

Appendix 4:

Mary River Project 2011 Potential Quarry and Borrow Investigations





Mary River

2011 Potential Quarry and Borrow Investigations

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1. Introduction

Baffinland Iron Mines Corporation (Baffinland) is planning to develop the Mary River iron ore deposits on North Baffin Island in the Qikiqtani Region of Nunavut. This project will require a large volume of rockfill and borrow material for the development of the site infrastructure at the Mary River mine site and Steensby Inlet port site, as well as for the construction of an approximately 140 km railway between the mine site and the port site.

Site investigations have been conducted by Thurber Engineering Ltd (Thurber), under the direction of Hatch Ltd. (Hatch) at the guarries and borrow areas in the summer of 2011.

This report reviews previous studies and investigations for the potential borrow and quarry areas, summarizes the 2011 site investigations and presents recommendations for further development of these quarry and borrow areas.

2. Background

The following supporting documents have been identified that refer to borrow and quarry areas for the Mary River project:

- Canarail Consultants Inc. (Canarail), "Additional Quarry Sites", TDM No. 159952-5000-121-032 [Ref 1].
- AMEC Americas Limited (AMEC), "Summary of Aggregate Resource Evaluation Testing Program, Baffinland Iron Mine Mary River Project" [Ref 2].
- Knight Piésold Consulting (KP), "Mary River Project Quarry Sites' Screening" [Ref 3].
- AMEC, "Interim ML/ARD Assessment of Railway Quarry Rock Samples, Baffinland Mary River Project – Issued for DEIS" [Ref 4].

These documents were used in the preparation of the Draft Environmental Impact Statement (DEIS), issued in December 2010 [Ref. 5].

Very limited drilling investigations were undertaken at these sites, but the investigation programs from 2006 to 2008 included some drilling to collect samples for preliminary laboratory testing to assess the suitability of the material for granular fill and ballast uses. Preliminary testing was also completed to assess the material's potential for Acid Rock Drainage (ARD). No specific testing was done to assess the material's suitability for use as concrete aggregate, except for a limited number of physical tests on rock samples for use as potential ballast material. In particular, it does not appear that any testing for alkali-aggregate reactivity has been conducted to determine the suitability of the rocks from the quarry and borrow area at the Mary River site and potential quarries at Steensby Inlet, where concrete will be used during construction of the project. Identified quarry and borrow areas at Mary River (QMR2 and Borrow Area #3) and at Steensby Inlet (QS-1, QS-2, QS-3 and QS-3A) are shown in Appendix A on figures from the DEIS [Ref 5]. A







potential borrow area around Station 128+000 was identified in 2011 and may be the closest potential source for fine aggregates for Steensby Inlet. The location of this borrow area is not shown on these figures.

3. Review of Previous Investigations and Laboratory Testing

3.1 "Additional Quarry Sites" Report

Canarail's "Additional Quarry Sites" report [Ref 1] identifies 43 quarry sites to be added to the quarry sites previously identified by KP. The report also states that twelve of KP's quarry sites were removed based on access difficulties, haul lengths, long upgrade haul distances, construction methodologies, quarry sizes and potential capacities. It was not expected that all of the 69 quarry sites would be developed, but it was felt that it would be better to identify too many rather than too few quarry sites. The report provided estimated volumes for all the sites and stated that Q133+500, also known as BAL-1, in the southern portion of the line will be used as ballast material. This report uses data from existing reports and field reconnaissance.

3.2 "Summary of Aggregate Resource Evaluation Testing Program" Report AMEC's "Summary of Aggregate Resource Evaluation Testing Program" report [Ref 2] summarizes laboratory testing done on potential sources of ballast, sub-ballast and rockfill material.

The test results on the ballast sources BAL-1 (Q133 \pm 500), BAL-2 (Q138 \pm 100), BAL-3 (Q139 \pm 600) and BAL-4 (Q139 \pm 600) are summarized as follows:

- All samples met the ballast specification requirements for degraded aggregate cement value (CV), bulk specific gravity, magnesium sulphate soundness and absorption.
- None of the samples met the shape factor requirements.
- All samples except one sample from BAL-1 (Q133 + 500) had losses that exceeded that maximum allowable limit in the Los Angeles abrasion test.
- All samples for BAL-2 (Q138+100), BAL-3 (Q139+600) and BAL-4 (Q139+600) met the
 requirements for the mill abrasion (MA) test, but only one sample from BAL-1 (Q133+500)
 met the test requirements.
- All the samples are below the maximum Petrographic Number (PN) requirement specified in Ontario provincial standards for high quality coarse aggregate used in highway road construction [Ref 6].

These results indicate that none of the BAL sources meet all the specification requirements for ballast stone. However, some of the poor test results may have been affected by the limitations of the method of sample preparation. All the samples show good resistance to freezing and thawing conditions.







Limited testing on sub-ballast and rockfill sources was undertaken at Q50+000, Q56+750, Q64+400, Q67+200, Q77+200 and Q82+700. The test results showed that the fines are non-plastic. Micro-deval abrasion testing on the coarse and fine aggregate fractions showed that the mass loss was below maximum losses specified in Ontario provincial standards [Ref 7]. These results indicate that the material could potentially be suitable for railway construction, although it will require additional testing.

The report recommended that additional testing be carried out on the ballast and sub-ballast sources to confirm these test results. In particular, the report recommends that testing be done at the quarry areas at Steensby Inlet, QS1, QS2, QS3 and QS3A, to assess their potential as concrete aggregate, ballast, sub-ballast, rockfill or other construction aggregate material. Also, it recommends that the fine aggregate source at Mary River be tested to assess its suitability for concrete fine aggregate uses.

The report did not identify or discuss any potential ballast materials at the northern end of the railway line. It is not known why the ballast materials were only planned to be sourced from the south end of the railway line. It was understood, however, that the southern end of the railway line passes through a number of rock cuts consisting of granitic rock, which might have been assumed to be hard and durable rock sources suitable for ballast material.

3.3 "Quarry Sites' Screening" Report

KP's "Mary River Project Quarry Sites' Screening" report [Ref 3] shows preliminary bounds and volumes for road and railway construction for 68 of the 69 quarry sites recommended by Canarail's "Additional Quarry Sites" report [Ref 1]. Outer boundaries are shown for each quarry for land tenure purposes and to provide flexibility to the contractor during quarry development. The report shows the areas of excavation that would be required for 1.5 times the volume excavation, assuming one10 m lift is used, as well as proposed permit areas, areas of potential access to quarries and substitute quarry locations in environmentally sensitive areas.

The report did not discuss Q40+600 or QS3, and did not provide volumes for QS1, QS2 or QS3A, because these sources were not anticipated to be used at the time. The report also does not provide volumes of material for material which could potentially be obtained from construction of the tunnels or the ore loading dock.

3.4 "Interim ML/ARD Assessment of Railway Quarry Rock Samples" Report

AMEC's "Interim ML/ARD Assessment of Railway Quarry Rock Samples" Report [Ref 4] assesses the metal leaching and acid rock drainage (ML/ARD) characteristics of rock samples collected by KP in 2008 along the rail alignment. Surface saw-cut sampling was used for ballast material suitability testing, chip sampling and core sampling for geochemical testing and surface grab sampling for durability testing. AMEC only used core samples for the ML/ARD testing, but the remainder of the samples are still stored at the SGS lab in Lakefield, Ontario.

The report provides a geological survey along the rail alignment, stating that the most northern approximately 29 km portion of the rail alignment crosses Paleozoic sedimentary rock and Precambrian rock. The southern 120 km portion of the rail alignment crosses only Precambrian







rock. The Paleozoic sedimentary rock includes sandstones, and the Precambrian rock includes gneisses.

Thirty-eight core samples from 26 boreholes were tested by SGS, taken every 3 to 7 km along the rail alignment. These included 7 sandstone, 6 granite and 25 granitoid gneiss samples.

The testing included acid-base accounting (ABA), Net Acid Generation (NAG), total metals by aqua regia digestion with ICP-MS finish, leachable metals, and mineralogy.

The report concluded that:

- The three types of materials tested are all suitable for quarry source material with a low potential for ML/ARD;
- Two gneiss samples had neutralization potential ratio (NPR) results that were unacceptably low, but the remainder of the samples did not show low NPR results. These samples were located at Station 64+400 and Station 95+200. However, samples between these stations had acceptable NPR results, indicating that a continuous area of low NPR likely does not exist between Station 64+400 and Station 95+200. This area should be investigated further;
- The sandstone and intrusive granite rocks are more homogeneous and may require less
 characterization prior to detailed development, but the less homogeneous gneissic rocks
 should be characterized in more detail, especially around Cockburn Lake, to ensure that the
 rock does not have potential for ML/ARD;
- ML/ARD conditions may be caused by low sulphide content in the rock, and that sulphide
 contents should be identified in future sampling; and
- The regional geological information should be better characterized to identify potential ML/ARD areas.

3.5 Draft Environmental Impact Statement Report

Table A1 of Appendix 10D-6 in the DEIS provides volumes for most of the quarries. The DEIS adds Q40+600 and provides volumes for QS2 to the list given by KP in the "Quarry Sites' Screening" report [Ref 3], but still does not include QS1, QS3A or QS3. The volumes are unchanged from the KP report. The DEIS also does not provide volumes of material for material which could potentially be obtained from construction of the tunnels or the ore loading dock.

Appendix 3D of the DEIS also contains drawings of possible access roads to the quarry sites prepared by Dillon Consulting.

4. 2011 Investigation Program

4.1 Overview

The DEIS identifies 69 potential quarry locations, outlined in Table 1 below. It was not possible to drill at each of the 69 quarry locations due to time limitations. It should be noted that some of the potential quarry sites were located in areas where water sources for drilling were not







available nearby. Where water sources for drilling were not available nearby, helicopters were used to transport and supply drilling water, affecting the utilization of the helicopter time for the other drilling programs, and hence jeopardizing the completion of the remaining 2011 drilling investigations. In the interests of completing as many boreholes as possible, many of the potential quarry areas without nearby water sources were not drilled. Visual observation of these sites indicated that there are abundant sources of rock materials.

During the 2011 investigation program, boreholes were drilled at 35 quarry locations which had not previously been exploited or tested, at four additional locations along the proposed tunnels and at five locations at the ore loading dock at Steensby Inlet. Drilling was carried out under field supervision from Thurber. As drilling had never occurred at most of the sites, the purpose of the 2011 drilling program at the quarry sites was to confirm the availability of bedrock at the site, to confirm the rock depth and collect samples for physical and ARD tests. At Mary River and Steensby Inlet, samples were also collected for alkali-aggregate reactivity (AAR) tests to assess the material's potential for use as concrete aggregates.

Quarry QS3 is not discussed in the DEIS, but was mentioned in a 2008 KP investigation report [Ref 8]. This site is located on a bedrock knob adjacent to QS3A and it could be developed for sources of rock material at Steensby Inlet. It has been included in Table 1 for completeness.

