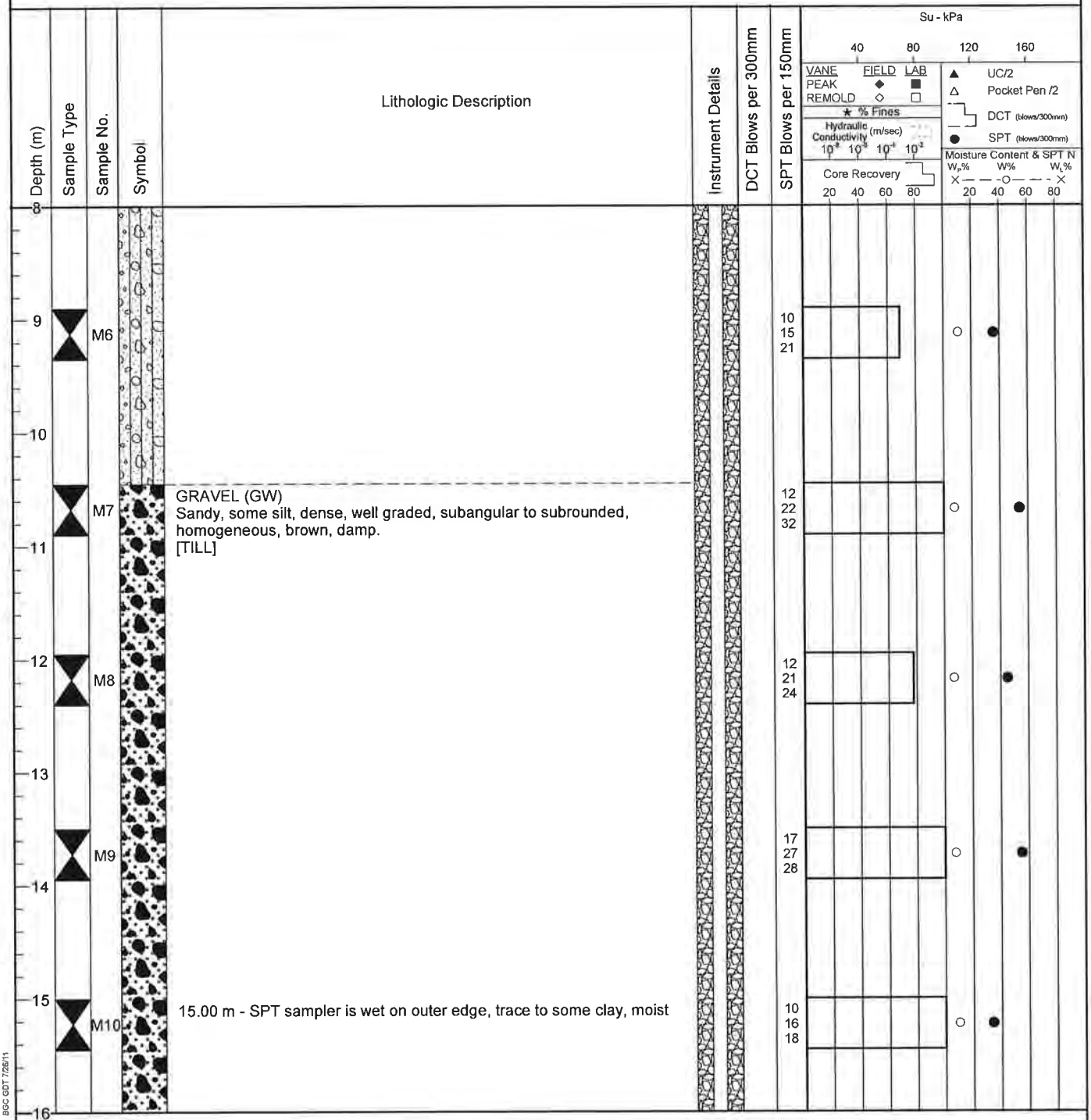
Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL.GDL BGC.GDT 7/28/11

Survey Method : Handheld GPS
Co-ordinates (m) : 685,639.E, 5,609,914.N
Ground Elevation (m) : 936
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 30.25

Start Date : 07 Feb 11
Finish Date : 09 Feb 11
Final Depth of Hole (m): : 40.6
Depth to Top of Rock (m) : 29.25
Logged by : MM
Reviewed by : HWN

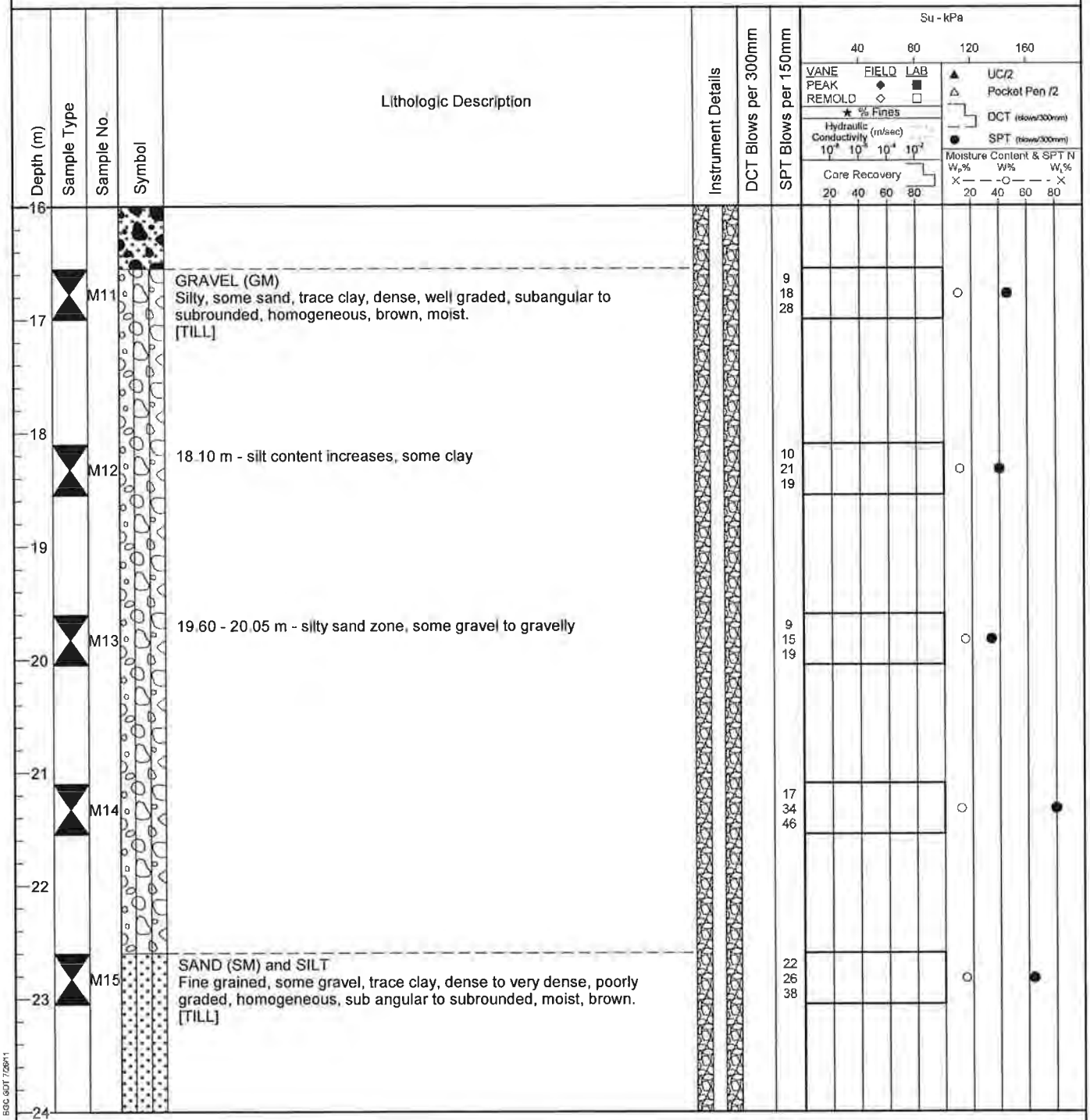


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Survey Method : Handheld GPS
Co-ordinates (m) : 685,639.E, 5,609,914.N
Ground Elevation (m) : 936
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 30.25

Start Date : 07 Feb 11
Finish Date : 09 Feb 11
Final Depth of Hole (m): : 40.6
Depth to Top of Rock (m) : 29.25
Logged by : MM
Reviewed by : HWN



(Continued on next page)

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL.GDL BGC GDT 7/26/11

Survey Method : Handheld GPS
Co-ordinates (m) : 685,639.E, 5,609,914.N
Ground Elevation (m) : 936
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 30.25

Start Date : 07 Feb 11
Finish Date : 09 Feb 11
Final Depth of Hole (m): : 40.6
Depth to Top of Rock (m) : 29.25
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
24							
		M16		24.15 m - some clay, sand and silt/clay appear to be laminated			10 15 19
25							
		M17					11 19 28
26							
27							
		M18					13 23 31
28							
		M19		SAND (SM) Fine grained, silty, some gravel to gravelly (angular, bluish grey, crushed rock?), some clay, well graded, dense, homogeneous, brown, moist.			11 16 25
29				Rock encountered at 29.25 m depth. See DH-BGC11-ED-11 rock log.			
30							
31							
32							

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK ◆ ■
REMOLD ◇ □
★ % Fines
Hydraulic Conductivity (m/sec) 10^{-4} 10^{-5} 10^{-6} 10^{-7}
Core Recovery
20 40 60 80
▲ UC/2
△ Pocket Pen /2
DCT (blows/300mm)
● SPT (blows/300mm)
Moisture Content & SPT N
W_P% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL GDL BGC.GDT 7/26/11

PROJECT: Ajax Project Feasibility Study
PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-11

CO-ORDINATES : 685,639.E, 5,609,914.N
GROUND ELEVATION (m) : 936
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) :-

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 30.25

START DATE : 07 Feb 11
FINISH DATE : 09 Feb 11
FINAL DEPTH (m) : 40.6
DEPTH TO TOP OF ROCK (m) : 29.3
LOGGED BY : MM
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION	CORE RECOVERY % / RQD % (20 40 60 80)	WEATHERING GRADE (2 3 4 5)	POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5	FRACTURE FREQUENCY (FF/M) (10 20 30 40)	Joint Condition (Jc) (5 10 15 20)	RMR (20 40 60 80)	DEPTH (m)
24										24
25										25
26			0 to 29.25 m - See DH-BGC11-ED-11 soil log.							26
27										27
28										28
29										29
30			BEDROCK Volcanic, bluish greenish grey, fine grained, massive, medium strong (R3), slightly weathered (W2), one joint set (65-70° from core axis), joint surfaces are medium strong, trace weak joint walls, close to moderately close spacing, little infill, smooth to rough, several joints along quartz veins. [PICRITE]							30
31										31
32										32

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CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: : 7/26/2011

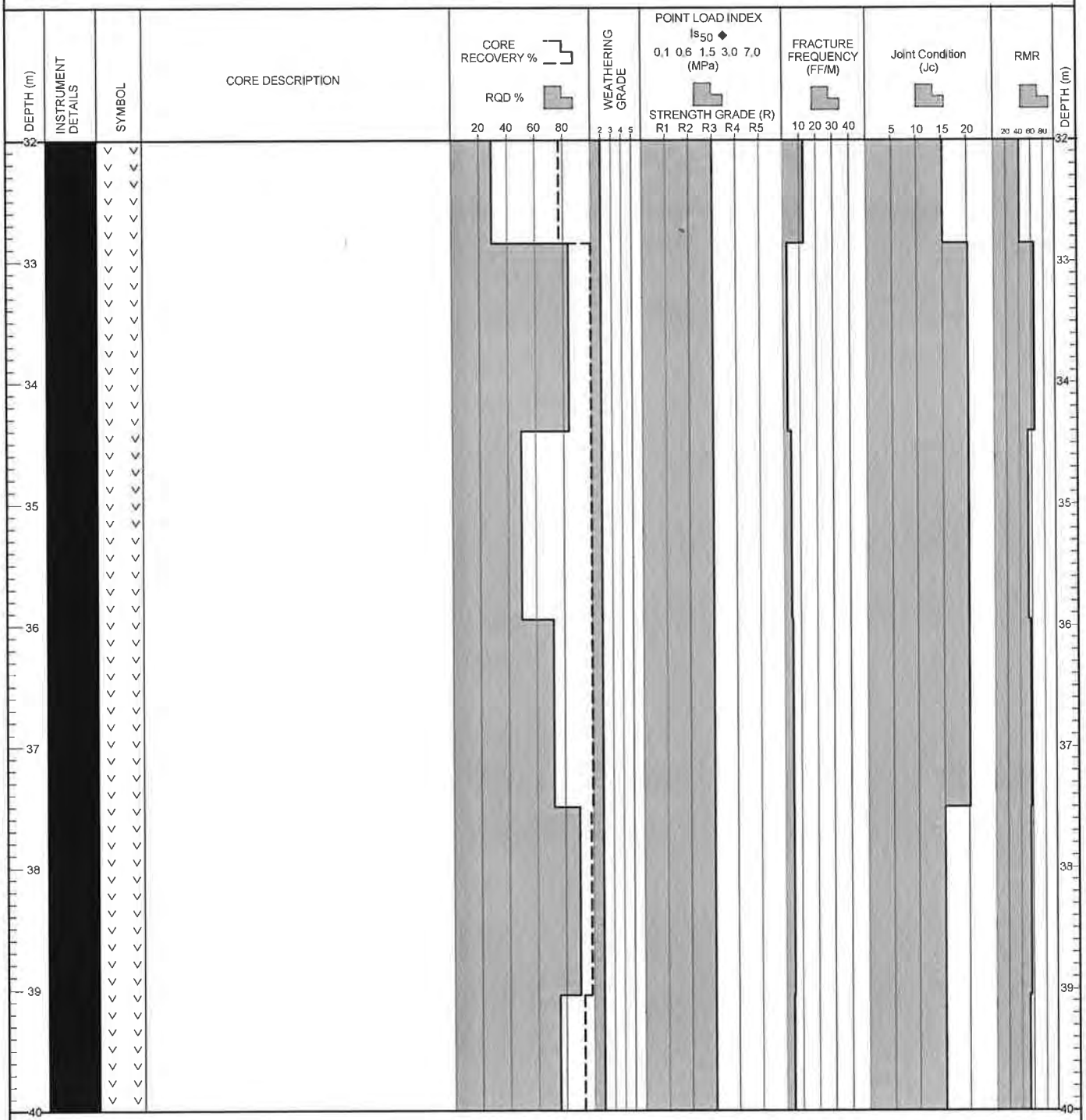
PROJECT: Ajax Project Feasibility Study
PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-11

CO-ORDINATES : 685,639.E, 5,609,914.N
GROUND ELEVATION (m) : 936
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 30.25

START DATE : 07 Feb 11
FINISH DATE : 09 Feb 11
FINAL DEPTH (m) : 40.6
DEPTH TO TOP OF ROCK (m) : 29.3
LOGGED BY : MM
REVIEWED BY : HWN



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BGC

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: 7/26/2011

AJAX CORE LOG AJAX_ROCK.GDL BGC.GDT 7/26/11

PROJECT: Ajax Project Feasibility Study

PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-11

CO-ORDINATES : 685,639 E, 5,609,914 N
GROUND ELEVATION (m) : 936
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 30.25

START DATE : 07 Feb 11
FINISH DATE : 09 Feb 11
FINAL DEPTH (m) : 40.6
DEPTH TO TOP OF ROCK (m) : 29.3
LOGGED BY : MM
REVIEWED BY : HWN

DEPTH (m) | INSTRUMENT DETAILS | SYMBOL | CORE DESCRIPTION | CORE RECOVERY % / RQD % (20 40 60 80) | WEATHERING GRADE (2 3 4 5) | POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5 | FRACTURE FREQUENCY (FF/M) (10 20 30 40) | Joint Condition (Jc) (5 10 15 20) | RMR (20 40 60 80) | DEPTH (m)

40

END OF HOLE AT 40.6 m

Notes:
1. 2.5" PVC standpipe piezometer installed.
2. All SPT's completed using auto trip hammer weighing 140 lbs dropped 30 inches
3. Drill hole backfilled with bentonite chips above the piezometer sandpack.
4. Elevation was extracted from DEM

41 42 43 44 45 46 47 48

BGC

CLIENT: Abacus Mining and Exploration Corporation

PRINT DATE: : 7/26/2011

AJAX CORE LOG AJAX_ROCK.GDL BGC GDT 7/26/11

Project: Ajax Project Feasibility Study

DRILL HOLE # DH-BGC11-ED-14

Location :

Project No. : 0712003

Survey Method :
Co-ordinates (m) : 686,721.E, 5,609,281.N
Ground Elevation (m) : 888
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 28.70

Start Date : 13 Feb 11
Finish Date : 15 Feb 11
Final Depth of Hole (m): : 38.7
Depth to Top of Rock (m) : 27.00
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
0				SAND (SW) Trace to some gravel, loose to compact, well graded, dry, brown. [FILL]			
1		M1					8 6 6
2							
3		M2					7 10 9
4							
		M3		SAND (SP) Fine grained, some silt, poorly graded, compact to dense, homogeneous, moist, brown. [FILL]			9 14 18
5				5.20 - 5.70 m - gravel and sand layer			
6		M4		GRAVEL (GP) Sandy (fine), trace silt, poorly graded, very dense, subrounded to subangular, homogeneous, damp, brown. [TILL]			16 26 43
7							
		M5		GRAVEL (GW) Sandy (fine), trace silt, well graded, very dense, homogeneous, subrounded to subangular, brown, damp.			16 28 24
8							

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK ◆ ■
REMOLD ◇ □
▲ UC/2
△ Pocket Pen /2
DCT (blows/300mm)
SPT (blows/300mm)
★ % Fines
Hydraulic Conductivity (m/sec)
10^{-6} 10^{-5} 10^{-4} 10^{-3}
Core Recovery
20 40 60 80
Moisture Content & SPT N
W_p% W% W_l%
20 40 60 80

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BGC ENGINEERING INC.
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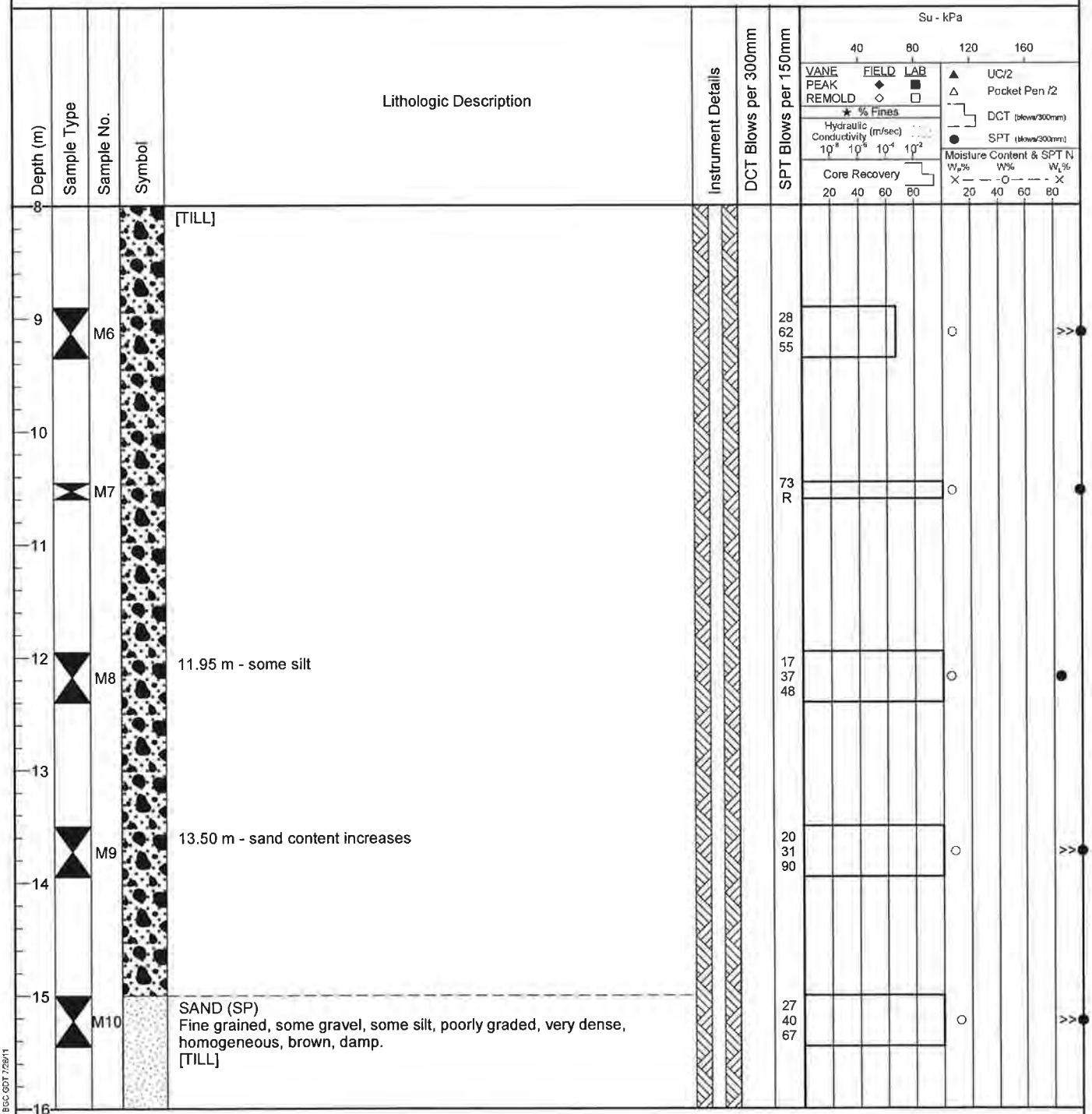
Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL.GDL BGC.GDT 7/28/11

Survey Method :
Co-ordinates (m) : 686,721.E, 5,609,281.N
Ground Elevation (m) : 888
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 28.70

Start Date : 13 Feb 11
Finish Date : 15 Feb 11
Final Depth of Hole (m): : 38.7
Depth to Top of Rock (m) : 27.00
Logged by : MM
Reviewed by : HWN



(Continued on next page)

BGC ENGINEERING INC.
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Client: Abacus Mining and Exploration Corporation

AJAX [SOIL] AJAX_SOIL.GDL BGC GDT 7/28/11

Survey Method :
Co-ordinates (m) : 686,721.E, 5,609,281.N
Ground Elevation (m) : 888
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 28.70

Start Date : 13 Feb 11
Finish Date : 15 Feb 11
Final Depth of Hole (m): : 38.7
Depth to Top of Rock (m) : 27.00
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	SPT Blows per 150mm
16					
		M11		16.55 m - silty	19 36 51
17					
18		M12		SILT (ML) Some sand, some gravel, trace clay, low plasticity, hard, homogeneous, brown, damp. [TILL]	19 36 37
19					
		M13			12 26 38
20					
21					
		M14			16 34 45
22					
		M15		Interbedded Layers (30 mm) of SAND (SP) Fine grained, silty, trace gravel, poorly graded, very dense, homogeneous, brown, damp. And SILT (ML) Clayey, trace gravel, hard, homogeneous, damp.	14 30 39
23					
24					

Instrument Details

DCT Blows per 300mm

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK
REMOLD
▲ UC/2
△ Pocket Pen /2
DCT (blows/300mm)
SPT (blows/300mm)
★ % Fines
Hydraulic Conductivity (m/sec)
10^{-6} 10^{-5} 10^{-4} 10^{-3}
Core Recovery
20 40 60 80
Moisture Content & SPT N
W_p% W% W_L%
20 40 60 80

(Continued on next page)

Survey Method :
Co-ordinates (m) : 686,721.E, 5,609,281.N
Ground Elevation (m) : 888
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 28.70

Start Date : 13 Feb 11
Finish Date : 15 Feb 11
Final Depth of Hole (m): : 38.7
Depth to Top of Rock (m) : 27.00
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
24				GRAVEL (GM) and SILT Some sand, well graded, very dense, subangular to subrounded, homogeneous, brown, damp. [TILL]			17 31 34
25		M16					
26		M17		25.65 m - becomes silty			14 24 41
27				Rock encountered at 27.00 m depth. See DH-BGC11-ED-14 rock log.			
28							
29							
30							
31							
32							

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK ◆ ■
REMOLD ◇ □
▲ UC/2
△ Pocket Pen /2
★ % Fines
DCT (blows/300mm)
Hydraulic Conductivity (m/sec) 10^{-8} 10^{-6} 10^{-4} 10^{-2}
SPT (blows/300mm)
Core Recovery 20 40 60 80
Moisture Content & SPT N
W_p% W% W_L%
20 40 60 80

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL.GDL BGC GDT 7/26/11

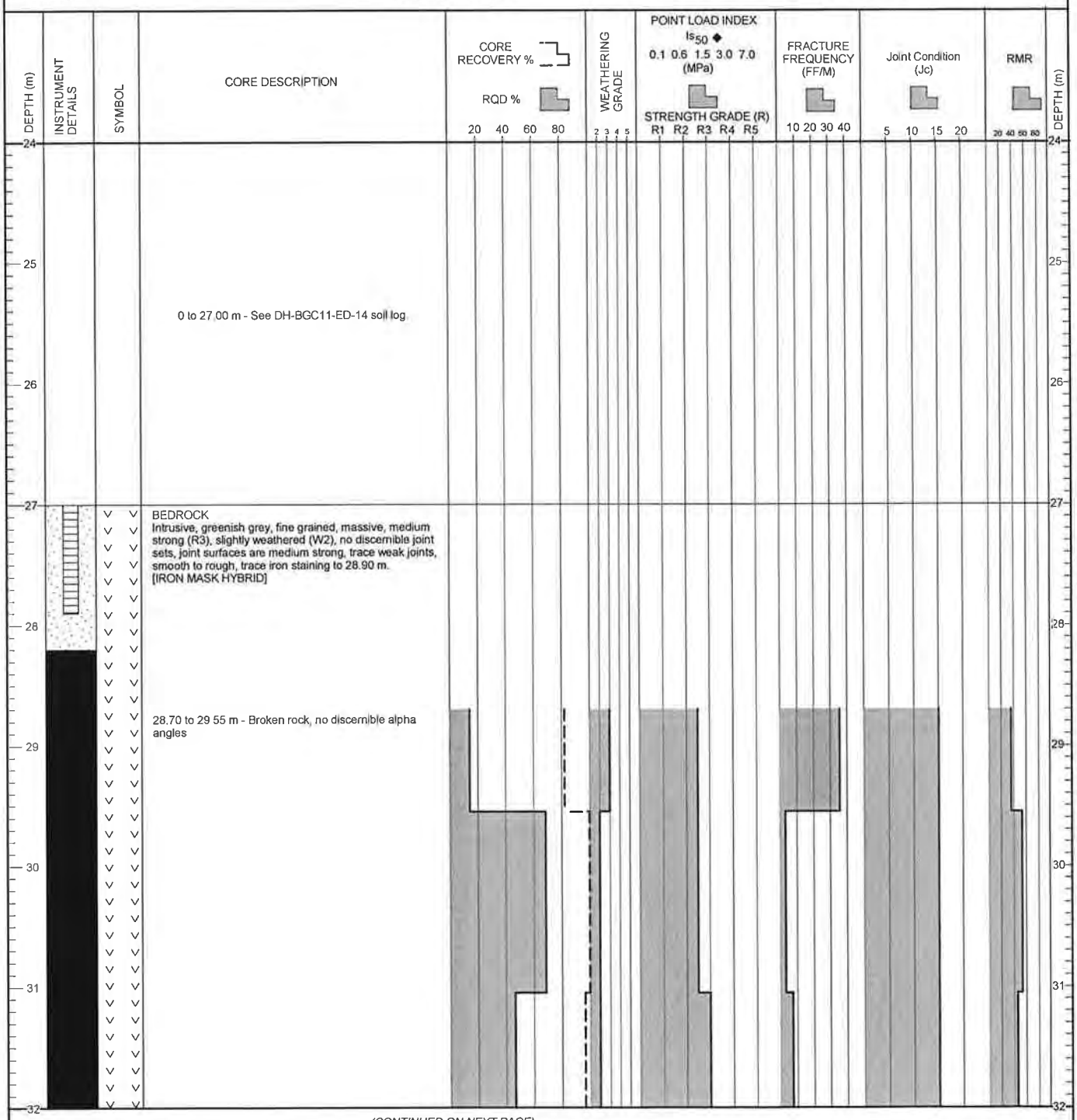
DRILL HOLE # DH-BGC11-ED-14

PROJECT: Ajax Project Feasibility Study
PROJECT NO. : 0712-003

CO-ORDINATES : 686,721.E, 5,609,281.N
GROUND ELEVATION (m) : 888
SURVEY METHOD :
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 28.70

START DATE : 13 Feb 11
FINISH DATE : 15 Feb 11
FINAL DEPTH (m) : 38.7
DEPTH TO TOP OF ROCK (m) : 27.0
LOGGED BY : MM
REVIEWED BY : HWN



(CONTINUED ON NEXT PAGE)

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: 7/26/2011

AJAX CORE LOG AJAX_ROCK.GDL BGC GDT 7/28/11

PROJECT: Ajax Project Feasibility Study

PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-14

CO-ORDINATES : 686,721.E, 5,609,281.N
GROUND ELEVATION (m) : 888
SURVEY METHOD :
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 28.70

START DATE : 13 Feb 11
FINISH DATE : 15 Feb 11
FINAL DEPTH (m) : 38.7
DEPTH TO TOP OF ROCK (m) : 27.0
LOGGED BY : MM
REVIEWED BY : HWN

DEPTH (m) | INSTRUMENT DETAILS | SYMBOL | CORE DESCRIPTION | CORE RECOVERY % / RQD % (20 40 60 80) | WEATHERING GRADE (2 3 4 5) | POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa) / STRENGTH GRADE (R) R1 R2 R3 R4 R5 | FRACTURE FREQUENCY (FF/M) (10 20 30 40) | Joint Condition (Jc) (5 10 15 20) | RMR (20 40 60 80) | DEPTH (m)

32
33
34
35
36
37
38
39
40

END OF HOLE AT 38.65 m

Notes:
1. 2.5" PVC standpipe piezometer installed.
2. Drillhole located in gravel pit.
3. All SPT's completed using auto trip hammer weighing 140 lbs dropped 30 inches.
4. Drill hole backfilled with grout above the piezometer sandpack.
5. Elevation was extracted from DEM

BGC

CLIENT: Abacus Mining and Exploration Corporation

PRINT DATE: : 7/26/2011

AJAX CORE LOG AJAX_ROCK.GDL BGC GDT 7/26/11

Project: Ajax Project Feasibility Study

DRILL HOLE # DH-BGC11-ED-15

Location :

Project No. : 0712003

Survey Method :	***Drill Designation*** : Fraste Track Rig	***Start Date*** : 15 Feb 11
Co-ordinates (m) : 685,999.E, 5,610,569.N	***Drilling Contractor*** : Geotech Drilling	***Finish Date*** : 16 Feb 11
Ground Elevation (m) : 963	***Drill Method*** : ODEX/SPT/Diamond	***Final Depth of Hole (m):*** : 19.1
Datum : NAD83	***Core*** : HQ3	***Depth to Top of Rock (m)*** : 8.70
Dip (degrees from horizontal) : 90	***Fluid*** : water	***Logged by*** : MM
Direction : n/a	***Casing*** : HW ***Cased To (m)*** : 9.15	***Reviewed by*** : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description
0				Silty, rootlets, dark brown. [TOPSOIL]
				GRAVEL (GM) Silty, some sand, trace clay, well graded, compact, homogeneous, subangular to subrounded, brown, dry. [TILL]
1				
2		M1		
3		M2		3.05 m - becomes moist.
4				
5		M3		SILT (ML) Some clay, some gravel, trace sand, firm to stiff, low plasticity, homogeneous, moist, brown. [TILL]
6		M4		6.10 m - Grain Size Analysis: 23% Gravel, 35% Sand, 31% Silt, 11% Clay
7				GRAVEL (GM) Silty, some sand, trace clay, well graded, very dense, homogeneous, subangular to subrounded, brown, moist. [TILL]
8		M5		

Instrument Details

DCT Blows per 300mm

SPT Blows per 150mm: 16, 23, 23 | 8, 11, 13 | 9, 12, 15 | 4, 7, 8 | 13, 30, R

Su - kPa: 40, 80, 120, 160

VANE FIELD LAB; PEAK ◆ ■; REMOLD ◇ □

▲ UC/2; △ Pocket Pen /2; DCT (blows/300mm); ● SPT (blows/300mm)

★ % Fines

Hydraulic Conductivity (m/sec) 10^{-8} 10^{-6} 10^{-4} 10^{-2}

Core Recovery: 20, 40, 60, 80

Moisture Content & SPT N: W_p% W% W_L%; 20, 40, 60, 80

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: Abacus Mining and Exploration Corporation

AJAX (SOIL) AJAX_SOIL.GDL BGC GDT 7/26/11

Survey Method :
Co-ordinates (m) : 685,999.E, 5,610,569.N
Ground Elevation (m) : 963
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Fraste Track Rig
Drilling Contractor : Geotech Drilling
Drill Method : ODEX/SPT/Diamond
Core : HQ3
Fluid : water
Casing : HW **Cased To (m)** : 9.15

Start Date : 15 Feb 11
Finish Date : 16 Feb 11
Final Depth of Hole (m): : 19.1
Depth to Top of Rock (m) : 8.70
Logged by : MM
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
8							
				Rock encountered at 8.70 m depth. See DH-BGC11-ED-15 rock log.			
9							
10							
11							
12							
13							
14							
15							
16							

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK ◆ ■
REMOLD ◇ □
▲ UC/2
△ Pocket Pen /2
DCT (blows/300mm)
● SPT (blows/300mm)
★ % Fines
Hydraulic Conductivity (m/sec)
10^{-8} 10^{-6} 10^{-4} 10^{-2}
Core Recovery
20 40 60 80
Moisture Content & SPT N
W_p% W% W_L%
20 40 60 80

PROJECT: Ajax Project Feasibility Study
PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-15

CO-ORDINATES : 685,999.E, 5,610,569.N
GROUND ELEVATION (m) : 963
SURVEY METHOD :
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 9.15

START DATE : 15 Feb 11
FINISH DATE : 16 Feb 11
FINAL DEPTH (m) : 19.1
DEPTH TO TOP OF ROCK (m) : 8.7
LOGGED BY : MM
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION
8			0 to 8.70 m - See DH-BGC11-ED-15 soil log.
9			BEDROCK Intrusive, greenish grey, fine grained, massive, medium strong (R3), slightly weathered (W2), two joint sets (40-50°, 55-65° from core axis), discontinuity surfaces are medium strong, trace weak joint surfaces, close spacing, smooth to rough, trace quartz veins and joints along quartz veins. [IRON MASK HYBRID]
16			15.60 to 16.05 m - Broken rock, 3-10cm blocks

CORE RECOVERY % / RQD % (20 40 60 80)
WEATHERING GRADE (2 3 4 5)
POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa)
STRENGTH GRADE (R) R1 R2 R3 R4 R5
FRACTURE FREQUENCY (FF/M) (10 20 30 40)
Joint Condition (Jc) (5 10 15 20)
RMR (20 40 60 80)

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BGC

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: : 7/26/2011

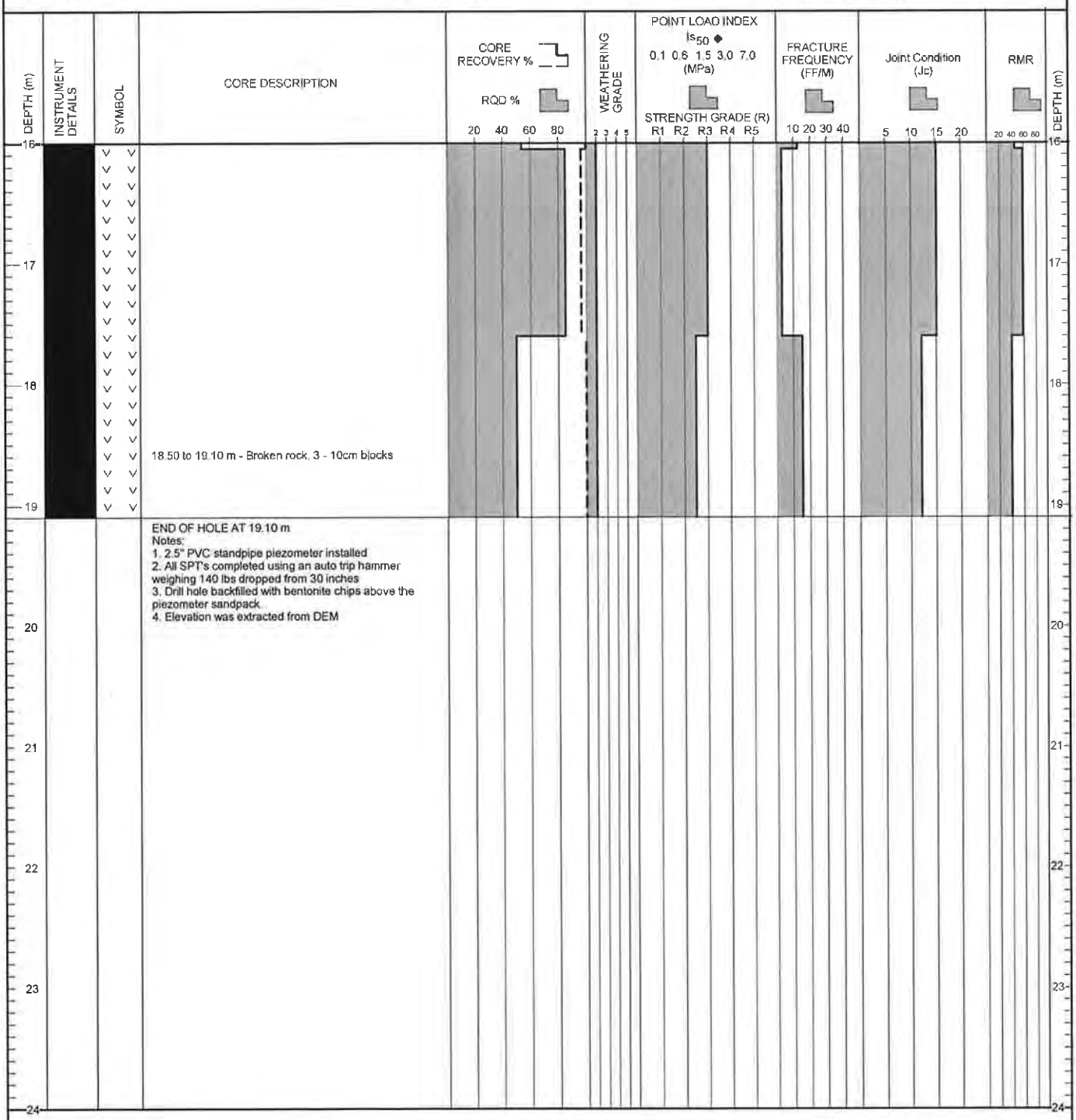
PROJECT: Ajax Project Feasibility Study
PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-ED-15

CO-ORDINATES : 685,999.E, 5,610,569.N
GROUND ELEVATION (m) : 963
SURVEY METHOD :
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : -

DRILL DESIGNATION : Fraste Track Rig
DRILLING CONTRACTOR : Geotech Drilling
DRILL METHOD : ODEX/SPT/Diamond
CORE SIZE : HQ3
FLUID : water
CASED TO (m): 9.15

START DATE : 15 Feb 11
FINISH DATE : 16 Feb 11
FINAL DEPTH (m) : 19.1
DEPTH TO TOP OF ROCK (m) : 8.7
LOGGED BY : MM
REVIEWED BY : HWN



BGC

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: : 7/26/2011

AJAX CORE LOG AJAX_ROCK.GDL BGC GDT 7/26/11

DRILL HOLE # DH-BGC11-PS-20

Location :

Project No. : 0712-003

Survey Method : Handheld GPS
Co-ordinates (m) : 683,109.E, 5,610,729.N
Ground Elevation (m) : 914
Datum : NAD83
Dip (degrees from horizontal) : 90
Direction : n/a

Drill Designation : Zinex A5
Drilling Contractor : Matrix
Drill Method : Diamond
Core : HQ
Fluid : water & polymer
Casing : HW **Cased To (m)** : 1.52

Start Date : 18 Apr 11
Finish Date : 18 Apr 11
Final Depth of Hole (m): : 9.9
Depth to Top of Rock (m) : 1.25
Logged by : AR
Reviewed by : HWN

Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	DCT Blows per 300mm	SPT Blows per 150mm
0				OVERBURDEN SOIL (no recovery) Refer to TP-BGC11-87 for soil description			
1				1.20 to 1.37 m - Highly weathered, disintegrated rock Rock encountered at 1.25 m depth. See DH-BGC11-PS-20 rock log.			
2							
3							
4							
5							
6							
7							
8							

Su - kPa
40 80 120 160
VANE FIELD LAB
PEAK ◆ ■
REMOLD ◇ □
▲ UC/2
△ Pocket Pen /2
★ % Fines
Hydraulic Conductivity (m/sec)
10^{-8} 10^{-6} 10^{-4} 10^{-2}
DCT (blows/300mm)
● SPT (blows/300mm)
Core Recovery
20 40 60 80
Moisture Content & SPT N
W_P% W% W_L%
20 40 60 80

AJAX (SOIL) AJAX_SOIL.GDL BGC.GDT 7/26/11

PROJECT: Ajax Project Feasibility Study

PROJECT NO. : 0712-003

DRILL HOLE # DH-BGC11-PS-20

CO-ORDINATES : 683,109.E, 5,610,729.N
GROUND ELEVATION (m) : 914
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : n/a

DRILL DESIGNATION : Zinex A5
DRILLING CONTRACTOR : Matrix
DRILL METHOD : Diamond
CORE SIZE : HQ
FLUID : water & polymer
CASED TO (m): 1.52

START DATE : 18 Apr 11
FINISH DATE : 18 Apr 11
FINAL DEPTH (m) : 9.9
DEPTH TO TOP OF ROCK (m) : 1.3
LOGGED BY : AR
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION
0			
1			0 to 1.25 m - See DH-BGC11-PS-20 soil log.
2			BEDROCK Intrusive greenish grey, medium grained, massive, microfractured, medium strong (R3), slightly to moderately weathered (W2-W3), one discernible discontinuity set (65-75° from core axis), joint surfaces are medium strong, closely spaced, trace silt infill, trace crushed rock infill, small aperture, rough and planar, magnetic. [IRON MASK HYBRID] 1.94 to 2.15 m - Broken rock, 3 -5 cm blocks
3			
4			
5			5.30 m - Fault, 100 mm aperture, fault gouge, alpha angle = 35 degrees
6			5.75 m - weathering grade changes to slightly weathered.
7			6.68 m - Fault, 220 mm aperture, fault gouge, alpha angle = 40 degrees
8			

CORE RECOVERY %
RQD % — 20 40 60 80

WEATHERING GRADE — 2 3 4 5

POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa)
STRENGTH GRADE (R) R1 R2 R3 R4 R5

FRACTURE FREQUENCY (FF/M) — 10 20 30 40

Joint Condition (Jc) — 5 10 15 20

RMR — 20 40 60 80

(CONTINUED ON NEXT PAGE)

CLIENT: Abacus Mining and Exploration Corporation

PRINT DATE: : 7/26/2011

DRILL HOLE # DH-BGC11-PS-20

CO-ORDINATES : 683,109.E, 5,610,729.N
GROUND ELEVATION (m) : 914
SURVEY METHOD :Handheld GPS
DATUM : NAD83
PLUNGE (°) : 90
TREND (°) : n/a

DRILL DESIGNATION : Zinex A5
DRILLING CONTRACTOR : Matrix
DRILL METHOD : Diamond
CORE SIZE : HQ
FLUID : water & polymer
CASED TO (m): 1.52

START DATE : 18 Apr 11
FINISH DATE : 18 Apr 11
FINAL DEPTH (m) : 9.9
DEPTH TO TOP OF ROCK (m) : 1.3
LOGGED BY : AR
REVIEWED BY : HWN

DEPTH (m)	INSTRUMENT DETAILS	SYMBOL	CORE DESCRIPTION
8			
9			8.42 m - Fault, 120 mm aperture, broken rock, alpha angle = 45 degrees
10			END OF HOLE AT 9.85 m Notes: 1. 2.5" PVC standpipe piezometer installed. 2. Drill hole backfilled with bentonite chips above the piezometer sandpack. 3. Elevation was extracted from DEM
11			
12			
13			
14			
15			
16			

CORE RECOVERY %
RQD % — 20 40 60 80

WEATHERING GRADE — 2 3 4 5

POINT LOAD INDEX Is_{50} ◆ 0.1 0.6 1.5 3.0 7.0 (MPa)
STRENGTH GRADE (R) — R1 R2 R3 R4 R5

FRACTURE FREQUENCY (FF/M) — 10 20 30 40

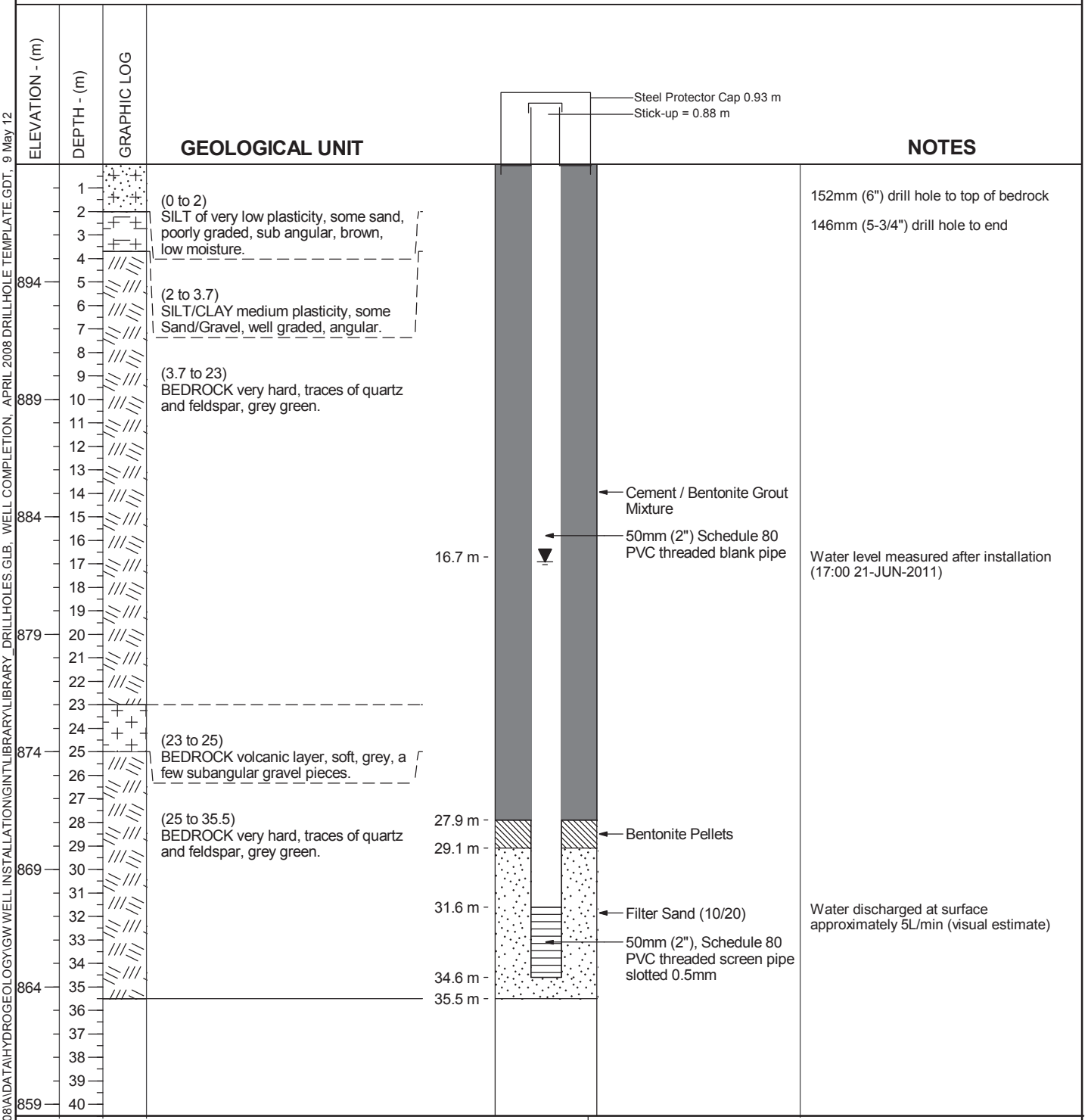
Joint Condition (Jc) — 5 10 15 20

RMR — 20 40 60 80

DEPTH (m)

CLIENT: Abacus Mining and Exploration Corporation
PRINT DATE: : 7/26/2011

Project:	**AJAX PROJECT**	Drill Hole No.	**MW11-04D**	**PAGE**	1 of 1
Contractor:	**JR DRILLING LTD**	Sample Type:	**Cuttings**	Date Drilling:	**21-JUN-2011**
Location:	**West of Proposed Pit/North of Jacko Lake**	Total Depth:	**35.5 m**	Date Installation:	**21-JUN-2011**
Coordinates:	**5,610,364 N , 682,617 E (UTM / NAD 83)**	Elevation:	**899 m**	Supervised by:	**AM**
Drilling Method:	**Air Rotary**			Reviewed by:	**CHS**



GENERAL REMARKS:

REV. 0 - Issued for Report

KGHM AJAX MINING INC.
AJAX PROJECT
MONITORING WELL DETAILS FOR MW11-04D

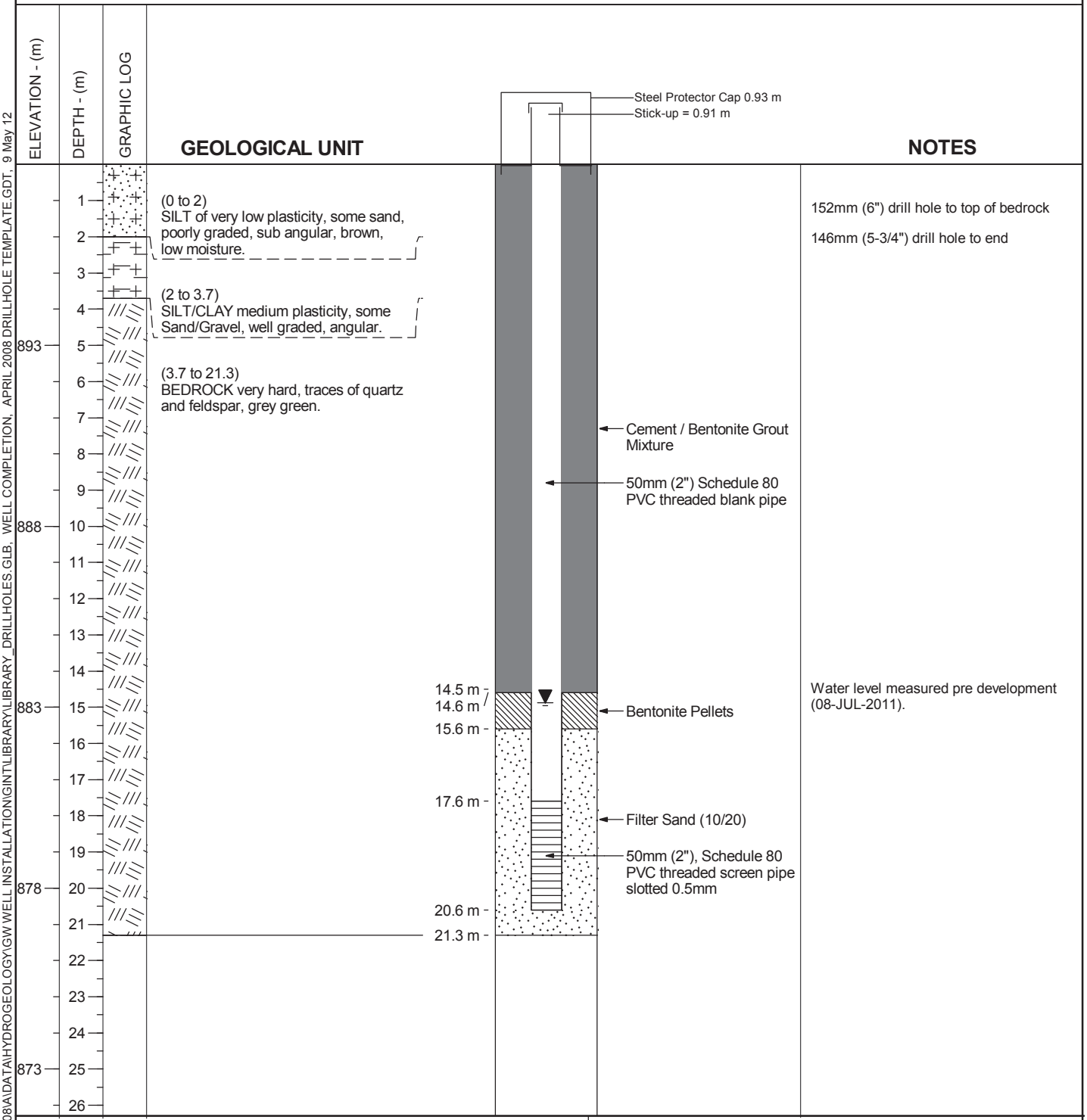
Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-246/8	3
FIGURE. 6	REV. 0

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

File:M:\101\00246\08\A\DATA\HYDROGEOLOGY\GW WELL INSTALLATION\GINT\PROJECTS\AJAX-WELL INSTALLATION.GPJ
Library: M:\101\00246\08\A\DATA\HYDROGEOLOGY\GW WELL INSTALLATION\GINTLIBRARY\LIBRARY_DRILLHOLES.GLB, WELL COMPLETION, APRIL 2008 DRILLHOLE TEMPLATE.GDT, 9 May 12

Project:	**AJAX PROJECT**	Drill Hole No.	**MW11-04S**	**PAGE**	1 of 1
Contractor:	**JR DRILLING LTD**	Sample Type:	**Cuttings**	Date Drilling:	**21-JUN-2011**
Location:	**West of Proposed Pit/North of Jacko Lake**	Total Depth:	**21.3 m**	Date Installation:	**21-JUN-2011**
Coordinates:	**5,610,367 N , 682,619 E (UTM / NAD 83)**	Elevation:	**898 m**	Supervised by:	**AM**
Drilling Method:	**Air Rotary**			Reviewed by:	**CHS**



GENERAL REMARKS:

KGHM AJAX MINING INC.
AJAX PROJECT
MONITORING WELL DETAILS FOR MW11-04S

REV. 0 - Issued for Report

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-246/8	**3**
FIGURE. **7**	REV. **0**

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

File:M:\101\00246\08\A\DATA\HYDROGEOLOGY\GW WELL INSTALLATION\GINT\PROJECTS\AJAX-WELL INSTALLATION.GPJ
Library: M:\101\00246\08\A\DATA\HYDROGEOLOGY\GW WELL INSTALLATION\GINTLIBRARY\LIBRARY_DRILLHOLES.GLB, WELL COMPLETION, APRIL 2008 DRILLHOLE TEMPLATE.GDT, 9 May 12

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-001D

Location: Ajax Project Site

Coordinates (m): 682286E - 5608796N
Ground Elevation (m): 921
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 11 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 5.18
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
921	0				SAND AND GRAVEL (GM) Silty, sand is fine, well graded, light greyish brown, trace rootlets and organics. [TOPSOIL]		At grade, dry	13/02/14 12:25	Logged from sump.
922	1				SAND (SM) Fine, some silt, uniform, light brown.		Dry	13/02/14 12:30	
923	2								
924	3				SILT (ML) Some sand, some clay, trace gravel, well graded, dark brown with grey clasts. [TILL]		Dry	13/02/14 12:30	
925	4								
926	5				GRAVEL AND SAND (GM) Some silt, sand is medium, gravel is fine, well graded, dark brown with grey clasts. [FLUVIAL]		Dry	13/02/14 12:40	Nearing bedrock?
927	6				BEDROCK Drill cuttings: fine to medium grained, dark to light grey, angular to subrounded, unweathered to slightly weathered. [NICOLA VOLCANICS]		Dry	13/02/14 12:42	
928	7								
929	8								
930	9								
931	10								

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-001D

Location: Ajax Project Site

Coordinates (m): 682286E - 5608796N
Ground Elevation (m): 921
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 11 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 5.18
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
931	10								
					Below 10.67 m - fine, light grey.		Dry	13/02/14 12:53	
932	11								
933	12								
934	13								
935	14								
936	15								
937	16								
938	17						Dry	13/02/14 13:15	Drill returns are very dry, dusty.
939	18								
940	19						Wet, light grey.	13/02/14 13:34	At 19.20 - water encountered. AIRLIFT #1 2.6 GPM
941	20								

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(Continued on next page)

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-001D

Location: Ajax Project Site

Coordinates (m): 682286E - 5608796N
Ground Elevation (m): 921
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 11 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 5.18
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
941	20								3.2 GPM 3.4 GPM Average 3.2 GPM
942	21								
943	22								
944	23				Below 22.86 m - fine, smaller clast size than above, dark green.		Wet, green	13/02/14 13:42	Chloritization?
945	24								
946	25								
947	26				At 25.90 m - colour change to brownish red.		Wet	13/02/14 13:50	
					At 26.52 m - colour change to grey.		Wet	13/02/14 13:53	
948	27								
949	28								
950	29						Wet	13/02/14 14:00	AIRLIFT #2 3.4 GPM 2.9 GPM 2.6 GPM Average 3.0 GPM
951	30				END OF HOLE AT 29.56 m NOTES:				

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(Continued on next page)

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-001D

Location: Ajax Project Site

Coordinates (m): 682286E - 5608796N
Ground Elevation (m): 921
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 11 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 5.18
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
951	30				1. 2" PVC standpipe piezometer installed with screen from 17.98 to 24.08 metres. 2. Filter sand placed from 17.07 to 24.69 metres. 3. Bentonite seal placed from 14.63 to 17.07 metres.				
952	31								
953	32								
954	33								
955	34								
956	35								
957	36								
958	37								
959	38								
960	39								
961	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-001S

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 682286E - 5608796N
Ground Elevation (m): 921
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 1.52

Start Date: 12 Feb 14
Finish Date: 12 Feb 14
Final Depth (m): 6.40
Depth to Top of Rock (m): 5.49
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
921	0				SAND AND GRAVEL (GM) Silty, well graded, light greyish brown. [TOPSOIL]		Dry	12/02/14 10:30	
922	1				SAND (SM) Fine, trace silt, uniform, light brown, no odour. [TILL]				
923	2						Dry	12/02/14 10:33	
924	3				SILT (ML) Some sand, some gravel, trace clay, gap graded, dark brown, no odour. [TILL]		Dry	12/02/14 10:35	
925	4								
926	5				SAND AND GRAVEL (GM) Some silt, well graded, light brown with grey clasts. [FLUVIAL]		Dry	12/02/14 10:40	
927	6	G	G1		BEDROCK Drill cuttings: fine to medium grained, light grey to light brown, angular to subrounded. [NICOLA VOLCANICS]		Dry	12/02/14 10:43	
928	7				END OF HOLE AT 6.40 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 3.96 to 5.49 metres. 2. Filter sand placed from 3.66 to 6.40 metres. 3. Bentonite seal placed frfom 1.83 to 3.66 metres.		Dry	12/02/14 10:45	
929	8								
930	9								
931	10								

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Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-002D

Location: Ajax Project Site

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 12 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.87
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
924	0				SAND (SW) Fine to medium, some gravel, trace silt, well graded, dark brown with grey clasts. [FILL]		Dry	12/02/14 13:00	Logged from road cut.
925	1				SAND AND GRAVEL (GW) Silty, sand is fine to medium, gravel is fine to coarse, well graded, light brown with grey clasts, multilithic, gravel size range from 3 mm to 20 mm. [FLUVIAL]		Dry	12/02/14 13:06	
926	2	G	G1				Dry	12/02/14 13:12	
927	3	G	G2		SILT (ML) Gravelly, some sand (fine), gravel is multilithic, grey, angular to subrounded, well graded, light greyish brown matrix. [TILL]		Dry	12/02/14 13:18	
928	4								
929	5	G	G3		GRAVEL (GM) Silty, some sand (fine), trace clay, gravel is multilithic, grey to purple, angular to subrounded, gravel size range from 2 mm to 15 mm. [FLUVIAL]		Dry	12/02/14 13:25	Welding time 13:30 to 13:42.
930	6								
931	7				SILT (ML) Some sand, some gravel, trace clay, uniform, low plasticity, light brown with grey clasts. [TILL]		Moist	12/02/14 13:47	
932	8						Moist	12/02/14 13:50	
933	9							13/02/14 08:55	At 8.53 m - static water level measured on February 13, 2014 at 8:55 a.m.
934	10				Below 9.14 m - increase in clay content to some, colour change to dark grey.		Moist	12/02/14 13:54	Slight increase in moisture.

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-002D

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 12 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.87
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
934	10						Moist	12/02/14 13:57	
935	11						Moist	12/02/14 14:00	Welding time 14:00 to 14:11.
936	12	G	G4		Below 12.19 m - decrease in gravel content, dark greyish brown.		Moist	12/02/14 14:15	
937	13								
938	14	G	G5				Moist	12/02/14 14:17	
939	15								
940	16	G	G6	V V	BEDROCK Drill cuttings: fine to coarse grained, light reddish brown to organish brown, slightly to moderately weathered, some oxidation. [NICOLA VOLCANICS]		Dry	12/02/14 14:22	
941	17			V V	Below 16.76 m - fine, dark grey.		Potential WT	12/02/14 14:40	
942	18			V V	Below 18.29 m - colour change to dark bluish grey.			12/02/14 14:47	
943	19			V V					
944	20			V V					

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DRILL HOLE # BGC14-002D

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 12 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.87
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
944	20				At 20.12 m - significant colour change to light yellowish brown.			12/02/14 14:50	Slightly softer drilling.
					At 20.42 m - colour change to dark grey.				
							Moist	12/02/14 14:53	
945	21								
946	22								
					At 22.56 m - colour change to dark brown.			12/02/14 14:55	
947	23				At 22.86 m - colour change to dark bluish grey.			12/02/14 14:57	
948	24								
		G	G7						
949	25								
950	26	G	G8		At 26.21 m - colour change to orangish brown.		Dry	12/02/14 15:07	Oxidation?
					At 26.52 m - colour change to grey.		Dry	12/02/14 15:09	
951	27								
		G	G9				Moist		
952	28								
953	29	G	G10				Wet	12/02/14 15:15	AIRLIFT #1 0.6 GPM 0.5 GPM 0.5 GPM Average 0.5 GPM
954	30								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-002D

Location: Ajax Project Site

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 12 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 29.87
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
954	30				END OF HOLE AT 29.87 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 16.76 to 22.86 metres. 2. Filter sand placed from 15.85 to 23.77 metres. 3. Bentonite seal placed from 14.02 to 15.85 metres.			12/02/14 16:30	AIRLIFT #2 0.8 GPM 0.9 GPM 0.8 GPM Average 0.8 GPM
955	31								
956	32								
957	33								
958	34								
959	35								
960	36								
961	37								
962	38								
963	39								
964	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-002S

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 13 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 15.70
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
924	0				SAND (SW) Fine to medium, some gravel (fine), some silt, light brown. [FILL]		At grade, dry	13/02/14 14:00	
925	1								
					GRAVEL (GP) Fine, some sand (medium to coarse), trace silt, poorly graded, light brown with grey clasts, maximum particle size is 10 mm. [FLUVIAL]		Dry	13/02/14 14:05	
926	2								
927	3						Dry	13/02/14 14:07	
928	4								
							Dry	13/02/14 14:11	Welding time 14:13 to 14:30.
929	5								
930	6				SILT (ML) Some gravel, trace sand (fine), trace clay, well graded, low plasticity, dark brown with dark grey clasts. [TILL]		Moist	13/02/14 14:33	
931	7								
					Below 7.62 m - increase in gravel content to gravelly, clasts are dark to light grey.		Moist	13/02/14 14:35	
932	8								
933	9				Below 9.14 m - significant decrease in gravel content to trace, increase in clay content to some, increase in moisture content.		Moist	13/02/14 14:38	
934	10								

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-002S

Location: Ajax Project Site

Coordinates (m): 682756E - 5608900N
Ground Elevation (m): 924
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 13 Feb 14
Finish Date: 13 Feb 14
Final Depth (m): 15.70
Depth to Top of Rock (m): 15.24
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
934	10				Below 10.67 m - colour change of matrix from dark brown to dark grey.		Moist	13/02/14 14:40	Welding time 14:41 to 14:55.
935	11								
936	12						Moist	13/02/14 14:58	
937	13								
938	14						Moist	13/02/14 15:01	
939	15				Below 14.78 m - slight increase in moisture content.		Moist	13/02/14 15:03	
				V V V V V V	BEDROCK Drill cuttings: fine to coarse grained, light reddish brown to organish brown, slightly to moderately weathered, some oxidation. [NICOLA VOLCANICS]		Dry	13/02/14 15:05	
940	16				END OF HOLE AT 15.70 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 9.09 to 15.19 metres. 2. Filter sand placed from 8.53 to 15.70 metres. 3. Bentonite seal placed from 6.71 to 8.53 metres.				
941	17								
942	18								
943	19								
944	20								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

A-JAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003D

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 32.34
Depth to Top of Rock (m): 21.95
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
894	0				SAND (SW) Gravelly, silty, well graded, light brown with grey clasts, trace organics (rootlets 1 mm diameter). [TOPSOIL]		Dry	14/02/14 08:17	Logged from sump.
895	1	G	G1				Dry	14/02/14 08:22	
896	2								
897	3	G	G2		SILT (ML) Some gravel, some sand (fine), trace to some clay, low plasticity, dark brown matrix with grey pockets and grey clasts. [TILL]		Dry Dry	14/02/14 08:24 14/02/14 08:25	
898	4								
899	5	G	G3		Below 4.57 m - decrease in clay content.		Moist	14/02/14 08:27	Welding time 8:28 to 8:48.
900	6	G	G4		Below 5.79 m - colour change to dark greyish brown.		Moist	14/02/14 08:50	
901	7								
902	8						Moist	14/02/14 08:52	
903	9	G	G5				Dry to moist	14/02/14 08:57	
904	10								

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-003D

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 32.34
Depth to Top of Rock (m): 21.95
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
904	10				Below 10.36 m - decrease in gravel content to trace, colour change to dark brown.		Moist	14/02/14 09:03	Welding time 9:04 to 9:20.
905	11								
906	12				SAND (SM) Coarse, some silt, trace gravel, dark greyish brown. [TILL]		Moist	14/02/14 09:23	
907	13								
908	14				Below 13.72 m - sand is medium, increase in silt content to silty, medium plasticity.		Moist	14/02/14 09:25	
909	15	G	G6		SILT (ML) Clayey, some sand (fine), dark grey, low plasticity. [TILL]		Moist	14/02/14 09:35	
910	16								
911	17	G	G7		Below 16.76 m - trace gravel, decrease in clay content to some	▽	Moist	14/02/14 09:37	Welding time 9:48 to 10:00.
912	18				GRAVEL AND SAND (GM) Silty, sand is coarse, gravel is coarse to fine, dark grey. [FLUVIAL]		Wet	14/02/14 10:02	At 17.07 m - water encountered. Estimated inflow 3-4 GPM.
913	19	G	G8				Wet	14/02/14 10:06	
914	20	G			Below 19.81 m - increase in clay content to trace, sand is coarse, slight colour change to		Wet	14/02/14 10:12	

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-003D

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 32.34
Depth to Top of Rock (m): 21.95
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
914	20	G	G9		lighter greyish brown.				
915	21								
		G	G10		SILT (ML) Gravelly, sandy (fine to medium), grey with pockets of brown silt. [TILL]		Dry to moist	14/02/14 10:17	
916	22				WEATHERED BEDROCK Drill cuttings: sandy (fine to medium), some gravel (coarse), uniform light greyish green. [NICOLA VOLCANICS]		Dry	14/02/14 10:21	Qualities of soil, logged as a soil.
917	23	G	G11						
918	24								
		G	G12				Dry	14/02/14 10:30	Highly chloritized bedrock?
919	25								
920	26	G	G13				Dry	14/02/14 10:39	
921	27								
		G	G14		BEDROCK Drill cuttings: fine grained, light grey, angular to subrounded, maximum particle size is 10 mm, fresh and unweathered. [NICOLA VOLCANICS]		Dry	14/02/14 10:40	Competent bedrock surface.
922	28								
923	29	G	G15				Dry	14/02/14 10:45	
924	30								

(Continued on next page)

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Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003D

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 32.34
Depth to Top of Rock (m): 21.95
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
924	30			V V			Dry		
925	31			V V					
926	32			V V					
927	33				END OF HOLE AT 32.34 m NOTES: 1. 2"PVC sandpipe piezometer installed with screen from 28.35 to 31.39 metres. 2. Filter sand placed from 26.21 to 32.34 metres. 3. Bentonite seal placed from 24.38 to 26.21 metres.				
928	34								
929	35								
930	36								
931	37								
932	38								
933	39								
934	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO); AJAX_SOIL_HYDROGEO.GJ... BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003I

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 11.28

Start Date: 17 Feb 14
Finish Date: 17 Feb 14
Final Depth (m): 21.95
Depth to Top of Rock (m): 20.11
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
894	0				SAND (SW) Gravelly, silty, well graded, light brown with grey clasts, trace organics (rootlets 1 mm diameter). [TOPSOIL]		Dry	17/02/14 08:11	Logged from sump.
895	1						Dry	17/02/14 08:15	
896	2								
897	3				SILT (ML) Some gravel, some sand (fine), trace clay, low plasticity, dark brown with grey clasts. [TILL]		Dry	17/02/14 08:17	
							Dry	17/02/14 08:18	
898	4								
899	5						Dry	17/02/14 08:21	Welding time 8:23 to 8:52.
900	6				Below 6.10 m - decrease in sand content to trace, colour change of matrix to dark grey.		Moist	17/02/14 08:54	
901	7								
							Moist	17/02/14 08:56	
902	8								
903	9						Slightly moist	17/02/14 08:59	
904	10								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEOLGDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-003I

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 11.28

Start Date: 17 Feb 14
Finish Date: 17 Feb 14
Final Depth (m): 21.95
Depth to Top of Rock (m): 20.11
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
904	10				Below 10.36 m - decrease in gravel content to trace, colour change of matrix to light brown.		Slightly moist	17/02/14 09:01	
905	11								
					SAND (SM) Fine to coarse, some silt, trace clay, dark greyish brown. [TILL]		Moist	17/02/14 09:02	Welding time 9:03 to 9:25.
906	12						Moist	17/02/14 09:27	
907	13								
908	14						Moist	17/02/14 09:28	
909	15				SILT Sandy, some clay to clayey, sand is fine, dark grey, medium plasticity. [TILL]		Moist	17/02/14 09:34	
							Moist	17/02/14 09:35	
910	16								
911	17				Below 16.76 m - gravelly, some clay.		Moist	17/02/14 09:38	
					GRAVEL AND SAND (GM) Silty, sand is coarse, dark grey. [FLUVIAL]		Wet - water encountered at unit change.		
912	18				Below 18.29 m - increase in clay content to trace.		Wet	17/02/14 10:10	Welding time 9:41 to 10:06.
913	19								
914	20				Below 19.81 m - decrease in silt content to trace, sand is coarse, gravel is fine, maximum		Wet	17/02/14 10:16	

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Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003I

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 11.28

Start Date: 17 Feb 14
Finish Date: 17 Feb 14
Final Depth (m): 21.95
Depth to Top of Rock (m): 20.11
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
914	20				particle size is 5 mm.				
					BEDROCK Drill cuttings: fine grained, light grey, fresh and unweathered. [NICOLA VOLCANICS]		Dry	17/02/14 10:18	Cuttings are dry, dusty.
915	21								
916	22				END OF HOLE AT 21.95 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 16.76 to 19.81 metres. 2. Filter sand placed from 15.54 to 20.42 metres. 3. Bentonite seal placed from 14.02 to 15.54 metres.		Dry	17/02/14 10:20	
917	23								
918	24								
919	25								
920	26								
921	27								
922	28								
923	29								
924	30								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003S

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 11.28
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
894	0				SAND (SW) Gravelly, some silt, well graded, light brown with grey clasts, trace organics (rootlets <2 mm diameter). [TOPSOIL]		Dry	14/02/14 14:54	
895	1								
896	2								
897	3				SILT Some gravel, some sand (fine), trace clay, dark brown with grey clasts. [TILL]		Dry Moist	14/02/14 14:56 14/02/14 14:59	
898	4								
899	5				Below 4.57 m - increase in sand content to sandy, light brown with grey clasts.		Dry	14/02/14 15:04	Welding time 15:05 to 15:25.
900	6				Below 6.10 m - decrease in sand content, dark brown with grey clasts.		Dry	14/02/14 15:29	
901	7								
902	8				Below 7.62 m - decrease in sand content to trace.		Dry to moist	14/02/14 15:32	
903	9						Dry to moist	14/02/14 15:35	
904	10				Below 9.75 m - decrease in gravel content to trace.				

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(Continued on next page)

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-003S

Location: Ajax Project Site

Coordinates (m): 683544E - 5608858N
Ground Elevation (m): 894
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 3.04

Start Date: 14 Feb 14
Finish Date: 14 Feb 14
Final Depth (m): 11.28
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
904	10								
905	11						Moist	14/02/14 15:39	
					END OF HOLE AT 11.28 m		Moist	14/02/14 15:40	
906	12				NOTES: 1. 2" PVC standpipe piezometer installed with screen from 9.75 to 11.28 metres. 2. Filter sand placed from 9.14 to 11.28 metres. 3. Bentonite seal placed from 7.32 to 9.14 metres.				
907	13								
908	14								
909	15								
910	16								
911	17								
912	18								
913	19								
914	20								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO); AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-007D

Location: Ajax Project Site

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 24.38
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
929	0				SAND (SW) Gravelly, silty, well graded, organics (rootlets, grasses) [TOPSOIL]		At grade, dry	23/02/14 08:58	
					GRAVEL (GP) Some sand, poorly graded, multilithic gravel cuttings, angular to subrounded, grey. [GLACIOFLUVIAL]				
930	1								
		G	G1				Dry	23/02/14 09:00	
931	2								
932	3	G	G2		SILT (ML) Gravelly (fine to coarse), some sand (fine), low plasticity, light brown to brown with grey clasts. [TILL]		Dry	23/02/14 09:03	
933	4								
		G	G3		Below 4.27 m - decrease in gravel content, slightly darker brown.		Dry	23/02/14 09:06	Welding time 9:07 to 9:48.
934	5								
935	6				Below 6.10 m - dark brown with grey clasts, increase in moisture content.		Dry to moist	23/02/14 09:52	
936	7								
		G	G4		Below 7.62 m - dark greyish brown.		Dry to moist	23/02/14 09:54	
937	8								
938	9						Dry to moist	23/02/14 09:57	
939	10								

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-007D

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 24.38
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
939	10								
		G	G5		Below 10.67 m - decrease in gravel content, dark grey.		Dry to moist	23/02/14 10:00	Welding time 10:02 to 10:34.
940	11								
941	12				Below 12.19 m - decrease in gravel to trace.		Dry to moist	23/02/14 10:39	
942	13								
		G	G6				Dry to moist	23/02/14 10:42	
943	14								
944	15				Below 15.24 m - slight increase in gravel content.		Dry to moist	23/02/14 10:48	
945	16								
		G	G7				Dry to moist	23/02/14 10:54	Welding time 10:55 to 11:19.
946	17								
947	18								
		G	G8		BOULDER Drill cuttings: fine, unweathered, dark grey, angular.		Dry	23/02/14 11:25	Tripping out to switch drill bits 11:27 to 11:55
948	19				SILT (ML) Gravelly (fine to coarse), poorly graded, light brown with brown and grey clasts. [TILL]				
949	20						Dry	23/02/14 12:03	

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(Continued on next page)

DRILL HOLE # BGC14-007D

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 24.38
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
949	20								
950	21						Dry	23/02/14 12:14	Below 21.34 m - most cuttings blown away or blown out of basket.
951	22								
952	23						Dry	23/02/14 12:22	
953	24								
954	25	G	G9		BEDROCK Drill cuttings: fine grained, dark grey, angular, fresh and unweathered. [NICOLA VOLCANICS]		Dry	23/02/14 12:30	
955	26	G	G10		Below 25.91 m - darker grey, very little cuttings recovered.		Dry	23/02/14 12:36	Very little cuttings recovered.
956	27								
					Below 27.43 m - light grey.		Dry	23/02/14 12:42	
957	28								
958	29						Dry	23/02/14 12:50	
959	30				END OF HOLE AT 29.56 m NOTES:				

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(Continued on next page)

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-007D

Location: Ajax Project Site

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 24.38
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
959	30				1. 4" PVC standpipe piezometer installed with screen from 26.52 to 29.56 metres. 2. Filter sand placed from 25.91 to 29.56 metres. 3. Bentonite seal placed from 24.03 to 25.91 metres.				
960	31								
961	32								
962	33								
963	34								
964	35								
965	36								
966	37								
967	38								
968	39								
969	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-007S

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 17.37
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
929	0				SAND (SW) Gravelly, silty, well graded, organics. [TOPSOIL]				
					GRAVEL (GP) Fine to coarse, some sand (coarse), gravel is grey, angular, multilithic. [FLUVIAL]		Dry	23/02/14 16:05	
930	1								
							Dry	23/02/14 16:07	
931	2								
932	3				SILT (ML) Gravelly (fine to coarse), poorly graded, low plasticity, light brown with grey and brown clasts. [TILL]		Dry	23/02/14 16:10	
933	4								
							Dry	23/02/14 16:12	Welding time 16:13 to 16:30.
934	5								
935	6				Below 6.10 m - decrease in gravel, trace clay, darker brown.		Dry to moist	23/02/14 16:33	
936	7								
							Dry to moist	23/02/14 16:35	
937	8								
938	9				Below 9.14 m - dark greyish brown.		Dry to moist	23/02/14 16:37	
939	10								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-007S

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 685324E - 5608722N
Ground Elevation (m): 929
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 4.57

Start Date: 23 Feb 14
Finish Date: 23 Feb 14
Final Depth (m): 17.37
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
939	10								
940	11				At 10.67 m - decrease in gravel, slight increase in clay.		Moist	23/02/14 16:42	Welding time 16:43 to 17:09.
941	12				Below 12.19 m - increase in gravel.		Moist	23/02/14 17:12	
942	13								
943	14				Below 13.72 m - increase in gravel.		Moist	23/02/14 17:15	
944	15								
945	16						Moist	23/02/14 17:18	
946	17								
947	18				END OF HOLE AT 17.37 m NOTES: 1. 4" PVC standpipe piezometer installed with screen from 14.33 to 17.37 metres. 2. Filter sand placed from 12.80 to 17.37 metres. 3. Bentonite seal placed from 10.97 to 12.80 metres.		Moist	23/02/14 17:22	
948	19								
949	20								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-013

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 686466E - 5606777N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 03 Mar 14
Finish Date: 04 Mar 14
Final Depth (m): 30.48
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
991	0				SILT (ML) Sandy (fine), some clay, trace gravel (fine), well graded, light greyish brown, low plasticity. [TILL]		Moist	03/03/14 15:51	Soapy feeling.
992	1	G	G1				Moist	03/03/14 15:52	
993	2				SAND AND SILT (SM) Sand is fine, trace clay, uniform, brown, low plasticity. [TILL]				
994	3	G	G2				Moist	03/03/14 15:34	
995	4								
996	5	G	G3		Below 4.57 m - trace to some clay.		Moist	03/03/14 15:56	Welding time 15:57 to 16:18.
997	6						Moist	03/03/14 16:20	
998	7	G	G4		Below 7.62 m - slight increase in silt content.		Moist	03/03/14 16:25	
999	8								
1000	9	G	G5		Below 9.14 m - increase in silt.		Moist	03/03/14 16:28	
1001	10				GRAVEL (GP)				At 9.75 m - water

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-013

Coordinates (m): 686466E - 5606777N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 03 Mar 14
Finish Date: 04 Mar 14
Final Depth (m): 30.48
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1001	10				Fine to coarse, sandy (coarse), trace clay, uniform, subangular to subrounded, multilithic. [GLACIOFLUVIAL]				encountered at start of unit.
1002	11	G	G6				Wet	03/03/14 16:30	AIRLIFT #1 1.5 GPM 1.3 GPM 1.3 GPM Average 1.4 GPM
					BEDROCK Drill cuttings: fine to coarse grained, uniform, multilithic, angular, modereately weathered, oxidation present.		Wet	03/03/14 16:31	Tripping out to switch bits 16:31 to 16:50.
1003	12	G	G7				Wet, dark grey	03/03/14 16:55	
1004	13								
1005	14				Below 13.72 m - dark grey, angular, slightly weathered, faintly oxidized.		Wet, dark grey	03/03/14 16:57	
1006	15	G	G8				Wet, dark grey	03/03/14 17:01	
1007	16								
1008	17						Wet, light grey	03/03/14 17:07	
1009	18	G	G9		Below 18.29 m - dark grey to light grey, subangular, average particle size is 4 mm.		Wet, light grey to clear	04/03/14 07:18	AIRLIFT #2 2.9 GPM 2.8 GPM 2.7 GPM Average 2.8 GPM
1010	19								
1011	20				Below 19.81 m - dark bluish grey, uniform, angular to subangular, average particle size is		Wet, clean to light	04/03/14 07:25	

(Continued on next page)

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DRILL HOLE # BGC14-013

Coordinates (m): 686466E - 5606777N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 03 Mar 14
Finish Date: 04 Mar 14
Final Depth (m): 30.48
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1011	20				2 mm.		grey		
1012	21								
		G	G10				Wet, silty	04/03/14 07:29	From 21.64 to 22.56 m - softer drilling, silty discharge water.
1013	22								
1014	23	G	G11		Below 22.86 m - trace silt present, average clast size is 5 mm.		Wet, silty	04/03/14 07:33	
								04/03/14 00:00	AIRLIFT #3 2.5 GPM 2.5 GPM 2.4 GPM Average 2.5 GPM
1015	24								
		G	G12		Below 24.38 m - angular, flat, grey average clast size is 4 mm.		Wet, clean to light grey	04/03/14 07:46	
1016	25								
1017	26				Below 25.91 m - average clast size is 2 mm.		Wet, clean to light grey	04/03/14 07:50	
1018	27								
		G	G13				Wet, clean to light grey	04/03/14 07:55	
1019	28	G	G14						
1020	29	G	G15		From 28.04 m to 28.65 m - yellowish brown, clayey, silty discharge, cuttings are angular, dark grey and brown. At 28.91 m - dark grey and angular, as above.		Wet, yellowish brown	04/03/14 07:56	
		G	G16				Wet, yellowish brown	04/03/14 08:03	
1021	30								

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DRILL HOLE # BGC14-013

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 686466E - 5606777N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 03 Mar 14
Finish Date: 04 Mar 14
Final Depth (m): 30.48
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1021	30				From 29.56 m to 29.87 m - yellowish brown, multilithic cuttings, silty. Below 29.87 m - fine, dark grey, angular.				
1022	31	G	G17		END OF HOLE AT 30.48 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 27.43 to 30.48 metres. 2. Filter sand placed from 26.52 to 30.48 metres. 3. Bentonite seal placed from 24.08 to 26.52 metres.		Wet, clean to light grey	04/03/14 08:09	AIRLIFT #4 2.6 GPM 2.7 GPM 2.7 GPM Average 2.7 GPM
1023	32								
1024	33								
1025	34								
1026	35								
1027	36								
1028	37								
1029	38								
1030	39								
1031	40								

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AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-014D

Location: Ajax Project Site

Coordinates (m): 686672E - 5807810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 04 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 18.90
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
988	0				SAND (SW) Fine, silty, gravelly (fine to coarse), well graded, dark brown with grey clasts. [TOPSOIL/TILL]		Moist	04/03/14 14:00	Moist from snow.
989	1								
		G	G1		GRAVEL (GP) Fine to coarse, sandy (coarse), uniform, brown and grey, angular to subrounded. [GLACIOFLUVIAL]		Dry	04/03/14 14:02	
990	2								
991	3	G	G2		SAND [SM] Fine, silty, some gravel (fine to coarse), light brown with grey clasts. [TILL]		Dry to moist	04/03/14 14:04	
992	4								
993	5						Dry to moist	04/03/14 14:07	Welding time 14:08 to 14:32.
994	6								
					SILT (ML) Sandy (fine), trace to some gravel, grey with grey and brown clasts, uniform, low plasticity. [TILL]		Dry to moist	04/03/14 14:37	
995	7								
		G	G3		Below 7.62 m - gravel is angular to subrounded, grey.		Dry to moist	04/03/14 14:40	
996	8								
997	9								
							Dry to moist	04/03/14 14:43	
998	10								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/26/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-014D

Coordinates (m): 686672E - 5607810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 04 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 18.90
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
998	10								
		G	G4		Below 10.67 m - trace clay, light brownish grey.		Dry to moist	04/03/14 14:46	Welding time 14:48 to 15:04.
999	11								
1000	12						Dry to moist	04/03/14 15:08	
1001	13								
		G	G5		Below 13.72 m - trace gravel, multilithic.		Dry to moist	04/03/14 15:09	
1002	14								
1003	15				Below 15.24 m - decrease in gravel.		Dry to moist	04/03/14 15:14	
1004	16								
		G	G6				Dry to moist	04/03/14 15:16	Welding time 15:17 to 15:35.
1005	17								
1006	18						Dry to moist	04/03/14 15:39	
1007	19			V V V V V V V V V V V V	BEDROCK Drill cuttings: sand (medium to coarse) and gravel (coarse), brownish grey, multilithic, sand is rounded, gravel is angular to subrounded, moderately weathered.				
1008	20	G					Dry	04/03/14 15:42	Tripping out to

(Continued on next page)

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Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-014D

Location: Ajax Project Site

Coordinates (m): 686672E - 5607810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 04 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 18.90
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1008	20	6	G7						switch drill bits 15:43 to 16:00.
1009	21	G	G8		Below 21.34 m - light greenish grey, rounded clasts, fine sand present in cuttings, moderately weathered.		Dry	04/03/14 16:05	
1010	22								
1011	23	G	G9		Below 22.86 m - gravelly sand, sand is fine, light greyish green, gravel is rounded, moderately weathered.		Dry	04/03/14 16:09	
1012	24								
		G	G10		Below 24.38 m - sandy gravel, gravel is dark grey, angular to subrounded, sand is coarse, grey, moderately weathered.		Dry	04/03/14 16:17	
1013	25							04/03/14 00:00	At 24.67 m - moisture encountered. "Break in dust".
								04/03/14 00:00	At 25.30 m - moisture encountered. "Break in dust".
1014	26	G	G11		Below 25.91 m - fine sand, light greenish grey, uniform, trace gravel, gravel is dark grey, angular, moderately weathered.		Dry	04/03/14 16:21	
1015	27								
		G	G12		Below 27.43 m - gravel, fine to coarse, some sand (fine), gravel is grey, subrounded, sand is greenish grey, moderately weathered.		Dry	04/03/14 16:28	
1016	28								
1017	29	G	G13						
1018	30				END OF HOLE AT 29.56 m				

NOTES:

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX HYDROGEO AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-014D

Location: Ajax Project Site

Coordinates (m): 686672E - 5607810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 04 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 18.90
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1018	30				1. 2" PVC standpipe piezometer installed with screen from 23.47 to 29.56 metres. 2. Filter sand placed from 22.56 to 29.56 metres. 3. Bentonite seal placed from 20.57 to 22.56 metres.				
1019	31								
1020	32								
1021	33								
1022	34								
1023	35								
1024	36								
1025	37								
1026	38								
1027	39								
1028	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/26/2014

DRILL HOLE # BGC14-014S

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 686672E - 5607810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 05 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 18.90
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
988	0				SAND (SW) Fine to coarse, gravelly, silty, well graded, dark brown with grey clasts. [TOPSOIL]		Moist from snow melt	05/03/14 11:28	
989	1								
990	2				GRAVEL (GW) Fine to coarse, silty, some sand (fine to coarse), well graded, greyish brown, angular to subrounded. [GLACIOFLUVIAL]		Dry	05/03/14 11:31	
991	3				SILT (ML) Some sand (fine), trace to some gravel, low plasticity, uniform, brown with grey clasts, clasts are angular. [TILL]		Dry	05/03/14 11:35	
992	4								
993	5				Below 4.57 m - sandy, fine.		Dry to moist	05/03/14 11:39	Welding time 11:40 to 12:04.
994	6				Below 6.10 m - decrease in gravel, light greyish brown with grey and brown clasts.		Dry to moist	05/03/14 12:06	
995	7								
996	8						Dry to moist	05/03/14 12:10	
997	9								
998	10						Dry to moist	05/03/14 12:13	

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/26/2014

AJAX (HYDROGEO): AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007

Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-014S

Location: Ajax Project Site

Coordinates (m): 686672E - 5507810N
Ground Elevation (m): 988
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 05 Mar 14
Finish Date: 05 Mar 14
Final Depth (m): 18.90
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
998	10								
					Below 10.67 m - trace clay.		Dry to moist	05/03/14 12:16	Welding time 12:16 to 12:40.
999	11								
1000	12						Dry to moist	05/03/14 12:42	
1001	13								
1002	14						Dry to moist	05/03/14 12:48	
1003	15				Below 15.24 m - increase in gravel content, angular to subrounded.		Dry to moist	05/03/14 12:50	
1004	16								
1005	17				Below 16.76 m - decrease in gravel content.		Dry to moist	05/03/14 12:59	Welding time 13:00 to 13:20.
1006	18								
					Below 18.29 m - gravel is angular.		Dry to moist	05/03/14 13:22	
1007	19				END OF HOLE AT 18.90 m				
1008	20				NOTES: 1. 2" PVC standpipe peizometer installed with screen from 12.80 to 18.90 metres. 2. Filter sand placed from 12.19 to 18.90 metres. 3. Bentonite seal placed from 9.75 to 12.19 metres.				

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.

Print Date: 5/28/2014

DRILL HOLE # BGC14-015D

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
991	0				SILT (ML) Sandy (fine), some gravel (fine), trace clay, well graded, low plasticity, dark brown with grey clasts. [TILL]		Moist	06/03/14 07:50	Drill bit plugged with soil 7:51 to 8:43.
992	1						Dry to moist	06/03/14 08:45	
993	2								
994	3	G	G1		Below 3.04 m - some sand (fine), trace to some clay.		Dry to moist	06/03/14 08:47	
995	4								
996	5	G	G2		SAND (SP) Fine, some gravel (fine), trace silt, uniform, brown with brown and grey clasts. [TILL]		Dry	06/03/14 08:57	Welding time 8:58 to 9:20.
997	6	G	G3		Below 6.10 m - some silt, trace gravel, slight increase in moisture.		Dry	06/03/14 09:23	
998	7				At 7.01 m - boulder.			06/03/14 09:25	Tripping rods to switch drill bits 9:25 to 9:33.
999	8	G	G4		Below 7.62 m - increase in silt, gravel no longer present.	▽	Dry to moist	06/03/14 00:00	
1000	9	G	G5		GRAVEL AND SAND (SP/GP) Gravel is fine to coarse, sand is medium to coarse, trace silt, uniform, subrounded, dark grey. [GLACIOFLUVIAL] Below 9.14 m - trace to some silt, subangular to subrounded.		Wet Wet	06/03/14 09:36 06/03/14 09:40	
1001	10								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-015D

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1001	10								
					Below 10.67 - trace to some clay, driller described as cohesive drilling.		Wet	06/03/14 09:47	Welding time and had to case through boulder 9:49 to 10:30.
1002	11								At 11.25 m - attempted to airlift, no water expelled.
					WEATHERED BEDROCK Drill cuttings: gravel and sand, gravel is coarse, sand is coarse, subangular, brownish grey, moderately to extremely weathered. [NICOLA VOLCANICS]				
1003	12	G	G6				Wet	06/03/14 10:30	
1004	13								
1005	14	G	G7		Below 13.72 m - fine sand, uniform, brownish grey.			06/03/14 10:45	
					BEDROCK Drill cuttings: fine grained, grey, angular, fresh and unweathered. [NICOLA VOLCANICS]		Dry	06/03/14 10:48	Hard drilling.
1006	15	G	G8				Dry	06/03/14 10:50	Tripping out rods to switch drill bits 10:55 to 11:08.
1007	16								
					Below 16.76 m - average particle size is 4 mm.		Dry	06/03/14 11:10	Welding time 11:15 to 11:40.
1008	17								
1009	18	G	G9		Below 18.29 m - average particle size is 5 mm.		Dry	06/03/14 11:54	
1010	19								
1011	20						Dry	06/03/14 11:55	

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DRILL HOLE # BGC14-015D

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1011	20								
1012	21	G	G10				Dry	06/03/14 11:56	
1013	22								
1014	23							06/03/14 11:57	
1015	24	G	G11		Below 24.38 m - average clast size is 3 mm.		Dry	06/03/14 11:58	
1016	25								
1017	26				Below 25.91 m - average particle size is 2 - 3 mm.		Dry	06/03/14 11:59	
1018	27	G	G12		Below 27.43 m - fine sand present in cuttings, increase in weathering.		Dry	06/03/14 12:00	
1019	28								
1020	29	G	G13		At 28.96 m - average particle size is 4 mm.		Dry	06/03/14 12:02	"Break in dust". From 29.26 m to 29.56 m - moisture detected, not enough for Airlift.
1021	30				END OF HOLE AT 29.56 m				

NOTES:

DRAFT

(Continued on next page)

DRILL HOLE # BGC14-015D

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 11.28
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1021	30				1. 2" PVC standpipe piezometer installed with screen from 23.47 to 29.56 metres. 2. Filter sand placed from 22.25 to 29.56 metres. 3. Bentonite seal placed from 20.17 to 22.25 metres.				
1022	31								
1023	32								
1024	33								
1025	34								
1026	35								
1027	36								
1028	37								
1029	38								
1030	39								
1031	40								

DRAFT

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-015S

Location: Ajax Project Site

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 2.13

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 11.28
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
991	0				SILT (ML) Sandy (fine), trace gravel, trace clay, well graded, low plasticity, brown with grey and brown clasts. [TILL]		Moist	06/03/14 15:10	
992	1						Dry to moist	06/03/14 15:13	
993	2								
994	3				Below 3.04 m - some sand increase in clay.		Dry to moist	06/03/14 15:16	
995	4								
996	5				SAND (SW) Fine, gravelly (fine to coarse), silty, well graded, dark grey with grey clasts, gravel is angular. [TILL]		Dry	06/03/14 15:19	Welding time 15:20 to 15:46.
997	6				Below 6.10 m - decrease in silt content.		Dry	06/03/14 15:51	
998	7								
999	8				Below 7.62 m - increase in silt content, dark greyish brown.		Dry	06/03/14 15:54	
1000	9					▽			
1001	10				SAND (SP) Fine, trace silt, some gravel to gravelly (fine), uniform, greyish brown. [GLACIOFLUVIAL]		Moist	06/03/14 15:55	

DRAFT

(Continued on next page)

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-015S

Location: Ajax Project Site

Coordinates (m): 686773E - 5606920N
Ground Elevation (m): 991
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 2.13

Start Date: 06 Mar 14
Finish Date: 06 Mar 14
Final Depth (m): 11.28
Depth to Top of Rock (m):
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1001	10								
1002	11				Below 10.67 m - gravelly, fine to coarse.		Moist	06/03/14 15:58	
1003	12				END OF HOLE AT 11.28 m NOTES: 1. 2" PVC standpipe piezometer installed with screen from 8.23 to 11.28 metres. 2. Filter sand placed from 7.62 to 11.28 metres. 3. Bentonite seal placed from 5.49 to 7.62 metres.				
1004	13								
1005	14								
1006	15								
1007	16								
1008	17								
1009	18								
1010	19								
1011	20								

DRAFT

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX HYDROGEO.GDL 360.GDT 5/28/14

DRILL HOLE # BGC14-017D

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring
Location: Ajax Project Site

Coordinates (m): 685540E - 5605928N
Ground Elevation (m): 1036
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 10 Mar 14
Finish Date: 10 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 3.96
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1036	0				SAND (SW) Fine, silty, some gravel (fine to coarse), well graded, dark brown, trace organics (roots, 5 - 10 mm diameter). [TOPSOIL]		Moist	10/03/14 10:41	
1037	1	G	G1						
1038	2				SILT (ML) Sandy (fine), trace to some gravel (fine to coarse), trace clay, well graded, light brown, low plasticity, clasts are angular. [TILL]		Moist	10/03/14 10:42	
1039	3	G	G2				Moist	10/03/14 10:44	
1040	4			V V	BEDROCK Drill cuttings: fine to medium grained, grey, angular, fresh and unweathered to slightly weathered.				
1041	5			V V		▽	Dry	10/03/14 10:47	Tripping out to switch bits 10:49 to 11:04. At 5.49 m - moisture encountered.
1042	6	G	G3	V V	Below 6.10 m - fine, gray, slightly green, fresh and unweathered, average clast size is 7 mm.		Dry	10/03/14 11:06	
1043	7			V V					
1044	8			V V	Below 7.62 m - bluish grey, average clast size is 4 mm.		Dry	10/03/14 11:10	At 8.23 m - moisture encountered.
1045	9	G	G4	V V			Dry	10/03/14 11:14	
1046	10			V V					

(Continued on next page)

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

DRILL HOLE # BGC14-017D

Coordinates (m): 685540E - 5605928N
Ground Elevation (m): 1036
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 10 Mar 14
Finish Date: 10 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 3.96
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1046	10								
					Below 10.67 m - angular to subangular, average clast size is 3 mm.		Dry	10/03/14 11:17	
1047	11								At 10.97 m - moisure encountered.
1048	12	G	G5				Dry	10/03/14 11:21	
1049	13								
1050	14	G	G6		Below 13.72 m - greenish grey sand present in cuttings, slightly weathered.		Dry	10/03/14 11:25	
1051	15	G	G7		Below 15.24 m - average clast size is 2 mm, uniform clasts, slightly weathered.		Dry	10/03/14 11:29	
1052	16								
1053	17						Dry	10/03/14 11:32	
1054	18	G	G8		At 18.29 m - lumps of clayey silt present in cuttings with slight oxidation, gravel cuttings are subrounded, slightly purplish red to grey, modereately weathered.		Dry to slightly moist	10/03/14 11:36	
1055	19								
1056	20	G			Below 19.81 m - grey clasts with some greenish grey sand present, angular to		Dry	10/03/14 11:39	

(Continued on next page)

DRAFT

DRILL HOLE # BGC14-017D

Coordinates (m): 685540E - 5605928N
Ground Elevation (m): 1036
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 10 Mar 14
Finish Date: 10 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 3.96
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1056	20	G	G9	subrounded				
1057	21							
		G	G10	Below 21.34 m - purplish grey, mostly fine sand, moderately weathered.		Dry	10/03/14 11:43	
1058	22							
1059	23	G	G11	Below 22.86 m - only some sand present, gravel cuttings are greyish green, angular, slightly weathered.		Dry	10/03/14 11:48	
						Dry to slightly moist	10/03/14 11:54	At 23.47 m - moisture encountered.
1060	24							
		G	G12					
1061	25							
1062	26	G	G13			Dry to slightly moist	10/03/14 11:59	At 25.91 m - sand is dry to slightly moist.
1063	27							At 26.82 m - moisture encountered.
		G	G14	Below 27.43 m - moderately weathered, moisture encountered, faint oxidation.		Dry to slightly moist	10/03/14 12:04	
1064	28							
1065	29	G	G15	Below 28.96 m - slightly weathered.		Dry	10/03/14 12:09	AIRLIFT #1 0.2 GPM (341 mL/27 sec)
				END OF HOLE AT 29.56 m				
1066	30			NOTES:				

(Continued on next page)

DRAFT

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-017D

Location: Ajax Project Site

Coordinates (m): 685540E - 5605928N
Ground Elevation (m): 1036
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 5.18

Start Date: 10 Mar 14
Finish Date: 10 Mar 14
Final Depth (m): 29.56
Depth to Top of Rock (m): 3.96
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1066	30				1. 2" PVC standpipe piezometer installed with screen from 23.47 to 29.56 metres. 2. Filter sand placed from 22.56 to 29.56 metres. 3. Bentonite seal placed from 20.12 to 22.56 metres.				
1067	31								
1068	32								
1069	33								
1070	34								
1071	35								
1072	36								
1073	37								
1074	38								
1075	39								
1076	40								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

Project No.: 1125-007
Project: Ajax 2014 EA Monitoring

DRILL HOLE # BGC14-017S

Location: Ajax Project Site

Coordinates (m): 685540E - 5605928N
Ground Elevation (m): 1036
Survey Method: Handheld GPS
Datum: NAD83
Plunge (°): 90
Trend (°):

Drill Designation: N/A
Drilling Contractor: JR Drilling Central
Drill Method: Dual Rotary
Diameter (m): 0.15
Fluid: N/A
Cased To (m): 1.52

Start Date: 10 Mar 14
Finish Date: 10 Mar 14
Final Depth (m): 5.18
Depth to Top of Rock (m): 4.57
Logged By: SLP
Reviewed By:

Elevation (m)	Depth (m)	Sample Type	Sample No.	Symbol	Lithologic Description	Instrument Details	Water Notes	Date + Time	Comments
1036	0				SAND (SW) Fine, silty, some gravel (fine to coarse), well graded, dark brown, trace organics (rootlets). [TOPSOIL]		Moist	10/03/14 13:42	
1037	1						Moist	10/03/14 13:43	
1038	2								
1039	3				SILT (ML) Sandy (fine), trace gravel (fine to coarse), trace clay, well graded, low plasticity, light brown with brown and grey clasts, clasts are angular to subrounded. [TILL]		Moist	10/03/14 13:44	
1040	4								
1041	5				BEDROCK Drill cuttings: fine to medium grained, grey, angular, fresh and unweathered to slightly weathered.		Dry	10/03/14 13:45	
1042	6				END OF HOLE AT 5.18 m NOTES: 1. 2" PVC standpipe peizometer installed with screen from 3.04 to 4.57 metres. 2. Filter sand placed from 2.74 to 5.18 metres. 3. Bentonite seal placed from 0.00 to 2.74 metres.				
1043	7								
1044	8								
1045	9								
1046	10								

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Client: KGHM International Ltd.
Print Date: 5/28/2014

AJAX (HYDROGEO) AJAX_SOIL_HYDROGEO.GDL BGC.GDT 5/28/14

APPENDIX D

STANDPIPE INSTALLATION DETAILS

(Pages D-1 to D-9)

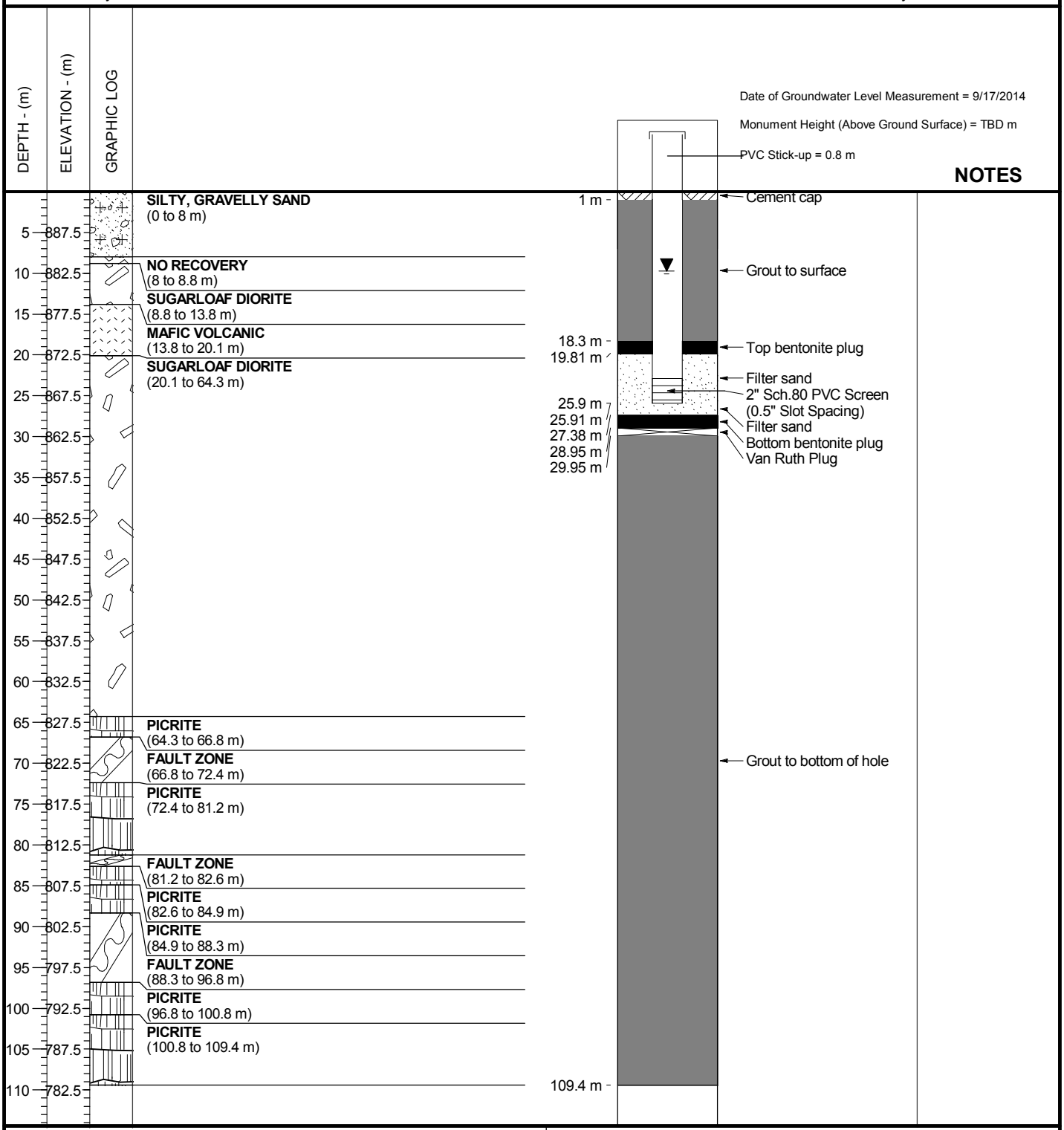
Project: Ajax Project | **Drillhole No.:** DH14-004 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 25 Jul 14

Location: Cicada Study - General Mine Site Infrastructure | Total Depth: 109.42 m | Date Completed: 28 Jul 14

Coordinates: 685,738 E , 5,609,107 N | Elevation: 892.5 m | Logged by: LS/JEF

Coordinate System: UTM NAD83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE D-1

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

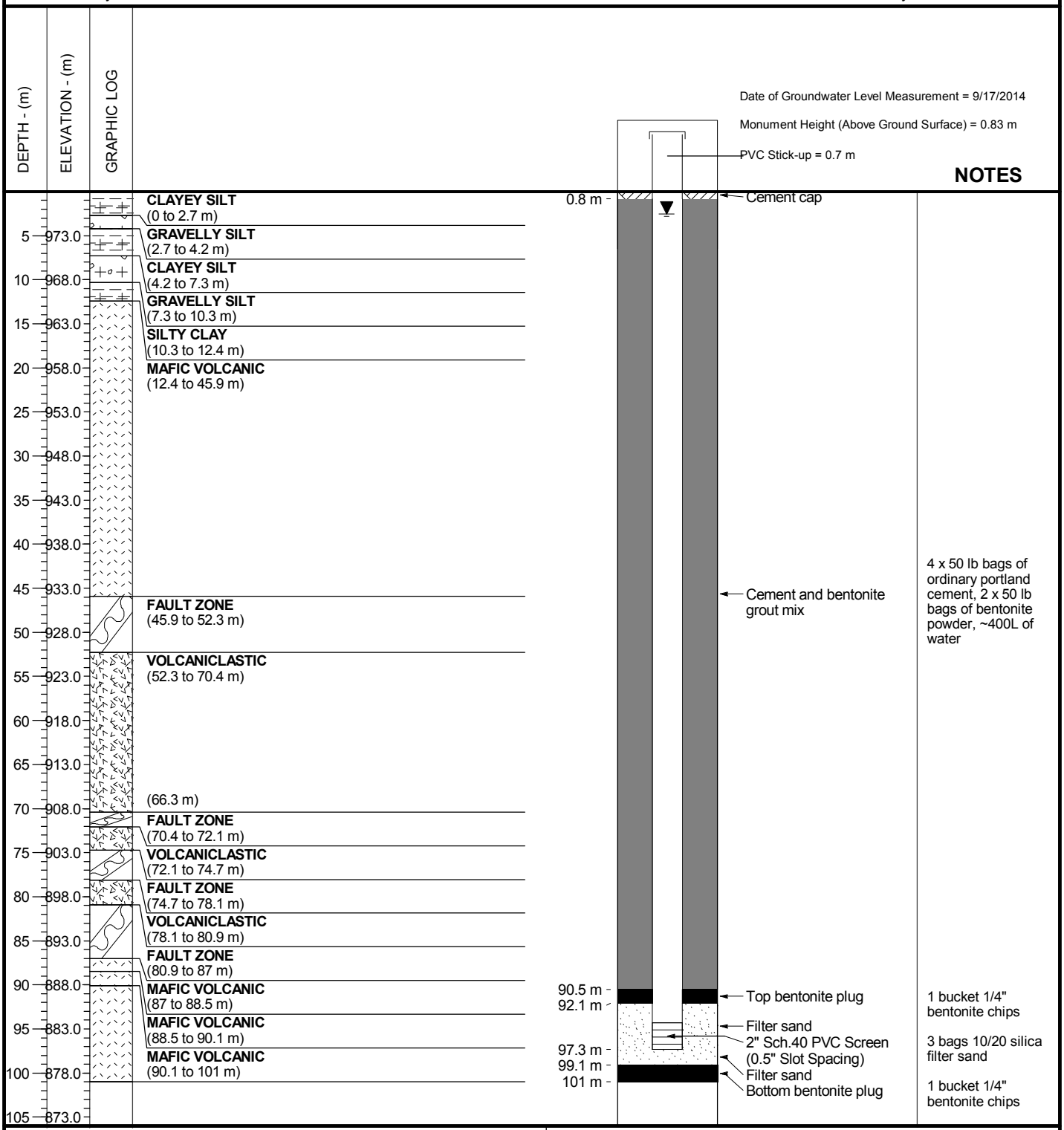
Project: Ajax Project | **Drillhole No.:** DH14-017 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 9 Aug 14

Location: Cicada Study / ELFZ? - SMRSF | Total Depth: 101.00 m | Date Completed: 12 Aug 14

Coordinates: 686,633 E , 5,606,963 N | Elevation: 978 m | Logged by: MEA/WBG

Coordinate System: UTM NAD83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE D-2

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

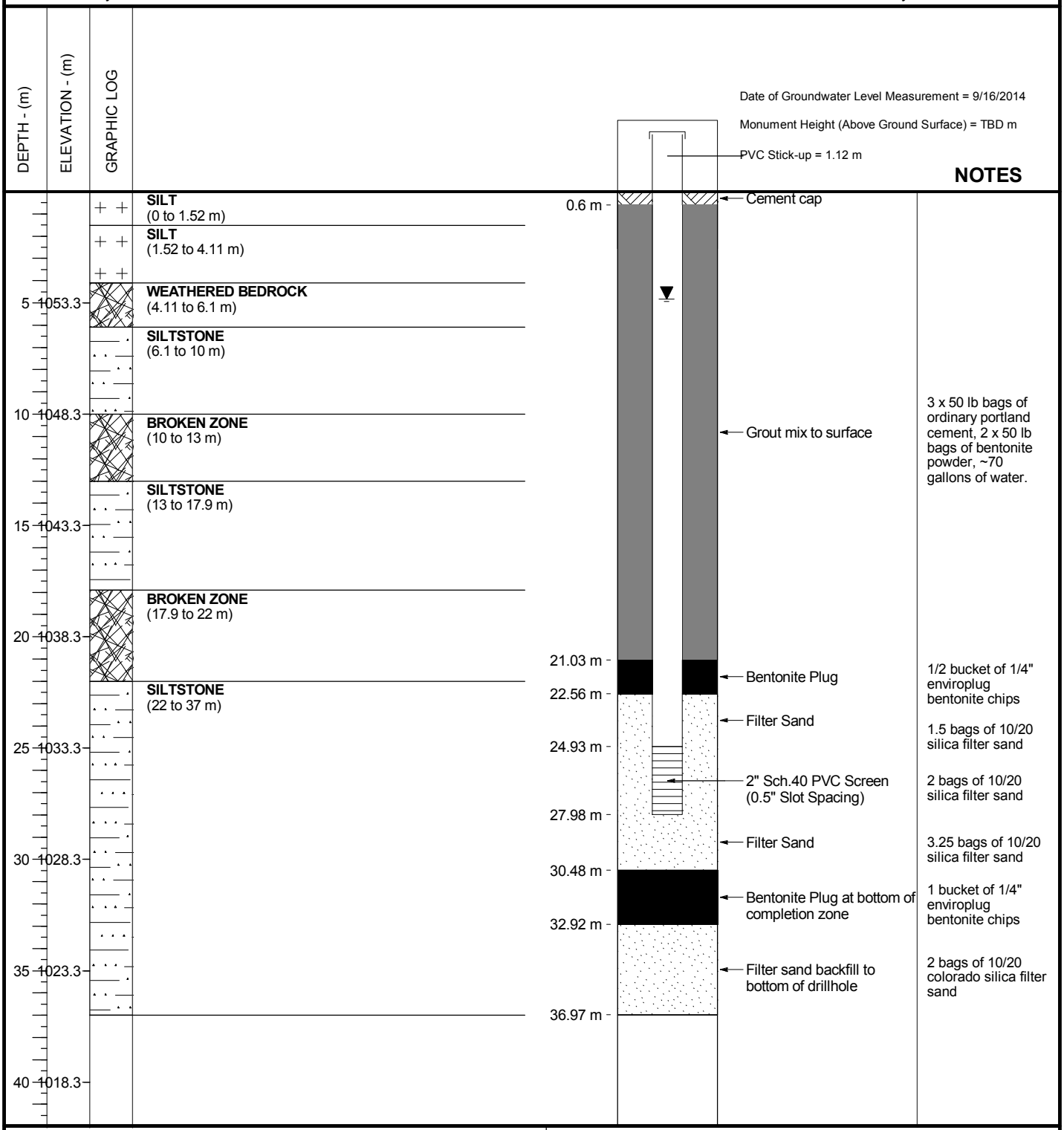
Project: Ajax Project | **Drillhole No.:** DH14-035 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 3 Sep 14

Location: South Embankment | Total Depth: 37.00 m | Date Completed: 5 Sep 14

Coordinates: 683,878 E , 5,605,627 N | Elevation: 1058.3 m | Logged by: JBC/MAS

Coordinate System: UTM NAD83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE D-3

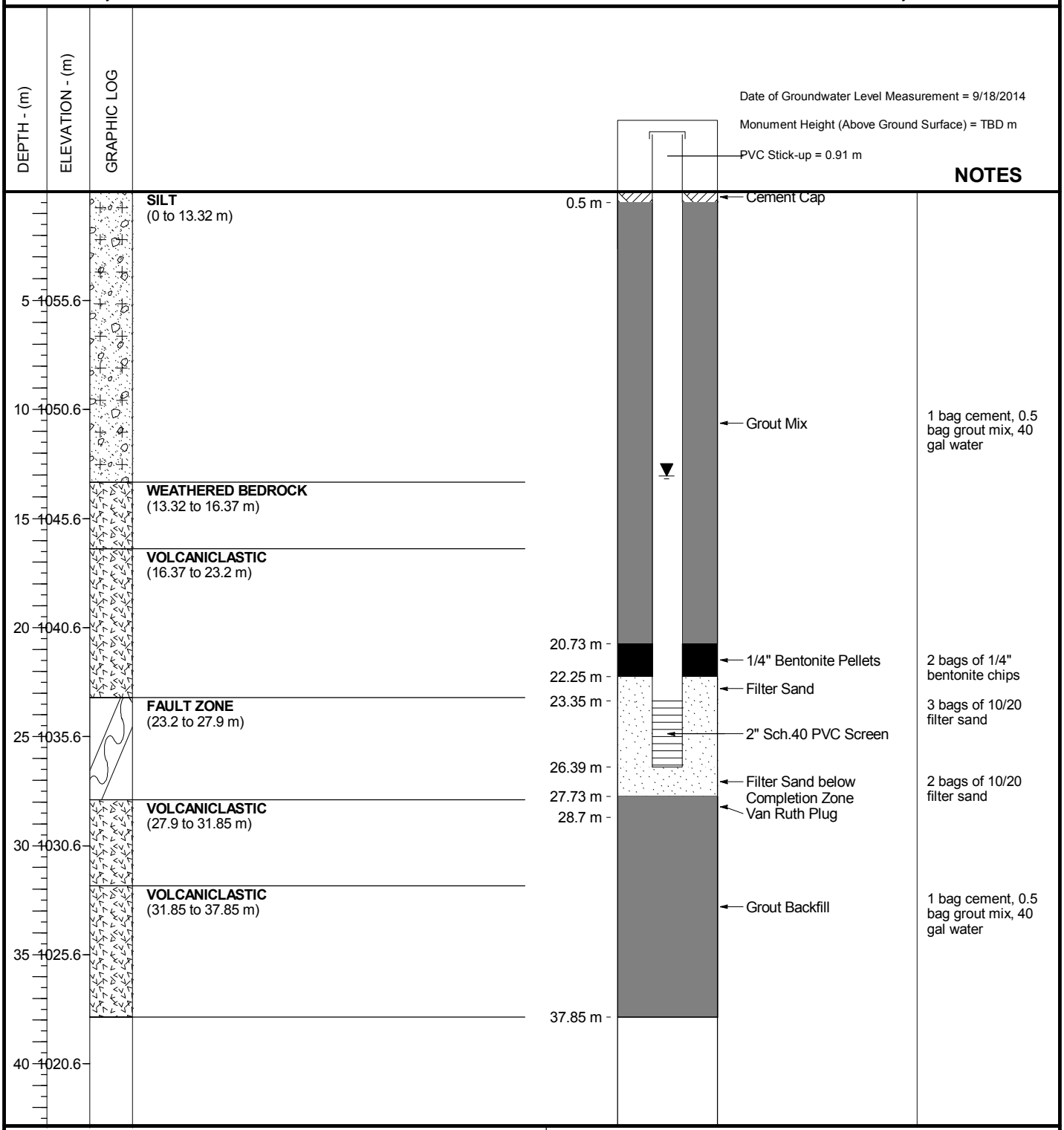
Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Southeast Embankment
Coordinates: 685,215 E , 5,605,147 N
Coordinate System: UTM NAD83 Zone 10

Drillhole No.: DH14-038
Drill Type: Fraste DR238
Total Depth: 37.85 m
Elevation: 1060.6 m
Azimuth , Inclination: 0 , -90

Page: 1 of 1
Date Started: 12 Sep 14
Date Completed: 15 Sep 14
Logged by: GNH
Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE D-4

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

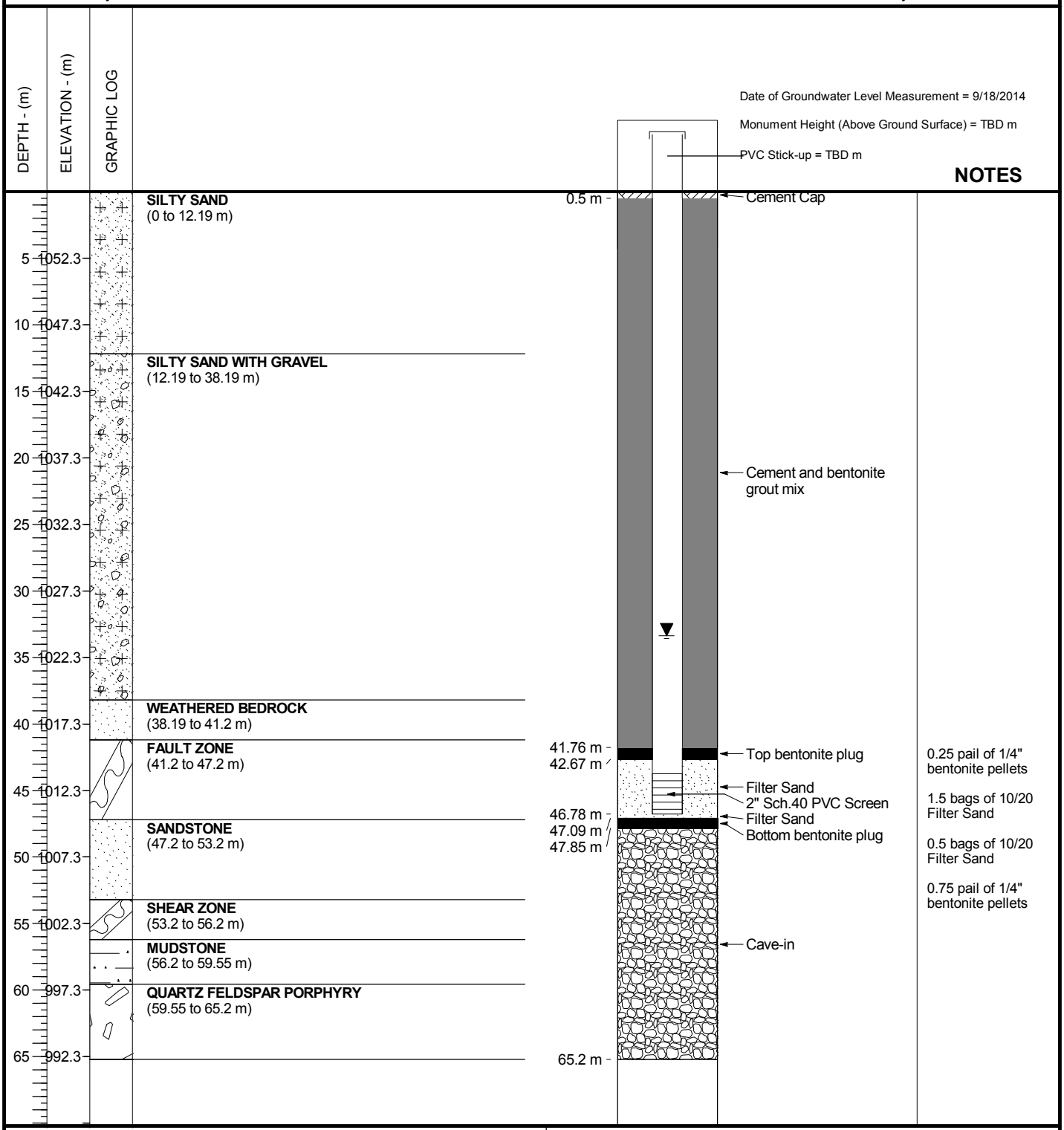
Project: Ajax Project | **Drillhole No.:** DH14-039 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 14 Sep 14

Location: Southeast Embankment | Total Depth: 65.20 m | Date Completed: 18 Sep 14

Coordinates: 684,892 E , 5,605,143 N | Elevation: 1057.3 m | Logged by: LEP

Coordinate System: UTM NAD83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-246/26	9	0

FIGURE D-5

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-001 TO 039 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

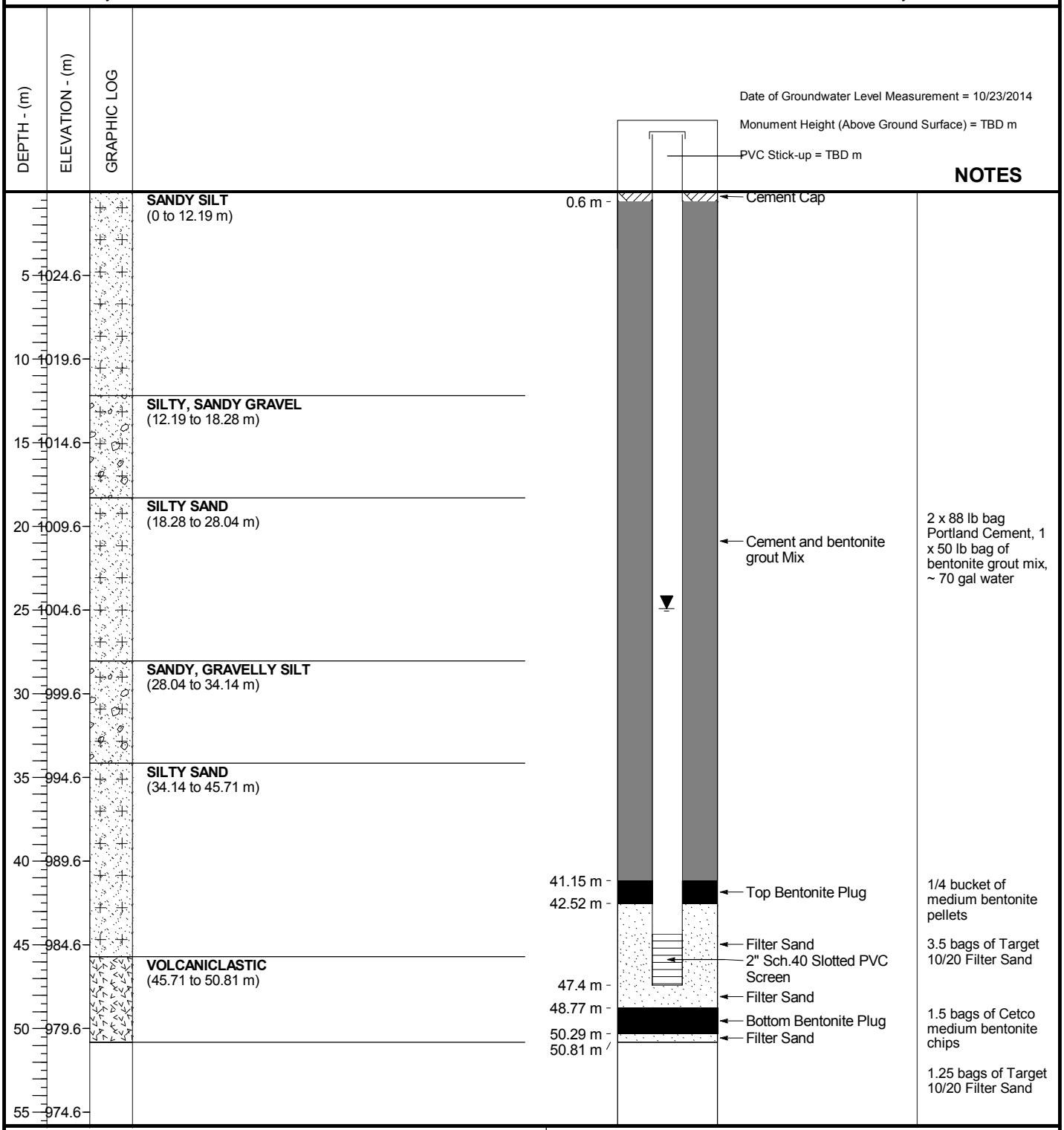
Project: Ajax Project | **Drillhole No.:** DH14-045 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR239 | Date Started: 21 Oct 14

Location: Potential Borrow Area | Total Depth: 50.81 m | Date Completed: 23 Oct 14

Coordinates: 686,420 E , 5,607,574 N | Elevation: 1029.6 m | Logged by: LEP/MAS

Coordinate System: UTM NAD 83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE D-6

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

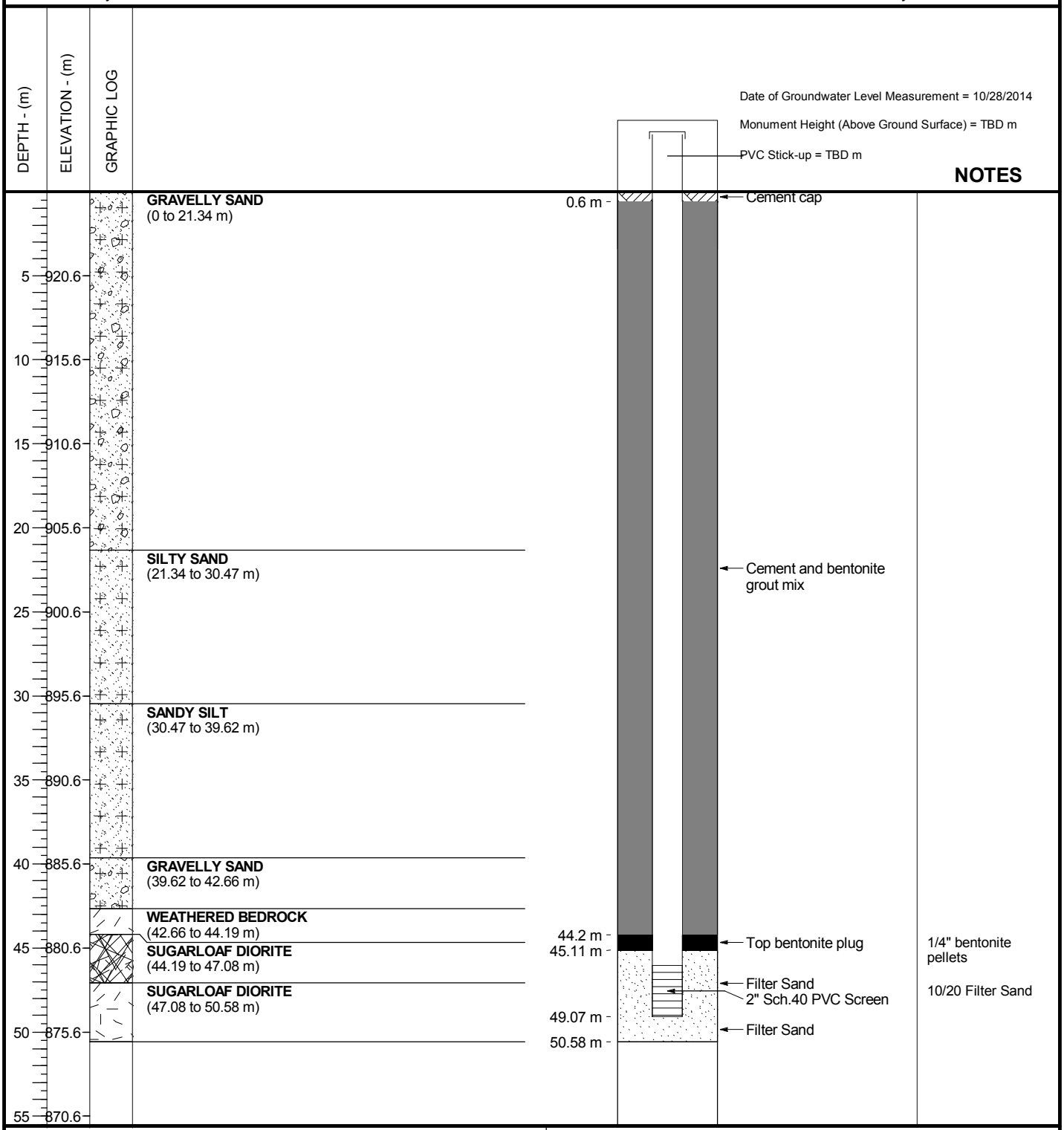
Project: Ajax Project | **Drillhole No.:** DH14-052 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 26 Oct 14

Location: Truck Shop Area | Total Depth: 50.58 m | Date Completed: 28 Oct 14

Coordinates: 686,717 E , 5,609,681 N | Elevation: 925.6 m | Logged by: LEP/MAS

Coordinate System: UTM NAD 83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE D-7

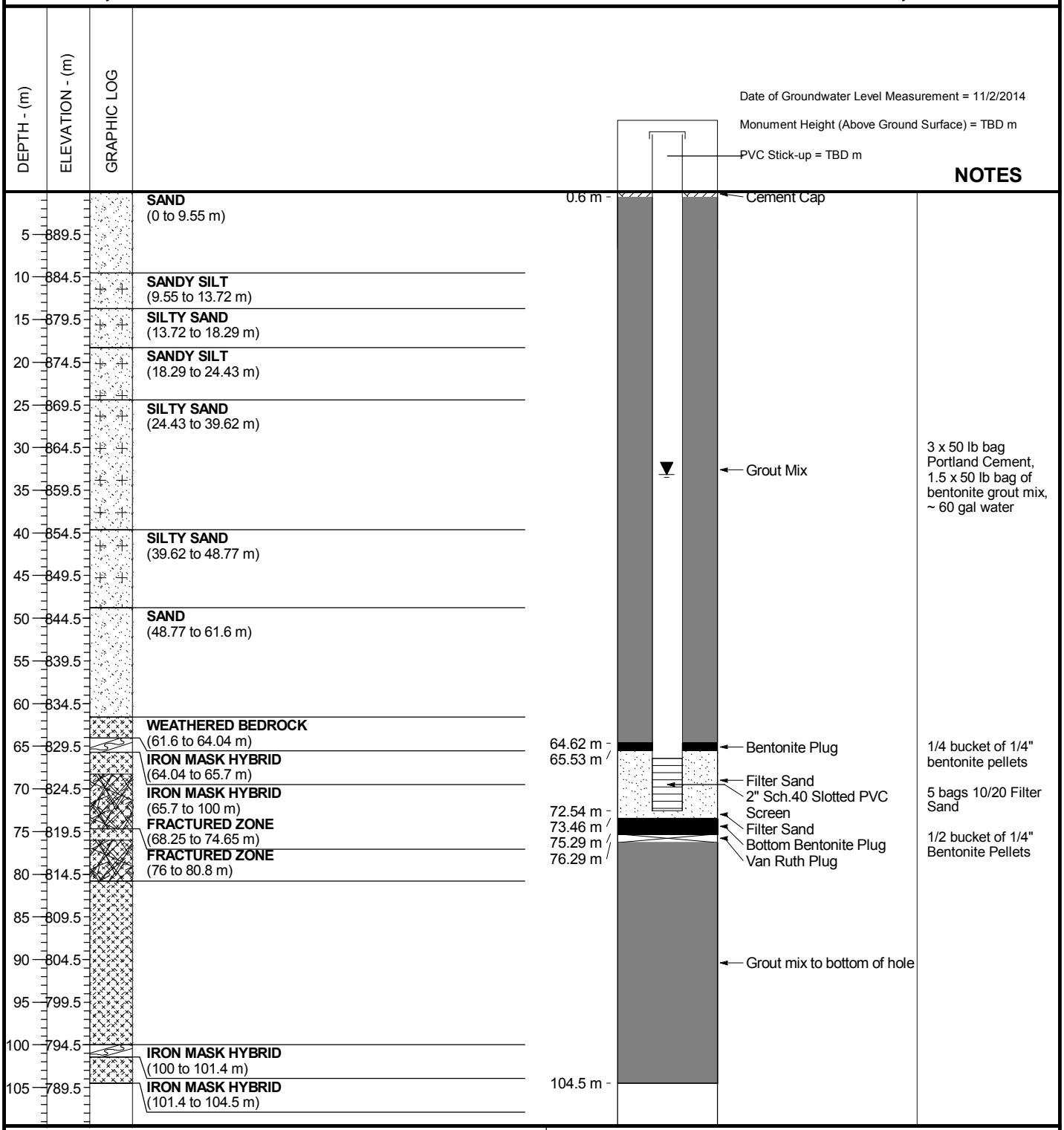
Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

Project: Ajax Project
Contractor: Geotech Drilling Services Ltd.
Location: Truck Shop Area
Coordinates: 686,850 E , 5,609,386 N
Coordinate System: UTM NAD 83 Zone 10

Drillhole No.: DH14-056
Drill Type: Fraste DR238
Total Depth: 104.50 m
Elevation: 894.5 m
Azimuth , Inclination: 0 , -90

Page: 1 of 1
Date Started: 30 Oct 14
Date Completed: 2 Nov 14
Logged by: LEP/MAS
Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE D-8

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

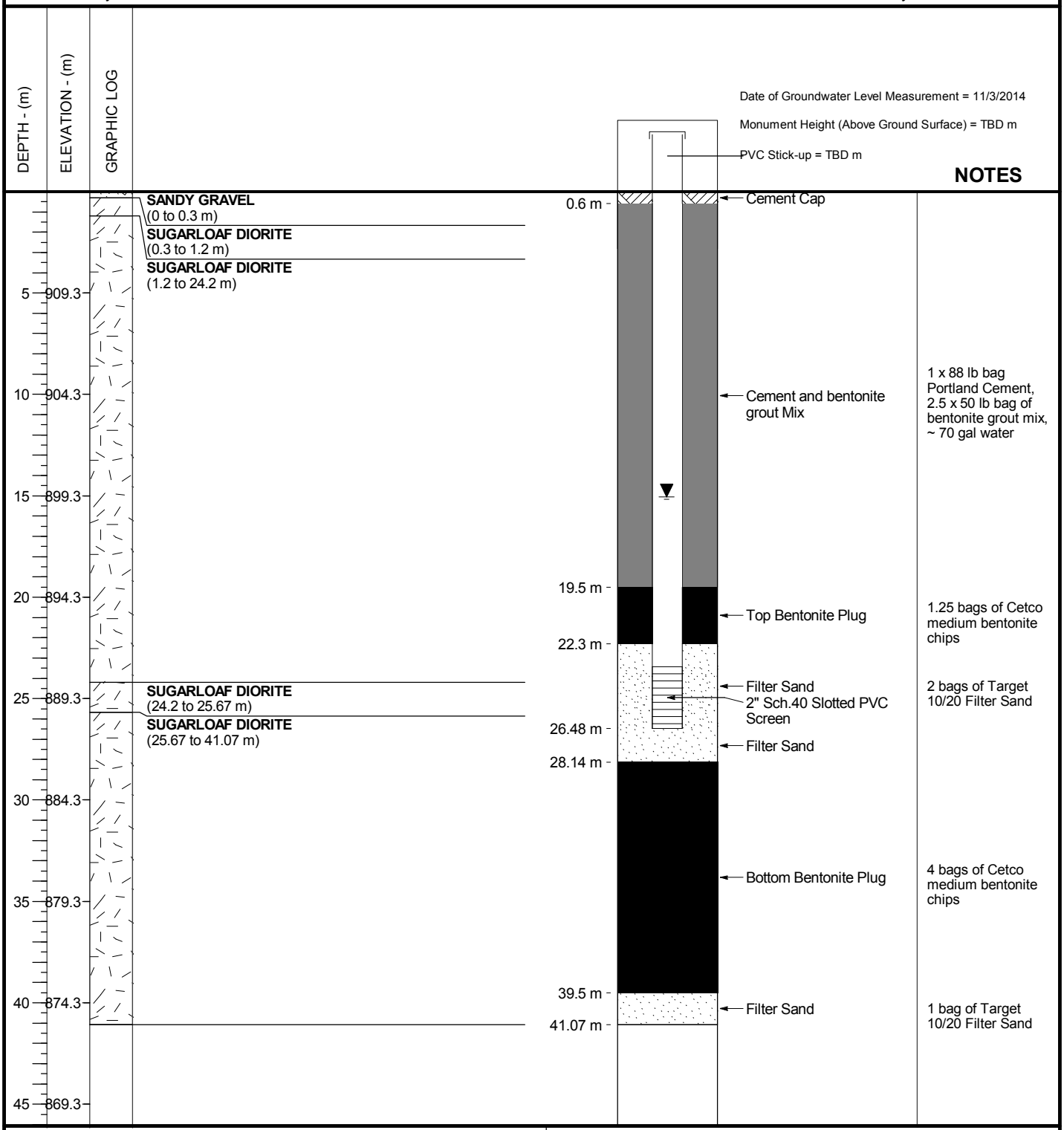
Project: Ajax Project | **Drillhole No.:** DH14-060 | **Page:** 1 of 1

Contractor: Geotech Drilling Services Ltd. | Drill Type: Fraste DR238 | Date Started: 2 Nov 14

Location: Primary Crusher Area | Total Depth: 41.07 m | Date Completed: 3 Nov 14

Coordinates: 685,215 E , 5,609,206 N | Elevation: 914.3 m | Logged by: GNH/JAG

Coordinate System: UTM NAD 83 Zone 10 | Azimuth , Inclination: 0 , -90 | Reviewed by: JAS



GENERAL REMARKS:

KGHM Ajax Mining Inc.
Ajax Project

Knight Piésold CONSULTING

Project No.	Ref. No.	Rev.
VA101-00246/26	9	0

FIGURE D-9

Logging conducted according to the Canadian Foundation Engineering Manual, 4th Edition, 2006.

M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\PROJECT\AJAX DRILLHOLES DH14-040 TO 067 REPORT 9.GPJ
M:\1\01\00246\26\A\DATA\TASK 200 - GEOTECHNICAL SITE INVESTIGATION\SI DATA WORK FILE\GINT\LIBRARY\KP LIB.GLB, WELL COMPLETION DETAILS - 1 PIPE, 2014 KP DATA TEMPLATE REVB.GDT, 07-Apr-15

APPENDIX E

LABORATORY TESTING RESULTS

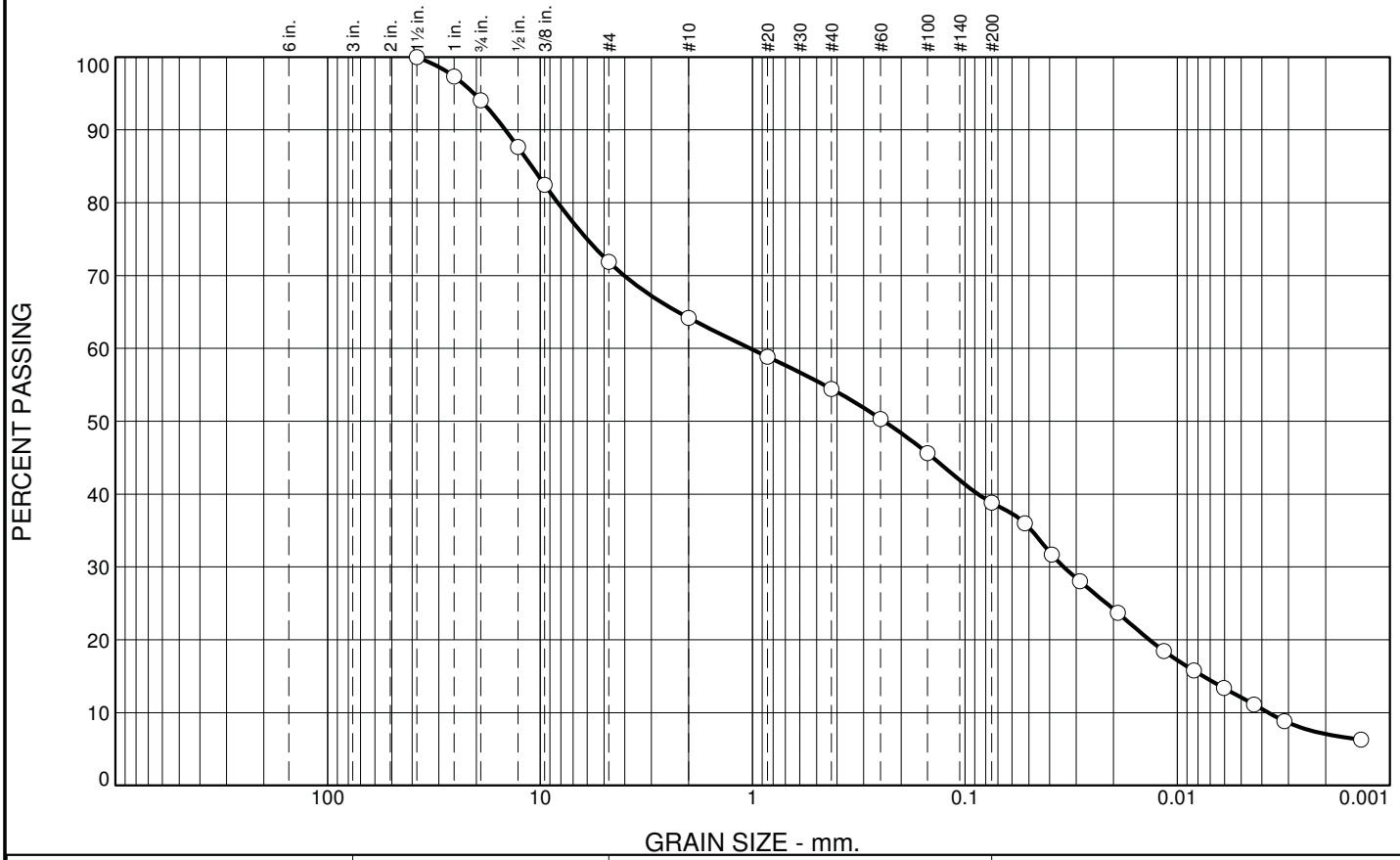
Appendix E1 Index Testing
Appendix E2 Rock Testing

APPENDIX E1

INDEX TESTING

(Pages E1-1 to E1-44)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.0	22.1	7.7	9.8	15.6	26.7	12.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	97.3		
0.75	94.0		
0.5	87.6		
0.375	82.5		
#4	71.9		
#10	64.2		
#20	58.9		
#40	54.4		
#60	50.3		
#100	45.6		
#200	38.8		
0.0522 mm.	36.0		
0.0390 mm.	31.7		
0.0288 mm.	28.0		
0.0191 mm.	23.7		
0.0116 mm.	18.5		
0.0084 mm.	15.8		
0.0060 mm.	13.4		
0.0044 mm.	11.1		
0.0031 mm.	8.8		
0.0014 mm.	6.3		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.5834 D_{85}= 10.9636 D_{60}= 1.0275
D_{50}= 0.2408 D_{30}= 0.0343 D_{15}= 0.0076
D_{10}= 0.0037 C_u= 275.56 C_c= 0.31

Classification

USCS= AASHTO=

Remarks

Sample No.: GP14-016 **Source of Sample:** **Date:** 1/8/15
Location: TP14-308 **Elev./Depth:** 1.4-1.55m

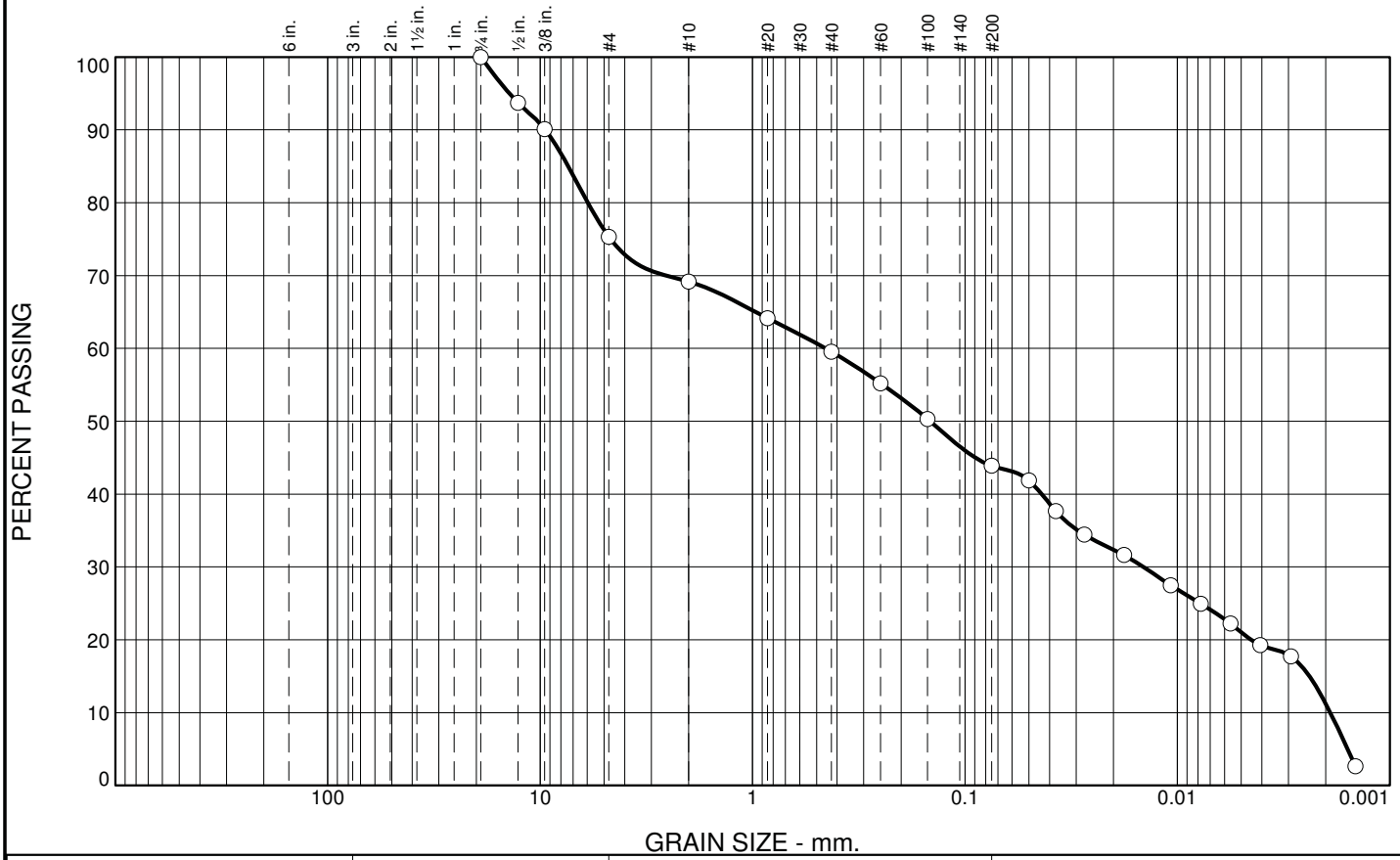
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.7	6.1	9.7	15.6	22.9	21.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75	100.0		
0.5	93.7		
0.375	90.1		
#4	75.3		
#10	69.2		
#20	64.2		
#40	59.5		
#60	55.2		
#100	50.3		
#200	43.9		
0.0500 mm.	41.9		
0.0373 mm.	37.6		
0.0274 mm.	34.4		
0.0178 mm.	31.6		
0.0107 mm.	27.5		
0.0078 mm.	25.0		
0.0056 mm.	22.2		
0.0041 mm.	19.3		
0.0029 mm.	17.7		
0.0015 mm.	2.7		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.4579 D_{85}= 7.3747 D_{60}= 0.4529
D_{50}= 0.1458 D_{30}= 0.0144 D_{15}= 0.0024
D_{10}= 0.0019 C_u= 237.72 C_c= 0.24

Classification

USCS= AASHTO=

Remarks

Sample No.: GP14-017 **Source of Sample:** **Date:** 1/8/15
Location: TP14-360 **Elev./Depth:** 1.5-1.65m

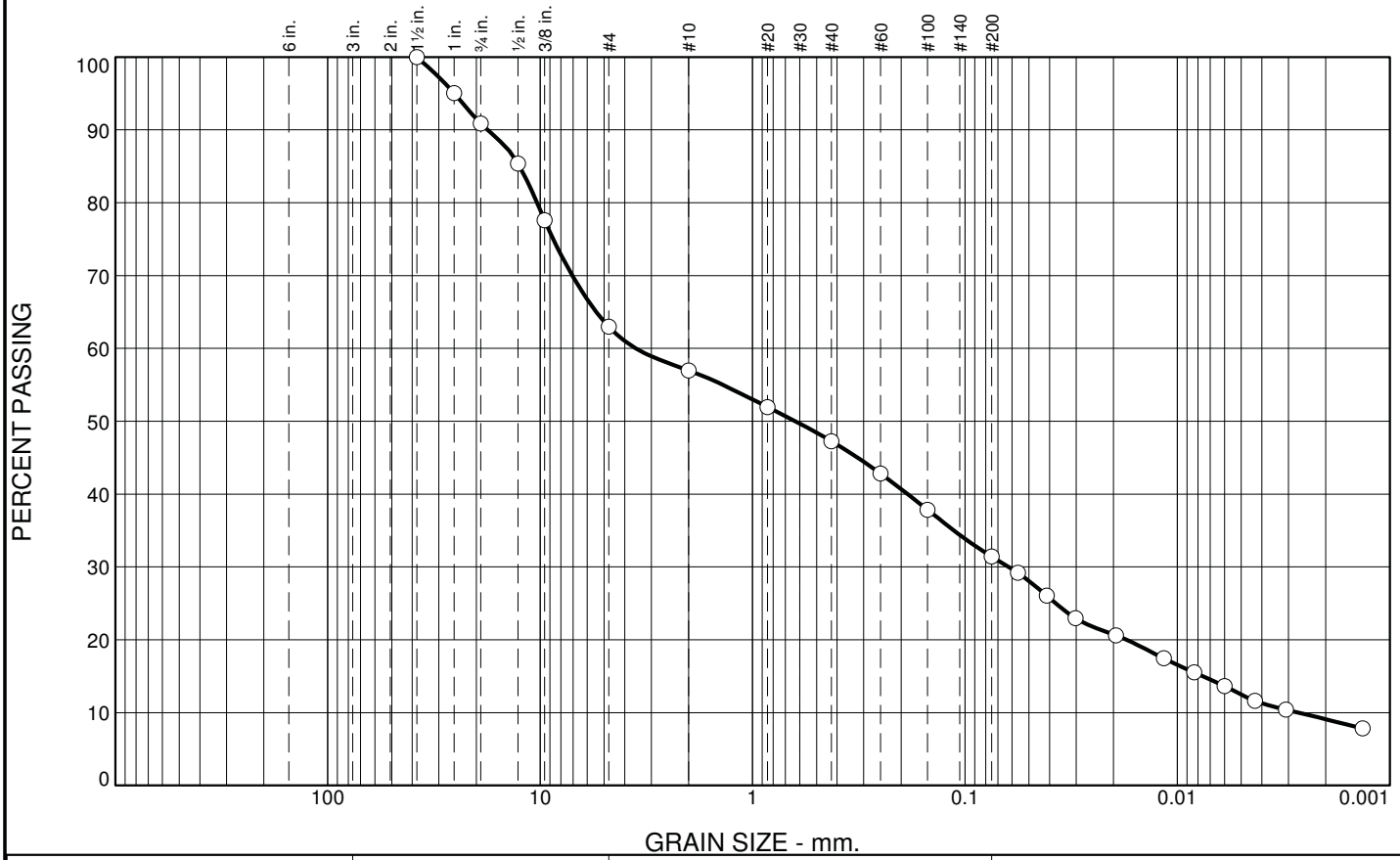
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.1	27.9	6.0	9.7	15.9	18.9	12.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	95.0		
0.75	90.9		
0.5	85.4		
0.375	77.6		
#4	63.0		
#10	57.0		
#20	51.9		
#40	47.3		
#60	42.8		
#100	37.8		
#200	31.4		
0.0564 mm.	29.2		
0.0413 mm.	26.1		
0.0301 mm.	23.0		
0.0195 mm.	20.6		
0.0116 mm.	17.5		
0.0083 mm.	15.5		
0.0060 mm.	13.6		
0.0043 mm.	11.6		
0.0031 mm.	10.4		
0.0013 mm.	7.8		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 17.6991 D_{85}= 12.4967 D_{60}= 3.5398
D_{50}= 0.6295 D_{30}= 0.0622 D_{15}= 0.0076
D_{10}= 0.0027 C_u= 1316.78 C_c= 0.41

Classification

USCS= AASHTO=

Remarks

Sample No.: GP14-018 **Source of Sample:** **Date:** 1/8/15
Location: TP14-377 **Elev./Depth:** 1.4-1.5m

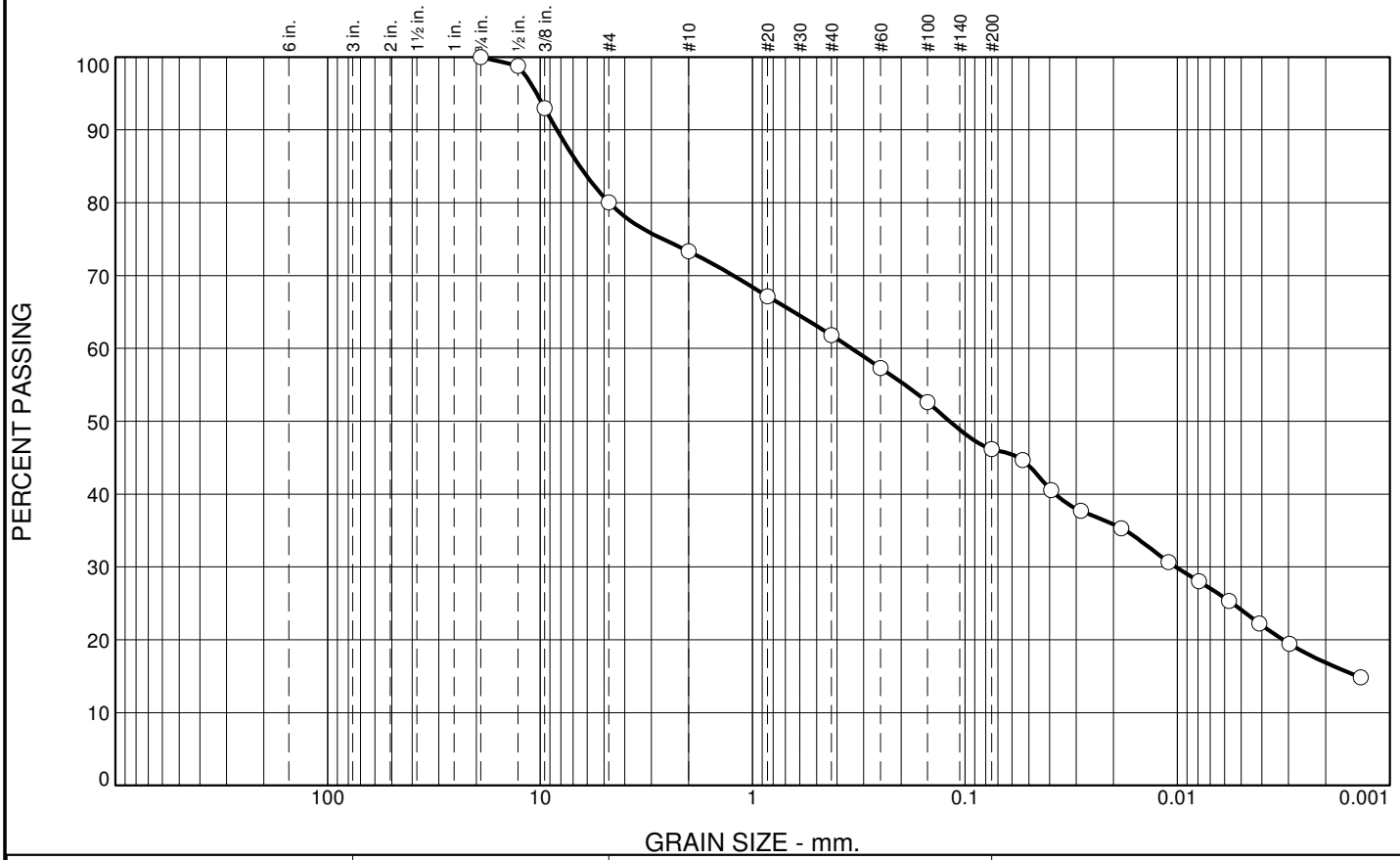
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.9	6.8	11.5	15.6	22.1	24.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75	100.0		
0.5	98.8		
0.375	93.0		
#4	80.1		
#10	73.3		
#20	67.2		
#40	61.8		
#60	57.3		
#100	52.6		
#200	46.2		
0.0536 mm.	44.7		
0.0393 mm.	40.5		
0.0285 mm.	37.7		
0.0184 mm.	35.3		
0.0110 mm.	30.7		
0.0079 mm.	28.0		
0.0057 mm.	25.3		
0.0041 mm.	22.2		
0.0030 mm.	19.4		
0.0014 mm.	14.8		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.3373 D_{85}= 6.4999 D_{60}= 0.3419
D_{50}= 0.1182 D_{30}= 0.0102 D_{15}= 0.0014
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: GP14-019 **Source of Sample:** **Date:** 1/8/15
Location: TP14-379 **Elev./Depth:** 1.5-1.65m

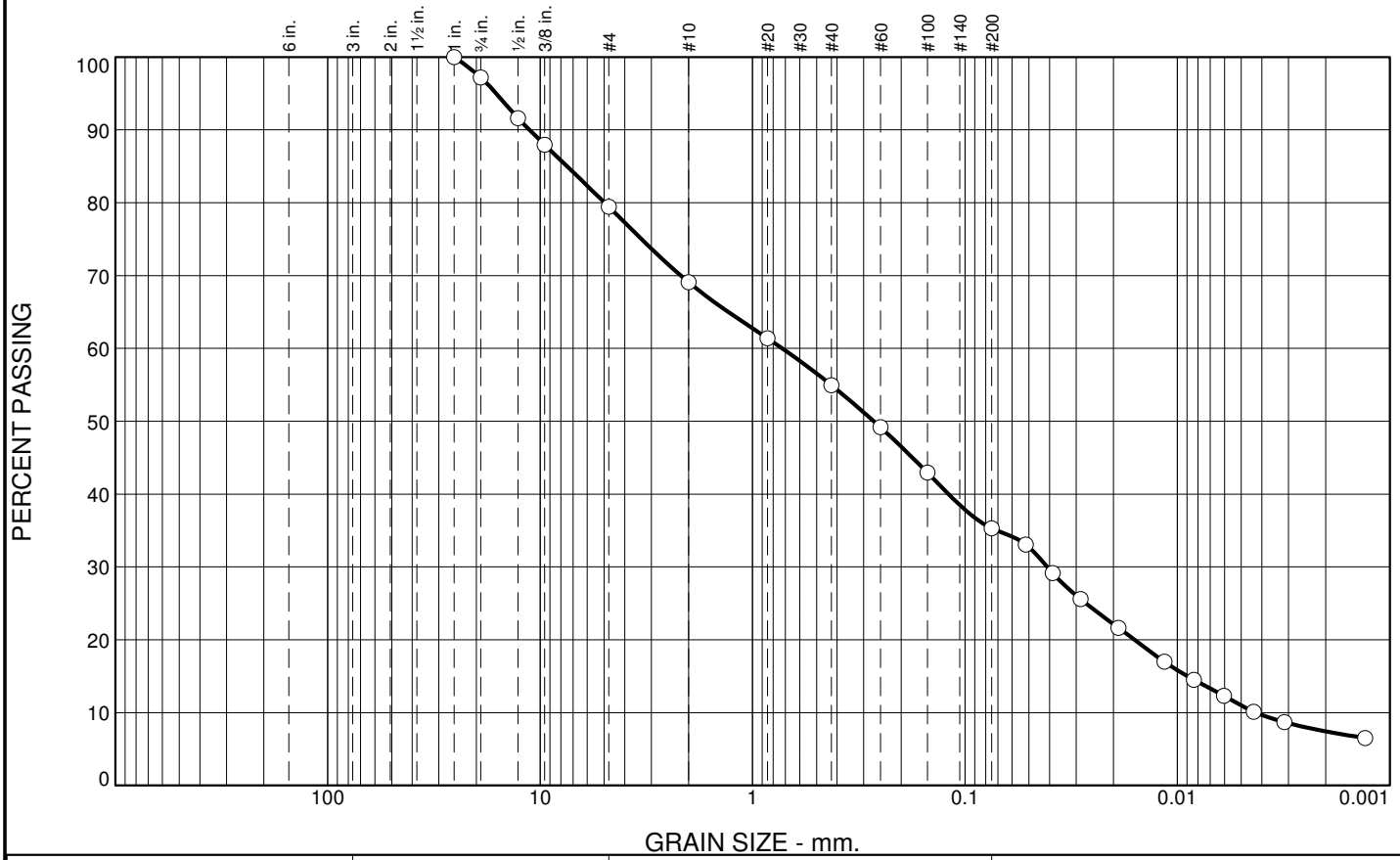
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.8	17.8	10.3	14.1	19.7	24.3	11.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
0.75	97.2		
0.5	91.6		
0.375	88.0		
#4	79.4		
#10	69.1		
#20	61.4		
#40	55.0		
#60	49.2		
#100	42.9		
#200	35.3		
0.0518 mm.	33.1		
0.0387 mm.	29.2		
0.0286 mm.	25.6		
0.0190 mm.	21.7		
0.0115 mm.	17.0		
0.0083 mm.	14.5		
0.0060 mm.	12.3		
0.0044 mm.	10.1		
0.0031 mm.	8.7		
0.0013 mm.	6.5		

* (no specification provided)

Soil Description

silty, clayey SAND with gravel

Atterberg Limits

PL= 15 LL= 21 PI= 6

Coefficients

D_{90}= 11.2400 D_{85}= 7.4706 D_{60}= 0.7254
D_{50}= 0.2688 D_{30}= 0.0410 D_{15}= 0.0090
D_{10}= 0.0043 C_u= 169.92 C_c= 0.54

Classification

USCS= SC-SM AASHTO= A-2-4(0)

Remarks

Sample No.: GP14-004 **Source of Sample:** **Date:** 11/8/14
Location: TP14-087 **Elev./Depth:** 1.4-1.5m

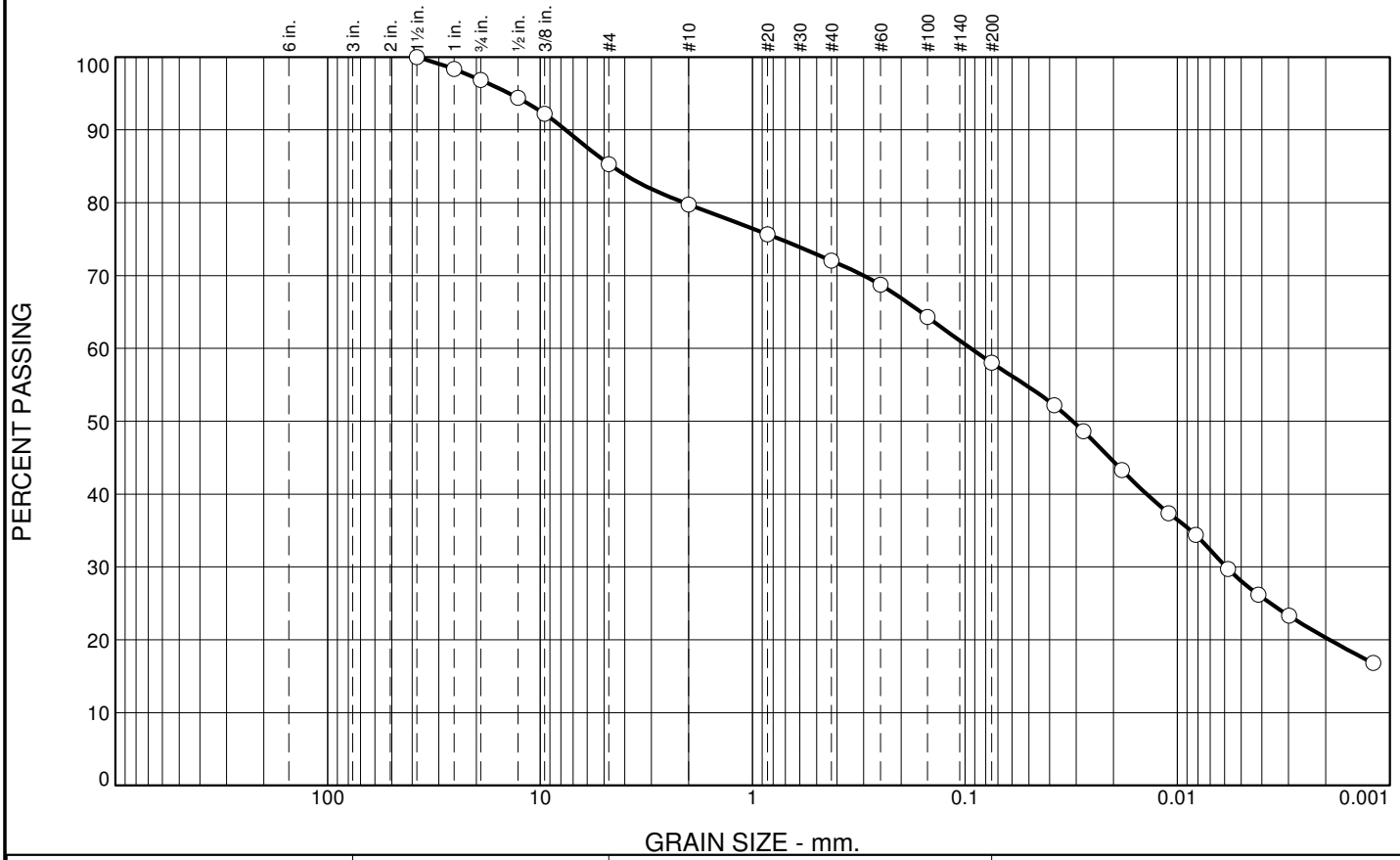
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: AMS **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	11.5	5.5	7.8	14.0	30.0	28.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	98.3		
0.75	96.8		
0.5	94.4		
0.375	92.2		
#4	85.3		
#10	79.8		
#20	75.7		
#40	72.0		
#60	68.7		
#100	64.3		
#200	58.0		
0.0380 mm.	52.2		
0.0277 mm.	48.6		
0.0182 mm.	43.3		
0.0110 mm.	37.4		
0.0082 mm.	34.4		
0.0058 mm.	29.7		
0.0042 mm.	26.2		
0.0030 mm.	23.3		
0.0012 mm.	16.8		

* (no specification provided)

Soil Description

sandy lean CLAY

Atterberg Limits

PL= 13 LL= 30 PI= 17

Coefficients

D_{90}= 7.5830 D_{85}= 4.5975 D_{60}= 0.0941
D_{50}= 0.0311 D_{30}= 0.0059 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

Sample No.: TP14-071-1 **Source of Sample:** **Date:** 11/11/14
Location: TP14-071 **Elev./Depth:** 4.5-4.9m

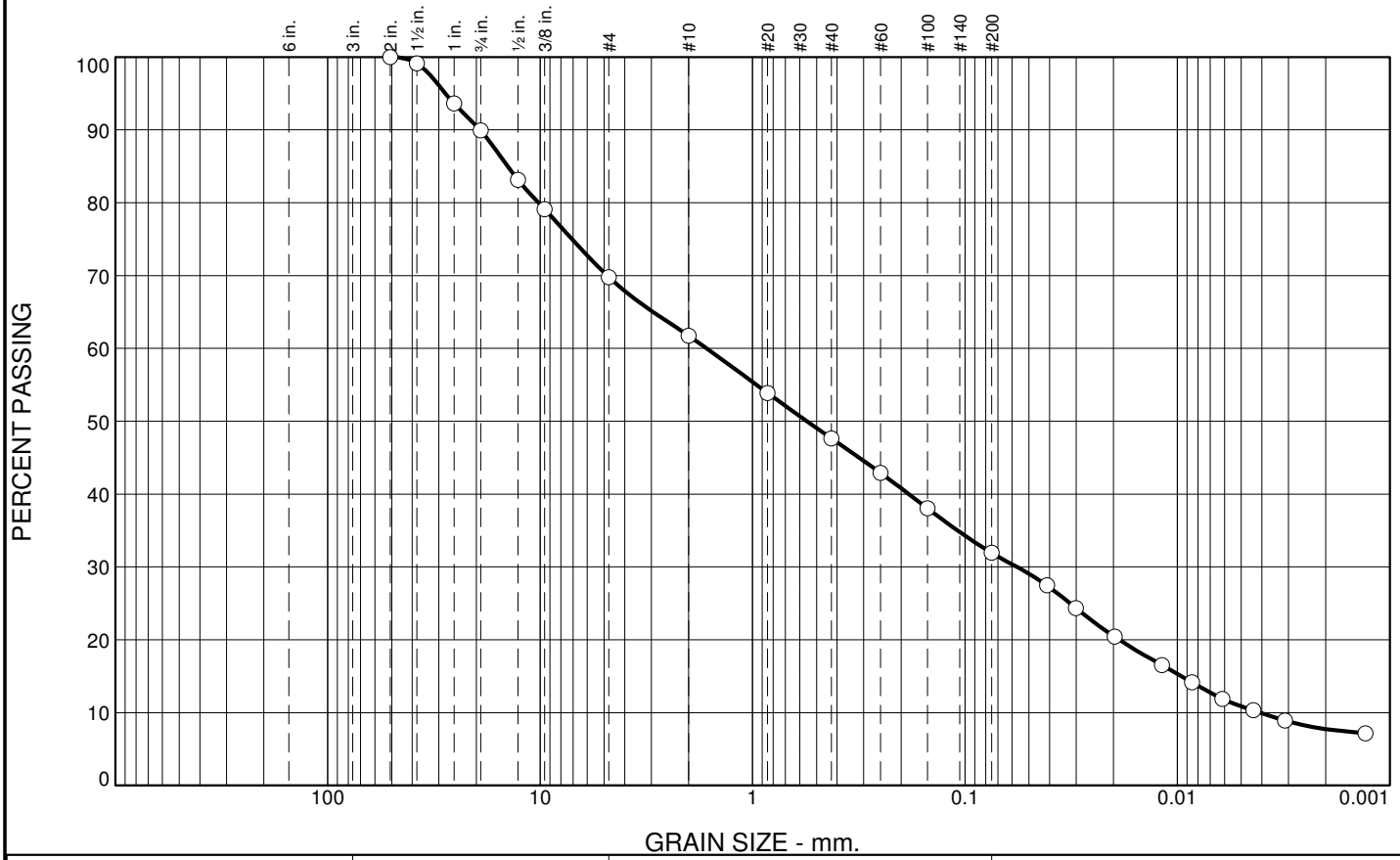
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: AMS **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.1	20.1	8.1	14.1	15.7	21.0	10.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	99.1		
1	93.6		
0.75	89.9		
0.5	83.1		
0.375	79.1		
#4	69.8		
#10	61.7		
#20	53.9		
#40	47.6		
#60	42.9		
#100	38.0		
#200	31.9		
0.0411 mm.	27.5		
0.0300 mm.	24.3		
0.0197 mm.	20.4		
0.0118 mm.	16.5		
0.0085 mm.	14.2		
0.0061 mm.	11.9		
0.0044 mm.	10.3		
0.0031 mm.	8.9		
0.0013 mm.	7.2		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 14 LL= 22 PI= 8

Coefficients

D_{90}= 19.1765 D_{85}= 14.2127 D_{60}= 1.6444
D_{50}= 0.5550 D_{30}= 0.0569 D_{15}= 0.0096
D_{10}= 0.0041 C_u= 404.09 C_c= 0.48

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

Sample No.: TP14-087-1 **Source of Sample:** **Date:** 11/11/14
Location: TP14-087 **Elev./Depth:** 3.5-3.7m

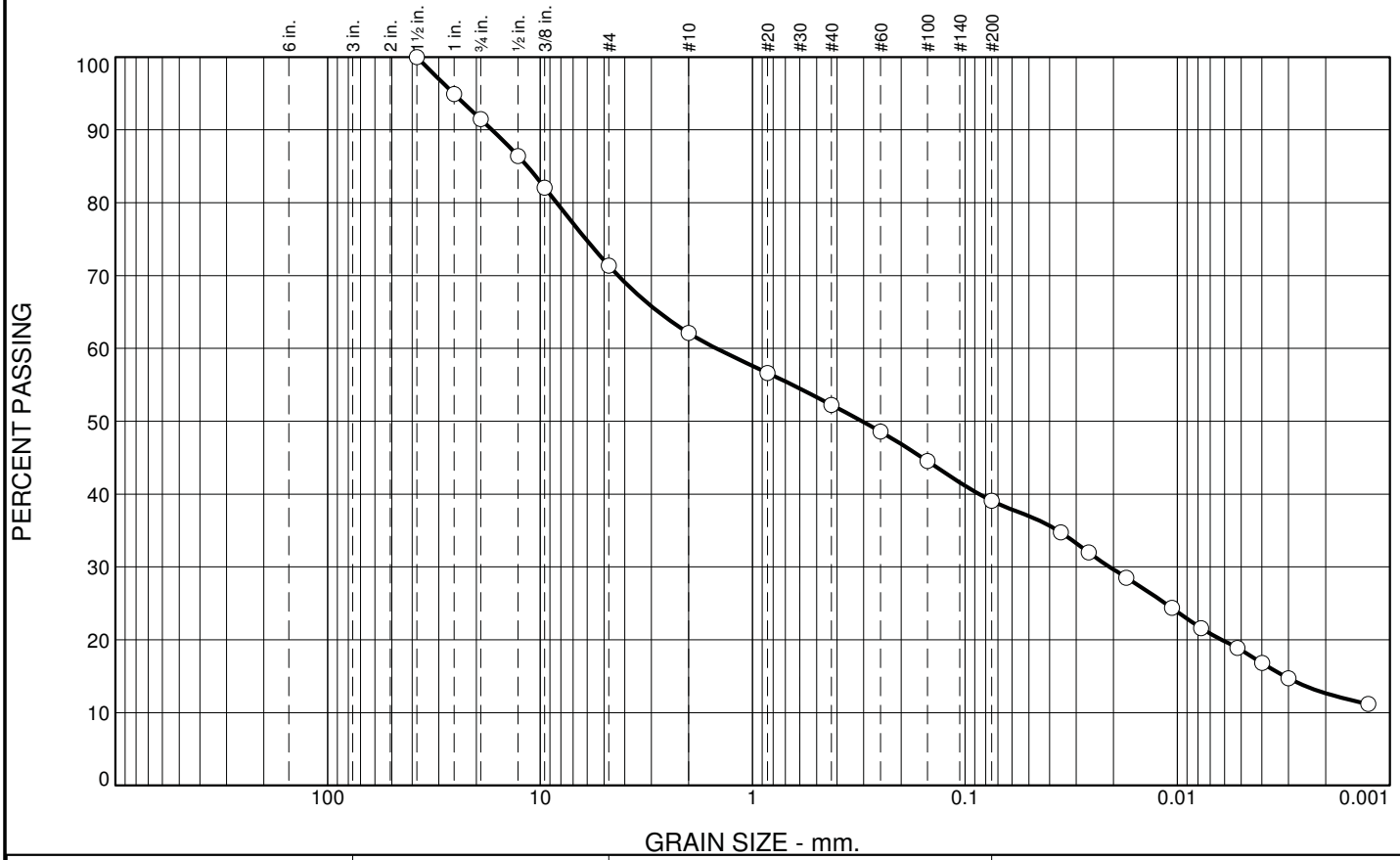
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: AMS **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.5	20.2	9.2	9.8	13.2	20.5	18.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	94.9		
0.75	91.5		
0.5	86.4		
0.375	82.1		
#4	71.3		
#10	62.1		
#20	56.6		
#40	52.3		
#60	48.6		
#100	44.5		
#200	39.1		
0.0354 mm.	34.8		
0.0262 mm.	32.0		
0.0174 mm.	28.5		
0.0106 mm.	24.4		
0.0077 mm.	21.6		
0.0052 mm.	18.9		
0.0040 mm.	16.8		
0.0030 mm.	14.7		
0.0013 mm.	11.2		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 13 LL= 27 PI= 14

Coefficients

D_{90}= 16.8410 D_{85}= 11.5089 D_{60}= 1.4844
D_{50}= 0.3044 D_{30}= 0.0208 D_{15}= 0.0031
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

Sample No.: TP14-183-1 **Source of Sample:** **Date:** 11/5/14
Location: TP14-183 **Elev./Depth:** 4.7-4.8m

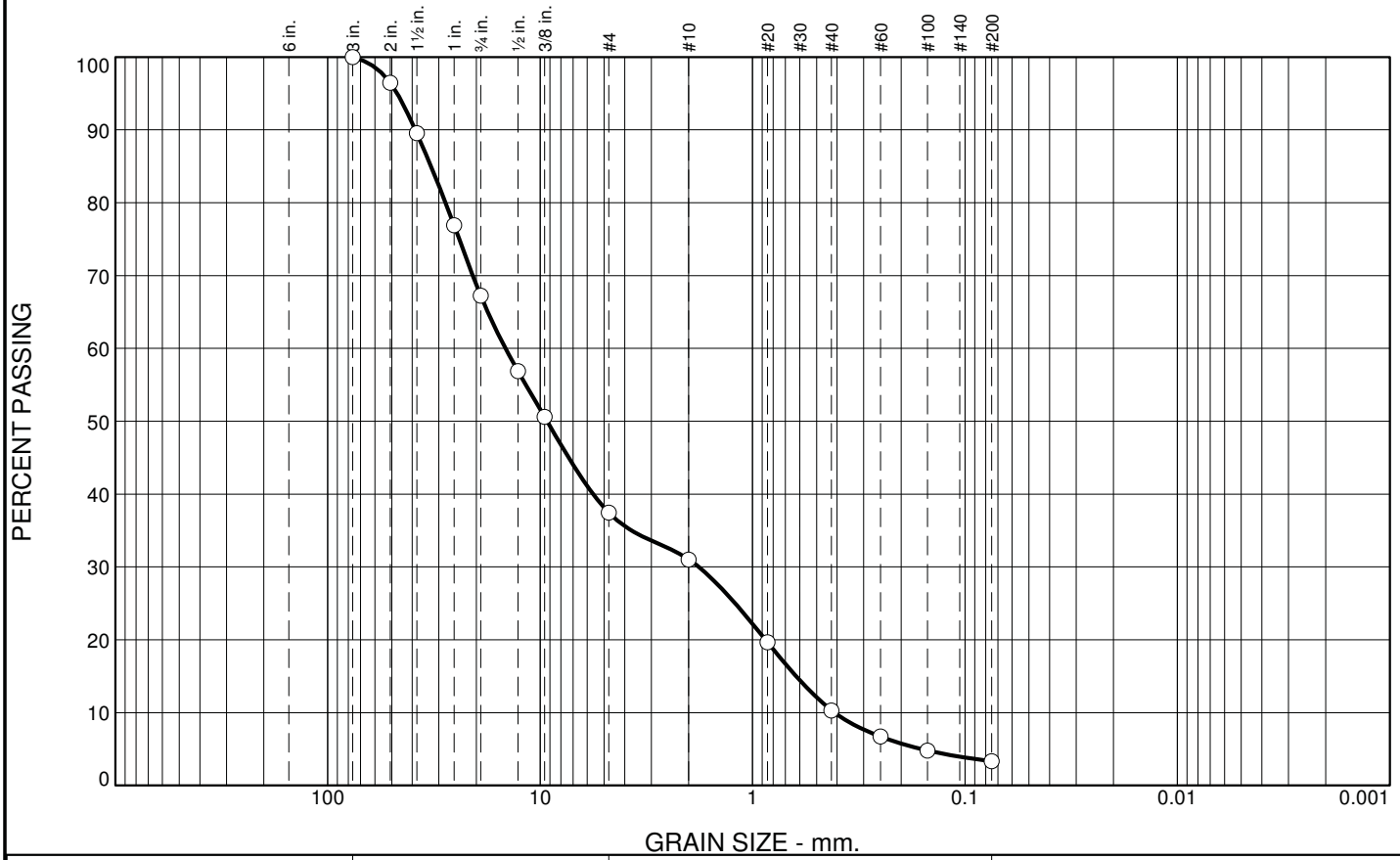
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: DAB **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	32.7	29.8	6.5	20.7	7.0	3.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	96.5		
1.5	89.5		
1	76.9		
0.75	67.3		
0.5	56.9		
0.375	50.6		
#4	37.5		
#10	31.0		
#20	19.7		
#40	10.3		
#60	6.7		
#100	4.8		
#200	3.3		

* (no specification provided)

Soil Description

poorly graded GRAVEL with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 38.7480 D_{85}= 32.6807 D_{60}= 14.5474
D_{50}= 9.2726 D_{30}= 1.7936 D_{15}= 0.6231
D_{10}= 0.4117 C_u= 35.34 C_c= 0.54

Classification

USCS= GP AASHTO= A-1-a

Remarks

Sample No.: TP14-213-1 **Source of Sample:** **Date:** 11/7/14
Location: TP14-213 **Elev./Depth:** 2.0-2.5m

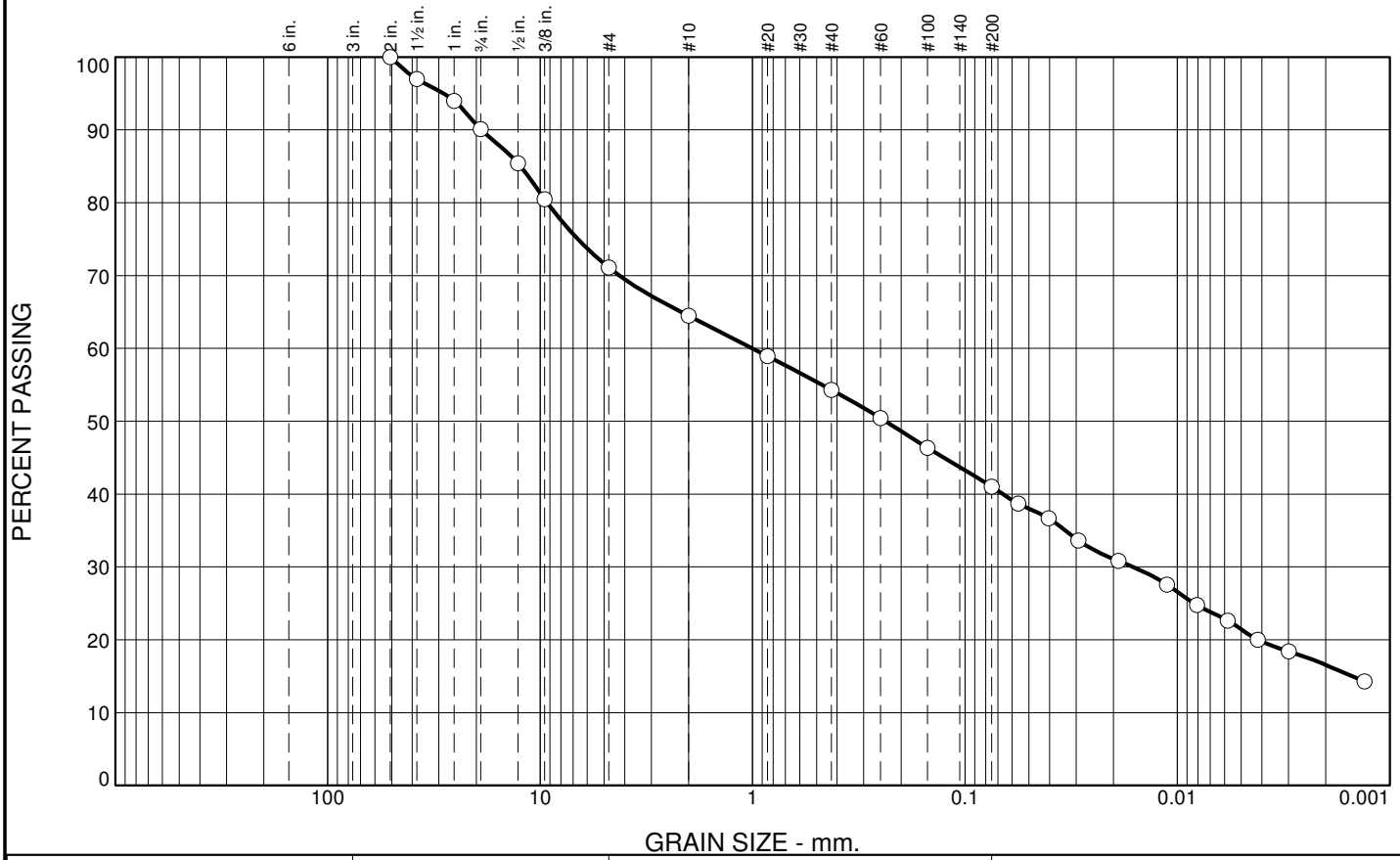
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: AMS **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.9	19.0	6.6	10.2	13.3	19.6	21.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	97.0		
1	94.0		
0.75	90.1		
0.5	85.4		
0.375	80.5		
#4	71.1		
#10	64.5		
#20	58.9		
#40	54.3		
#60	50.5		
#100	46.3		
#200	41.0		
0.0560 mm.	38.7		
0.0403 mm.	36.7		
0.0293 mm.	33.6		
0.0189 mm.	30.8		
0.0112 mm.	27.6		
0.0081 mm.	24.8		
0.0058 mm.	22.6		
0.0042 mm.	20.0		
0.0030 mm.	18.4		
0.0013 mm.	14.3		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 14 LL= 28 PI= 14

Coefficients

D_{90}= 18.8990 D_{85}= 12.3687 D_{60}= 1.0025
D_{50}= 0.2362 D_{30}= 0.0162 D_{15}= 0.0015
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

Sample No.: TP14-295-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-295 **Elev./Depth:** 2.7-2.8m

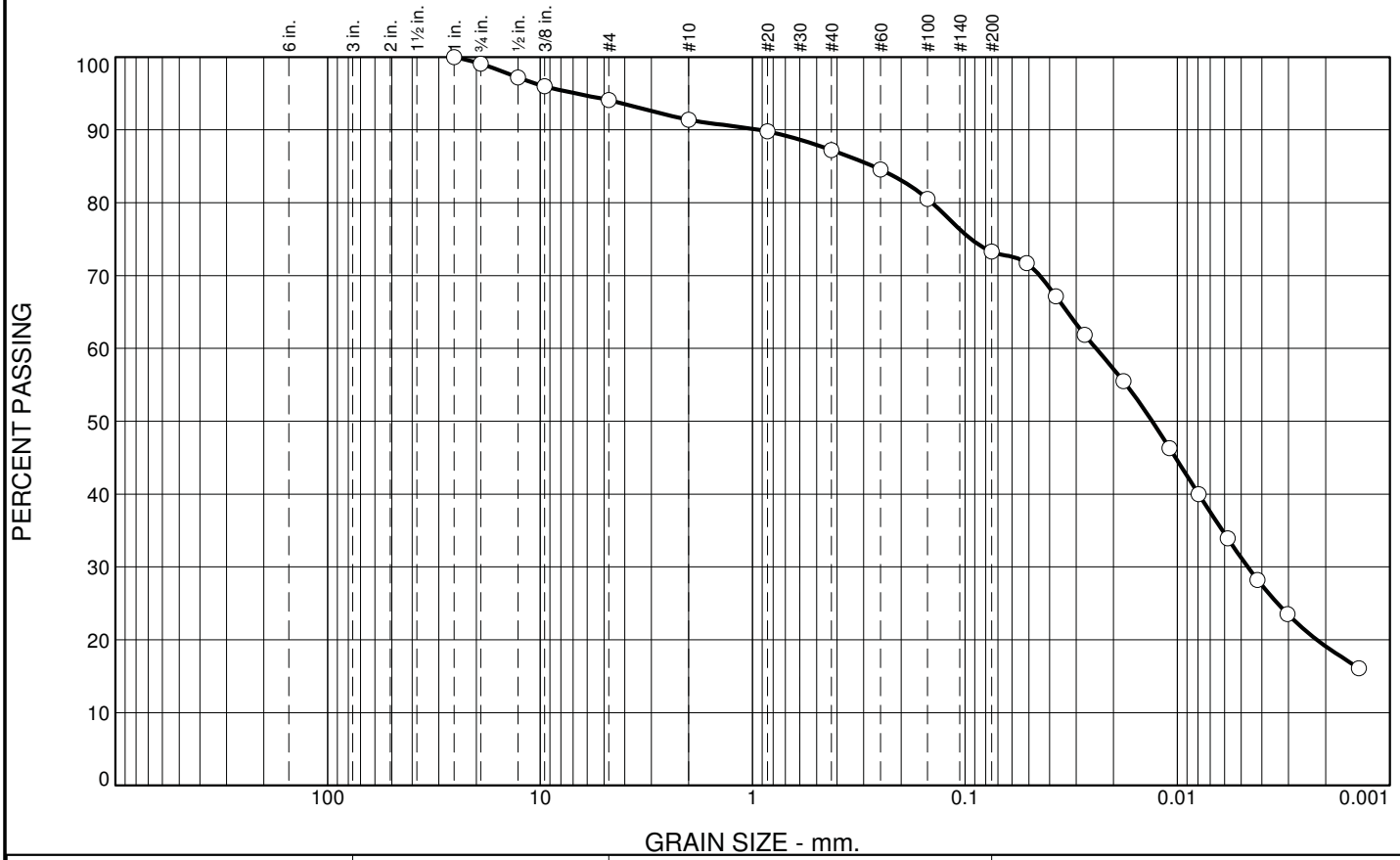
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.9	5.0	2.7	4.2	13.9	42.1	31.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
0.75	99.1		
0.5	97.2		
0.375	96.0		
#4	94.1		
#10	91.4		
#20	89.8		
#40	87.2		
#60	84.6		
#100	80.5		
#200	73.3		
0.0511 mm.	71.7		
0.0373 mm.	67.2		
0.0273 mm.	61.9		
0.0179 mm.	55.5		
0.0109 mm.	46.3		
0.0079 mm.	40.0		
0.0058 mm.	33.9		
0.0042 mm.	28.2		
0.0030 mm.	23.5		
0.0014 mm.	16.1		