Rock excavated during the construction of two tunnels in the southern portion of the rail alignment and at the ore loading dock at Steensby Inlet has also been identified as a potential source of rockfill materials. The four boreholes drilled along the tunnel locations and the five boreholes at the ore loading dock are included in Tables 1 and 2.

Table 1 also includes the approximate stations and coordinates of the potential quarry and borrow areas, the volumes of material anticipated to be sourced from the quarry and borrow areas, and whether a borehole was drilled at the quarry or borrow area in 2011. Table 2 summarizes the boreholes drilled in 2011, along with the quarry and borrow samples sent for lab testing. Borehole logs from the 2011 drilling program at the potential quarry and borrow sites are found in Appendix B [Ref 9].

Concrete will be required for construction of the Mary River and Steensby Inlet infrastructure. Material from potential quarries at the Mary River and Steensby Inlet sites will be tested to assess their suitability for concrete coarse aggregate in addition to their suitability as ballast and rockfill material. Additional samples were collected from Borrow Area #3 and from a potential borrow area in the vicinity of Station 128 + 000 for testing to meet suitability requirements for concrete fine aggregates.

4.2 Rock Samples

In general, the 16 quarry boreholes that were selected for sampling were chosen based on the distance from rail line and depth to bedrock. Boreholes closer to the railway and with bedrock at shallower depth were preferred over boreholes farther from the railway and with greater amounts of overburden.







The depth of samples for physical characteristic testing from the 16 boreholes was selected randomly. A section of core was selected that was representative of the average bedrock conditions.

The depth of samples for ARD testing was based on rock mineralogy. Sections of rock were selected that appeared to contain sulfide minerals such as pyrite. Where no evidence of sulfide minerals was found, the sample depth was selected randomly.

4.3 Bedrock Depth and Type

Table 2 and Figure 3 show the depth to bedrock in each borehole.

Bedrock was encountered in 42 of the 44 boreholes. At boreholes Q28+400 and Q31+500, bedrock was not encountered at end of drilling depths of 24.2 m and 13.2 m, respectively.

Sandstone bedrock was found at boreholes Q4+100, Q7+500 and Q18+100, and granitic gneiss bedrock was encountered at the remaining 39 boreholes. This confirms the geologic characterization of the railway line found in AMEC's "Interim ML/ARD Assessment of Railway Quarry Rock Samples" Report [Ref 4], as discussed in Section 3.4 of this report.

The depth to bedrock encountered in the boreholes varied along the rail alignment. Thirty-one boreholes had depths to bedrock of 5 m or less, six boreholes had depths to bedrock between 5 m and 10 m, and seven boreholes had depths to bedrock greater than 10 m. The maximum depth to bedrock recorded was 35 m. The boreholes with a depth to bedrock greater than 10 m are all found in the northernmost 40 km along the rail alignment. South of this point, the average depth is much lower at 2.5 m, indicating that the area has more prominent bedrock outcrops along the railway line.

4.4 ROD

The bedrock may be used for rail embankment material or ballast material if it has the required physical characteristics and does not show potential for ML/ARD. For ballast material, it is important that the rock be of good quality.

The Rock Quality Designation (RQD) gives an indication of rock soundness and quality. Rock with RQD values between 75% and 100% is classified as good to excellent, while rock with RQD values between 0% to 75% is classified as very poor, poor and fair. Table 2 summarizes the total thickness and percent in each borehole of very poor to fair rock. There is no discernible correlation between depth of rock and rock strength. Figure 3 summarizes the % of very poor to fair rock in each borehole.

Of the potential ballast sites which were previously investigated, only site BAL-1 (Q133 + 500) was not investigated in 2011. The borehole advanced in the vicinity of BAL-2 (Q138 + 100) consisted of 41% poor to fair rock, with RQD values ranging from 47% to 73%. The borehole advanced in the vicinity of BAL-3 (Q139 + 600) and BAL-4 (Q139 + 600), had no very poor to fair rock, confirming that it could be a very suitable source for ballast material.







4.5 Point Load Testing

Point load tests were conducted on the rock, with results provided in Appendix C. In general, the most weak rock is found between Q7+500 and Q22+500, with a few weak areas between Q42+000 and Q53+700, and at Q88+800, QTR-12 (Station 101+100) and NTUN-DH03 (Station 102+930). Between these weaker areas, and from Station 114+600 to the end of the rail alignment, the rock is almost exclusively very strong to extremely strong (100 MPa to 330 MPa).

5. Laboratory Testing

Laboratory testing programs have been previously carried out by AMEC and SGS Group (SGS) using samples collected by KP. It was determined that testing of the 2011 investigation material should be carried out by AMEC and SGS to provide continuity with previous programs. The samples that were collected are summarized in Table 2. Sand samples were also collected from Borrow Area #3 and from a potential borrow area in the vicinity of Station 128+000 for testing to meet suitability requirements for concrete fine aggregates.

The tests to be conducted will be the same as those done in previous programs [Ref 2 and Ref 4], as the 2011 investigation program for potential rock quarry sites was intended to provide additional information on the previously identified potential quarries. Physical and geochemical testing results are not available at this time and will be reported separately by AMEC.

6. Preliminary Recommendations

The 2011 drilling program has increased the knowledge about the potential quarry and borrow areas by better characterizing the subsurface conditions at the potential sites and by taking samples for testing.

As the next step after the 2011 drilling program and prior to the final design, the following activities are recommended. It should be noted that these recommendations are only based on limited field test results from drilling; laboratory test results are not yet available and may change the recommendations indicated below:

- Additional investigations should be conducted to complete drilling at the potential quarries
 outlined in Table 1 which were not drilled in 2011. It is not necessary to investigate the
 quarries used exclusively for construction of the access road;
- Alternative quarry sites should be identified to replace sites where the 2011 drilling program showed deep bedrock or no bedrock. Prior to this, it should be determined whether the borehole results were anomalies, and the sites should be checked for the presence of bedrock outcrops. If so, additional drilling should be conducted at these sites;
- When physical and geochemical testing is completed and reported by AMEC, the potential
 quarries will need to be re-evaluated on the basis of the test results. The quarries should be
 revisited, alternative quarries may be added if necessary and volumes of the quarries should







be adjusted based on the information from the current investigation program. The volume of material that can be extracted from rock cut areas and tunnels will be provided by Canarail/EBA Engineering;

- Additional investigations should be conducted at a number of quarry sites to confirm the thickness of overburden, particularly for quarries which will potentially supply large volumes of materials;
- When the laboratory test results are completed and reported, potential ballast sources should be assessed at QMR2, around Station 22 + 500 and 50 + 000, and at QS1, QS2 and QS3A;
- Borrow areas containing large boulders which could be crushed into rock aggregates should be considered, particularly in the most northern 35 km portion of the railway line; and
- Additional rock samples from the 2011 investigation program may need to be tested for ARD and physical characteristics, such as samples from boreholes drilled at other potential rock cut areas which could be used as rockfill material.

7. References

- 1. Canarail Consultants Inc, "Additional Quarry Sites", TDM No. 159952-5000-121-032 Rev. C, December 5, 2008.
- 2. AMEC Americas Limited, "Summary of Aggregate Resource Evaluation Testing Program, Baffinland Iron Mine Mary River Project", File No. TC83911 Phase 2000, January 13, 2009.
- 3. Knight Piésold Consulting, "Mary River Project Quarry Sites' Screening", File No., NB102-181/25-A.01, Cont. No. NB10-00321, June 25, 2010.
- 4. AMEC Americas Limited, "Interim ML/ARD Assessment of Railway Quarry Rock Samples, Baffinland Mary River Project Issued for DEIS", File No. TC 101507, December 14, 2010.
- 5. Knight Piésold Consulting, "Mary River Project, Draft Environmental Impact Statement", December 2010.
- 6. Ontario Provincial Standard Specification, "Material Specification for Aggregates Hot Mix Asphalt", OPSS 1003, November 2006.
- 7. Ontario Provincial Standard Specification, "Material Specification for Aggregates Base, Subbase, Select Subgrade, and Backfill Material", OPSS 1010, November 2003.
- 8. Knight Piésold Consulting, "Baffinland Iron Mines Corporation, Mary River Project, Rail Alignment, Steensby Port Site Infrastructure & Borrow Sources, 2008 Site Investigations Summary Report", Ref. No. NB102-181/24-2, December 31, 2010.
- 9. Thurber Engineering Limited, "2011 Geotechnical Investigation Factual Report", under preparation.

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Tables







Table 1: Quarry Summary

0	Approximate	Northing	Easting	Volume v	vith Conting	ency (m³)²	Drilled
Quarry Name	Station ¹	Coordinates	Coordinates	Railway	Road	Total	in 2011
QMR2	Mary River	7,914,203	560,128	491,079	47,052	538,130	Yes
Q-0+500	- 0 + 500	7,911,899	563,668	826,508	196,174	1,022,683	Yes
Q4+100	4+100	7,909,418	566,698	570,968	199,833	770,801	Yes
Q7 + 500	7+500	7,907,667	569,432	619,585	174,374	793,959	Yes
Q10+250	10+250	7,905,378	572,883	1,007,536	206,620	1,214,157	Yes
Q14+500	14 + 200	7,904,382	575,868	1,232,091	240,446	1,472,537	Yes
Q18 + 100	18 + 100	7,902,853	578,804	1,463,455	263,943	1,727,398	Yes
Q22 + 500	22 + 500	7,901,663	583,415	1,484,696	230,582	1,715,278	Yes
Q25 + 500	25 + 500	7,900,221	586,954	<i>7</i> 55,019	124,801	879,820	Yes
Q28 + 400	28 + 400N	7,898,617	588,240	158,886	104,426	263,312	Yes
Q31 + 500	31 + 500N	7,897,863	590,944	53,356	128,885	182,242	Yes
Q35 + 000	35 + 000N	7,896,866	594,445	<i>77,</i> 971		77,971	
Q35 + 500	35 + 500N	7,896,244	595,477	248,555	118,172	366,726	Yes
Q38 + 700	38 + 700N	7,893,140	596,368	342,908	116,780	459,687	Yes
Q40+600	40 + 600N	7,889,375	596,009	812,884	153,489	966,373	
Q42 + 000	42 + 000N	7,890,881	598,151	305,177	96,131	401,308	Yes
Q44 + 300	44 + 300N	7,888,054	598,208	302,919	62,185	365,104	Yes
Q44 + 000	44 + 000	7,885,927	596,138	178,149	38,931	217,080	Yes
Q45 + 000	45 + 000	7,884,724	596,201	54,862	29,020	83,882	Yes
Q45 + 800	45 + 800	7,884,147	596,990	34,368	42,430	76,798	
Q48 + 000	48 + 000	7,882,597	598,495	28,241	58,397	86,637	
Q50 + 000	50 + 000	7,881,100	597,357	134,915	70,757	205,672	Yes
Q53 + 700	53 + 700	7,877,567	597,616	339,267	<i>7</i> 8,350	417,616	Yes
Q56 + 750	56 + 750	7,875,280	598,852	426,916	87,668	514,583	Yes
Q60 + 000	60 + 000	7,871,954	599,087	327,131	102,084	429,214	
Q64+400	64 + 400	7,868,565	600,221	203,898	94,957	298,854	
Q67 + 200	67 + 200	7,865,619	600,161	156,728	79,560	236,288	
Q71+000	71 + 000	7,863,169	602,398	161,614	71,915	233,530	
Q74 + 200	74 + 200	7,860,226	603,469	109,863	63,161	173,024	
Q77 + 200	77 + 200	7,857,588	604,840	86,660	65,983	152,642	
Q79 + 600	79 + 600	<i>7,</i> 855,411	605,366	145,051	77,616	222,666	
Q82 + 700	82 + 700	7,852,449	605,710	166,692	90,198	256,890	Yes
Q85 + 200	85 + 200	7,850,087	606,073	227,871	89,196	317,067	Yes
Q88+800	88 + 800	7,846,674	605,956	238,151	63,999	302,150	Yes
QTR21	90 + 400	7,845,379	605,707		51,239	51,239	
Q92+000	92+000	7,843,535	605,816	98,287		98,287	
QTR22	92+000	7,843,330	605,243		47,682	47,682	
QTR23	93 + 600	7,841,721	606,018		33,456	33,456	
Q95 + 400	95 + 150	7,840,905	607,500	16,898	56,143	73,041	
Q96 + 100	96 + 100	7,840,533	608,580	17,031	149,531	166,562	
Q96 + 700	96 + 700	7,839,908	608,976	6,493		6,493	
QTR10	97 + 300	7,839,328	611,431		203,081	203,081	
QTR11	98 + 700	7,838,013	611,995		134,433	134,433	
QTR6	98 + 900	7,836,409	611,377		101,012	101,012	
QTR13	100 + 700	7,833,967	609,448		165,509	165,509	Yes