* (no specification provided)

Soil Description

elastic SILT with sand

Atterberg Limits

PL= 39 LL= 53 PI= 14

Coefficients

D_{90}= 0.9360 D_{85}= 0.2698 D_{60}= 0.0242
D_{50}= 0.0131 D_{30}= 0.0047 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(12)

Remarks

Sample No.: TP14-301-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-301 **Elev./Depth:** 1.5-2.0m

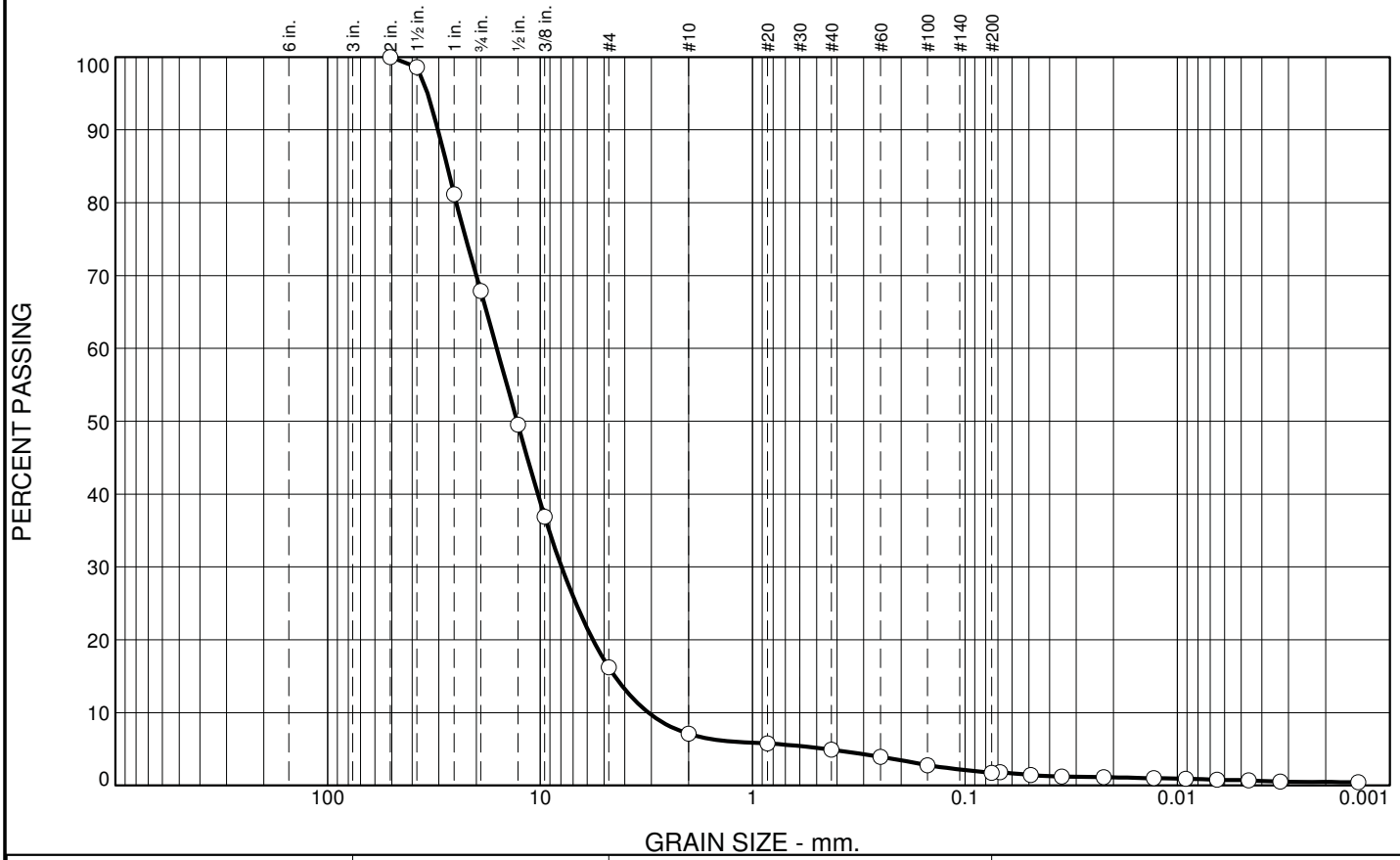
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	32.1	51.7	9.1	2.2	3.1	1.1	0.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	98.6		
1	81.1		
0.75	67.9		
0.5	49.5		
0.375	36.9		
#4	16.2		
#10	7.1		
#20	5.8		
#40	4.9		
#60	3.9		
#100	2.8		
#200	1.8		
0.0683 mm.	1.8		
0.0491 mm.	1.5		
0.0350 mm.	1.2		
0.0222 mm.	1.2		
0.0129 mm.	1.0		
0.0091 mm.	0.9		
0.0065 mm.	0.8		
0.0046 mm.	0.7		
0.0033 mm.	0.5		
0.0014 mm.	0.5		

* (no specification provided)

Soil Description

well-graded GRAVEL

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 30.2811 D_{85}= 27.4107 D_{60}= 15.9924
D_{50}= 12.8369 D_{30}= 7.9259 D_{15}= 4.4476
D_{10}= 3.0907 C_u= 5.17 C_c= 1.27

Classification

USCS= GW AASHTO= A-1-a

Remarks

Sample No.: TP14-306-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-306 **Elev./Depth:** 2-2.5m

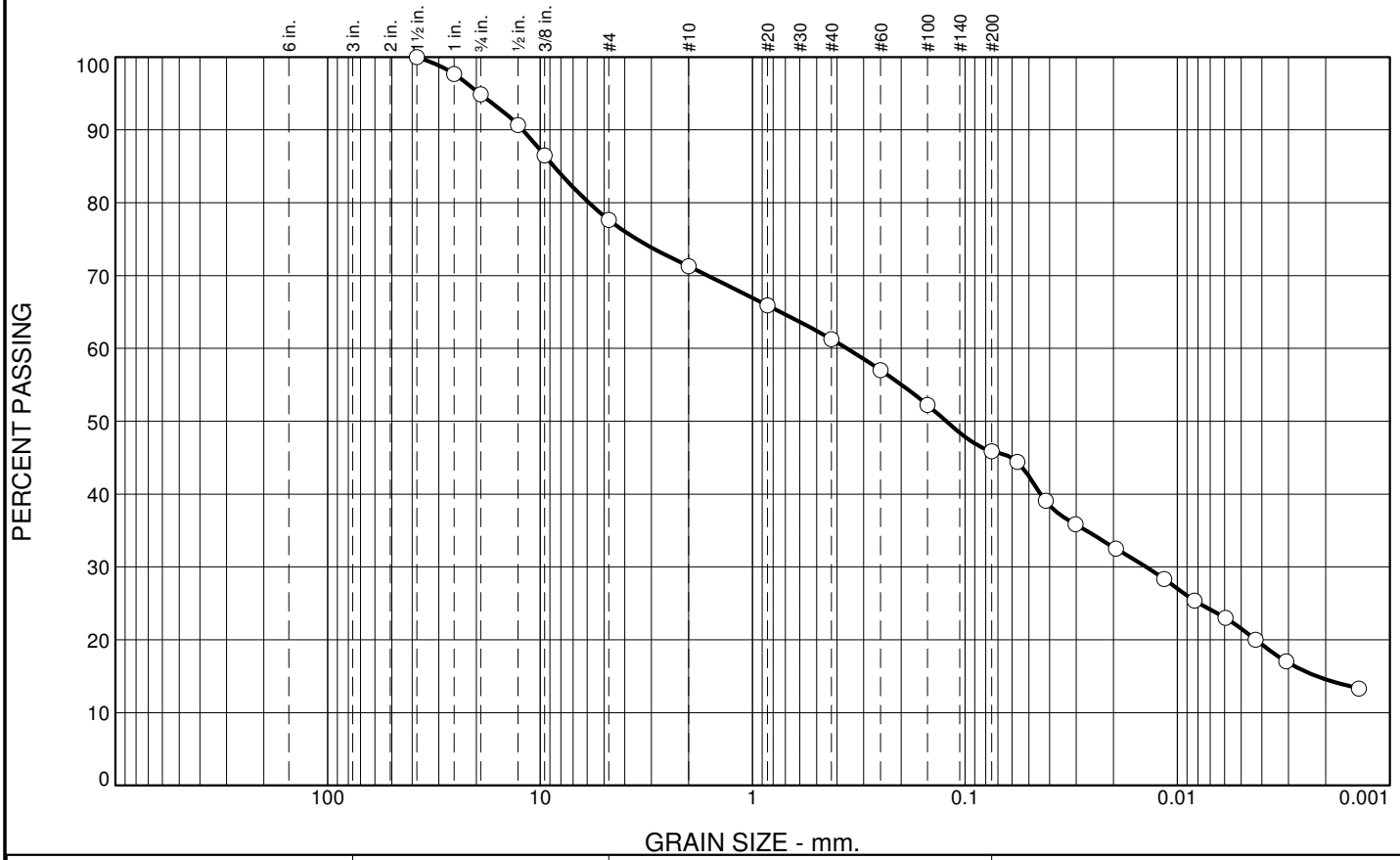
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.1	17.3	6.3	10.0	15.4	24.4	21.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	97.7		
0.75	94.9		
0.5	90.7		
0.375	86.5		
#4	77.6		
#10	71.3		
#20	65.9		
#40	61.3		
#60	57.0		
#100	52.2		
#200	45.9		
0.0567 mm.	44.4		
0.0417 mm.	39.1		
0.0301 mm.	35.9		
0.0195 mm.	32.5		
0.0115 mm.	28.3		
0.0083 mm.	25.4		
0.0059 mm.	23.0		
0.0043 mm.	20.0		
0.0031 mm.	17.0		
0.0014 mm.	13.3		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 14 LL= 28 PI= 14

Coefficients

D_{90}= 12.0787 D_{85}= 8.6155 D_{60}= 0.3591
D_{50}= 0.1227 D_{30}= 0.0140 D_{15}= 0.0022
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(3)

Remarks

Sample No.: TP14-343-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-343 **Elev./Depth:** 4.2-4.3m

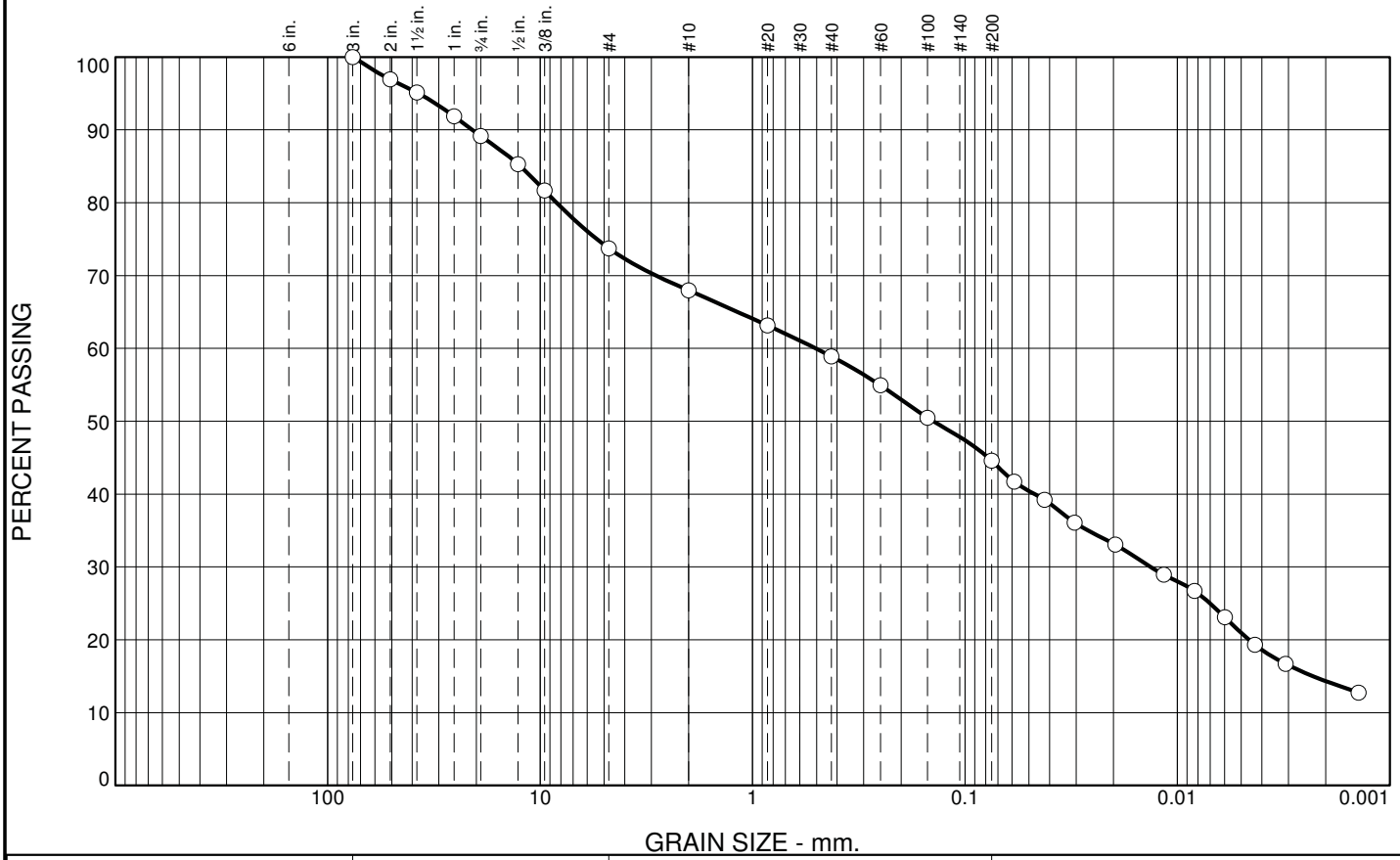
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.9	15.4	5.7	9.1	14.3	23.7	20.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	96.9		
1.5	95.1		
1	91.9		
0.75	89.1		
0.5	85.3		
0.375	81.7		
#4	73.7		
#10	68.0		
#20	63.1		
#40	58.9		
#60	54.9		
#100	50.5		
#200	44.6		
0.0587 mm.	41.7		
0.0422 mm.	39.2		
0.0304 mm.	36.1		
0.0196 mm.	33.1		
0.0116 mm.	28.9		
0.0083 mm.	26.7		
0.0060 mm.	23.1		
0.0043 mm.	19.3		
0.0031 mm.	16.7		
0.0014 mm.	12.8		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 15 LL= 27 PI= 12

Coefficients

D_{90}= 20.8847 D_{85}= 12.3833 D_{60}= 0.5035
D_{50}= 0.1408 D_{30}= 0.0134 D_{15}= 0.0023
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

Sample No.: TP14-344-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-344 **Elev./Depth:** 3.8-3.9m

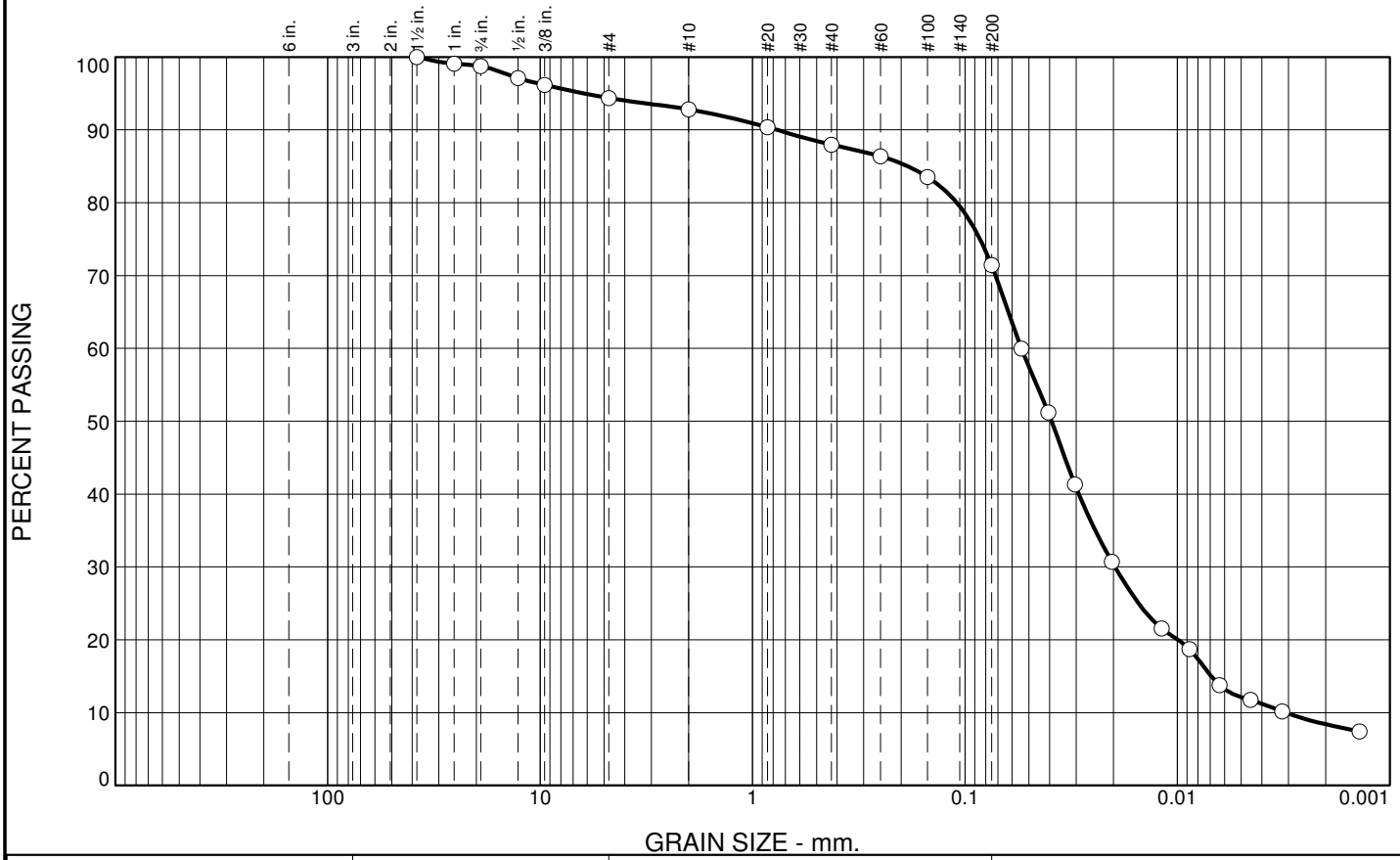
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.3	4.3	1.6	4.8	16.6	59.3	12.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	99.1		
0.75	98.7		
0.5	97.1		
0.375	96.2		
#4	94.4		
#10	92.8		
#20	90.3		
#40	88.0		
#60	86.4		
#100	83.5		
#200	71.4		
0.0542 mm.	60.0		
0.0406 mm.	51.2		
0.0304 mm.	41.3		
0.0203 mm.	30.7		
0.0119 mm.	21.5		
0.0088 mm.	18.7		
0.0063 mm.	13.8		
0.0045 mm.	11.8		
0.0032 mm.	10.2		
0.0014 mm.	7.4		

* (no specification provided)

Soil Description

SILT with sand

Atterberg Limits

PL= 20 LL= 22 PI= 2

Coefficients

D_{90}= 0.7701 D_{85}= 0.1862 D_{60}= 0.0542
D_{50}= 0.0391 D_{30}= 0.0196 D_{15}= 0.0069
D_{10}= 0.0031 C_u= 17.51 C_c= 2.30

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample No.: TP14-346-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-346 **Elev./Depth:** 4-4.5m

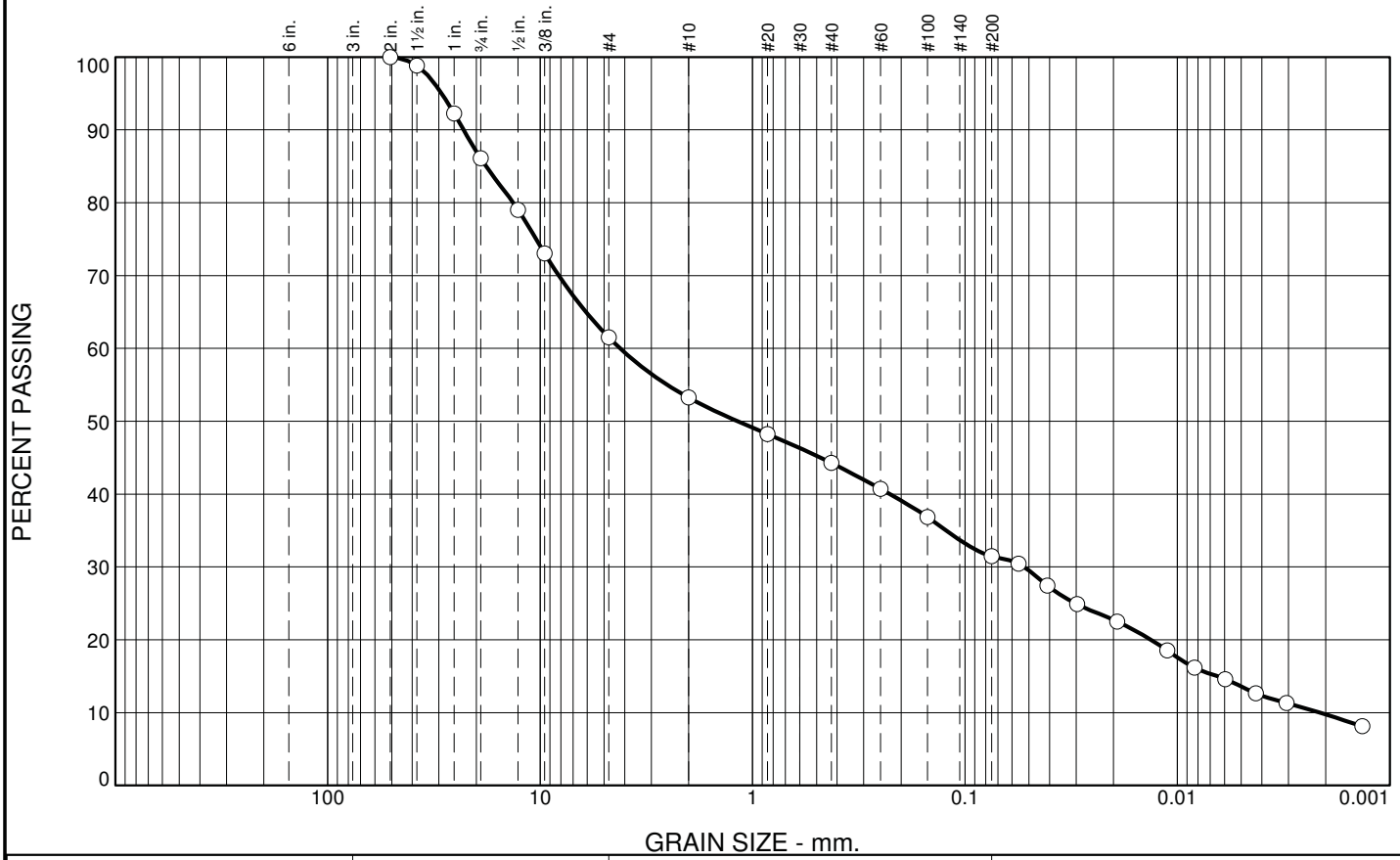
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.9	24.6	8.2	9.0	12.8	17.9	13.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
1.5	98.8		
1	92.2		
0.75	86.1		
0.5	79.0		
0.375	73.0		
#4	61.5		
#10	53.3		
#20	48.3		
#40	44.3		
#60	40.7		
#100	36.8		
#200	31.5		
0.0560 mm.	30.4		
0.0409 mm.	27.4		
0.0297 mm.	24.9		
0.0192 mm.	22.5		
0.0112 mm.	18.5		
0.0083 mm.	16.2		
0.0060 mm.	14.6		
0.0043 mm.	12.6		
0.0031 mm.	11.3		
0.0013 mm.	8.1		

* (no specification provided)

Soil Description

clayey GRAVEL with sand

Atterberg Limits

PL= 13 LL= 22 PI= 9

Coefficients

D_{90}= 22.9306 D_{85}= 17.9780 D_{60}= 4.2000
D_{50}= 1.1755 D_{30}= 0.0527 D_{15}= 0.0065
D_{10}= 0.0021 C_u= 1970.45 C_c= 0.31

Classification

USCS= GC AASHTO= A-2-4(0)

Remarks

Sample No.: TP14-369-1 **Source of Sample:** **Date:** 1/7/15
Location: TP14-369 **Elev./Depth:** 4.5-4.8m

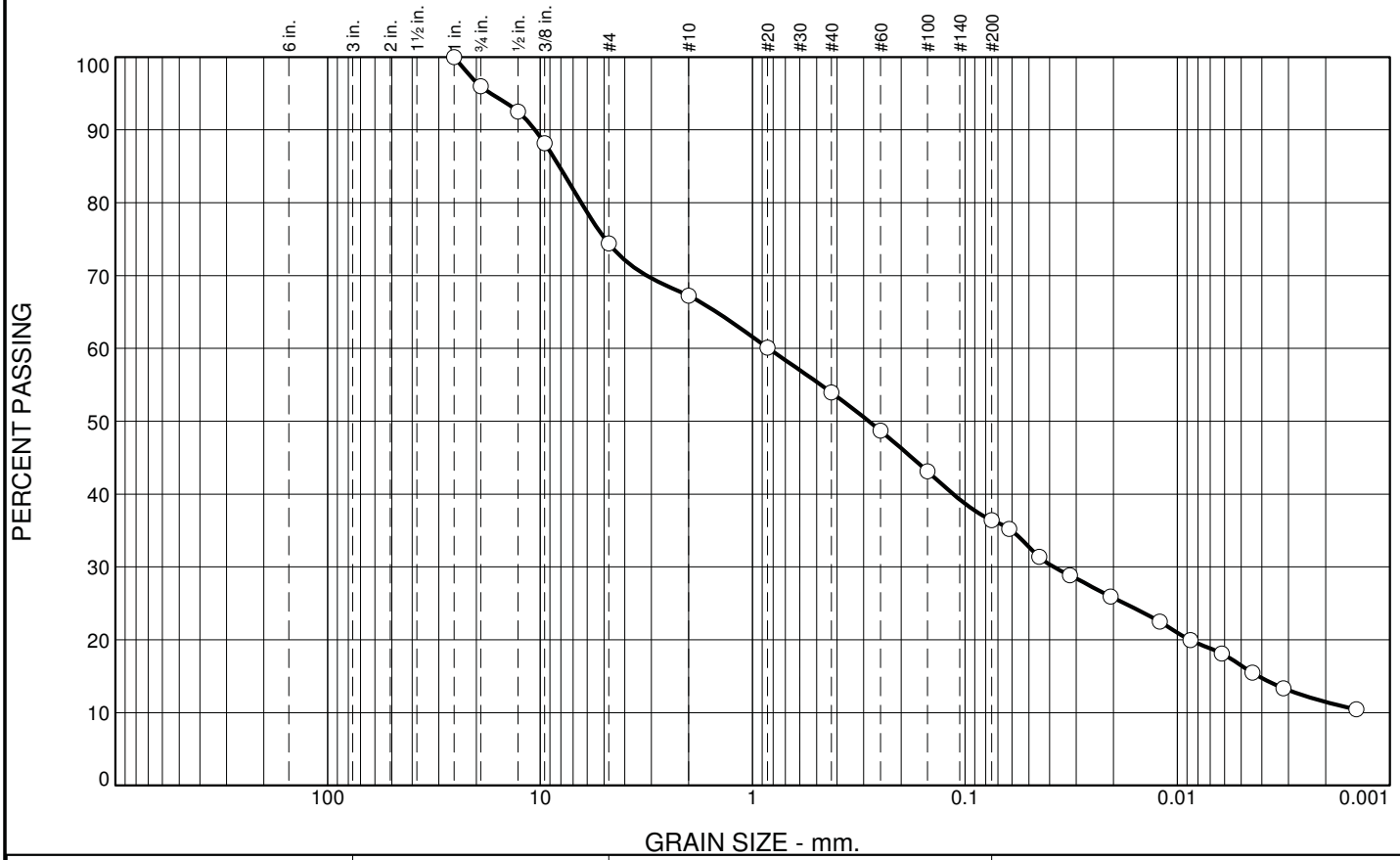
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.0	21.6	7.2	13.3	17.5	24.9	11.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	96.0		
.5	92.5		
0.375	88.2		
#4	74.4		
#10	67.2		
#20	60.1		
#40	53.9		
#60	48.7		
#100	43.1		
#200	36.4		
0.0619 mm.	35.2		
0.0447 mm.	31.4		
0.0321 mm.	28.9		
0.0206 mm.	25.9		
0.0121 mm.	22.5		
0.0087 mm.	20.0		
0.0062 mm.	18.1		
0.0044 mm.	15.5		
0.0032 mm.	13.4		
0.0014 mm.	10.5		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 13 LL= 27 PI= 14

Coefficients

D_{90}= 10.5831 D_{85}= 8.1201 D_{60}= 0.8409
D_{50}= 0.2836 D_{30}= 0.0382 D_{15}= 0.0041
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(1)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-052 SPT#8 **Elev./Depth:** 12.19-12.62m

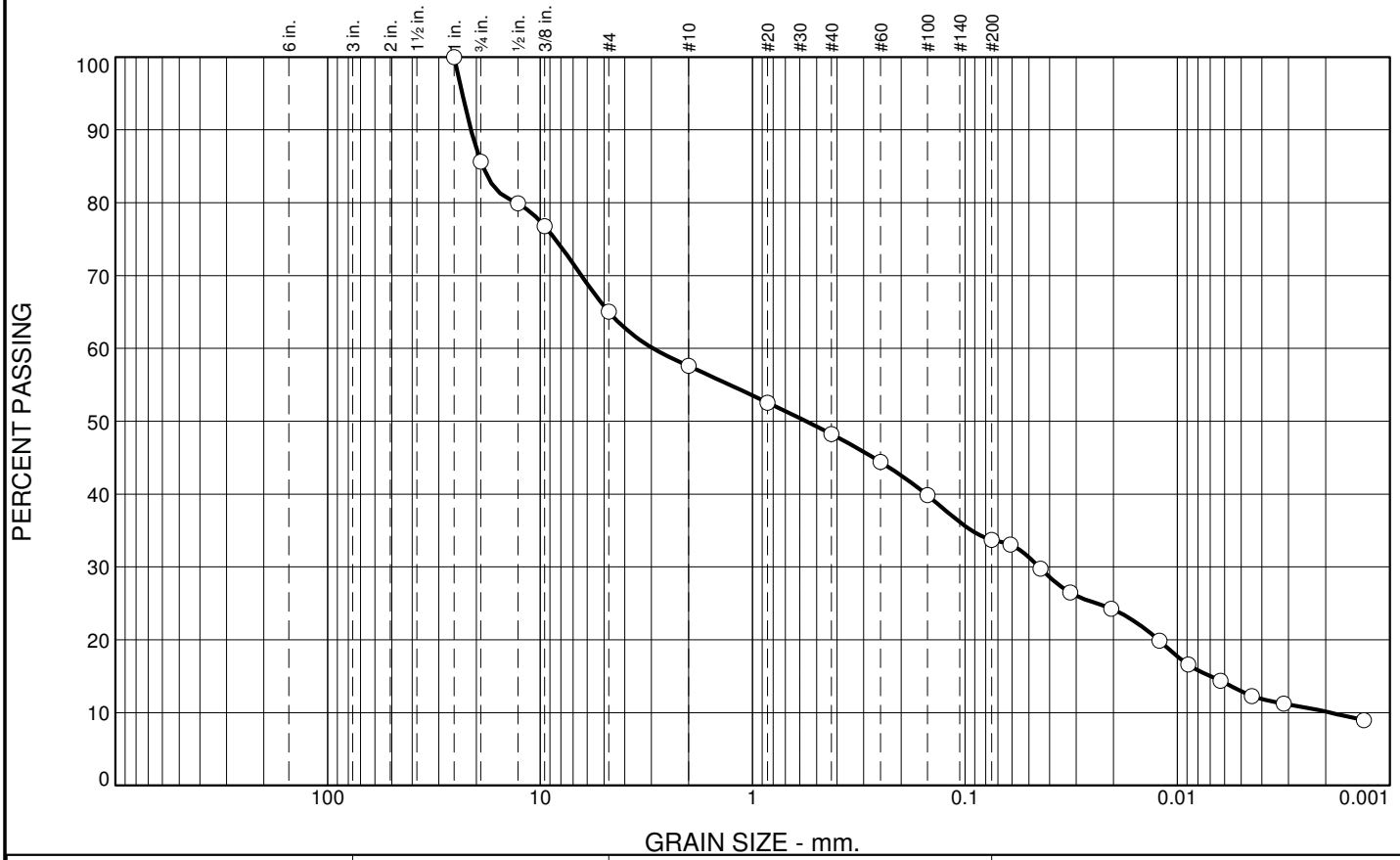
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.4	20.6	7.4	9.4	14.5	23.6	10.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	85.6		
.5	79.9		
0.375	76.8		
#4	65.0		
#10	57.6		
#20	52.6		
#40	48.2		
#60	44.4		
#100	39.8		
#200	33.7		
0.0610 mm.	33.1		
0.0441 mm.	29.8		
0.0319 mm.	26.5		
0.0205 mm.	24.3		
0.0121 mm.	19.9		
0.0089 mm.	16.6		
0.0063 mm.	14.4		
0.0045 mm.	12.3		
0.0032 mm.	11.3		
0.0013 mm.	9.0		

* (no specification provided)

Soil Description

clayey GRAVEL with sand

Atterberg Limits

PL= 13 LL= 24 PI= 11

Coefficients

D_{90}= 21.1479 D_{85}= 18.6827 D_{60}= 2.9421
D_{50}= 0.5583 D_{30}= 0.0449 D_{15}= 0.0070
D_{10}= 0.0019 C_u= 1541.26 C_c= 0.36

Classification

USCS= GC AASHTO= A-2-6(0)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-052 SPT#10 **Elev./Depth:** 15.24-15.52m

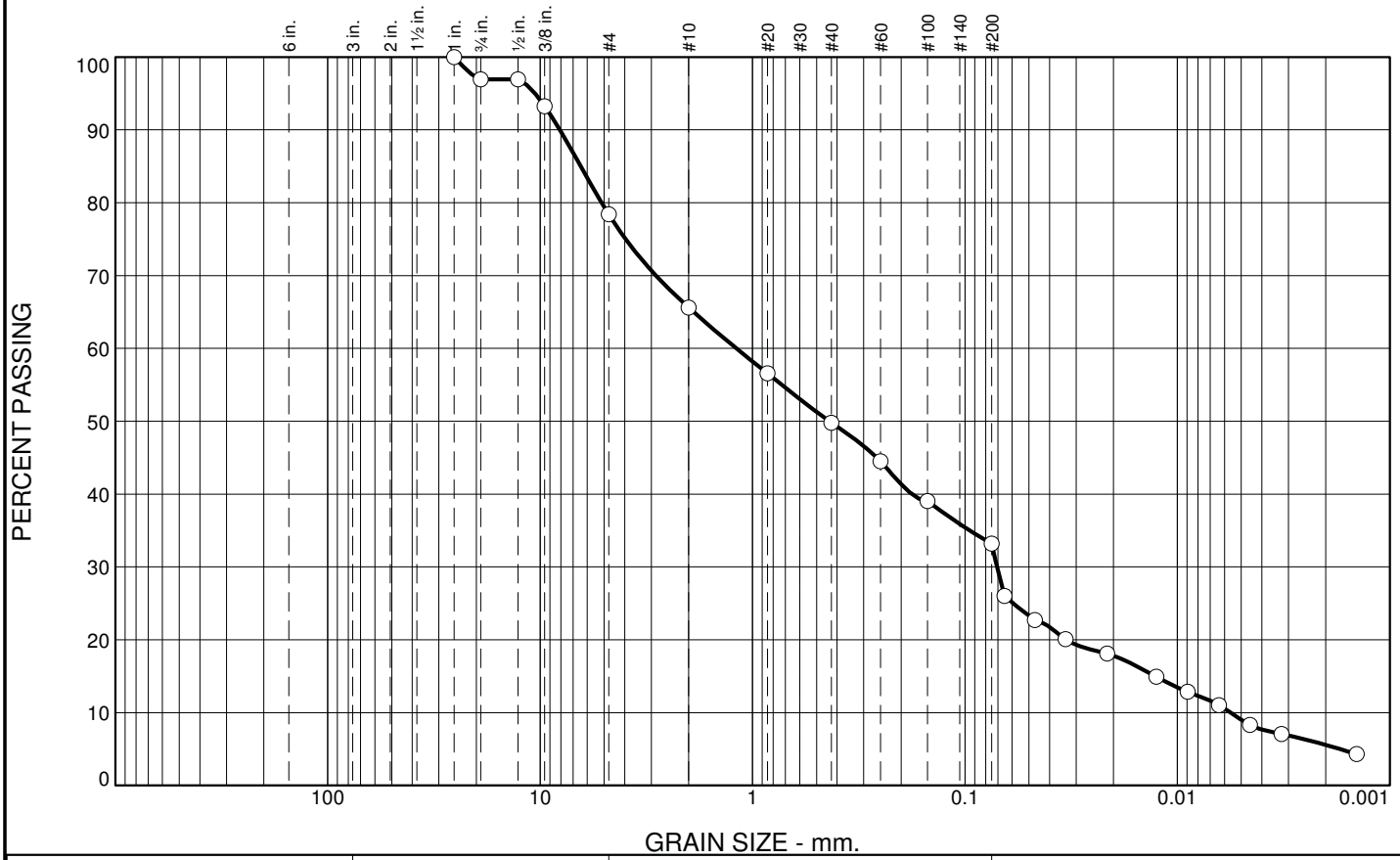
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.1	18.5	12.8	15.8	16.6	27.6	5.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	96.9		
.5	96.9		
0.375	93.3		
#4	78.4		
#10	65.6		
#20	56.6		
#40	49.8		
#60	44.5		
#100	39.1		
#200	33.2		
0.0652 mm.	26.0		
0.0469 mm.	22.7		
0.0336 mm.	20.1		
0.0214 mm.	18.1		
0.0126 mm.	14.9		
0.0090 mm.	12.9		
0.0064 mm.	11.0		
0.0046 mm.	8.3		
0.0032 mm.	7.1		
0.0014 mm.	4.3		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 12 LL= 25 PI= 13

Coefficients

D_{90}= 8.0787 D_{85}= 6.4388 D_{60}= 1.1903
D_{50}= 0.4348 D_{30}= 0.0706 D_{15}= 0.0127
D_{10}= 0.0056 C_u= 212.07 C_c= 0.75

Classification

USCS= SC AASHTO= A-2-6(1)

Remarks

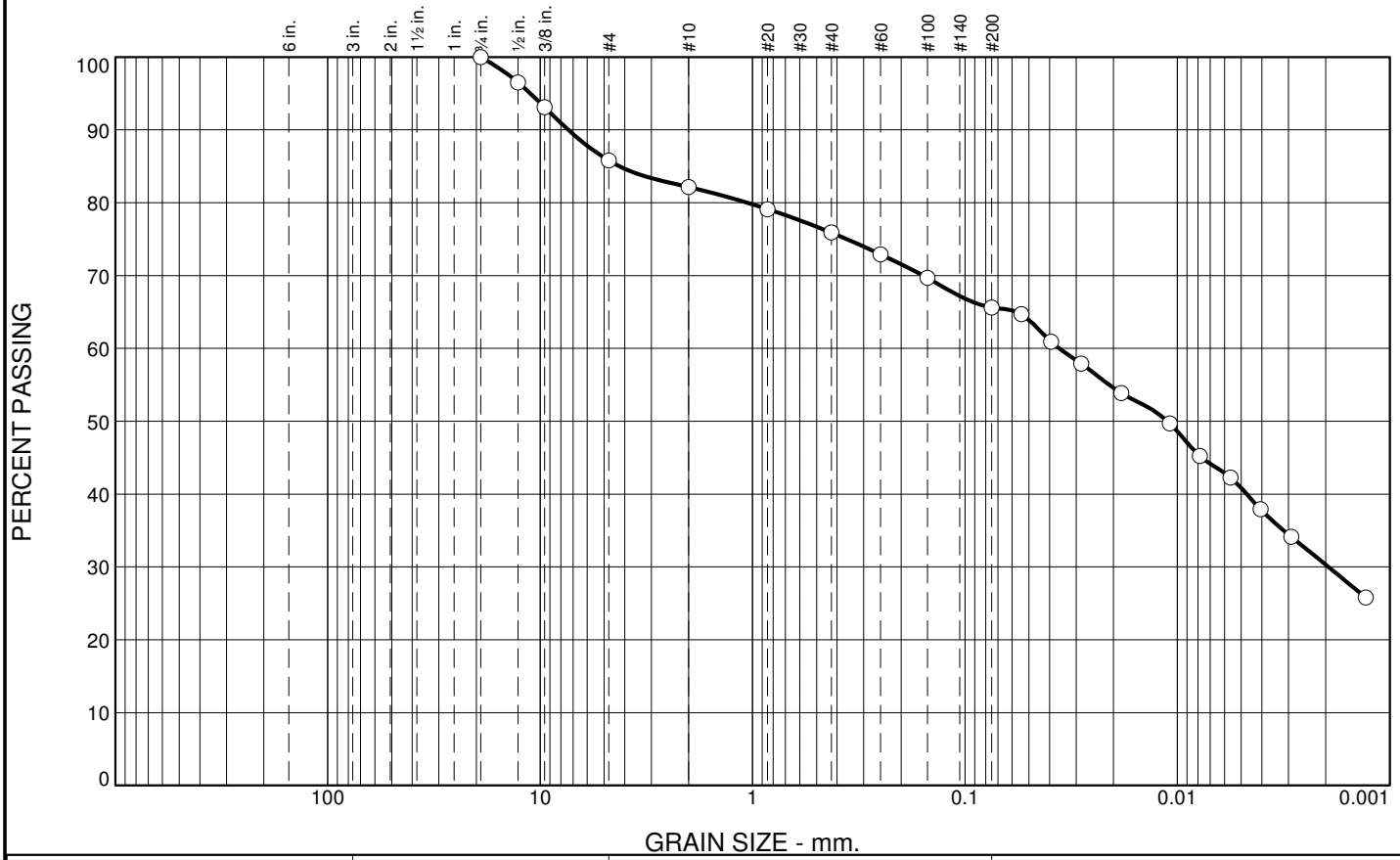
Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-052 SPT#14 **Elev./Depth:** 27.43-27.95m

Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine
Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.2	3.7	6.2	10.3	35.3	30.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	96.5		
0.375	93.1		
#4	85.8		
#10	82.1		
#20	79.1		
#40	75.9		
#60	72.9		
#100	69.7		
#200	65.6		
0.0543 mm.	64.7		
0.0393 mm.	60.9		
0.0283 mm.	57.9		
0.0184 mm.	53.9		
0.0108 mm.	49.7		
0.0078 mm.	45.2		
0.0056 mm.	42.3		
0.0041 mm.	37.9		
0.0029 mm.	34.2		
0.0013 mm.	25.8		

* (no specification provided)

Soil Description

sandy lean CLAY

Atterberg Limits

PL= 15 LL= 39 PI= 24

Coefficients

D_{90}= 7.3619 D_{85}= 4.2356 D_{60}= 0.0360
D_{50}= 0.0111 D_{30}= 0.0019 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-054 SPT#6 **Elev./Depth:** 9.14-9.75m

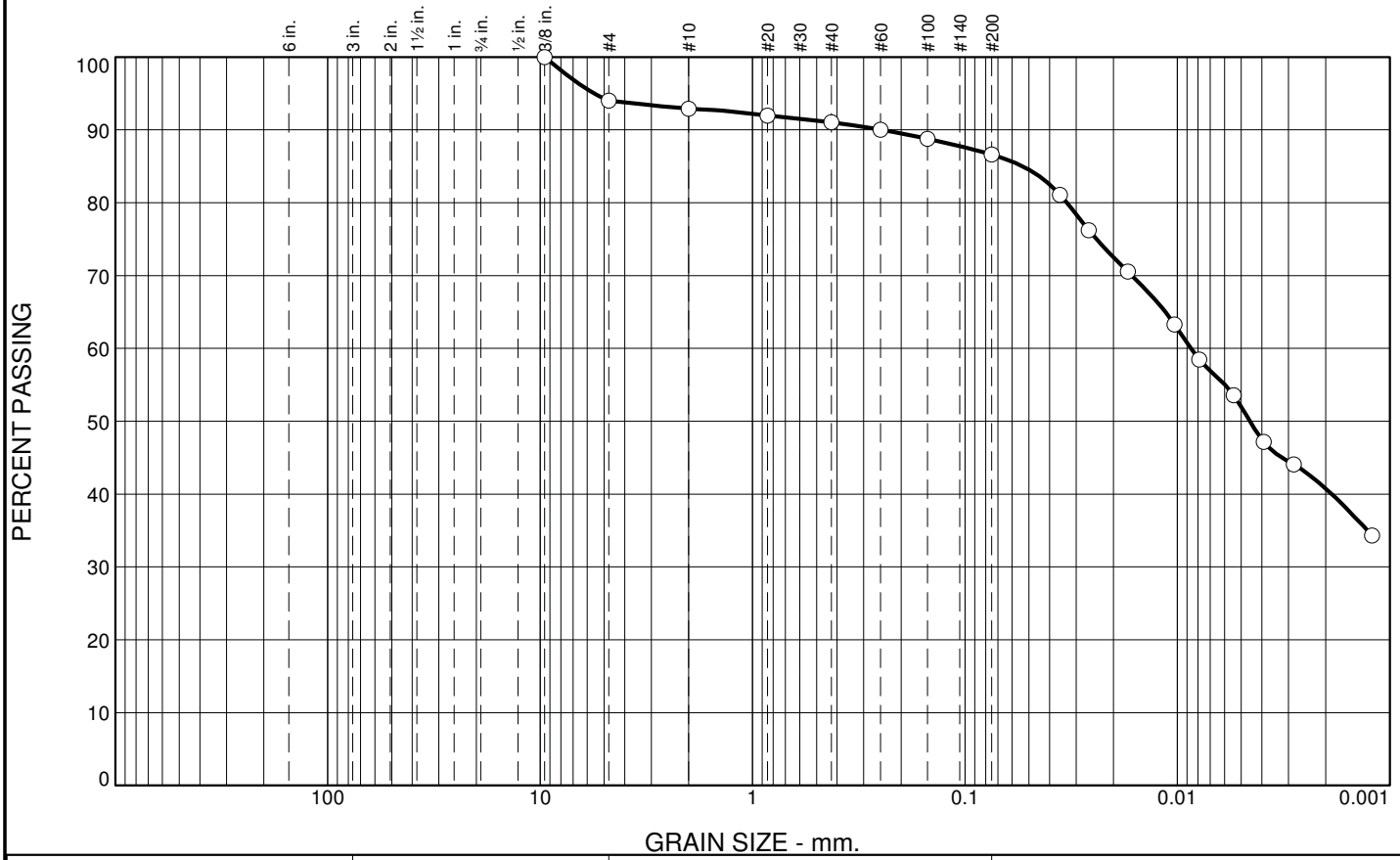
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.0	1.1	1.9	4.4	45.9	40.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	94.0		
#10	92.9		
#20	92.0		
#40	91.0		
#60	90.0		
#100	88.8		
#200	86.6		
0.0357 mm.	81.1		
0.0261 mm.	76.2		
0.0171 mm.	70.6		
0.0103 mm.	63.3		
0.0079 mm.	58.5		
0.0054 mm.	53.6		
0.0039 mm.	47.2		
0.0028 mm.	44.1		
0.0012 mm.	34.3		

* (no specification provided)

Soil Description

lean CLAY

Atterberg Limits

PL= 15 LL= 35 PI= 20

Coefficients

D_{90}= 0.2467 D_{85}= 0.0536 D_{60}= 0.0086
D_{50}= 0.0046 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-054 SPT#10 **Elev./Depth:** 15.24-15.85m

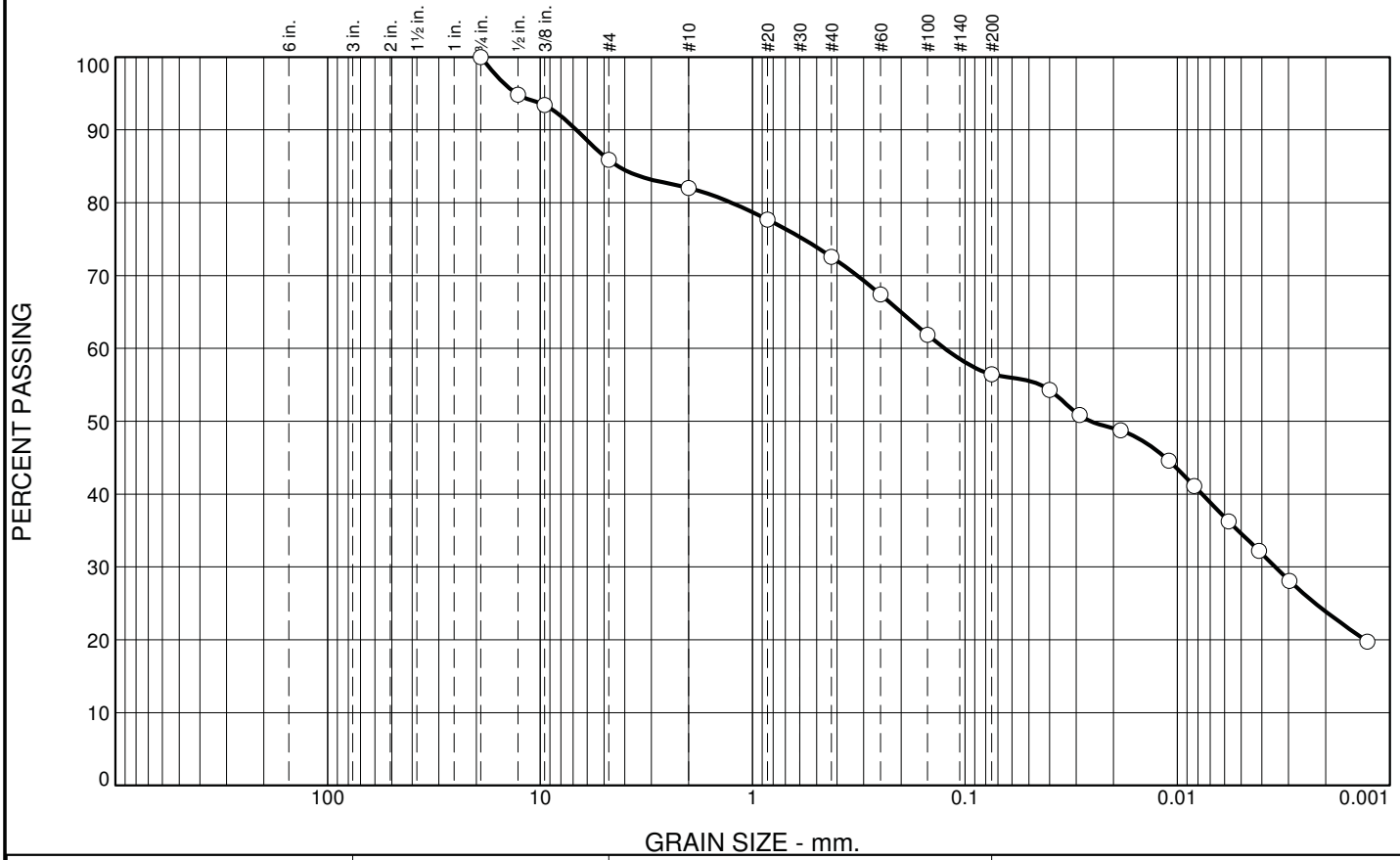
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.1	3.9	9.4	16.1	32.6	23.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	94.8		
0.375	93.4		
#4	85.9		
#10	82.0		
#20	77.7		
#40	72.6		
#60	67.4		
#100	61.9		
#200	56.5		
0.0400 mm.	54.3		
0.0289 mm.	50.8		
0.0185 mm.	48.8		
0.0110 mm.	44.6		
0.0083 mm.	41.1		
0.0057 mm.	36.3		
0.0041 mm.	32.2		
0.0030 mm.	28.1		
0.0013 mm.	19.8		

* (no specification provided)

Soil Description

sandy lean CLAY

Atterberg Limits

PL= 14 LL= 40 PI= 26

Coefficients

D_{90}= 6.7614 D_{85}= 4.2907 D_{60}= 0.1247
D_{50}= 0.0256 D_{30}= 0.0035 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-054 SPT#12 **Elev./Depth:** 21.33-21.94m

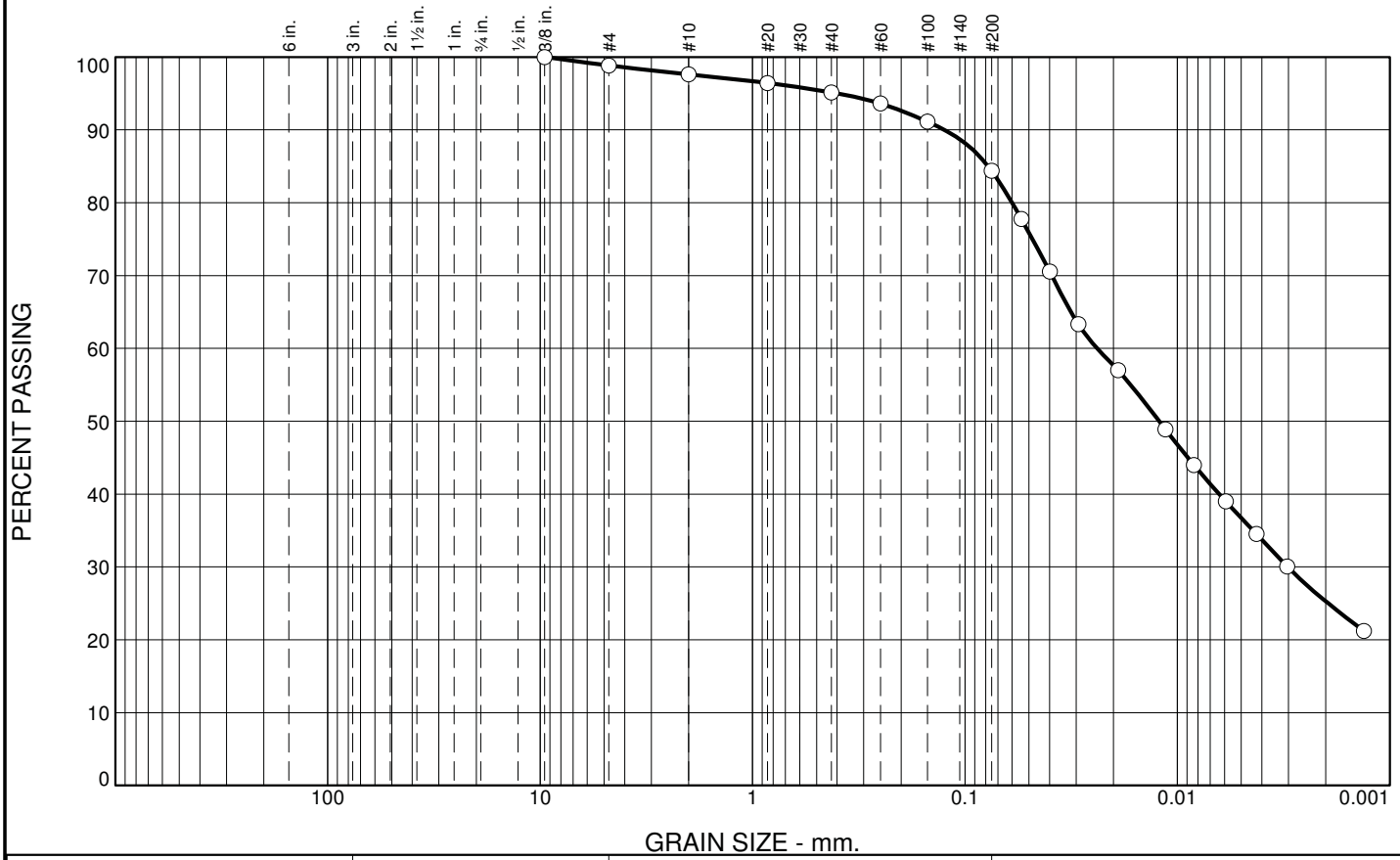
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	1.2	2.5	10.7	59.1	25.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	98.8		
#10	97.6		
#20	96.4		
#40	95.1		
#60	93.6		
#100	91.1		
#200	84.4		
0.0543 mm.	77.8		
0.0399 mm.	70.5		
0.0292 mm.	63.3		
0.0190 mm.	57.0		
0.0114 mm.	48.9		
0.0083 mm.	44.0		
0.0059 mm.	39.0		
0.0042 mm.	34.5		
0.0030 mm.	30.1		
0.0013 mm.	21.2		

* (no specification provided)

Soil Description

lean CLAY with sand

Atterberg Limits

PL= 16 LL= 28 PI= 12

Coefficients

D_{90}= 0.1250 D_{85}= 0.0778 D_{60}= 0.0238
D_{50}= 0.0122 D_{30}= 0.0030 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-054 SPT#16 **Elev./Depth:** 33.53-34.14m

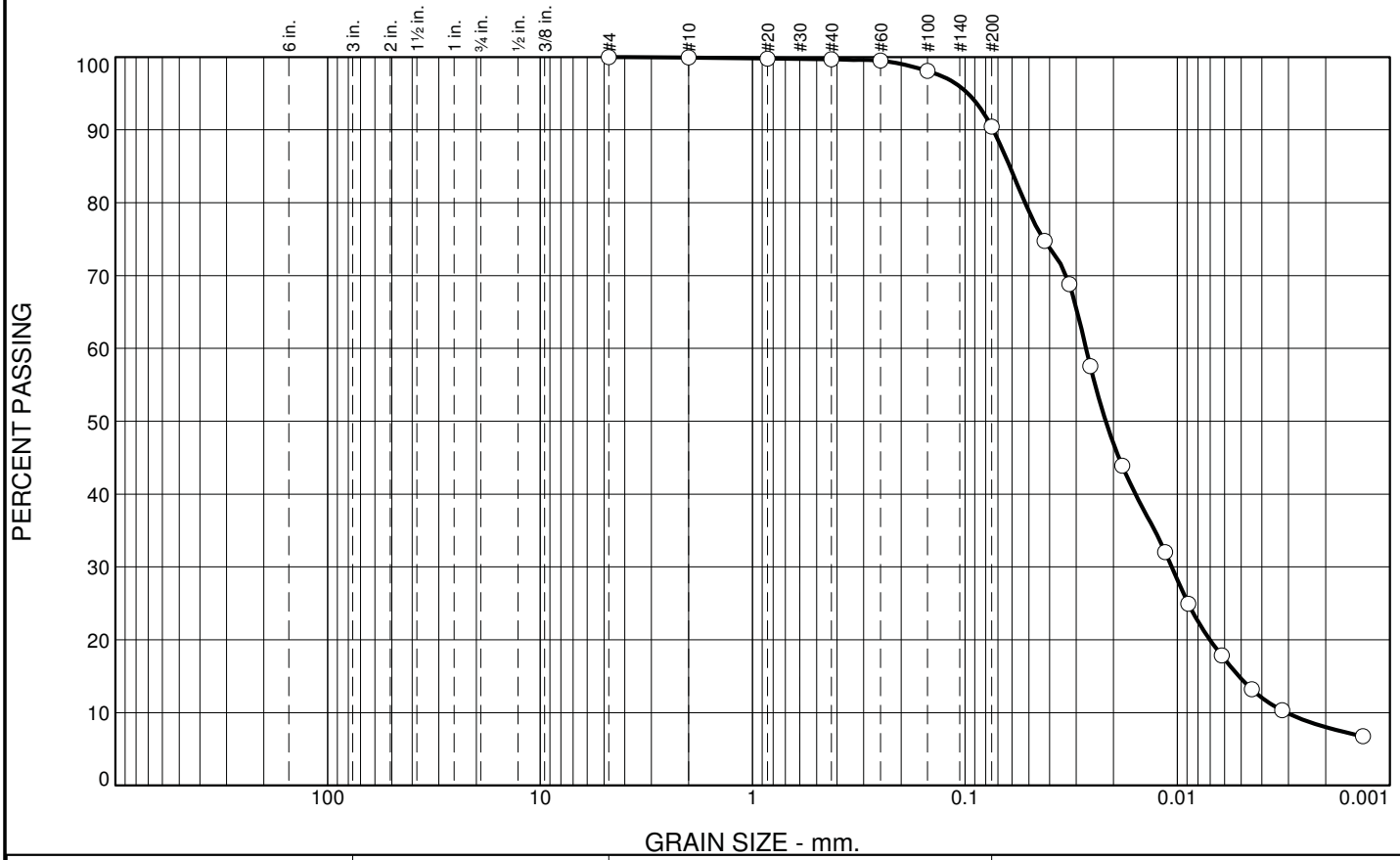
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.2	9.3	82.4	8.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.8		
#40	99.7		
#60	99.5		
#100	98.1		
#200	90.4		
0.0423 mm.	74.8		
0.0323 mm.	68.8		
0.0257 mm.	57.6		
0.0182 mm.	43.9		
0.0114 mm.	32.1		
0.0089 mm.	24.9		
0.0062 mm.	17.9		
0.0045 mm.	13.2		
0.0032 mm.	10.3		
0.0013 mm.	6.8		

* (no specification provided)

Soil Description

SILT

Atterberg Limits

PL= 20 LL= 21 PI= 1

Coefficients

D_{90}= 0.0737 D_{85}= 0.0616 D_{60}= 0.0269
D_{50}= 0.0217 D_{30}= 0.0106 D_{15}= 0.0051
D_{10}= 0.0030 C_u= 8.82 C_c= 1.37

Classification

USCS= ML AASHTO= A-4(0)

Remarks

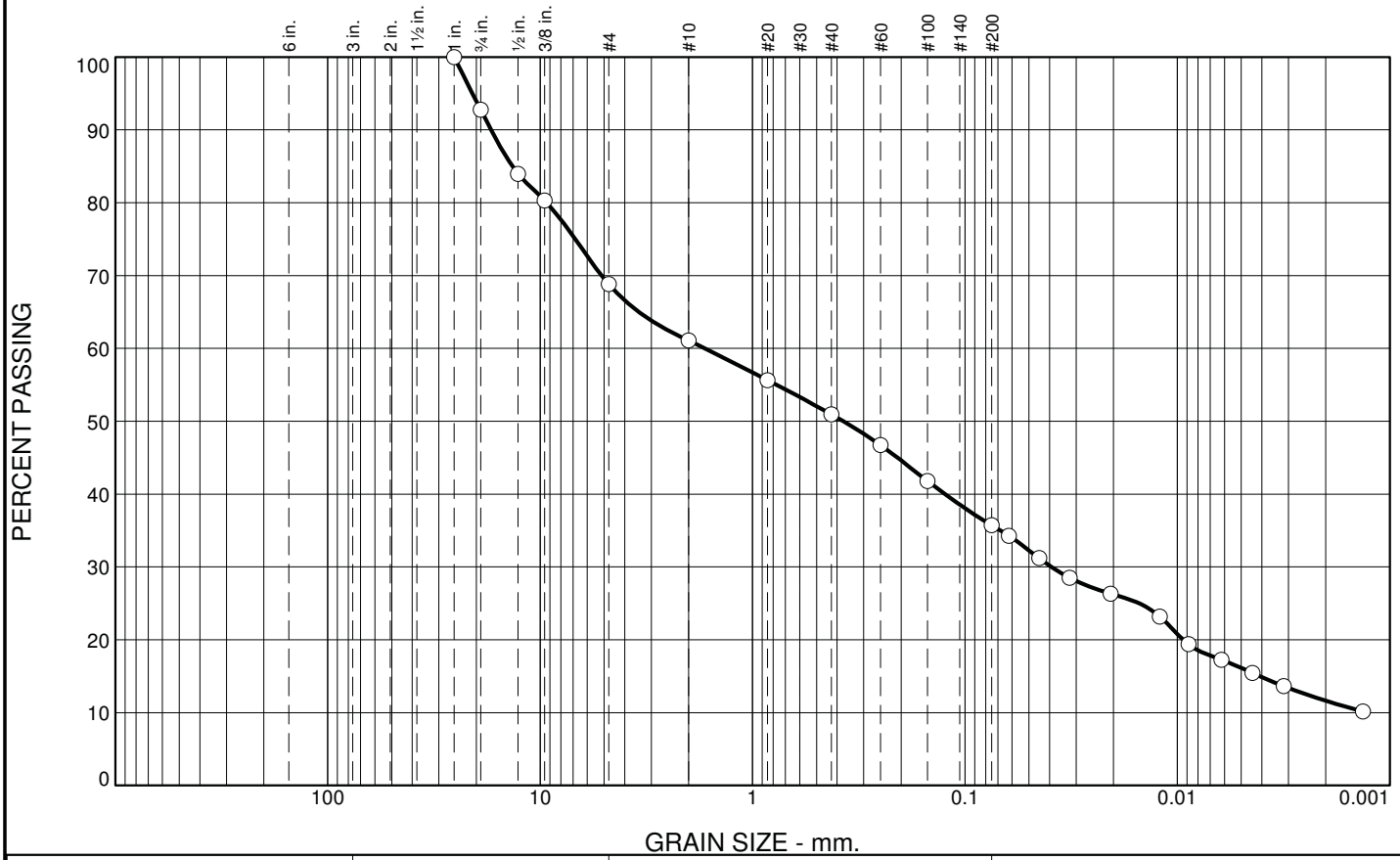
Sample No.: **Source of Sample:** **Date:** 2/9/15
Location: DH14-054 SPT#18 **Elev./Depth:** 39.62-4.2m

Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine
Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.2	24.0	7.7	10.2	15.2	24.1	11.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	92.8		
.5	84.0		
0.375	80.3		
#4	68.8		
#10	61.1		
#20	55.6		
#40	50.9		
#60	46.7		
#100	41.8		
#200	35.7		
0.0621 mm.	34.3		
0.0447 mm.	31.2		
0.0321 mm.	28.5		
0.0206 mm.	26.3		
0.0121 mm.	23.2		
0.0089 mm.	19.4		
0.0062 mm.	17.3		
0.0044 mm.	15.4		
0.0032 mm.	13.6		
0.0013 mm.	10.1		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 14 LL= 23 PI= 9

Coefficients

D_{90}= 17.0318 D_{85}= 13.4991 D_{60}= 1.6828
D_{50}= 0.3738 D_{30}= 0.0390 D_{15}= 0.0041
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-4(0)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#4 **Elev./Depth:** 6.1-6.71m

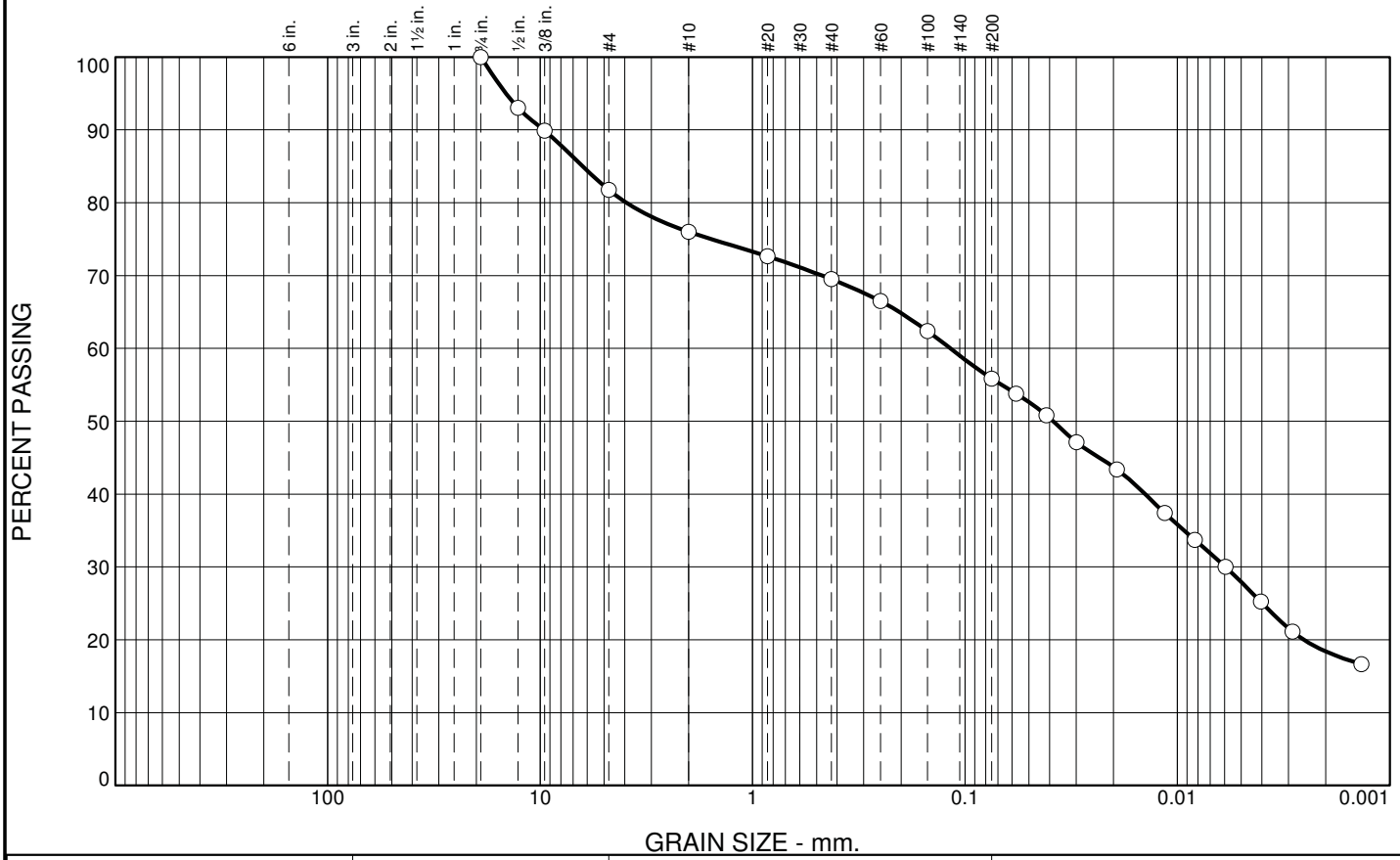
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.2	5.8	6.5	13.6	37.5	18.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	93.0		
0.375	89.9		
#4	81.8		
#10	76.0		
#20	72.6		
#40	69.5		
#60	66.5		
#100	62.4		
#200	55.9		
0.0575 mm.	53.8		
0.0414 mm.	50.8		
0.0299 mm.	47.1		
0.0193 mm.	43.4		
0.0115 mm.	37.4		
0.0083 mm.	33.7		
0.0059 mm.	30.0		
0.0040 mm.	25.2		
0.0029 mm.	21.1		
0.0014 mm.	16.6		

* (no specification provided)

Soil Description

sandy lean CLAY with gravel

Atterberg Limits

PL= 15 LL= 27 PI= 12

Coefficients

D_{90}= 9.6244 D_{85}= 6.3046 D_{60}= 0.1172
D_{50}= 0.0385 D_{30}= 0.0059 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(4)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#6 **Elev./Depth:** 9.14-9.55m

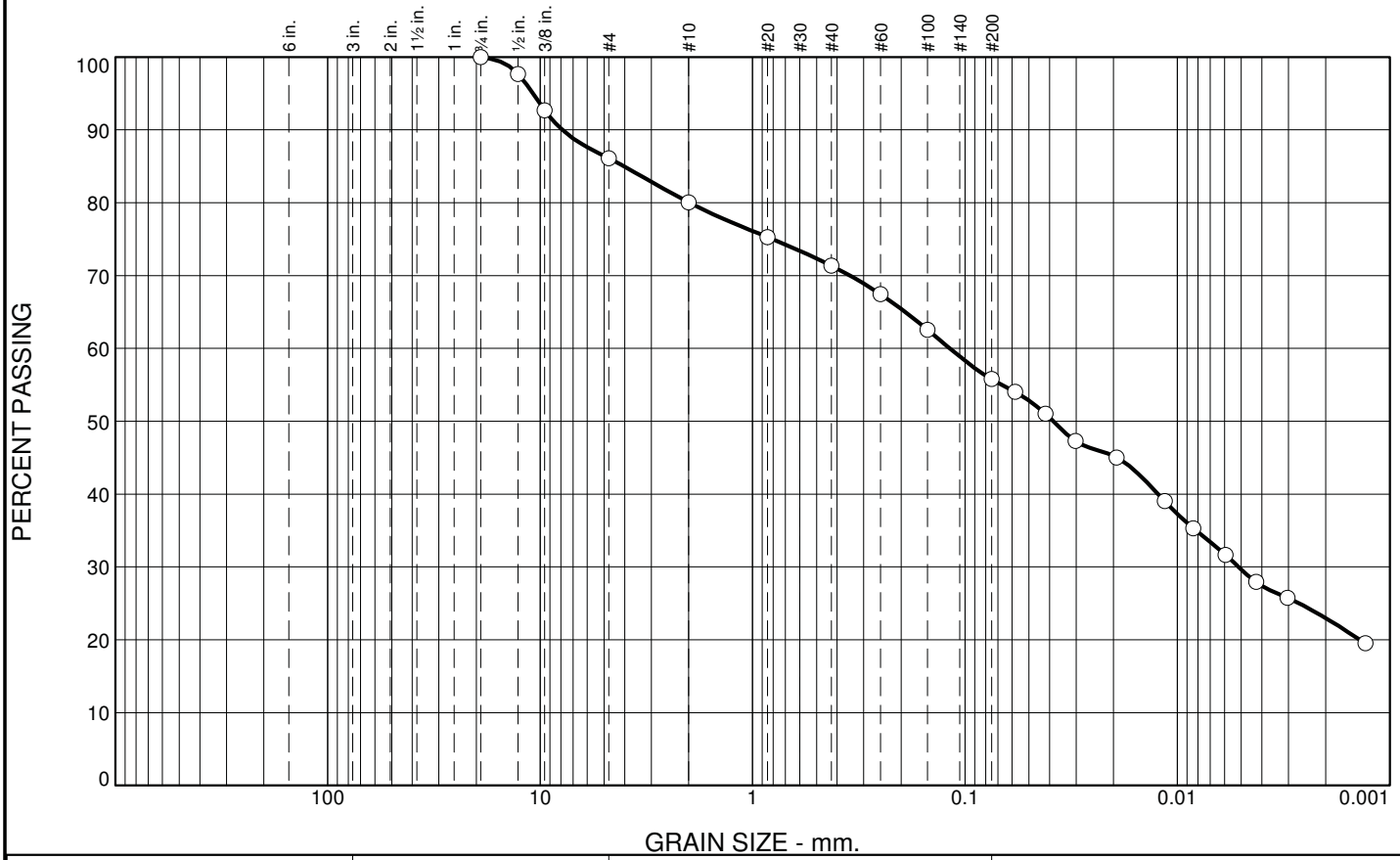
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.9	6.1	8.7	15.5	32.8	23.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.7		
0.375	92.7		
#4	86.1		
#10	80.0		
#20	75.3		
#40	71.3		
#60	67.4		
#100	62.6		
#200	55.8		
0.0581 mm.	54.0		
0.0418 mm.	51.0		
0.0302 mm.	47.3		
0.0193 mm.	45.0		
0.0115 mm.	39.1		
0.0084 mm.	35.3		
0.0059 mm.	31.7		
0.0043 mm.	27.9		
0.0030 mm.	25.8		
0.0013 mm.	19.5		

* (no specification provided)

Soil Description

sandy lean CLAY

Atterberg Limits

PL= 14 LL= 32 PI= 18

Coefficients

D_{90}= 7.8537 D_{85}= 4.0325 D_{60}= 0.1178
D_{50}= 0.0384 D_{30}= 0.0051 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#10 **Elev./Depth:** 15.24-15.85m

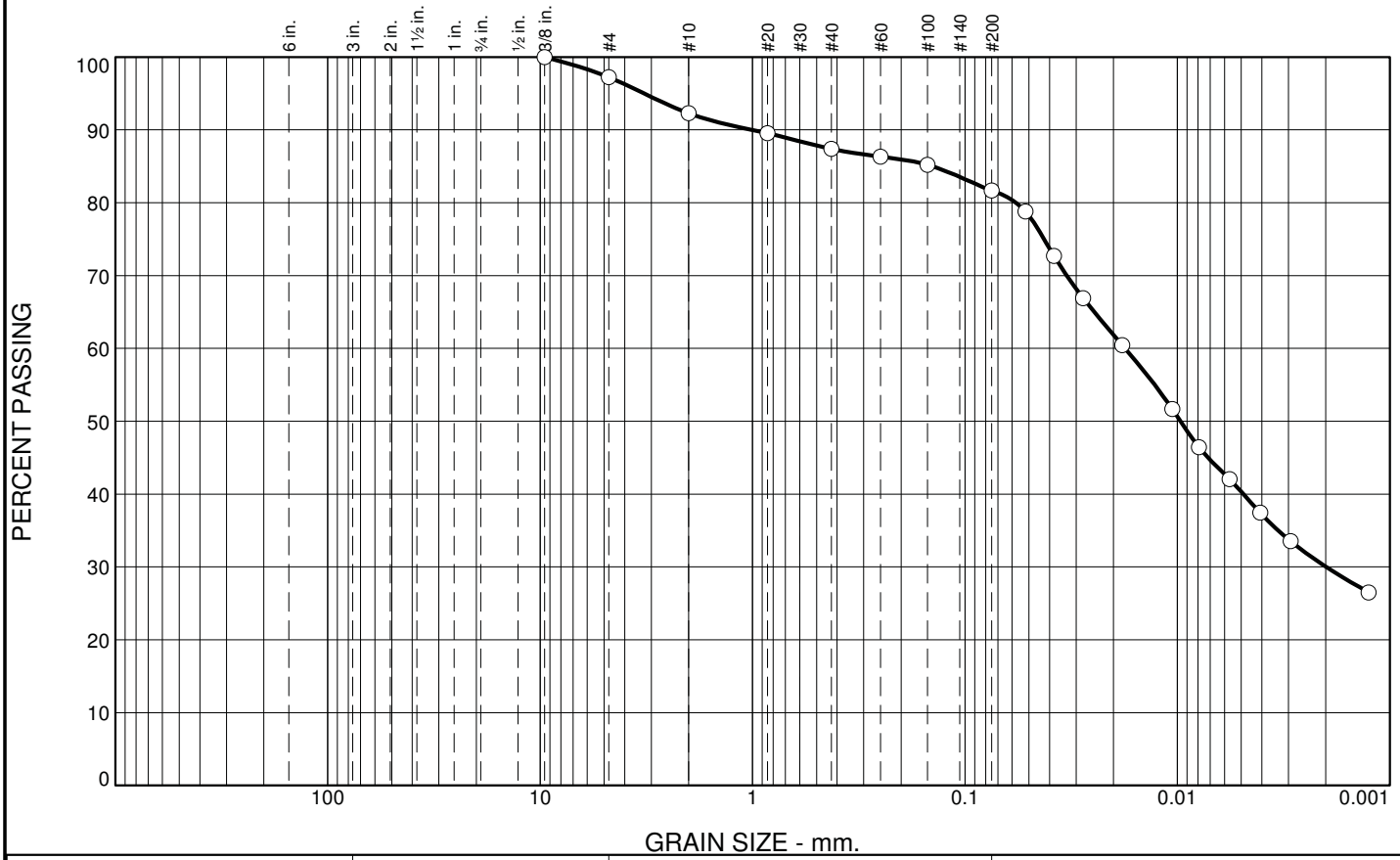
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.8	4.9	4.9	5.7	51.7	30.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375	100.0		
#4	97.2		
#10	92.3		
#20	89.5		
#40	87.4		
#60	86.3		
#100	85.2		
#200	81.7		
0.0520 mm.	78.8		
0.0381 mm.	72.7		
0.0278 mm.	66.9		
0.0182 mm.	60.4		
0.0106 mm.	51.7		
0.0079 mm.	46.4		
0.0057 mm.	42.0		
0.0041 mm.	37.4		
0.0029 mm.	33.5		
0.0013 mm.	26.5		

* (no specification provided)

Soil Description

lean CLAY with sand

Atterberg Limits

PL= 14 LL= 36 PI= 22

Coefficients

D_{90}= 1.0054 D_{85}= 0.1423 D_{60}= 0.0176
D_{50}= 0.0097 D_{30}= 0.0020 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#14 **Elev./Depth:** 27.43-28.04m

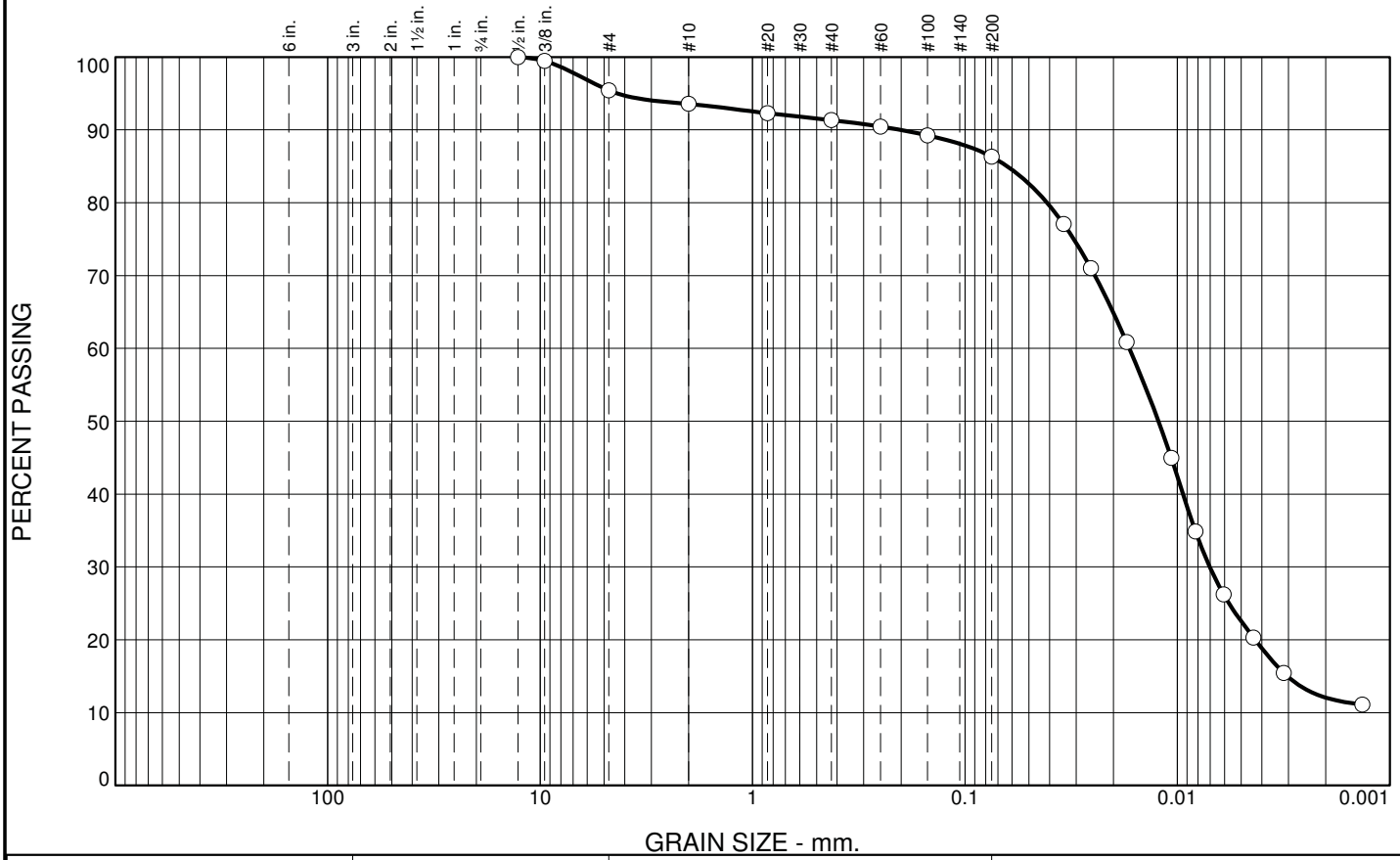
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.6	1.8	2.3	5.0	74.2	12.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
0.375	99.4		
#4	95.4		
#10	93.6		
#20	92.3		
#40	91.3		
#60	90.5		
#100	89.2		
#200	86.3		
0.0343 mm.	77.1		
0.0255 mm.	71.0		
0.0174 mm.	60.9		
0.0107 mm.	45.0		
0.0082 mm.	34.9		
0.0060 mm.	26.2		
0.0044 mm.	20.3		
0.0032 mm.	15.5		
0.0013 mm.	11.1		

* (no specification provided)

Soil Description

lean CLAY

Atterberg Limits

PL= 20 LL= 30 PI= 10

Coefficients

D_{90}= 0.2029 D_{85}= 0.0634 D_{60}= 0.0168
D_{50}= 0.0123 D_{30}= 0.0070 D_{15}= 0.0030
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(8)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#18 **Elev./Depth:** 39.62-40.18m

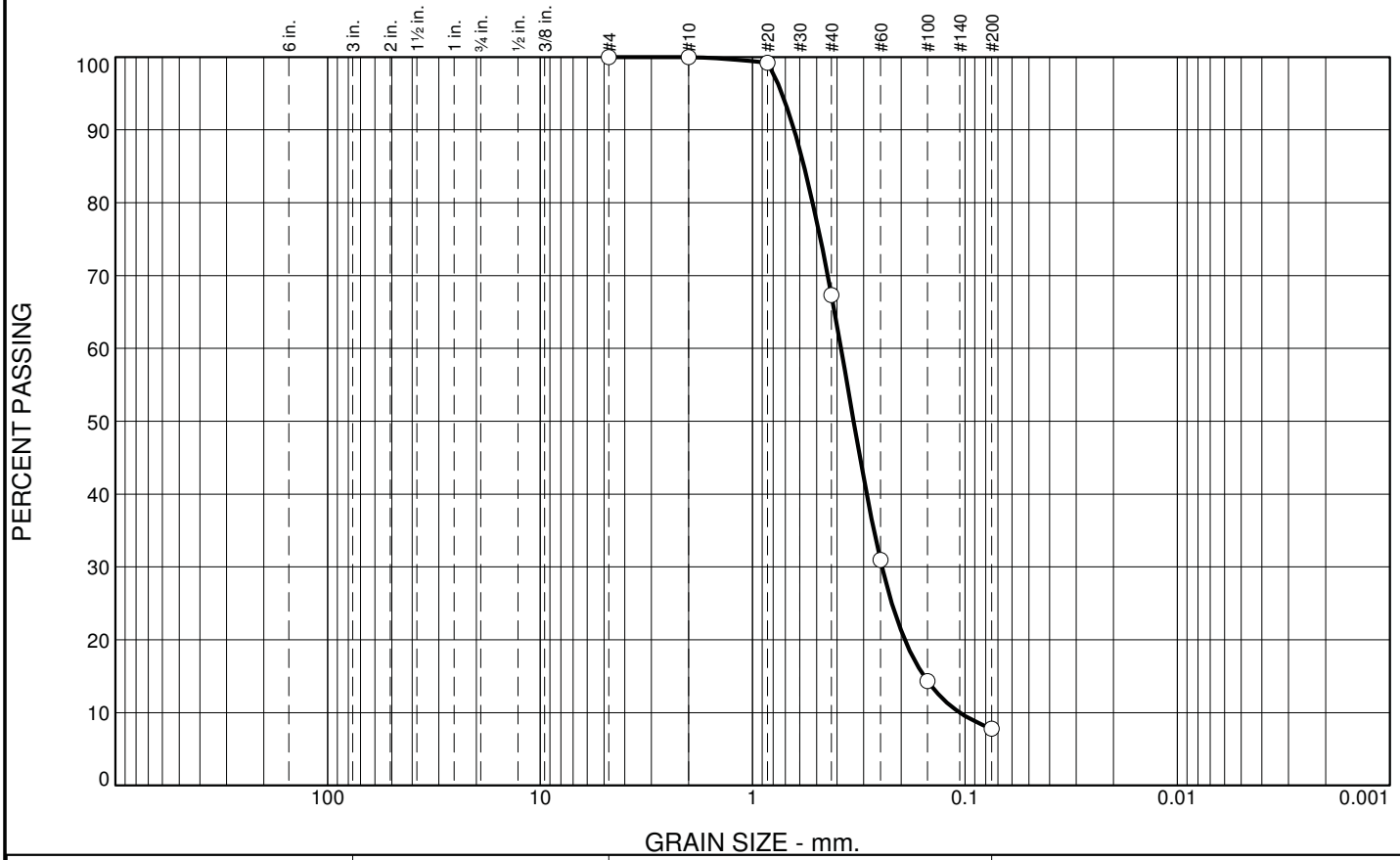
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	32.7	59.5	7.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.2		
#40	67.3		
#60	30.9		
#100	14.3		
#200	7.8		

* (no specification provided)

Soil Description

poorly graded SAND with silt

Atterberg Limits

PL= NP LL= 19 PI= NP

Coefficients

D_{90}= 0.6378 D_{85}= 0.5725 D_{60}= 0.3831
D_{50}= 0.3342 D_{30}= 0.2456 D_{15}= 0.1558
D_{10}= 0.1058 C_u= 3.62 C_c= 1.49

Classification

USCS= SP-SM AASHTO= A-3

Remarks

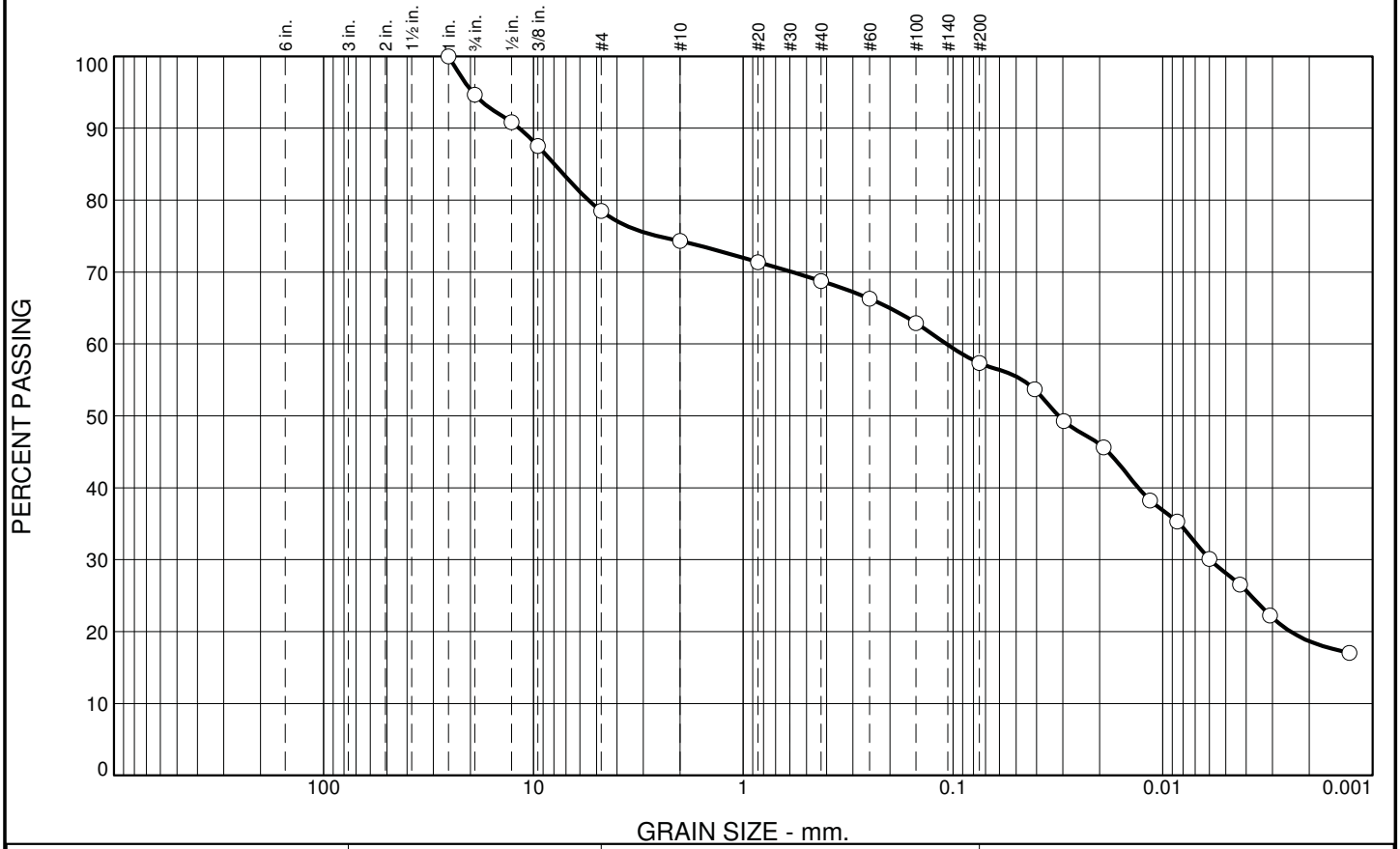
Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-056 SPT#22 **Elev./Depth:** 51.81-52.42m

Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine
Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.4	16.1	4.2	5.5	11.4	38.7	18.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.6		
.5	90.8		
0.375	87.5		
#4	78.5		
#10	74.3		
#20	71.4		
#40	68.8		
#60	66.3		
#100	62.9		
#200	57.4		
0.0408 mm.	53.7		
0.0296 mm.	49.3		
0.0191 mm.	45.6		
0.0115 mm.	38.2		
0.0085 mm.	35.3		
0.0060 mm.	30.1		
0.0043 mm.	26.5		
0.0031 mm.	22.2		
0.0013 mm.	17.1		

* (no specification provided)