ON	Approximate	Northing	Easting	Volume	with Conting	ency (m³)²	Drilled
Quarry Name	Station ¹	Coordinates	Coordinates	Railway	Road	Total	in 2011
QTR12	101 + 100	7,836,190	610,857		162,040	162,040	Yes
NTUN-DH01	102 + 540	7,835,656	605,976				Yes
NTUN-DH03	102+930	7,835,382	605,698				Yes
NTUN-DH05	103 + 140	7,835,245	605,535				Yes
STUN-DH03	108 + 180	7,832,812	601,490				Yes
QTR7	108 + 300	7,832,685	608,302		132,606	132,606	
QTR17	105 + 700	7,832,984	603,944		948,392	948,392	
QTR14	104+300	7,831,608	607,681		171,297	171,297	
QTR15	105 + 200	7,830,326	606,224		227,039	227,039	
QTR16	106 + 200	7,830,731	603,228		905,620	905,620	
Q110+200	110 + 200	7,831,193	600,359	253,809		253,809	
QTR8	112+000	7,830,182	602,012		603,136	603,136	
Q114+600	114+600	7,827,828	597,850	382,501		382,501	Yes
QTR9	116 + 500	7,826,260	600,261		361,991	361,991	Yes
Q116+800	116+800	7,826,194	597,422	764,455		764,455	Yes
QTR18	120+600	7,822,808	599,870		536,571	536,571	
QTR4A	123+000	7,820,410	598,555	958,066	636,598	1,594,664	Yes
QTR19	126+900	7,816,806	597,863		451,609	451,609	
Q127+800	127+800	7,815,755	598,770	545,218		545,218	
Q128+000	128+000	7,813,922	598,828		222,278	222,278	
Q131+100	131 + 100	7,813,509	600,177	112,666	191,240	303,906	Yes
Q133+500	133 + 500	7,811,052	601,482				
QTR20	134+100	7,810,467	598,087		169,565	169,565	
Q138+100	138 + 100	7,807,612	598,865		104,996	104,996	Yes
Q139+600	139+600	7,806,105	598,727		119,999	119,999	Yes
QS3A	Steensby	7,800,000	595,698				Yes
QS3	Steensby	7,799,349	597,500				
QS2	Steensby	7,801,066	595,200		300,000	300,000	Yes
QS1	Steensby	7,803,054	593,500				Yes
SI-OLD-004	Steensby	7,798,314	592,879				Yes
SI-OLD-005	Steensby	7,798,331	592,860				Yes
SI-OLD-006	Steensby	7,798,409	592,876				Yes
SI-OLD-007	Steensby	7,798,424	592,840				Yes
SI-OLD-008	Steensby	7,798,489	592,891				Yes

Notes:



¹ Two sets of stationing are used along the rail alignment. Following the Ravn River realignment, which extends from approximately station 26+100 to station 46+582.93, the stationing resets to 43+830 to be consistent with the stationing used prior to the Ravn River realignment. To avoid confusion, stationing along the Ravn River realignment has an "N" suffix.

² Volumes obtained from the DEIS [Ref 5].





Table 2: Borehole Statistics

Borehole Name	Date Started	Date Completed	Borehole Depth (m)	Bedrock Depth (m)	Very Poor to Fair Rock Thickness (m)	% Very Poor to Fair Rock	Rock Type	Physical Testing	Depth of Physical Sample (m)	Depth of ARD Sample (m)
QMR2	7-Aug-11	7-Aug-11	26.0	0.90	1.1	4%	Granitic Gneiss	yes	2.0 to 7.0	11.25 to 11.35
Q0 + 500	30-Jul-11	31-Jul-11	30.0	16.15	13.85	100%	Granitic Gneiss			26.7 to 26.8
Q4+100	29-Jul-11	30-Jul-11	62.0	35.00	27	100%	Sandstone			53.43 to 53.5
Q7+500	28-Jul-11	29-Jul-11	50.0	21.80	19.2	68%	Sandstone			40.9 to 41
Q10+250	25-Jul-11	26-Jul-11	41.0	8.00	33	100%	Granitic Gneiss			22.9 to 23
Q14+500	24-Jul-11	24-Jul-11	47.2	11.20	33	92%	Granitic Gneiss			25.1 to 25.2
Q18 + 100	23-Jul-11	23-Jul-11	38.0	5.00	No data	No data	Sandstone			17.6 to 17.7
Q22 + 500	22-Jul-11	22-Jul-11	62.0	2.00	3	5%	Granitic Gneiss			20.4 to 20.5
Q25 + 500	22-Jul-11	22-Jul-11	32.3	5.34	2.9	11%	Granitic Gneiss	yes	8.34 to 13.3	6.7 to 6.8
Q28 + 400	18-Jul-11	18-Jul-11	24.2	> 24.2	-	-	No bedrock found			
Q31 + 500	19-Jul-11	19-Jul-11	13.2	> 13.2	-	-	No bedrock found			
Q35 + 500	1 <i>7-</i> Jul-11	1 <i>7</i> -Jul-11	26.2	2.45	11.75	49%	Granitic Gneiss			19.53 to 19.65
Q38 + 700	16-Jul-11	16-Jul-11	50.4	31.20	7.2	38%	Granitic Gneiss			38.15 to 38.24
Q42+000	16-Jul-11	16-Jul-11	23.4	5.67	8.73	49%	Granitic Gneiss	yes	12.75 to 18.0	21.57 to 21.67
Q44+300	15-Jul-11	15-Jul-11	14.4	1.90	-	0%	Granitic Gneiss			5.24 to 5.33
Q44+000	15-Jul-11	15-Jul-11	23.0	5.00	18	100%	Granitic Gneiss	yes	8.0 to 12.9	18.8 to 18.9
Q45+000	14-Jul-11	14-Jul-11	14.3	2.20	-	0%	Granitic Gneiss			7.45 to 7.56
Q50+000	14-Jul-11	14-Jul-11	16.9	0.44	-	0%	Granitic Gneiss	yes	7.79 to 13.1	14.8 to 14.9
Q53 + 700	13-Jul-11	13-Jul-11	29.2	7.70	-	0%	Granitic Gneiss	yes	14.2 to 19.4	23.2 to 23.3
Q56+750	11-Jul-11	11-Jul-11	11.2	4.41	-	0%	Granitic Gneiss	yes	4.7 to 9.7	10.8 to 10.9
Q82 + 700	22-Jul-11	22-Jul-11	16.0	1.65	9.35	65%	Granitic Gneiss	yes	4.55 to 9.5	4.2 to 4.3
Q85 + 200	20-Jul-11	21-Jul-11	25.9	2.58	8.52	37%	Granitic Gneiss			
Q88+800	1 <i>7-</i> Jul-11	18-Jul-11	15.0	0.10	4.4	30%	Granitic Gneiss			7.89 to 7.98







Borehole Name	Date Started	Date Completed	Borehole Depth (m)	Bedrock Depth (m)	Very Poor to Fair Rock Thickness (m)	% Very Poor to Fair Rock	Rock Type	Physical Testing	Depth of Physical Sample (m)	Depth of ARD Sample (m)
QTR13	14-Jul-11	14-Jul-11	15.1	5.00	3.1	31%	Granitic Gneiss	yes	5.2 to 10.2	11.3 to 11.45
QTR12	15-Jul-11	15-Jul-11	20.5	2.85	11.65	66%	Granitic Gneiss			8.8 to 8.92
NTUN-DH01	3-Aug-11	3-Aug-11	34.8	6.45	1.35	5%	Granitic Gneiss			13.0 to 13.4
NTUN-DH03	1-Aug-11	13-Aug-11	121.6	4.50	0.00	0%	Granitic Gneiss			109.2 to 109.6
NTUN-DH05	30-Jul-11	30-Jul-11	82.3	2.99	3.00	4%	Granitic Gneiss			
STUN-DH03	29-Jul-11	31-Jul-11	87.45	3.30	0.00	0%	Granitic Gneiss			63.0 to 63.4
Q114+600	25-Jul-11	25-Jul-11	33.6	2.30	-	0%	Granitic Gneiss	yes	9.4 to 14.52	16.95 to 17.05
QTR9	25-Jul-11	26-Jul-11	32.4	0.30	2.1	7%	Granitic Gneiss			29.75 to 29.86
Q116+800	26-Jul-11	26-Jul-11	32.4	1.93	-	0%	Granitic Gneiss	yes	12.75 to 17.39	9.1 to 9.2
QTR4A	4-Aug-11	4-Aug-11	32.45	0.51	14	44%	Granitic Gneiss	yes	19.9 to 24.9	15.5 to 15.6
Q131 + 100	5-Aug-11	5-Aug-11	20.48	8.35	3.15	26%	Granitic Gneiss	yes	11.48 to 16.1	17.6 to 17.7
Q138 + 100	16-Jul-11	1 <i>7</i> -Jul-11	30.93	0.00	12.7	41%	Granitic Gneiss	yes	17.29 to 22.18	6.1 to 6.2
Q139+600	19-Jul-11	19-Jul-11	13.9	0.00	-	0%	Granitic Gneiss			
QS1	6-Aug-11	6-Aug-11	17.52	0.00	6.02	34%	Granitic Gneiss	yes	9.6 to 14.52	15.6 to 15.75
QS2	24-Jul-11	25-Jul-11	30.0	0.00	3.2	11%	Granitic Gneiss			5.9 to 6.04
QS3A	23-Jul-11	23-Jul-11	15.1	0.00	11.8	78%	Granitic Gneiss	yes	4.97 to 10.0	15.6 to 15.75
SI-OLD-004	8-Aug-11	8-Aug-11	32.23	0.00	3	9%	Granitic Gneiss			
SI-OLD-005	9-Aug-11	10-Aug-11	31.96	0.00	5	16%	Granitic Gneiss			7.5 to 7.9
SI-OLD-006	10-Aug-11	11-Aug-11	38.38	0.00	6	16%	Granitic Gneiss			
SI-OLD-007	11-Aug-11	11-Aug-11	32.4	0.00	11.4	35%	Granitic Gneiss			8.1 to 8.5
SI-OLD-008	12-Aug-11	12-Aug-11	35.61	0.00	13.4	38%	Granitic Gneiss			