Soil Description

gravelly lean CLAY with sand

Atterberg Limits

PL= 15 LL= 28 PI= 13

Coefficients

D_{90}= 11.6879 D_{85}= 7.9361 D_{60}= 0.1074
D_{50}= 0.0314 D_{30}= 0.0060 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(4)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-059 SPT#5 **Elev./Depth:** 7.62-7.89m

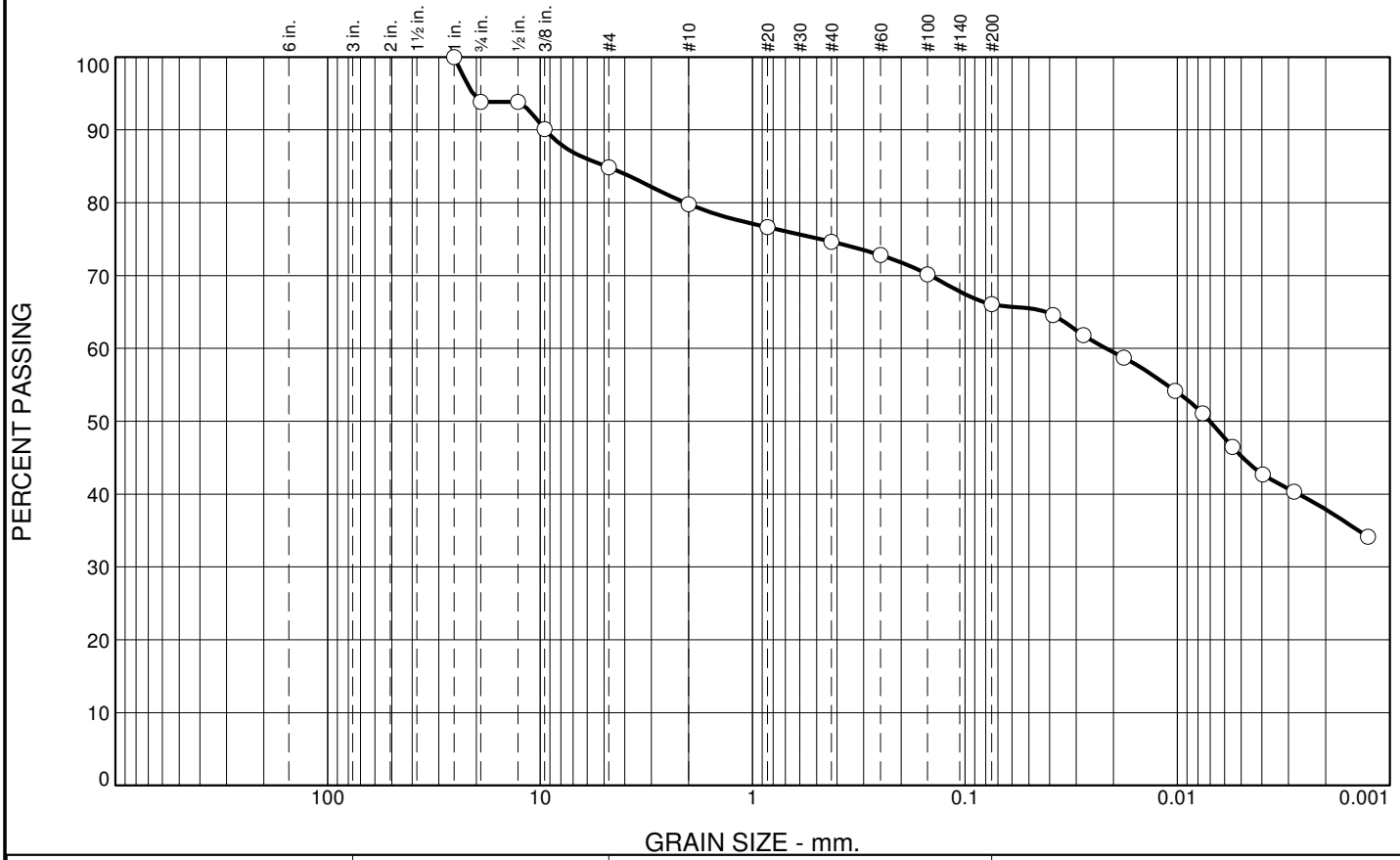
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.2	8.9	5.1	5.2	8.5	28.2	37.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	93.8		
.5	93.8		
0.375	90.1		
#4	84.9		
#10	79.8		
#20	76.6		
#40	74.6		
#60	72.8		
#100	70.2		
#200	66.1		
0.0386 mm.	64.6		
0.0277 mm.	61.8		
0.0179 mm.	58.7		
0.0102 mm.	54.2		
0.0076 mm.	51.1		
0.0055 mm.	46.5		
0.0040 mm.	42.7		
0.0028 mm.	40.3		
0.0013 mm.	34.1		

* (no specification provided)

Soil Description

sandy lean CLAY with gravel

Atterberg Limits

PL= 15 LL= 41 PI= 26

Coefficients

D_{90}= 9.4621 D_{85}= 4.8769 D_{60}= 0.0216
D_{50}= 0.0070 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(15)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-059 SPT#9 **Elev./Depth:** 13.72-14.33m

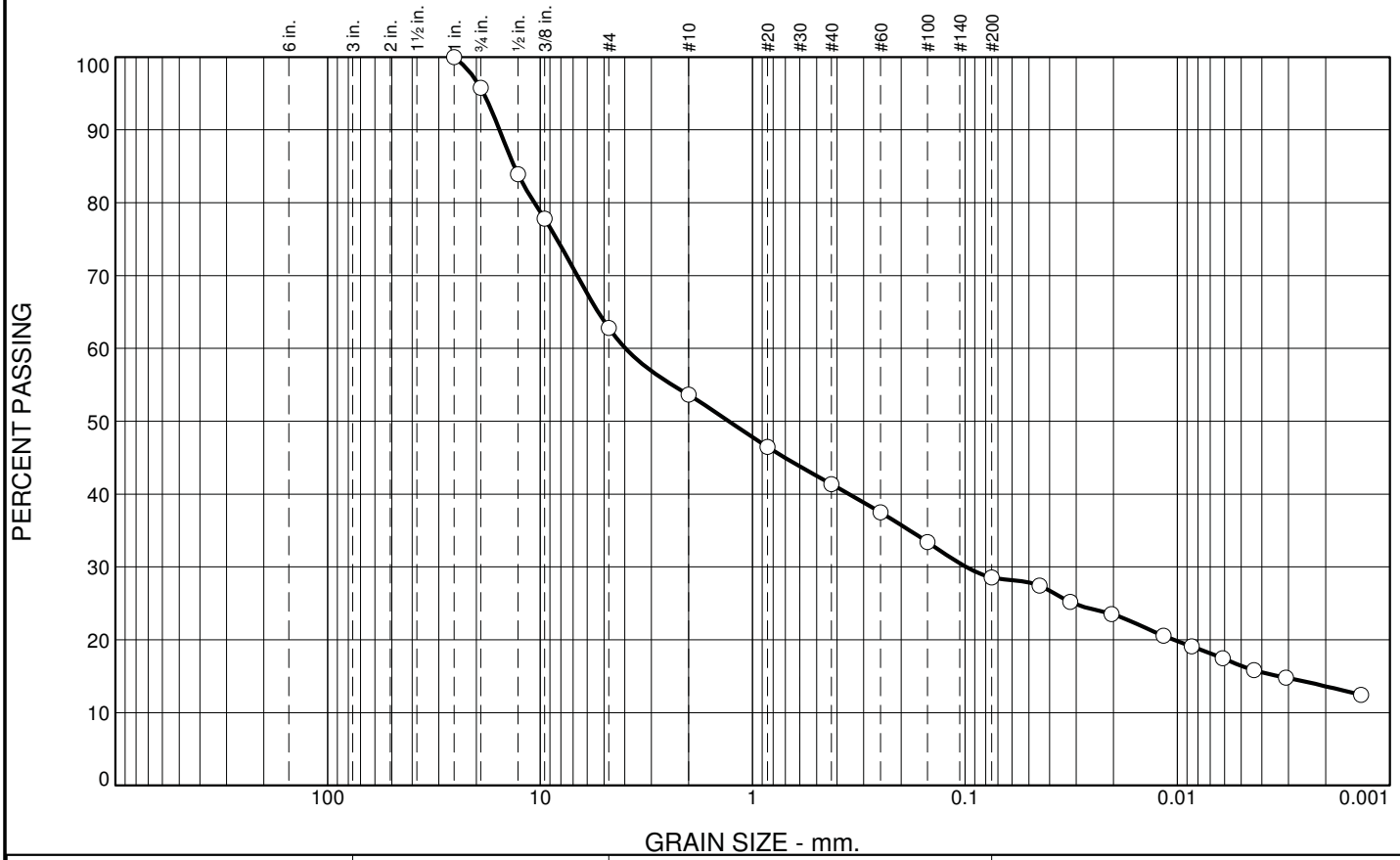
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.2	33.0	9.2	12.2	12.8	15.0	13.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.8		
.5	83.9		
0.375	77.8		
#4	62.8		
#10	53.6		
#20	46.5		
#40	41.4		
#60	37.5		
#100	33.4		
#200	28.6		
0.0446 mm.	27.4		
0.0320 mm.	25.2		
0.0204 mm.	23.5		
0.0116 mm.	20.5		
0.0086 mm.	19.1		
0.0061 mm.	17.5		
0.0044 mm.	15.8		
0.0031 mm.	14.8		
0.0014 mm.	12.4		

* (no specification provided)

Soil Description

clayey GRAVELL with sand

Atterberg Limits

PL= 13 LL= 30 PI= 17

Coefficients

D_{90}= 15.5426 D_{85}= 13.2207 D_{60}= 3.9619
D_{50}= 1.2940 D_{30}= 0.0986 D_{15}= 0.0033
D_{10}= C_u= C_c=

Classification

USCS= GC AASHTO= A-2-6(1)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-059 SPT#13 **Elev./Depth:** 24.38-24.99m

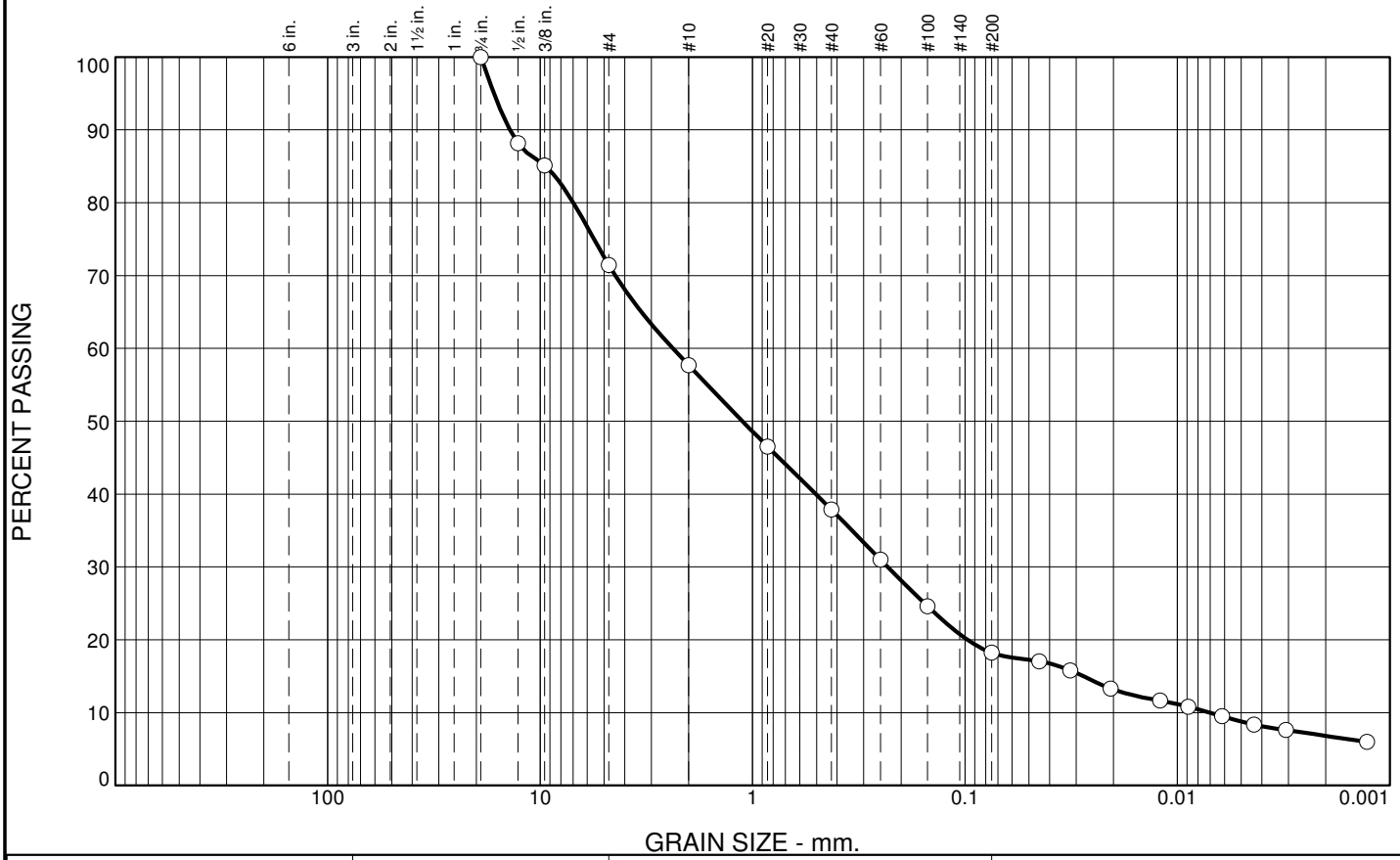
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.5	13.8	19.8	19.7	11.4	6.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	88.1		
0.375	85.1		
#4	71.5		
#10	57.7		
#20	46.5		
#40	37.9		
#60	31.0		
#100	24.6		
#200	18.2		
0.0447 mm.	17.1		
0.0320 mm.	15.8		
0.0206 mm.	13.3		
0.0121 mm.	11.6		
0.0089 mm.	10.8		
0.0061 mm.	9.5		
0.0044 mm.	8.4		
0.0031 mm.	7.6		
0.0013 mm.	6.0		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 13 LL= 23 PI= 10

Coefficients

D_{90}= 13.8910 D_{85}= 9.4260 D_{60}= 2.3737
D_{50}= 1.1152 D_{30}= 0.2312 D_{15}= 0.0277
D_{10}= 0.0070 C_u= 338.41 C_c= 3.21

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

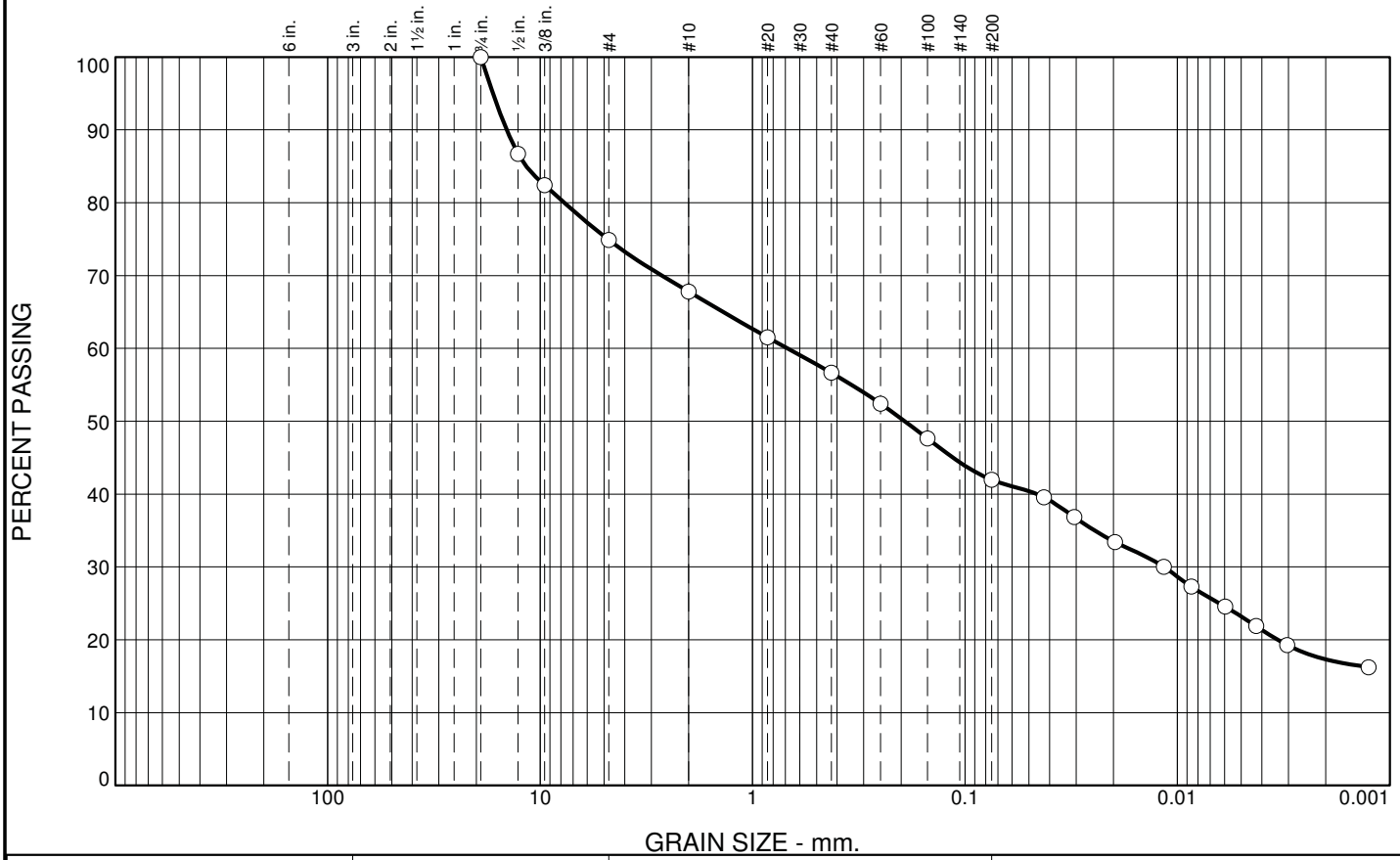
Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-059 SPT#15 **Elev./Depth:** 30.43-31.09m

Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine
Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.1	7.1	11.2	14.6	24.7	17.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	86.7		
0.375	82.4		
#4	74.9		
#10	67.8		
#20	61.5		
#40	56.6		
#60	52.4		
#100	47.6		
#200	42.0		
0.0426 mm.	39.6		
0.0306 mm.	36.8		
0.0197 mm.	33.4		
0.0116 mm.	30.0		
0.0086 mm.	27.3		
0.0060 mm.	24.5		
0.0043 mm.	21.9		
0.0030 mm.	19.3		
0.0013 mm.	16.2		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 14 LL= 31 PI= 17

Coefficients

D_{90}= 14.3738 D_{85}= 11.6247 D_{60}= 0.6852
D_{50}= 0.1919 D_{30}= 0.0115 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(3)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-059 SPT#17 **Elev./Depth:** 36.57-37.18m

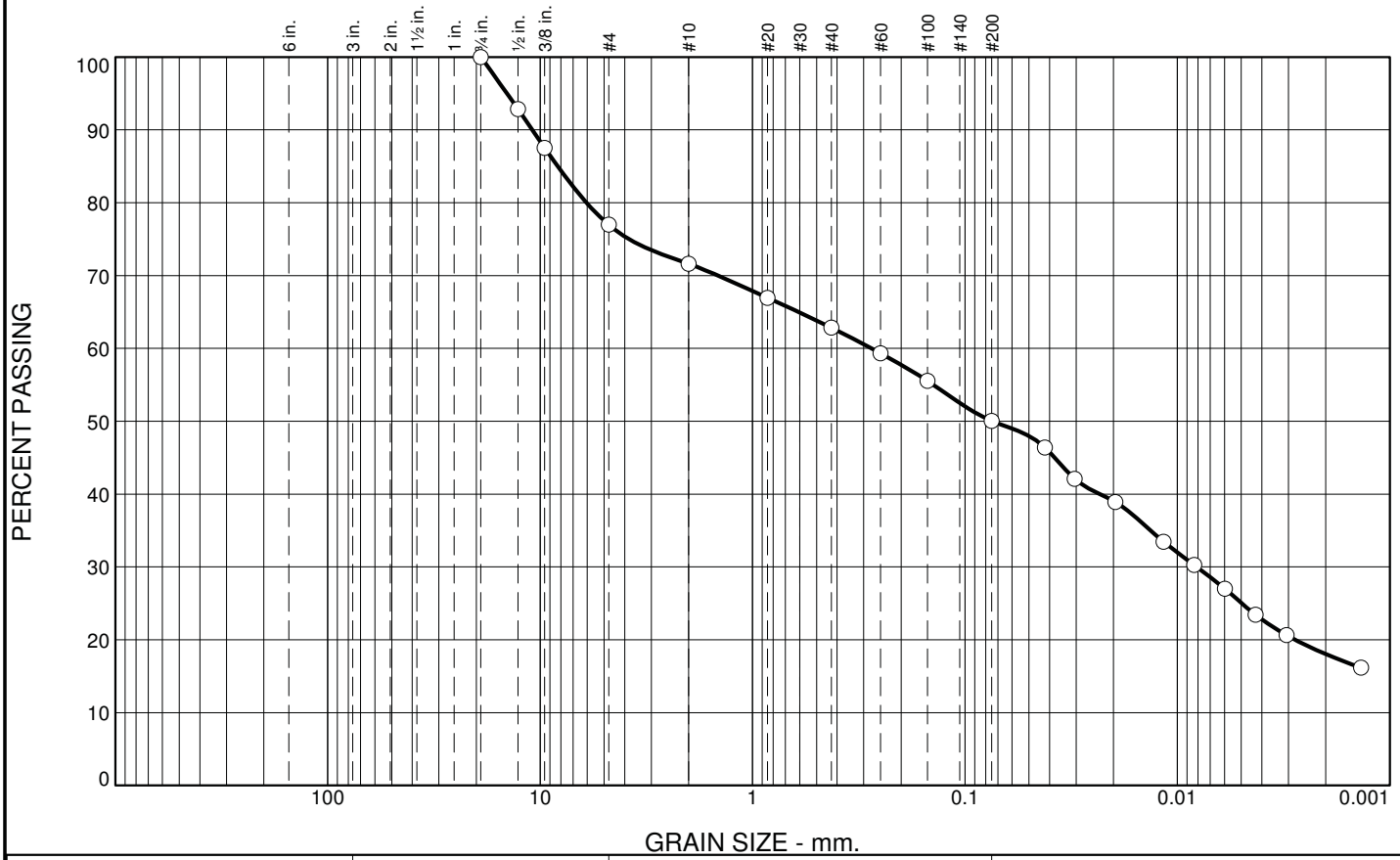
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.0	5.4	8.8	12.8	32.0	18.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.8		
0.375	87.5		
#4	77.0		
#10	71.6		
#20	66.9		
#40	62.8		
#60	59.3		
#100	55.5		
#200	50.0		
0.0420 mm.	46.4		
0.0304 mm.	42.1		
0.0196 mm.	38.9		
0.0116 mm.	33.4		
0.0083 mm.	30.3		
0.0060 mm.	27.0		
0.0043 mm.	23.5		
0.0031 mm.	20.6		
0.0014 mm.	16.2		

* (no specification provided)

Soil Description

sandy lean CLAY with gravel

Atterberg Limits

PL= 14 LL= 28 PI= 14

Coefficients

D_{90}= 10.8936 D_{85}= 8.2646 D_{60}= 0.2761
D_{50}= 0.0744 D_{30}= 0.0081 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(4)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-065 SPT#3 **Elev./Depth:** 4.57-5.18m

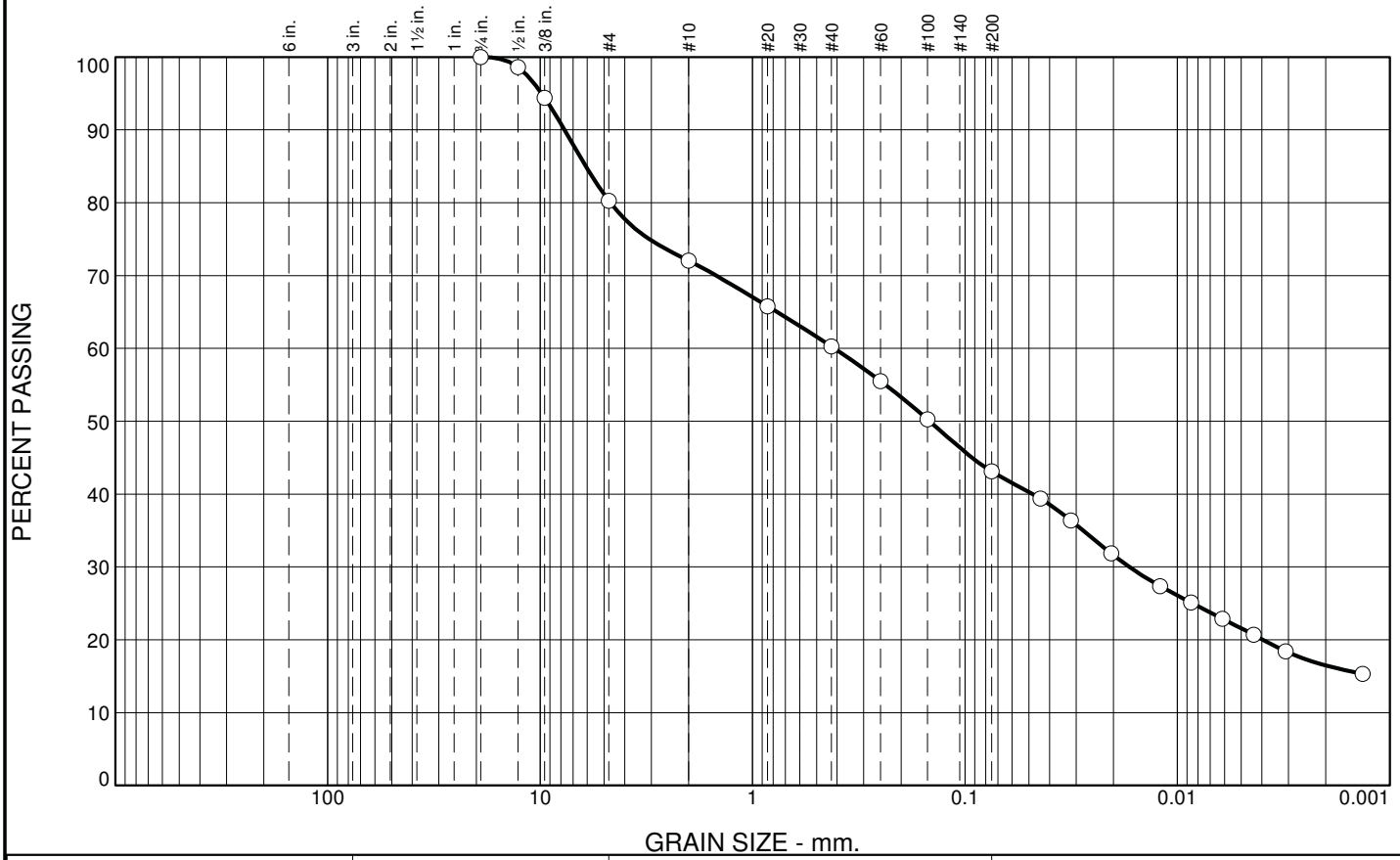
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.8	8.2	11.7	17.2	26.6	16.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	98.6		
0.375	94.4		
#4	80.2		
#10	72.0		
#20	65.8		
#40	60.3		
#60	55.5		
#100	50.2		
#200	43.1		
0.0441 mm.	39.4		
0.0317 mm.	36.4		
0.0205 mm.	31.8		
0.0121 mm.	27.4		
0.0086 mm.	25.1		
0.0061 mm.	22.9		
0.0044 mm.	20.7		
0.0031 mm.	18.4		
0.0013 mm.	15.3		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 13 LL= 24 PI= 11

Coefficients

D_{90}= 7.6828 D_{85}= 6.0912 D_{60}= 0.4109
D_{50}= 0.1468 D_{30}= 0.0168 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(1)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-065 SPT#5 **Elev./Depth:** 7.62-8.23m

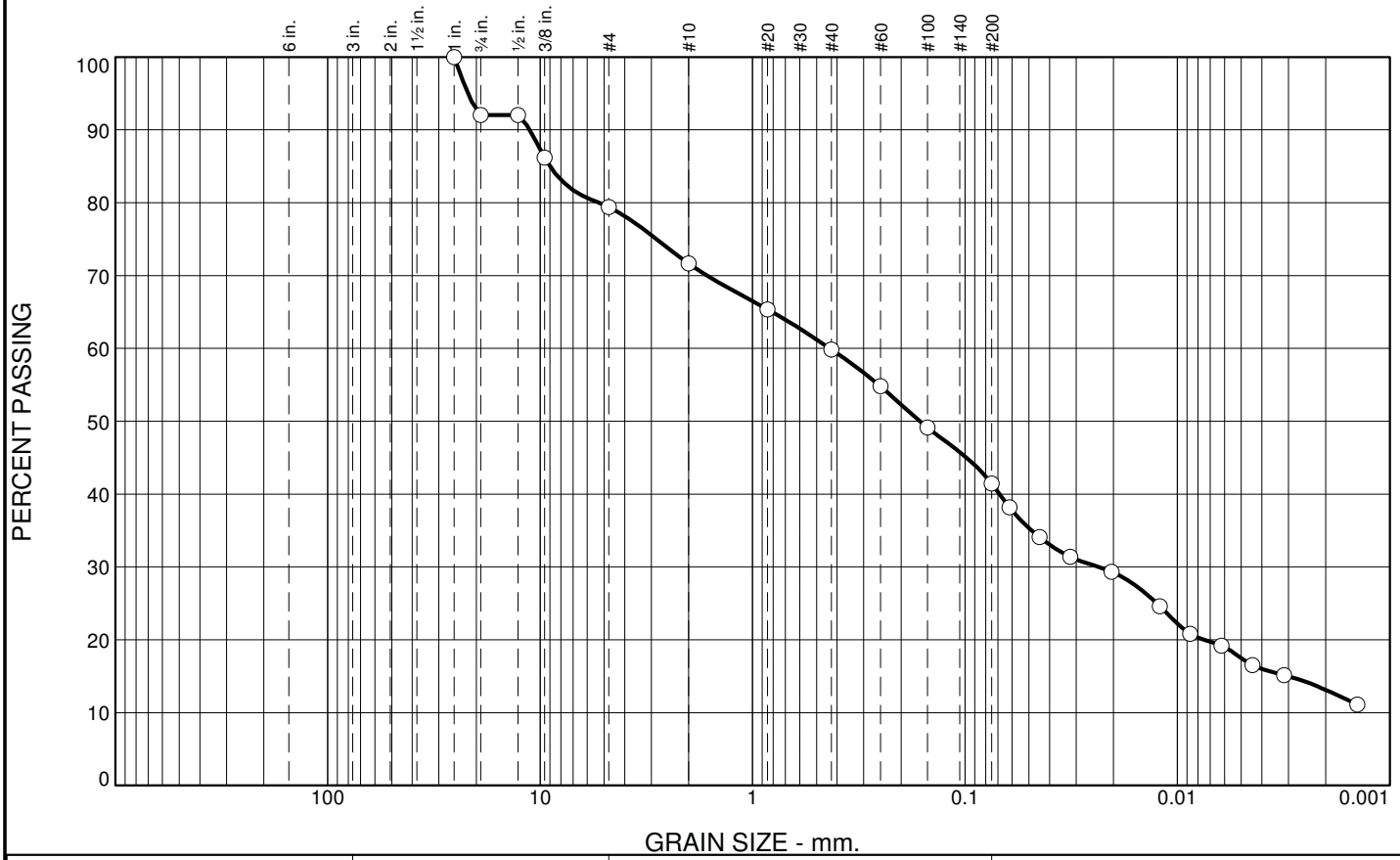
Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: JK **Checked By:** JDB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	12.6	7.7	11.8	18.4	28.4	13.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	92.0		
.5	92.0		
0.375	86.2		
#4	79.4		
#10	71.7		
#20	65.4		
#40	59.9		
#60	54.8		
#100	49.1		
#200	41.5		
0.0616 mm.	38.2		
0.0446 mm.	34.1		
0.0320 mm.	31.4		
0.0204 mm.	29.3		
0.0121 mm.	24.6		
0.0087 mm.	20.8		
0.0062 mm.	19.2		
0.0044 mm.	16.5		
0.0031 mm.	15.2		
0.0014 mm.	11.1		

* (no specification provided)

Soil Description

clayey SAND with gravel

Atterberg Limits

PL= 13 LL= 24 PI= 11

Coefficients

D_{90}= 11.2070 D_{85}= 8.9825 D_{60}= 0.4323
D_{50}= 0.1630 D_{30}= 0.0235 D_{15}= 0.0030
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(1)

Remarks

Sample No.: **Source of Sample:** **Date:** 2/11/15
Location: DH14-065 SPT#6 **Elev./Depth:** 9.14-9.65m

Knight Piésold CONSULTING

Client: KGHM
Project: Ajax Mine

Project No: VA101-246/26 **Figure**

Tested By: STT **Checked By:** JDB

Knight Piésold CONSULTING

Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		TP14-070-1	TP14-071-1	GP14-002	TP14-082-1	GP14-003
Test Pit ID		TP14-070	TP14-071	TP14-073	TP14-082	TP14-083
Depth (m)		3.0-3.3	4.5-4.9	1.5-1.7	2.2-2.3	1.4-1.5
Tare No.		P26	C4	P59	RG20	C57
Tare + Wet Soil	A	915.5	1457.5	340.2	1101.3	412.7
Tare + Dry Soil	B	869.4	1340.1	323.3	1050.5	394.6
Tare	C	118.0	304.6	146.8	185.1	116.7
Wt. of Water	D , A-B	46.2	117.4	16.9	50.9	18.1
Dry Soil, Ws	E , B-C	751.4	1035.5	176.5	865.3	277.9
Moisture Content, (%)	(D / E) x100	6.1	11.3	9.6	5.9	6.5

Sample No.		GP14-004	TP14-087-1	TP14-095-1	GP14-005	GP14-006
Sample ID		TP14-087	TP14-087	TP14-095	TP14-097	TP14-098
Depth (m)		1.4-1.5	3.5-3.7	1.0-1.1	0.6-0.75	1.5-1.6
Tare No.		C53	C1	Ryan	C79	C77
Tare + Wet Soil	A	414.8	1268.1	1087.1	414.8	412.8
Tare + Dry Soil	B	400.9	1210.7	1043.3	393.6	394.0
Tare	C	118.4	391.7	183.9	117.7	117.8
Wt. of Water	A-B, D	13.9	57.3	43.8	21.2	18.8
Dry Soil, Ws	B-C, E	282.5	819.1	859.4	275.9	276.2
Moisture Content, (%)	(D / E) x100	4.9	7.0	5.1	7.7	6.8

Sample No.		TP14-098-1	GP14-007	GP14-008	TP14-109-1	TP14-112-1
Sample ID		TP14-098	TP14-099	TP14-100	TP14-109	TP14-112
Depth		4.0-4.3	0.9-1.05	1.0-1.05	4.0-4.1	3.5-4.0
Tare No.		Manning	C59	C73	Vick	RG11
Tare + Wet Soil	A	1070.9	426.9	323.0	1016.3	1700.6
Tare + Dry Soil	B	1002.7	404.8	311.7	943.1	1594.6
Tare	C	183.1	117.1	117.6	183.9	186.5
Wt. of Water	A-B, D	68.1	22.1	11.3	73.2	106.0
Dry Soil, Ws	B-C, E	819.6	287.6	194.1	759.1	1408.1
Moisture Content, (%)	(D / E) x100	8.3	7.7	5.8	9.6	7.5

Knight Piésold CONSULTING

Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		TP14-123-1	TP14-137-1	TP14-138-1	Proctor-001	TP14-157-1
Test Pit ID		TP14-123	TP14-137	TP14-138	TP14-153	TP14-157
Depth (m)		4.0-5.0	0.3-1.6	0.53-1.35	0.66-1.05	0.4-1.5
Tare No.		C3	Newton	Be	Bloom	P18
Tare + Wet Soil	A	890.4	885.5	810.6	4567.2	676.6
Tare + Dry Soil	B	853.5	853.5	726.6	4457.5	576.9
Tare	C	298.8	183.9	182.5	388.9	117.9
Wt. of Water	D , A-B	36.9	32.0	84.0	109.7	99.6
Dry Soil, Ws	E , B-C	554.7	669.6	544.1	4068.6	459.0
Moisture Content, (%)	(D / E) x100	6.7	4.8	15.4	2.7	21.7

Sample No.		TP14-167-1	TP14-174-1	TP14-183-1	TP14-213-1	TP14-220-1
Sample ID		TP14-167	TP14-174	TP14-183	TP14-213	TP14-220
Depth (m)		4.9-5.0	4.6-4.7	4.7-4.8	2.0-2.5	4.4-4.6
Tare No.		RG18	RG20	Ryan	RG12	RG5
Tare + Wet Soil	A	1286.3	875.6	1230.5	998.9	1046.1
Tare + Dry Soil	B	1021.6	828.1	1149.1	982.4	984.5
Tare	C	185.6	185.2	183.9	184.4	184.5
Wt. of Water	A-B, D	264.7	47.6	81.5	16.5	61.6
Dry Soil, Ws	B-C, E	836.0	642.9	965.2	798.1	800.0
Moisture Content, (%)	(D / E) x100	31.7	7.4	8.4	2.1	7.7

Sample No.		TP14-221-1	TP14-289-1	TP14-295-1	TP14-301-1	TP14-304-1
Sample ID		TP14-221	TP14-289	TP14-295	TP14-301	TP14-304
Depth (m)		1.0-1.5	3.3-3.4	2.7-2.8	1.5-2.0	3.4-3.5
Tare No.		1	P111	C73	C75	C58
Tare + Wet Soil	A	1923.9	518.8	579.3	475.7	558.4
Tare + Dry Soil	B	1900.5	482.9	540.7	367.8	523.7
Tare	C	307.1	148.8	117.7	117.4	117.4
Wt. of Water	A-B, D	23.4	35.9	38.6	107.9	34.7
Dry Soil, Ws	B-C, E	1593.4	334.1	423.0	250.4	406.3
Moisture Content, (%)	(D / E) x100	1.5	10.7	9.1	43.1	8.5

Knight Piésold CONSULTING

Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		TP14-306-1	TP14-310-1	TP14-323-1	TP14-331-1	TP14-343-1
Test Pit ID		TP14-306	TP14-310	TP14-323	TP14-331	TP14-343
Depth (m)		2.0-2.5	4.0-4.3	4.3-4.4	3.8-3.9	4.2-4.3
Tare No.		Crush	COW	C51	P66	C52
Tare + Wet Soil	A	13225.5	827.8	633.2	752.6	543.0
Tare + Dry Soil	B	12789.0	758.1	570.8	694.1	503.0
Tare	C	2126.5	131.6	118.0	147.7	117.8
Wt. of Water	D , A-B	436.5	69.7	62.4	58.5	40.0
Dry Soil, Ws	E , B-C	10662.5	626.5	452.8	546.4	385.2
Moisture Content, (%)	(D / E) x100	4.1	11.1	13.8	10.7	10.4

Sample No.		TP14-344-1	TP14-346-1	TP14-356-1	TP14-362-1	TP14-367-1
Sample ID		TP14-344	TP14-346	TP14-356	TP14-362	TP14-367
Depth (m)		3.8-3.9	4.0-4.5	3.5-3.9	4.5-4.8	1.5-1.8
Tare No.		C53	Sow	C74	P58	Slimer
Tare + Wet Soil	A	738.3	523.5	696.7	761.7	624.6
Tare + Dry Soil	B	676.4	495.8	658.5	705.1	603.3
Tare	C	118.5	132.3	117.9	146.5	134.6
Wt. of Water	A-B, D	61.9	27.7	38.2	56.6	21.3
Dry Soil, Ws	B-C, E	557.9	363.5	540.6	558.6	468.7
Moisture Content, (%)	(D / E) x100	11.1	7.6	7.1	10.1	4.5

Sample No.		TP14-369-1	TP14-372-1			
Sample ID		TP14-369	TP14-372			
Depth		4.5-4.8	4.0-4.2			
Tare No.		C77	AVS			
Tare + Wet Soil	A	770.9	14237.5			
Tare + Dry Soil	B	728.8	13913.0			
Tare	C	117.9	2055.0			
Wt. of Water	A-B, D	42.1	324.5			
Dry Soil, Ws	B-C, E	610.9	11858.0			
Moisture Content, (%)	(D / E) x100	6.9	2.7			

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Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		DH14-051	DH14-051	DH14-052	DH14-052	DH14-052
Test Pit ID		SPT#10	SPT#12	SPT#8	SPT#10	SPT#14
Depth (m)		15.2-15.81	21.28-21.89	12.19-12.62	15.24-15.52	27.43-27.95
Tare No.		DB	P59	C79	C59	C57
Tare + Wet Soil	A	647.7	383.9	499.8	446.7	495.8
Tare + Dry Soil	B	592.2	347.3	473.0	412.3	459.9
Tare	C	151.6	146.8	117.7	117.3	116.8
Wt. of Water	D , A-B	55.5	36.6	26.8	34.4	35.9
Dry Soil, Ws	E , B-C	440.6	200.5	355.3	295.0	343.1
Moisture Content, (%)	(D / E) x100	12.6	18.3	7.5	11.7	10.5

Sample No.		DH14-053	DH14-054	DH14-054	DH14-054	DH14-054
Sample ID		SPT#6	SPT#6	SPT#10	SPT#12	SPT#16
Depth (m)		9.12-9.73	9.14-9.75	15.24-15.85	21.33-21.94	33.53-34.14
Tare No.		C54	P69	P76	C74	P58
Tare + Wet Soil	A	447.4	619.7	571.4	571.0	523.2
Tare + Dry Soil	B	422.7	557.9	493.4	506.3	454.0
Tare	C	117.4	151.9	148.5	117.8	146.5
Wt. of Water	A-B, D	24.7	61.8	78.0	64.7	69.2
Dry Soil, Ws	B-C, E	305.3	406.0	344.9	388.5	307.5
Moisture Content, (%)	(D / E) x100	8.1	15.2	22.6	16.7	22.5

Sample No.		DH14-054	DH14-055	DH14-055	DH14-055	DH14-055
Sample ID		SPT#18	SPT#4	SPT#8	SPT#10	SPT#14
Depth (m)		39.62-40.2	6.08-6.69	12.16-12.77	15.2-15.81	27.36-27.97
Tare No.		C52	C73	C51	Slimer	Sow
Tare + Wet Soil	A	479.8	665.9	497.6	533.8	571.2
Tare + Dry Soil	B	401.3	605.2	462.0	499.3	520.5
Tare	C	117.7	117.7	118.0	134.6	132.2
Wt. of Water	A-B, D	78.5	60.7	35.6	34.5	50.7
Dry Soil, Ws	B-C, E	283.6	487.5	344.0	364.7	388.3
Moisture Content, (%)	(D / E) x100	27.7	12.5	10.3	9.5	13.1

Knight Piésold CONSULTING

Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		DH14-055	DH14-056	DH14-056	DH14-056	DH14-056
Test Pit ID		SPT#17	SPT#4	SPT#6	SPT#10	SPT#14
Depth (m)		36.48-37.09	6.1-6.71	9.14-9.55	15.24-15.85	27.43-28.04
Tare No.		Hog	C73	C63	C55	C51
Tare + Wet Soil	A	629.6	555.1	393.1	408.8	423.6
Tare + Dry Soil	B	577.5	526.8	369.4	378.7	377.1
Tare	C	131.7	117.7	132.2	118.2	117.9
Wt. of Water	D , A-B	52.1	28.3	23.7	30.1	46.5
Dry Soil, Ws	E , B-C	445.8	409.1	237.2	260.5	259.2
Moisture Content, (%)	(D / E) x100	11.7	6.9	10.0	11.6	17.9

Sample No.		DH14-056	DH14-056	DH14-057	DH14-057	DH14-057
Sample ID		SPT#18	SPT#22	SPT#6	SPT#10	SPT#14
Depth (m)		39.62-40.18	51.81-52.42	9.12-9.73	15.2-15.81	27.36-27.97
Tare No.		C75	P69	DB	P58	C58
Tare + Wet Soil	A	430.5	529.8	429.9	396.1	490.5
Tare + Dry Soil	B	372.4	467.4	398.7	367.5	455.1
Tare	C	117.4	151.9	151.7	146.5	117.3
Wt. of Water	A-B, D	58.1	62.4	31.2	28.6	35.4
Dry Soil, Ws	B-C, E	255.0	315.5	247.0	221.0	337.8
Moisture Content, (%)	(D / E) x100	22.8	19.8	12.6	12.9	10.5

Sample No.		DH14-057	DH14-059	DH14-059	DH14-059	DH14-059
Sample ID		SPT#16	SPT#5	SPT#9	SPT#13	SPT#15
Depth (m)		33.44-34.05	7.62-7.89	13.72-14.33	24.38-24.99	30.43-31.09
Tare No.		C66	C56	P76	P61	Slimer
Tare + Wet Soil	A	503.9	386.1	406.4	519.3	311.3
Tare + Dry Soil	B	452.7	361.1	367.9	490.9	295.6
Tare	C	132.4	117.8	148.5	145.4	134.6
Wt. of Water	A-B, D	51.2	25.0	38.5	28.4	15.7
Dry Soil, Ws	B-C, E	320.3	243.3	219.4	345.5	161.0
Moisture Content, (%)	(D / E) x100	16.0	10.3	17.5	8.2	9.8

Knight Piésold CONSULTING

Moisture Content
ASTM D 2216

Project	AJAX Geotech	Project No.	VA101-00246
Lab No.	L2014-116	Date of Test	11/5/14-1/8/15
Tested By	DAB/JHK/AMS/STT	Checked By	JDB

Drying Conditions: 105 deg C Method: Oven

Sample No.		DH14-059	DH14-062	DH14-062	DH14-062	DH14-062
Test Pit ID		SPT#17	SPT#4	SPT#7	SPT#8	SPT#12
Depth (m)		36.57-37.18	6.1-6.71	10.67-11.08	12.19-12.6	21.33-21.7
Tare No.		C638	C57	C59	P67	C74
Tare + Wet Soil	A	473.2	571.8	437.6	556.1	568.5
Tare + Dry Soil	B	442.9	542.1	392.1	516.3	520.8
Tare	C	132.1	116.8	117.3	148.8	117.9
Wt. of Water	D , A-B	30.3	29.7	45.5	39.8	47.7
Dry Soil, Ws	E , B-C	310.8	425.3	274.8	367.5	402.9
Moisture Content, (%)	(D / E) x100	9.7	7.0	16.6	10.8	11.8

Sample No.		DH14-062	DH14-064	DH14-064	DH14-064	DH14-064
Sample ID		SPT#14	SPT#5	SPT#9	SPT#11	SPT#13
Depth (m)		27.43-28.00	7.6-8.21	13.68-14.29	18.24-18.85	24.32-24.93
Tare No.		C52	Cow	C67	C78	P59
Tare + Wet Soil	A	562.7	432.6	629.4	422.1	446.4
Tare + Dry Soil	B	512.7	408.1	595.8	389.8	395.5
Tare	C	117.8	131.5	133.6	117.8	146.9
Wt. of Water	A-B, D	50.0	24.5	33.6	32.3	50.9
Dry Soil, Ws	B-C, E	394.9	276.6	462.2	272.0	248.6
Moisture Content, (%)	(D / E) x100	12.7	8.9	7.3	11.9	20.5

Sample No.		DH14-064	DH14-064	DH14-065	DH14-065	DH14-065
Sample ID		SPT#15	SPT#19	SPT#3	SPT#5	SPT#6
Depth (m)		30.4-31.01	42.56-43.17	4.57-5.18	7.62-8.23	9.14-9.65
Tare No.		C72	Sow	P111	C54	C79
Tare + Wet Soil	A	428.1	412.3	432.6	370.5	455.6
Tare + Dry Soil	B	398.3	380.4	406.1	348.6	428.8
Tare	C	116.3	132.2	148.8	117.3	117.7
Wt. of Water	A-B, D	29.8	31.9	26.5	21.9	26.8
Dry Soil, Ws	B-C, E	282.0	248.2	257.3	231.3	311.1
Moisture Content, (%)	(D / E) x100	10.6	12.9	10.3	9.5	8.6

APPENDIX E2

ROCK TESTING

(Pages E2-1 to E2-90)

14-KPL-02

ROCK STRENGTH LABORATORY REPORT

PREPARED FOR:
KNIGHT PIESOLD LTD.

PROJECT:
ROCK STRENGTH LABORATORY REPORT
FOR
AJAX PROJECT
2014 GEOTECHNICAL SITE INVESTIGATION

KNIGHT PIESOLD PROJECT #VA101-246/26

November 12, 2014

November 12, 2014 14-KPL-02

Knight Piésold Ltd.
750 West Pender Street
Vancouver, BC V6C 2T8

Attention: Ms. Josie Speed

RE: Rock Strength Laboratory Report for AJAX PROJECT – 2014 Geotechnical Site Investigation [KNIGHT PIESOLD PROJECT #VA101-246/26]

Testing Date: October, 2014

Tested by: Dr. Paul Hughes, P.Eng

Tested at: Norman B Keevil Institute of Mining Engineering, University of British Columbia

Testing Program: Report contains results of thirty-three (33) Unconfined Compressive Strength tests with elastic modulus readings, twenty (20) Unconfined Compressive Strength tests and thirty-four (34) specific gravity results.

Equipment: MTS Electro-Hydraulic Testing Machine
Sartorius Universal Scale Model U4600p + **V40

Method: ISRM-1979 (UCS & Modulus) & ASTM C-97-02 (Bulk Density)

PB Hughes and Associates
1B-2775 Fir Street, Vancouver, British Columbia V6J 3C2
email phughes@mining.ubc.ca Phone: 604-626-9649

Comments:

The results of the testing of the thirty-three core samples for Unconfined Compressive Strength (UCS) with axial and circumferential elastic modulus readings, twenty UCS tests, and thirty-four specific gravity tests are presented within. The tests were performed per ISRM or ASTM standard unless noted.

Samples were shipped to the laboratory and tested 'as-is'. No rock descriptions were provided by Knight Piésold Ltd.

UCS samples identified as competent were wet cut and tested per ISRM specifications. Best efforts were made to cut the core samples such that the height to diameter ratio were within the ISRM standard. This was not possible on all samples as the samples sent to the laboratory were either too short to begin with or had detoriated during shipment. Samples that do not have a height to diameter ratio between 2.5 and 3.0 do not satisfy the ISRM test specification. However, samples with a height to width ratio between 2.0 and 2.5 do satisfy ASTM 7012-10 standards. Reported UCS values with specimen height to diameter ratios below the standard requirement must be employed with proper judgment in engineering applications.

Modulus results presented were prepared using data recorded by automated testing software. Calculations of strength and strain were performed in a spreadsheet. Reported modulus and Poisson`s ratio values were interpreted by calculating the slopes of the axial and circumferential strain vs. strain data using a 50 data point average around the 50% of the failure load.

Comments (continued):

Comment specific to the following four samples:

(a) DH14-012 / 59.82 - 60.10 m / UCS#1 / Main Embankment ;

(b) DH14-016 / 32.97 - 33.37 m / UCS#2 / Main Embankment ;

(c)DH14-028 / 53.87 - 54.23 m / UCS#1 / Main Embankment ;

(d)DH14-037 / 11.20 - 11.56 m / UCS#1 / East Embankment

These four sample failed at low strengths along pre-existing features. The Young's Modulus and Poisson's ratio values should only be used subject to the Engineer's judgment. Sample (c) & (d) failed such that a Poisson's ratio value was not obtained.

The test results reported are of an experimental and exploratory nature. No particular results can be guaranteed or considered representative of the rock mass as a whole. The use of the values reported must be considered with respect to the rock and rock mass in its entirety and the conditions present at site. Application of the test results provided is subject to judgment of a Professional Engineer. Worksheets and data files are available upon request

In closing, if there are any questions or comments with regards to this project, please do not hesitate to contact the undersigned.



Paul Hughes, PEng, Ph.D.
PB Hughes & Associates

Summary

Unconfined Compressive Strength Test with Young's Modulus and Poisson's Ratio Values

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Diameter d (mm)	Height H (mm)	Ratio H/d H/d	UCS (MPa)	UCS (psi)	Young Modulus E (GPa)	Poisson Ratio ν ( )
M1	DH14-002	33.24 - 33.61	UCS#1	East Embankment	173.05	60.42	2.86	89.82	13024	62.01	0.35
M2	DH14-002	46.51 - 46.80	UCS#2	East Embankment	171.71	60.04	2.86	107.12	15532	51.25	0.17
M3	DH14-005	35.73 - 36.06	UCS#2	East Embankment	168.45	60.19	2.80	92.94	13477	79.22	0.24
M4	DH14-005	32.62 - 32.94	UCS#1	East Embankment	169.82	60.27	2.82	25.47	3693	24.77	0.07
M5	DH14-005	44.45 - 44.67	UCS#3	East Embankment	163.35	60.34	2.71	72.90	10571	40.21	0.13
M7	DH14-008	62.33 - 62.64	UCS#2	Main Embankment	168.21	60.36	2.79	98.41	14270	46.17	0.20
M8	DH14-008	68.91 - 69.17	UCS#3	Main Embankment	172.12	60.56	2.84	31.12	4513	36.64	0.20
M9	DH14-009	37.02 - 37.28	UCS#3	Main Embankment	172.51	60.39	2.86	109.68	15904	78.92	0.14
M10	DH14-010	18.21 - 18.49	UCS#1	Main Embankment	169.10	60.47	2.80	84.99	12323	75.20	0.25
M11	DH14-010	47.20 - 47.53	UCS#2	Main Embankment	171.36	60.26	2.84	154.28	22371	69.23	0.24
M12	DH14-012	59.82 - 60.10	UCS#1	Main Embankment	163.84	60.34	2.72	4.91	712	5.30	0.10
M13	DH14-013	45.65 - 45.95	UCS#1	Plant Site	121.71	60.48	2.01	70.34	10200	45.26	0.34
M14	DH14-013	85.47 - 85.75	UCS#3	Plant Site	132.66	60.53	2.19	28.43	4122	100.98	0.39
M16	DH14-015	74.17 - 74.47	UCS#1	Main Embankment	139.48	60.30	2.31	19.22	2787	8.84	0.18
M17	DH14-016	23.51 - 24.00	UCS#1	Main Embankment	169.50	60.72	2.79	26.26	3808	24.53	0.12
M18	DH14-016	32.97 - 33.37	UCS#2	Main Embankment	173.18	60.57	2.86	6.60	957	175.84	0.17
M19	DH14-016	50.10 - 50.40	UCS#3	Main Embankment	178.57	60.66	2.94	18.56	2691	14.47	0.29

Unconfined Compressive Strength Test with Young's Modulus and Poisson's Ratio Values (continued)

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Diameter d (mm)	Height H (mm)	Ratio H/d H/d	UCS (MPa)	UCS (psi)	Young Modulus E (GPa)	Poisson Ratio ν ( )
M21	DH14-018	38.80 - 39.00	UCS#2	Downstream of Main Embankment	164.03	60.54	2.71	97.96	14204	66.19	0.19
M22	DH14-021	21.98 - 22.30	UCS#1	Main Embankment	167.93	60.43	2.78	30.29	4392	7.75	0.21
M23	DH14-021	39.87 - 40.12	UCS#2	Main Embankment	174.23	60.47	2.88	40.64	5893	9.44	0.37
M24	DH14-021	50.92 - 51.22	UCS#3	Main Embankment	124.42	60.53	2.06	38.35	5560	11.56	0.20
M25	DH14-022	18.49 - 18.67	UCS#1	Main Embankment	172.93	60.40	2.86	34.10	4944	26.30	0.23
M26	DH14-022	51.04 - 51.35	UCS#2	Main Embankment	168.29	60.31	2.79	32.98	4782	25.81	0.15
M27	DH14-028	53.87 - 54.23	UCS#1	Main Embankment	171.34	60.13	2.85	7.89	1144	98.00	0.54
M28	DH14-034	12.48 - 12.79	UCS#1	South-west Embankment	170.89	60.47	2.83	21.57	3127	23.53	0.16
M30	DH14-034	33.91 - 34.21	UCS#3	South-west Embankment	169.11	60.26	2.81	93.71	13588	78.93	0.28
M31	DH14-035	13.30 - 13.57	UCS#1	South-west Embankment	176.20	60.45	2.91	41.89	6074	19.56	0.12
M32	DH14-035	27.20 - 27.49	UCS#2	South-west Embankment	169.77	60.42	2.81	66.18	9595	50.50	0.18
M33	DH14-035	31.47 - 31.76	UCS#3	South-west Embankment	179.39	60.25	2.98	106.15	15391	60.24	0.20
M35	DH14-037	11.20 - 11.56	UCS#1	East Embankment	178.72	60.40	2.96	12.21	1770	2.75	0.12
M37	DH14-037	68.50 - 68.81	UCS#3	East Embankment	171.24	60.55	2.83	152.80	22157	71.48	0.19
M38	DH14-038	18.17 - 18.51	UCS#1	South Embankment	180.55	60.40	2.99	41.26	5982	8.32	0.09
M39	DH14-038	34.60 - 34.85	UCS#2	South Embankment	179.06	60.53	2.96	66.87	9696	51.44	0.18

Unconfined Compressive Strength Test

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Diameter d (mm)	Height H (mm)	Ratio H/d H/d	UCS (MPa)	UCS (psi)
U1	UCS #4 BHUD14-02	4.56 - 4.79	UCS#2	Between Main and East Embankment	60.06	171.98	2.86	11.6	1685
U2	UCS #8 BHUD14-04	16.68 - 16.93	UCS#3	Between Main and East Embankment	60.07	159.93	2.66	14.2	2062
U3	UCS #11 BHUD14-06	27.51 - 27.71	UCS#1	Inside TSF close to East Embankment	60.33	150.67	2.50	292.0	42343
U4	UCS #12 BHUD14-06	39.86 - 40.20	UCS#2	Inside TSF close to East Embankment	60.63	169.53	2.80	98.5	14286
U5	UCS #15 BHLD14-05	22.88 - 23.13	UCS#1	SWRSA	59.67	172.65	2.89	80.6	11693
U6	UCS #21 BHLD14-02	31.23 - 31.45	UCS#2	SWRSA	59.66	170.77	2.86	68.2	9889
U7	UCS#22 BHLD14-01	84.13 - 84.38	UCS#3	SWRSA	58.51	169.99	2.91	30.0	4356
U8	UCS #4 BHUD14-02	24.78 - 25.14	UCS#1	Main Embankment	60.47	168.14	2.78	162.3	23531
U9	UCS #8 BHUD14-04	43.89 - 44.25	UCS#2	Main Embankment	60.37	170.26	2.82	25.0	3620
U10	UCS #11 BHUD14-06	36.20 - 36.50	UCS#1	small seepage pond Embankment	60.58	130.62	2.16	27.4	3976
U11	UCS #12 BHUD14-06	76.69 - 76.94	UCS#2	small seepage pond Embankment	60.55	122.53	2.02	18.6	2698
U12	UCS #15 BHLD14-05	89.52 - 89.76	UCS#3	small seepage pond Embankment	60.54	165.17	2.73	17.1	2478
U13	UCS #21 BHLD14-02	39.50 - 39.78	UCS#1	SWRSA	60.23	163.85	2.72	66.6	9656
U14	UCS#22 BHLD14-01	75.14 - 75.50	UCS#2	SWRSA	60.31	168.06	2.79	56.3	8162
U15	UCS #4 BHUD14-02	16.71 - 16.99	UCS#1	SWRSA	60.24	126.67	2.10	10.0	1457
U16	UCS #8 BHUD14-04	43.94 - 44.22	UCS#2	SWRSA	60.24	170.44	2.83	106.2	15392
U17	UCS #11 BHUD14-06	66.22 - 66.44	UCS#3	SWRSA	60.36	128.59	2.13	112.7	16347
U18	UCS #12 BHUD14-06	32.71 - 32.99	UCS#1	SWRSA	60.5	170.92	2.83	39.9	5781
U19	UCS #15 BHLD14-05	45.35 - 45.60	UCS#2	SWRSA	60.44	169.87	2.81	28.7	4165
U20	UCS #21 BHLD14-02	96.35 - 96.68	UCS#3	SWRSA	60.48	169.8	2.81	12.7	1841

Specific Gravity and Moisture Content Test Results

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Natural Weight (g)	Dry Weight (g)	Bath Weight (g)	Bulk Specific Gravity	Moisture Content (%)
M1	DH14-002	33.24 - 33.61	UCS#1	East Embankment	1676.0	1669.8	1062.1	2.75	0.37%
M2	DH14-002	46.51 - 46.80	UCS#2	East Embankment	718.3	717.3	455.6	2.74	0.14%
M3	DH14-005	35.73 - 36.06	UCS#2	East Embankment	875.2	873.2	553.8	2.73	0.23%
M4	DH14-005	32.62 - 32.94	UCS#1	East Embankment	1017.1	1013.7	642.1	2.73	0.34%
M5	DH14-005	44.45 - 44.67	UCS#3	East Embankment	272.7	271.4	171.9	2.73	0.48%
M7	DH14-008	62.33 - 62.64	UCS#2	Main Embankment	1040.2	1036.8	681.3	2.92	0.33%
M8	DH14-008	68.91 - 69.17	UCS#3	Main Embankment	608.3	606.3	387.9	2.78	0.33%
M9	DH14-009	37.02 - 37.28	UCS#3	Main Embankment	582.7	581.7	368.9	2.73	0.17%
M10	DH14-010	18.21 - 18.49	UCS#1	Main Embankment	542.3	541.3	352.3	2.86	0.18%
M11	DH14-010	47.20 - 47.53	UCS#2	Main Embankment	981.7	981.1	637.1	2.85	0.06%
M12	DH14-012	59.82 - 60.10	UCS#1	Main Embankment	389.6	386.0	240.5	2.65	0.93%
M13	DH14-013	45.65 - 45.95	UCS#1	Plant Site	1297.3	1291.4	851.1	2.93	0.46%
M14	DH14-013	85.47 - 85.75	UCS#3	Plant Site	463.0	462.4	306.7	2.97	0.13%
M16	DH14-015	74.17 - 74.47	UCS#1	Main Embankment	699.0	693.3	438.9	2.73	0.82%
M17	DH14-016	23.51 - 24.00	UCS#1	Main Embankment	2006.7	1994.4	1264.2	2.73	0.62%
M18	DH14-016	32.97 - 33.37	UCS#2	Main Embankment	1084.4	1079.2	684.2	2.73	0.48%
M19	DH14-016	50.10 - 50.40	UCS#3	Main Embankment	823.9	819.3	520.9	2.75	0.56%

Specific Gravity and Moisture Content Test Results (continued)

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Natural Weight (g)	Dry Weight (g)	Bath Weight (g)	Bulk Specific Gravity	Moisture Content (%)
M21	DH14-018	38.80 - 39.00	UCS#2	Downstream of Main Embankment	306.1	305.5	201.1	2.93	0.20%
M22	DH14-021	21.98 - 22.30	UCS#1	Main Embankment	963.0	958.0	610.9	2.76	0.52%
M23	DH14-021	39.87 - 40.12	UCS#2	Main Embankment	733.1	728.2	463.1	2.75	0.67%
M24	DH14-021	50.92 - 51.22	UCS#3	Main Embankment	940.7	935.2	595.8	2.76	0.59%
M25	DH14-022	18.49 - 18.67	UCS#1	Main Embankment	598.0	595.1	385.8	2.84	0.49%
M26	DH14-022	51.04 - 51.35	UCS#2	Main Embankment	1008.5	1005.6	651.5	2.840	0.29%
M27	DH14-028	53.87 - 54.23	UCS#1	Main Embankment	1382.5	1373.7	863.8	2.694	0.64%
M28	DH14-034	12.48 - 12.79	UCS#1	South-west Embankment	855.6	852.5	553.0	2.846	0.36%
M30	DH14-034	33.91 - 34.21	UCS#3	South-west Embankment	763.4	761.5	502.6	2.941	0.25%
M31	DH14-035	13.30 - 13.57	UCS#1	South-west Embankment	525.4	524.1	333.5	2.750	0.25%
M32	DH14-035	27.20 - 27.49	UCS#2	South-west Embankment	733.6	731.5	469.1	2.788	0.29%
M33	DH14-035	31.47 - 31.76	UCS#3	South-west Embankment	886.0	884.7	580.6	2.909	0.15%
M35	DH14-037	11.20 - 11.56	UCS#1	East Embankment	1000.6	967.6	590.1	2.563	3.41%
M37	DH14-037	68.50 - 68.81	UCS#3	East Embankment	979.6	978.0	639.1	2.886	0.16%
M38	DH14-038	18.17 - 18.51	UCS#1	South Embankment	957.8	940.4	589.4	2.679	1.85%
M39	DH14-038	34.60 - 34.85	UCS#2	South Embankment	333.2	330.6	210.1	2.744	0.79%

ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-002
Depth (m):	33.24 - 33.61
Sample Number:	UCS#1
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	62.01
Poisson Ratio, ν:	0.35
Failure Mode:	shear
Specific Gravity:	2.75

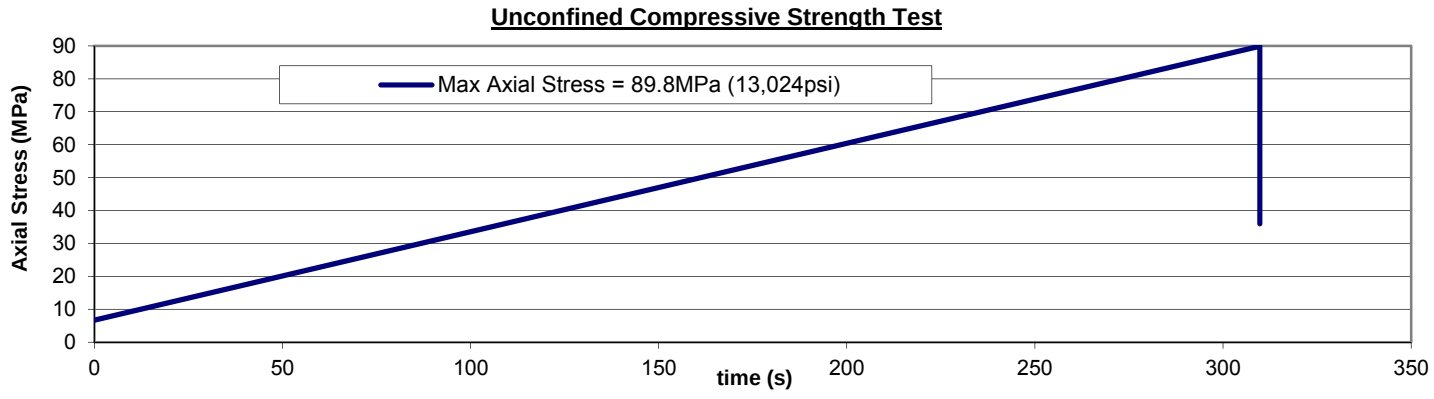
Before Test

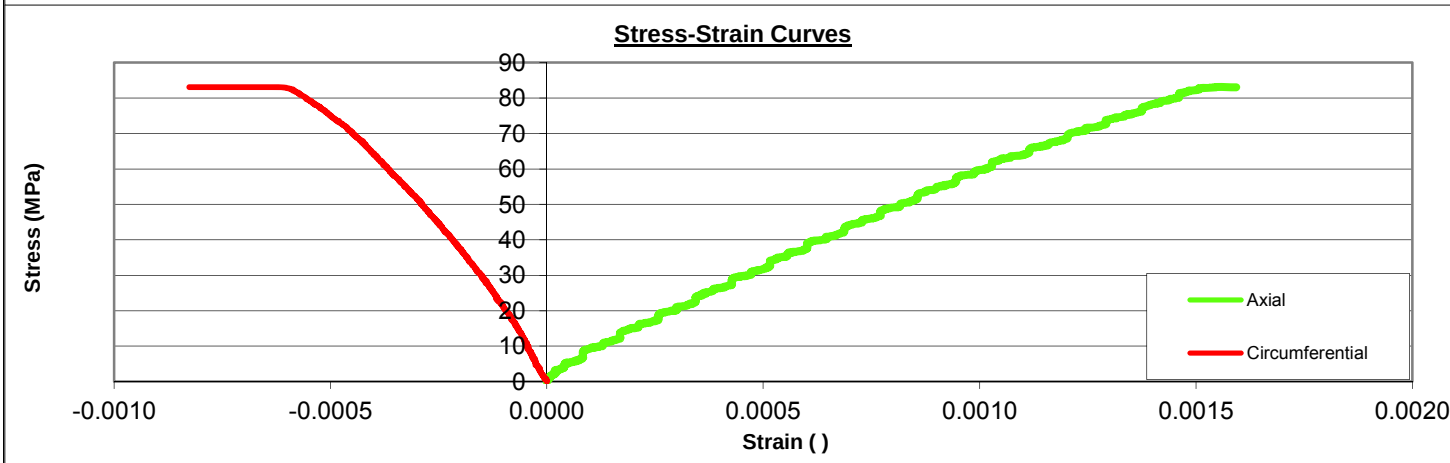


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.42	2867.2	173.05	2.9	257.5	89.8	13,024

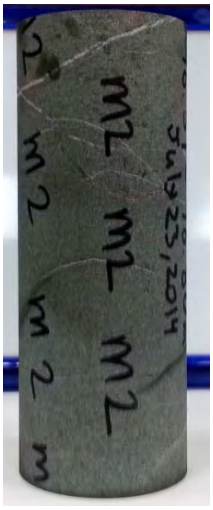




ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-002
Depth (m):	46.51 - 46.80
Sample Number:	UCS#2
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	51.25
Poisson Ratio, ν:	0.17
Failure Mode:	pre-existing feature
Specific Gravity:	2.74

Before Test

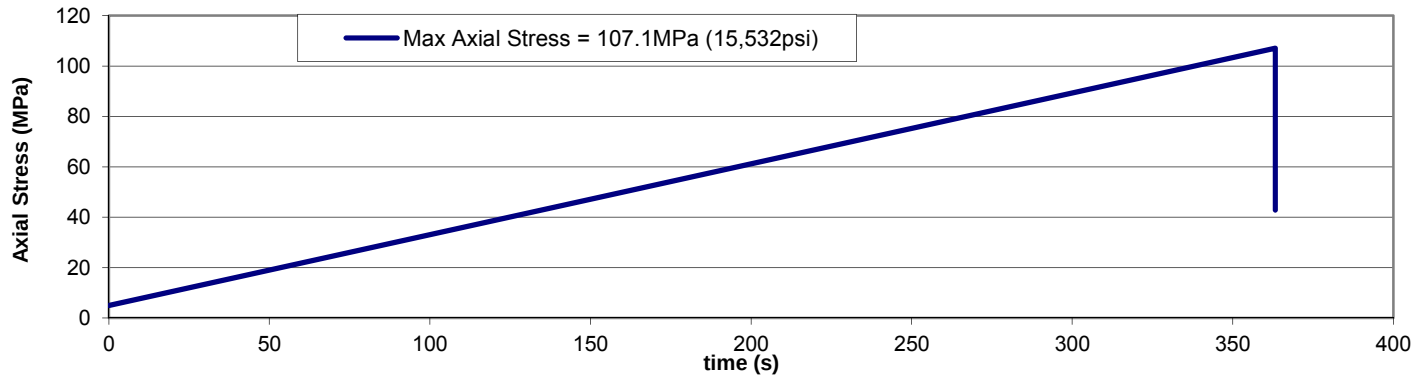


After Test

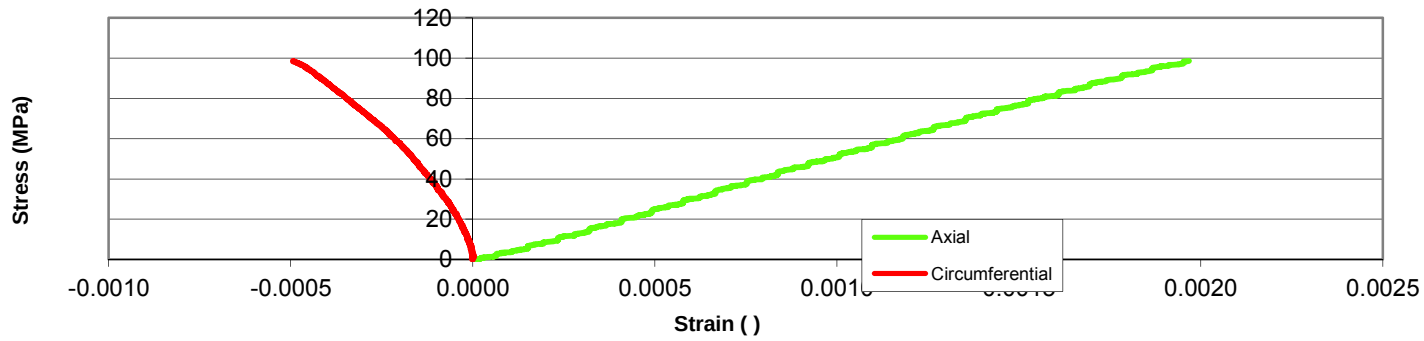


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.04	2831.2	171.71	2.9	303.3	107.1	15,532

Unconfined Compressive Strength Test



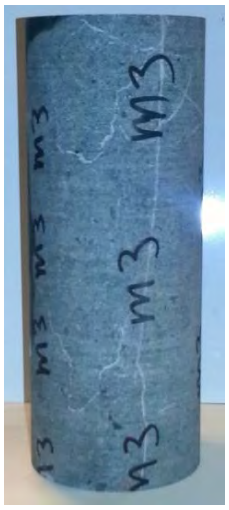
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-005
Depth (m):	35.73 - 36.06
Sample Number:	UCS#2
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	79.22
Poisson Ratio, ν:	0.24
Failure Mode:	shear
Specific Gravity:	2.73

Before Test

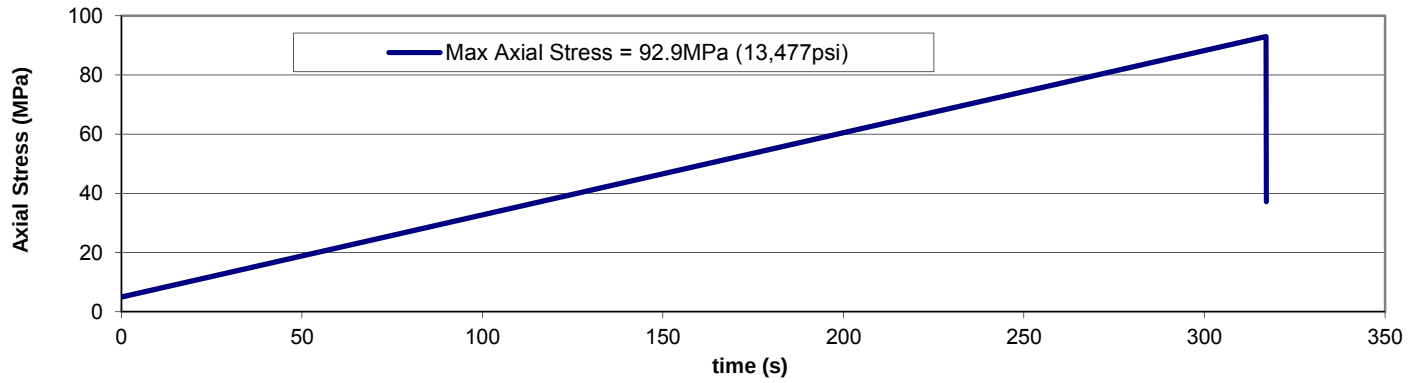


After Test

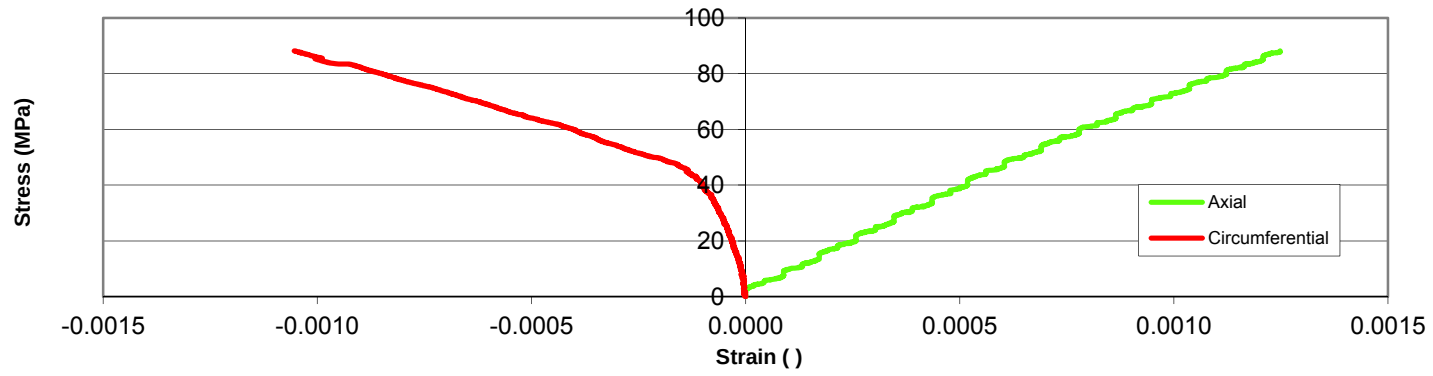


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.19	2845.4	168.45	2.8	264.5	92.9	13,477

Unconfined Compressive Strength Test



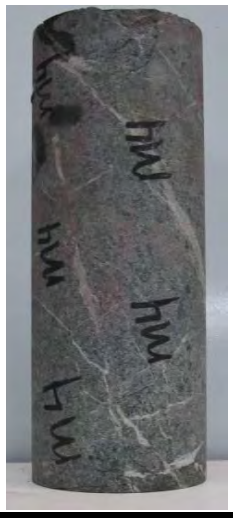
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-005
Depth (m):	32.62 - 32.94
Sample Number:	UCS#1
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	24.77
Poisson Ratio, ν:	0.07
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

Before Test

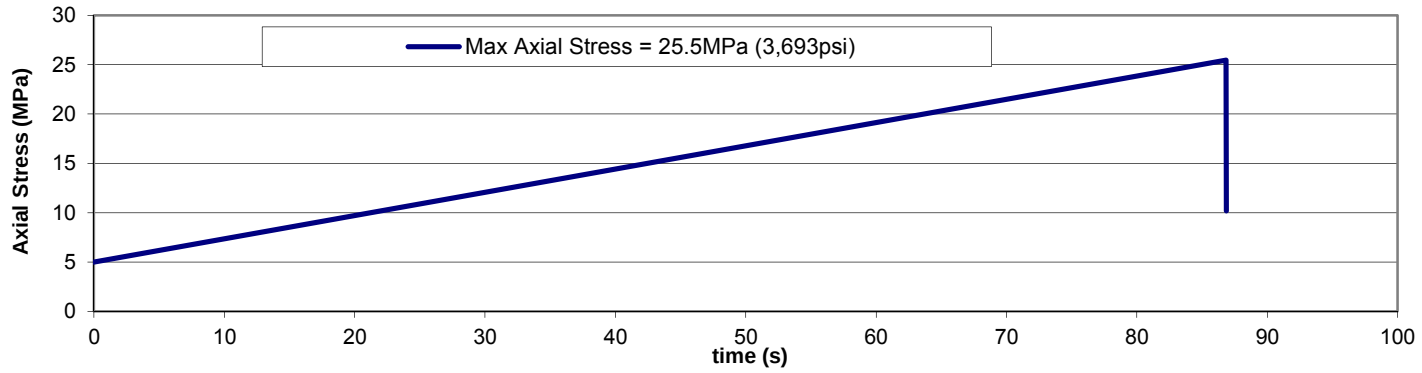


After Test

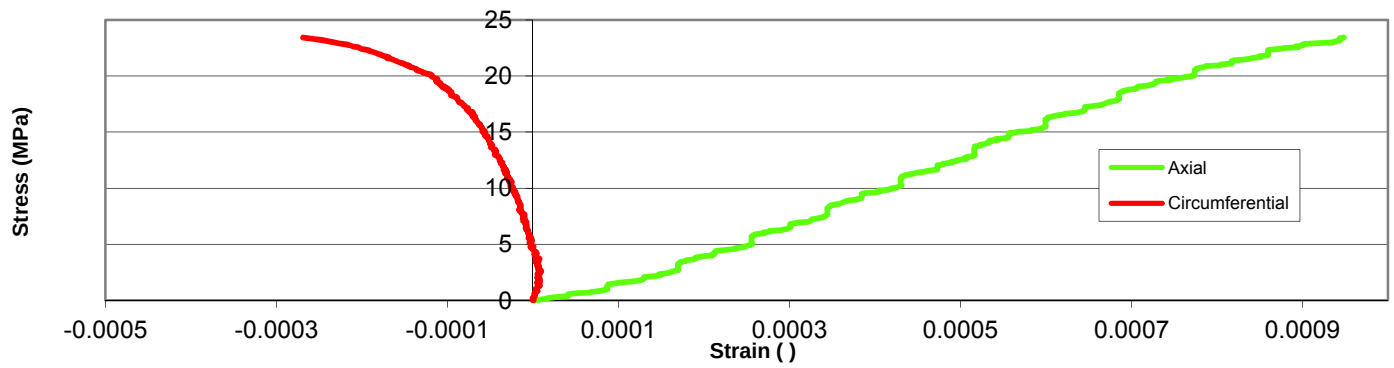


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.27	2852.9	169.82	2.8	72.7	25.5	3,693

Unconfined Compressive Strength Test



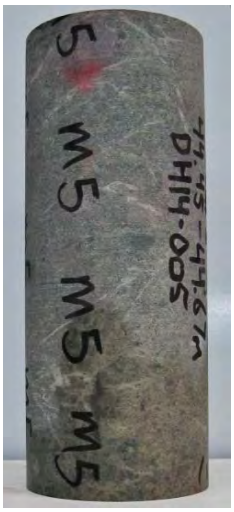
Stress-Strain Curves



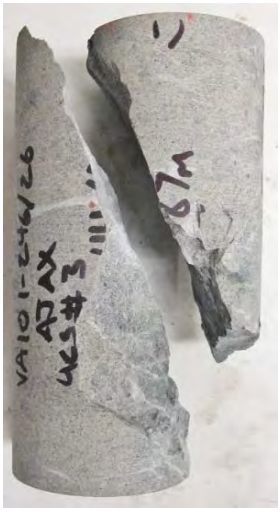
ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-005
Depth (m):	44.45 - 44.67
Sample Number:	UCS#3
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	40.21
Poisson Ratio, ν:	0.13
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

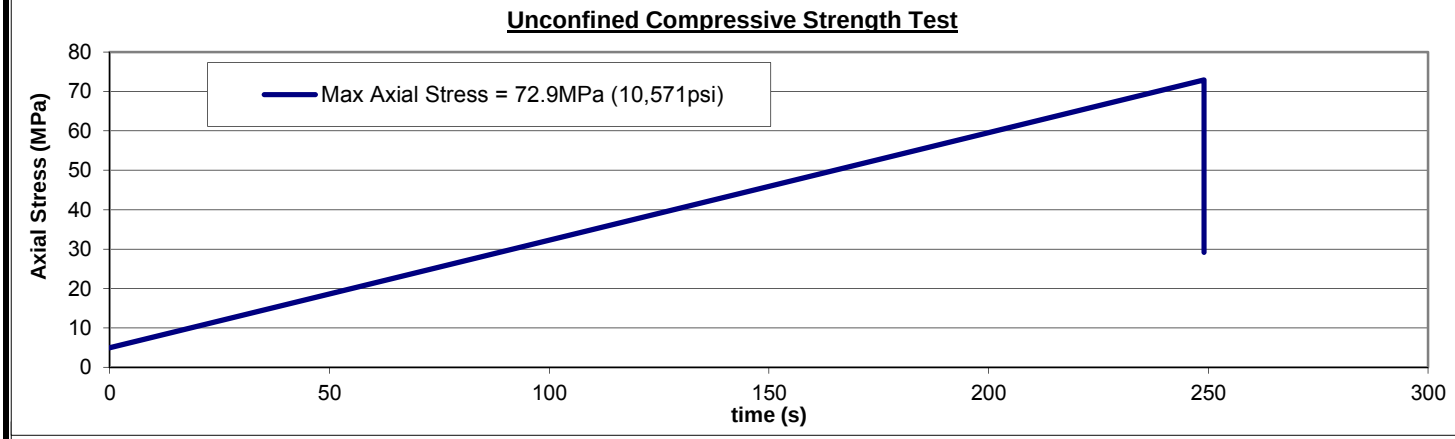
Before Test

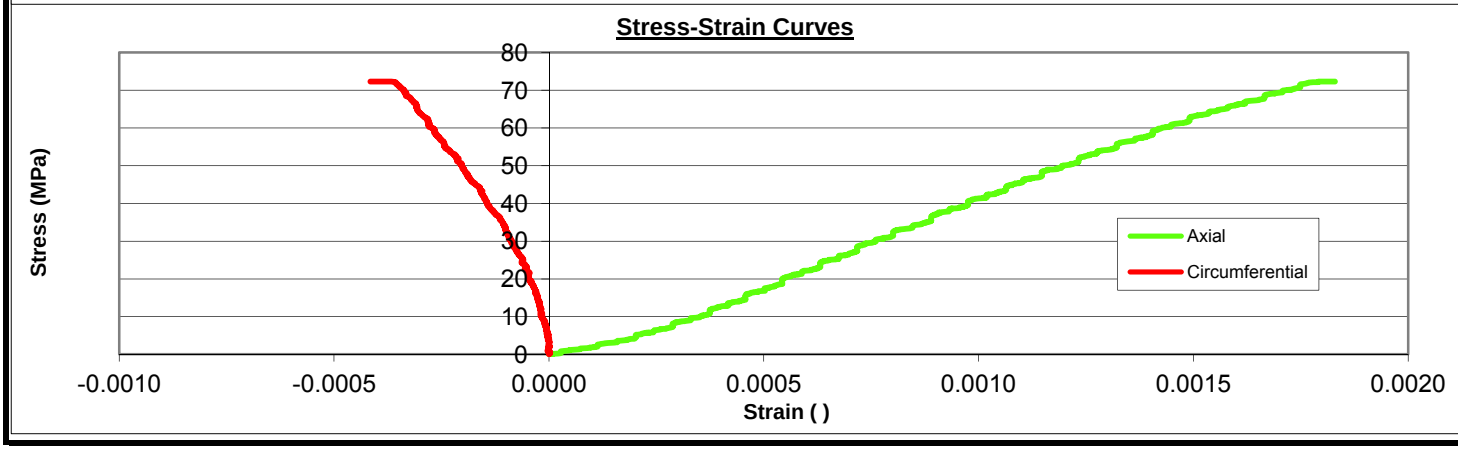


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.34	2859.6	163.35	2.7	208.5	72.9	10,571

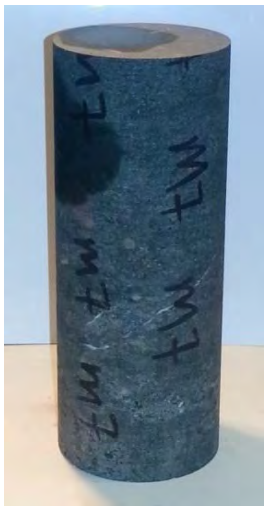




ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-008
Depth (m):	62.33 - 62.64
Sample Number:	UCS#2
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	46.17
Poisson Ratio, ν:	0.20
Failure Mode:	shear
Specific Gravity:	2.92

Before Test

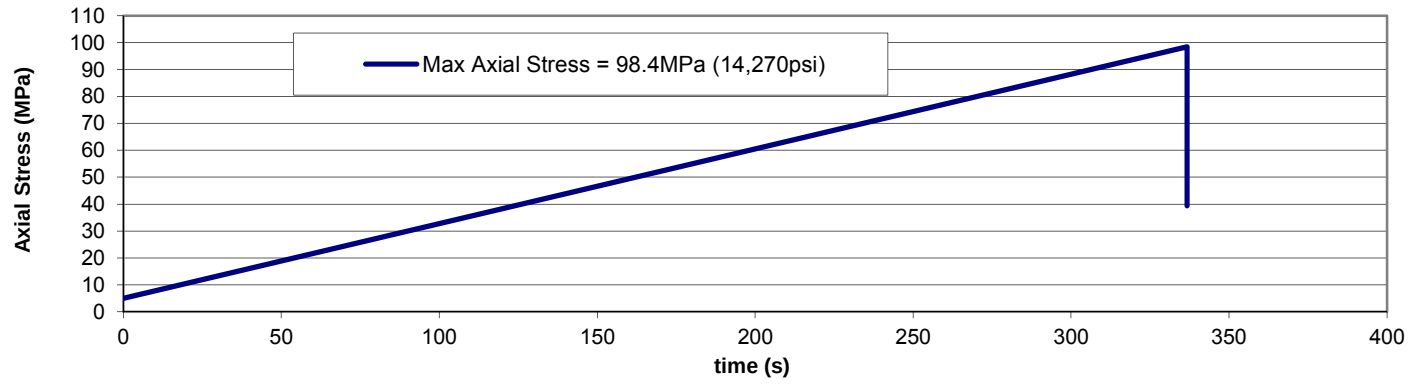


After Test

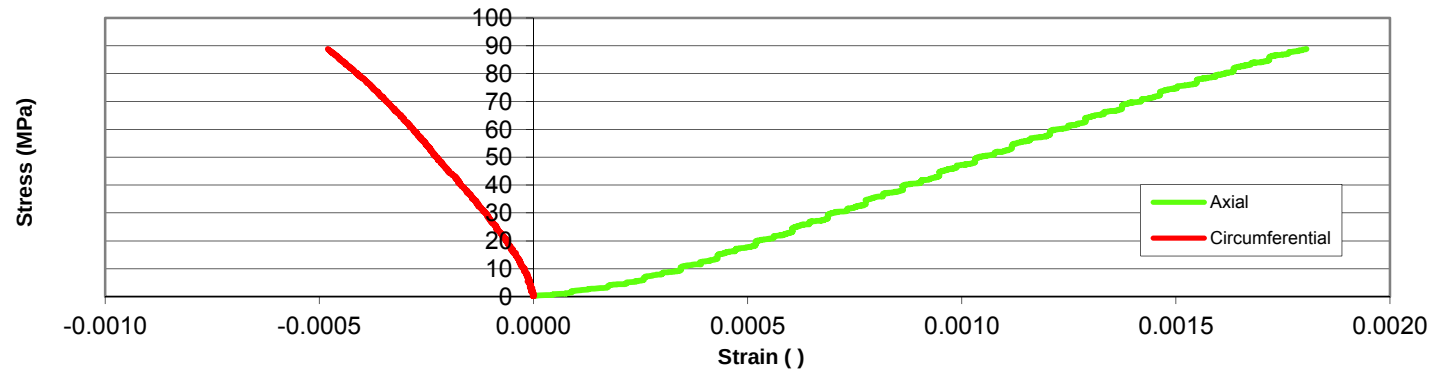


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.36	2861.5	168.21	2.8	281.6	98.4	14,270

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-008
Depth (m):	68.91 - 69.17
Sample Number:	UCS#3
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	36.64
Poisson Ratio, ν:	0.20
Failure Mode:	shear
Specific Gravity:	2.78

Before Test

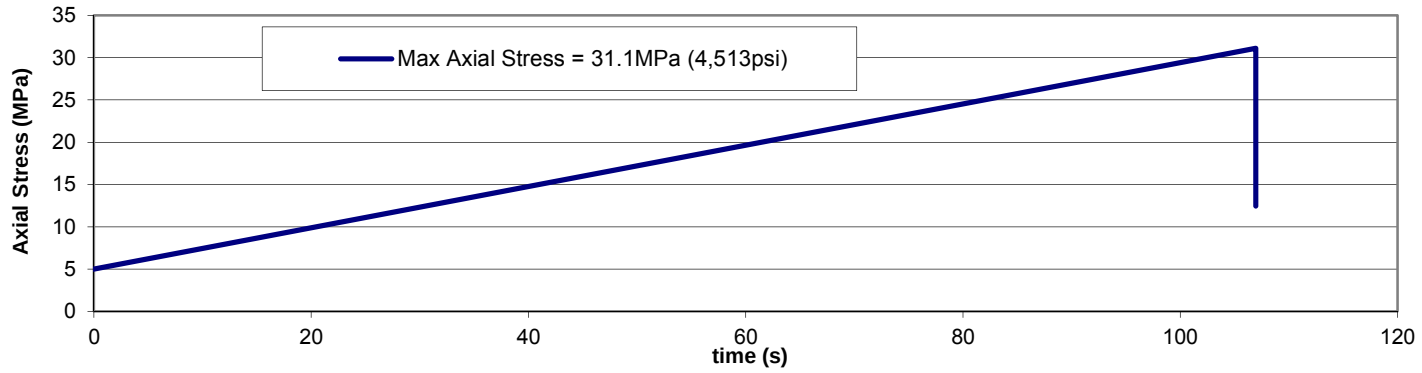


After Test

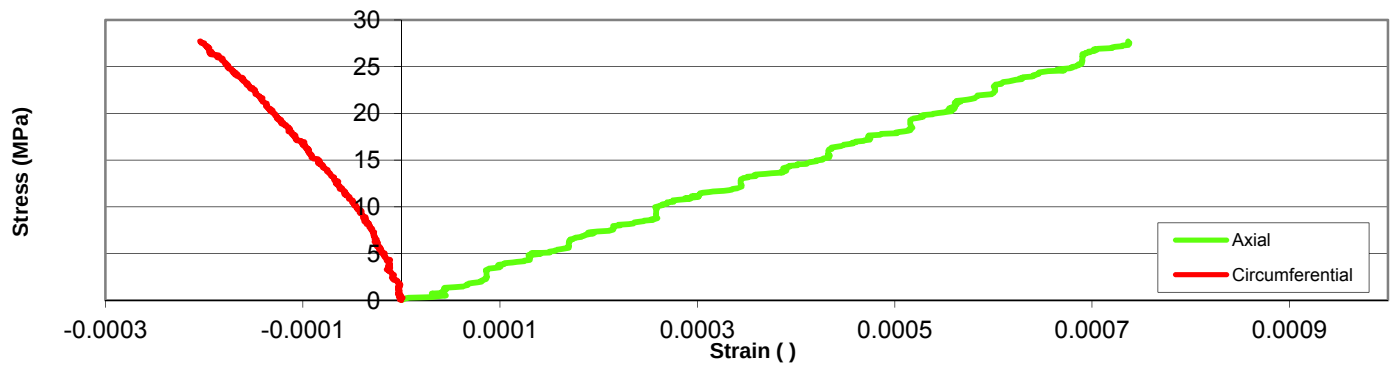


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.56	2880.5	172.12	2.8	89.6	31.1	4,513

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-009
Depth (m):	37.02 - 37.28
Sample Number:	UCS#3
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	78.92
Poisson Ratio, ν:	0.14
Failure Mode:	shear
Specific Gravity:	2.73

Before Test

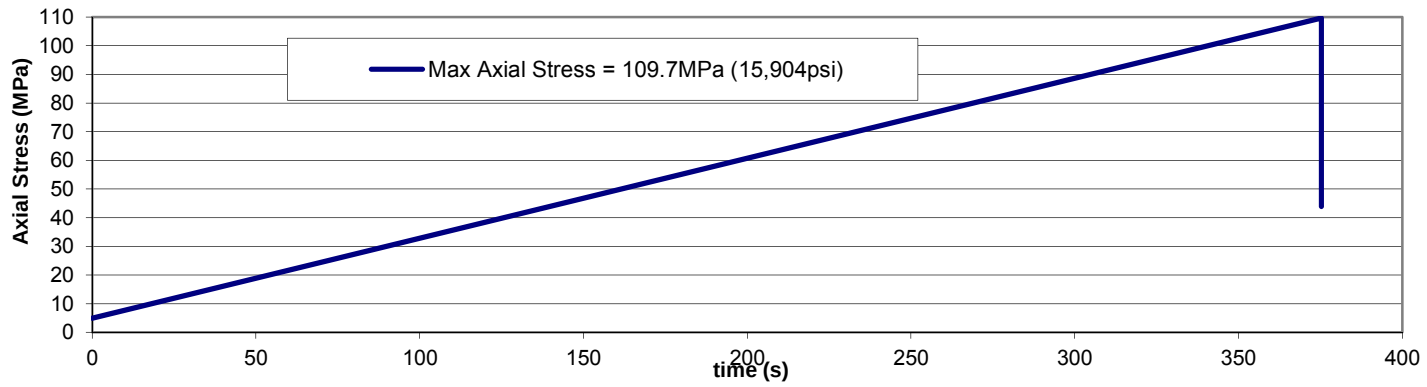


After Test

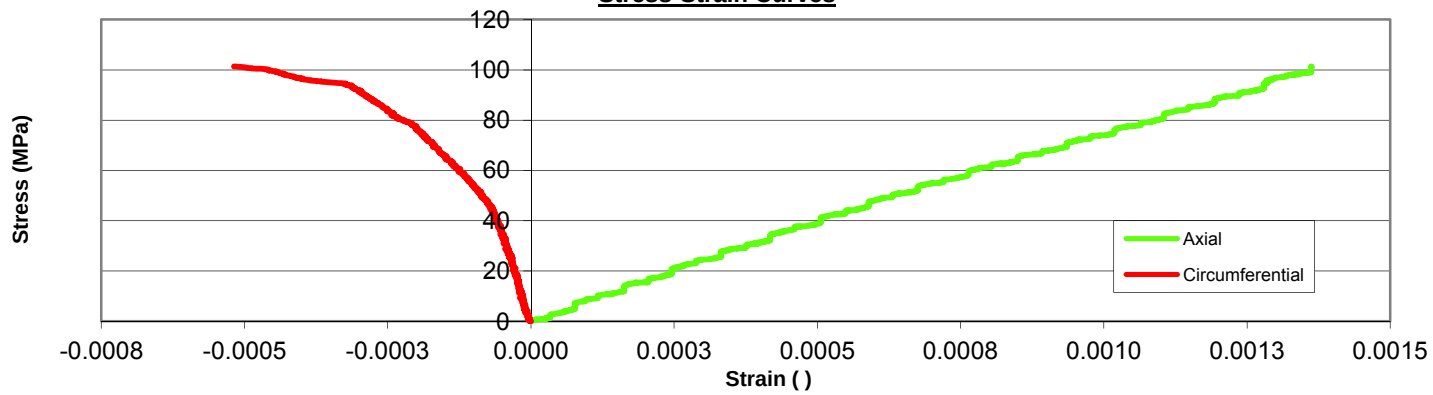


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.39	2864.3	172.51	2.9	314.2	109.7	15,904

Unconfined Compressive Strength Test



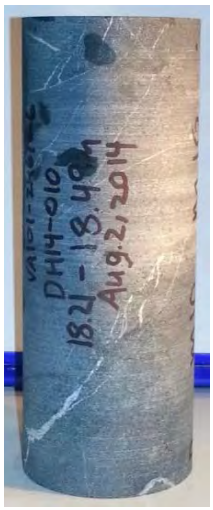
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-010
Depth (m):	18.21 - 18.49
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	75.20
Poisson Ratio, ν:	0.25
Failure Mode:	pre-existing feature
Specific Gravity:	2.86

Before Test

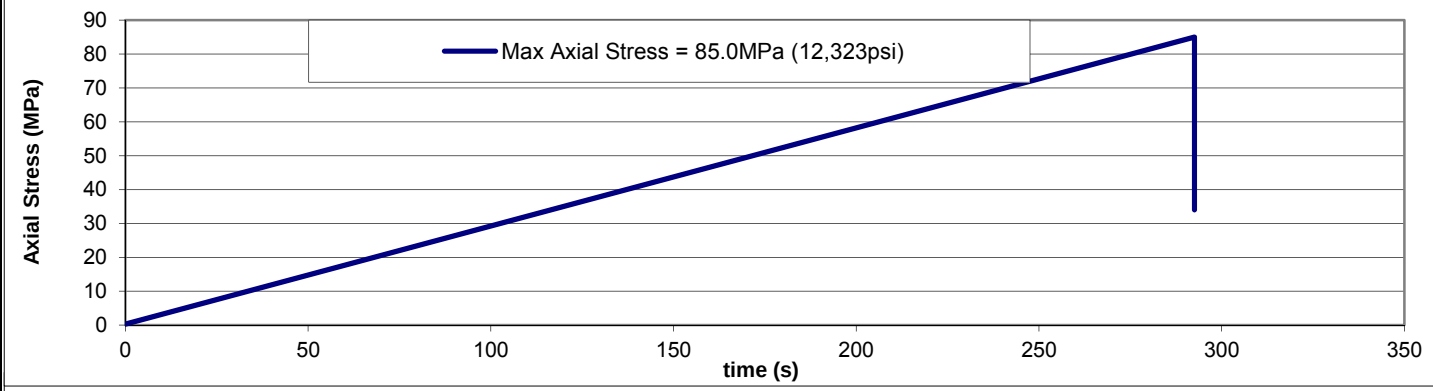


After Test

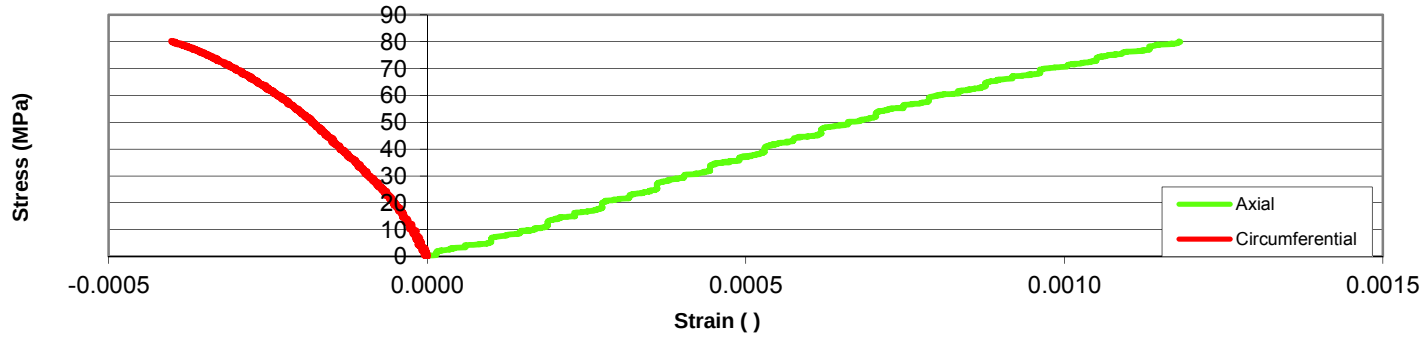


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.47	2871.9	169.10	2.8	244.1	85.0	12,323

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-010
Depth (m):	47.20 - 47.53
Sample Number:	UCS#2
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	69.23
Poisson Ratio, ν:	0.24
Failure Mode:	shear
Specific Gravity:	2.85

Before Test

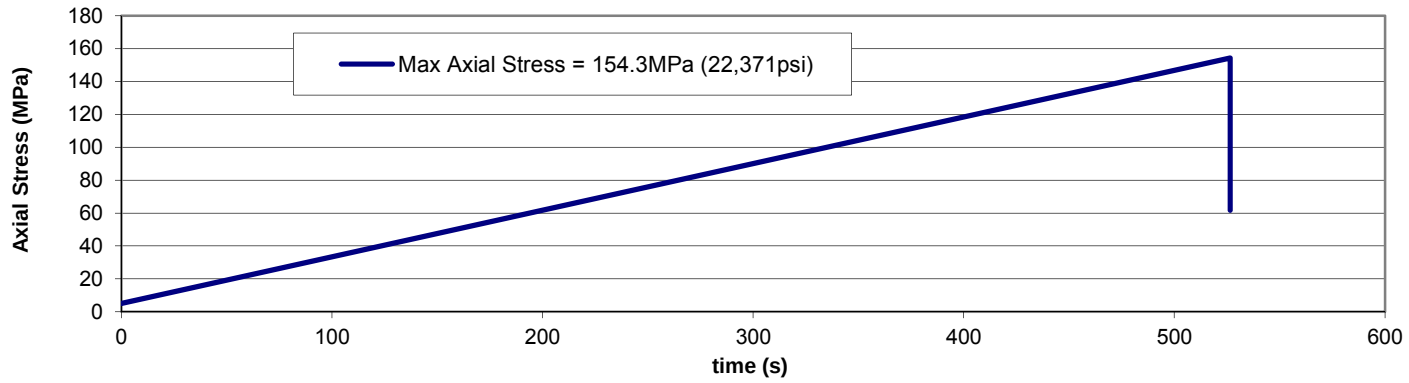


After Test

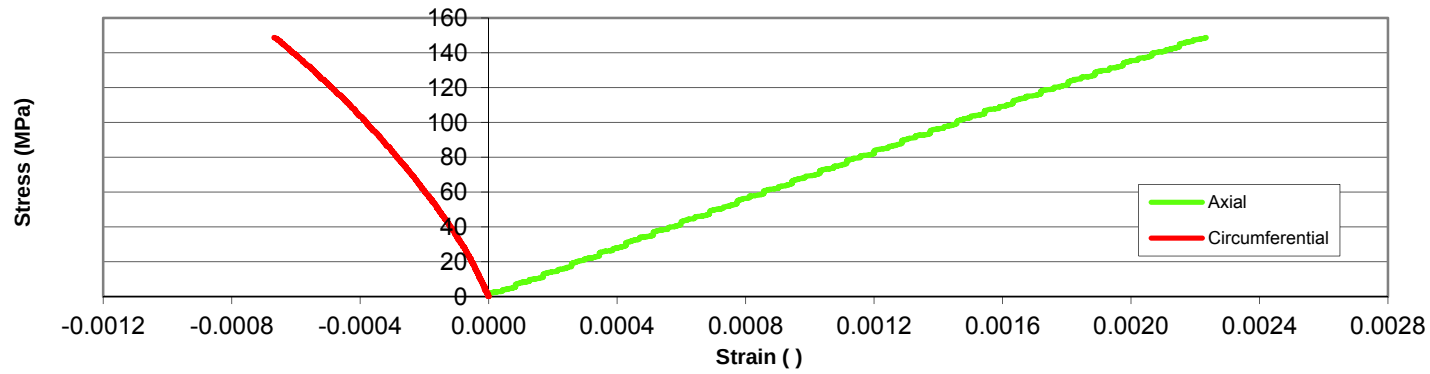


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.26	2852.0	171.36	2.8	440.0	154.3	22,371

Unconfined Compressive Strength Test



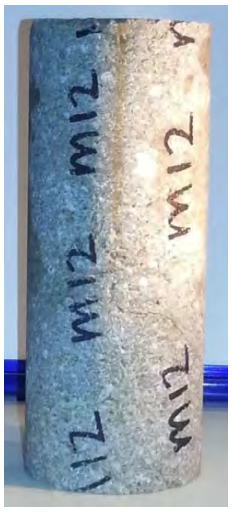
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-012
Depth (m):	59.82 - 60.10
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	5.30
Poisson Ratio, ν:	0.10
Failure Mode:	pre-existing feature
Specific Gravity:	2.65

Before Test

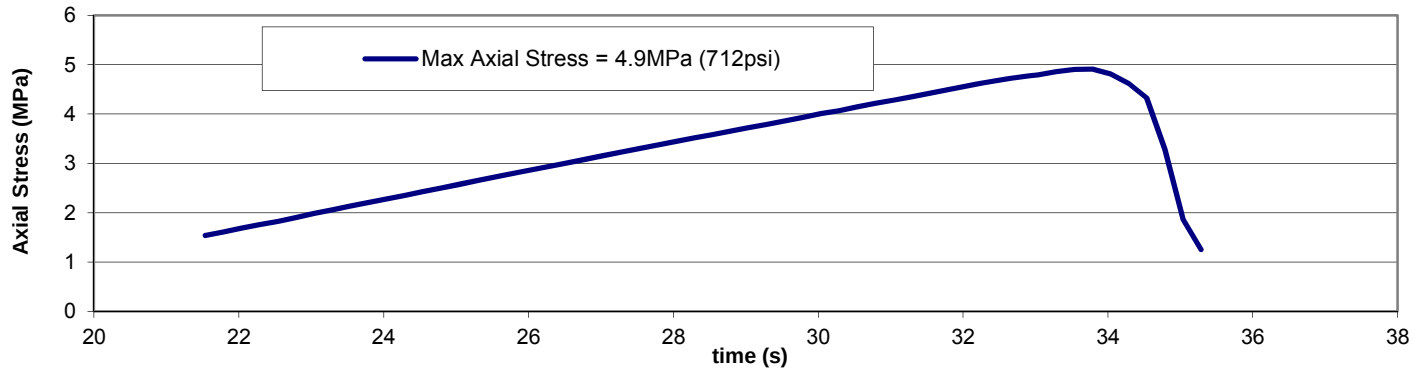


After Test

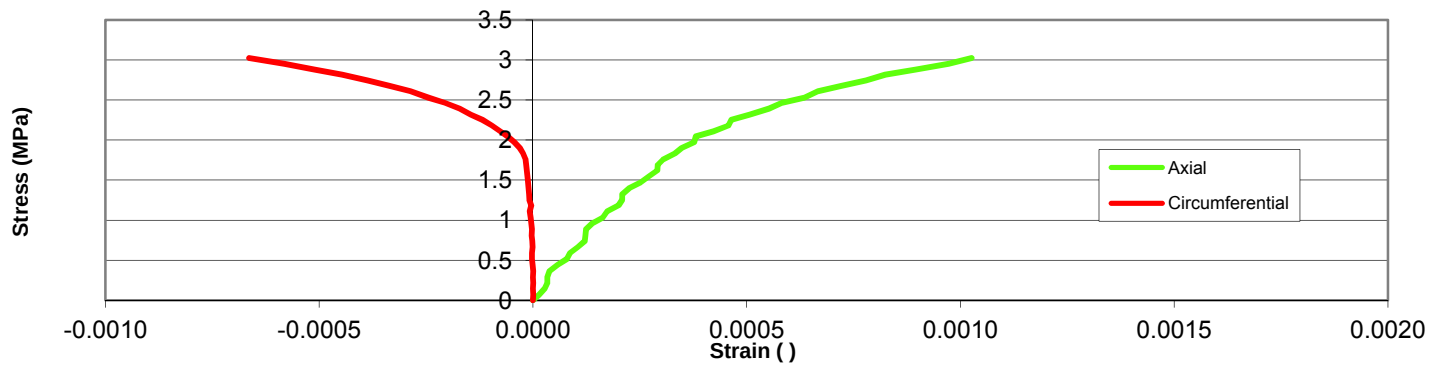


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.34	2859.6	163.84	2.7	14.0	4.9	712

Unconfined Compressive Strength Test



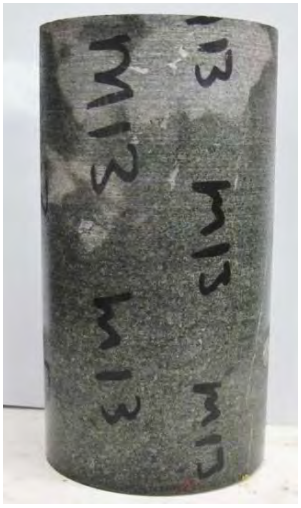
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-013
Depth (m):	45.65 - 45.95
Sample Number:	UCS#1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	45.26
Poisson Ratio, ν:	0.34
Failure Mode:	shear
Specific Gravity:	2.93

Before Test

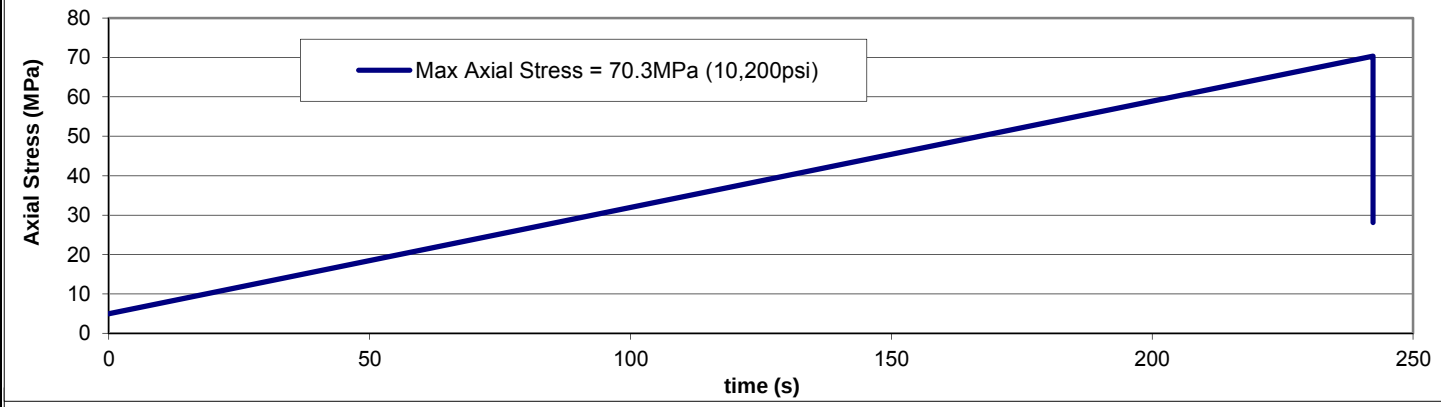


After Test

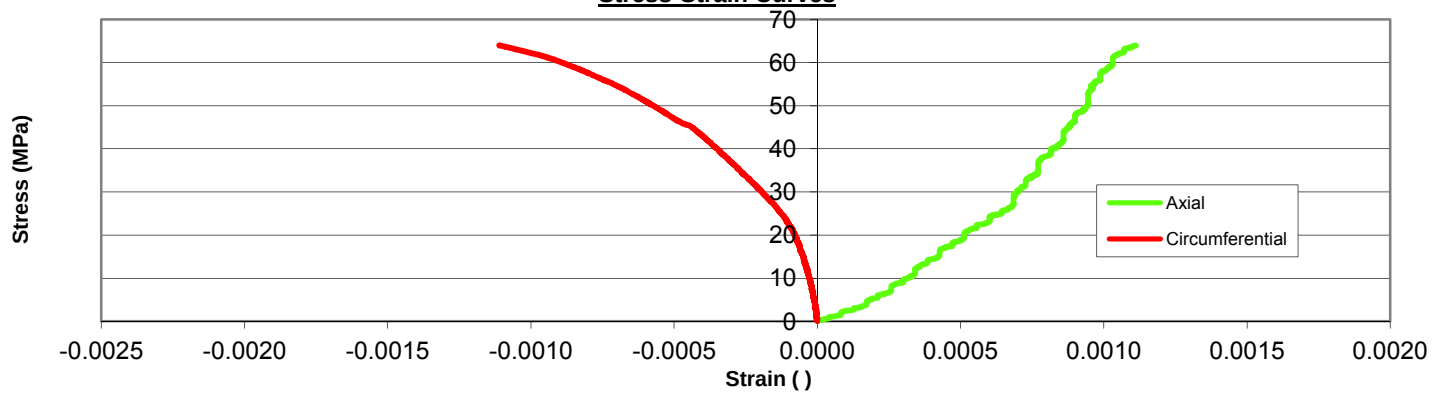


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.48	2872.9	121.71	2.0	202.1	70.3	10,200

Unconfined Compressive Strength Test



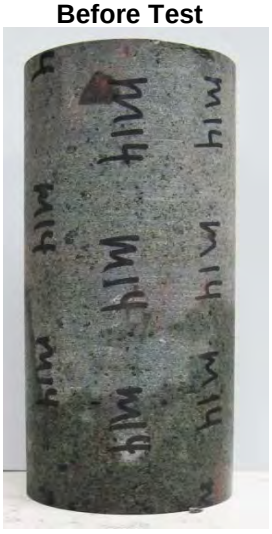
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-013
Depth (m):	85.47 - 85.75
Sample Number:	UCS#3
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	100.98
Poisson Ratio, ν:	0.39
Failure Mode:	pre-existing feature
Specific Gravity:	2.97

Before Test

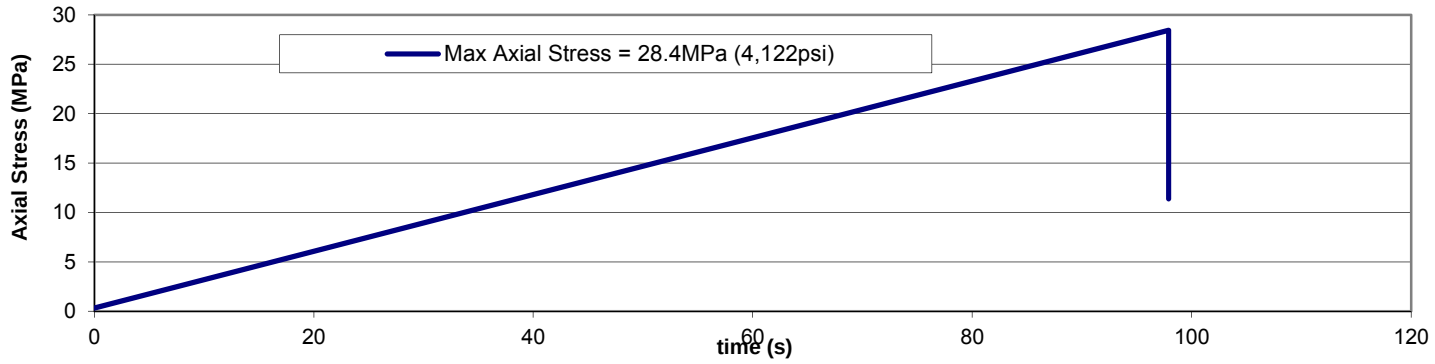


After Test

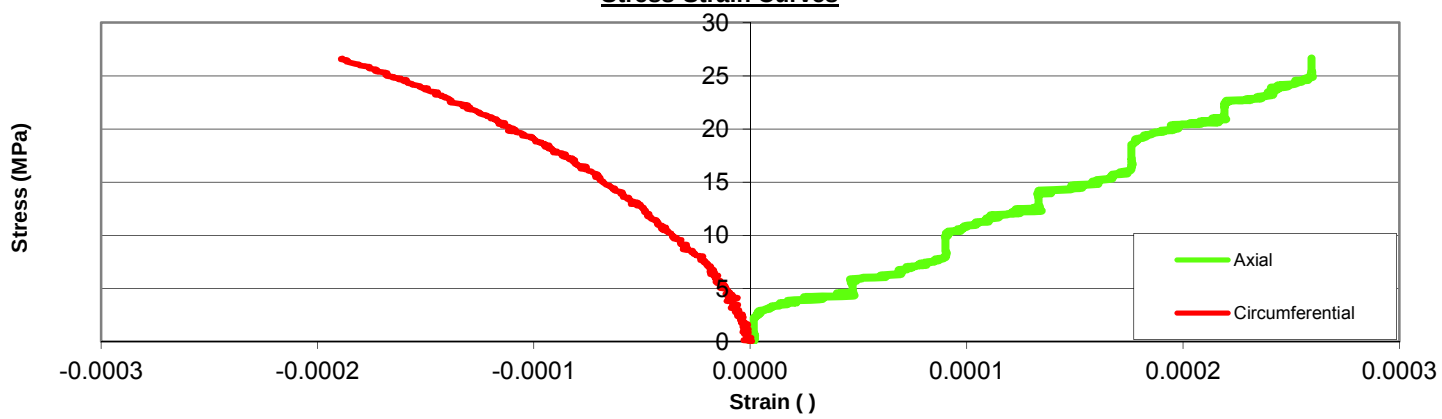


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.53	2877.6	132.66	2.2	81.8	28.4	4,122

Unconfined Compressive Strength Test



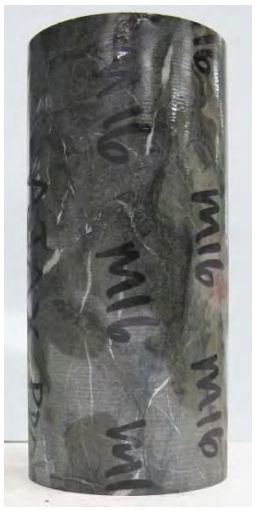
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-015
Depth (m):	74.17 - 74.47
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	8.84
Poisson Ratio, ν:	0.18
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

Before Test

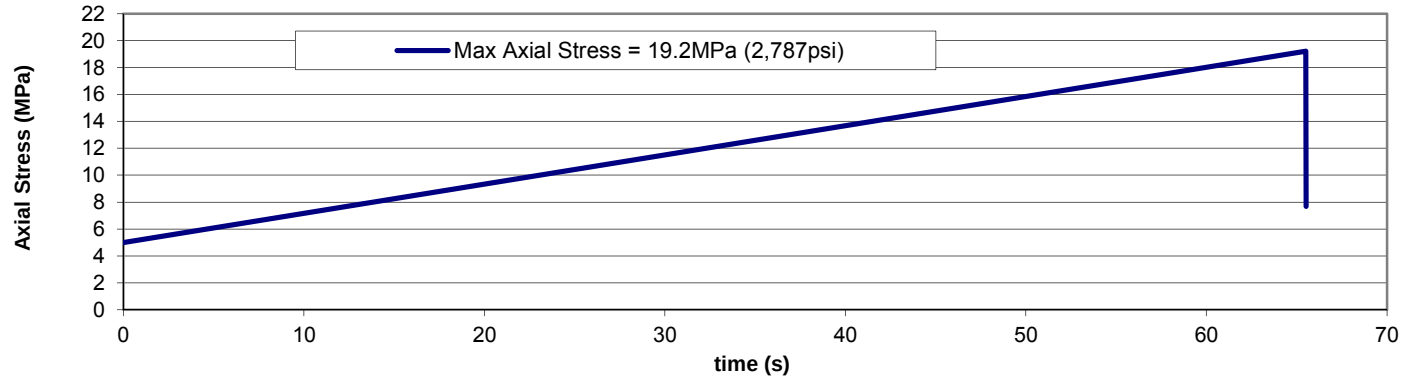


After Test

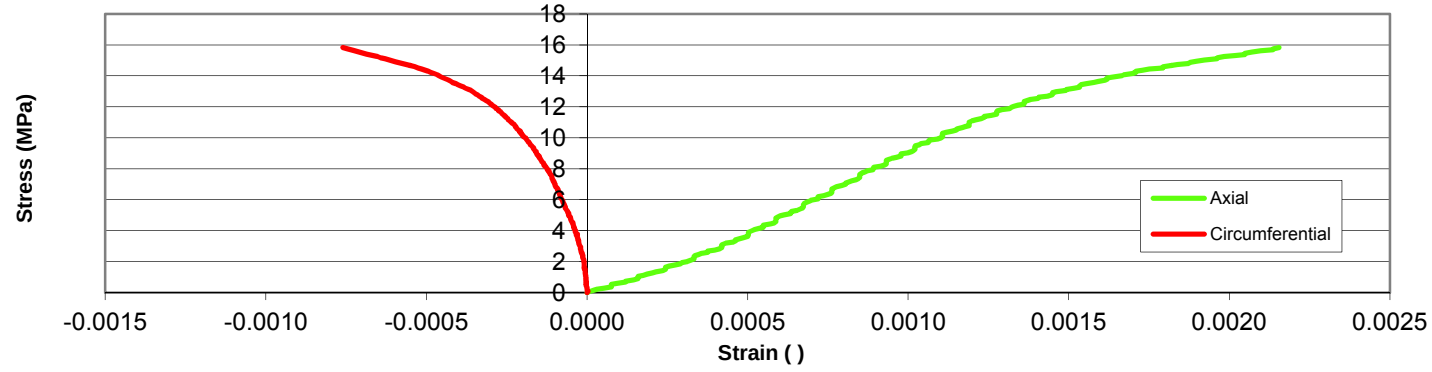


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.30	2855.8	139.48	2.3	54.9	19.2	2,787

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-016
Depth (m):	23.51 - 24.00
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	24.53
Poisson Ratio, ν:	0.12
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

Before Test

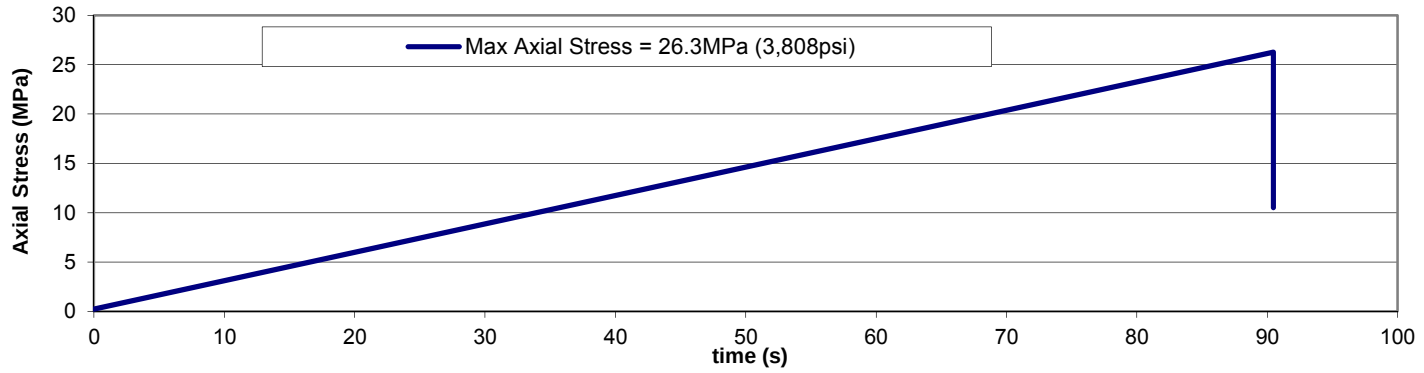


After Test

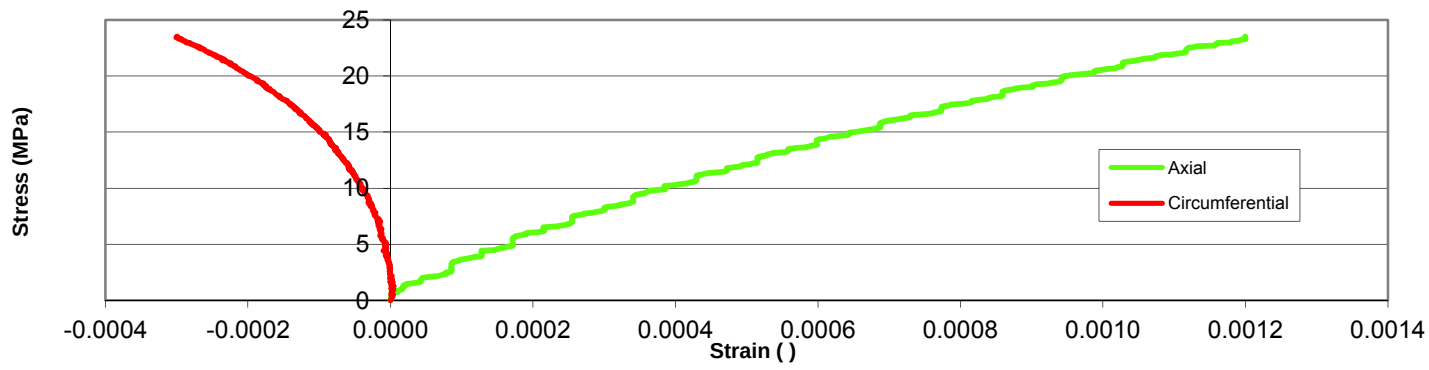


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.72	2895.7	169.50	2.8	76.1	26.3	3,808

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-016
Depth (m):	32.97 - 33.37
Sample Number:	UCS#2
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	175.84
Poisson Ratio, ν:	0.17
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

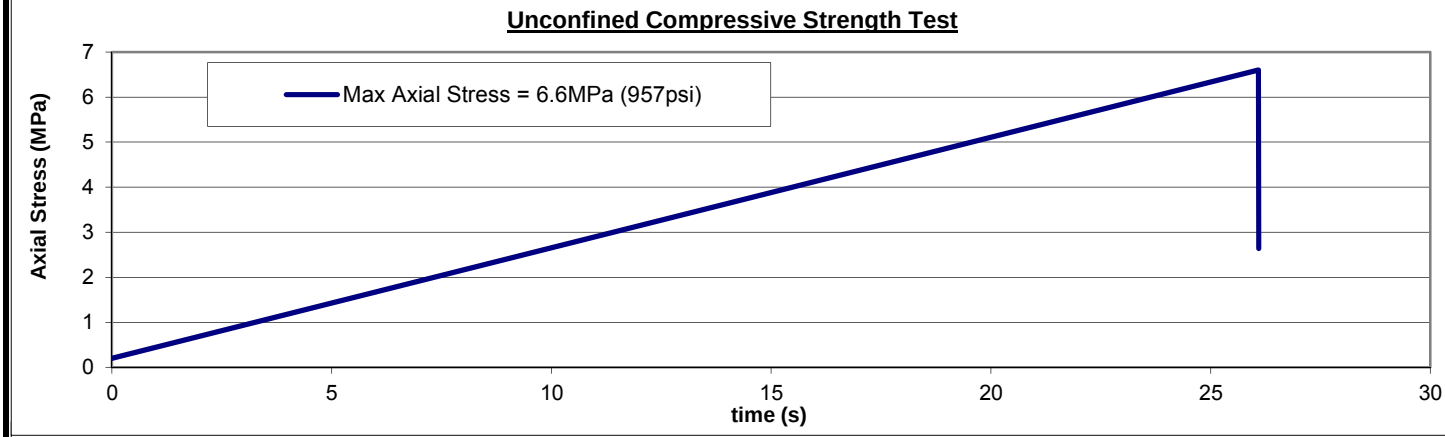
Before Test

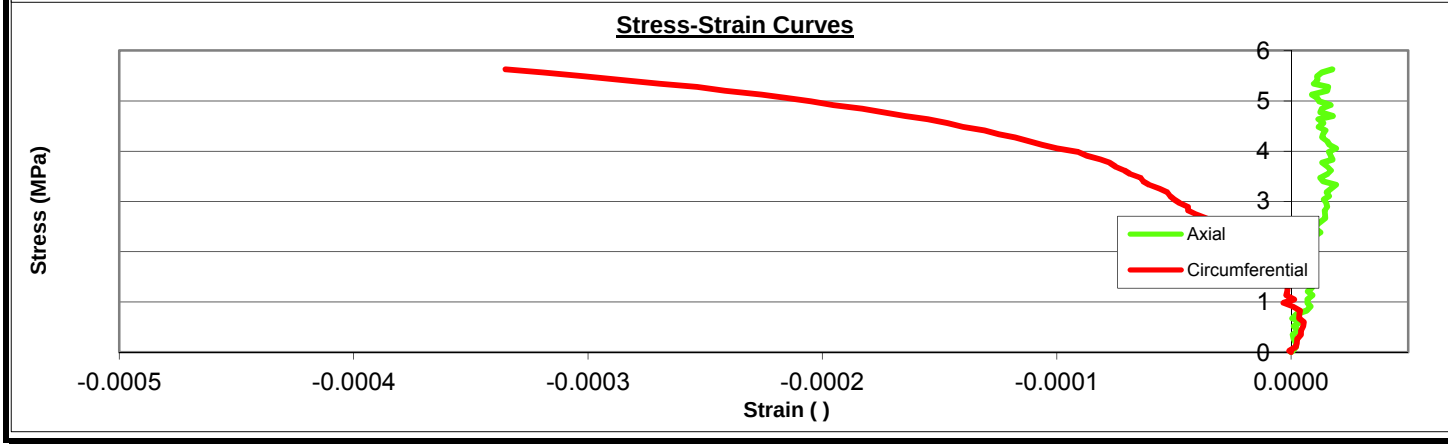


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.57	2881.4	173.18	2.9	19.0	6.6	957





ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-016
Depth (m):	50.10 - 50.40
Sample Number:	UCS#3
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	14.47
Poisson Ratio, ν:	0.29
Failure Mode:	shear
Specific Gravity:	2.75

Before Test

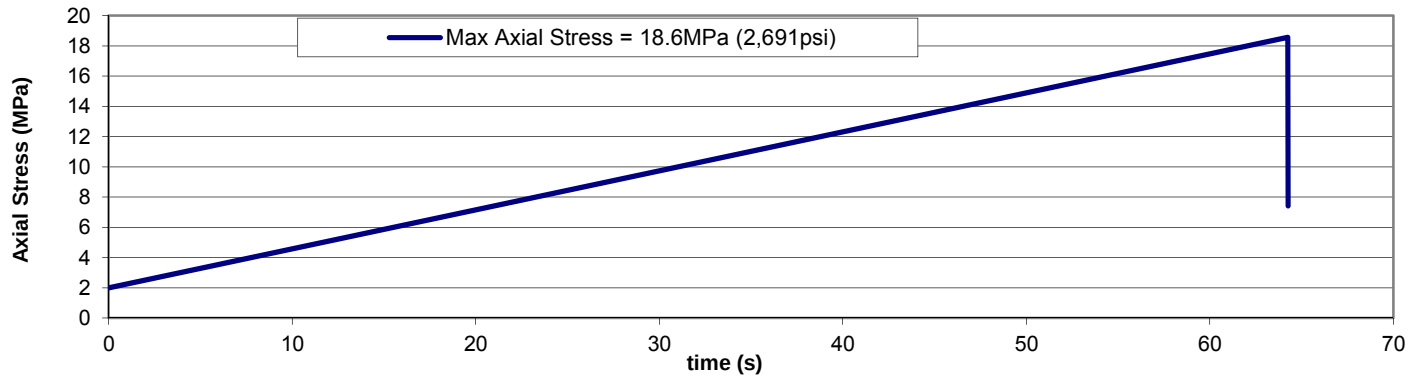


After Test

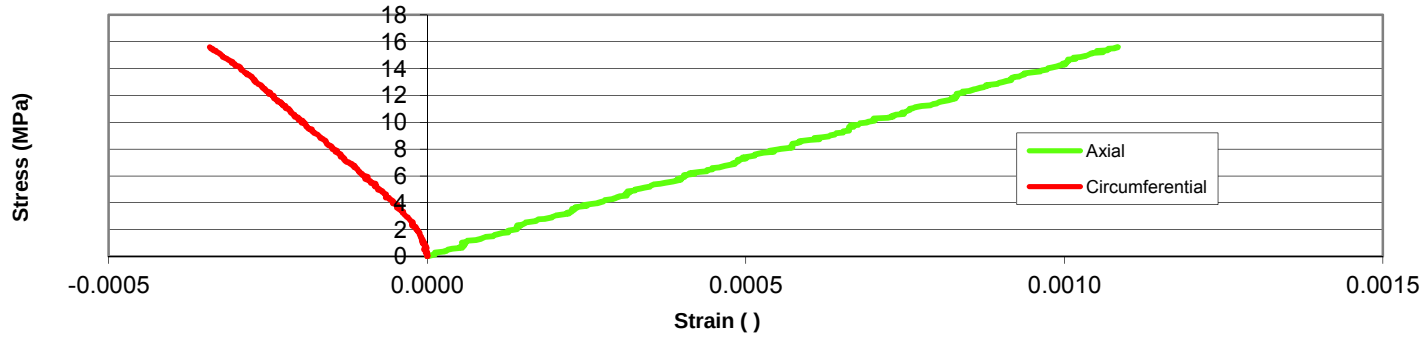


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.66	2890.0	178.57	2.9	53.6	18.6	2,691

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-018
Depth (m):	38.80 - 39.00
Sample Number:	UCS#2
Drillhole Location:	Downstream of Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	66.19
Poisson Ratio, ν:	0.19
Failure Mode:	shear
Specific Gravity:	2.93

Before Test

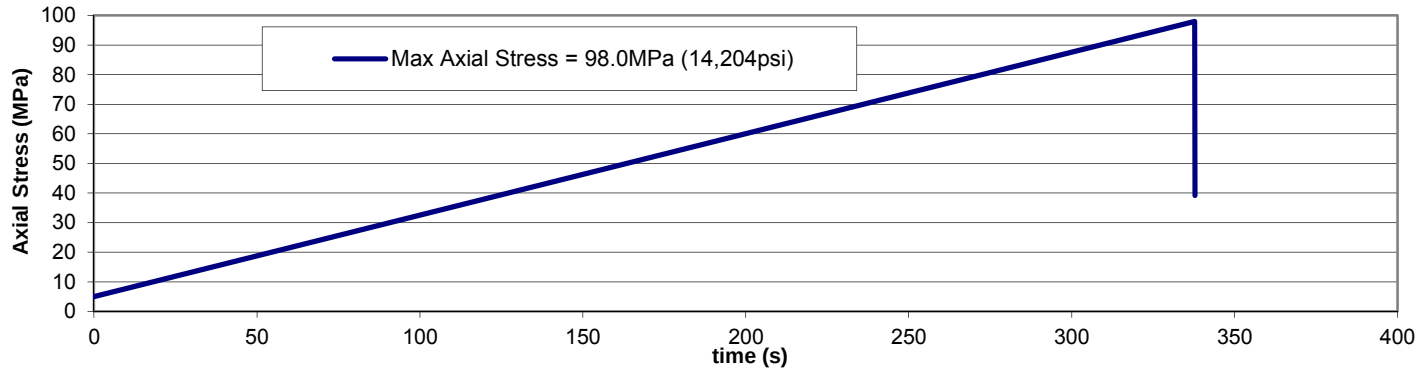


After Test

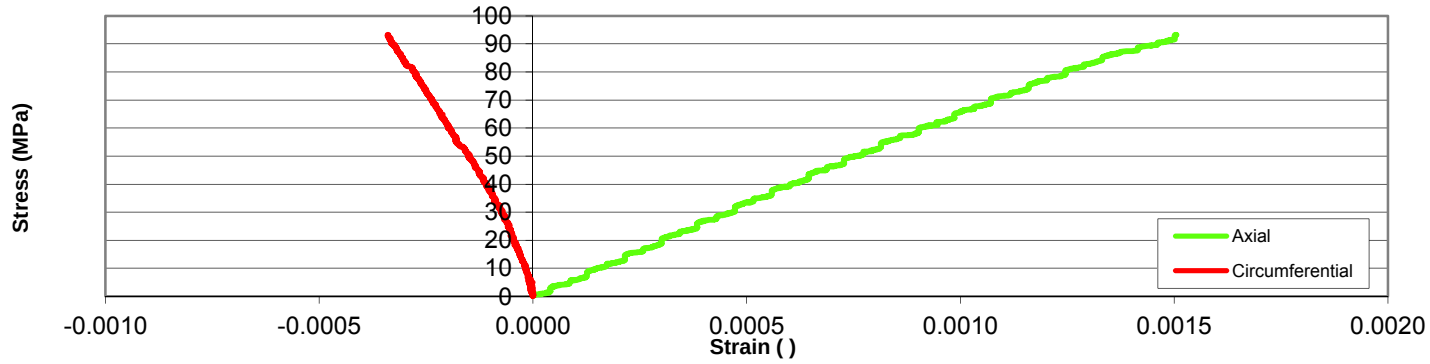


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.54	2878.6	164.03	2.7	282.0	98.0	14,204

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-021
Depth (m):	21.98 - 22.30
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	7.75
Poisson Ratio, ν:	0.21
Failure Mode:	shear
Specific Gravity:	2.76

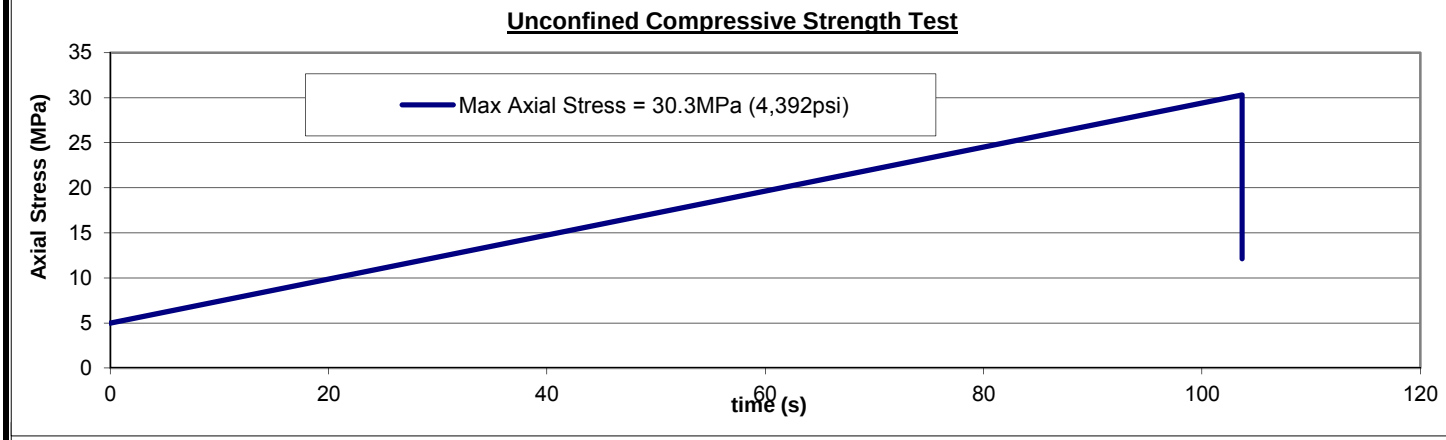
Before Test

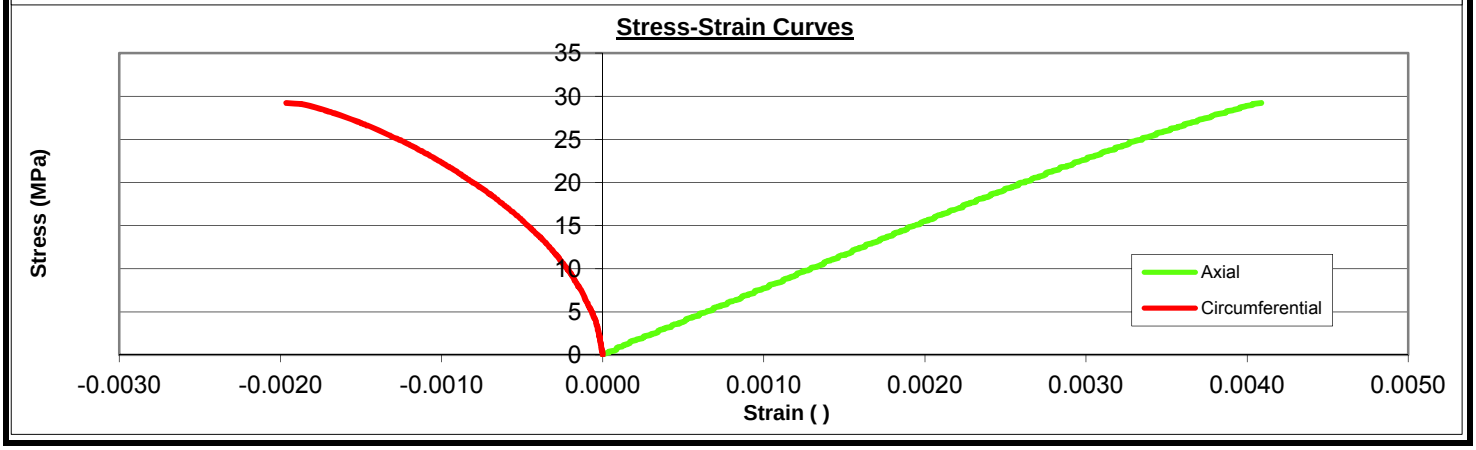


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	Maximum Axial Stress	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.43	2868.1	167.93	2.8	86.9	30.3	4,392

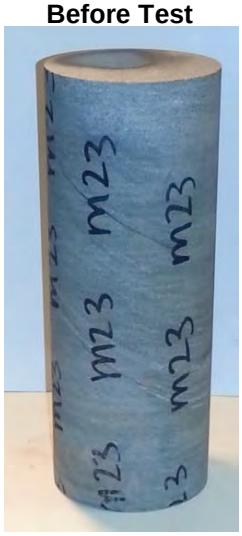




ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-021
Depth (m):	39.87 - 40.12
Sample Number:	UCS#2
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	9.44
Poisson Ratio, ν:	0.37
Failure Mode:	shear
Specific Gravity:	2.75

Before Test

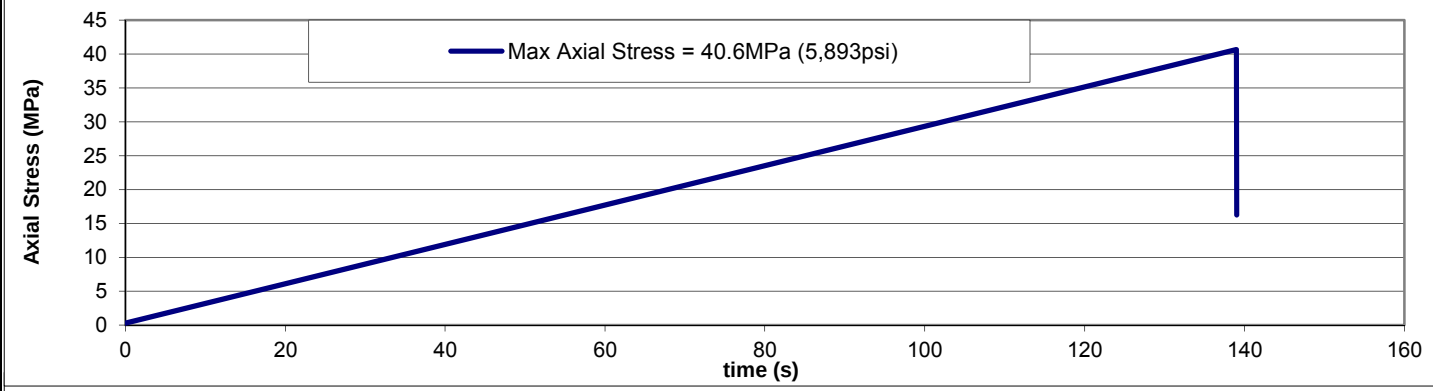


After Test

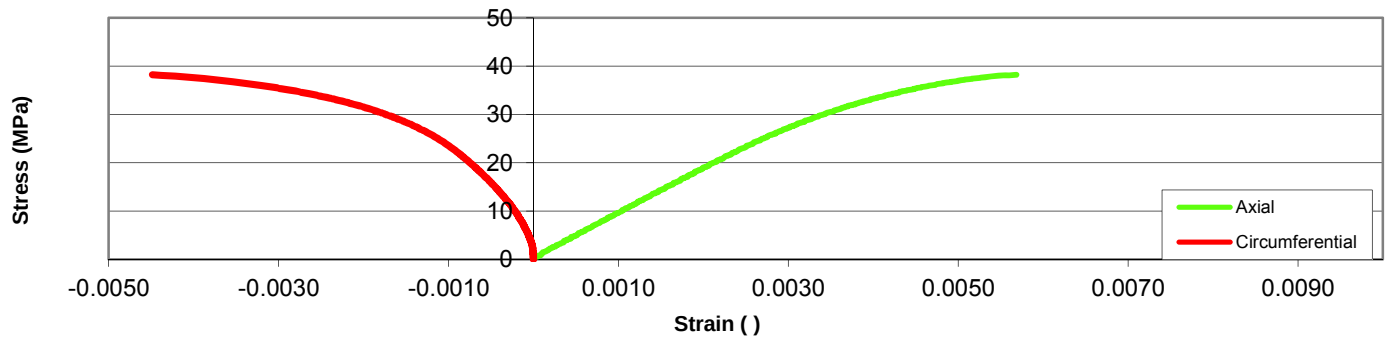


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.47	2871.9	174.23	2.9	116.7	40.6	5,893

Unconfined Compressive Strength Test



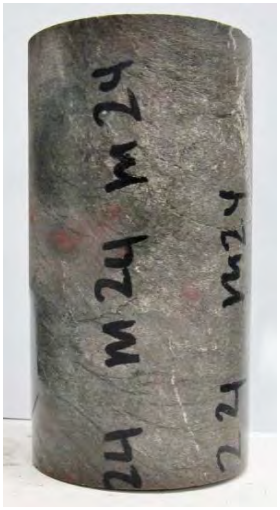
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-021
Depth (m):	50.92 - 51.22
Sample Number:	UCS#3
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	11.56
Poisson Ratio, ν:	0.20
Failure Mode:	pre-existing feature
Specific Gravity:	2.76

Before Test

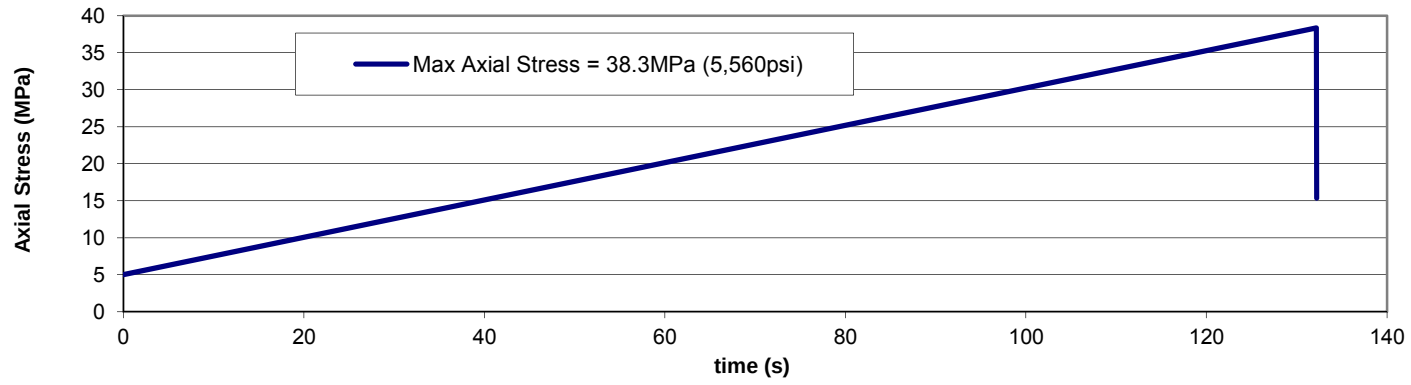


After Test

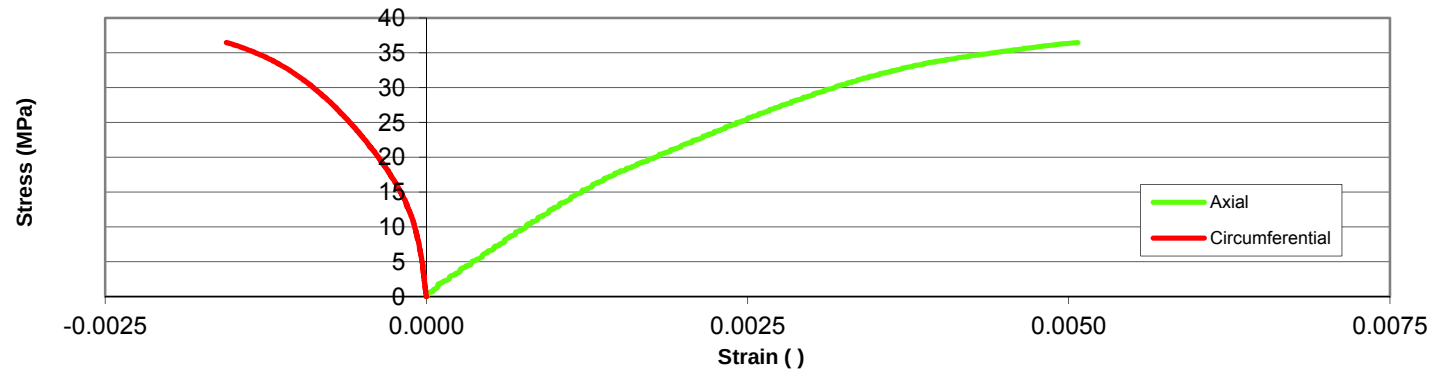


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.53	2877.6	124.42	2.1	110.3	38.3	5,560

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-022
Depth (m):	18.49 - 18.67
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	26.30
Poisson Ratio, ν:	0.23
Failure Mode:	pre-existing feature
Specific Gravity:	2.84

Before Test

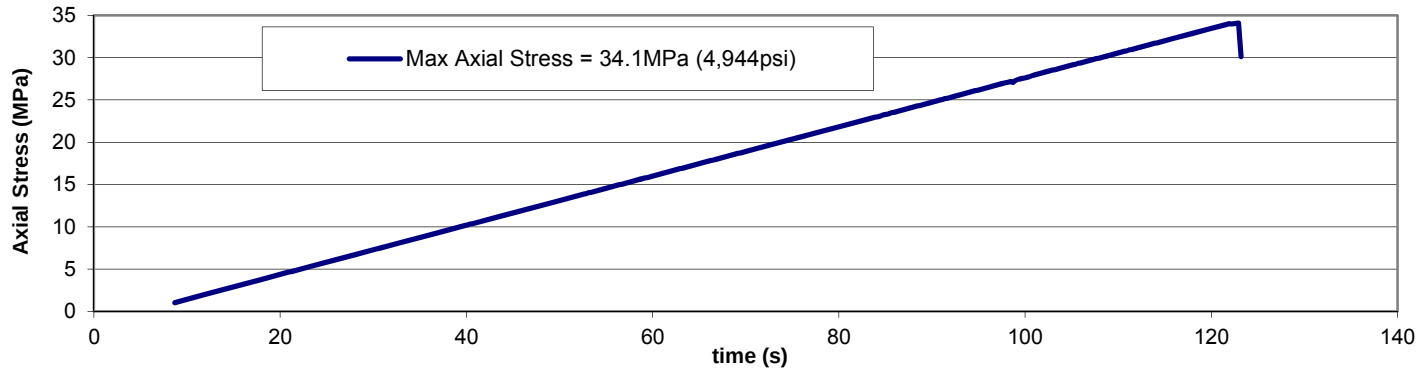


After Test

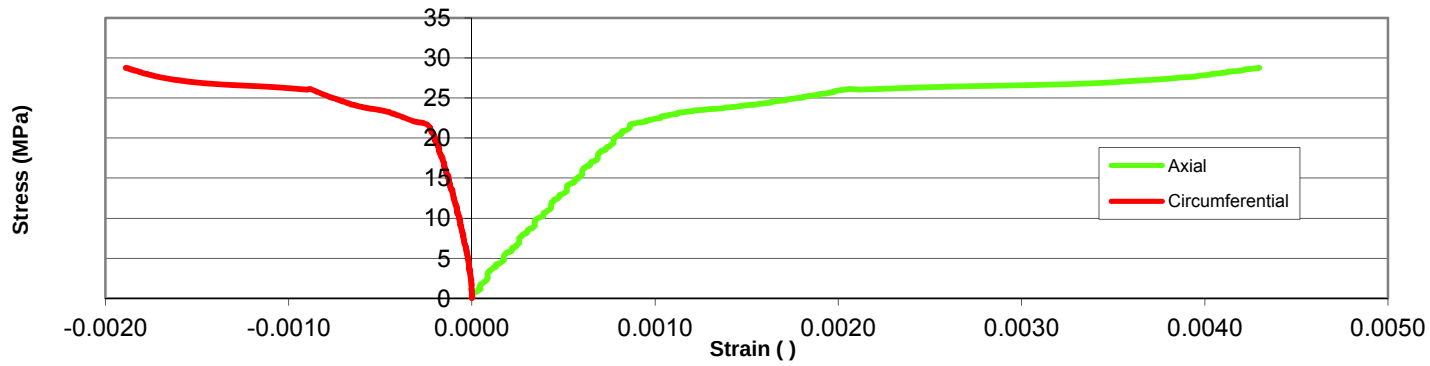


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.40	2865.3	172.93	2.9	97.7	34.1	4,944

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-022
Depth (m):	51.04 - 51.35
Sample Number:	UCS#2
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	25.81
Poisson Ratio, ν:	0.15
Failure Mode:	pre-existing feature
Specific Gravity:	2.84

Before Test

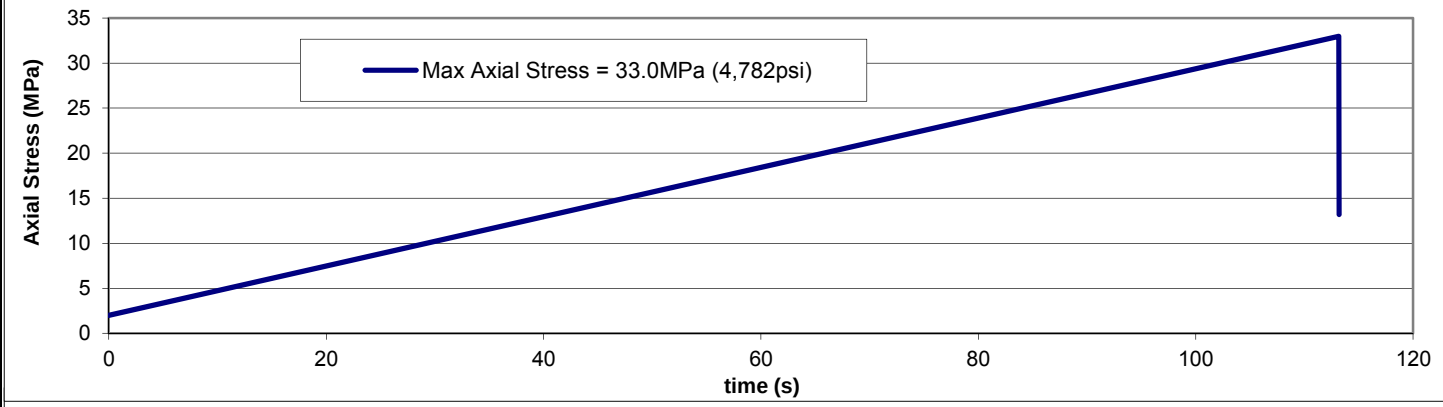


After Test

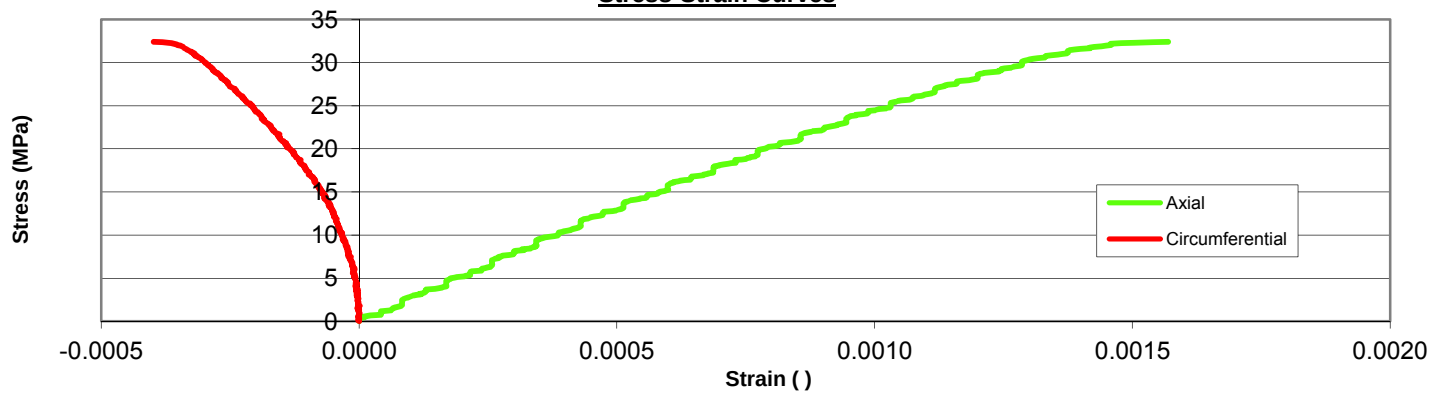


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.31	2856.7	168.29	2.8	94.2	33.0	4,782

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-028
Depth (m):	53.87 - 54.23
Sample Number:	UCS#1
Drillhole Location:	Main Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	98.00
Poisson Ratio, ν:	N/A
Failure Mode:	pre-existing feature
Specific Gravity:	2.69

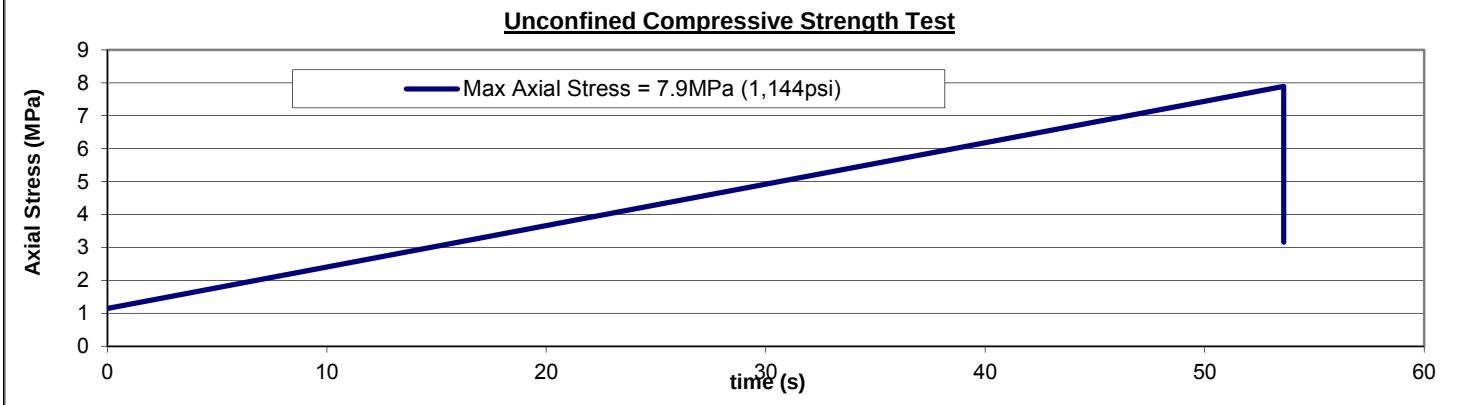
Before Test

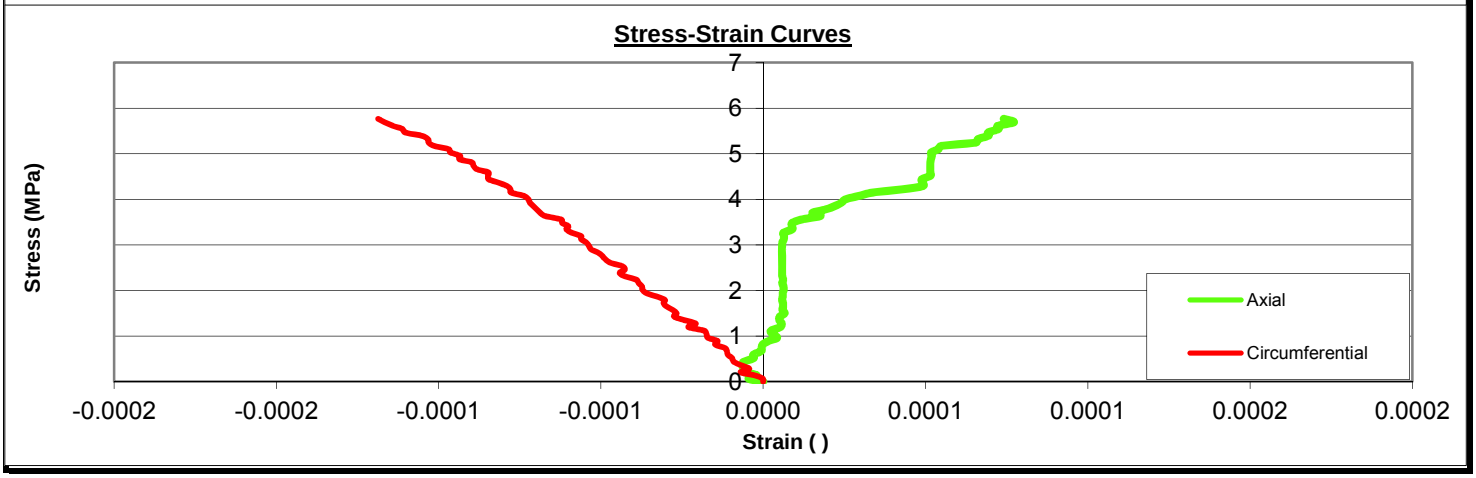


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σUCS	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.13	2839.7	171.34	2.8	22.4	7.9	1,144





ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST (ISRM-1979)

Drillhole ID:	DH14-034
Depth (m):	12.48 - 12.79
Sample Number:	UCS#1
Drillhole Location:	South-west Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	23.53
Poisson Ratio, ν:	0.16
Failure Mode:	pre-existing feature
Specific Gravity:	2.85

Before Test

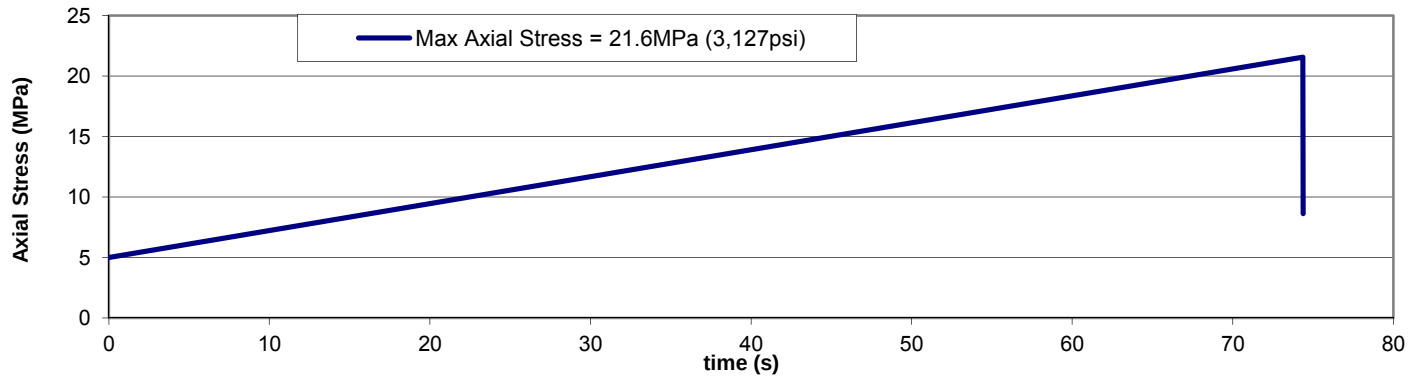


After Test

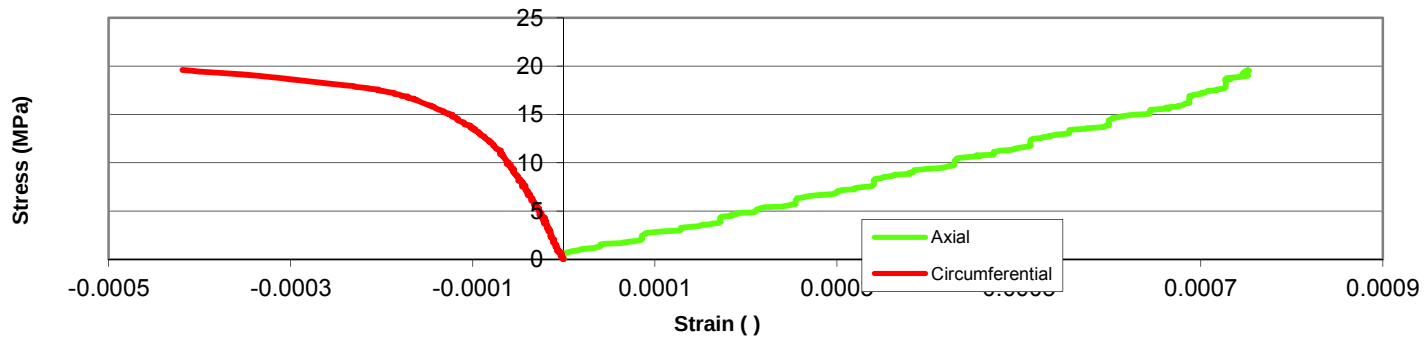


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.47	2871.9	170.89	2.8	61.9	21.6	3,127

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-034
Depth (m):	33.91 - 34.21
Sample Number:	UCS#3
Drillhole Location:	South-west Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	78.93
Poisson Ratio, ν:	0.28
Failure Mode:	pre-existing feature
Specific Gravity:	2.94

Before Test

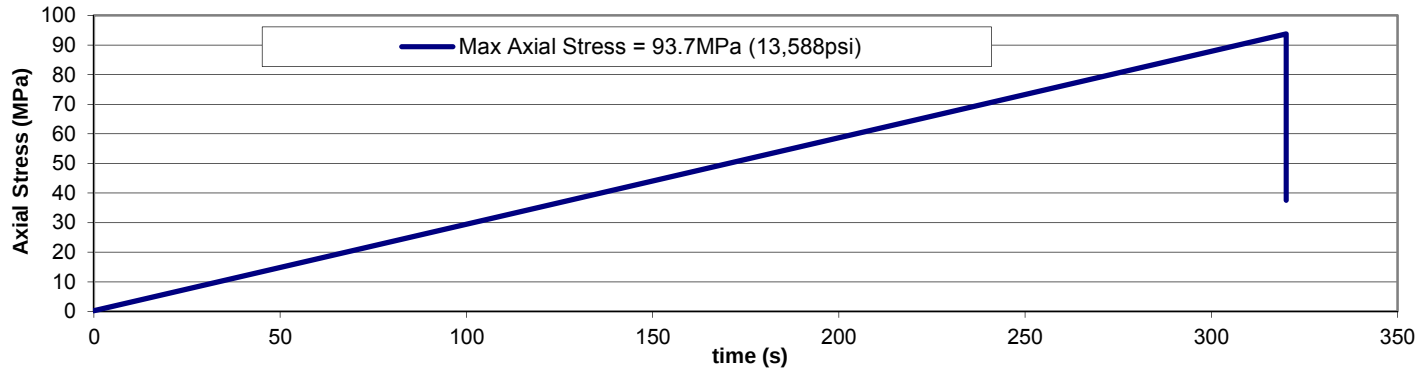


After Test

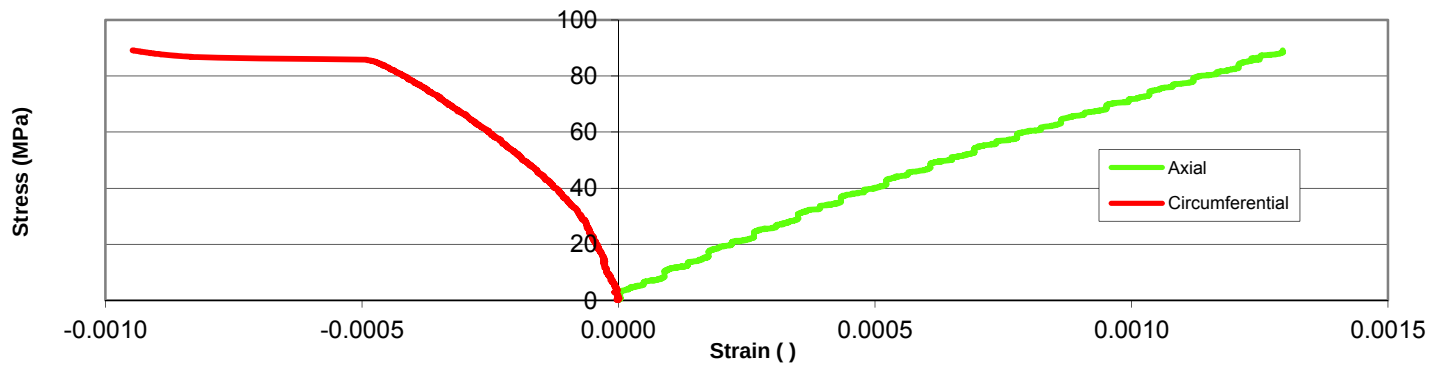


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.26	2852.0	169.11	2.8	267.3	93.7	13,588

Unconfined Compressive Strength Test



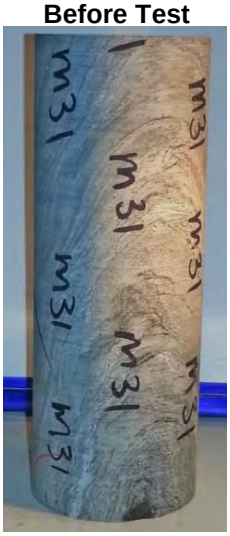
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-035
Depth (m):	13.30 - 13.57
Sample Number:	UCS#1
Drillhole Location:	South-west Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	19.56
Poisson Ratio, ν:	0.12
Failure Mode:	shear
Specific Gravity:	2.75

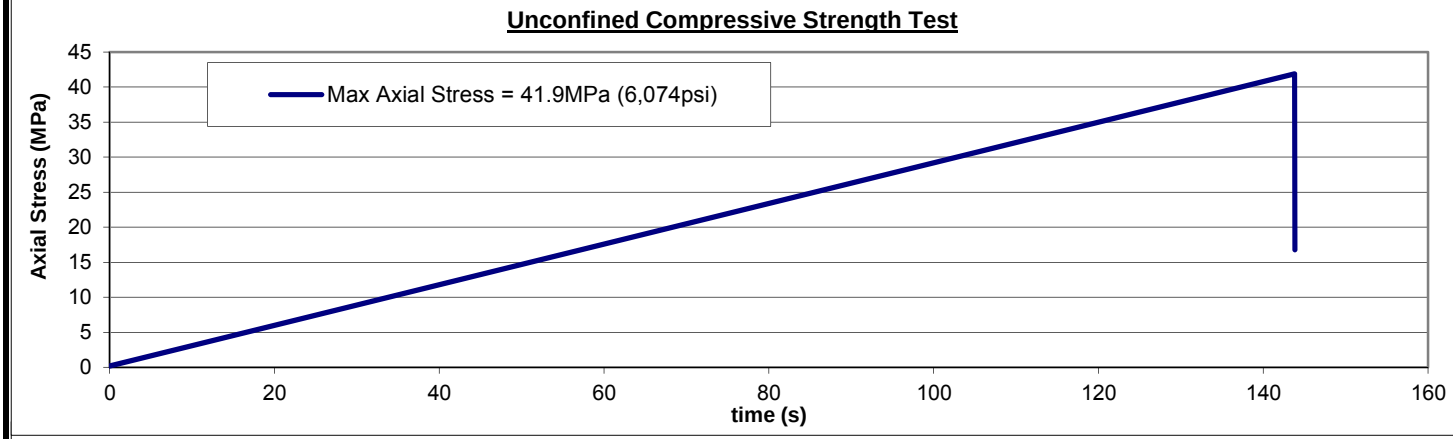
Before Test

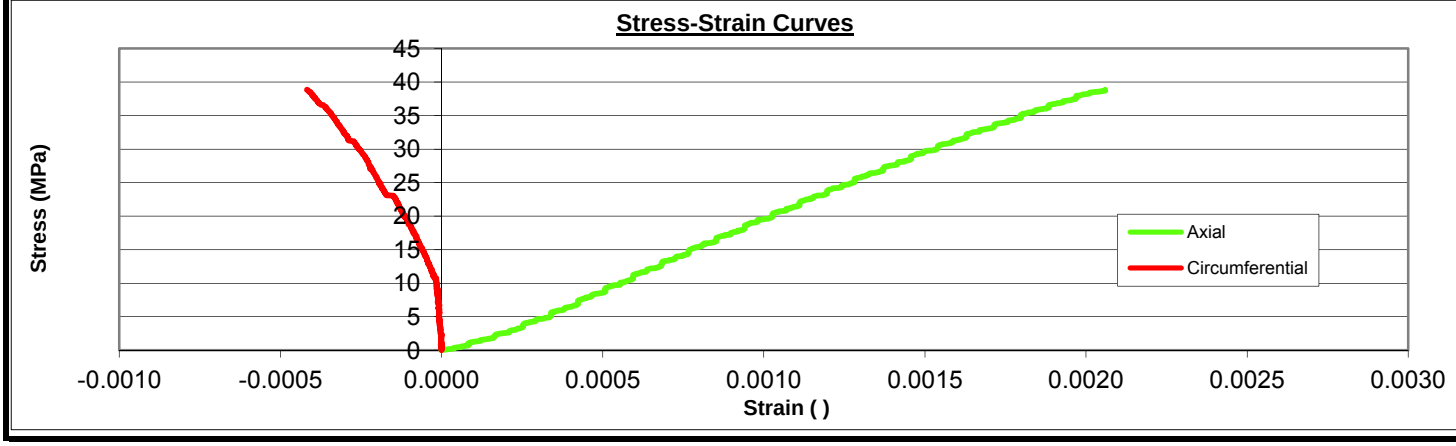


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.45	2870.0	176.20	2.9	120.2	41.9	6,074





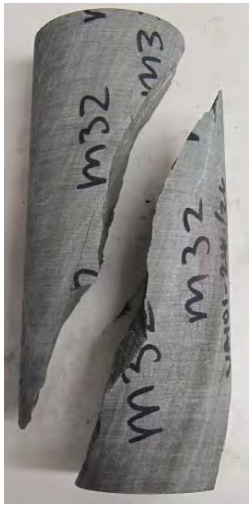
ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-035
Depth (m):	27.20 - 27.49
Sample Number:	UCS#2
Drillhole Location:	South-west Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	50.50
Poisson Ratio, ν:	0.18
Failure Mode:	shear
Specific Gravity:	2.79

Before Test

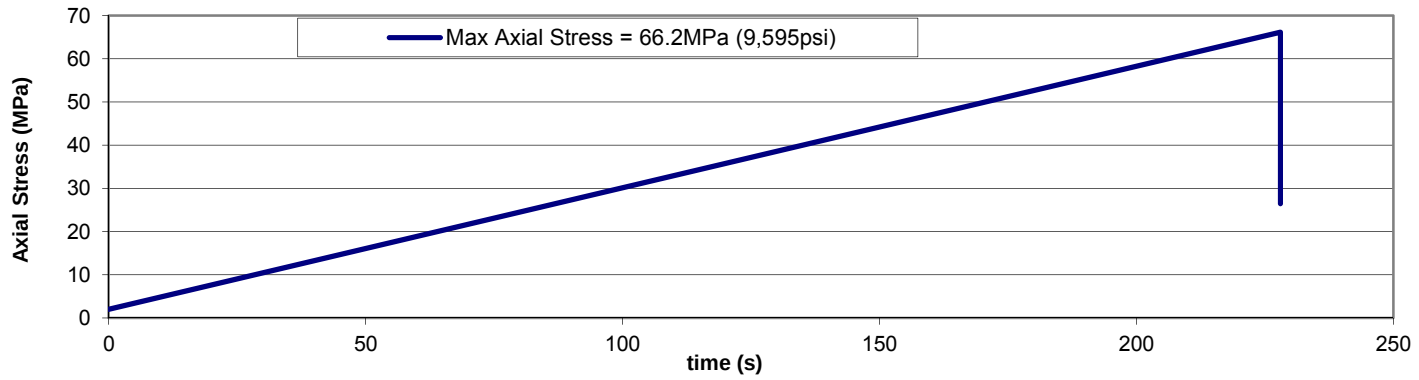


After Test

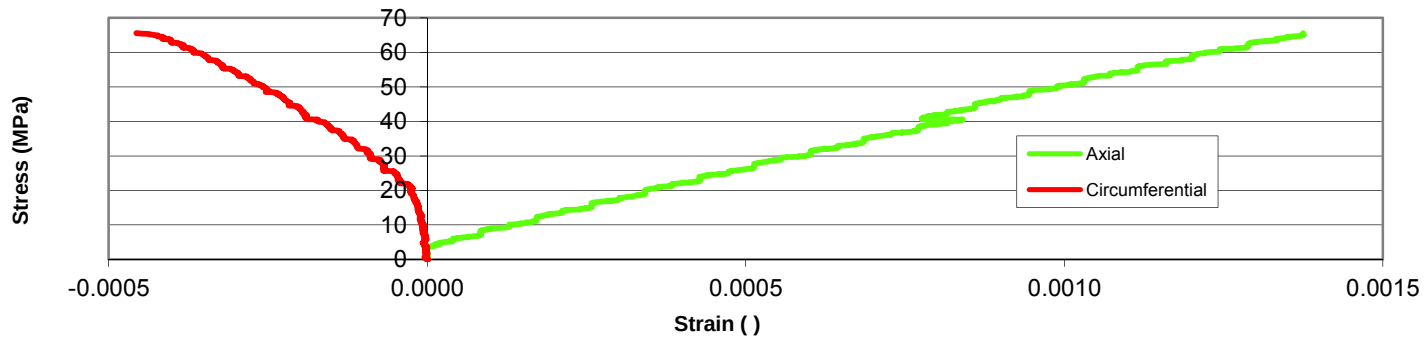


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.42	2867.2	169.77	2.8	189.7	66.2	9,595

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-035
Depth (m):	31.47 - 31.76
Sample Number:	UCS#3
Drillhole Location:	South-west Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	60.24
Poisson Ratio, ν:	0.20
Failure Mode:	shear
Specific Gravity:	2.91

Before Test

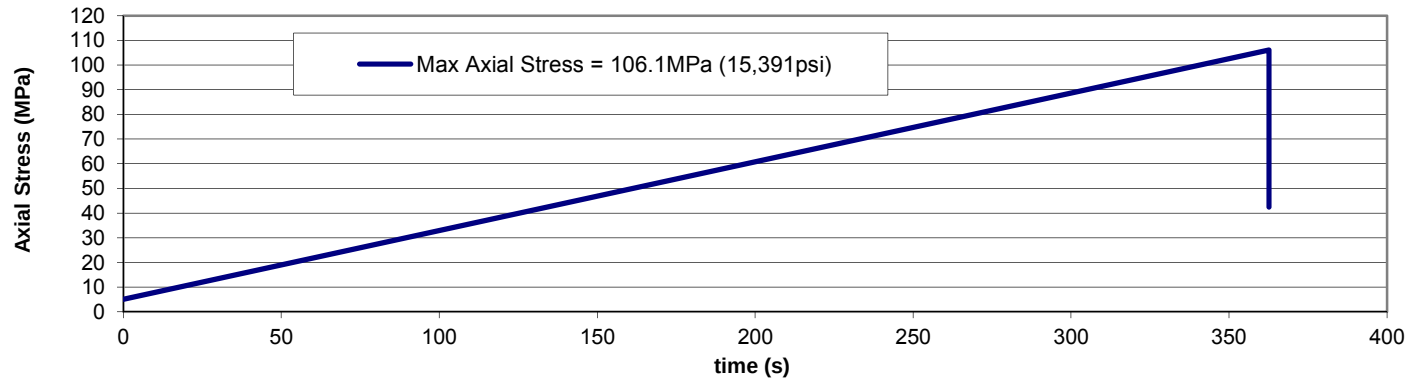


After Test

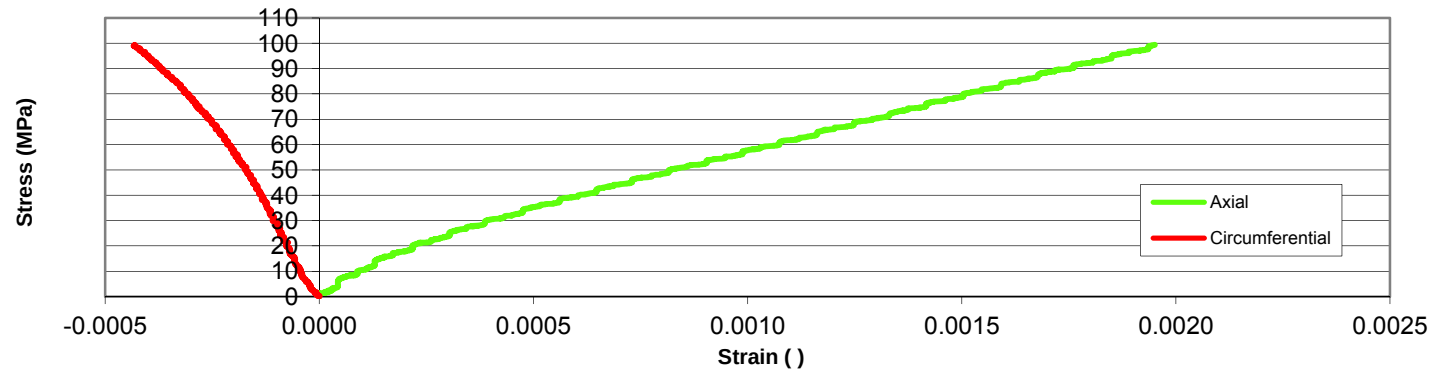


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.25	2851.0	179.39	3.0	302.6	106.1	15,391

Unconfined Compressive Strength Test



Stress-Strain Curves



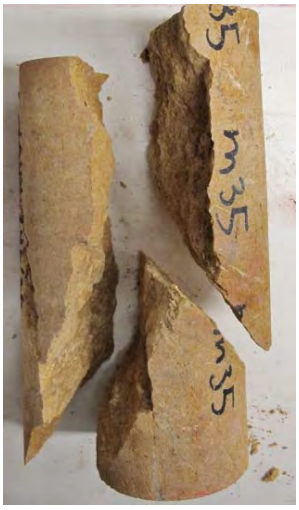
ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-037
Depth (m):	11.20 - 11.56
Sample Number:	UCS#1
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	2.75
Poisson Ratio, ν:	N/A
Failure Mode:	shear
Specific Gravity:	2.56

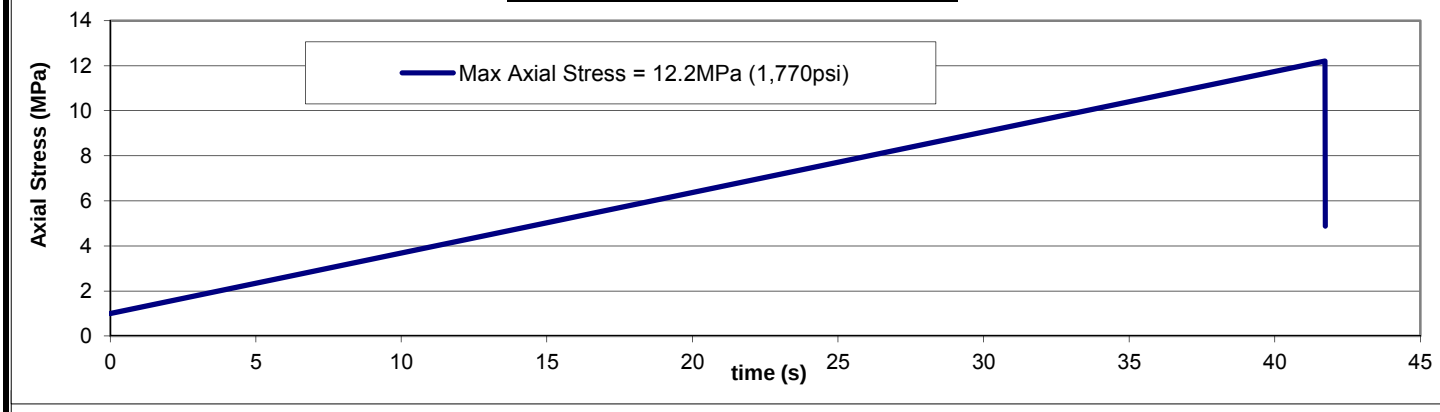
Before Test

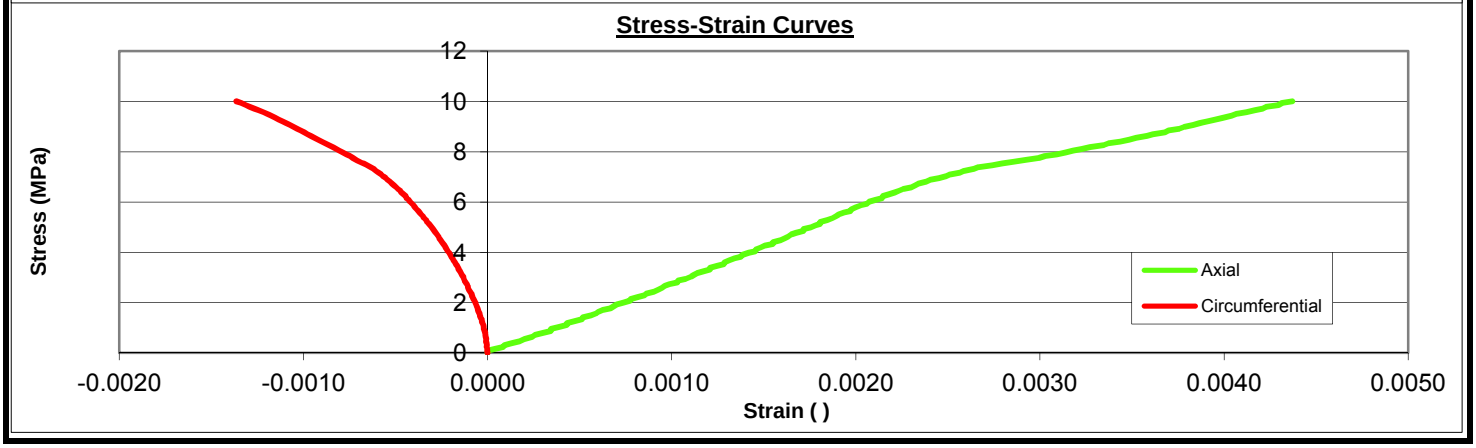


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	Maximum Axial Stress	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.40	2865.3	178.72	3.0	35.0	12.2	1,770





ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-037
Depth (m):	68.50 - 68.81
Sample Number:	UCS#3
Drillhole Location:	East Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	71.48
Poisson Ratio, ν:	0.19
Failure Mode:	pre-existing feature
Specific Gravity:	2.69