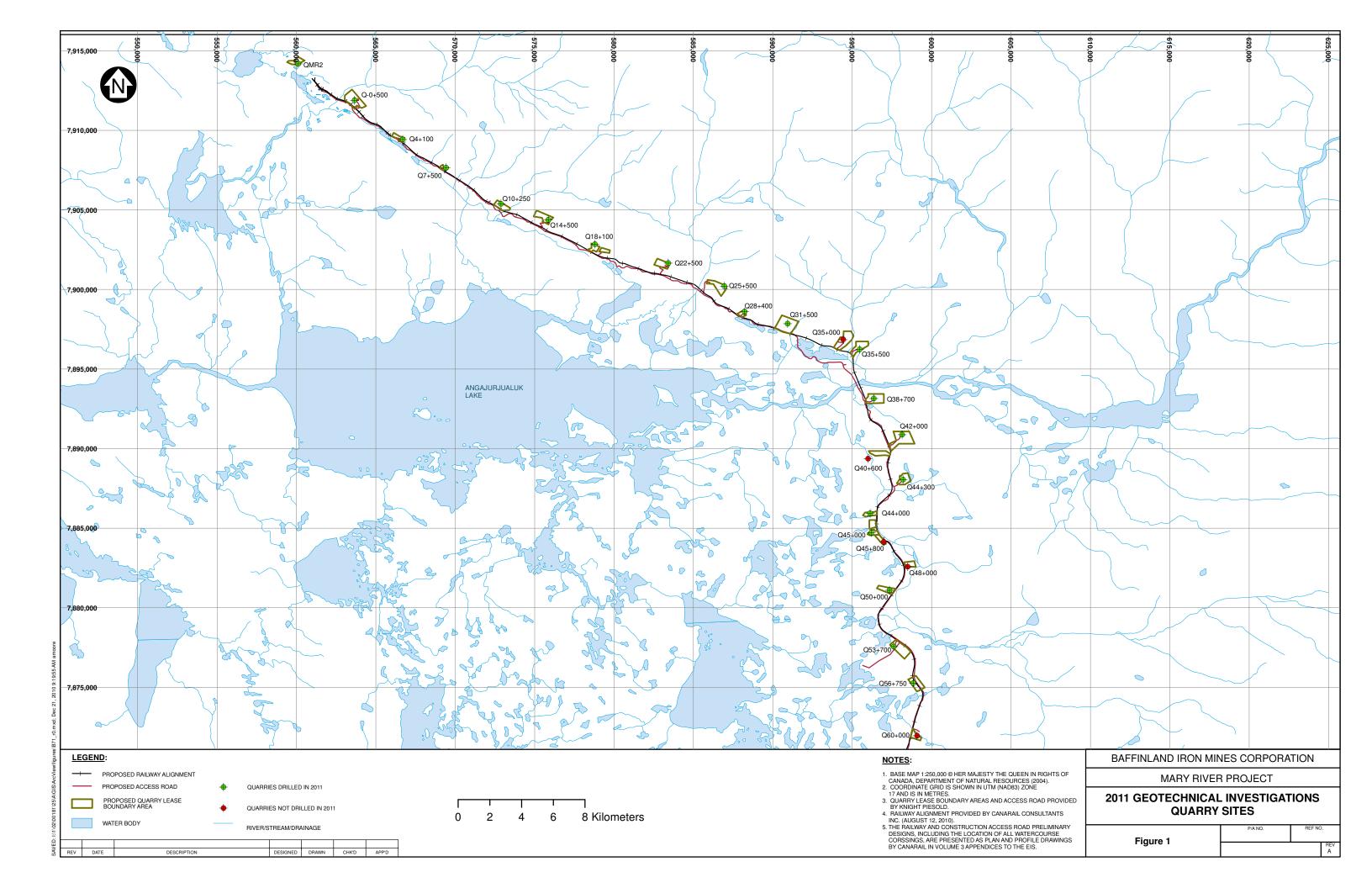


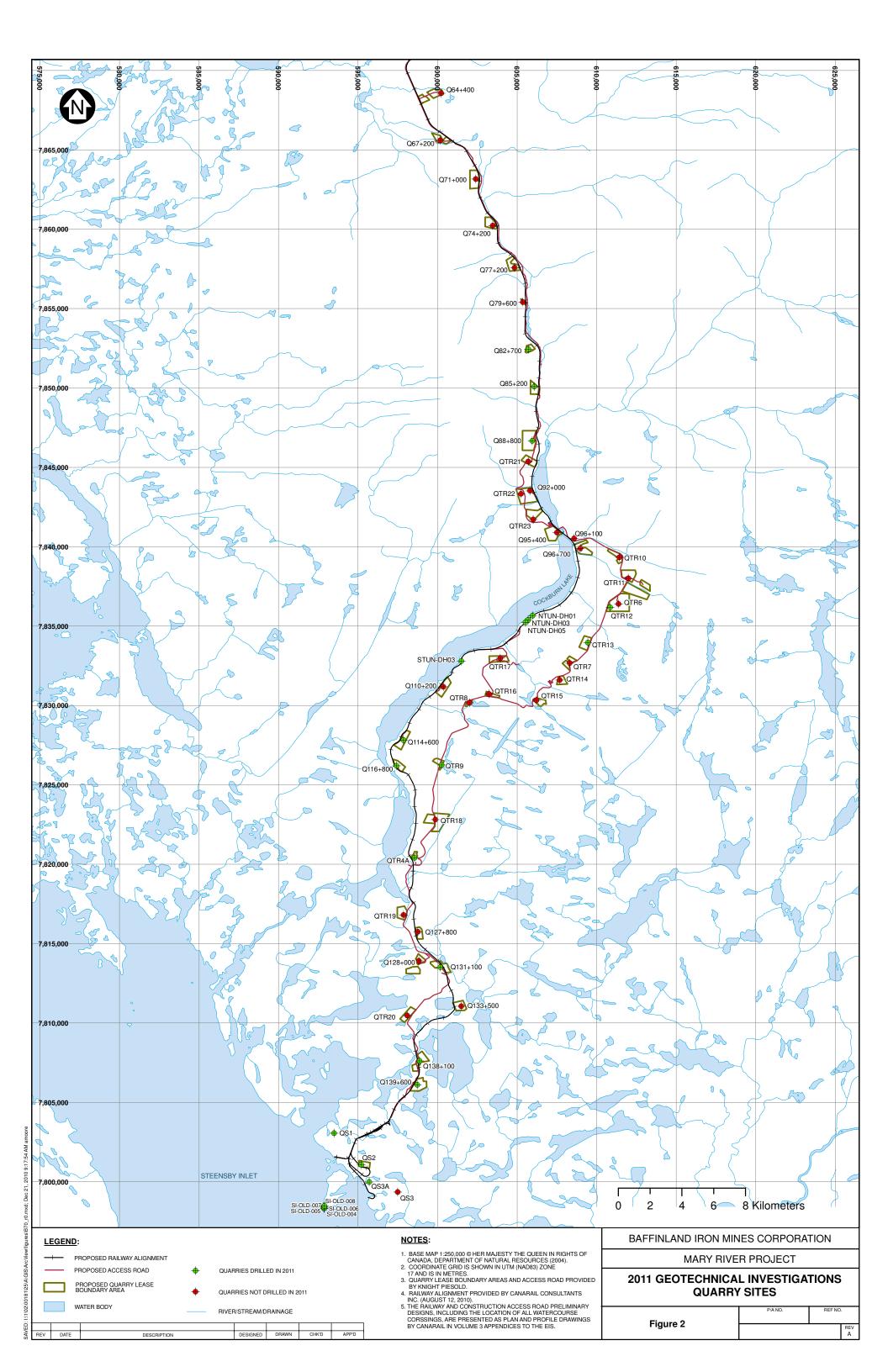


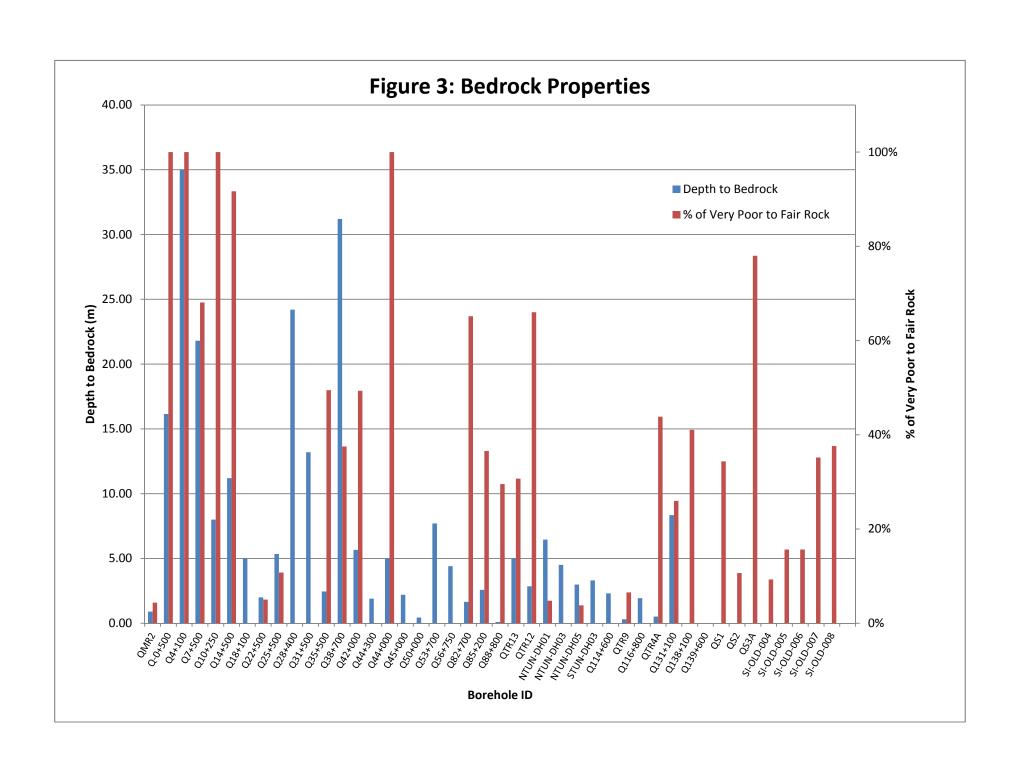


Figures







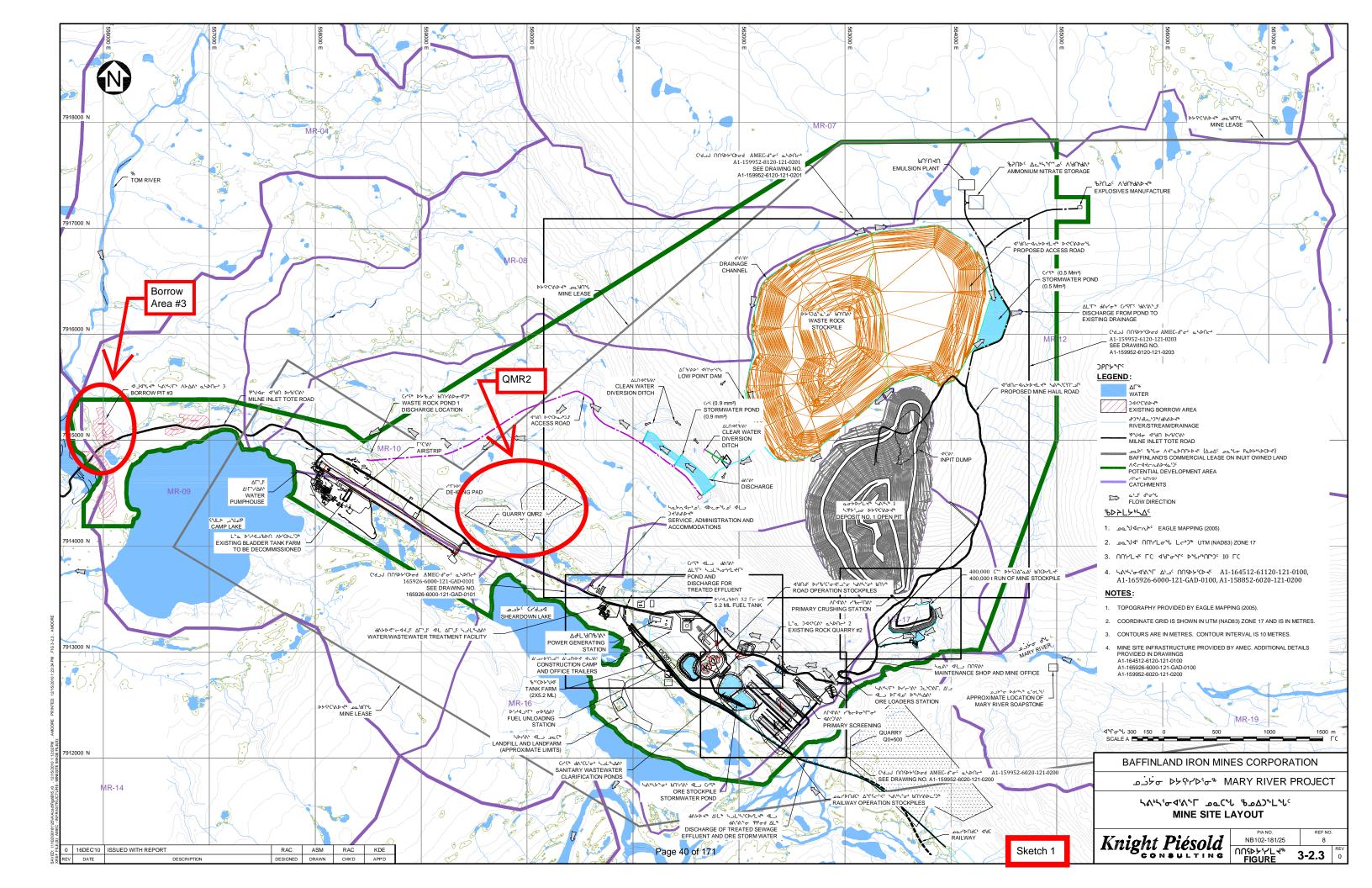






Appendix A: Sketches









Appendix B: Borehole Logs



RECORD OF BOREHOLE QMR-2

Mary River Project **PROJECT**

Mary River - Quarry

Project No. 19-1605-126

LOCATION STARTED COMPLETED :

August 7, 2011

August 7, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 914 203 E 560 128

SHEET 1 OF 2 DATUM: CGVD28

		ETED : August 7, 2011			Τ.	CAA4			14 203 E 560 128	EXCES	SICE	CONTE	NT, PE		Г	GVD28 THERMIST
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE	 -		H	SAM T		_				oice	е		NG F	THERMISTI GROUND C
L SC,	M		STRATA PLOT	(m)	띪	וט	BLOWS/0.3m	RECOVERY %	COMMENTS	10 	2 			40 	ADDITIONAL LAB. TESTING	FROZEN
me l	ING	DESCRIPTION	\TA	ELEV. (m)	NUMBER	TYPE	WS/(OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		ER CC	NTEN	T, PERC		B. Ti	UNFROZEN
4	BOR		STR/	Ē	z		BLO	3EC(50 100 150 200 250	wp 10	2	0 W	30	wl 40	₹≤	UNCERTAI
\dashv	\top	GROUND SURFACE	П	0.00	\vdash			_	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
1		COBBLES (< 100mm) granitic fines	00	5.50												
		washed out	54	0.90											FI	0.9
1		GRANITIC GNEISS, slightly weathered to fresh, very strong, quartz-rich, grey	Ĭ	0.00	1	RUN	ı		TCR=70% SCR=70% RQD=70%						1 1	0.5
		rresh, very strong, quartz-rich, grey	\gg												1	
2			X												1	
3			W												1	
۱ '															١.	
			\gg		2	RUN	1		TCR=100% SCR=100% RQD=95%						1 1	
1			\mathbb{K}												1	
			\gg												1 1	
5			X												1	
3			W												1	
´			\mathbb{K}/\mathbb{A}		_	L			TOD-1000/ COD-1000/ COD 1000/							
			S		3	RUN			TCR=100% SCR=100% RQD=100%						1	
7																
			\gg													
3			W		-										2	
			$\langle \rangle \rangle$												3 1	
,			W												1	
	≣				,	RUN			TCR=100% SCR=100% RQD=90%							
,	puo		\gg			IXOIX			10K-100% 3CK-100% KQD-30%						1	
10	Diamond		\mathbb{K}												1	
	g		\gg													
11			W												1	
															'	
12			W													
					5	RUN	ı		TCR=100% SCR=100% RQD=99%							
13			\gg												١.	
'															1 1	
			$ \rangle\rangle$													
14		some quartz veins (100mm)	M		T										1	
															1	
15			M												1	
			\mathbb{K}		6	RUN			TCR=100% SCR=100% RQD=94%						<u> </u>	
16																
Ĭ			\mathbb{M}												2	
, ,															2	
17		large plagioclase crystal at 17.0m to 17.69m	M												_	
															2	
18			M												2	
					7	RUN			TCR=97% SCR=97% RQD=93%						2	
19			W													
-																
			$ \rangle\rangle$													
		GROUNDWATER ELEV	۷Á٦	TIONS	3									•	•	
		$\overline{egin{array}{c} egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} arra$				_	<u> </u>)FE	P/DUAL INSTALLATION				D	-(011		
		WATER LEVEL (date)	LLM	TION					LEVEL (date)		GGED		Bouche	r/Clarke		
		million (date)					/ \ \		(Gato)	CF	HECKE	: ט	KS			THU



RECORD OF BOREHOLE QMR-2

Mary River Project **PROJECT**

> Mary River - Quarry DRILLER: BOART LONGYEAR, LM-55

Project No. 19-1605-126

August 7, 2011 STARTED August 7, 2011 COMPLETED :

LOCATION

N 7 914 203 E 560 128

SHEET 2 OF 2 DATUM: CGVD28

		ETED : August 7, 2011			_				14 203 E 560 128	EVE	-00 105	CONTE	NT DEC		IVI: C	GVD28
H LE	BORING METHOD	SOIL PROFILE	1,		'	SAM	_			EXC	ESS ICE	ice		CENI	NG A	THERMISTER/ GROUND COND
DEPTH SCALE (metres)	MET		STRATA PLOT	(m)	띪	ш	BLOWS/0.3m	RECOVERY %	COMMENTS					10 	ADDITIONAL LAB. TESTING	FROZEN
EPTF (me	RING	DESCRIPTION	RATA	ELEV. (m)	NUMBER	TYPE	/SMC	SOVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	1	ATER Co rp ├──	ONTENT	, PERCE		ADDI AB. T	UNFROZEN
	8		STF	Ш	_		B	REC	50 100 150 200 250					10	۲,	UNCERTAIN
_																
- 21																
					8	RUN	1		TCR=100% SCR=100% RQD=100%							
-22	_															
	nd Drill														1	
23	NQ Diamond															
	Š														6	
-24																
					9	RUN	1		TCR=100% SCR=100% RQD=94%							
25																
-26				26.00												
-26		END OF BOREHOLE AT 26.00m.														·
- 27																
-28																
- 29																
-30																
- 31																
-32																
- 33																
0.4																
-34																
- 35																
55																
-36																
- •																
- 37																
-38																
- 39																
		I GROUNDWATER ELE	LLI VA7	L	<u></u>				<u> </u>	<u> </u>						
		∇ SHALLOW/SINGLE INSTA			-	_	<u>_</u> _)FF	P/DUAL INSTALLATION		0005		Double -	/Clark-		
		WATER LEVEL (date)	,/\	. IOIN					LEVEL (date)		LOGGEI CHECKE		Boucher KS	<i>г</i> ыагке		THURBER
																IHUKBEI