Before Test

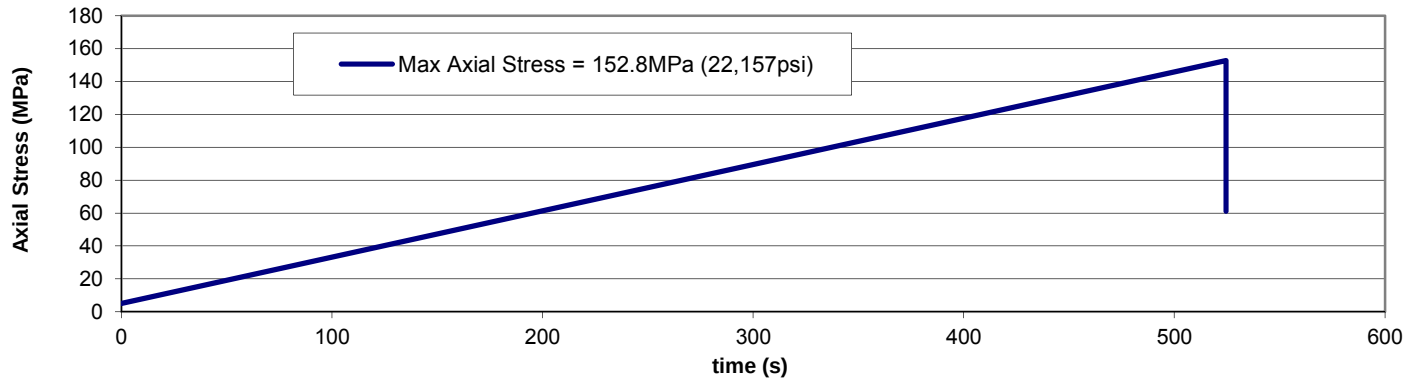


After Test

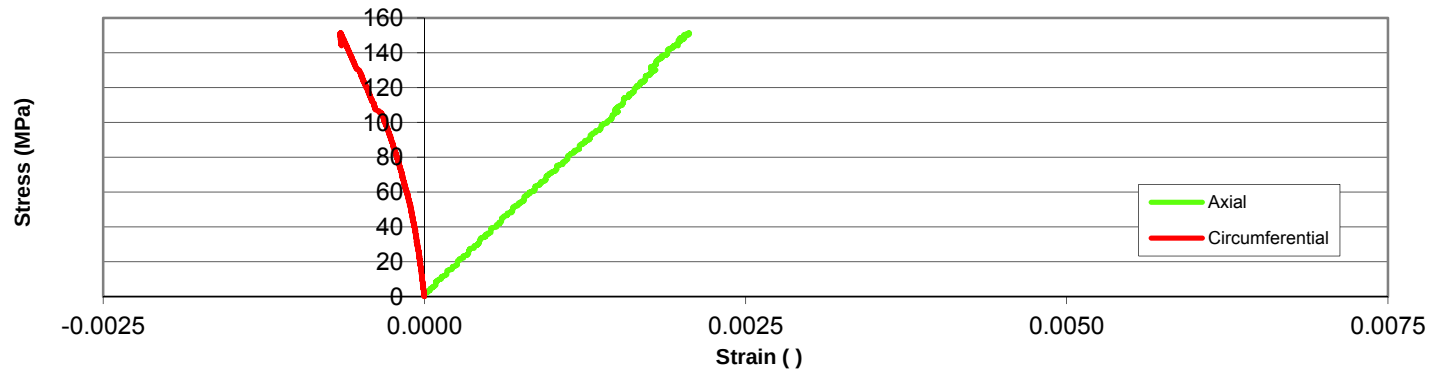


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.55	2879.5	171.24	2.8	440.0	152.8	22,157

Unconfined Compressive Strength Test



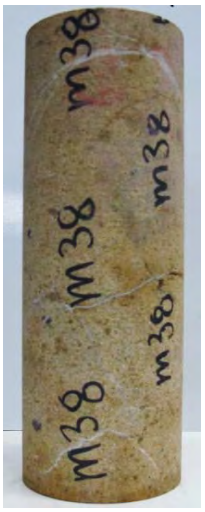
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-038
Depth (m):	18.17 - 18.51
Sample Number:	UCS#1
Drillhole Location:	South Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	8.32
Poisson Ratio, ν:	0.09
Failure Mode:	pre-existing feature
Specific Gravity:	2.69

Before Test

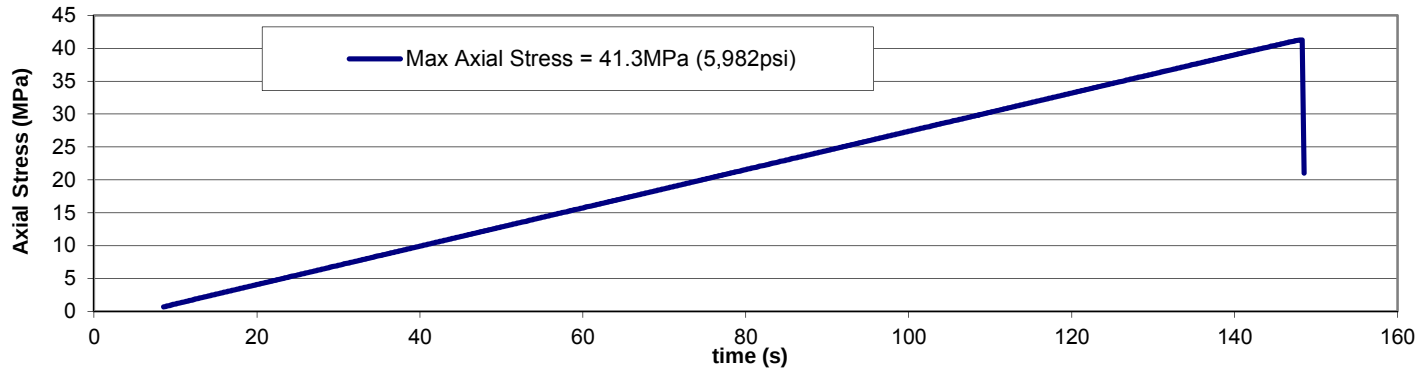


After Test

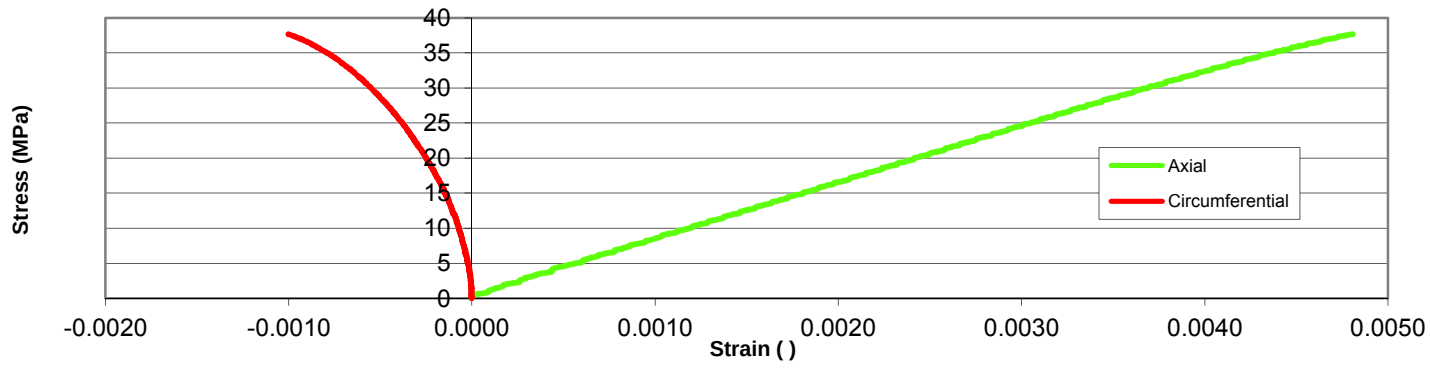


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.40	2865.3	180.55	3.0	118.2	41.3	5,982

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-038
Depth (m):	34.60 - 34.85
Sample Number:	UCS#2
Drillhole Location:	South Embankment
Tested By:	P.Hughes
Young Modulus, E (GPa):	51.44
Poisson Ratio, ν:	0.18
Failure Mode:	pre-existing feature
Specific Gravity:	2.69

Before Test

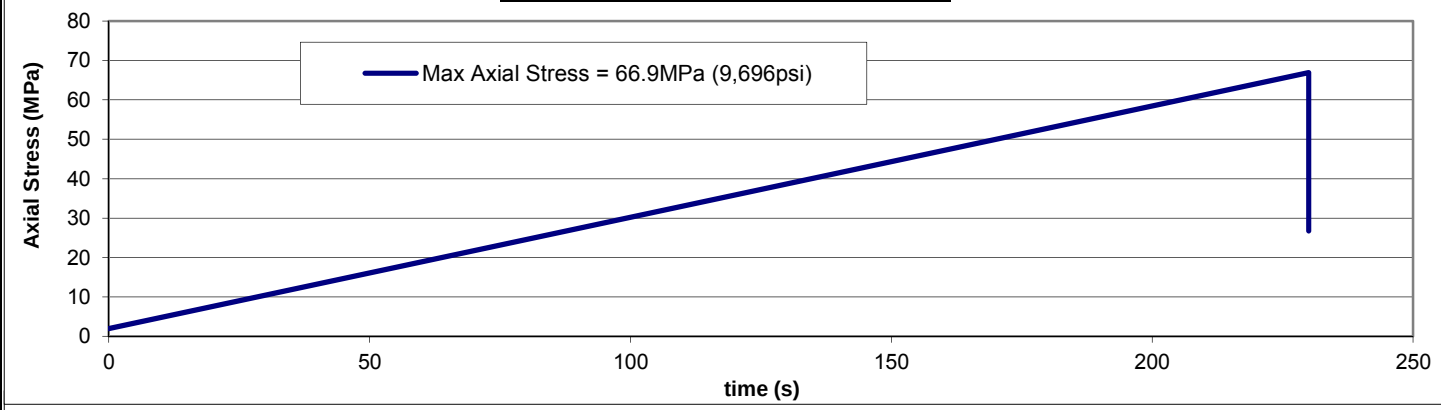


After Test

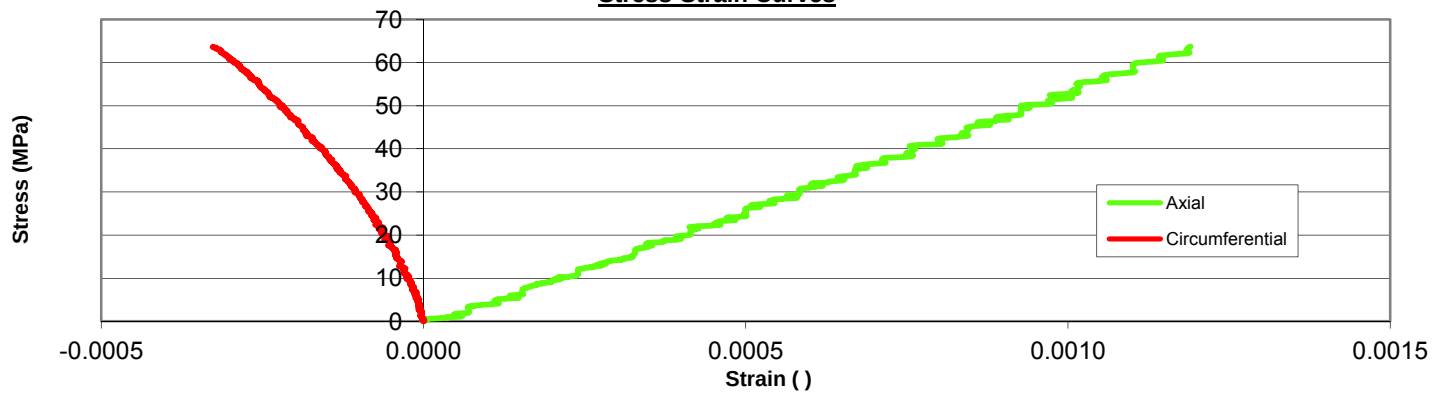


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.53	2877.6	179.06	3.0	192.4	66.9	9,696

Unconfined Compressive Strength Test



Stress-Strain Curves



Drillhole ID:	UCS #4 BHUD14-02
Depth (m):	4.56 - 4.79
Sample Number(m):	UCS#2
Drillhole Location:	Between Main and East Embankment
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

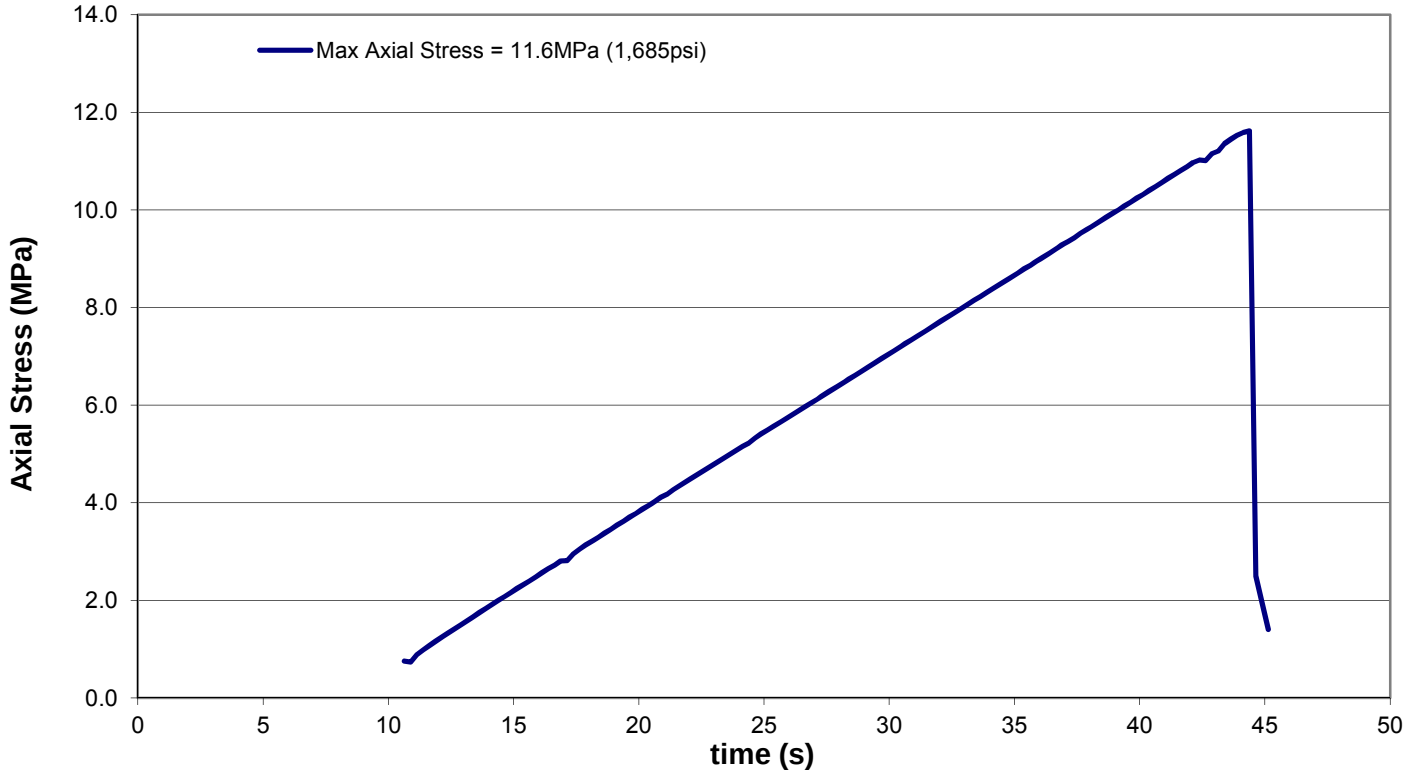
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.06	2833.1	171.98	2.9	32.9	11.6	1,685

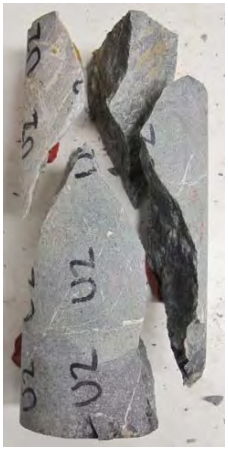
Unconfined Compressive Strength Test



Drillhole ID:	UCS #8 BHUD14-04
Depth (m):	16.68 - 16.93
Sample Number(m):	UCS#3
Drillhole Location:	Between Main and East Embankment
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

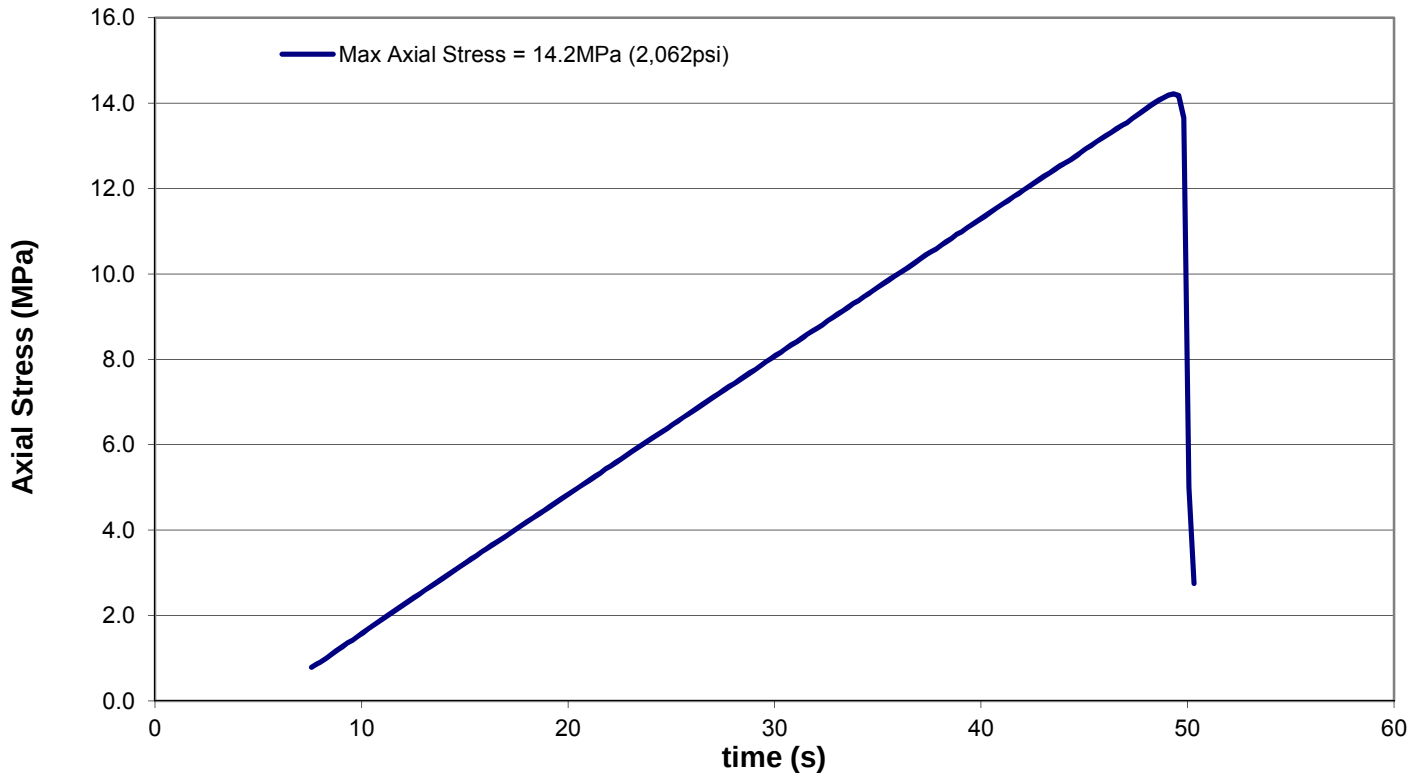
Sample Photos





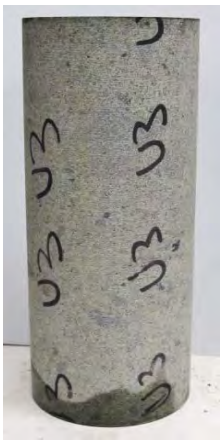
Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.07	2834.0	159.93	2.7	40.3	14.2	2,062

Unconfined Compressive Strength Test



Drillhole ID:	UCS #11 BHUD14-06
Depth (m):	27.51 - 27.71
Sample Number(m):	UCS#1
Drillhole Location:	Inside TSF close to East Embankment
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

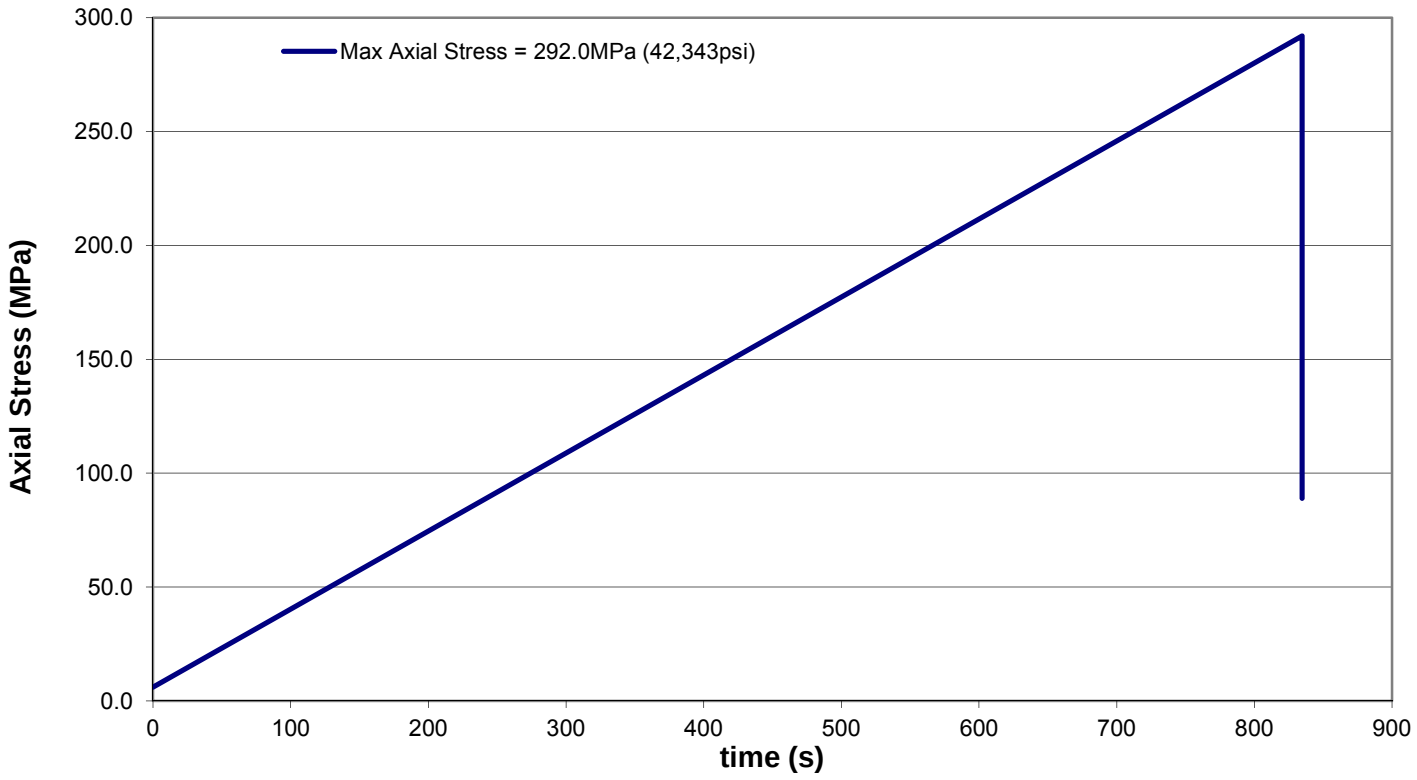
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.33	2858.6	150.67	2.5	834.8	292.0	42,343

Unconfined Compressive Strength Test



Drillhole ID:	UCS #12 BHUD14-06
Depth (m):	39.86 - 40.20
Sample Number(m):	UCS#2
Drillhole Location:	Inside TSF close to East Embankment
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

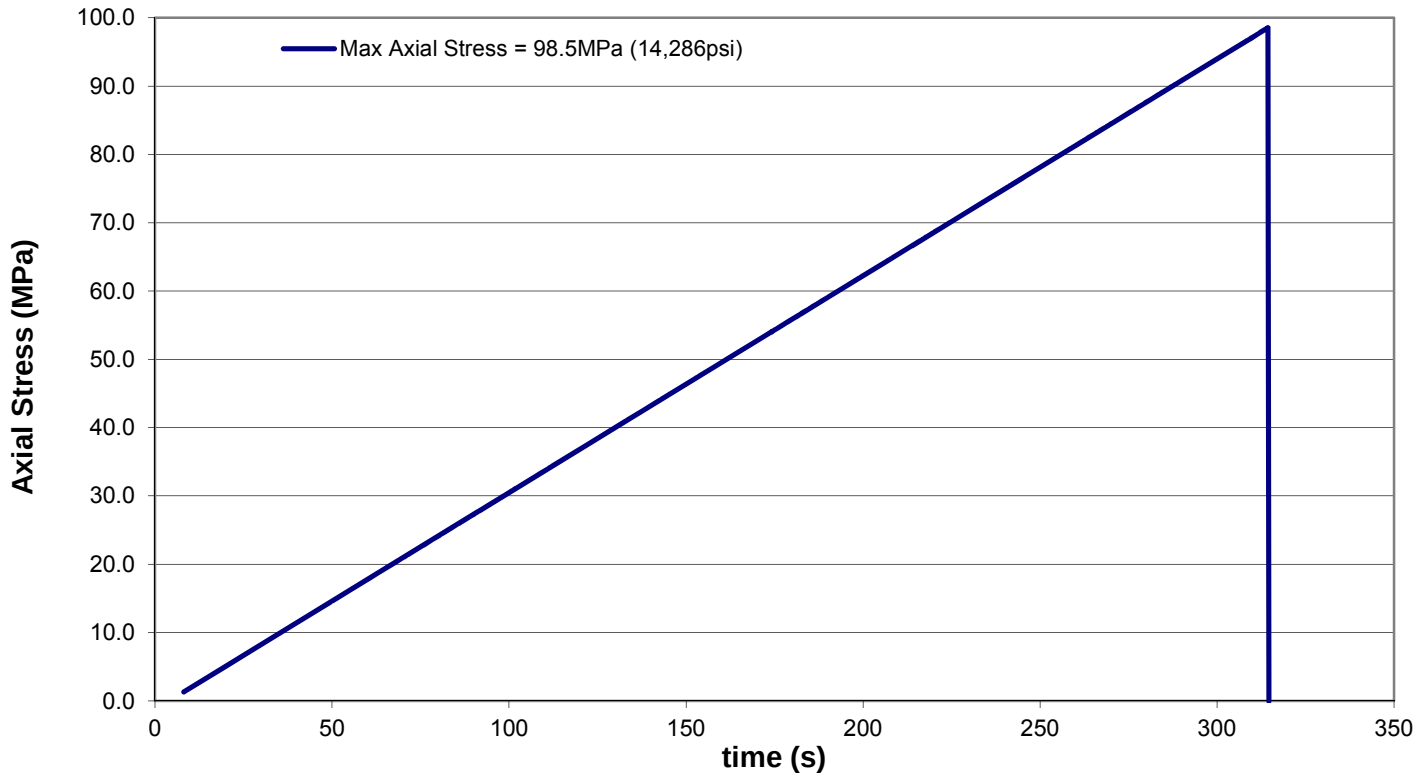
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.63	2887.1	169.53	2.8	284.5	98.5	14,286

Unconfined Compressive Strength Test



Drillhole ID:	UCS #15 BHLD14-05
Depth (m):	22.88 - 23.13
Sample Number(m):	UCS#1
Drillhole Location:	SWRSA
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

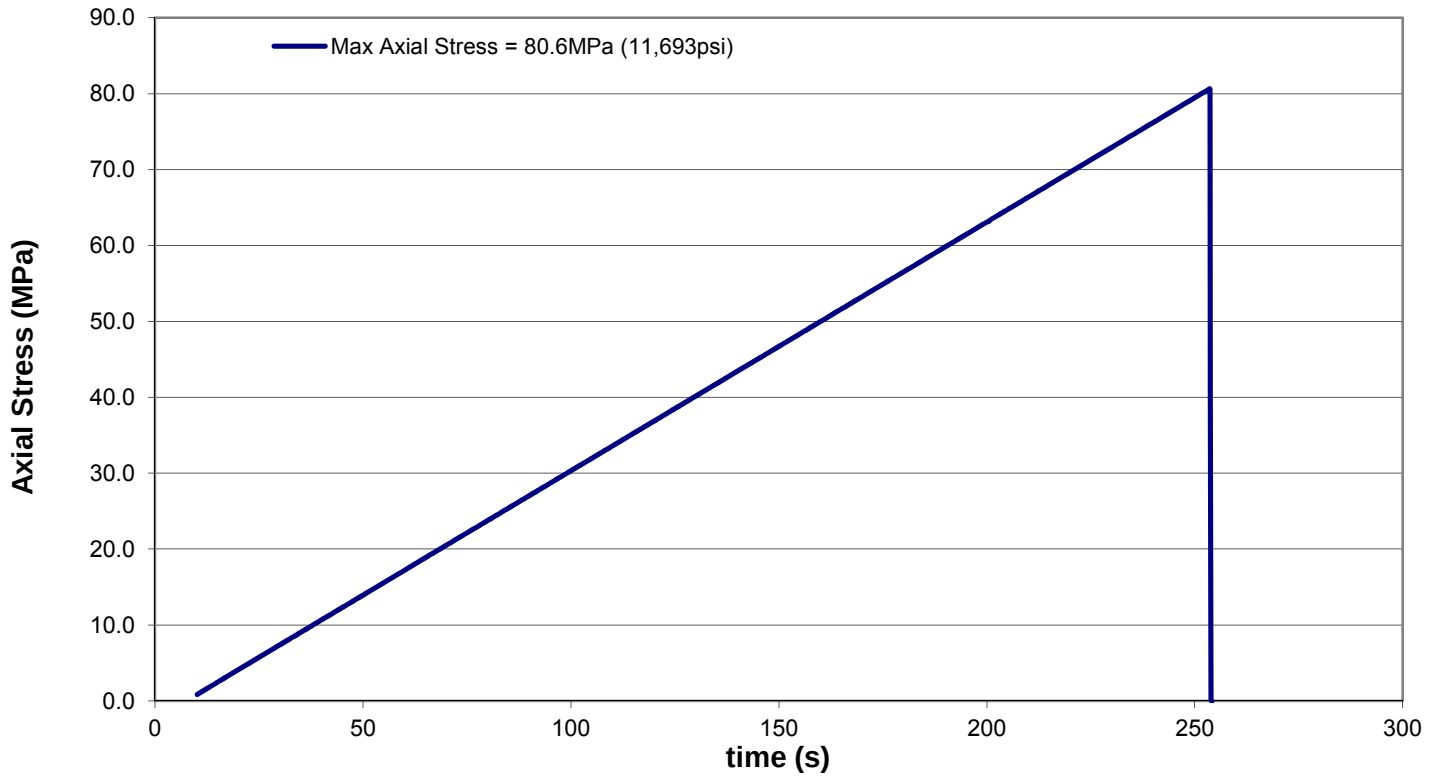
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
59.67	2796.4	172.65	2.9	225.5	80.6	11,693

Unconfined Compressive Strength Test



Drillhole ID:	UCS #21 BHLD14-02
Depth (m):	31.23 - 31.45
Sample Number(m):	UCS#2
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

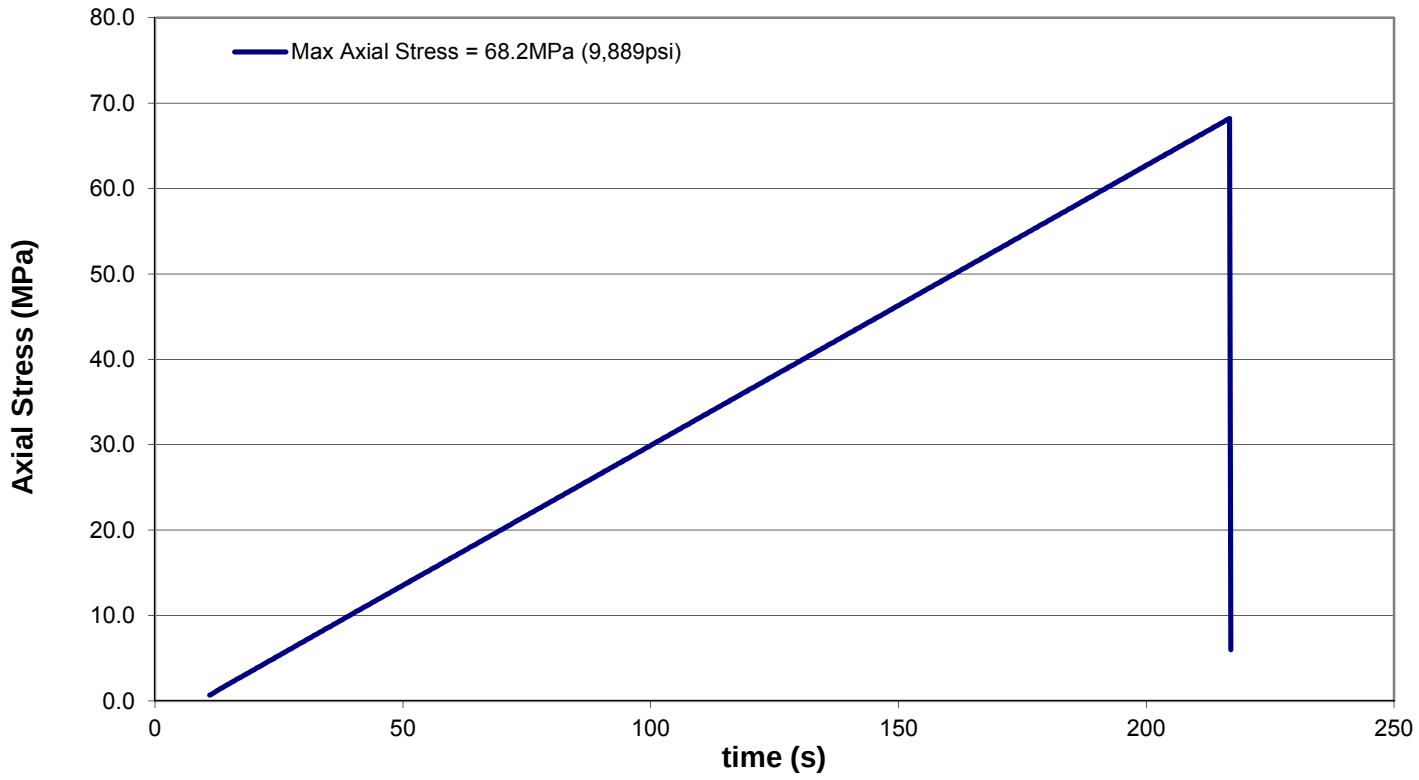
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
59.66	2795.5	170.77	2.9	190.7	68.2	9,889

Unconfined Compressive Strength Test



Drillhole ID:	UCS#22 BHLD14-01
Depth (m):	84.13 - 84.38
Sample Number(m):	UCS#3
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

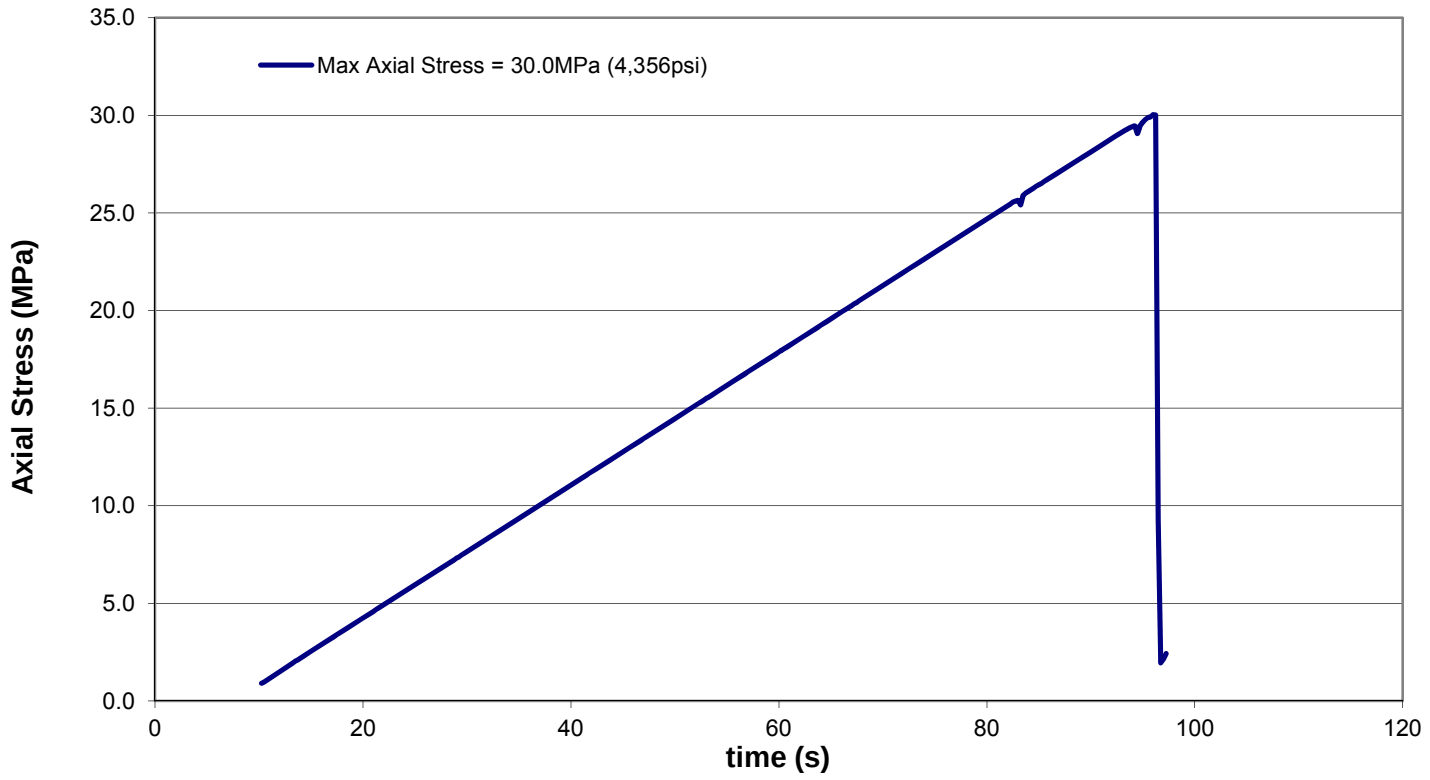
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
58.51	2688.7	169.99	2.9	80.8	30.0	4,356

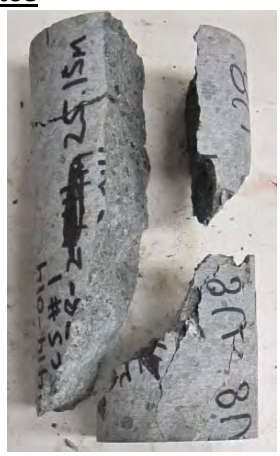
Unconfined Compressive Strength Test



Drillhole ID:	UCS #4 BHUD14-02
Depth (m):	24.78 - 25.14
Sample Number(m):	UCS#1
Drillhole Location:	Main Embankment
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

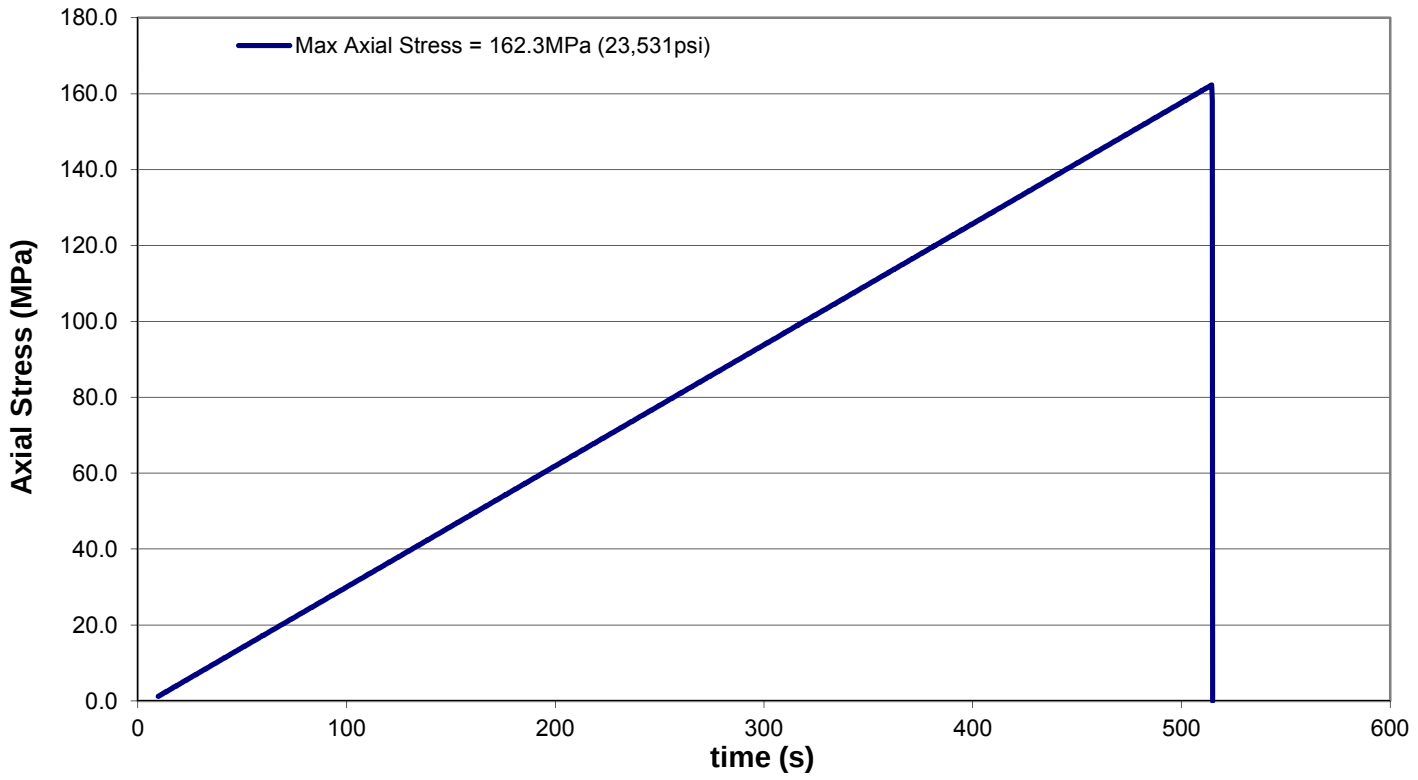
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.47	2871.9	168.14	2.8	466.1	162.3	23,531

Unconfined Compressive Strength Test



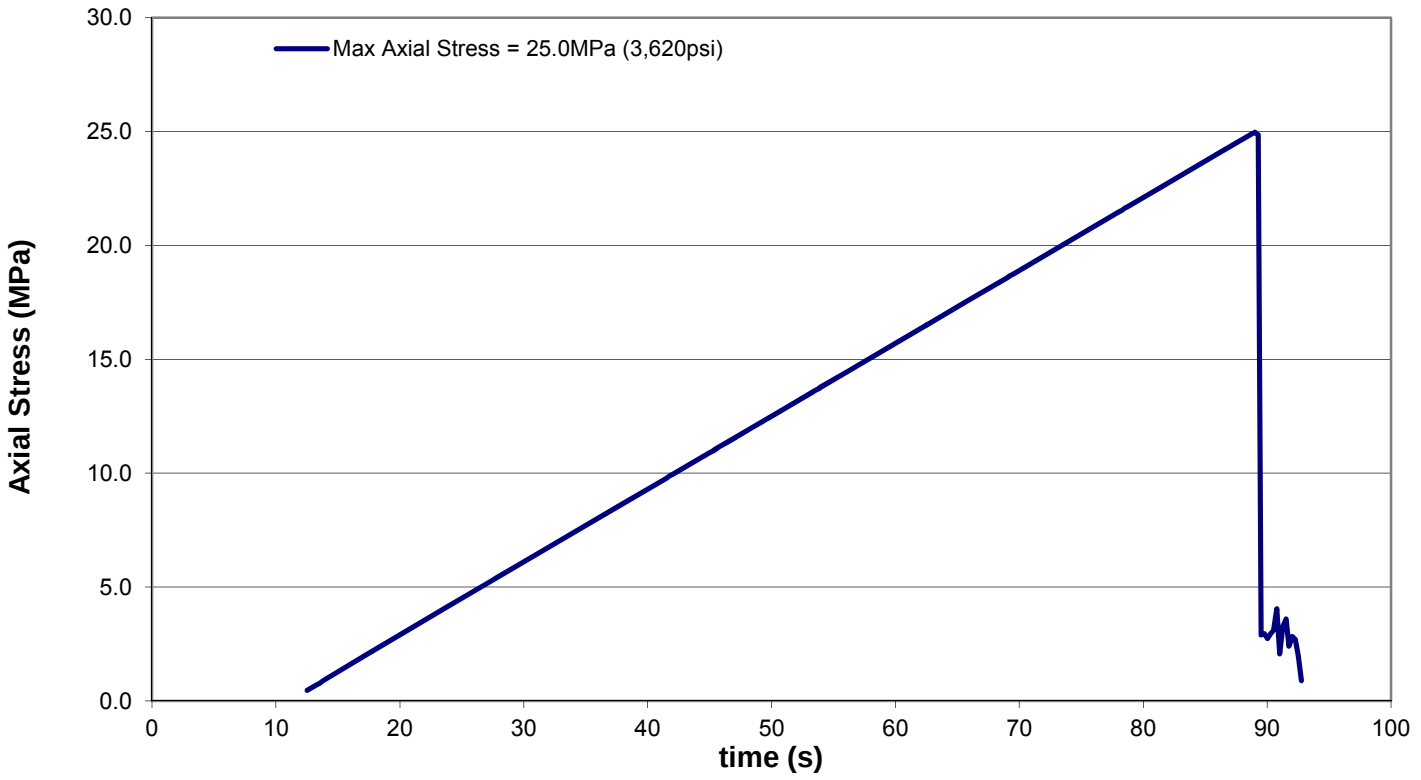
Drillhole ID:	UCS #8 BHUD14-04
Depth (m):	43.89 - 44.25
Sample Number(m):	UCS#2
Drillhole Location:	Main Embankment
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

Sample Photos



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.37	2862.4	170.26	2.8	71.5	25.0	3,620

Unconfined Compressive Strength Test



Drillhole ID:	UCS #11 BHUD14-06
Depth (m):	36.20 - 36.50
Sample Number(m):	UCS#1
Drillhole Location:	small seepage pond Embankment
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

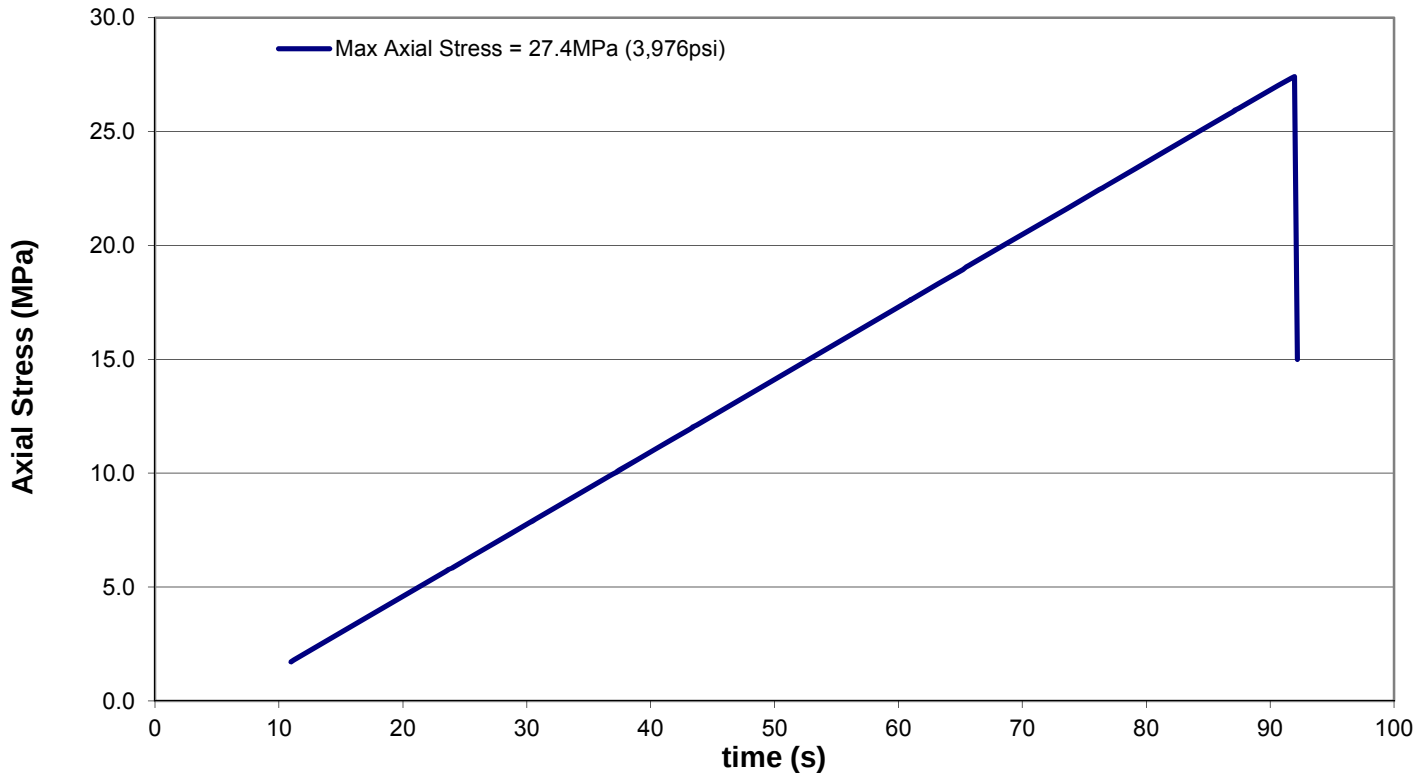
Sample Photos





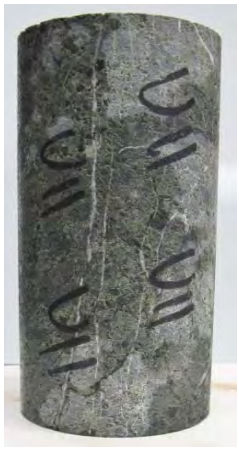
Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.58	2882.4	130.62	2.2	79.0	27.4	3,976

Unconfined Compressive Strength Test



Drillhole ID:	UCS #12 BHUD14-06
Depth (m):	76.69 - 76.94
Sample Number(m):	UCS#2
Drillhole Location:	small seepage pond Embankment
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

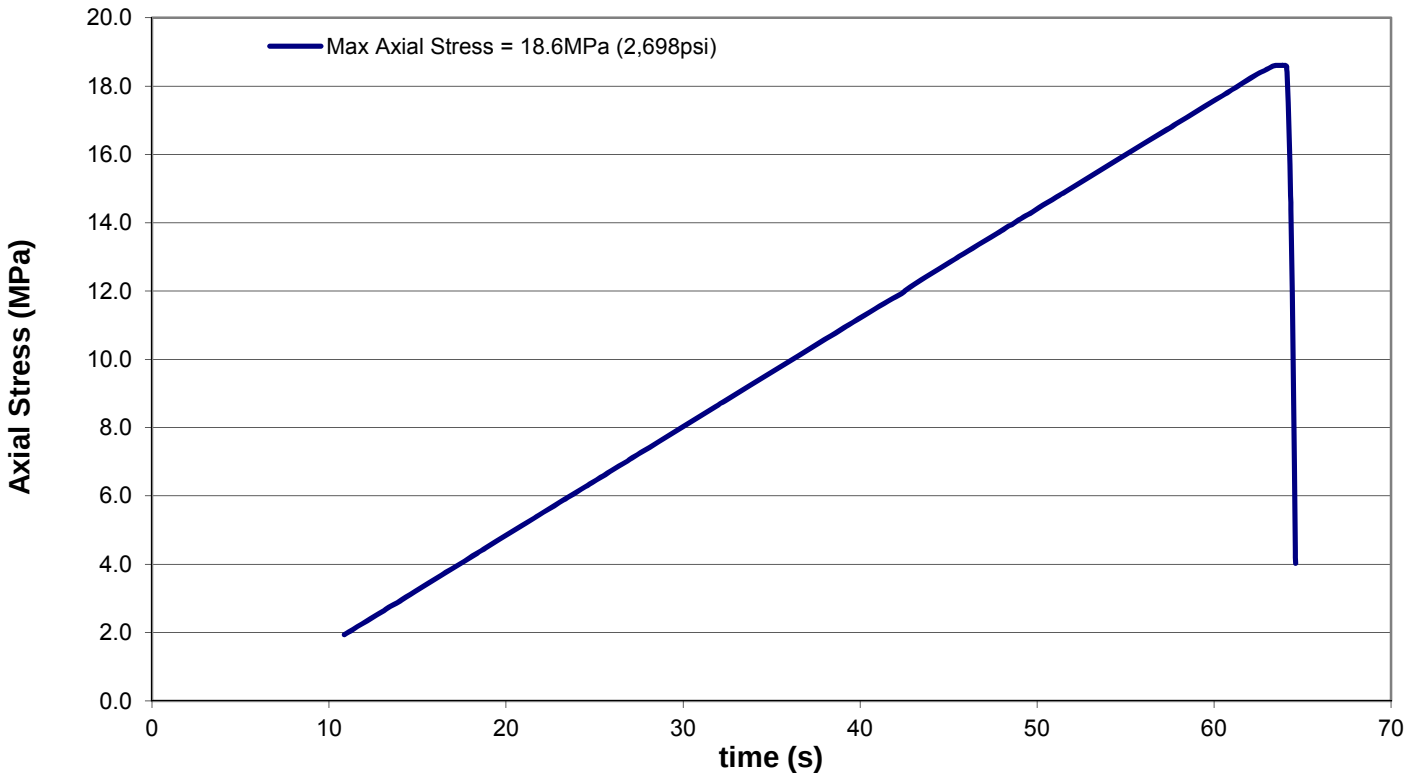
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.55	2879.5	122.53	2.0	53.6	18.6	2,698

Unconfined Compressive Strength Test



Drillhole ID:	UCS #15 BHLD14-05
Depth (m):	89.52 - 89.76
Sample Number(m):	UCS#3
Drillhole Location:	small seepage pond Embankment
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

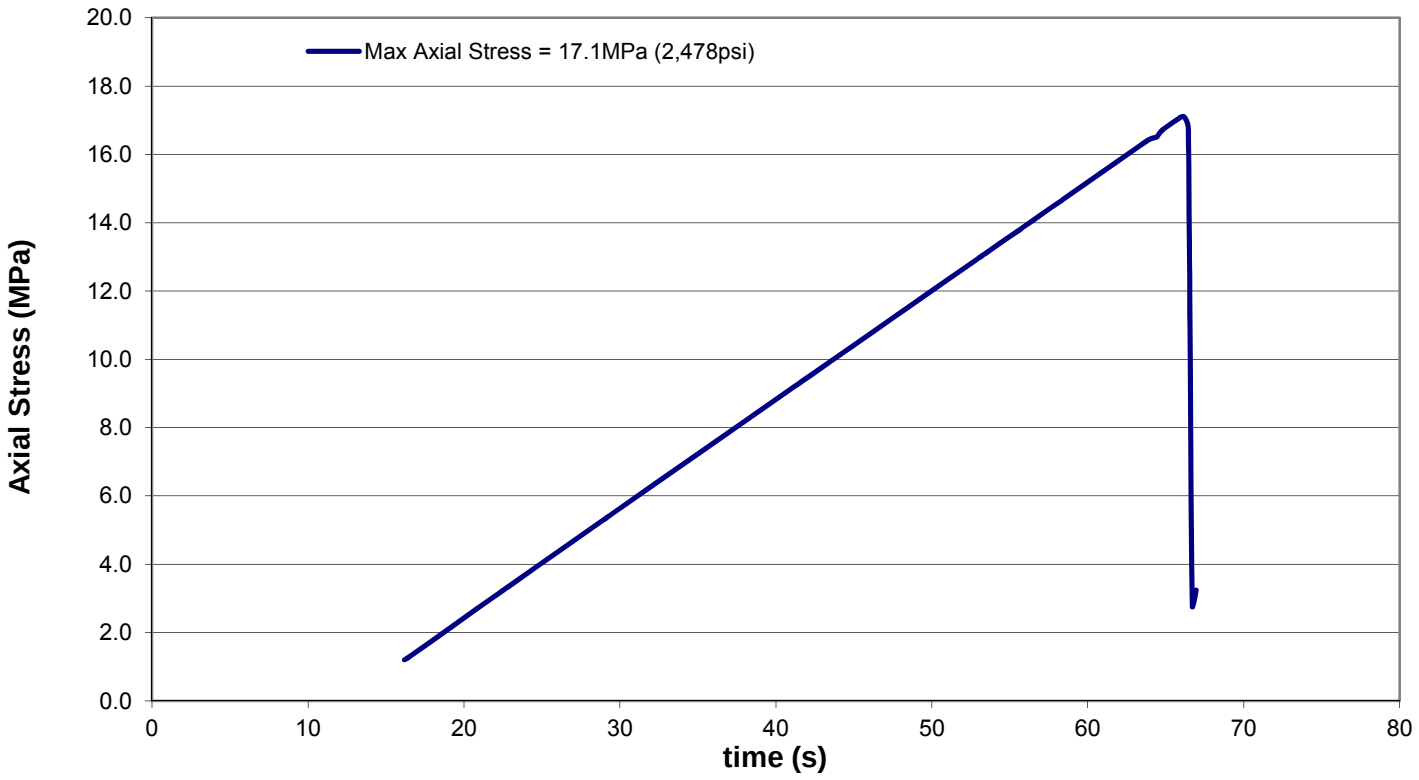
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.54	2878.6	165.17	2.7	49.2	17.1	2,478

Unconfined Compressive Strength Test



Drillhole ID:	UCS #21 BHLD14-02
Depth (m):	39.50 - 39.78
Sample Number(m):	UCS#1
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

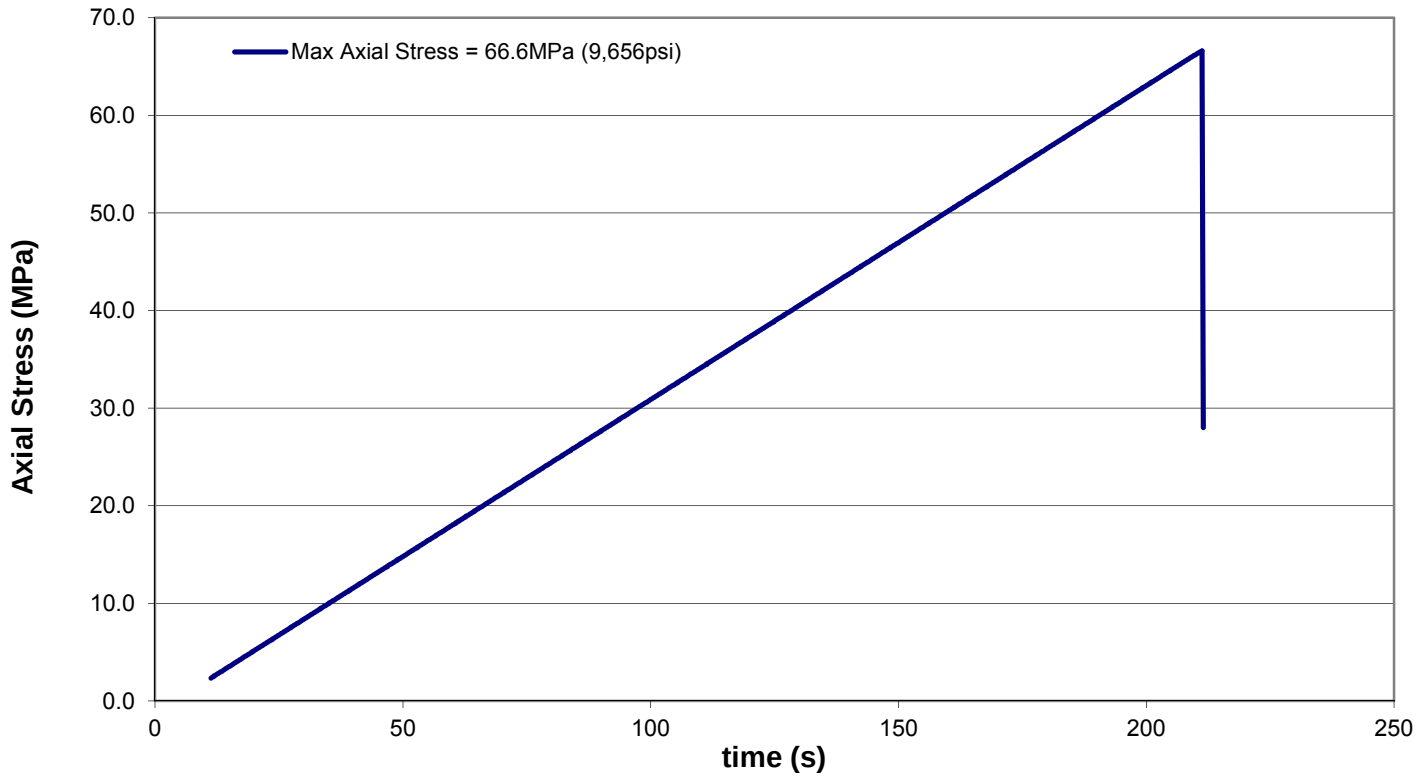
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.23	2849.2	163.85	2.7	189.7	66.6	9,656

Unconfined Compressive Strength Test



Drillhole ID:	UCS#22 BHLD14-01
Depth (m):	75.14 - 75.50
Sample Number(m):	UCS#2
Drillhole Location:	SWRSA
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

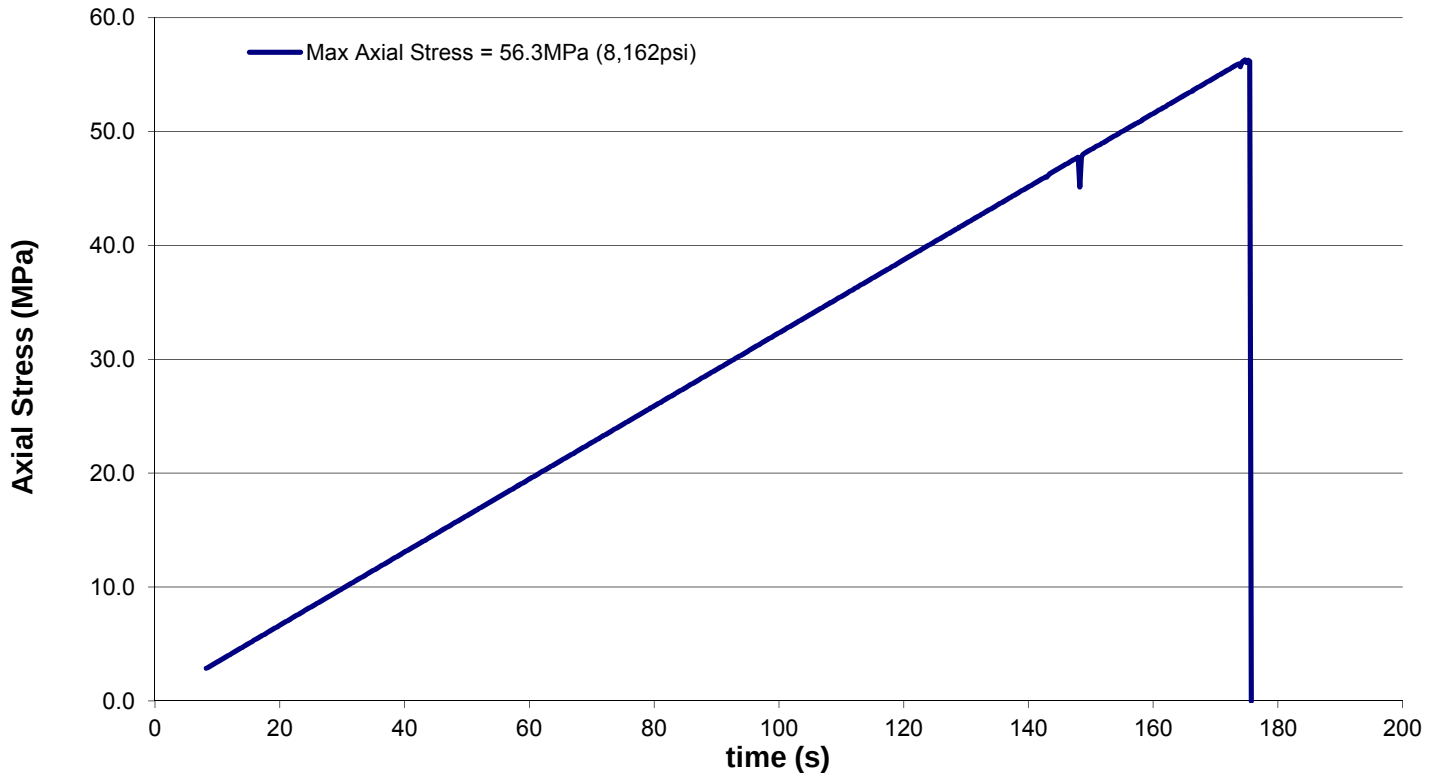
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.31	2856.7	168.06	2.8	160.8	56.3	8,162

Unconfined Compressive Strength Test



Drillhole ID:	UCS #4 BHUD14-02
Depth (m):	16.71 - 16.99
Sample Number(m):	UCS#1
Drillhole Location:	SWRSA
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

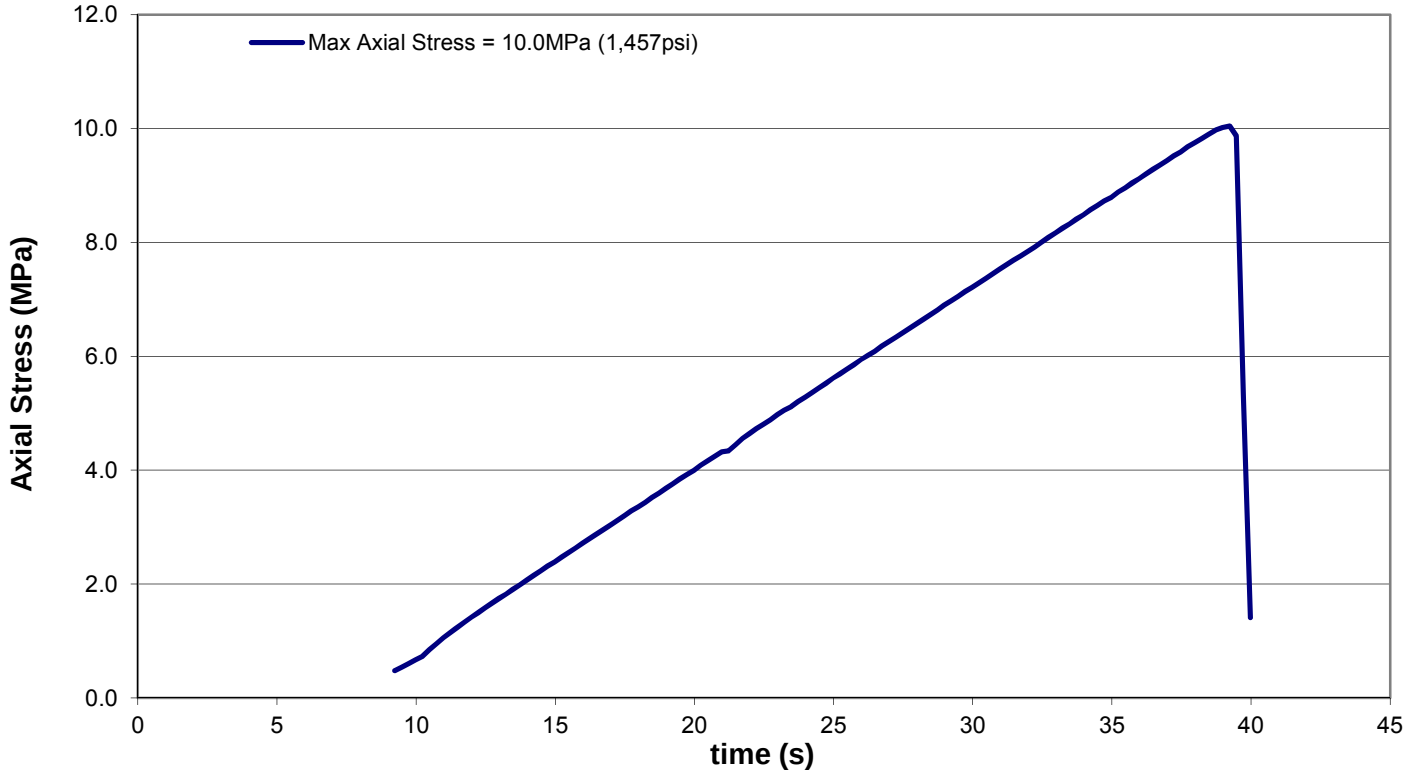
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.24	2850.1	126.67	2.1	28.6	10.0	1,457

Unconfined Compressive Strength Test



Drillhole ID:	UCS #8 BHUD14-04
Depth (m):	43.94 - 44.22
Sample Number(m):	UCS#2
Drillhole Location:	SWRSA
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

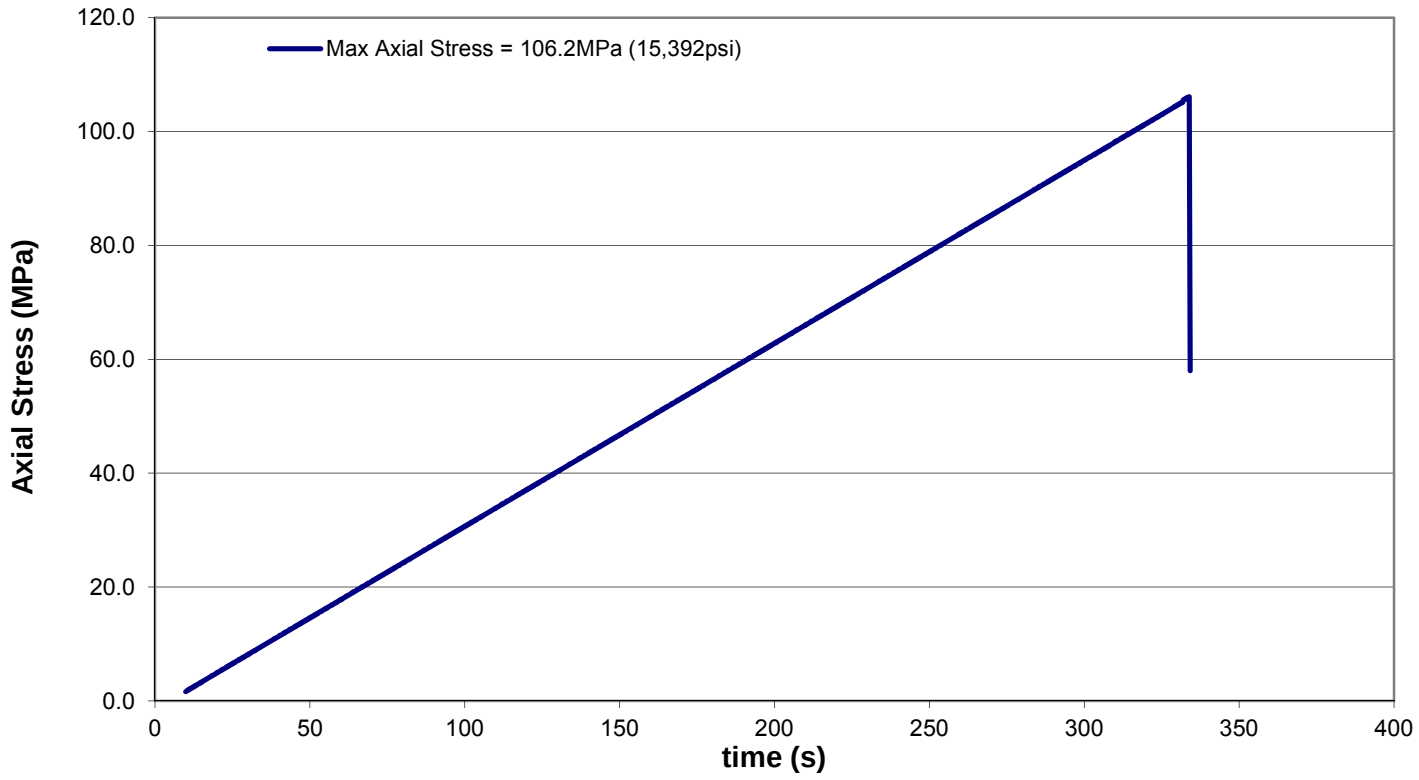
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.24	2850.1	170.44	2.8	302.5	106.2	15,392

Unconfined Compressive Strength Test



Drillhole ID:	UCS #11 BHUD14-06
Depth (m):	66.22 - 66.44
Sample Number(m):	UCS#3
Drillhole Location:	SWRSA
Failure Mode:	shear
Test Date:	October, 2014
Tested by:	P.Hughes

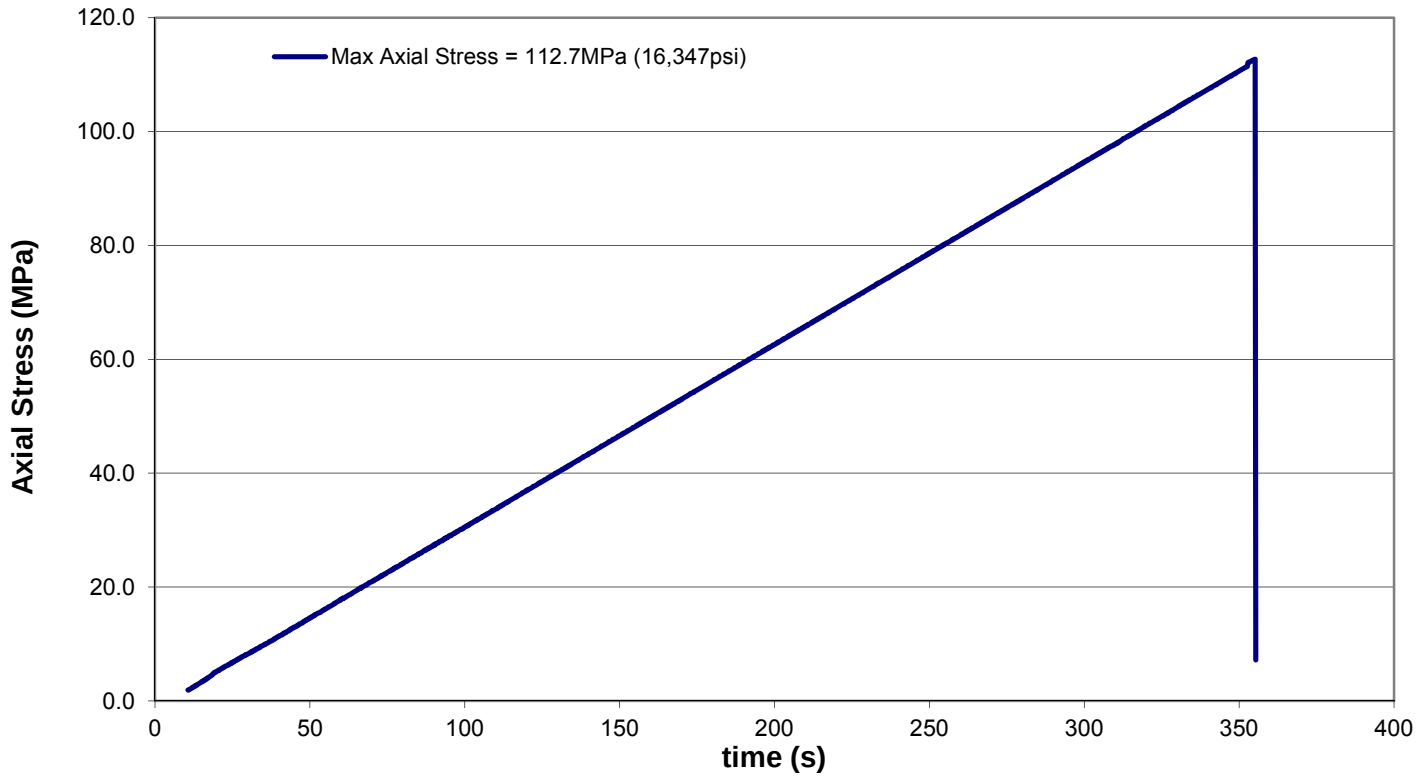
Sample Photos





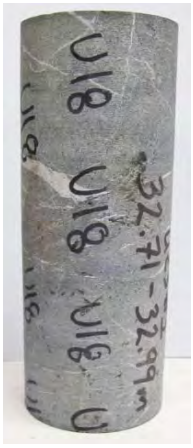
Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.36	2861.5	128.59	2.1	322.6	112.7	16,347

Unconfined Compressive Strength Test



Drillhole ID:	UCS #12 BHUD14-06
Depth (m):	32.71 - 32.99
Sample Number(m):	UCS#1
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

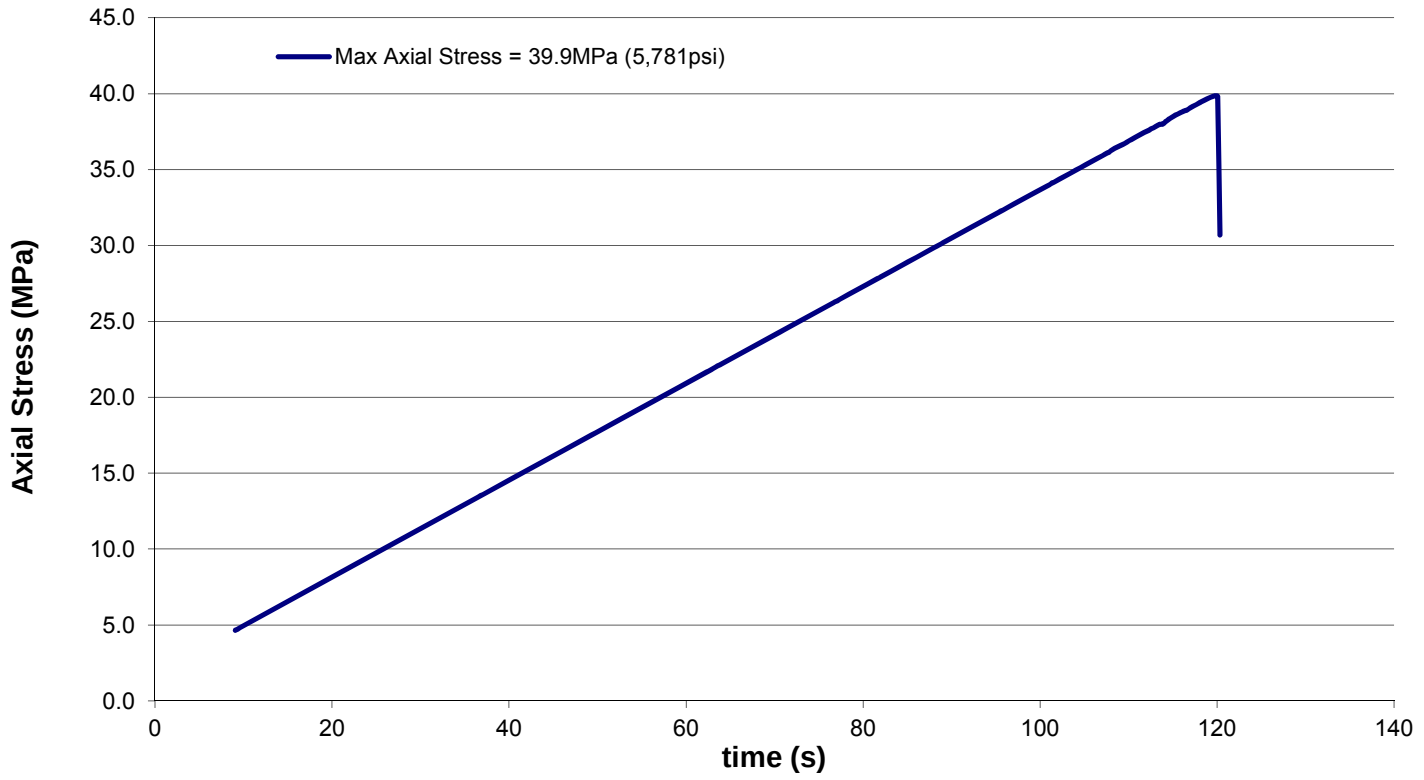
Sample Photos





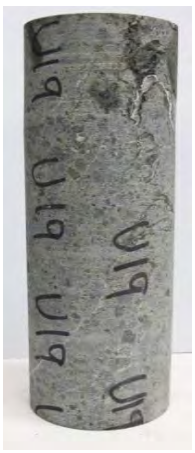
Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.50	2874.8	170.92	2.8	114.6	39.9	5,781

Unconfined Compressive Strength Test



Drillhole ID:	UCS #15 BHLD14-05
Depth (m):	45.35 - 45.60
Sample Number(m):	UCS#2
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

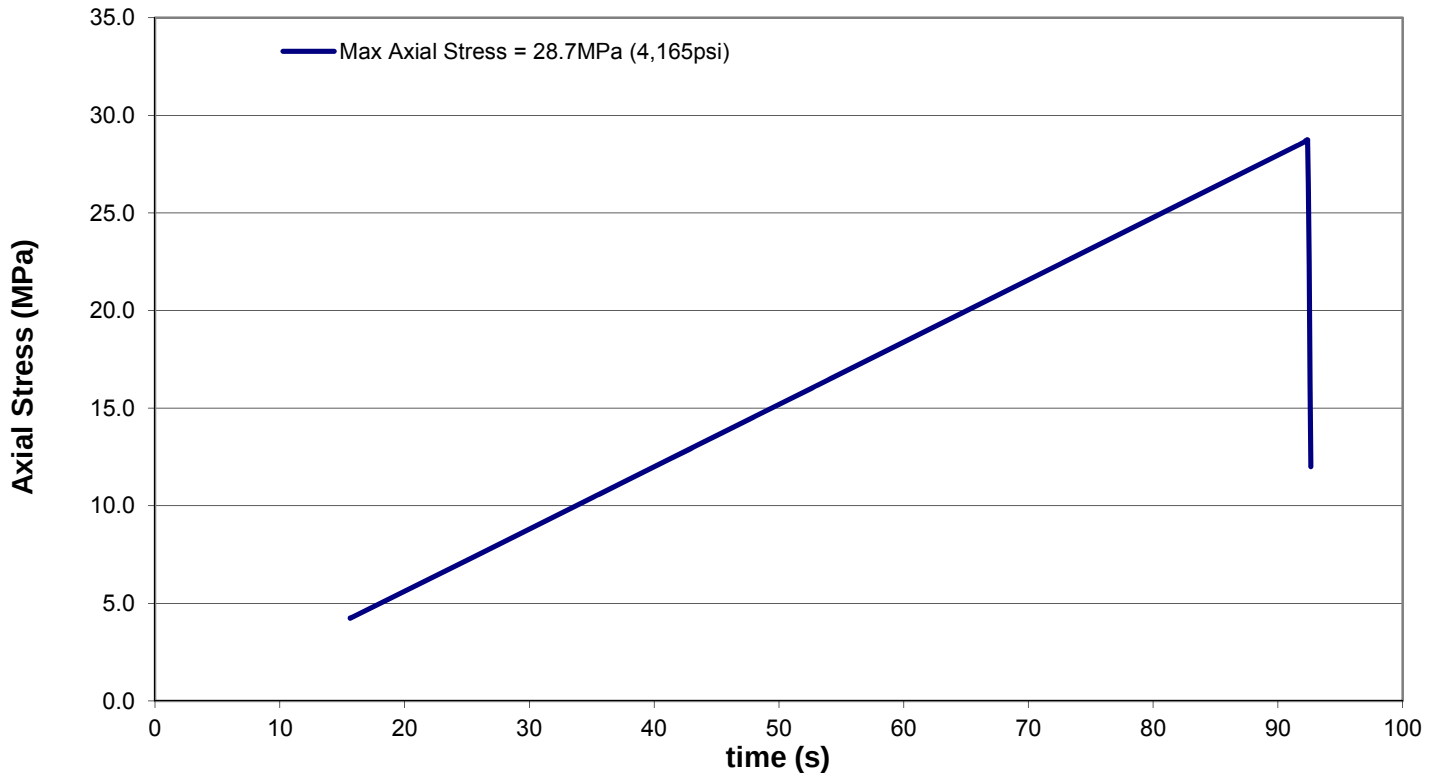
Sample Photos





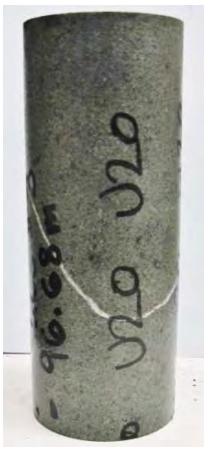
Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.44	2869.1	169.87	2.8	82.6	28.7	4,165

Unconfined Compressive Strength Test



Drillhole ID:	UCS #21 BHLD14-02
Depth (m):	96.35 - 96.68
Sample Number(m):	UCS#3
Drillhole Location:	SWRSA
Failure Mode:	pre-existing feature
Test Date:	October, 2014
Tested by:	P.Hughes

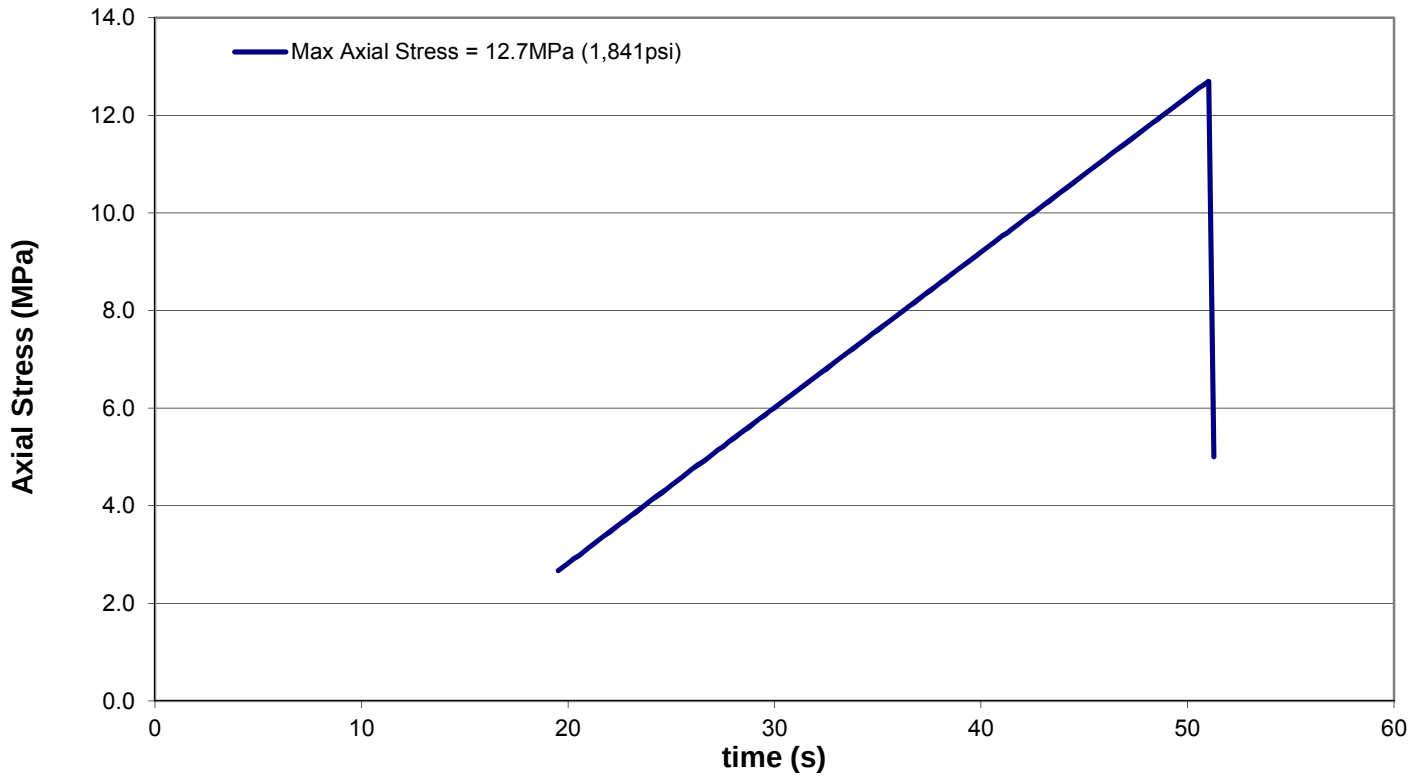
Sample Photos





Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.48	2872.9	169.80	2.8	36.5	12.7	1,841

Unconfined Compressive Strength Test



ROCK STRENGTH LABORATORY REPORT

PREPARED FOR:
KNIGHT PIESOLD LTD.

PROJECT:
ROCK STRENGTH LABORATORY REPORT
FOR
AJAX PROJECT (BATCH 3)
2014 GEOTECHNICAL SITE INVESTIGATION

KNIGHT PIESOLD PROJECT #VA101-246/26

December 18, 2014

December 18, 2014 14-KPL-04

Knight Piésold Ltd.
750 West Pender Street
Vancouver, BC V6C 2T8

Attention: Ms. Josie Speed

RE: Rock Strength Laboratory Report for AJAX PROJECT – 2014 Geotechnical Site Investigation (Batch 3) [KNIGHT PIESOLD PROJECT #VA101-246/26]

Testing Date: November, 2014

Tested by: Dr. Paul Hughes, P.Eng

Tested at: Norman B Keevil Institute of Mining Engineering, University of British Columbia

Testing Program: Report contains results of twenty-one (21) Unconfined Compressive Strength tests with elastic modulus readings and thirty-four (23) specific gravity results.

Equipment: MTS Electro-Hydraulic Testing Machine
Sartorius Universal Scale Model U4600p + **V40

Method: ISRM-1979 (UCS & Modulus) & ASTM C-97-02 (Bulk Density)

PB Hughes and Associates
1B-2775 Fir Street, Vancouver, British Columbia V6J 3C2
email phughes@mining.ubc.ca Phone: 604-626-9649

Comments:

The results of the testing of the twenty-one core samples for Unconfined Compressive Strength (UCS) with axial and circumferential elastic modulus readings and twenty-three specific gravity tests are presented within. The tests were performed per ISRM or ASTM standard unless noted.

Samples were shipped to the laboratory and tested 'as-is'. No rock descriptions were provided by Knight Piésold Ltd.

UCS samples identified as competent were wet cut and tested per ISRM specifications. Best efforts were made to cut the core samples such that the height to width ratio were within the ISRM standard. This was not possible on all samples as the samples sent to the laboratory were either too short to begin with or had deteriorated during shipment. Samples that do not have a height to width ratio between 2.5 and 3.0 do not satisfy the ISRM test specification. However, samples with a height to width ratio between 2.0 and 2.5 do satisfy ASTM 7012-10 standards. The use of strength values in design for laboratory specimen with length to diameter ratios below the standards must be employed with proper engineering judgment.

There was not sufficient length of competent sample for UCS testing for the following two samples:

- DH14-047 / UCS #1 / 36.07 - 36.37
- DH14-047 / UCS #2 / 57.16 - 57.48

Modulus results presented were prepared using data recorded by automated testing software. Calculations of strength and strain were performed in a spreadsheet. Reported modulus and Poisson`s

Comments (continued):

ratio values were interpreted by calculating the slopes of the axial and circumferential strain vs. stress data using a 50 data point average around the 50% of the failure load.

Two samples failed at low strengths along pre-existing features. The Young's Modulus and Poisson's ratio values are to be discarded for the following two samples:

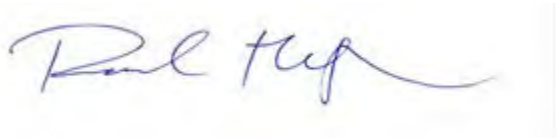
- DH14-043 / UCS #1 / 26.00 - 26.30;
- DH14-044 / UCS #1 / 11.61 - 11.94;

Two samples failed along a side fracture plane and not through the core axis. By ISRM standards the test is not considered a shear failure and is not representative of the intact strength of the rock. The two samples with side fractures are as follows:

- DH14-058 / 21.25 - 21.56 / UCS #2
- DH14-063 / 12.76 - 13.11 / UCS #1

The test results reported are of an experimental and exploratory nature. No particular results can be guaranteed or considered representative of the rock mass as a whole. The use of the values reported must be considered with respect to the rock and rock mass in its entirety and the conditions present at site. Application of the test results provided is subject to judgment of a Professional Engineer. Worksheets and data files are available upon request

In closing, if there are any questions or comments with regards to this project, please do not hesitate to contact the undersigned.