PROJECT Mary River Project

Project No. 19-1605-126

LOCATION

STARTED

-0+500 - Quarry July 30, 2011

DRILLER: BOART LONGYEAR N 7 911 899 F 563 668

SHEET 1 OF 2

<u> </u>	HOD	SOIL PROFILE	1. 1		Ľ	SAMI				oic	ENT, PERCENT e	무일	THERMIST GROUND C
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 WATER CONTEN wp	30 40 I I T, PERCENT WI 30 40	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAI
		GROUND SURFACE	П	0.00									
1		no recovery			1	RUN		0					
3		GRAVEL, granitic, fines washed out		2.15									
1					2	RUN		13					
5		SAND and GRAVEL, trace to some silt, grey to brown		5.15									
7		layer of grey sand (120mm) ICE and SAND inclusions (Vs) at 6.50m to 7.00m			3	RUN		70			800		6.10
3		some zones of frozen soil (Nbn) at 7.20m to 8.15m (Vr)								•			8.1
	nd Drill				4	RUN		90		0			
10	NQ Diamond	some cobbles											
12					_	Diski		E7					
13				44		RUN		57	Grain Size Analysis: Gr 43%/ Sa 42%/ Si & Cl 15%	0			
14		GRAVEL, sandy, trace to some silt and clay, some fractures with clay infilling, with completely weathered shale fragments, brown to red	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	14.15		RUN		80					
16		GRANITIC GNEISS, moderately weathered, some fibrous minerals, some clay gouges, red, grey		16.15		RUN			TCR=92% SCR=75% RQD=13%				16.19
17 18		clay gouges, red, grey clay at 17.12m (30mm) highly weathered, massive, highly broken, medium strong, reddish brown											
19					7	RUN			TCR=53% SCR=15% RQD=7%				
		GROUNDWATER ELE $\overline{\lor}$ SHALLOW/SINGLE INSTA			<u></u>				P/DUAL INSTALLATION				_

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

-0+500 - Quarry

DRILLER: BOART LONGYEAR

SHEET 2 OF 2

July 30, 2011 STARTED COMPLETED :

July 31, 2011

N 7 911 899 E 563 668

DATUM: CGVD28

П		SOIL PROFILE				SAM	PLE	S		EXCESS ICE CONTENT, PERCENT	THERMISTER/ GROUND CON
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10	FROZEN UNFROZEN UNCERTAIN
21		residual to completely weathered, extremely to very weak, very dark reddish brown			8	RUN	l		TCR=50% SCR=10% RQD=0%		
23		silty sand, trace clay (300mm) residual to highly weathered, very weak to weak									
24 25	NQ Diamond Drill				9	RUN	l		TCR=50% SCR=12% RQD=0%		
26 27	_									FI 2 2 2 2 2 2 2	
28		becoming slightly weathered, massive, medium strong, pinkish grey			10	RUN	l		TCR=67% SCR=29% RQD=22%	5 5 2 5 6	
29 30		END OF BOREHOLE AT 30.00m.		30.00	ı	RUN			TCR=100% SCR=29%	4 6	
31 32											
33											
34 35											
36 37											
38											
39											
		GROUNDWATER ELE			8				P/DUAL INSTALLATION LEVEL (date)	LOGGED : Clarke/Ametrano CHECKED : KS	THURB



PROJECT: Mary River Project

Project No. 19-1605-126

LOCATION

STARTED

COMPLETED

4+100 - Quarry July 29, 2011

July 30, 2011

DRILLER: BOART LONGYEAR N 7 909 418 E 566 698 SHEET 1 OF 4 DATUM: CGVD28

EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SOIL PROFILE SAMPLES ADDITIONAL LAB. TESTING oice DEPTH SCAL 20 STRATA PLOT BLOWS/0.3m FROZEN ELEV. (m) NUMBER RECOVERY **COMMENTS** TYPE BORING WATER CONTENT, PERCENT DYNAMIC CONE PENETRATION RESISTANCE PLOT UNFROZEN DESCRIPTION -0^{W} UNCERTAIN 30 100 150 200 250 10 20 40 GROUND SURFACE **GRAVEL** and **COBBLES** (<160mm), granitic, angular to subrounded, fines washed out 25 RUN no recovery fines washed away 3 0 5 5.11 **SAND**, medium to coarse grained, some gravel (< 45mm), pink to grey Grain Size Analysis: RUN 32 Gr 16%/Sa 84%/ Si & Cl 0% -8 gravelly 29 9.00 9.23 RUN 9 90 ICE with soil inclusions at 9.00m to 9.23m 9.61 **GRAVEL**, with some zones of silty fine sand, some cobbles (180mm), some fines washed out RUN 100 6 RUN boulders (270mm to 300mm) with some cobbles, medium to coarse sand cobbles (<170mm) RUN 63 14.00 SAND and GRAVEL (<40mm), grey, some 15 RUN 33 17.00 GRAVEL and COBBLES, granitic, grey, 18 25 19

GROUNDWATER ELEVATIONS

11/9/1

5126.GPJ

SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Clarke/Ametrano
CHECKED : KS

THURBER

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

4+100 - Quarry July 29, 2011

DRILLER: BOART LONGYEAR

SHEET 2 OF 4

STARTED COMPLETED

July 30, 2011 N 7 909 418 E 566 698 DATUM: CGVD28

ц	dob	SOIL PROFILE			,	SAM	PLE	S		EXC	SS ICE	CONTE	NT, PERCENT	٥٦	THERMISTER GROUND COI
DEP IN SCALE (metres)	BORING METHOD		LOT	(E	E.		.3m	۶۲ %	COMMENTS	1	0 2 I		30 40	ADDITIONAL LAB. TESTING	FROZEN
met T	ING.	DESCRIPTION	TAF	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	OVEF	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTENT	, PERCENT	コピュー 100円 110円 110円 110円 110円 110円 110円 110円	UNFROZEN
5	BOR		STRATA PLOT		≥	-	BLO	RECOVERY %	50 100 150 200 250	1 1	p	0 3		¥ 5	UNCERTAIN
		no recovery		20.20.	l										
21															
۱ ۲					10	RUN		0							
22					10	KUN		0							
22															
23															
23															
_															
24					l	L									
					11	RUN		0							
25															
26															
_															
27					40	DUA		_							
_					12	RUN		0							
28															
_															
29	≣														
_	NQ Diamond Drill														
30	Diam							40							
	g	SILT, clayey, trace gravel, wet, brown	Ш	30.80	13	RUN		43							
31		GLT, Sidyoy, Rudo gravos, Wot, Stown	ľИ												
32				32.00								0			
32		SAND and GRAVEL, occasional boulders (< 300mm), with silty clay interbeds	* * * * * * * * * * * * * * * * * * * *												
33															
33					14	RUN		67							
34					'*	INOIN	!	01							
34															
35			***	35.00											35.00
33		SANDSTONE, residual to completely weathered, extremely to very weak, brown													
36														FI 8	
50		completely to moderately weathered, massive, medium strong, light greyish			15	RUN			TCR=33% SCR=33% RQD=4%					8 9	
37		brown			13	NON			1011-00/0 0011-00/0 RQD-4/0					6	
~'														>25	
38															
00															
39															
55		residual to highly weathered, medium strong			16	RUN			TCR=13% SCR=6% RQD=0%						
			\mathbb{M}												
	_	GROUNDWATER ELE			3	_									
		$\overline{igspace}$ shallow/single insta	LLA	TION					P/DUAL INSTALLATION		_OGGE[) :	Clarke/Ametrane)	
		WATER LEVEL (date)				,	WA٦	ER	LEVEL (date)		CHECKE	D :	KS		THURE

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 4+100 - Quarry

STARTED

July 29, 2011

DRILLER: BOART LONGYEAR

SHEET 3 OF 4

CC	MPLE	TED : July 30, 2011					N	7 90	09 418 E 566 698				DATUM:	
	BORING METHOD	SOIL PROFILE	L			SAMI		-		EXCESS IC	oice	e	.NI IN:	THERMIST GROUND
DEPTH SCALE (metres)	MET		STRATA PLOT	(i)	H	ļ,,	BLOWS/0.3m	RECOVERY %	COMMENTS			30 40	ADDITIONAL	FROZEN
F B	≅ING	DESCRIPTION	ATA I	ELEV. (m)	NUMBER	TYPE)/S/(OVE	DYNAMIC CONE PENETRATION	WATER (CONTEN	T, PERCEN		UNFROZE
i	BOF		STR/	ᆸ	ĭ		BLO	REC	DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	wp ⊢— 10	20		4 5	UNCERTA
			V//.											
41														
		highly broken												
·42		Ingriy broken												
					17	RUN			TCR=5% SCR=18% RQD=6%					
43														
.44		highly to moderately weethered massive			_									
		highly to moderately weathered, massive, medium strong												
45														
					18	RUN			TCR=67% SCR=44% RQD=25%					
46														
47													4	
·		mademately use the second											1 3	
48		moderately weathered											4	
					19	RUN			TCR=81% SCR=58% RQD=21%				3	
49													>25	
	≣ □												3	
-50	NQ Diamond Drill												5 20	
	Diar												20	
51	ž												3	
					20	RUN			TCR=77% SCR=43% RQD=15%				6	
-52													4	
													2	
53													6	
													5	
.54													8	
-					21	RUN			TCR=87% SCR=61% RQD=24%				7 2	
55													4	
													5 2	
56													2 10	
													4 5	
57													9	
					22	RUN			TCR=100% SCR=6% RQD=30%				>25	
58													4	
													2	
59		allahdhuusadharad allamad											3 9	
		slightly weathered, alternating brown and grey											2	
													3 >25	
		GROUNDWATER ELE			3	_	,							
		☐ SHALLOW/SINGLE INST	ALLA	TION					P/DUAL INSTALLATION	LOGGE		Clarke/Ame	etrano	
		WATER LEVEL (date)				١	WAT	ER	LEVEL (date)	CHECK	ED :	KS		THU



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION : 4+100 - Quarry

DRILLER: BOART LONGYEAR

SHEET 4 OF 4

STARTED : July 29, 2011 COMPLETED : July 30, 2011

N 7 909 418 E 566 698

DATUM: CGVD28

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ш	BORING METHOD	SOIL PROFILE			5	SAM	PLE:	S		EVC	33 ICE	ice		CEINI	. (2)	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	Ĭ		<u> </u>				_	%						10	< ∠	
SC	ME		STRATA PLOT	ELEV. (m)	兴	l	BLOWS/0.3m	RECOVERY %	COMMENTS	1	0 2 I	20 3 I	10 4	10 	Q IS	FROZEN
⊒ ∃	19	DESCRIPTION	A	~ ~	胃	띮	0/S	μ	COMINENTS	W	ATER CO	ONTENT	PERCE	NT		UNFROZEN 💹
EP.	8	DESCRIPTION	\	É	NUMBER	TYPE	8	ő	RESISTANCE PLOT —			OW W	——— v		AB AB	
□	301		1 1 1 1	Ш	z		3	<u>ы</u>	DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	1	p	20 3	0 4	10	~	UNCERTAIN
_	_		100		\vdash		_	IL.	30 100 130 230 230	<u> </u>					├──	
			\downarrow													_
!			M												3	-
1					23	RUN			TCR=75% SCR=62% RQD=14%]
F			\mathbb{K}/\mathbb{A}													-
- 61]
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ŀ			\mathbb{K}/\mathbb{A}													-
-62			\mathbb{Z}	62.00												
- 02		END OF BOREHOLE AT 62.00m.														-
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-		GROUNDWATER ELE	.VAT	IONS	j .											

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Clarke/Ametrano CHECKED : KS



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION :

STARTED

7+500 - Quarry July 28, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 3

SOIL PROFILE	
Sand Cobbles (-75mm) Sand Cobbles (-75	ER/
GROUND SURFACE	
GROUND SURFACE	
COBBLES (<100mm), grantic, fines washed out, very poor recovery 1 RUN 8 SAND, trace silt, trace gravel, trace cobbles, brown 2 RUN 33 Cobbles (-75mm) 3 RUN 50	N
1 RUN 8 SAND. trace silt, trace gravel, trace cobbles, brown 3 RUN 50 Cobbles (~75mm) 3 RUN 50	
3.00 SAND, trace silt, trace gravel, trace cobbles, brown SAND, trace silt, trace gravel, trace cobbles (-75mm) 3.00 2 RUN 33 RUN 50 7 8 9	
3.00 SAND, trace silt, trace gravel, trace cobbles, brown SAND, trace silt, trace gravel, trace cobbles (-75mm) 3.00 2 RUN 33 RUN 50 7 8 9	
3.00 SAND, trace silt, trace gravel, trace cobbles, brown 2 RUN 33 Cobbles (~75mm) 3 RUN 50	
3.00 SAND, trace silt, trace gravel, trace cobbles, brown 2 RUN 33 Cobbles (~75mm) 3 RUN 50	-
SAND, trace silt, trace gravel, trace cobbles, brown 2 RUN 33 7 Cobbles (~75mm) 3 RUN 50	
-4 cobbles, brown 2 Run 33 -6 cobbles (~75mm) 3 Run 50 -7 -8 9	
- 5 cobbles (~75mm) 3 RUN 50 - 7 - 8 - 9	
-6 cobbles (~75mm) 3 RUN 50 -7 -8 -9 -9 -7 -7 -7 -7 -7 -7	-
-6 cobbles (~75mm) 3 RUN 50 -7 -8 -9 -9 -7 -7 -7 -7 -7 -7	
- 7	
- 7	
-7 -8 -9	-
	-
To purple the composition of the	
	-
	.
F-12	-
5 RUN 50 cobbles (<140mm)	
[13 Source (***********************************	-
	-
<u> 15 </u>	-
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[-16	-
16.90	
17 BOULDER, sandstone, completely	-
	-
[
20.00	

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Ametrano CHECKED : KS

THURBER

PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : 7+500 - Quarry

 STARTED
 :
 July 28, 2011
 DRILLER:
 BOART LONGYEAR, LM-55
 SHEET 2 OF 3

 COMPLETED
 :
 July 29, 2011
 N 7 907 667 E 569 432
 DATUM: CGVD28

ш	8	SOIL PROFILE			S	AMI	PLES	S		EXC	ESS IC	E CONTE		RCENT	. (2)	THERMISTER/ GROUND COND.
CAL (S)	ᇤ		ТО	_			E	%			10		30	40	ADDITIONAL LAB. TESTING	FROZEN
DEPTH SCALE (metres) BORING METHOD] J	ELEV. (m)	NUMBER	щ	BLOWS/0.3m	RECOVERY %	COMMENTS	10 20 30 40 						
EPT (m	Į ž	DESCRIPTION	AT	EV.	UME	TYPE	SMC	8	DYNAMIC CONE PENETRATION RESISTANCE PLOT		vp —	ONTEN	I, PERC	l wl		UNFROZEN 💹
	BO		STRATA PLOT	ӹ	z		BLC	REC	50 100 150 200 250		10	20	30	40	^ _	UNCERTAIN
			+"+					_		1					 	
-		SILT, clayey, trace sand, firm, grey, moist	TMT													-
•																:
- 21																
ļ - ·						D		400			"					:
<u> </u>			ĽЩ	21.80	8	RUN		100								21.80
-22		SANDSTONE, moderately to faintly weathered, medium strong to strong, light greyish brown														-
ŀ		greyish brown]
- - 23			\mathbb{N}												3	<u> </u>
23															3	-
ŀ															2	-
-24															1	-
F					9	RUN			TCR=100% SCR=95% RQD=57%						2 2]
f		faintly weathered, strong													2]
- 25															0]
ļ															>25 3]
-26															2	
•															4]
ļ.															2]
27		vertical joints from 27.7m to 27.9m													4	-
ļ.					10	RUN			TCR=100% SCR=93% RQD=81%						1] :
-28															5	
1 20															3]
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- 29	_														1	-
·	۵														6 7	-
-30	puo	vertical joints from 29.7m to 30.0m, 31.4m													3	
F	NQ Diamond	to 31.6m													5	7
F	ğ				11	RUN			TCR=100% SCR=65% RQD=57%						2]
- 31	-														1 3	-
-															5]
ļ															1]
-32															1 2	-
•															2	
- 33		faintly weathered to fresh													4	-
•		lainily weathered to fresh			12	RUN			TCR=100% SCR=97% RQD=92%						1 1]
!					'-	. VOIN			131 100/0 0011-31/0 1\QD=32/0						2	:
-34			\mathbb{K}												0	-
ļ															2 2	:
- 35		fatathum ather to the second	\mathbb{M}												1	-
1		faintly weathered, closely to moderately spaced, medium strong													2] :
ļ			\mathbb{M}												2	:
-36															2 2	-
ļ			\mathbb{M}		13	RUN			TCR=100% SCR=59% RQD=49%						8	:
- - 37															>25	
! "			\mathbb{M}												>25 >25] :
<u> </u>															5]
-38															4	-
1															3]
2 20			\mathbb{M}												2]
- 39															0]
<u>'</u> [14	RUN			TCR=87% SCR=72% RQD=34%						5 4]
-	\Box	GROUNDWATER ELE	DY/1		Ļ						1				L 4	<u> </u>

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Ametrano
CHECKED : KS



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 7+500 - Quarry

July 28, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 3 OF 3 N 7 907 667 E 569 432 July 29, 2011 COMPLETED DATUM: CGVD28

SOIL PROFILE SAMPLES SOIL PROFILE SAMPLES COMMENTS DYNAMIC CONE PERSTANCE PLOT WATER CONTENT, PERCENT WATER CONTENT, PE	THERMISTER/ GROUND COND
-41	FROZEN
-41	UNFROZEN
-42	UNCERTAIN _
-41	
-42 -43	1
-42 Figure TCR=100% SCR=46% RQD=30% TCR=100% SCR=46% RQD=30% TCR=100% SCR=94% RQD=78% TCR=10	
15 RUN TCR=100% SCR=46% RQD=30% 16 RUN TCR=100% SCR=94% RQD=78% 16 RUN TCR=100% SCR=94% RQD=78%	
- 43 TOR=100% SCR=94% RQD=78%	
-44	1
45 16 RUN TCR=100% SCR=94% RQD=78% 147 16 RUN 1	
45 16 RUN TCR=100% SCR=94% RQD=78% 47	
45 16 RUN TCR=100% SCR=94% RQD=78% 47	
16 RUN TCR=100% SCR=94% RQD=78%	
-46 -47	
47	
	1
[-48	1
TORENO SCR=95% RQD=74%	
[-49]	
-50 END OF BOREHOLE AT 50.00m.	
55	
[-56	
57	
_[:	
변 59	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) GROUNDWATER ELEVATIONS WATER LEVEL (date) LOGGED : Ametrano CHECKED : KS	
SHALLOW/SINGLE INSTALLATION ▼ DEEP/DUAL INSTALLATION LOGGED : Ametrano	
WATER LEVEL (date) WATER LEVEL (date) CHECKED: KS	THURBER



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 10+250 - Quarry

STARTED

COMPLETED :

July 25, 2011 July 26, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 905 378 E 572 883

SHEET 1 OF 3 DATUM: CGVD28

	2	SOIL PROFILE			Τ	SAM	PLE:	S		EXCES	SS ICE		NT, PEF	RCENT		THERMISTE GROUND C
DEP IN SCALE (metres)	BORING METHOD		<u> </u>		+					10	9	o ice		40	ADDITIONAL LAB. TESTING	
(metres)	3 ME		STRATA PLOT	ELEV. (m)	NUMBER	М	BLOWS/0.3m	RECOVERY %	COMMENTS				J Γ, PERCI		TEST	FROZEN
٤	RING	DESCRIPTION	ATA	LEV.	M	TYPE	SWC	SOVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		IER CC	ONTENT	I, PERCI	wl	ADDI AB.	UNFROZEN
[BO		STR		$\int_{-\infty}^{\infty}$		BLC	REC	50 100 150 200 250	10 1	2	0	30 	40 	_ ` _]	UNCERTAIN
7		GROUND SURFACE	7-1-1-	0.0												
		SILT, sandy, trace gravel (inferred), occasional boulders (<400mm) and cobbles, coarse to medium grained, subrounded, grey to light brown and pink, fines washed														
		grey to light brown and pink, fines washed			Ι,			40								
		out		:	1	RUN	1	49								
2																
]												
3		cobbles (100mm to 200mm)														
					2	RUN	1	47								
.																
				:												
5		conducilt trace arrival from 5 0 - 1 - 5 5		:	_											
		sandy silt, trace gravel from 5.0m to 5.5m														
,																
´				:	,	RUN		48								
,					"	1,(01)		+0								
				8.0												8.00
١ ا		GRANITIC GNEISS, moderately		3.0	T											6.00
		weathered, medium to coarse grained, highly to moderately fractured, grey to pink														
1	_			1												
	D Drill			1	4	RUN	ı		TCR=100% SCR=100% RQD=63%							
0	Diamond															
	NO Dis			1												
1	z															
				1												
12				1												
ا -`				1	5	RUN			TCR=100% SCR=100% RQD=73%							
13				1		101			1311 100/0 0011-100/0 11QD-13/0							
١٥																
				1												
4]												
15			\mathbb{W}	1												
					6	RUN	1		TCR=100% SCR=100% RQD=47%							
6																
				1												
7					\vdash	-										
			\mathbb{X}	1												
8																
_				1	7	RUN	J		TCR=100% SCR=100% RQD=37%							
9				1	′				100/0 OON-100/0 NQD-01/0							
9																
			\mathbb{W}	1												
_		GROUNDWATER ELE	VA	TION	s S							<u> </u>	1	1		
		¥ SHALLOW/SINGLE INSTA			-	_	Z	EE	P/DUAL INSTALLATION				121			
		WATER LEVEL (date)	ALLA	TION					LEVEL (date)		DGGED			znia/Amet	rano	
		······································								C	HECKE	: ע.	KS			THUR

Mary River Project **PROJECT**

July 26, 2011

Project No. 19-1605-126

LOCATION 10+250 - Quarry July 25, 2011 STARTED

COMPLETED :