Paul Hughes, PEng, Ph.D.
PB Hughes & Associates

Summary

Unconfined Compressive Strength Test with Young's Modulus and Poisson's Ratio Values

UBC SAMPLE ID	Drillhole ID	Sample Number	Depth (m)	Drillhole Location	Height H (mm)	Diameter d (mm)	Ratio H/d	UCS (MPa)	UCS (psi)	Young Modulus E (GPa)	Poisson Ratio ν ( )
E1	DH14-041	UCS #2	54.45 - 54.80	Plant Site	121.22	60.62	2.01	14.1	2050	27.98	0.26
E2	DH14-043	UCS #1	26.00 - 26.30	Plant Site	171.71	60.04	2.86	2.0	290	N/A	N/A
E3	DH14-043	UCS #2	44.08 - 44.31	Plant Site	164.23	60.49	2.71	66.5	9643	42.89	0.18
E4	DH14-044	UCS #1	11.61 - 11.94	Plant Site	166.84	59.62	2.80	10.6	1541	35.22	N/A
E5	DH14-044	UCS #2	30.61 - 30.81	Plant Site	166.54	59.79	2.79	60.0	8696	97.85	0.13
E6	DH14-045	UCS #1	46.66 - 47.03	Plant Site	167.39	60.04	2.79	84.5	12255	64.52	0.29
E7	DH14-046	UCS #1	37.42 - 37.64	EMRSF	146.21	60.15	2.43	153.1	22194	87.51	0.27
E10	DH14-048	UCS #1	14.41 - 14.66	Plant Site	165.86	60.89	2.72	109.7	15907	65.89	0.09
E11	DH14-048	UCS #2	44.76 - 45.16	Plant Site	165.37	60.77	2.72	91.6	13279	60.4	0.16
E12	DH14-050	UCS #1	8.76 - 9.02	Plant Site	157.87	60.29	2.62	113.0	16387	74.49	0.22
E13	DH14-050	UCS #2	23.45 - 23.85	Plant Site	161.48	60.35	2.68	17.0	2458	80.21	0.24
E14	DH14-054	UCS #1	50.71 - 51.04	Plant Site	161.01	60.62	2.66	26.4	3832	40.68	0.12
E15	DH14-058	UCS #1	13.11 - 13.37	Primary Crusher	161.45	60.6	2.66	127.7	18515	87.86	0.13
E16	DH14-058	UCS #2	21.25 - 21.56	Primary Crusher	162.99	60.65	2.69	152.3	22081	89.14	0.23
E17	DH14-058	UCS #3	44.88 - 45.17	Primary Crusher	161.78	60.64	2.67	264.5	38354	75.02	0.29
E18	DH14-060	UCS #1	28.41 - 28.67	Primary Crusher	165.49	60.76	2.72	147.1	21324	63.61	0.25
E19	DH14-061	UCS #1	8.32 - 8.61	Primary Crusher	123.67	60.63	2.04	75.6	10960	91.07	0.17
E20	DH14-062	UCS #1	43.20 - 43.45	TSF basin	142.55	60.8	2.34	15.4	2231	13.1	0.22
E21	DH14-063	UCS #1	12.76 - 13.11	Possible quarry site	163.46	60.63	2.70	152.4	22098	37.73	0.20
E22	DH14-063	UCS #2	34.26 - 34.49	Possible quarry site	158.54	60.58	2.62	166.2	24094	75.15	0.20
E23	DH14-060	UCS #2	37.70- 37.96	Primary Crusher	162.76	60.69	2.68	228.5	33130	66.35	0.24

Specific Gravity and Moisture Content Test Results

UBC SAMPLE ID	Drillhole ID	Depth (m)	Sample Number	Drillhole Location	Natural Weight (g)	Dry Weight (g)	Bath Weight (g)	Bulk Specific Gravity	Moisture Content (%)
E1	DH14-041	54.45 - 54.80	UCS #2	Plant Site, no UCS #1	1207.9	1186.2	763.2	2.804	1.83%
E2	DH14-043	26.00 - 26.30	UCS #1	Plant Site	886.6	879.9	567.4	2.816	0.76%
E3	DH14-043	44.08 - 44.31	UCS #2	Plant Site	438.5	434.0	282.5	2.864	1.04%
E4	DH14-044	11.61 - 11.94	UCS #1	Plant Site	842.4	839.7	534.0	2.747	0.32%
E5	DH14-044	30.61 - 30.81	UCS #2	Plant Site	668.3	666.7	441.3	2.958	0.24%
E6	DH14-045	46.66 - 47.03	UCS #1	Plant Site	922.5	921.2	603.7	2.901	0.14%
E7	DH14-046	37.42 - 37.64	UCS #1	EMRSF	855.0	853.0	594.9	3.305	0.23%
E8	DH14-047	36.07 - 36.37	UCS #1	Plant Site	936.1	922.0	588.0	2.760	1.53%
E9	DH14-047	57.16 - 57.48	UCS #2	Plant Site	1178.2	1161.5	751.5	2.833	1.44%
E10	DH14-048	14.41 - 14.66	UCS #1	Plant Site	646.6	644.8	424.2	2.922	0.28%
E11	DH14-048	44.76 - 45.16	UCS #2	Plant Site	411.7	410.6	270.4	2.929	0.27%
E12	DH14-050	8.76 - 9.02	UCS #1	Plant Site	473.0	471.9	309.1	2.899	0.23%
E13	DH14-050	23.45 - 23.85	UCS #2	Plant Site	1600.7	1598.1	1049.7	2.914	0.16%
E14	DH14-054	50.71 - 51.04	UCS #1	Plant Site	1075.7	1071.0	681.4	2.749	0.44%
E15	DH14-058	13.11 - 13.37	UCS #1	Primary Crusher	549.3	547.7	356.1	2.859	0.29%
E16	DH14-058	21.25 - 21.56	UCS #2	Primary Crusher	991.5	991.2	647.6	2.885	0.03%
E17	DH14-058	44.88 - 45.17	UCS #3	Primary Crusher	563.2	562.3	368.1	2.895	0.16%
E18	DH14-060	28.41 - 28.67	UCS #1	Primary Crusher	594.9	594.3	384.6	2.834	0.10%
E19	DH14-061	8.32 - 8.61	UCS #1	Primary Crusher	1114.3	1111.9	710.1	2.767	0.22%
E20	DH14-062	43.20 - 43.45	UCS #1	TSF basin	662.1	646.2	411.5	2.754	2.46%
E21	DH14-063	12.76 - 13.11	UCS #1	Possible quarry site	1324.7	1323.6	864.4	2.883	0.08%
E22	DH14-063	34.26 - 34.49	UCS #2	Possible quarry site	457.2	456.1	297.3	2.873	0.24%
E23	DH14-060	37.70- 37.96	UCS #2	Primary Crusher	647.1	647.0	421.5	2.869	0.02%

ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-041
Depth (m):	54.45 - 54.80
Sample Number:	UCS #2
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	27.98
Poisson Ratio, ν:	0.26
Failure Mode:	pre-existing feature
Specific Gravity:	2.75

Before Test

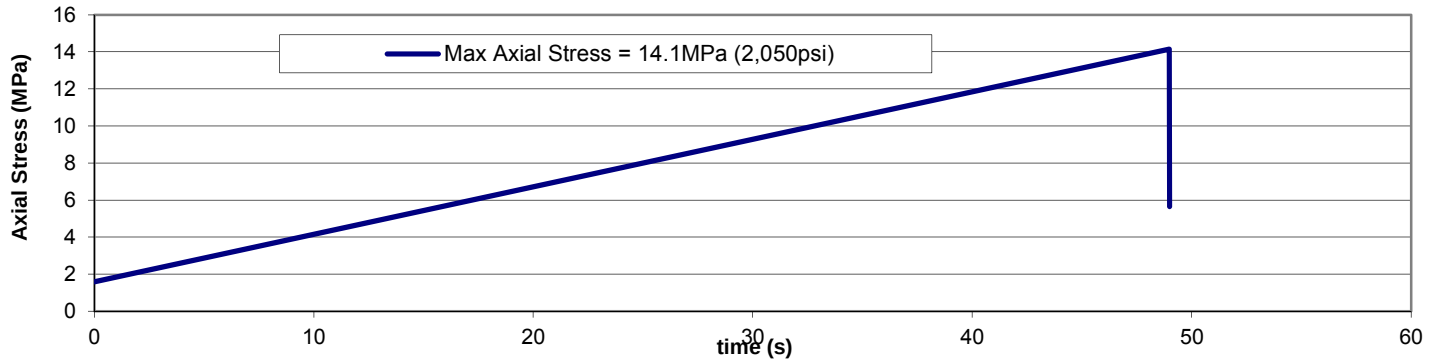


After Test

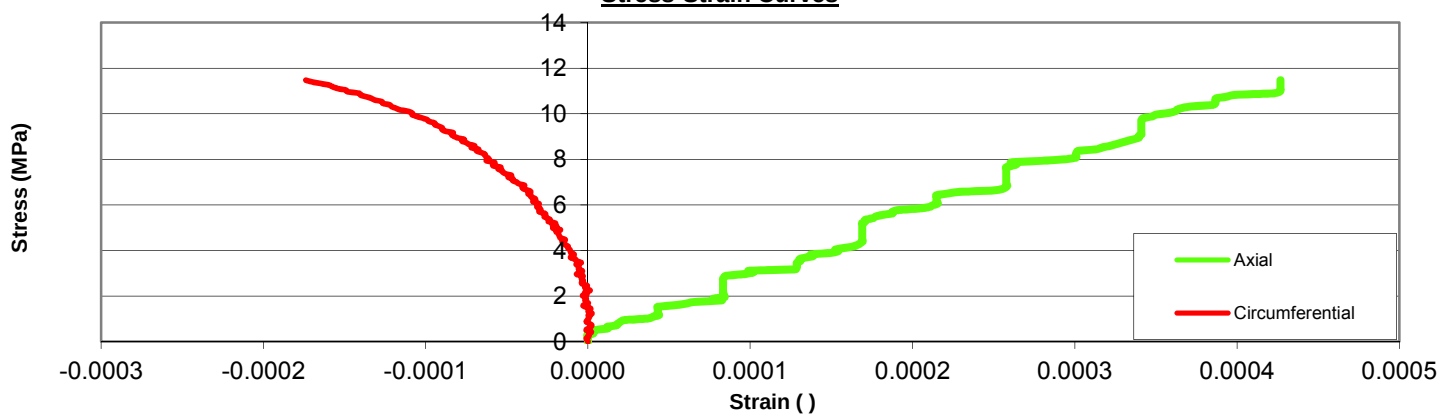


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σUCS	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.62	2886.2	121.22	2.0	40.8	14.1	2,050

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-043
Depth (m):	26.00 - 26.30
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	N/A
Poisson Ratio, ν:	N/A
Failure Mode:	pre-existing feature
Specific Gravity:	2.74

Before Test

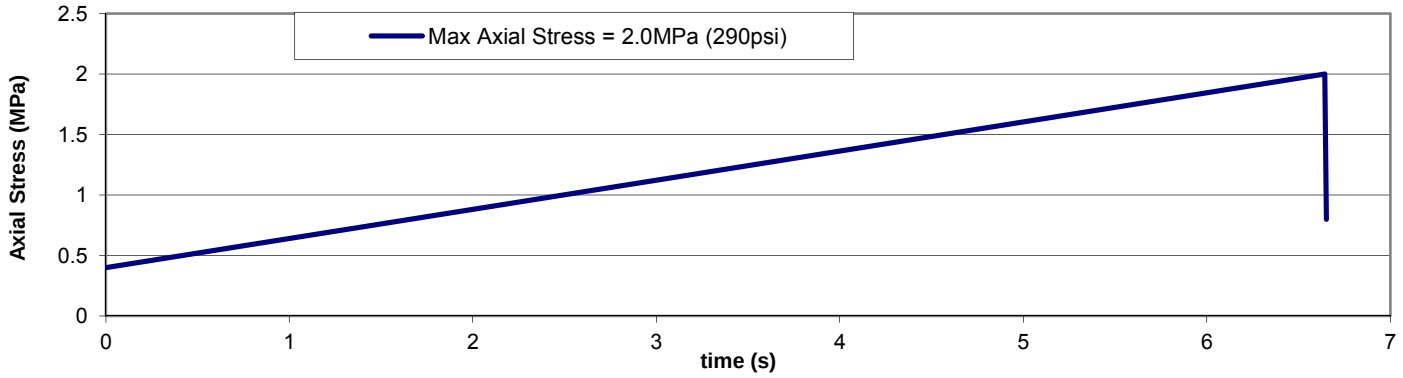


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.04	2831.2	171.71	2.9	5.7	2.0	290

Unconfined Compressive Strength Test

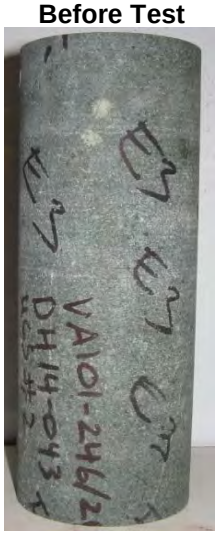


Note: Sample failed along pre-existing feature at onset of testing and elastic modulus readings were invalid.

ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-043
Depth (m):	44.08 - 44.31
Sample Number:	UCS #2
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	42.89
Poisson Ratio, ν:	0.18
Failure Mode:	shear
Specific Gravity:	2.73

Before Test

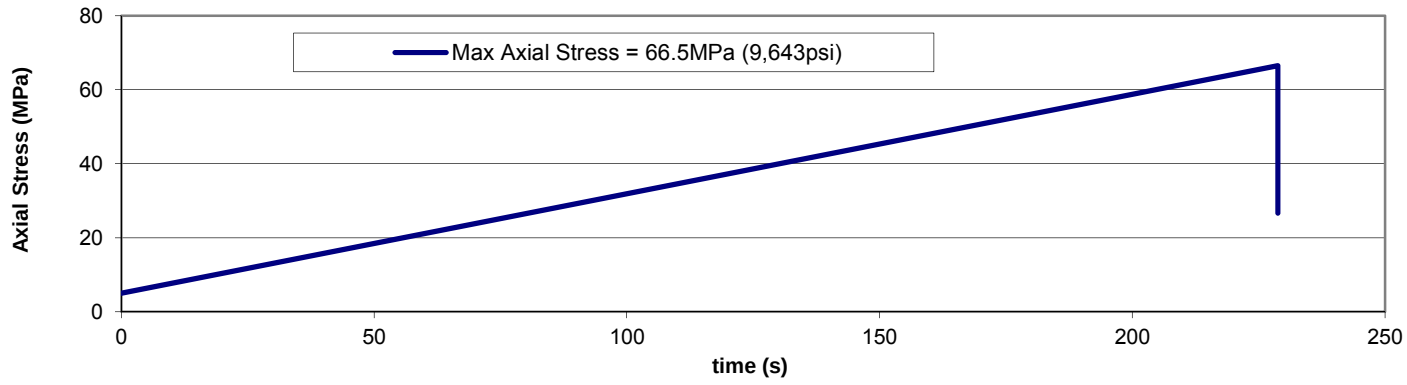


After Test

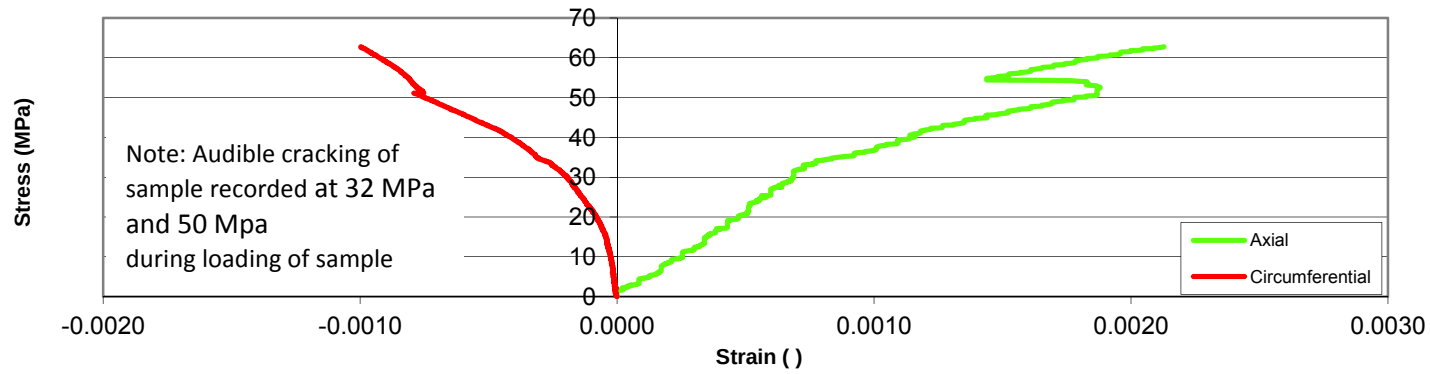


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σUCS	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.49	2873.8	164.23	2.7	191.1	66.5	9,643

Unconfined Compressive Strength Test



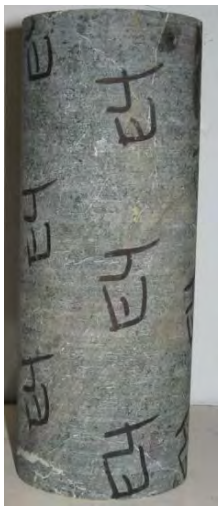
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-044
Depth (m):	11.61 - 11.94
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	35.22
Poisson Ratio, ν:	N/A
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

Before Test

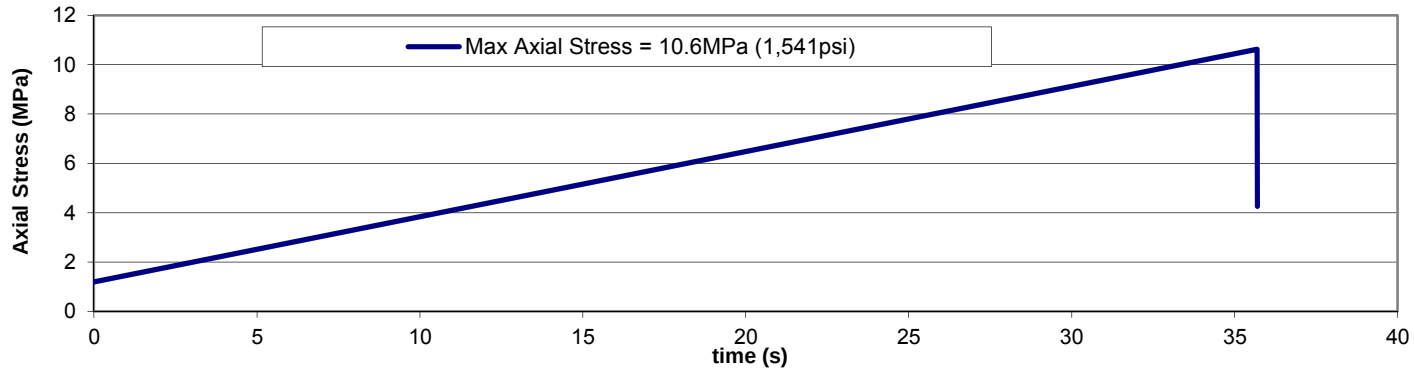


After Test

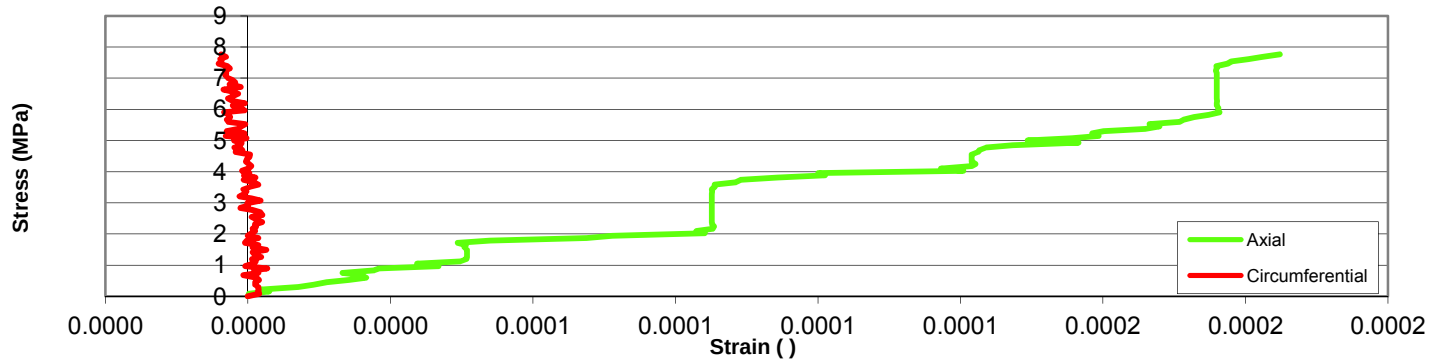


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
59.62	2791.7	166.84	2.8	29.7	10.6	1,541

Unconfined Compressive Strength Test



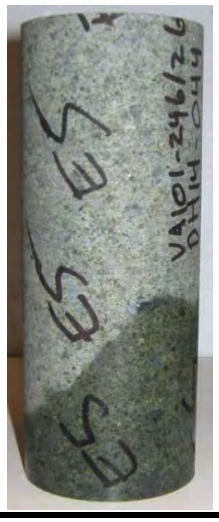
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-044
Depth (m):	30.61 - 30.81
Sample Number:	UCS #2
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	97.85
Poisson Ratio, ν:	0.13
Failure Mode:	pre-existing feature
Specific Gravity:	2.73

Before Test

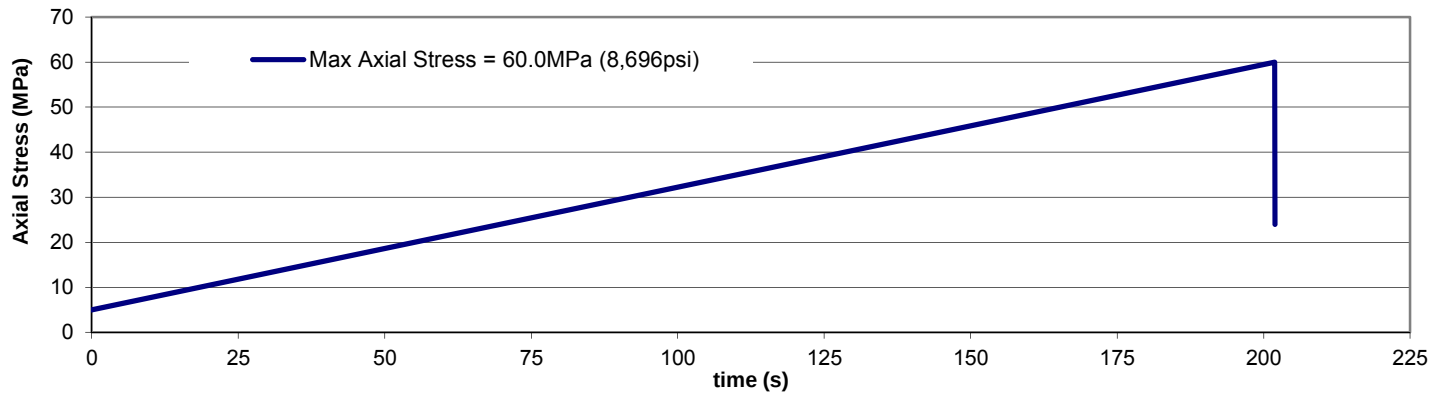


After Test

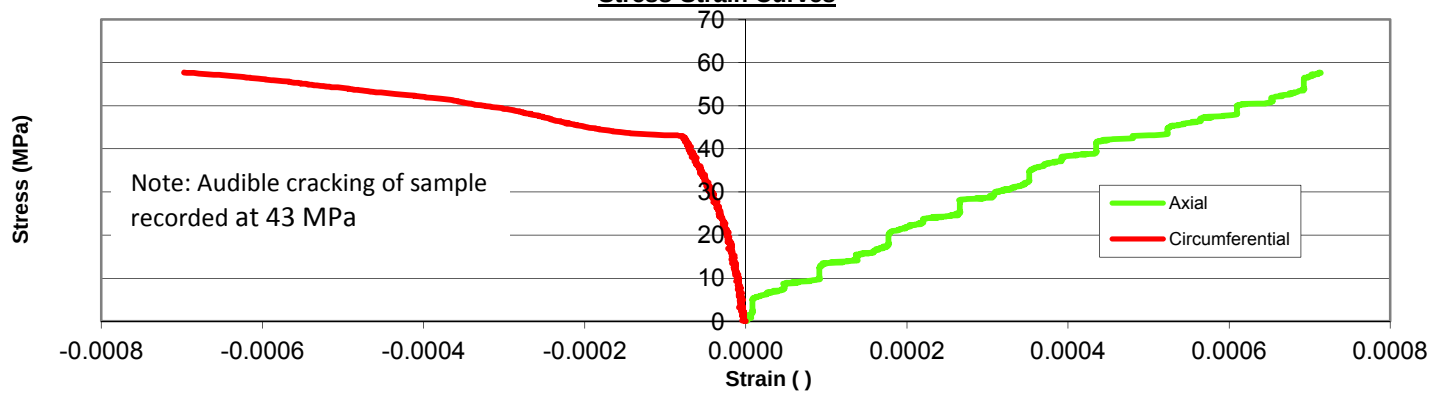


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
59.79	2807.7	166.54	2.8	168.4	60.0	8,696

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-045
Depth (m):	46.66 - 47.03
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	64.52
Poisson Ratio, ν:	0.29
Failure Mode:	shear
Specific Gravity:	0.00

Before Test

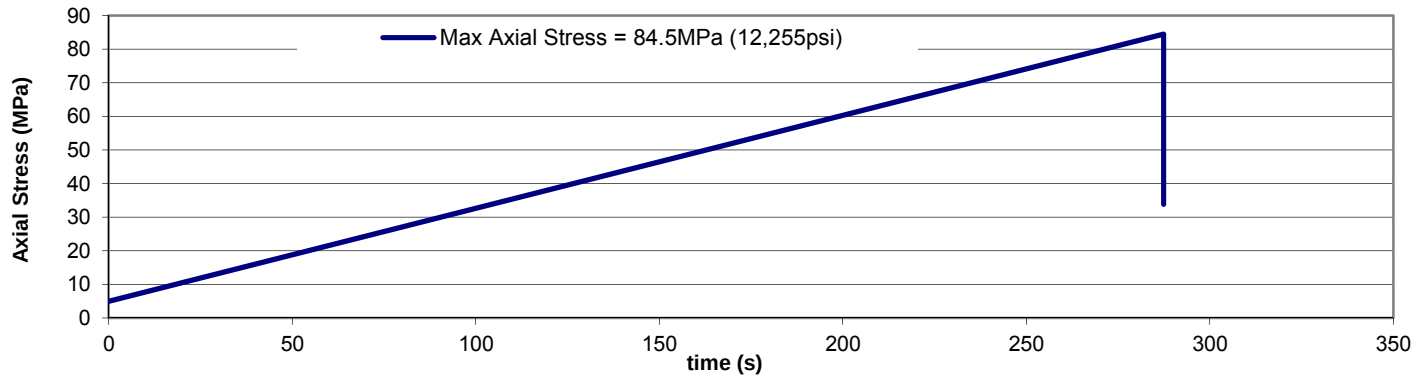


After Test

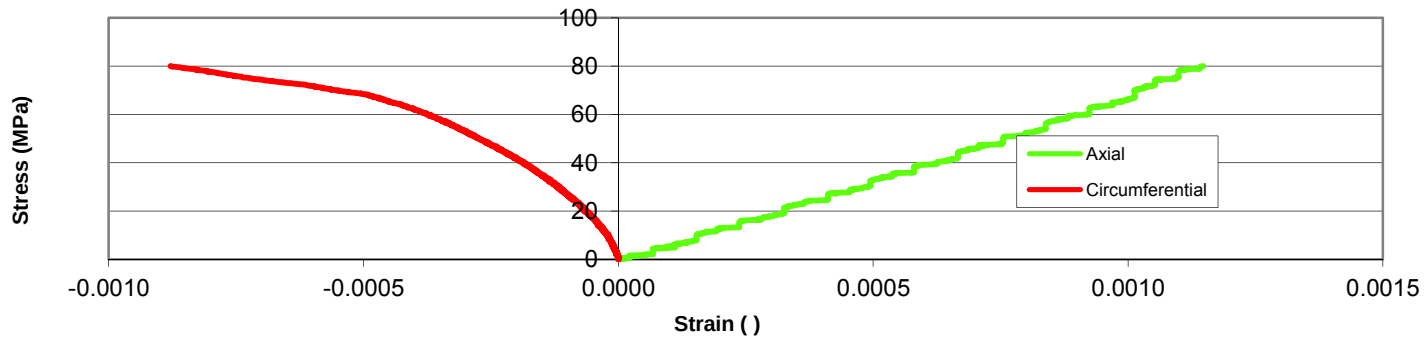


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.04	2831.2	167.39	2.8	239.3	84.5	12,255

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-046
Depth (m):	37.42 - 37.64
Sample Number:	UCS #1
Drillhole Location:	EMRSF
Tested By:	P.Hughes
Young Modulus, E (GPa):	87.51
Poisson Ratio, ν:	0.27
Failure Mode:	shear
Specific Gravity:	2.92

Before Test

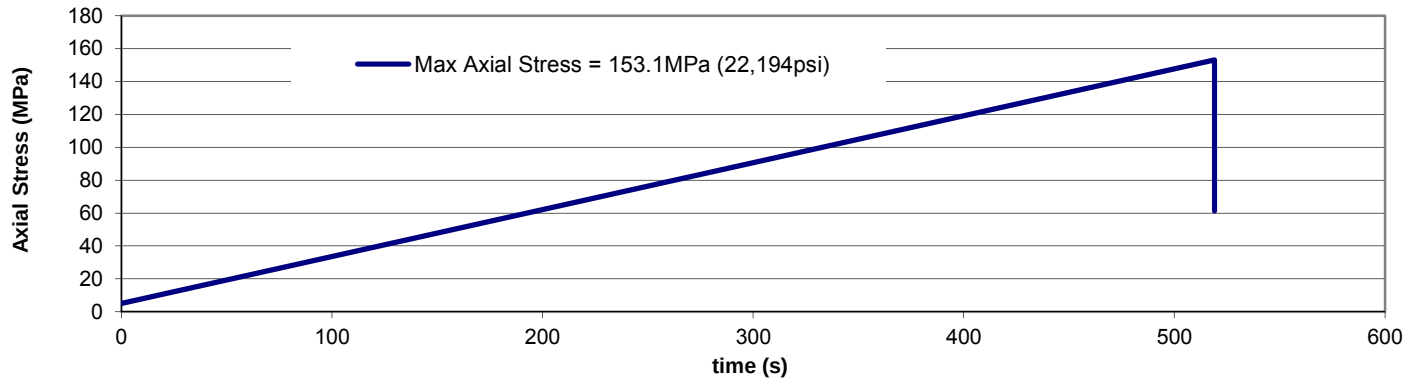


After Test

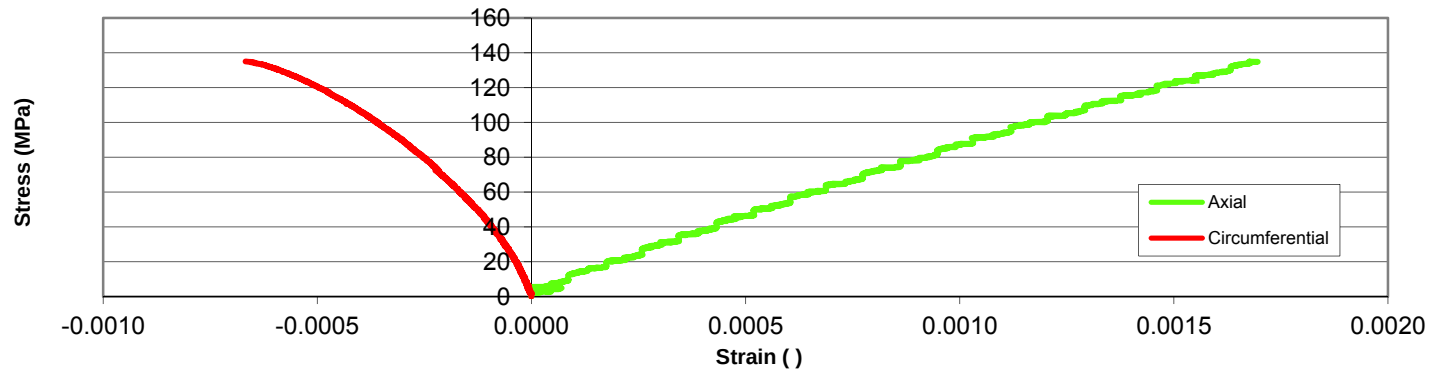


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.15	2841.6	146.21	2.4	434.9	153.1	22,194

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-048
Depth (m):	14.41 - 14.66
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	65.89
Poisson Ratio, ν:	0.09
Failure Mode:	shear
Specific Gravity:	2.86

Before Test

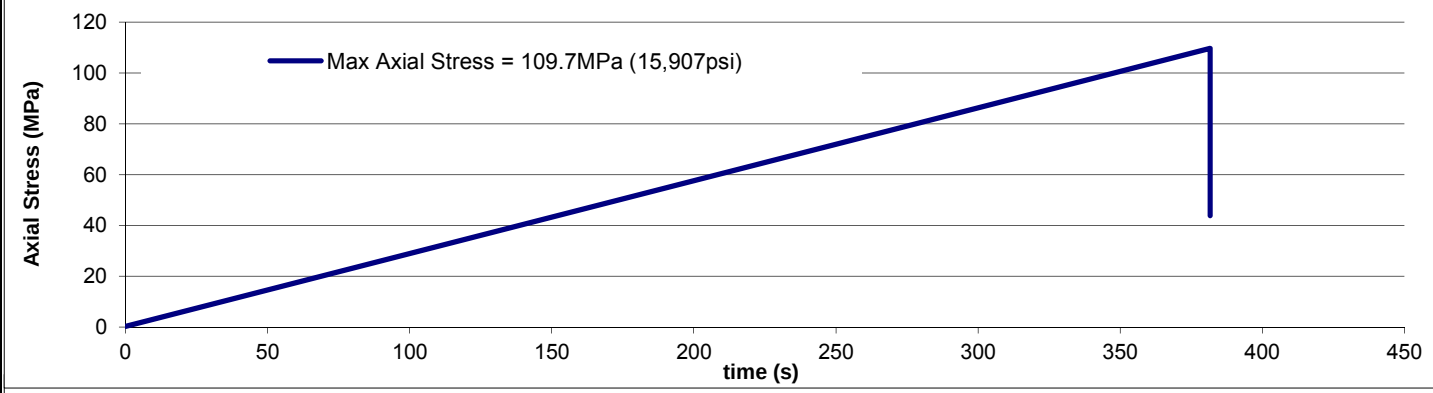


After Test

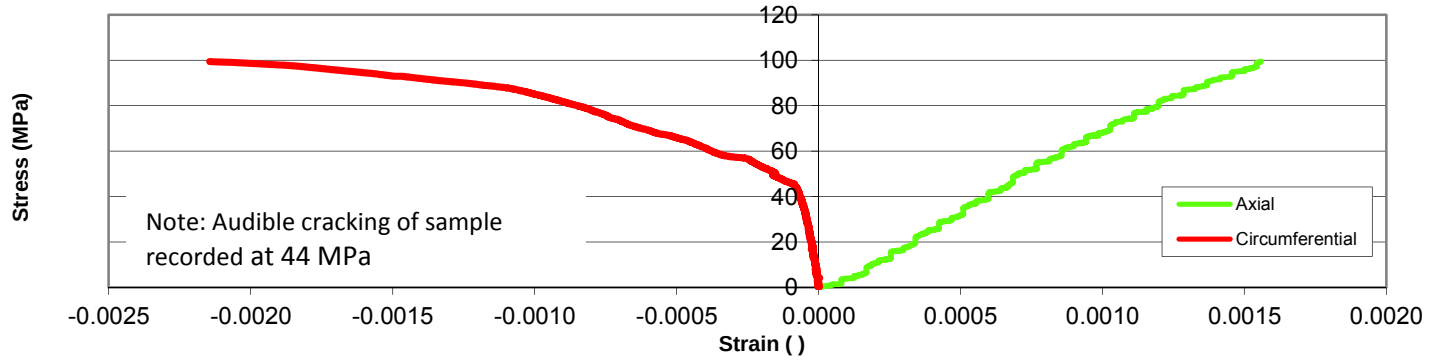


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.89	2911.9	165.86	2.7	319.5	109.7	15,907

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-048
Depth (m):	44.76 - 45.16
Sample Number:	UCS #2
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	60.40
Poisson Ratio, ν:	0.16
Failure Mode:	shear
Specific Gravity:	2.85

Before Test

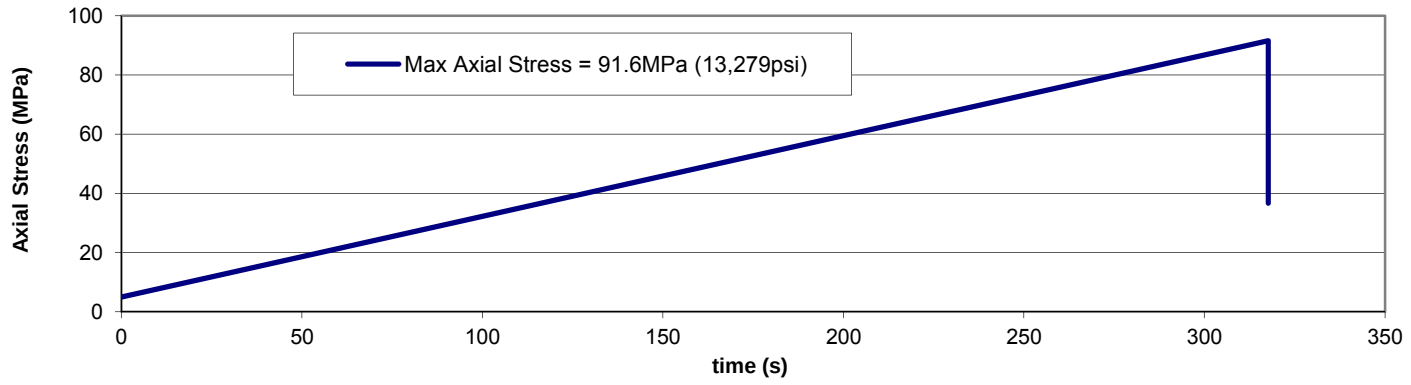


After Test

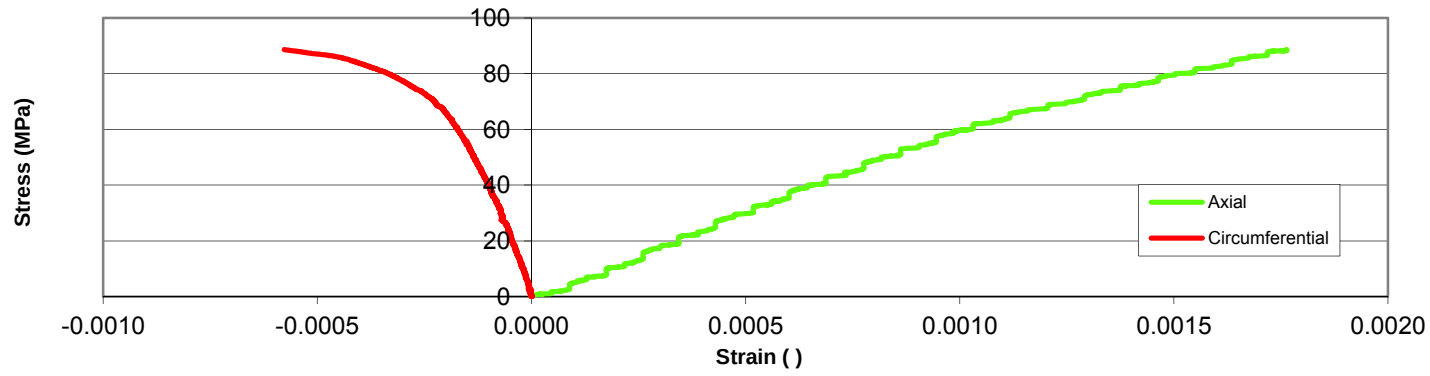


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.77	2900.5	165.37	2.7	265.6	91.6	13,279

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-050
Depth (m):	8.76 - 9.02
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	74.49
Poisson Ratio, ν:	0.22
Failure Mode:	shear
Specific Gravity:	2.65

Before Test

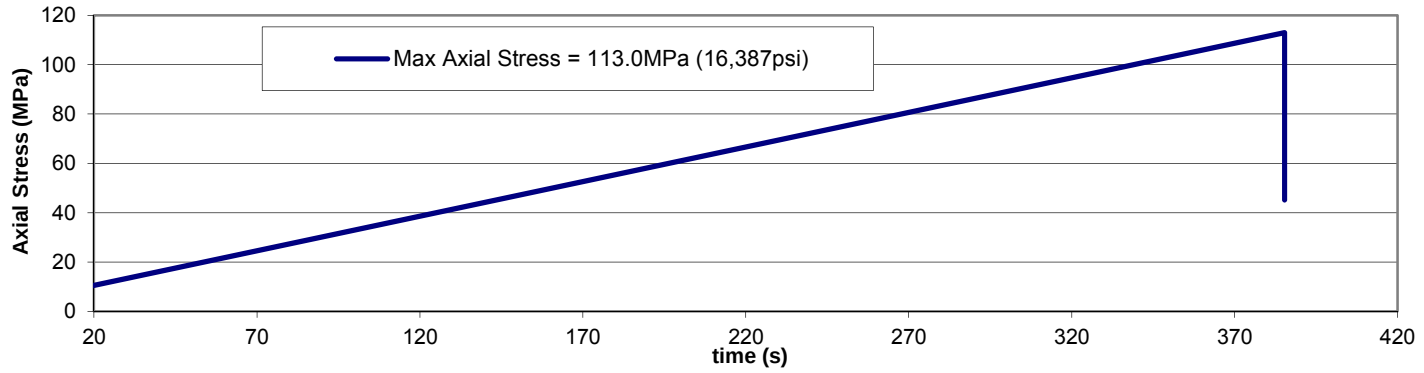


After Test

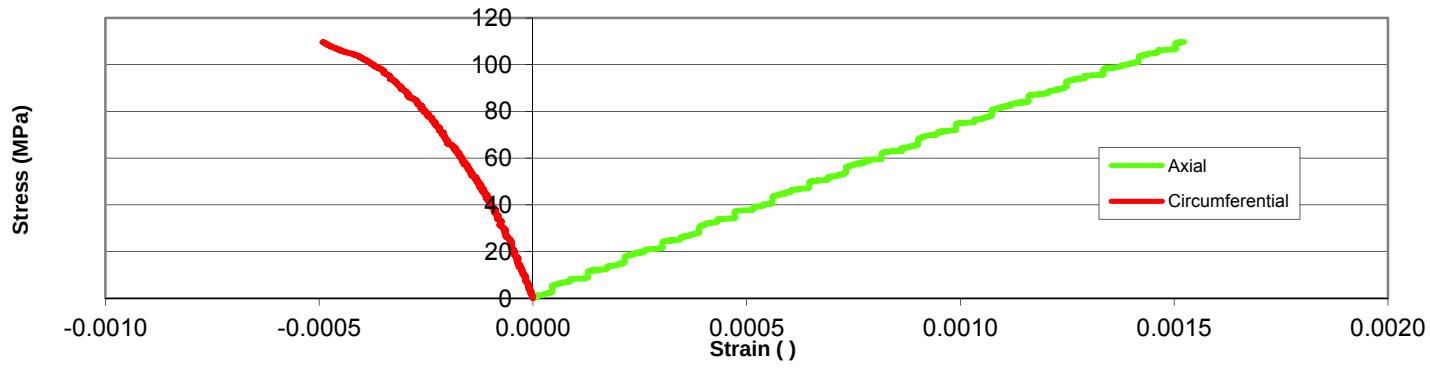


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.29	2854.8	157.87	2.6	322.6	113.0	16,387

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-050
Depth (m):	23.45 - 23.85
Sample Number:	UCS #2
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	80.21
Poisson Ratio, ν:	0.24
Failure Mode:	pre-existing feature
Specific Gravity:	2.93

Before Test

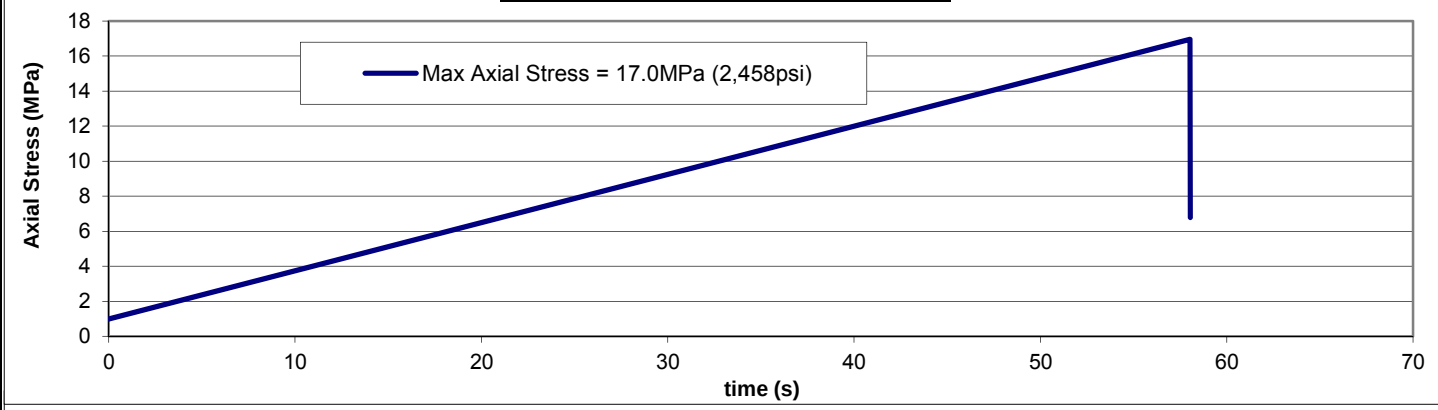


After Test

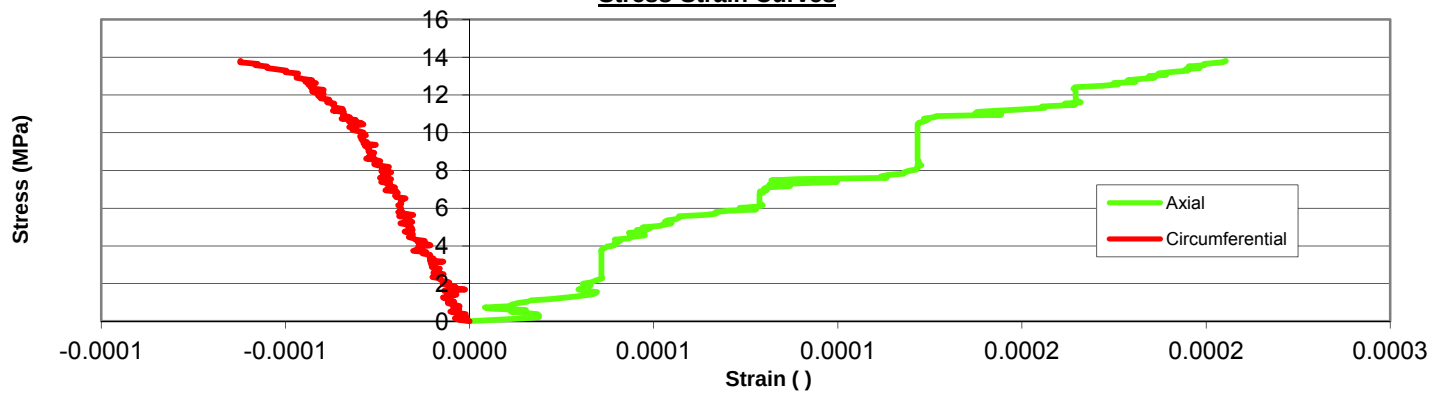


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.35	2860.5	161.48	2.7	48.5	17.0	2,458

Unconfined Compressive Strength Test



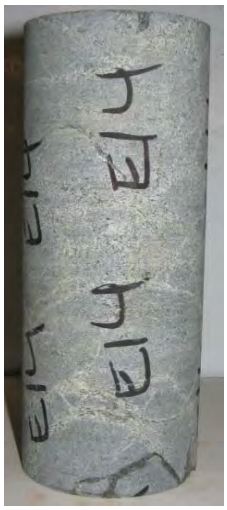
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-054
Depth (m):	50.71 - 51.04
Sample Number:	UCS #1
Drillhole Location:	Plant Site
Tested By:	P.Hughes
Young Modulus, E (GPa):	40.68
Poisson Ratio, ν:	0.12
Failure Mode:	pre-existing feature
Specific Gravity:	2.75

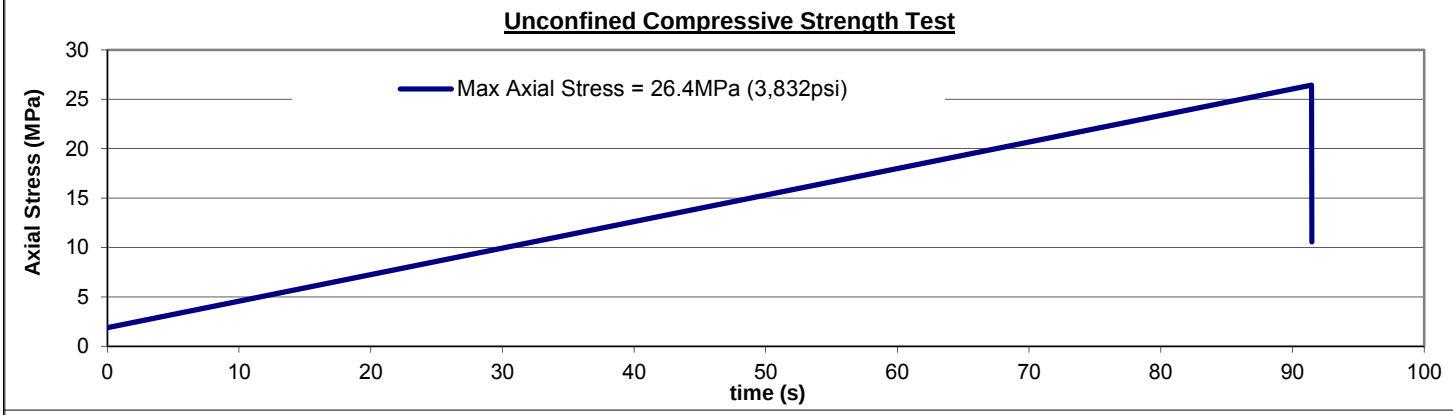
Before Test

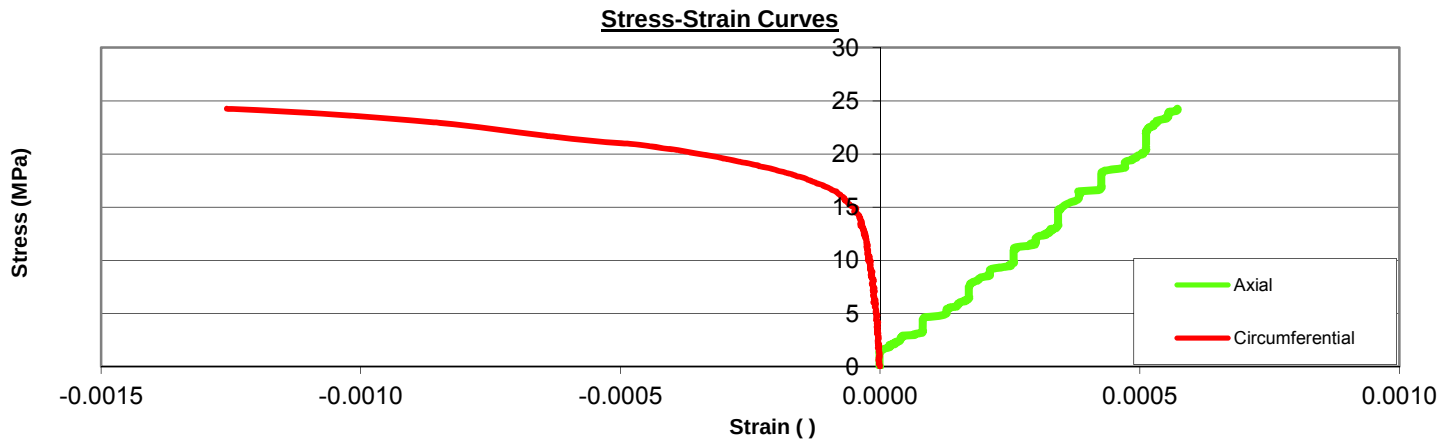


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.62	2886.2	161.01	2.7	76.3	26.4	3,832

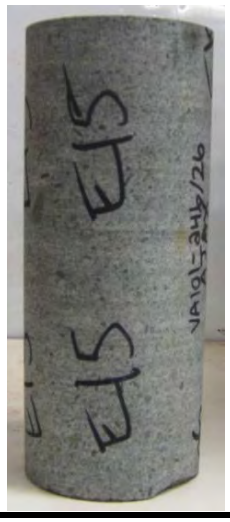




ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-058
Depth (m):	13.11 - 13.37
Sample Number:	UCS #1
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	87.86
Poisson Ratio, ν:	0.13
Failure Mode:	shear
Specific Gravity:	2.86

Before Test

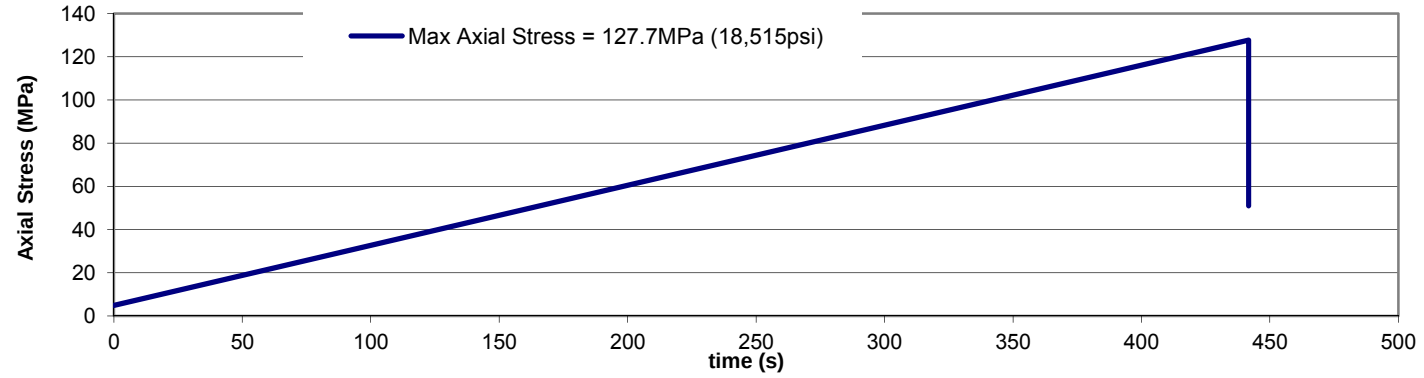


After Test

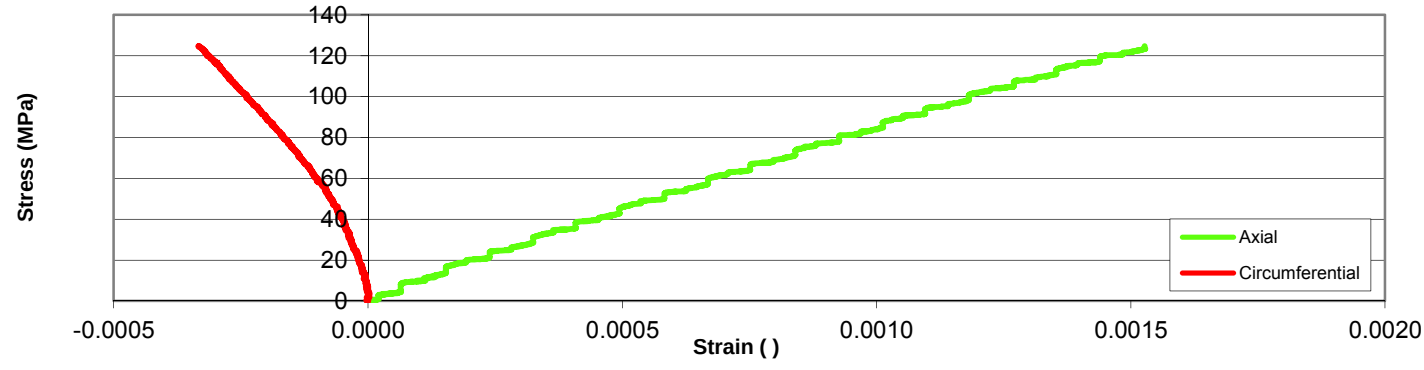


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.60	2884.3	161.45	2.7	368.3	127.7	18,515

Unconfined Compressive Strength Test



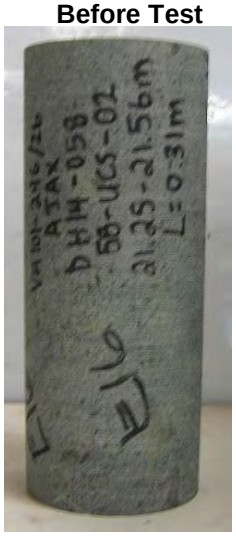
Stress-Strain Curves



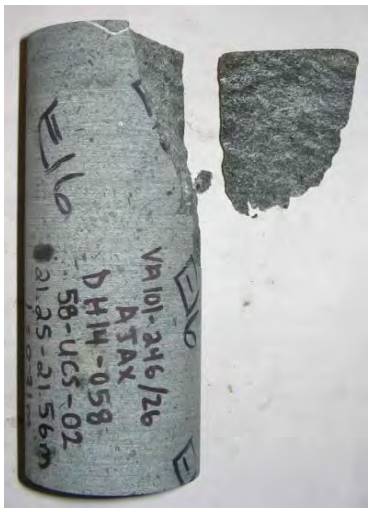
ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-058
Depth (m):	21.25 - 21.56
Sample Number:	UCS #2
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	89.14
Poisson Ratio, ν:	0.23
Failure Mode:	side fracture
Specific Gravity:	2.88

Before Test

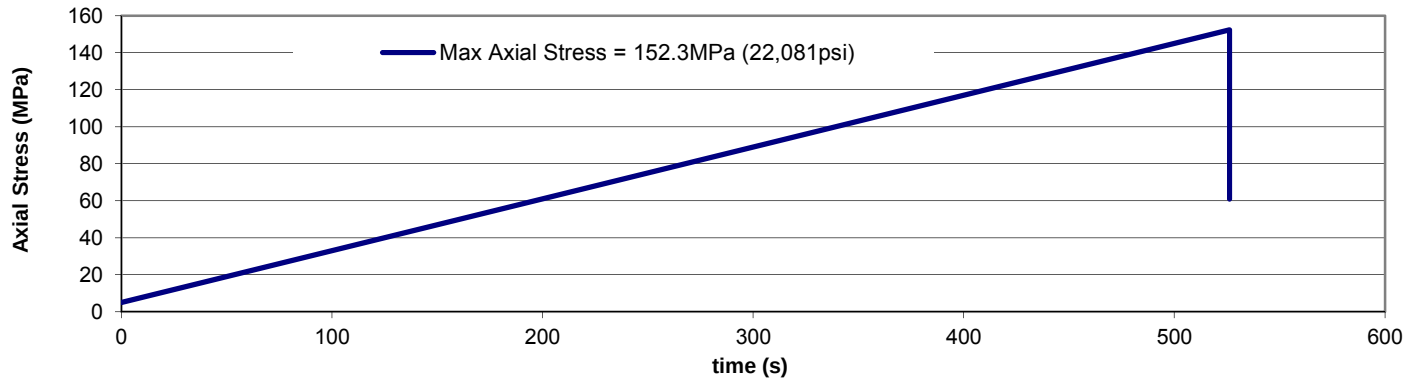


After Test

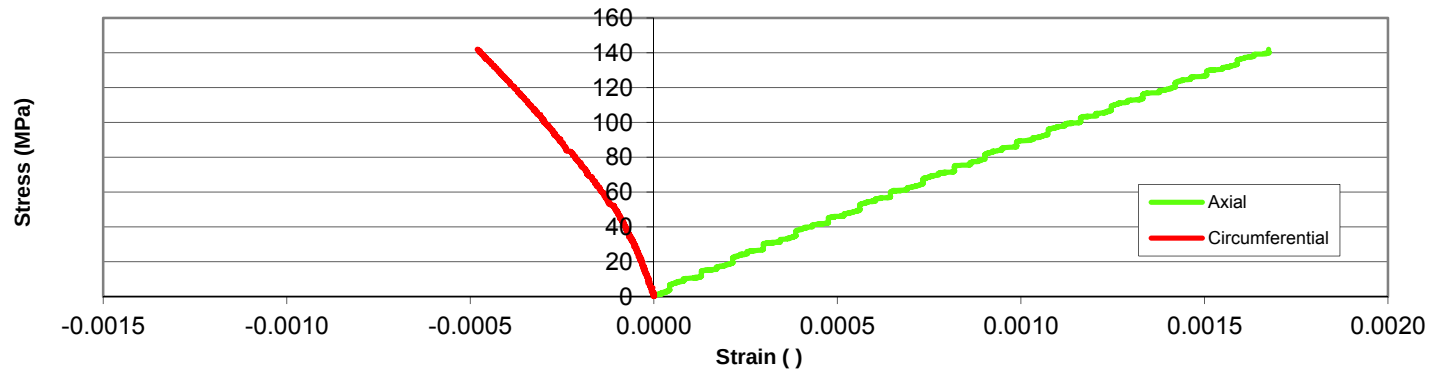


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.65	2889.0	162.99	2.7	440.0	152.3	22,081

Unconfined Compressive Strength Test



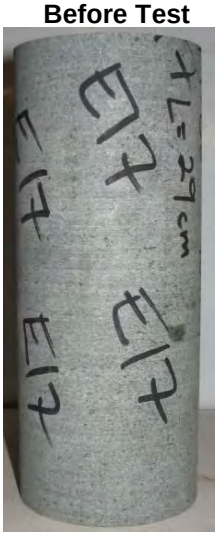
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-058
Depth (m):	44.88 - 45.17
Sample Number:	UCS #3
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	75.02
Poisson Ratio, ν:	0.29
Failure Mode:	shear
Specific Gravity:	2.90

Before Test

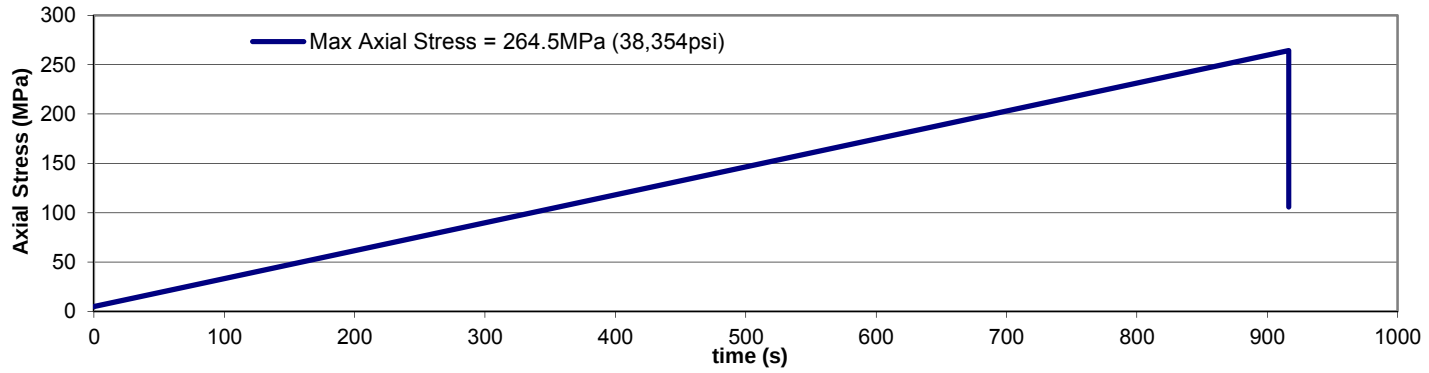


After Test

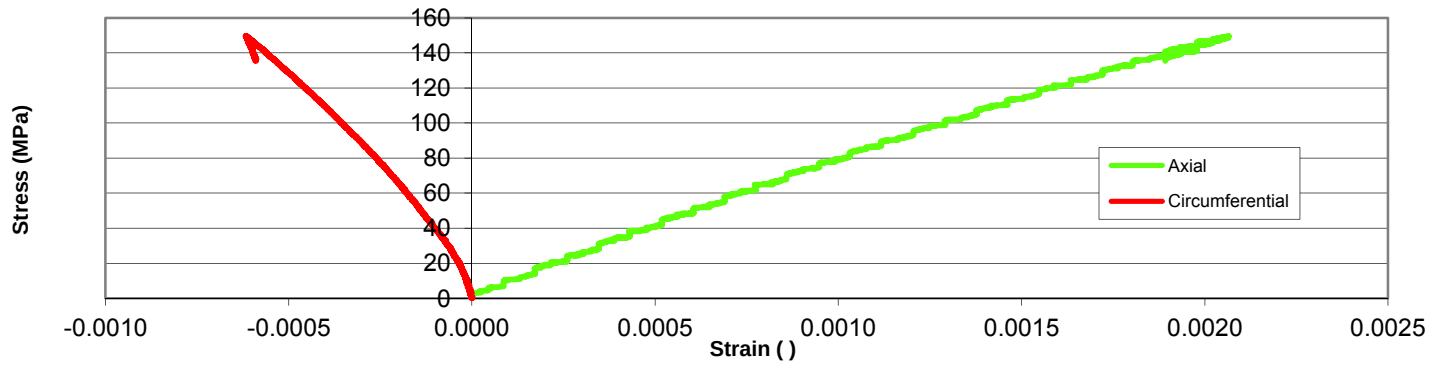


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σUCS	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.64	2888.1	161.78	2.7	763.9	264.5	38,354

Unconfined Compressive Strength Test



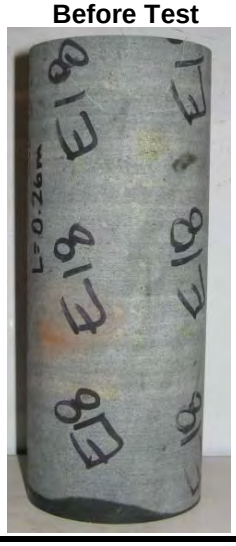
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-060
Depth (m):	28.41 - 28.67
Sample Number:	UCS #1
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	63.61
Poisson Ratio, ν:	0.25
Failure Mode:	shear
Specific Gravity:	2.83

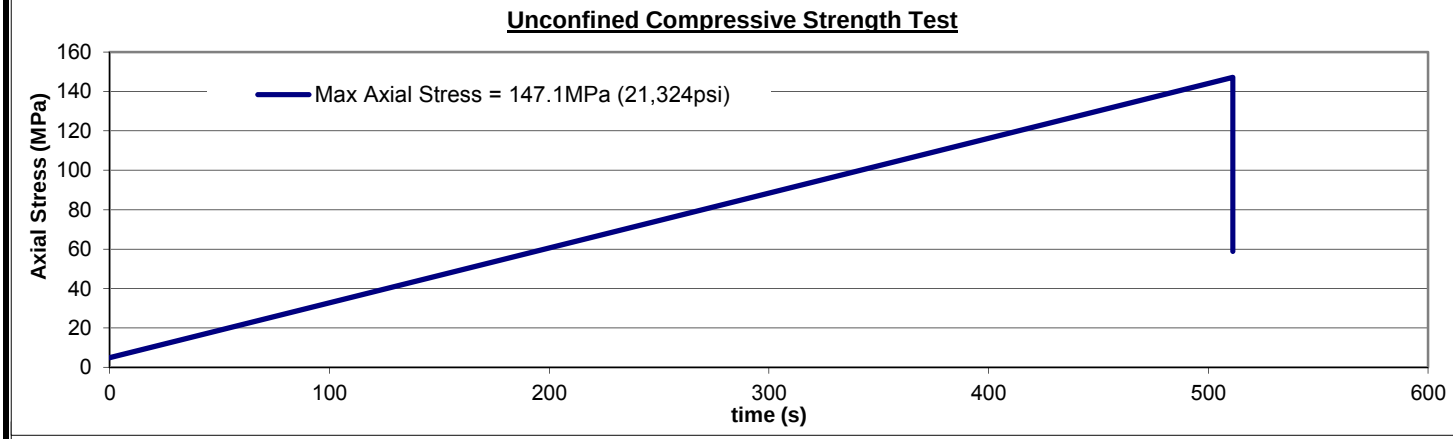
Before Test

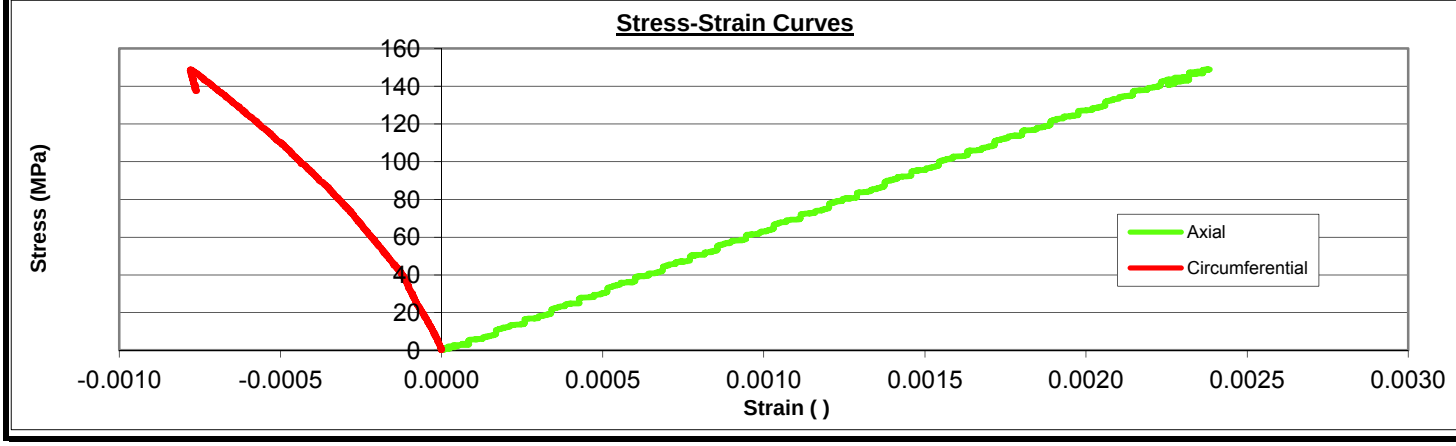


After Test



Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.76	2899.5	165.49	2.7	426.4	147.1	21,324

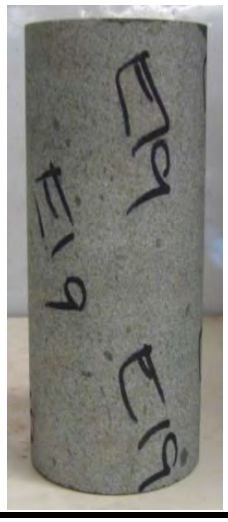




ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-061
Depth (m):	8.32 - 8.61
Sample Number:	UCS #1
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	91.07
Poisson Ratio, ν:	0.17
Failure Mode:	shear
Specific Gravity:	2.77

Before Test

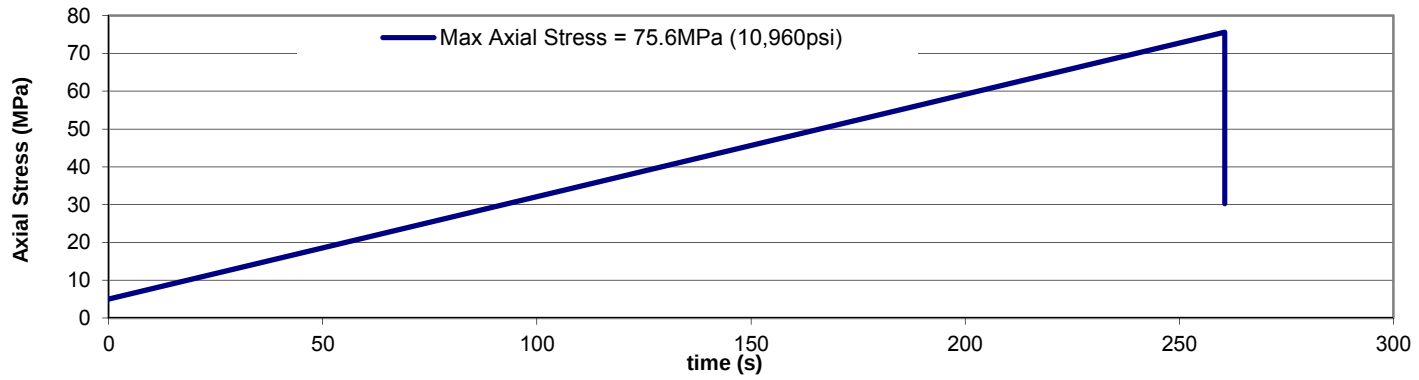


After Test

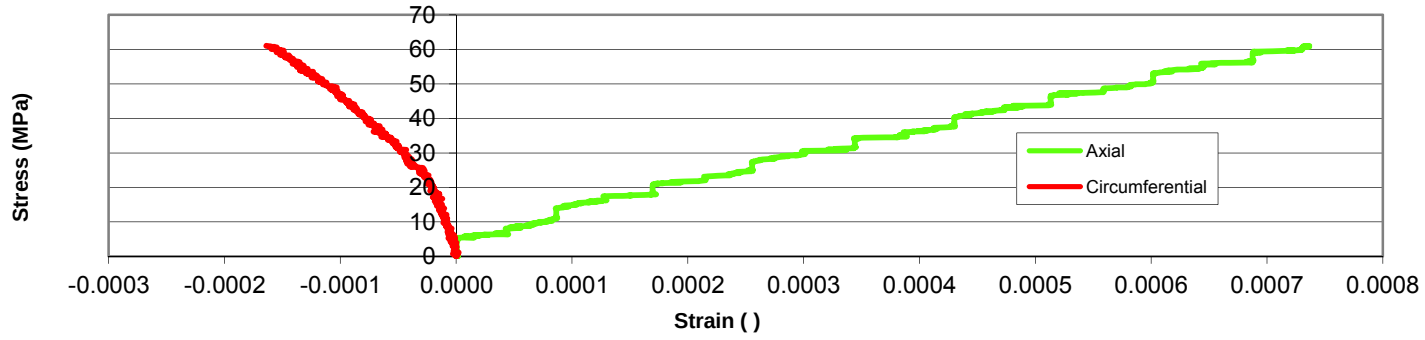


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σUCS	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.63	2887.1	123.67	2.0	218.2	75.6	10,960

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-062
Depth (m):	43.20 - 43.45
Sample Number:	UCS #1
Drillhole Location:	TSF basin
Tested By:	P.Hughes
Young Modulus, E (GPa):	13.10
Poisson Ratio, ν:	0.22
Failure Mode:	pre-existing feature
Specific Gravity:	2.75

Before Test

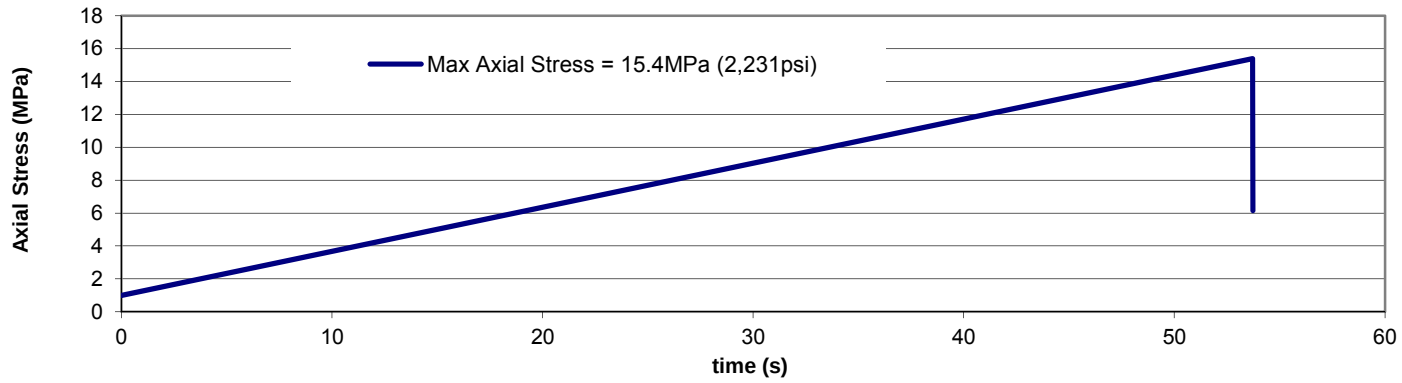


After Test

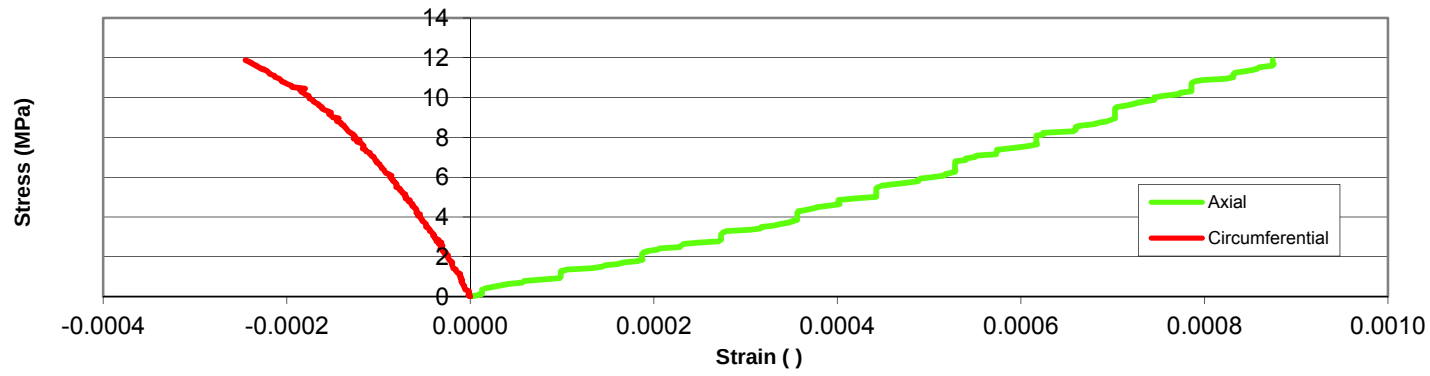


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.80	2903.3	142.55	2.3	44.7	15.4	2,231

Unconfined Compressive Strength Test



Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-063
Depth (m):	12.76 - 13.11
Sample Number:	UCS #1
Drillhole Location:	Possible quarry site
Tested By:	P.Hughes
Young Modulus, E (GPa):	37.73
Poisson Ratio, ν:	0.20
Failure Mode:	side fracture
Specific Gravity:	2.88

Before Test

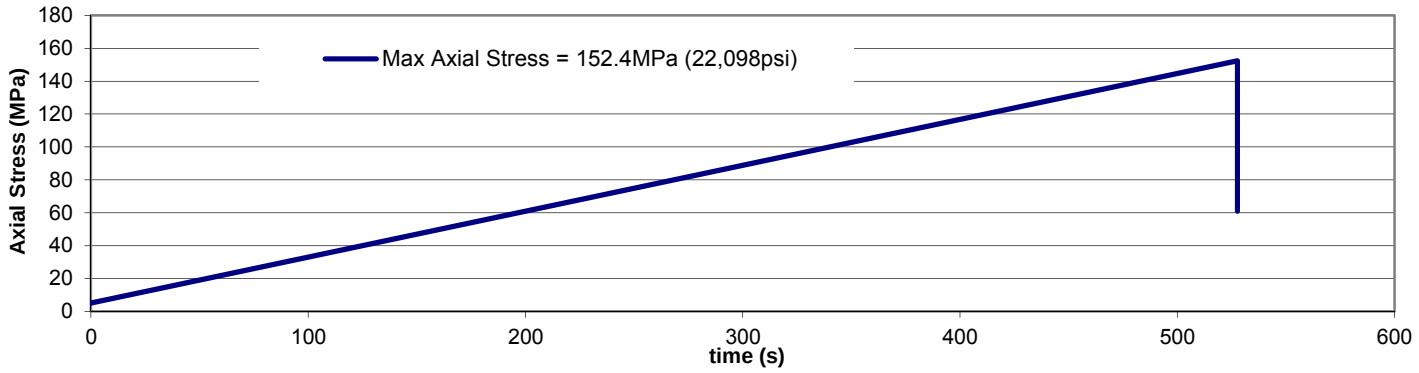


After Test

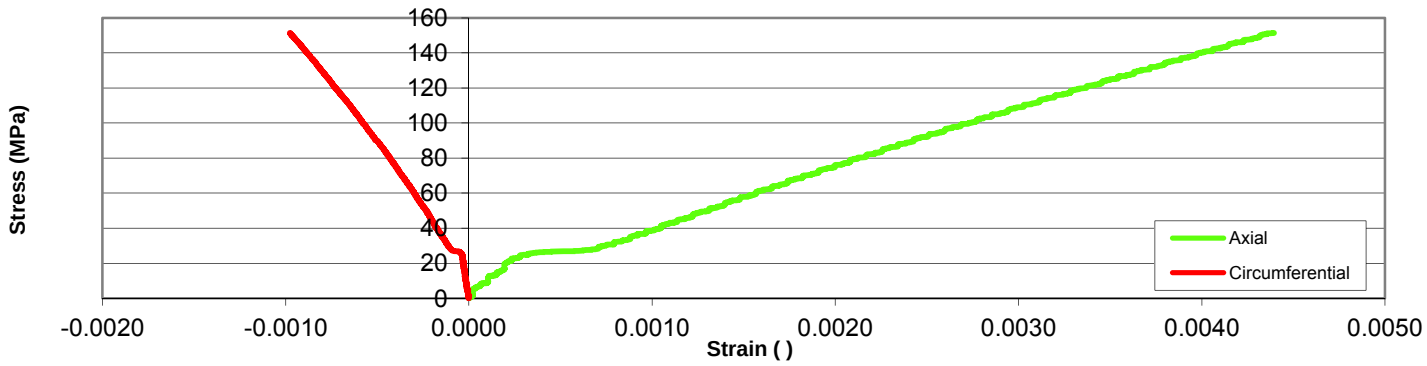


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.63	2887.1	163.46	2.7	440.0	152.4	22,098

Unconfined Compressive Strength Test



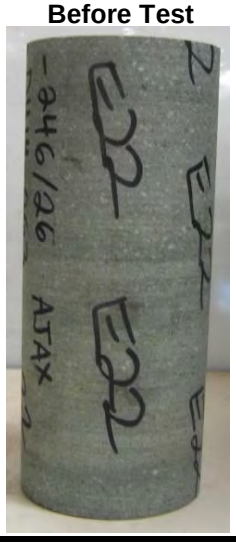
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-063
Depth (m):	34.26 - 34.49
Sample Number:	UCS #2
Drillhole Location:	Possible quarry site
Tested By:	P.Hughes
Young Modulus, E (GPa):	75.15
Poisson Ratio, ν:	0.20
Failure Mode:	shear
Specific Gravity:	2.87

Before Test

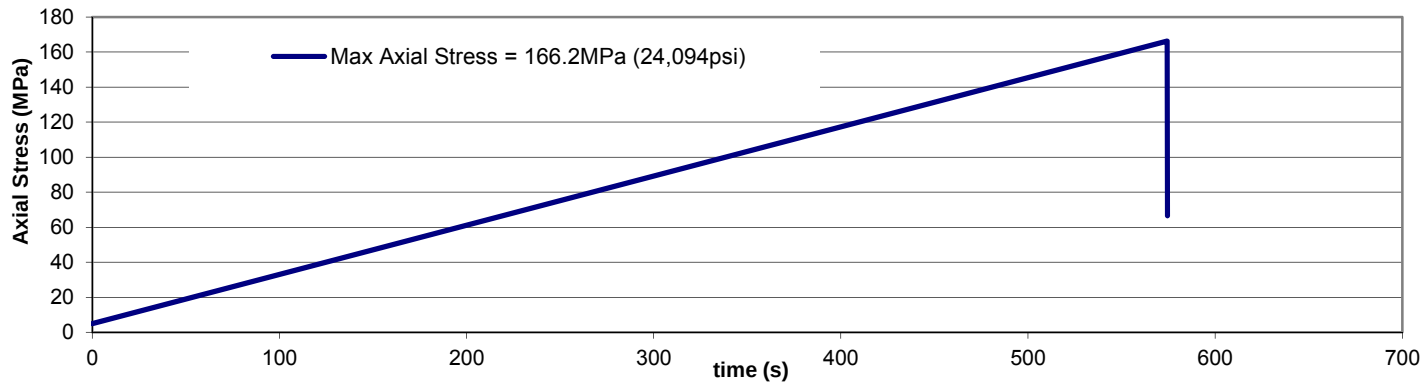


After Test

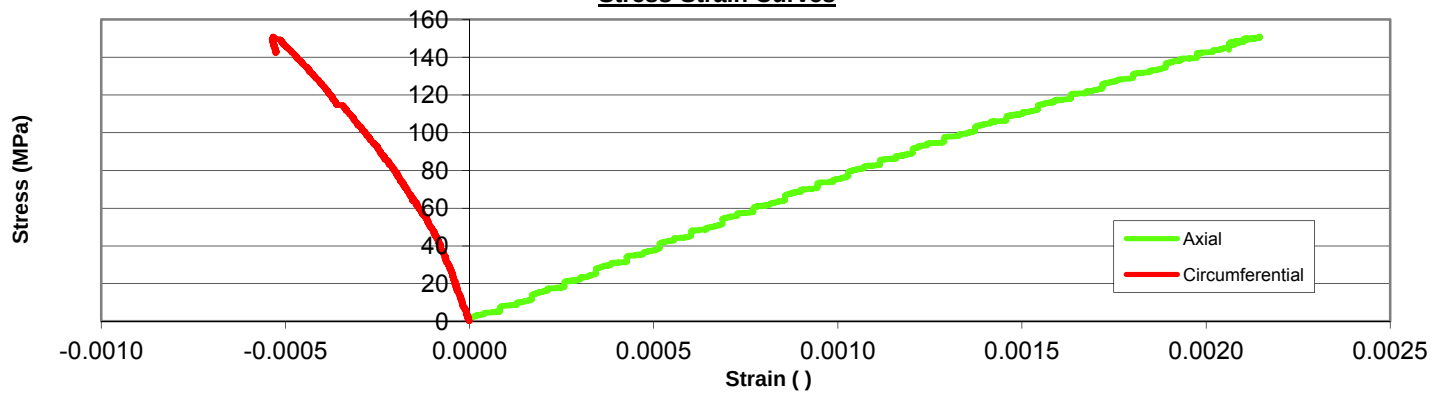


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.58	2882.4	158.54	2.6	479.0	166.2	24,094

Unconfined Compressive Strength Test



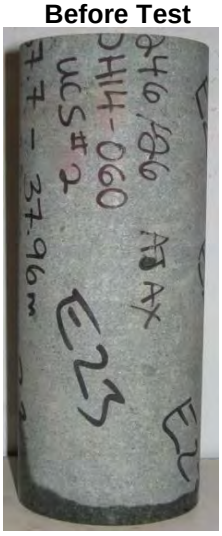
Stress-Strain Curves



ELASTIC MODULUS AND UNCONFINED COMPRESSIVE STRENGTH TEST
(ISRM-1979)

Drillhole ID:	DH14-060
Depth (m):	37.70- 37.96
Sample Number:	UCS #2
Drillhole Location:	Primary Crusher
Tested By:	P.Hughes
Young Modulus, E (GPa):	66.35
Poisson Ratio, ν:	0.24
Failure Mode:	shear
Specific Gravity:	2.87

Before Test

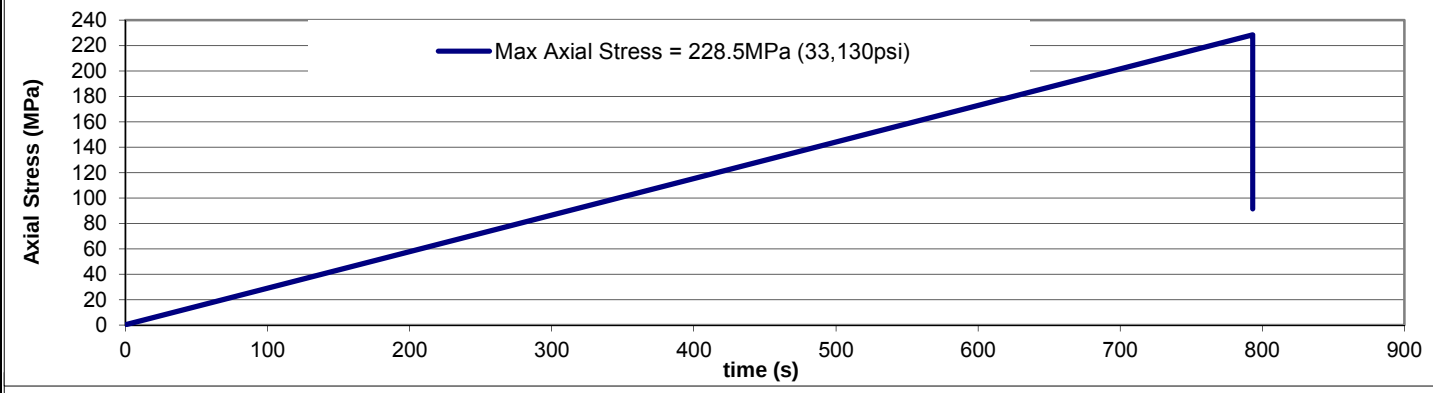


After Test

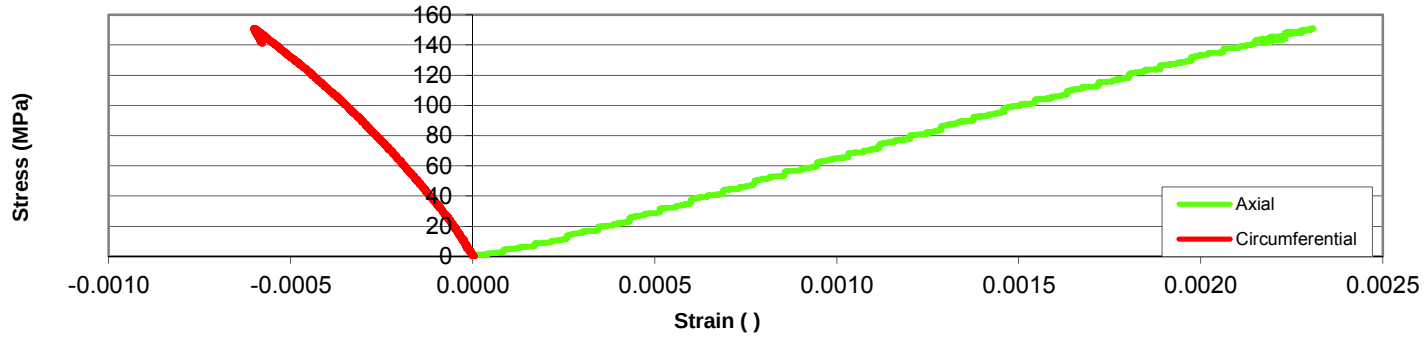


Diameter, (ϕ)	Area, (A)	Height, (h)	Ratio	Peak Load	σ_{UCS}	
(mm)	(mm^2)	(mm)	h/ϕ	(kN)	(MPa)	(psi)
60.69	2892.8	162.76	2.7	661.0	228.5	33,130

Unconfined Compressive Strength Test



Stress-Strain Curves



APPENDIX F

MINE ROCK STORAGE FACILITY GEOTECHNICAL STABILITY ASSESSMENT

(Pages F-1 to F-31)

APPENDIX F MINE ROCK STORAGE FACILITY AND STOCKPILE STABILITY ANALYSES

1 – GENERAL

This appendix presents the methodology, assumptions and results of the stability analyses of the Mine Rock Storage Facilities (MRSF) and overburden and topsoil stockpiles. The analyses follow the recommended approach presented in the Mined Rock and Overburden Piles - Investigation and Design Manual Interim Guidelines (BC MWRPRC, 1991).

2 – STABILITY RATING AND CLASSIFICATION

The BC MWRPRC guidelines provide recommendations for stability assessments of mine waste piles. These guidelines include a Dump Stability Rating (DSR) scheme. The DSR system provides a semi-quantitative method for assessing the relative potential for instability and recommends the appropriate level of investigation and design. This is based on individual point ratings for each of the main factors affecting dump stability. Each factor is given a point rating based on qualitative and/or quantitative descriptions accounting for the possible range of conditions. An overall DSR is calculated as the sum of the individual ratings for each of the various factors.

The DSR scheme was used to classify the three MRSFs and the overburden and topsoil stockpiles. A summary of the results is presented in Table F2.1. The MSRFs and overburden and topsoil stockpiles classify as Low to Moderate Hazard facilities. The guidelines recommend that thorough site investigations, including laboratory testing, basic stability analyses and routine visual and instrumentation monitoring be completed for Class II (low failure hazard) facilities. Additional recommendations for Class III (moderate failure hazard) facilities include detailed investigations that may include drillholes and strength laboratory testing, and detailed instrumentation monitoring to confirm the design assumptions and establish loading limits. Moderate restrictions may be imposed on construction such as limitations to loading rates and lift thickness.

The BC MWRPRC guidelines provide a range of suggested minimum acceptable factors of safety. The design value for the minimum factor of safety is selected based on the level of confidence in the understanding of the site conditions, material parameters, and consequence of instability. The following minimum factors of safety were adopted based on these considerations:

Overall stability (deep seated failures):

- Short term (static, during construction) 1.3
- Long term (static, post-closure) 1.5
- Pseudo-static (1 in 475 year earthquake) 1.1

Surface stability (shallow failures):

- Short term (static, during construction) 1.0
- Long term (static, post-closure) 1.2

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TABLE F2.1

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AJAX PROJECT

MINE ROCK STORAGE FACILITY AND STOCKPILE
DUMP STABILITY RATING CLASSIFICATION

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Key Factors Affecting Stability	Point Rating									
	East MRSF		South MRSF		West MRSF		Overburden Stockpile		Topsoil Stockpile	
	Condition	Point Rating	Condition	Point Rating	Condition	Point Rating	Condition	Point Rating	Condition	Point Rating
Dump Height	50 - 100 m	50	> 200 m	200	100 - 200 m	100	< 50 m	0	< 50 m	0
Dump Volume	Medium	50	Large	100	Large	100	Small	0	Small	0
Dump Slope	Flat	0	Flat	0	Flat	0	Flat	0	Flat	0
Foundation Slope	Moderate	50	Extreme	200	Extreme	200	Flat	0	Flat	0
Degree of Confinement	Moderately Confined	50	Moderately Confined	50	Moderately Confined	50	Moderately Confined	50	Moderately Confined	50
Foundation Type	Intermediate	100	Intermediate	100	Intermediate	100	Intermediate	100	Intermediate	100
Dump Material Quality	High	0	High	0	High	0	Poor	200	Poor	200
Method of Construction	Favourable	0	Favourable	0	Favourable	0	Favourable	0	Favourable	0
Piezometric & Climate Conditions	Intermediate	100	Intermediate	100	Intermediate	100	Intermediate	100	Intermediate	100
Dumping Rate	Moderate	100	Moderate	100	Moderate	100	Moderate	100	Moderate	100
Seismicity	Moderate	50	Moderate	50	Moderate	50	Moderate	50	Moderate	50
DUMP STABILITY RATING		**550**		**900**		**800**		**600**		**600**
	Class	**Failure Hazard**	**Class**	**Failure Hazard**	**Class**	**Failure Hazard**	**Class**	**Failure Hazard**	**Class**	**Failure Hazard**
Dump Stability Class	**II**	Low	**III**	Moderate	**III**	Moderate	**III**	Moderate	**III**	Moderate

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NOTES:
1. BASED ON GUIDELINES FROM B.C. MINE WASTE ROCK PILE RESEARCH COMMITTEE (BCMWRPRC, 1991).

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3 – METHODOLOGY USED FOR STABILITY ANALYSES

3.1 GENERAL

Slope stability analyses for each facility were carried out for final design heights at end of construction and post-closure conditions. The stability analyses for the waste facilities were carried out for static and pseudo-static conditions using the limit equilibrium computer program SLOPE/W (Geostudio, 2012). In this program a systematic search was performed to obtain the minimum factor of safety from a number of potential slip surfaces. Factors of safety were calculated using the Morgenstern-Price method of analysis.

The cross sections used in the stability analyses are shown in plan on Figure F3.1 and sections on Figures F3.2 to F3.4.

3.2 PIEZOMETRIC LEVELS AND PORE PRESSURE RESPONSE

The phreatic surface was determined based on the observations from test pit excavations, standpipe piezometers and site topography. The water table for the South and East MRSF was generally encountered at the bedrock-till interface. The depth to the phreatic surface was limited to a maximum of 5 m below the ground surface to account for seasonal variations in ground water levels. The water table for the West MRSF was assumed to be at the ground surface elevation based on the presence of a small drainage path on the site plan. The location of the topsoil and overburden stockpiles has not been finalized at the time of writing this report. A conservatively high phreatic surface was assumed for the overburden and topsoil stockpiles, located mid-way between ground surface and the top of the stockpile.

The construction of the MRSFs and topsoil and overburden stockpiles will lead to generation of excess pore pressures in the saturated low permeability (fine grained) foundation soils, which predominantly comprise of glacial till materials with the potential for discontinuous lacustrine units. The pore pressure response $\bar{B}$ parameter is defined as the ratio of excess pore pressure, Δu, to the total applied stress σ:

$$\bar{B} = \Delta u/\sigma$$

Each added lift will lead to an increase of total stress in the foundation, which generates excess pore pressures. However, the excess pore pressures will dissipate with time as the foundation soils consolidate. The rate of consolidation depends on the consolidation properties of the foundation materials and the length of the drainage path, which depends on the thickness of the units.

The rate of excess pore pressure generation and dissipation is also dependent on the rate of loading of the facility. A pore pressure response parameter $\bar{B}$ of 0.4 was adopted for the condition during construction based on experiences with similar foundation conditions and anticipated loading rates. Pore pressure monitoring will be required to assess the dump stability during construction. “Trigger” levels will be established to ensure pore pressures in the foundation are within the predicted range and that stability is maintained. Exceedance of the trigger levels may require changes of the loading rate or the geometry to allow consolidation and strength gain in the foundation soils. Details of the instrumentation monitoring, trigger levels, and the required response will be outlined in the Operation, Maintenance and Surveillance (OMS) manual for the MRSFs and overburden and topsoil piles.

The stability analyses were completed assuming the mine rock is fully drained. It was also assumed no excess pore pressures would be generated in the stockpiled overburden and topsoil materials.

3.3 SEISMIC STABILITY AND DEFORMATION ANALYSES

The upper 30 m of the site stratigraphy is dominated by a dense glacial till with standard penetration test (SPTs) values generally ranging from 15 to over 50 (refusal). These conditions correspond with site class C/D as defined by the National Building Code of Canada (NBCC, 2010). This classification is at the

boundary of class C (very dense soil and soft rock) and class D (stiff soil) with an average shear wave velocity of about 360 m/s.

Seismic loading was modelled by performing a pseudo-static analysis for the 1 in 475 year earthquake event as recommended by the BC MWRPRC guidelines. The pseudo-static analysis applies a horizontal force (seismic coefficient) to the model to simulate earthquake loading. The 1 in 475 year earthquake corresponds with a peak ground acceleration (PGA) of 0.10 g for class C/D conditions. A seismic coefficient of 0.05 was adopted for the pseudo-static analysis, which is equal to one-half the peak ground acceleration as commonly used in embankment stability analyses. The minimum required factor of safety of for pseudo-static analysis is 1.1. Satisfying this requirement implies that the 1 in 475 year earthquake event would result in deformations much smaller than 1 m. These deformations are acceptable and do not affect the integrity of the facilities. The pseudo-static analyses were conducted for end of construction and post-closure conditions.

A deformation analysis was also completed for the MSRFs to estimate the potential deformations resulting from a 1 in 10,000 year earthquake event for post-closure conditions (no excess pore pressures). The 1 in 10,000 year earthquake corresponds with a PGA of 0.34g for site class C/D, and has a design earthquake magnitude of 7.3.

Potential deformations under earthquake loading from the 1 in 10,000 year event have been estimated using the simplified methods of Newmark (1965) and Makdisi-Seed (1977). These two methods estimate displacement of the potential sliding mass based on the average maximum ground acceleration along the slip surface and the yield acceleration. The yield acceleration required to reduce the factor of safety to 1.0 was determined by iterative stability analyses.

The more recently published method of Bray (2007) was also used to predict seismically induced slide displacements. In addition to the yield acceleration, this method considers the predominant period of response (Ts) of the waste piles under seismic loading and the corresponding spectral ground acceleration (Sa). The predominant period is related to the stiffness characteristics of the rockfill and to the height of the waste pile. Spectral acceleration values were provided by the uniform hazard spectrum defined for the design earthquake event. The uniform hazard spectra for the design earthquake events were defined from the results of the site specific probabilistic seismic hazard analysis for the Afton site (Klohn Crippen Berger, May 2011).

Some deformation of the waste pile is expected to result from settlement of the rockfill materials during earthquake shaking. Potential settlement of the crest of the waste piles has been estimated using the empirical relationship provided by Swaisgood (2003). This relationship was developed from an extensive review of case histories of embankment dam behaviour due to earthquake loading. Required inputs to the relationship are the earthquake magnitude, the maximum acceleration on rock at the site, the overburden thickness and the height of the waste pile.

682 500 E

689 000 E

697 500 E

5 605 000 N

5 607 500 N

5 605 000 N

DH-BGC11-ND-26
DH-BGC11-PS-25
DH-BGC11-PS-23
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DH-BGC11-ND-06
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MW11-04D
MW11-08D/S
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BGC14-009

1 F3.2 FIG
2 F3.2 FIG
3 F3.3 FIG
4 F3.3 FIG
5 F3.4 FIG
1 F3.2 FIG
2 F3.2 FIG
3 F3.3 FIG
4 F3.3 FIG
5 F3.4 FIG

LEGEND:

- KINDER MORGAN PIPELINE 90m BUFFER
- KP GEOTECHNICAL DRILLHOLES
- MONITORING WELLS BY OTHERS
- CONDEMNATION DRILLHOLES
- GEOTECHNICAL DRILLHOLES BY OTHERS
- ACCESS ROAD
- PROPERTY BOUNDARY
- SEISMIC LINES

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10.
2. CONTOUR INTERVAL IS 5 METRES.

SCALE A 250 125 0 250 500 750 1000 1250 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	27MAY'15	ISSUED WITH REPORT	JAS	JY	LJG

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AJAX PROJECT

MINE ROCK STORAGE FACILITY GEOTECHNICAL SITE INVESTIGATION PLAN

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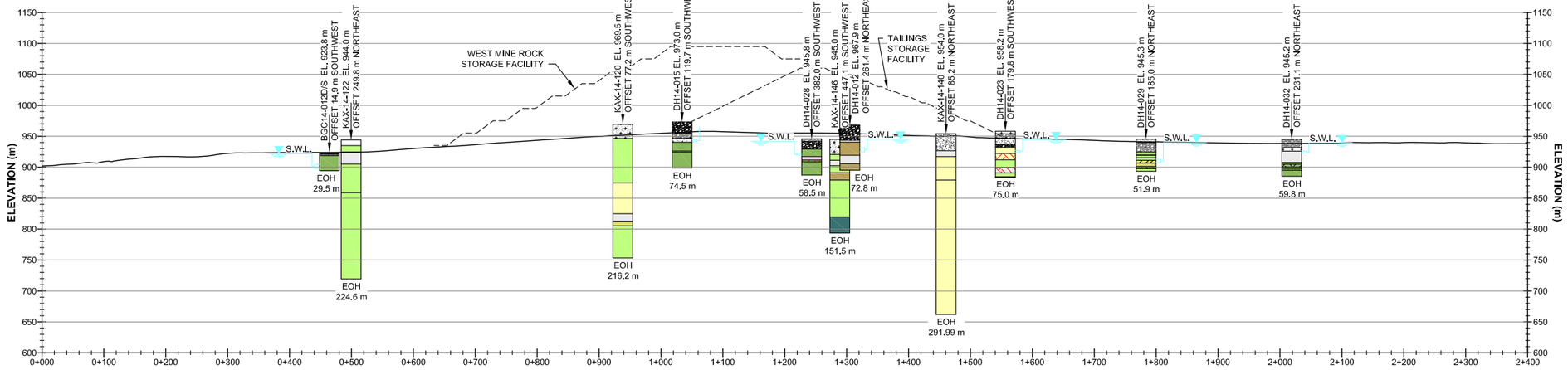
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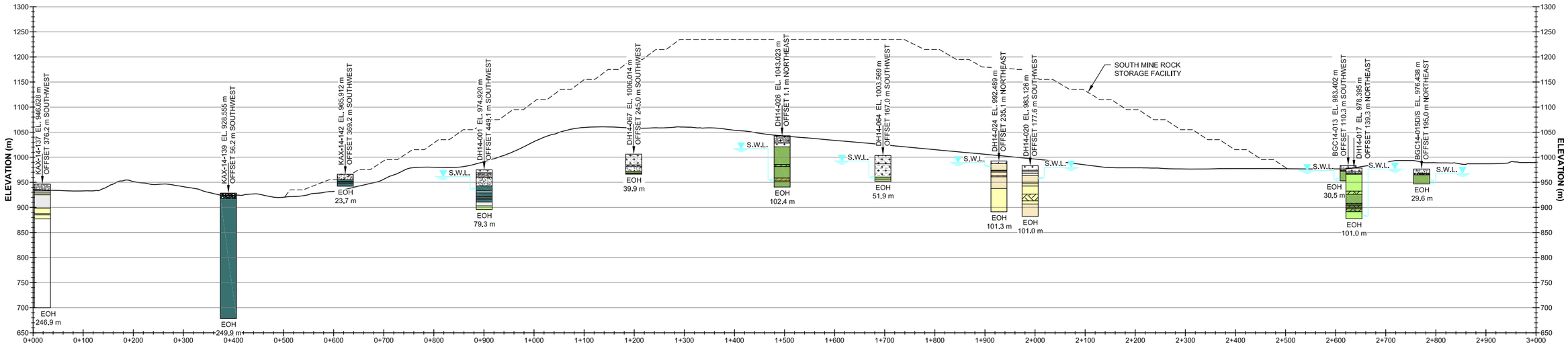
FIGURE F3.1

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1 F3.1 FIG **SECTION**
SCALE A



2 F3.1 FIG **SECTION**
SCALE A

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

LEGEND:

	SUGARLOAF DIORITE		MUDSTONE		CLAY		SANDY SILT
	MAFIC VOLCANIC		SEDIMENTARY		SILT		SILTY GRAVEL
	MAFIC TUFF		PORPHYRY		SAND		SILTY SAND GRAVEL
	PICRITE		IRON MASK HYBRID		GRAVEL		SAND AND GRAVEL
	VOLCANICLASTIC		FRACTURED ZONE		CLAY AND SILT		GRAVELY SILT
	SANDSTONE		FAULT ZONE		GRAVELY SAND		BOULDERS
	SILTSTONE		SHEAR ZONE		SILTY SAND		GLACIAL TILL
	MONZONITE				SANDY CLAY		CLAYEY SAND

$K = 3 \times 10^{-5}$ HYDRAULIC CONDUCTIVITY (m/sec)

S.W.L. STATIC WATER LEVEL PIEZOMETERS

SCALE A 80 40 0 100 200 300 400 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	27MAY'15	ISSUED WITH REPORT	JAS	JY	LJG

KGHM AJAX MINING INC.

AJAX PROJECT

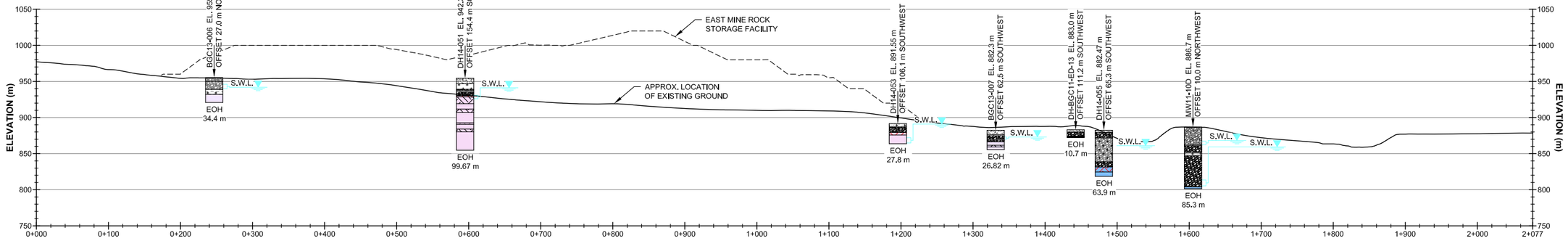
MINE ROCK STORAGE FACILITY
GEOTECHNICAL SITE INVESTIGATION
SECTIONS 1 AND 2

Knight Piésold CONSULTING

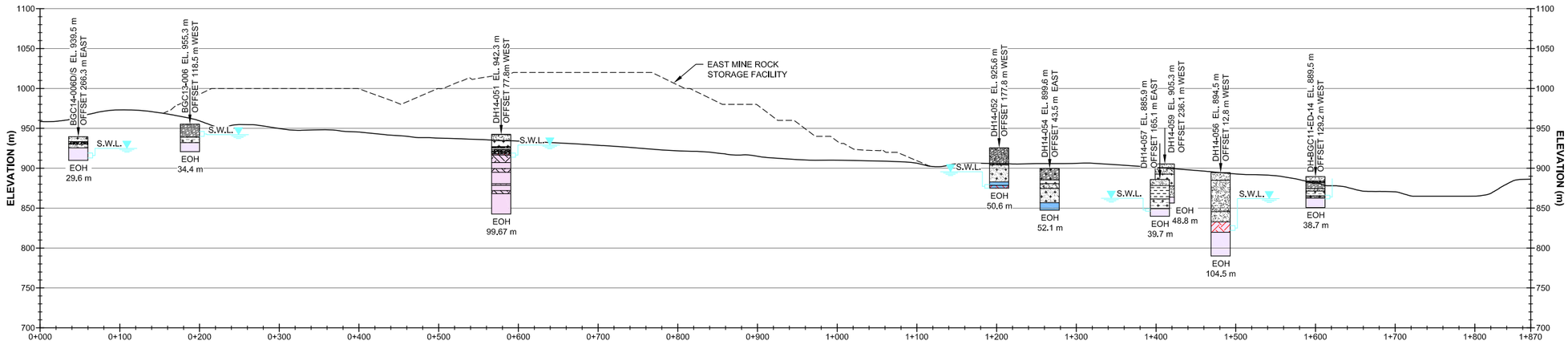
P/A NO. VA101-246/26 | REF NO. 9

FIGURE F3.2 | REV 0

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XREF FILES: IMAGE FILES:



3 F3.1 FIG. **SECTION**
SCALE A



4 F3.1 FIG. **SECTION**
SCALE A

LEGEND:

SUGARLOAF DIORITE	MUDSTONE	CLAY	SANDY SILT	$K = 3 \times 10^{-5}$	HYDRAULIC CONDUCTIVITY (m/sec)
MAFIC VOLCANIC	SEDIMENTARY	SILT	SILTY GRAVEL	S.W.L.	STATIC WATER LEVEL PIEZOMETERS
MAFIC TUFF	PORPHYRY	SAND	SILTY SAND GRAVEL		
PICRITE	IRON MASK HYBRID	GRAVEL	SAND AND GRAVEL		
VOLCANICLASTIC	FRACTURED ZONE	CLAY AND SILT	GRAVELY SILT		
SANDSTONE	FAULT ZONE	GRAVELY SAND	BOULDERS		
SILTSTONE	SHEAR ZONE	SILTY SAND	GLACIAL TILL		
			CLAYEY SAND		

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

SCALE A 60 30 0 100 200 300 m

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MINE ROCK STORAGE FACILITY
GEOTECHNICAL SITE INVESTIGATION
SECTIONS 3 AND 4

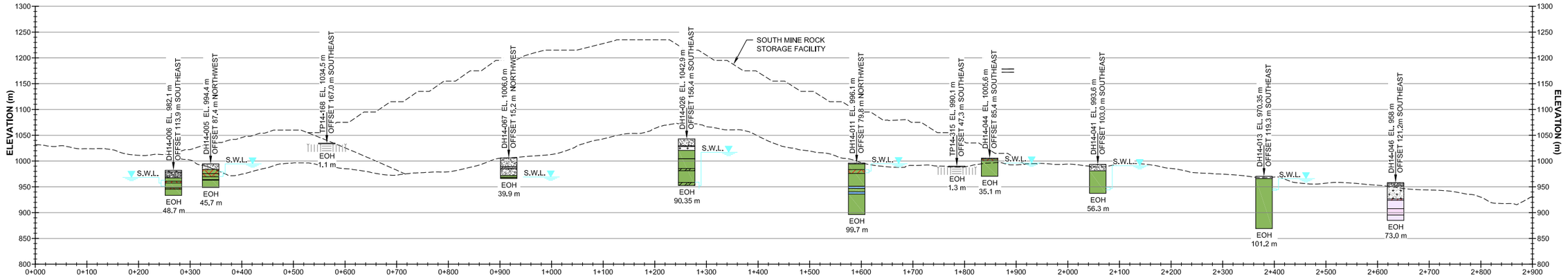
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FIGURE F3.3 | REV 0

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0	27MAY'15	ISSUED WITH REPORT	JAS	JY	LJG

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5 F3.1 FIG **SECTION**
SCALE A

LEGEND:

SUGARLOAF DIORITE	MUDSTONE	CLAY	SANDY SILT	$K = 3 \times 10^{-5}$	HYDRAULIC CONDUCTIVITY (m/sec)
MAFIC VOLCANIC	SEDIMENTARY	SILT	SILTY GRAVEL	S.W.L.	STATIC WATER LEVEL PIEZOMETERS
MAFIC TUFF	PORPHYRY	SAND	SILTY SAND GRAVEL		
PICRITE	IRON MASK HYBRID	GRAVEL	SAND AND GRAVEL		
VOLCANICLASTIC	FRACTURED ZONE	CLAY AND SILT	GRAVELY SILT		
SANDSTONE	FAULT ZONE	GRAVELY SAND	BOULDERS		
SILTSTONE	SHEAR ZONE	SILTY SAND	GLACIAL TILL		
			CLAYEY SAND		

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

80 40 0 100 200 300 400 m
SCALE A

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MINE ROCK STORAGE FACILITY GEOTECHNICAL SITE INVESTIGATION SECTION 5

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FIGURE F3.4 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	27MAY'15	ISSUED WITH REPORT	JAS	JY	LJG

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XREF FILE(S): IMAGE FILE(S):

4 – MINE ROCK STORAGE FACILITY STABILITY ANALYSES

4.1 GENERAL

The stability analyses for each MRSF were based on the maximum cross section through the facility; additional cross sections were analyzed where mine site infrastructure will be located at the toe of the slope. The plan and sections used in the MRSF stability analysis are shown on Figures F3.1 to F3.4.

4.2 MATERIAL PARAMETERS AND ASSUMPTIONS

The material unit weights and effective strength parameters used in the analyses are provided in Table F4.1. The following parameters and assumptions were incorporated into the stability analyses:

- The stability analyses were completed assuming the MRSF was constructed of mine rock only.
- Topsoil, loess deposits and any soft surficial materials are assumed to be removed prior to construction.
- The foundation conditions were inferred from the available drillhole logs located in proximity to the MRSFs. The extent of the various units was estimated based on interpolation of the available data and engineering judgement.
- The overburden was modelled as glacial till, with discontinuous deposits of glaciolacustrine soils within the foundation of the South and East MRSF. The model also includes the alluvial sands and gravels encountered to the south of the East MRSF.
- The effective friction angles of the foundation materials were adopted based on typical values for similar material.
- Bulk unit weights for the mine rock and foundation materials were based on typical values for similar materials.
- The shear strength of the mine rock was defined using a function that defines the variation of shear strength with normal stress. The shear strength of waste rock materials typically reduces at higher stresses due to the crushing of particle contact points within the material and a reduction in material dilatancy. The shear strength is also related to the density and durability of the material and the particle size distribution. The strength function representative of average rockfill (Leps, 1970) was selected based on the assumption that the waste comprises well graded, strong rockfill.
- The shear strength for the Picrite was determined using Generalized Hoek-Brown strength function that defines the variation of shear strength with normal stress. It was based on published information on the Uniaxial Compressive Strength of intact rock (UCSi), intact rock parameter (mi), Geological Strength Index (GSI) and a Disturbance Factor (D).
- All mine rock and foundation materials are assumed to be non-liquefiable.

Table F4.1 Material Strength Parameters for MRSFs

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)
	MRSF Materials		
Mine Rock	21	See Note 1	
Controlled Rock Fill (TSF Embankment)	21	See Note 1	
	Foundation Materials		
Native Sand and Gravel	19	35	0
Native Glacial Till	20	34	0
Native Glaciolacustrine	18	14	0
Picrite[2]	21	See Note 2	
Fresh Bedrock	Impenetrable		

NOTES:

1. A relationship for friction angle and effective stress was developed for the rockfill materials, based on published information on the shear strength properties of rockfill (Leps, 1970).
2. A relationship for normal stress and shear stress was developed for the Picrite, based on the intact rock strength, using the Generalized Hoek-Brown Criterion with UCS_i = 20 MPa, m_i = 15, GSI = 30, and D = 0.

4.3 RESULTS

The Factors of Safety for both static and pseudo-static analyses for each MRSF are presented on Table F4.2. The static stability for each MRSF meets the minimum design Factors of Safety under both short term (end of construction) and long term conditions (post-closure). The deep seated failure surface and factor of safety for the end of construction and post-closure is shown on Figures F4.1 to F4.14.

The pseudo-static analyses for seismic conditions (1 in 475 year earthquake event) also exceed the minimum required factor of safety.

Potential deformations resulting from the 1 in 10,000 year earthquake were calculated using the Newmark (1965), Makdisi and Seed (1977) and Bray (2007) methods, and are predicted to be less than 10 cm. Potential crest settlements under seismic loading were estimated to be less than 40 cm using the Swaisgood (2003) method.

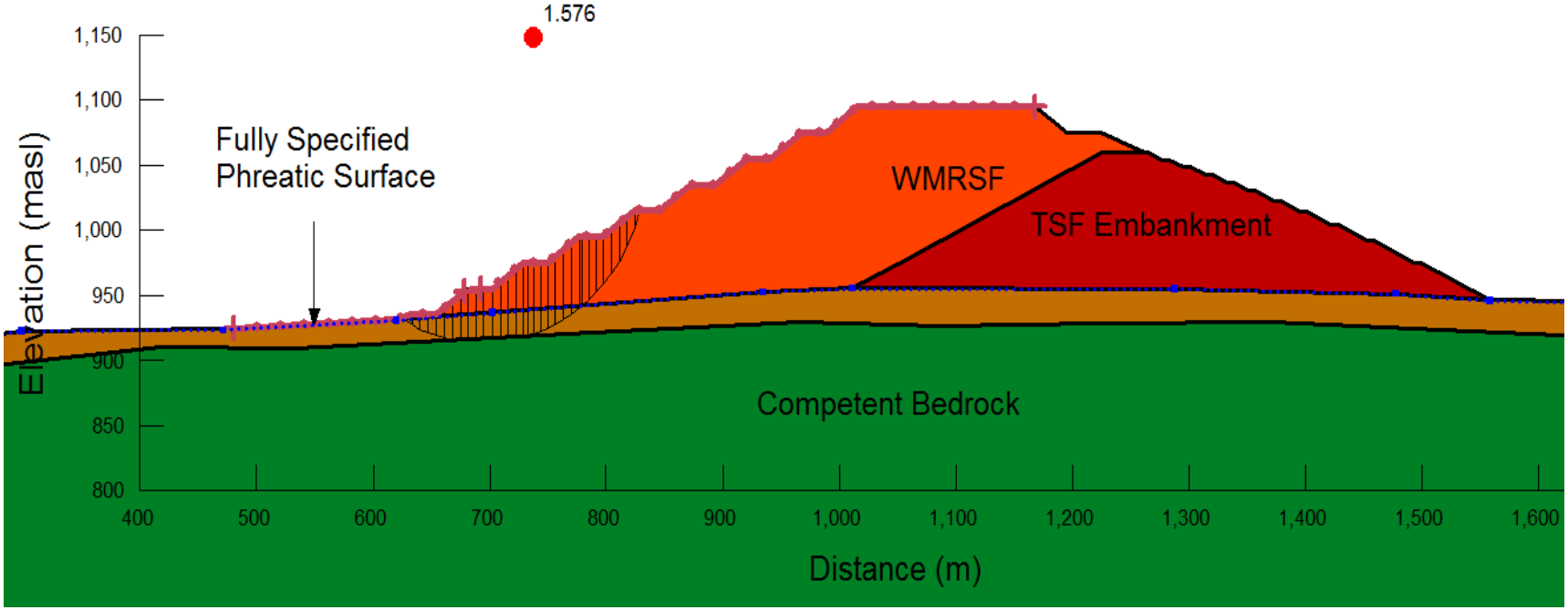
Table F4.2 Stability Results for MRSFs

Section Number	Mine Rock Storage Facility	Slip Surface Direction	Factor of Safety					
			Stability of Dump Surface		Overall Stability (Deep Seated Stability)			
			End of Construction[3]	Post-Closure[4]	End of Construction[3]		Post-Closure[4]	
			Static	Static	Static	Seismic[1]	Static	Seismic[1]
Required Minimum Factor of Safety			**1.0**	**1.2**	**1.3**	**1.1**	**1.5**	**1.1**
1	West	North West	1.48	1.64	1.58	1.30	1.91	1.66
2	South	North West	1.85	1.85	1.31	1.13	1.82	1.58
		South East	1.79	1.78	1.80	1.47	2.36	2.05
3	East	South East	1.57	1.57	1.57	1.36	1.94	1.69
4		South	1.62	1.62	1.83	1.56	2.38	2.03
5	South	Towards Plant Site	1.72	1.86	1.67	1.41	2.32	2.03
		Towards TSF	1.85	1.85	2.25	1.52	2.47	2.16

NOTES:

1. Seismic coefficient of 0.05 used for pseudostatic analysis, which corresponds to a perk ground acceleration of 0.10g (1 in 475 year event, site class C/D).
2. Slip surfaces are a minimum depth of 3 m.
3. End of construction stability assumes excess pore pressures in the fine grained foundation soils, pore pressure response factor, B = 0.4.
4. Post-closure stability assumes the pore pressure in the fine grained foundation soils has dissipated, pore pressure response factor, B = 0.

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (Ḃ)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 1: WEST MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

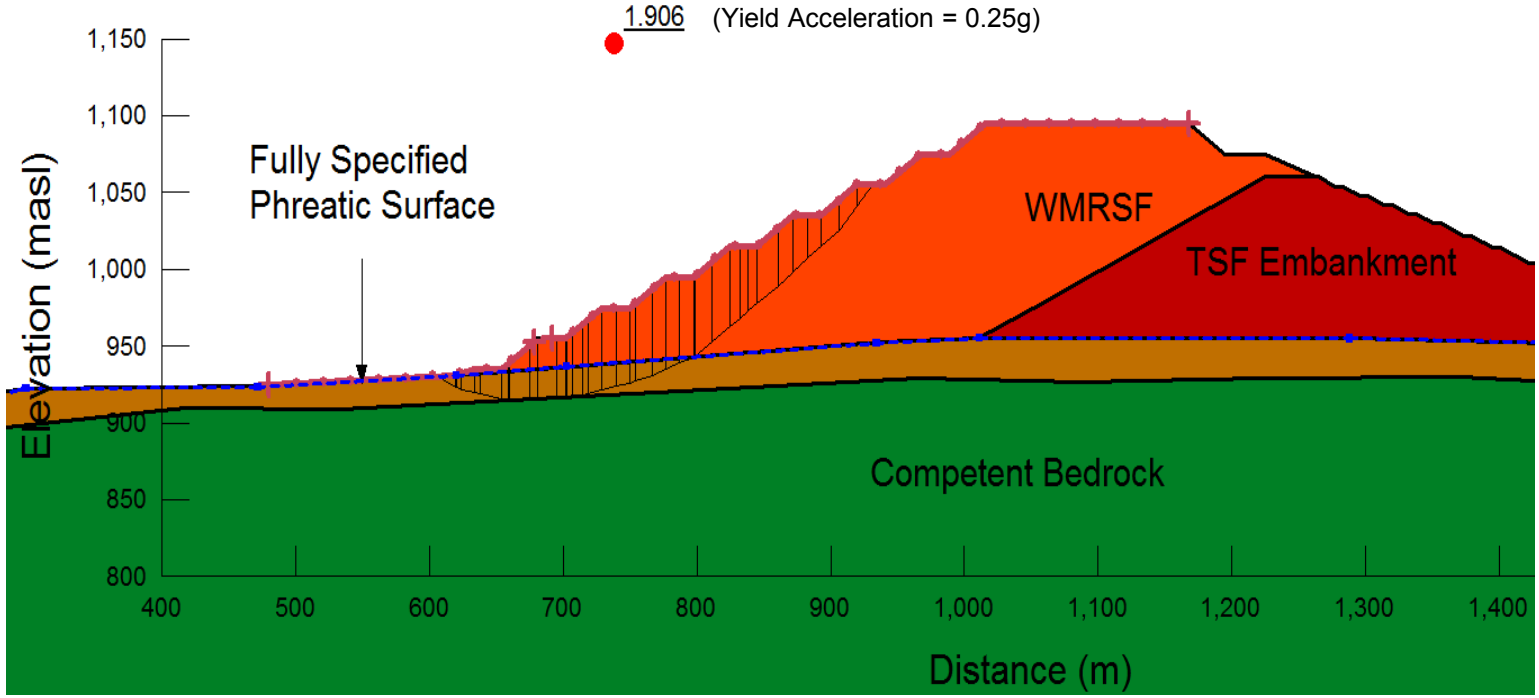
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FIGURE F4.1 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (B)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 1: WEST MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

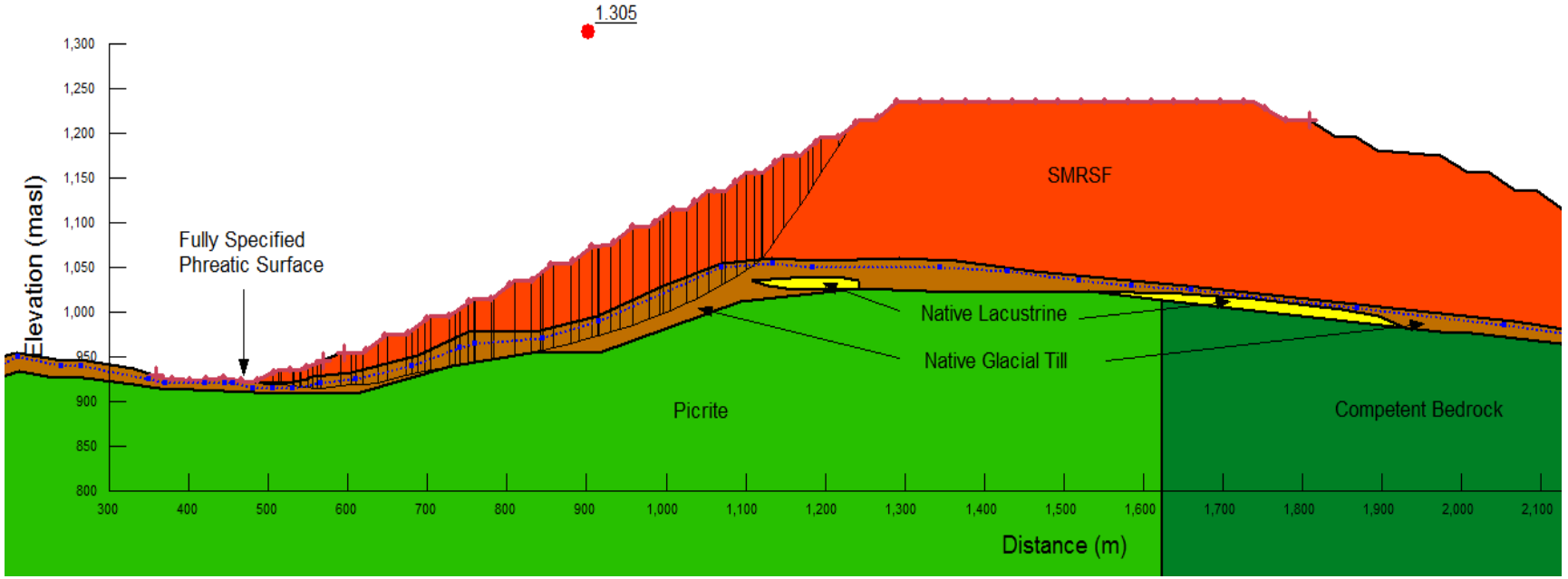
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FIGURE F4.2 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\bar{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

REV	DATE	DESCRIPTION	PREP'D	REV'D
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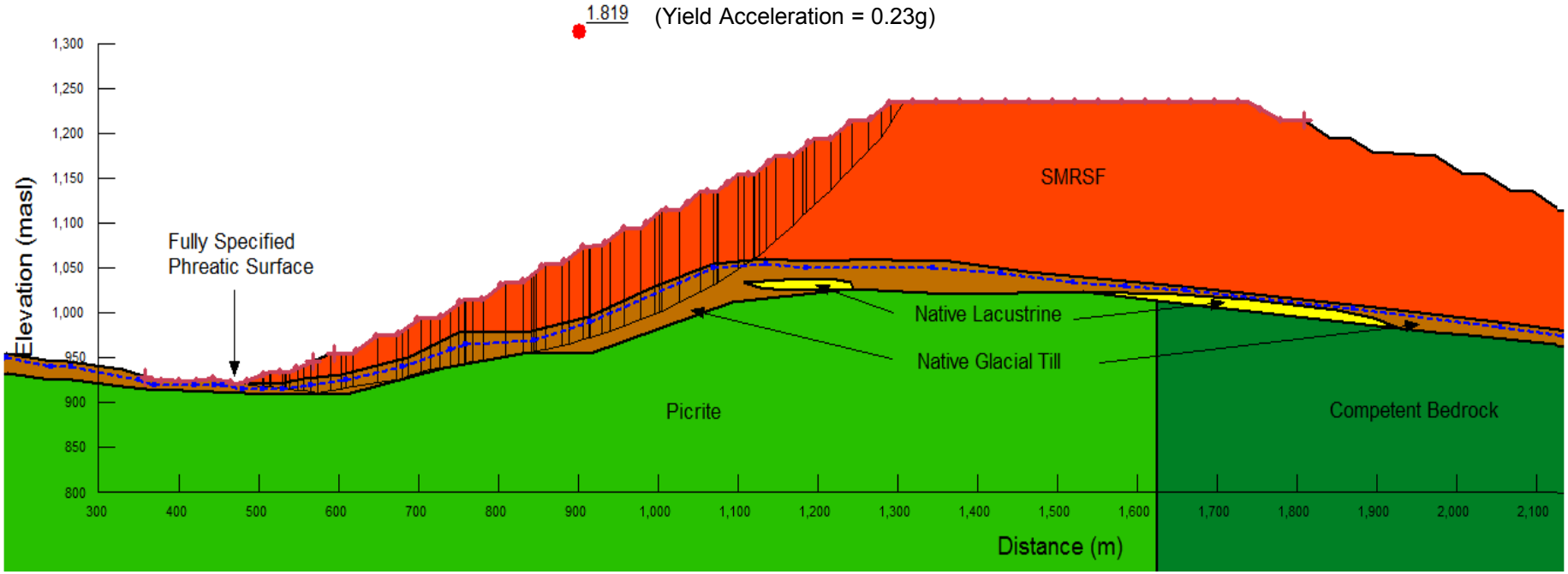
SECTION 2: SOUTH MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

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FIGURE F4.3 | REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (B̄)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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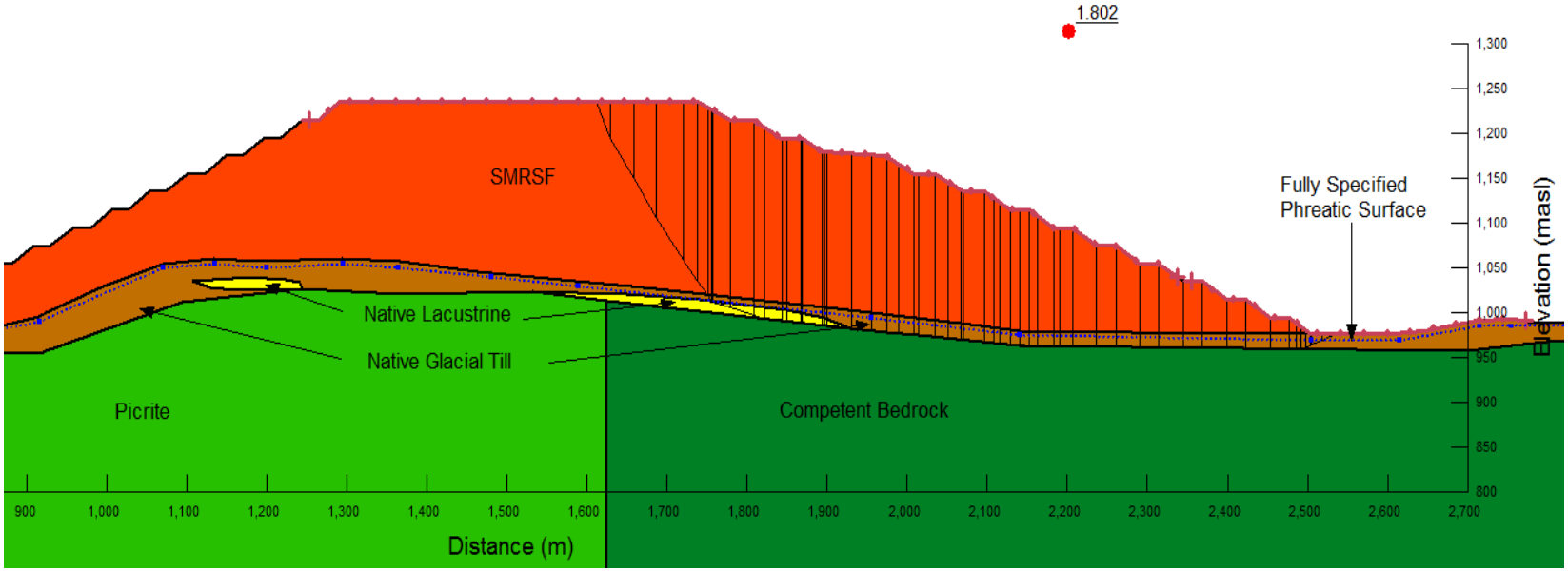
SECTION 2: SOUTH MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

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P/A NO. VA101-00246/26 | REF. NO. 9

FIGURE F4.4 | REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (B̄)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

REV	DATE	DESCRIPTION	PREP'D	REV'D
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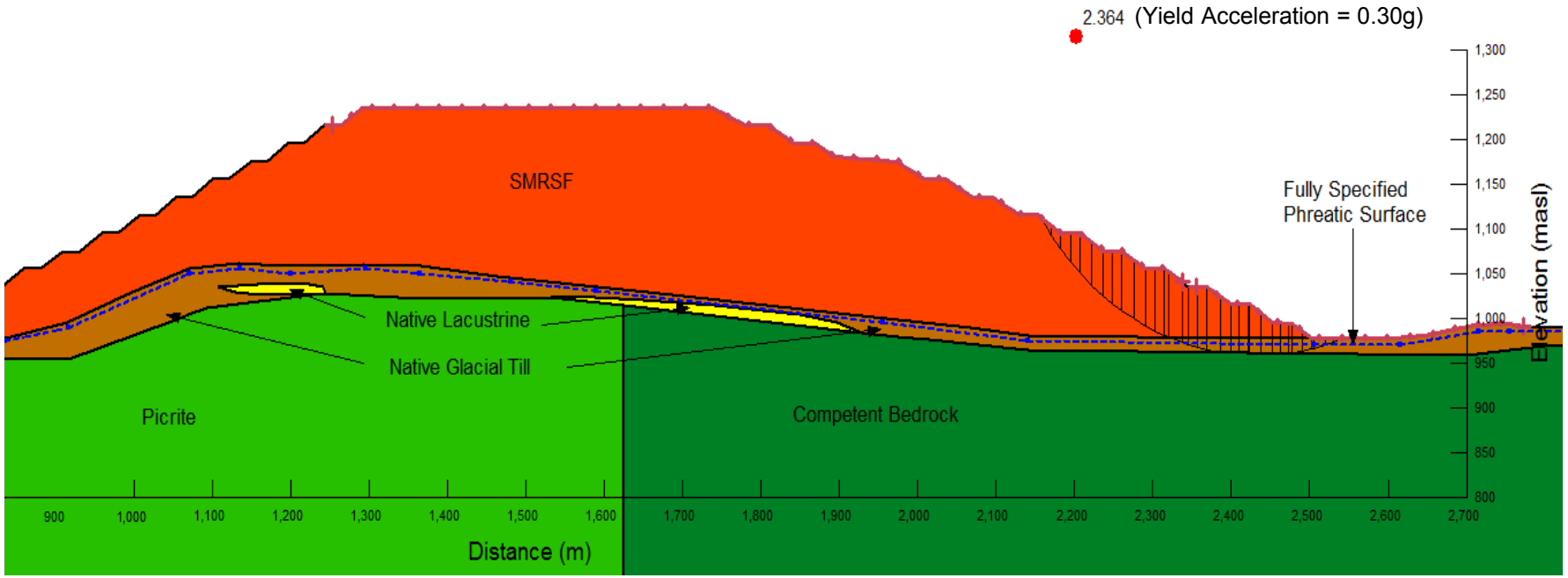
SECTION 2: SOUTH MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

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FIGURE F4.5 | REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\dot{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

REV	DATE	DESCRIPTION	PREP'D	REV'D
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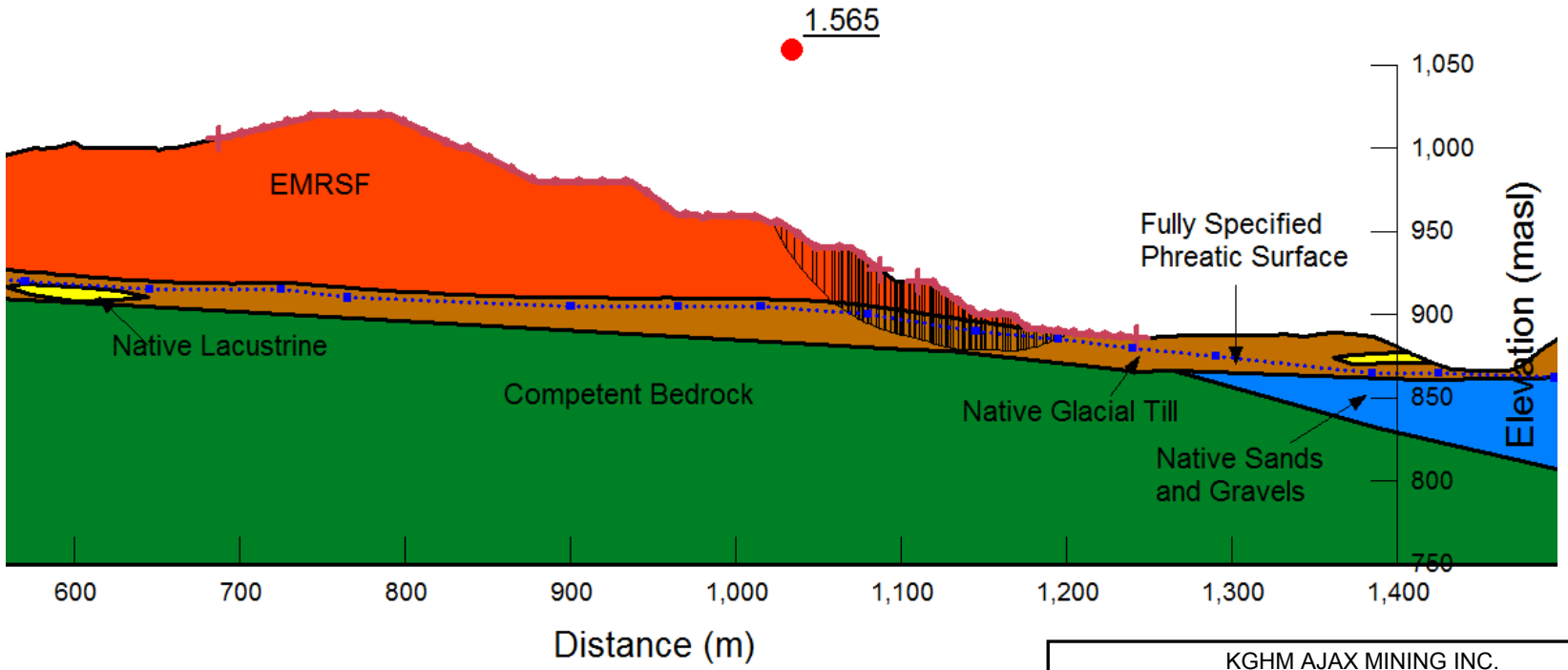
SECTION 2: SOUTH MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

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FIGURE F4.6 | REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\dot{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 3: EAST MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

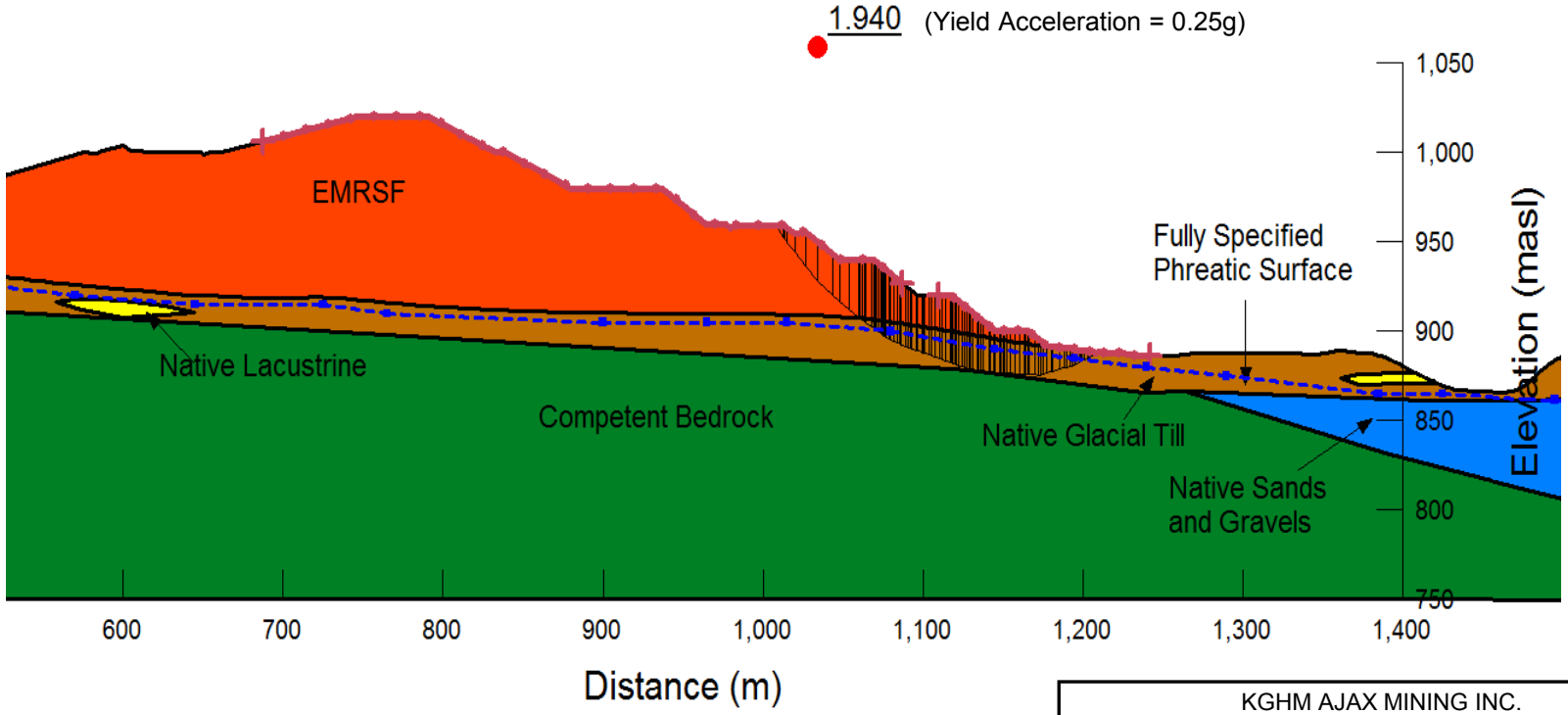
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FIGURE F4.7 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\dot{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 3: EAST MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

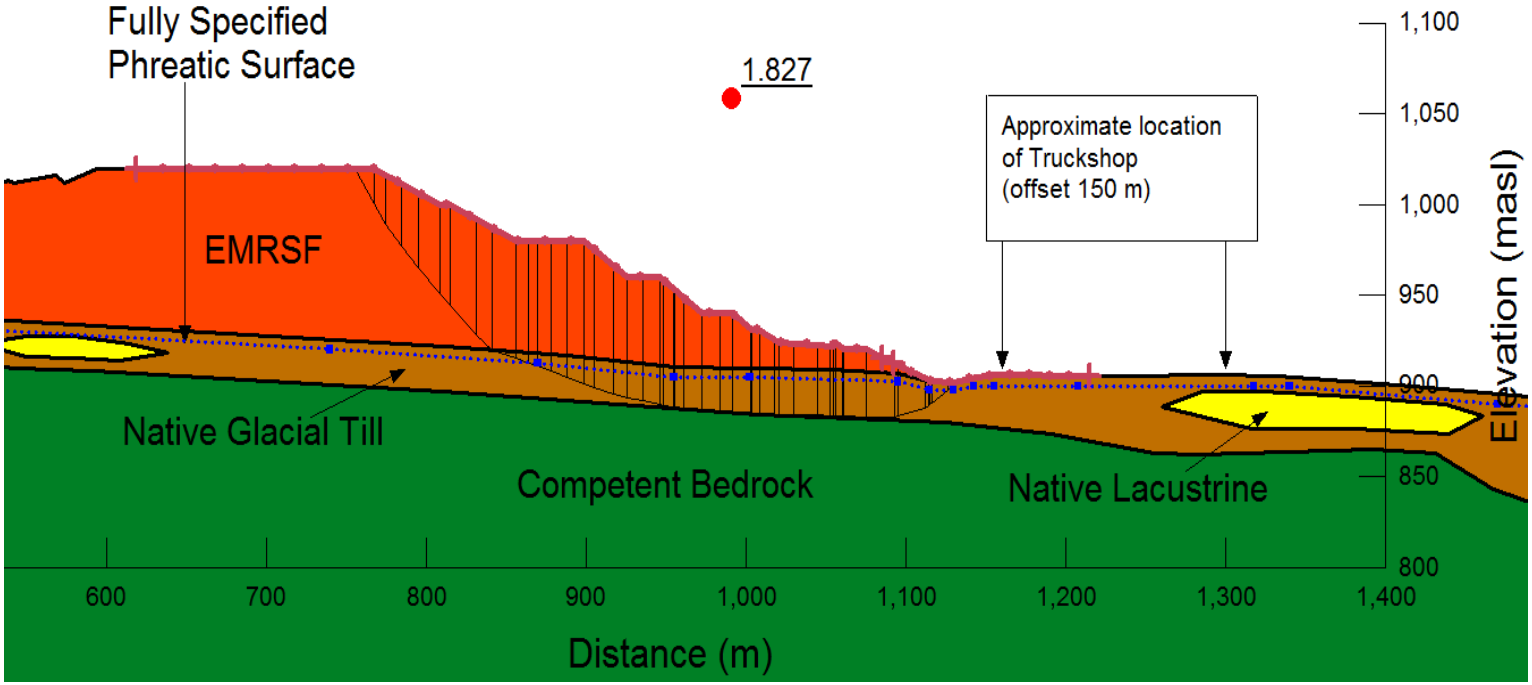
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FIGURE F4.8 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (B̄)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 4: EAST MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

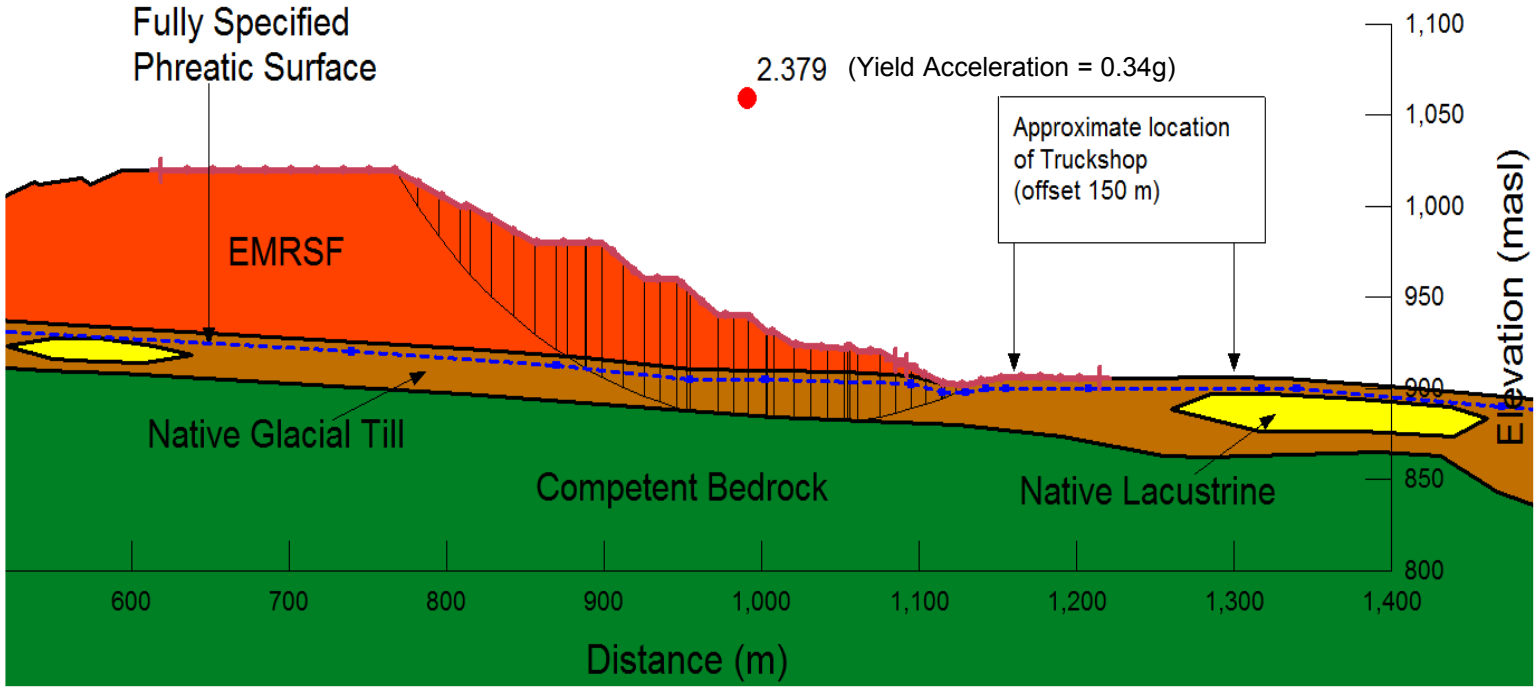
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FIGURE F4.9 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\bar{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 4: EAST MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

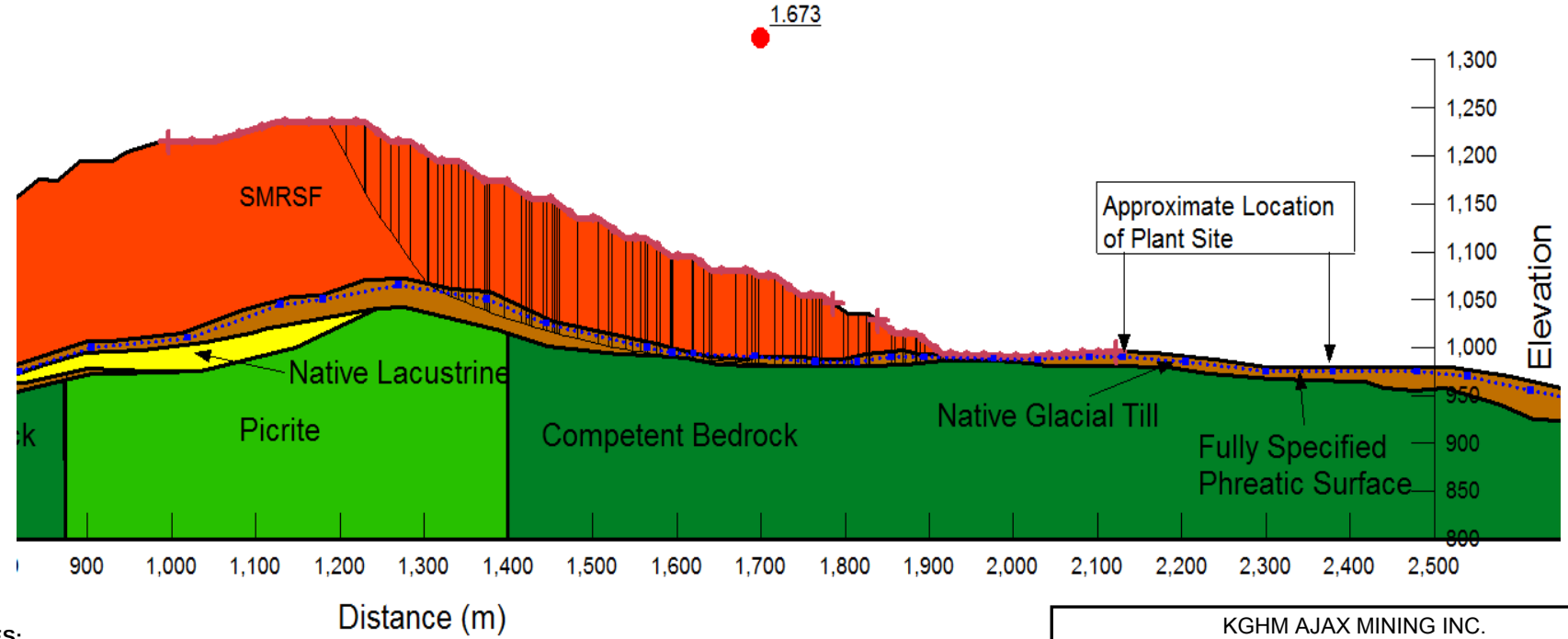
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FIGURE F4.10 | REV 0

REV	DATE	DESCRIPTION	PREP'D	REV'D
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Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\bar{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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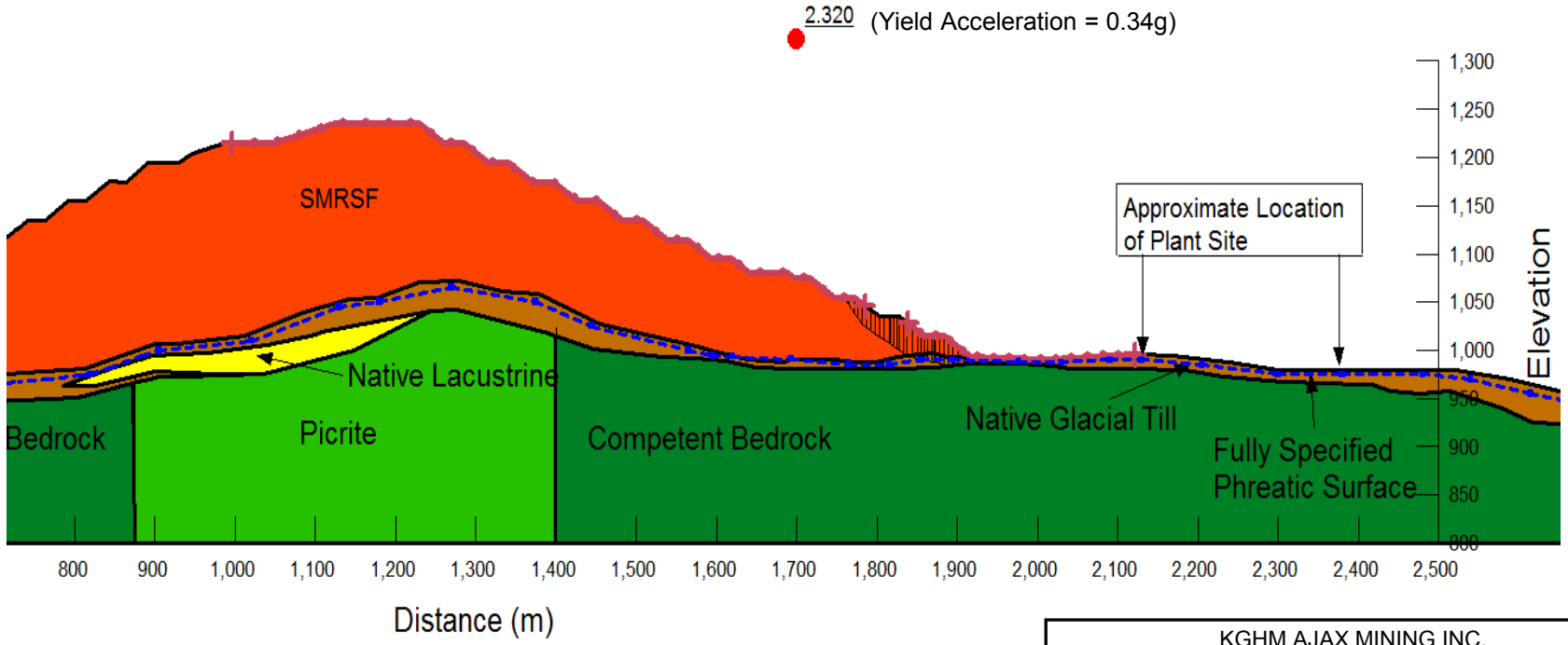
SECTION 5: SOUTH MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

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FIGURE F4.11 REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (Ḃ)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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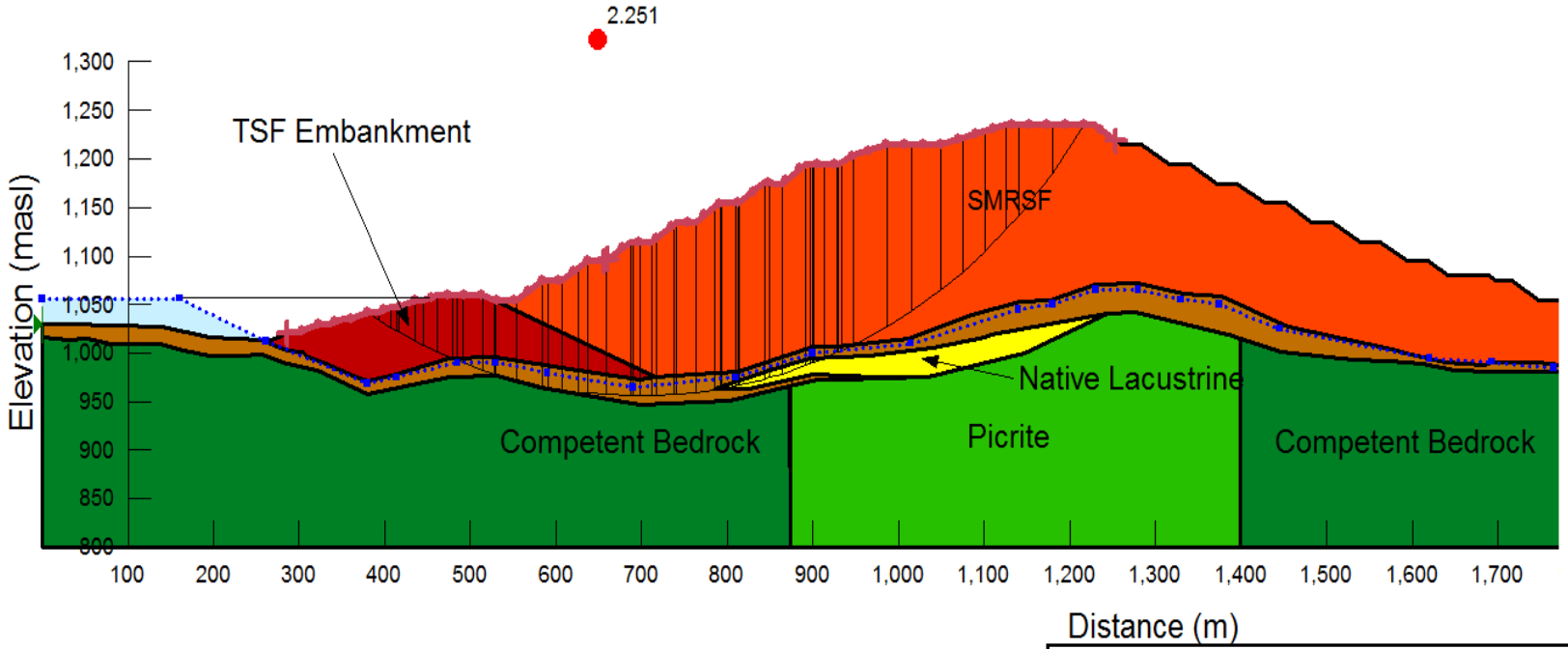
SECTION 5: SOUTH MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

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FIGURE F4.12 | REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (Ḃ)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0.4
Native Glaciolacustrine	18	14	0	0.4
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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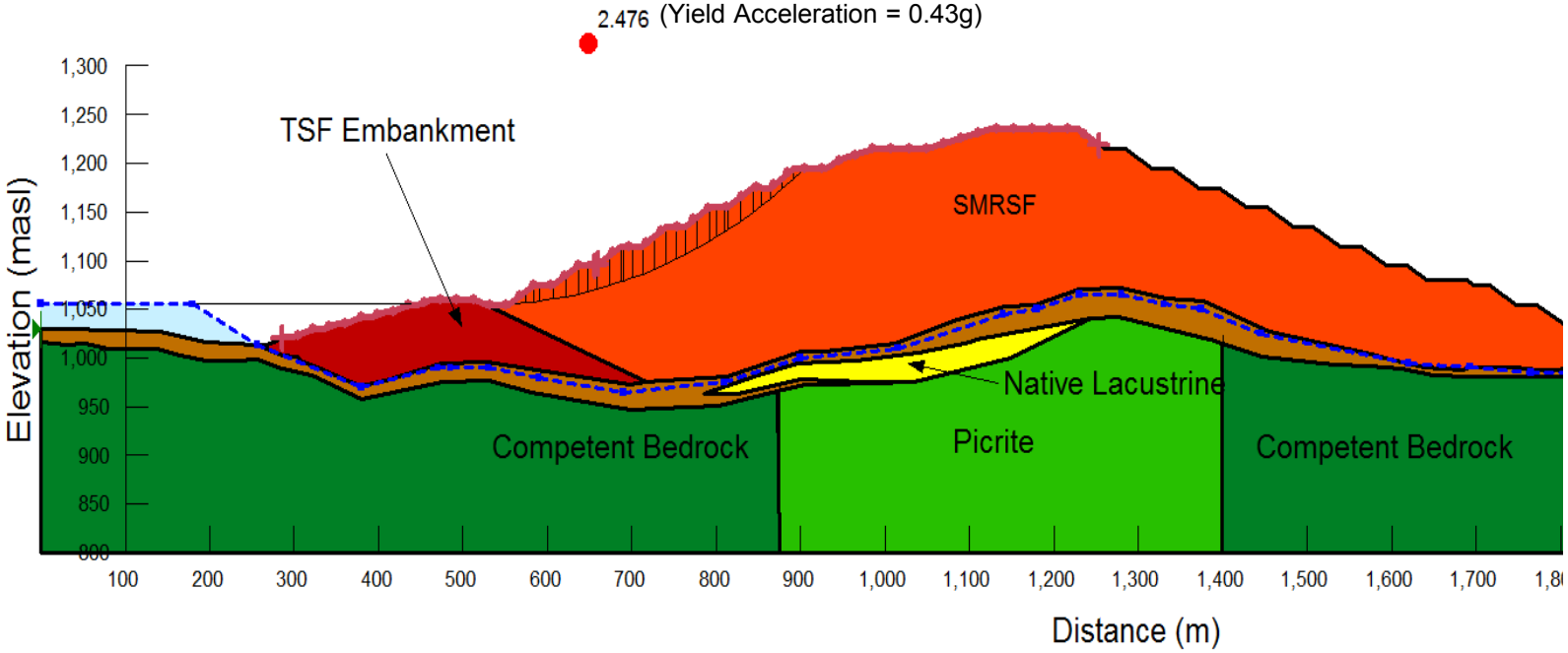
SECTION 5: SOUTH MINE ROCK STORAGE FACILITY END OF CONSTRUCTION STABILITY ANALYSIS

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FIGURE F4.13 REV 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response ($\dot{B}$)
	MRSF Materials			
Mine Rock	21	See Note 1		0
Controlled Rock Fill (TSF Embankment)	21	See Note 1		0
	Foundation Materials			
Native Sand and Gravel	19	35	0	0
Native Glacial Till	20	34	0	0
Native Glaciolacustrine	18	14	0	0
Picrite[2]	21	See Note 2		
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF ROCKFILL (LEPS, 1970).
2. A RELATIONSHIP FOR NORMAL STRESS AND SHEAR STRESS WAS DEVELOPED FOR THE PICRITE, BASED ON THE INTACT ROCK STRENGTH, USING THE GENERALIZED HOEK-BROWN CRITERION.
3. PHREATIC SURFACE WAS FULLY SPECIFIED BASED ON 2014 SITE INVESTIGATION DATA.

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SECTION 5: SOUTH MINE ROCK STORAGE FACILITY POST-CLOSURE STABILITY ANALYSIS

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FIGURE F4.14 REV 0

5 – OVERBURDEN AND TOPSOIL STOCKPILES STABILITY ANALYSIS

5.1 GENERAL

Stability analyses were undertaken to determine typical stockpile slopes and heights. The location of the overburden and topsoil stockpiles had not been finalized at the time of writing this report, and therefore typical foundation conditions were used in the stability analyses. The stratigraphy was modelled as 30 m of glacial till overlying competent bedrock, assuming flat topography. No glaciolacustrine material was assumed to be present within the stockpile foundations. The presence of glaciolacustrine or other weak layers in the stockpile foundation may significantly influence the stability.

5.2 MATERIAL PARAMETERS AND ASSUMPTIONS

The material unit weights and effective strength parameters used in the analyses are provided in Table F5.1. The following parameters and assumptions were incorporated into the stability analyses:

- It is assumed all topsoil will be removed from the overburden stockpile prior to construction.
- It is assumed all topsoil, loess deposits and any soft surficial materials located below the toe berms of the overburden and topsoil stockpiles will be removed prior to construction.
- Strength parameters were adopted based on typical values for similar materials.
- Bulk unit weights were based on typical values for similar materials.
- The stockpiles were assumed to be founded on 30 m glacial till overlying competent bedrock.
- All stockpiled materials and foundation materials are assumed to be non-liquefiable.

Table F5.1 Material Strength Parameters for Overburden and Topsoil Stockpiles

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)
Stockpile Materials			
Overburden (Glacial Till)	19	33	0
Topsoil	14	20	0
Controlled Rock Fill (Toe Berm)	21	See Note 1	
Foundation Materials			
Native Glacial Till	20	34	0
Fresh Bedrock	Impenetrable		

NOTES:

1. A relationship for friction angle and effective stress was developed for the rockfill materials, based on published information on the shear strength properties of rockfill (Leps, 1970).

5.3 RESULTS

The stability analyses indicate a toe berm is required to improve the stability of the overburden and topsoil stockpiles and allow for efficient storage of the materials. The toe berm will also improve drainage at the toe of the stockpiles, thereby further improving the stability. The berm was assumed to be constructed of controlled rockfill to a minimum of 3 m high with 2H:1V slopes.

The overburden and topsoil stockpiles were analysed for the end of construction case only as it was assumed that the materials would be used for reclamation at the end of the mine life and therefore stability at post-closure was not required.

The overburden stockpile with toe berm meets the required factors of safety for 3H:1V overall slopes and a maximum height of 25 m. The topsoil stockpile with toe berm will require construction to 4H:1V slopes to a maximum height of 10 m.

The factors of safety for both static and pseudo-static analyses for the overburden and topsoil stockpile at end of construction are presented on Table F5.2. The critical potential failure surface and factor of safety for the end of construction is shown on Figures F5.1 to F5.2. It is recommended to confirm the foundation conditions for the overburden and topsoil stockpiles, once their locations have been established. The stability of the stockpiles will have to be re-evaluated if weak layers are encountered that are not excavated.

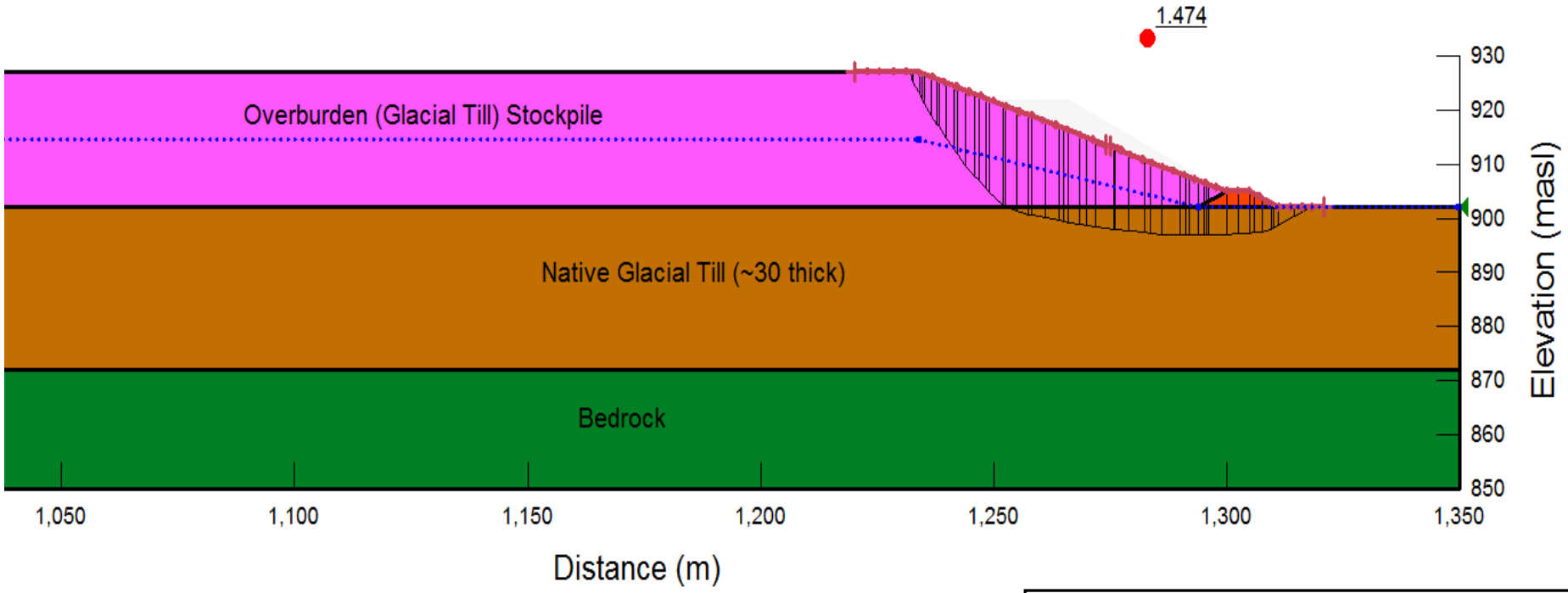
Table F5.2 Stability Results for Overburden and Topsoil Stockpiles

	Factor of Safety	
	Overall Stability	
	End of Construction[3]	
	Static	**Seismic[1]**
Required Minimum Factor of Safety	**1.3**	**1.1**
Overburden Stockpile 3H:1V at 25 m high	1.47	1.24
Topsoil Stockpile 4H:1V at 10 m high	1.50	1.23

NOTES:

1. Seismic coefficient of 0.05 used for pseudostatic analysis, which corresponds to a peak ground acceleration of 0.10g (1 in 475 year event, site class C/D).
2. Slip surfaces are a minimum depth of 2 m.
3. End of construction stability assumes excess pore pressures in the fine grained foundation soils, pore pressure response factor, Ḃ = 0.4.

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (Ḃ)
Stockpile Materials				
Overburden (Glacial Till)	19	33	0	0
Topsoil	14	20	0	0
Stability Berm (Mine Rock Fill)	21	See Note 1		
Foundation Materials				
Native Glacial Till	20	34	0	0.4
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF THE ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE AND FOUNDATION MATERIALS WERE ASSUMED AS SHOWN.

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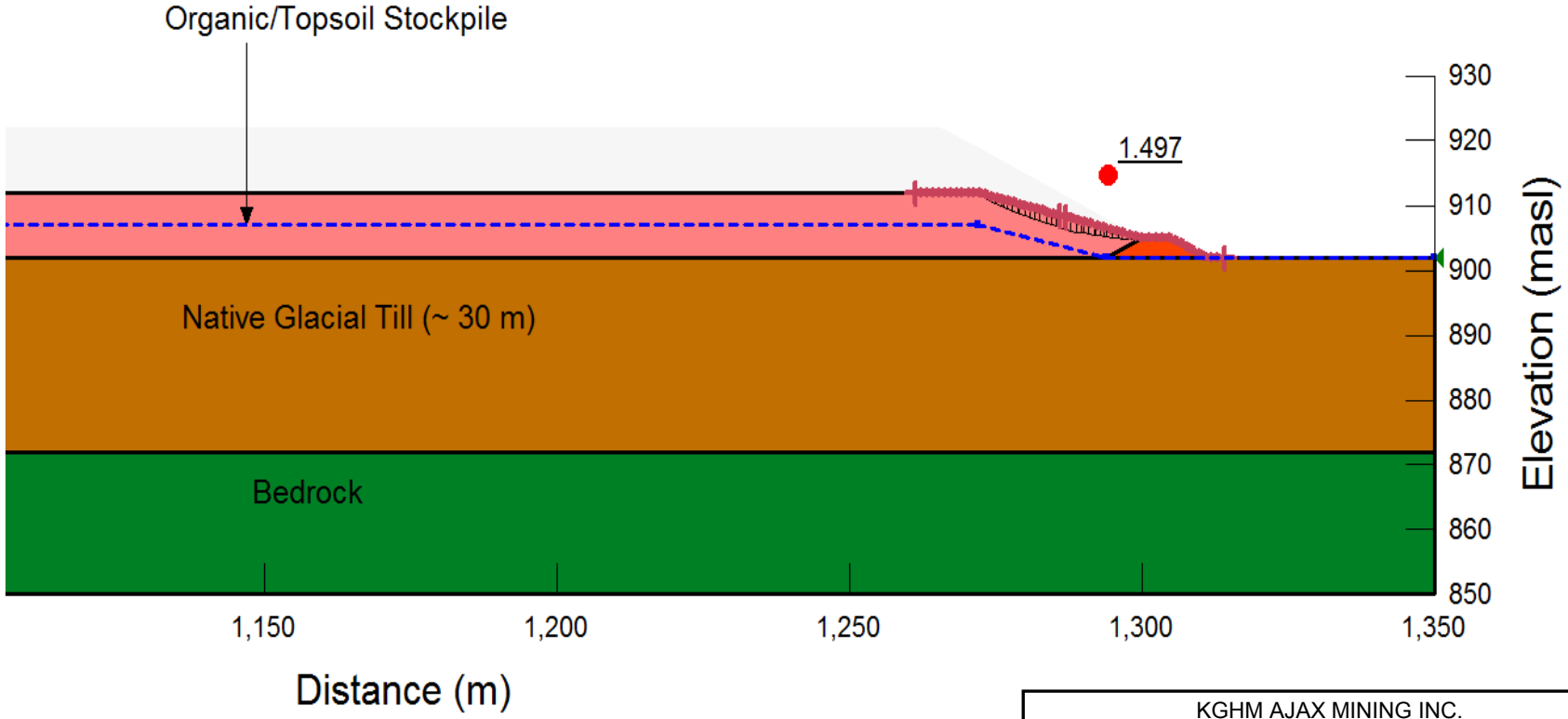
OVERBURDEN STOCKPILE END OF CONSTRUCTION STABILITY ANALYSIS

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FIGURE F5.1 | 0

Unit	Unit Weight (kN/m^3)	Effective Friction Angle (deg)	Effective Cohesion (kPa)	Pore Pressure Response (B̄)
Stockpile Materials				
Overburden (Glacial Till)	19	33	0	0
Topsoil	14	20	0	0
Stability Berm (Mine Rock Fill)	21	See Note 1		
Foundation Materials				
Native Glacial Till	20	34	0	0.4
Fresh Bedrock	Impenetrable			



NOTES:
1. A RELATIONSHIP FOR FRICTION ANGLE AND EFFECTIVE STRESS WAS DEVELOPED FOR THE ROCKFILL MATERIALS, BASED ON PUBLISHED INFORMATION ON THE SHEAR STRENGTH PROPERTIES OF THE ROCKFILL (LEPS, 1970).
2. PHREATIC SURFACE AND FOUNDATION MATERIALS WERE ASSUMED AS SHOWN.

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TOPSOIL STOCKPILE
END OF CONSTRUCTION
STABILITY ANALYSIS

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REF. NO. 9

FIGURE F5.2 0

6 – GENERAL GUIDELINES FOR MRSF AND STOCKPILE CONSTRUCTION

The following are recommended methods of mine rock facility construction and operation. These methods may be updated and revised, as necessary, based on field observations and performance monitoring during the initial stages of mine rock pile construction.

The general guidelines for the development of the mine rock facilities are as follows:

- Monitor foundation pore pressures during loading and review lift thicknesses and rate of rise accordingly if elevated pore pressures develop.
- Load the ore stockpile in lifts starting at the toe and working progressively upslope. This construction method is used to improve overall stability as each constructed lift will act as a buttress for the toe of the next lift.
- The lifts should be loaded and developed in a direction parallel to the slope wherever possible to avoid stress concentrations associated with “nose” configurations where the axis of the pile extends outward and perpendicular to the slope.
- Finger drains of sand and gravel may be constructed to collect water from a wide area beneath the facility and direct it into a collector pond.
- Pre-lifts typically range between 5 and 15 meters in thickness. Where soil conditions are too soft and wet to support equipment for stripping or excavating drainage trenches, foundations should be prepared and protected by placing a pre-lift of mine rock material to consolidate and/or span or contain weak soils.

Guidelines for surface water and snow control measures include:

- Surface water from catchment areas outside the mine rock facilities should be collected and diverted around the mine rock facilities to the maximum possible extent.
- Where the topography and the site characteristics are suitable, construction of flow-through rock drains for mine dumps may provide a viable, economic alternative to costly and often difficult to maintain surface water diversions.
- Residual snow and ice concentrations from the previous winter, in combination with relatively fine dump materials, may cause instability within the mine rockw dump. To minimize the effect of snow on dump stability, the following general guidelines should be followed, where appropriate:
    - Dump materials should not be placed on dumping faces where the depth of snow is significant (i.e. greater than 0.5 meter). The dump surface should be worked evenly to avoid large depressions that may infill with snow.
    - Snow removed from the mine should not be disposed in an active dump. A separate dumping area should be provided where consequences of instability, avalanches, etc. are minimal.
    - Snow should not be disposed in drainage courses or gullies which will be covered by dump materials.

Construction of the MRSFs and the soil salvaging and stockpiling operations will require a variety of management practices to properly handle and store materials during all phases of the mine development.

7 – REFERENCES

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APPENDIX G

FACTORED BEARING RESISTANCES AND ESTIMATED SETTLEMENT FOR MINE SITE INFRASTRUCTURE COMPONENTS

Appendix G1 Bearing Resistances and Estimated Settlement for Foundations on Overburden
Appendix G2 Bearing Resistances and Estimated Settlement for Foundations on Bedrock

APPENDIX G1

BEARING RESISTANCES AND ESTIMATED SETTLEMENT FOR FOUNDATIONS ON OVERBURDEN

(Tables G1.1 to G1.8)

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TABLE G1.1

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MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON STRUCTURAL FILL - EMBEDMENT DEPTH (D) = 0.0 m

Material Parameters		
Friction Angle, ϕ'	36	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.0	kN/m^3
Young's Modulus, E	100	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Pad Elevation (m)	Depth to Bedrock Beneath Building Pad (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 0.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 0.0 m S (mm)	Modulus of Subgrade Reaction D = 0.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	910.0 m	51.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	800	400	267	350 kPa	15.5 mm	23
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	800	400	267	350 kPa	15.5 mm	23
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	800	400	267	420 kPa	18.6 mm	23
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	945.0 m	9.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	800	400	267	350 kPa	12.8 mm	27
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	800	400	267	350 kPa	12.8 mm	27
Primary Crusher	85 m x 70 m	896.0 m	910.0 m	17.2 m	Building Foundation	Mat	18 x 18 m	4,500	2,250	1,500	840 kPa	16.5 mm	6

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.2

KGHM AJAX MINING INC.
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MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON STRUCTURAL FILL - EMBEDMENT DEPTH (D) = 1.0 m

Material Parameters		
Friction Angle, ϕ'	36	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.0	kN/m^3
Young's Modulus, E	100	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 1.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 1.0 m S (mm)	Modulus of Subgrade Reaction D = 1.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	909.0 m	50.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	2,200	1,100	733	350 kPa	15.2 mm	23
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	2,200	1,100	733	350 kPa	15.2 mm	23
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	2,200	1,100	733	420 kPa	18.2 mm	23
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	944.0 m	8.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	2,200	1,100	733	350 kPa	12.5 mm	28
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	2,200	1,100	733	350 kPa	12.5 mm	28
Primary Crusher	85 m x 70 m	896.0 m	909.0 m	16.2 m	Building Foundation	Mat	18 x 18 m	5,900	2,950	1,967	840 kPa	15.8 mm	6

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.3

KGHM AJAX MINING INC.
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MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON STRUCTURAL FILL - EMBEDMENT DEPTH (D) = 2.0 m

Material Parameters		
Friction Angle, ϕ'	36	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.0	kN/m^3
Young's Modulus, E	100	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 2.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 2.0 m S (mm)	Modulus of Subgrade Reaction D = 2.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	908.0 m	49.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,900	1,950	1,300	350 kPa	15.2 mm	23
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,900	1,950	1,300	350 kPa	15.2 mm	23
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	3,900	1,950	1,300	420 kPa	18.2 mm	23
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	943.0 m	7.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,900	1,950	1,300	350 kPa	12.0 mm	29
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,900	1,950	1,300	350 kPa	12.0 mm	29
Primary Crusher	85 m x 70 m	896.0 m	908.0 m	15.2 m	Building Foundation	Mat	18 x 18 m	7,400	3,700	2,467	840 kPa	15.0 mm	6

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Rev 0\Appendices\G1 - Bearing Resistances and Estimated Settlement on Soil\[Table G1.3 & G1.7.xlsx]Table G1.3

NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.4

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON STRUCTURAL FILL - EMBEDMENT DEPTH (D) = 5.0 m

Material Parameters		
Friction Angle, ϕ'	36	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.0	kN/m^3
Young's Modulus, E	100	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 5.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 5.0 m S (mm)	Modulus of Subgrade Reaction D = 5.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	905.0 m	46.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	10,400	5,200	3,467	350 kPa	15.2 mm	23
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	10,400	5,200	3,467	350 kPa	15.2 mm	23
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	10,400	5,200	3,467	420 kPa	18.2 mm	23
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	940.0 m	4.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	10,400	5,200	3,467	350 kPa	10.0 mm	35
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	10,400	5,200	3,467	350 kPa	10.0 mm	35
Primary Crusher	85 m x 70 m	896.0 m	905.0 m	12.2 m	Building Foundation	Mat	18 x 18 m	11,900	5,950	3,967	840 kPa	11.8 mm	6

M:\1\01\00246\26\A\Report\9 - Preliminary Geotech Report - Mine Site Infrastructure\Rev 0\Appendices\G1 - Bearing Resistances and Estimated Settlement on Soil\[Table G1.4 & G1.8.xlsx]Table G1.4

NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.5

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON GLACIAL TILL - EMBEDMENT DEPTH (D) = 0.0 m

Material Parameters		
Friction Angle, ϕ'	34	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.5	kN/m^3
Young's Modulus, E	200	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Pad Elevation (m)	Depth to Bedrock Beneath Building Pad (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 0.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 0.0 m S (mm)	Modulus of Subgrade Reaction D = 0.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	910.0 m	51.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	600	300	200	350 kPa	7.8 mm	45
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	600	300	200	350 kPa	7.8 mm	45
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	600	300	200	420 kPa	9.3 mm	45
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	945.0 m	9.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	600	300	200	350 kPa	6.4 mm	55
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	600	300	200	350 kPa	6.4 mm	55
Primary Crusher	85 m x 70 m	896.0 m	910.0 m	17.2 m	Building Foundation	Mat	18 x 18 m	3,300	1,650	1,100	840 kPa	8.2 mm	12

NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.6

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON GLACIAL TILL - EMBEDMENT DEPTH (D) = 1.0 m

Material Parameters		
Friction Angle, ϕ'	34	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.5	kN/m^3
Young's Modulus, E	200	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 1.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 1.0 m S (mm)	Modulus of Subgrade Reaction D = 1.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	909.0 m	50.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	1,700	850	567	350 kPa	7.6 mm	46
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	1,700	850	567	350 kPa	7.6 mm	46
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	1,700	850	567	420 kPa	9.1 mm	46
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	944.0 m	8.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	1,700	850	567	350 kPa	6.2 mm	56
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	1,700	850	567	350 kPa	6.2 mm	56
Primary Crusher	85 m x 70 m	896.0 m	909.0 m	16.2 m	Building Foundation	Mat	18 x 18 m	4,400	2,200	1,467	840 kPa	7.9 mm	12

NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.7

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON GLACIAL TILL - EMBEDMENT DEPTH (D) = 2.0 m

Material Parameters		
Friction Angle, ϕ'	34	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.5	kN/m^3
Young's Modulus, E	200	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 2.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 2.0 m S (mm)	Modulus of Subgrade Reaction D = 2.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	908.0 m	49.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,000	1,500	1,000	350 kPa	7.5 mm	47
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,000	1,500	1,000	350 kPa	7.5 mm	47
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	3,000	1,500	1,000	420 kPa	9.0 mm	47
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	943.0 m	7.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,000	1,500	1,000	350 kPa	6.0 mm	58
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	3,000	1,500	1,000	350 kPa	6.0 mm	58
Primary Crusher	85 m x 70 m	896.0 m	908.0 m	15.2 m	Building Foundation	Mat	18 x 18 m	5,500	2,750	1,833	840 kPa	7.5 mm	12

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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TABLE G1.8

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR FOUNDATIONS ON GLACIAL TILL - EMBEDMENT DEPTH (D) = 5.0 m

Material Parameters		
Friction Angle, ϕ'	34	degrees
Cohesion, c'	0	kPa
Unit Weight, γ'	21.5	kN/m^3
Young's Modulus, E	200	MPa
Poisson's Ratio, υ	0.3	

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Mine Site Infrastructure Components	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Foundation Elevation (m)	Depth to Bedrock Beneath Foundation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 5.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement D = 5.0 m S (mm)	Modulus of Subgrade Reaction D = 5.0 m k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Truck Shop	42.7 m x 37.1 m	905.8 m	905.0 m	46.6 m	Mine Truck Wash Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,200	4,100	2,733	350 kPa	7.6 mm	46
	98.1 m x 70.8 m				Mine Truck Shop Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,200	4,100	2,733	350 kPa	7.6 mm	46
	11.2 m x 10.15 m				Gate House/Truck Scale	Spread	3 x 3 m to 4.5 x 4.5 m	8,200	4,100	2,733	420 kPa	9.1 mm	46
Explosives Building	42.7 m x 37.1 m	943 m to 961.5 m	940.0 m	4.4 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,200	4,100	2,733	350 kPa	5.0 mm	70
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,200	4,100	2,733	350 kPa	5.0 mm	70
Primary Crusher	85 m x 70 m	896.0 m	905.0 m	12.2 m	Building Foundation	Mat	18 x 18 m	9,000	4,500	3,000	840 kPa	5.9 mm	12

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER VESIC, 1975).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC 2005).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$
4. N_c, N_q, N_γ = BEARING CAPACITY FACTORS (AS PER HANSEN, 1970).
5. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
6. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
7. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
8. S = ESTIMATED FOUNDATION SETTLEMENT (SPREAD FOOTINGS AS PER MAYNE & POULOS, 1999; CIRCULAR FOOTINGS AS PER POULOS & DAVIS, 1974; STRIP FOOTINGS AS PER POULOS & DAVIS, 1974; MAT FOUNDATIONS AS PER TIMOSHENKO & GOUDIER, 1951)
9. I_G = GROUND STIFFNESS INFLUENCE FACTOR (AS PER MAYNE & POULOS, 1999)
10. I_S, I_C = FOOTING INFLUENCE FACTOR (AS PER BOOKER & ROWE, 1981)
11. I_F, I_1, I_2, I_S = INFLUENCE FACTORS FOR MAT FOUNDATION FOOTINGS (AS PER TIMOSHENKO & GOUDIER, 1951).
12. k_S = MODULUS OF SUBGRADE REACTION (AS PER CANADIAN FOUNDATION ENGINEERING MANULA, CGS, 2006).

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APPENDIX G2

BEARING RESISTANCES AND ESTIMATED SETTLEMENT FOR FOUNDATIONS ON BEDROCK

(Tables G2.1 to G2.3)

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TABLE G2.1

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR PRIMARY CRUSHER ON SUGARLOAF DIORITE

Material Parameters		
RMR_{89}	67	
RQD	90	%
UCS, $\sigma_{ult\ (r)}$	150.0	MPa
Young's Modulus, E	70.0	GPa
Poisson's Ratio, υ	0.20	

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Mine Site Infrastructure Component	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Pad Elevation (m)	Approx. Bedrock Elevation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 0.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement S (mm)	Modulus of Subgrade Reaction[8] (D = 0 m) k_S (MPa/m)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)			
Primary Crusher	85 m x 70 m	896.0 m	910.0 m	892.8 m	Building Foundation	Mat	18 x 18 m	125,000	62,500	41,667	350 to 420 kPa	0.83 mm	5,000

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER WYLLIE, 1999).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC, 2010).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$.
4. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
5. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
6. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
7. S = ESTIMATED FOUNDATION SETTLEMENT AS PER WYLLIE, 1999.
8. k_S = MODULUS OF SUBGRADE REACTION FOR MAT FOOTINGS ON BEDROCK SUBGRADES AS PER BOWLES, 1997.

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TABLE G2.2

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR EXPLOSIVES FACILITY COMPONENTS ON IRON MASK HYBRID

Material Parameters		
RMR_{89}	39	
RQD	55	%
UCS, $\sigma_{ult\ (r)}$	150.0	MPa
Young's Modulus, E	90.0	GPa
Poisson's Ratio, υ	0.27	

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Mine Site Infrastructure Component	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Pad Elevation (m)	Approx. Bedrock Elevation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 0.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement S (mm)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)		
Explosives Facility	114 m x 102 m	943.0 to 961.5 m	945.0 m	935.6 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	25,000	12,500	8,333	350 kPa	0.25 mm
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	25,000	12,500	8,333	350 kPa	0.25 mm

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER WYLLIE, 1999).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC, 2010).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$.
4. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
5. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
6. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
7. S = ESTIMATED FOUNDATION SETTLEMENT AS PER WYLLIE, 1999.
8. k_S = MODULUS OF SUBGRADE REACTION FOR MAT FOOTINGS ON BEDROCK SUBGRADES AS PER BOWLES, 1997.

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TABLE G2.3

KGHM AJAX MINING INC.
AJAX PROJECT

MINE SITE INFRASTRUCTURE GEOTECHNICAL ASSESSMENT
FOUNDATION PARAMETERS FOR EXPLOSIVES FACILITY COMPONENTS ON PICRITE

Material Parameters		
RMR_{89}	49	
RQD	61	%
UCS, $\sigma_{ult\ (r)}$	25.0	MPa
Young's Modulus, E	6.3	GPa
Poisson's Ratio, υ	0.25	

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Mine Site Infrastructure Component	Building Dimensions L x B (m)	Approximate Ground Elevation (m)	Building Pad Elevation (m)	Approx. Bedrock Elevation (m)	Building Components	Footing Type	Footing Dimensions L' x B' (m)	Factored Bearing Resistances D = 0.0 m			Anticipated Bearing Pressure q (kPa)	Estimated Foundation Settlement S (mm)
								q_{ult} (kN/m^2)	q_f (kN/m^2)	q_{allow} (kN/m^2)		
Explosives Facility	114 m x 102 m	943.0 to 961.5 m	945.0 m	935.6 m	Explosive Manufacturing Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,300	4,150	1,383	350 kPa	1.85 mm
					Explosive Storage Building	Spread/Strip	3 x 3 m to 4.5 x 4.5 m	8,300	4,150	1,383	350 kPa	1.85 mm

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NOTES:

1. q_{ult} = ULTIMATE BEARING CAPACITY (AS PER WYLLIE, 1999).
2. R_f = RESISTANCE FACTOR = 0.5 FOR SHALLOW FOUNDATIONS (NBCC, 2010).
3. q_f = FACTORED BEARING RESISTANCE, WHERE $q_f = q_{ult} * R_f$.
4. WATER TABLE ASSUMED BELOW ZONE OF INFLUENCE (DRAINED CONDITIONS).
5. ASSUMING UNIFORM VERTICAL STATIC LOADING AND NO ECCENTRICITIES.
6. SETTLEMENTS BELOW THE FOUNDATIONS SHOULD ALSO BE CONSIDERED TO CONFIRM AN ACCEPTABLE FACTORED BEARING PRESSURE FOR THE STRUCTURES
7. S = ESTIMATED FOUNDATION SETTLEMENT AS PER WYLLIE, 1999.
8. k_S = MODULUS OF SUBGRADE REACTION FOR MAT FOOTINGS ON BEDROCK SUBGRADES AS PER BOWLES, 1997.

REV	DATE	DESCRIPTION	PREP'D	REV'D
0	16JUN'15	ISSUED WITH REPORT VA101-246/26-9	JEF	LJG