DRILLER: BOART LONGYEAR, LM-55 N 7 905 378 E 572 883

SHEET 2 OF 3 DATUM: CGVD28

щ	4OD	SOIL PROFILE			_ ;	SAM	PLE	_		EXCESS ICE CONTENT, PERCENT	L 1G	THERMISTER/ GROUND CON
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 30 40 WATER CONTENT, PERCENT wp I	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
21					8	RUN	I		TCR=100% SCR=100% RQD=60%			
23												
25					9	RUN	ı		TCR=100% SCR=100% RQD=64%			
26		moderately to slightly weathered, closely to moderately spaced, very to extremely strong									FI 1 2 6 4	
28					10	RUN			TCR=100% SCR=50% RQD=19%		7 5 4 3 >25	
29	d Drill	moderately weathered									>25 2 2 2	
30	NQ Diamond				11	RUN	I		TCR=100% SCR=60% RQD=41%		3 4 5 2 5 2	
32											3 3 4	
33					12	RUN	ı		TCR=100% SCR=50% RQD=38%		6 3 6 7 7	
35											>25 3 1 2	
36					13	RUN			TCR=100% SCR=50% RQD=42%		>25 5 10 5 >25	
37 38											25 1 1 2 3	
39					14	RUN			TCR=100% SCR=49% RQD=35%		1 2 4 3 8	
		000111000000000000000000000000000000000									15	
		GROUNDWATER ELE SHALLOW/SINGLE INSTA WATER LEVEL (date)			>				P/DUAL INSTALLATION LEVEL (date)	LOGGED : Khabbaznia/Amet	rano	THUR



Mary River Project **PROJECT**

Project No. 19-1605-126

10+250 - Quarry LOCATION

STARTED

July 25, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 3 OF 3

COMMENTS	1PLETE	ED : July 26, 2011					Ν	7 90	05 378 E 572 883						M: C	GVD28
41 END OF BOREHOLE AT 41.00m. 41.00	무	SOIL PROFILE			5	SAM	PLE			EXC	ESS ICE			CENT	IL IG	THERMISTER/ GROUND COND
41 END OF BOREHOLE AT 41.00m. 41.00	MET		PLOT	(E)	H H	l	0.3m	RY %	COMMENTS			20 3 L	80 4 I		ION/	_
41 END OF BOREHOLE AT 41.00m. 41.00	SING	DESCRIPTION	ATA F	EV. (UMBE	TYPE)/SMC	OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTENT	, PERCE		AB. TI	UNFROZEN
END OF BOREHOLE AT 41.00m. 42 43 -44 -45 -46 -47 -48 -50 -51 -52 -53 -54 -55 -56 -57	BOF		STR,	13	ž		BLC	REC	50 100 150 200 250		ир I 10 2 I	20 3 I	30 4		₹ 5	UNCERTAIN _
### END OF BOREHOLE AT 41.00m. #################################															2	
SOIL PROFILE DESCRIPTION DESC																
-42 43 -44 -45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS	E															
-44 -45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59		DESCRIPTION														
-44 -45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS		DESCRIPTION 1														
-44																
-45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS																
-45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS																
-46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS																
-46 -47 -48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59 GROUNDWATER ELEVATIONS																
GROUNDWATER ELEVATIONS PRODUCT SOME ACTUAL TODA GROUNDWATER ELEVATIONS PRODUCT SOME ACTUAL TODA GROUNDWATER ELEVATIONS PRODUCT SOME ACTUAL TODA AT 100 AT 100																
END OF ECREHOLE AT 41.00m. 41.00 GROUNDWATER ELEVATIONS																
-48 -49 -50 -51 -52 -53 -54 -55 -56 -57 -58 -59																
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GROUNDWATER ELEVATIONS																
		GROUNDWATER ELE	VAT	IONS	5							1		<u> </u>		
S LECOMOTION DELITION DELITION LOGGED : Knabbaznia/Amer						Ţ	Z D	EEI	P/DUAL INSTALLATION		LOGGED) :	Khabbaz	nia/Ametr	ano	
WATER LEVEL (date) WATER LEVEL (date) CHECKED: KS																THURBE



PROJECT Mary River Project

Project No. 19-1605-126

14+500 - Quarry LOCATION

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12

15

16

18 11/9/1

19

July 24, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 1 OF 3 COMPLETED July 24, 2011 N 7 904 382 E 575 868 DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SAMPLES SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING oice DEPTH SCAL 20 STRATA PLOT BLOWS/0.3m 10 FROZEN ELEV. (m) NUMBER RECOVERY **COMMENTS** TYPE WATER CONTENT, PERCENT UNFROZEN DYNAMIC CONE PENETRATION RESISTANCE PLOT DESCRIPTION -0^{W} UNCERTAIN 20 30 100 150 200 250 10 40 GROUND SURFACE **BOULDERS** and **COBBLES**, grey to pink, fines washed out 47 3 RUN 100 5 5.20 **BOULDERS**, granitic, dark brown to red, highly weathered, highly fractured RUN 100

RUN

5 RUN

6 RUN

RUN

11.20

100

5126.GPJ **GROUNDWATER ELEVATIONS**

clayey silt, some gravel, brown, moist from $9.50 \mathrm{m}$ to $9.70 \mathrm{m}$

GRANITIC GNEISS, medium to coarse grained, highly weathered, highly fractured, brownish red to pink

moderately weathered, moderately spaced

abla shallow/single installation WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

TCR=100% SCR=43% RQD=43%

TCR=100% SCR=100% RQD=37%

TCR=100% SCR=100% RQD=53%

LOGGED : Khabbaznia/Ametrano CHECKED : KS



11.20

Mary River Project **PROJECT**

Project No. 19-1605-126

14+500 - Quarry LOCATION

July 24, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 2 OF 3 July 24, 2011 N 7 904 382 E 575 868 DATUM: CGVD28 COMPLETED

DESCRIPTION	STRATA PLOT	ELEV. (m)	9	Z Z TYPE		RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250 TCR=100% SCR=100% RQD=70% TCR=100% SCR=100% RQD=47%		ATER CO	DNTENT	30 	40 L ENT wl 40	ADDITIONAL LAB. TESTING	THERMISTER/GROUND CON FROZEN UNFROZEN UNCERTAIN
			9											
				RUN			TCR=100% SCR=100% RQD=47%							
			10											
ghtly to moderately weathered				RUN			TCR=100% SCR=100% RQD=77%							
grilly to moderately weathered			11	RUN			TCR=100% SCR=100% RQD=45%							
			12	RUN			TCR=100%							
			13	RUN			TCR=100%							
rong to very strong, massive				RUN			TCR=100% SCR=49% RQD=40%						FI 15 5 3 2 10 2	
	GROUNDWATER ELI	GROUNDWATER ELEVAT	GROUNDWATER ELEVATIONS	ang to very strong, massive GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION	ong to very strong, massive 13 RUN 14 RUN GROUNDWATER ELEVATIONS ✓ SHALLOW/SINGLE INSTALLATION	GROUNDWATER ELEVATIONS	ang to very strong, massive 13 RUN 14 RUN GROUNDWATER ELEVATIONS ✓ SHALLOW/SINGLE INSTALLATION ✓ DEER	In the second of the second o	I3 RUN TCR=100% Ong to very strong, massive I4 RUN TCR=100% SCR=49% RQD=40% GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION	ong to very strong, massive 14 RUN TCR=100% GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED	TCR=100% TCR=100% GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED :	GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION TCR=100% TCR=100% TCR=100% TCR=100% TCR=100% SCR=49% RQD=40% LOGGED : Khabba	TCR=100% I3 RUN TCR=100% TCR=100% GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED : Khabbaznia/Ame	TCR=100% 13 RUN TCR=100% TCR=100



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 14+500 - Quarry July 24, 2011 STARTED

DRILLER: BOART LONGYEAR, LM-55 N 7 904 382 E 575 868

SHEET 3 OF 3 DATUM: CGVD28

СО		D : July 24, 2011 TED : July 24, 2011					N	7 90	OART LONGYEAR, LM-55 04 382 E 575 868	EXCESS ICE CONTEN		M: CGV	
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 3(9 40 L PERCENT ——I WI	BDITIONA B. TESTIN	HERMISTEF ROUND CO ROZEN NFROZEN NCERTAIN
41												5 4 25 9	
42 43	Diamond Drill	slightly weathered			15	RUN	ı		TCR=100% SCR=77% RQD=62%			3 1 8 2 5	
44												1 3 2 2 10	
45 46					16	RUN	ı		TCR=100% SCR=66% RQD=41%			4 5 10 2 10	
47 48		END OF BOREHOLE AT 47.20m.		47.20								3 2 2	
19													
50 51													
52													
53 54													
55													
56 57													
58													
59													
		GROUNDWATER ELE			3				P/DUAL INSTALLATION LEVEL (date)		habbaznia/Ameti S	ano	THUR



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION July 23, 2011 STARTED

COMPLETED :

18+100 - Quarry

July 23, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 902 853 E 578 804

SHEET 1 OF 3 DATUM: CGVD28

CC	MPLE	ETED : July 23, 2011					N	7 90	02 853 E 578 804					DATU	M: C0	GVD28
щ	dol	SOIL PROFILE			,	SAM	PLES	S		EXC	ESS ICI	CONTEI	NT, PER	CENT		THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		LOT	(۱	~		.3m	Υ%			10			0	I≤∠I	FROZEN
TH 8	9	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONF PENETRATION	V	/ATER C	ONTENT		NT	E E	UNFROZEN 📉
DEF	ORII		[RA]	EE	Ž	←	LOV	ECO	DYNAMIC CONE PENETRATION RESISTANCE PLOT		vp	0 0 3		vl O	PB	UNCERTAIN
<u> </u>	В	GROUND SURFACE	S				Ф	₹	50 100 150 200 250		+	20 3	1		$\vdash \vdash$	
<u> </u>		GRAVEL, some cobbles, granitic, grey, fines washed out	***	0.00												
•		fines washed out														1
-1					1	RUN		50								4
E																1
-2																<u> </u>
, _		cobbles (<110mm)														1
•																1
- 3																
[2	RUN		50]
-4																-
																1
- - 5		CANDSTONE slightly to mand anotaly		5.00												5.00
ŀ		SANDSTONE, slightly to moderately weathered, weak to medium strong, bedded, brown														1
-6		bedded, brown]
F						L										:
ţ			M		3	RUN			TCR=100%							1
7																1
ŀ																1
-8																-
•]
- 9																1
ľ	≣ □				1	RUN			TCR=100%							1
1,	NQ Diamond Drill	becoming reddish brown	\mathbb{M}		¯	l Con			1611-16076							1
10	Diam]
ŀ	ğ]
11																-
ŀ																1
-12																4
E .					5	RUN			TCR=100%]
13]
"																
ļ.,																1
-14																
E]
- 15																
ļ.					6	RUN			TCR=100%							1
- 16																4
ŀ																1
- 17					L]
<u></u> '']
																:
-18																-
; [7	RUN			TCR=100%							1
19		uncemented sand interbeds from 19.2m to														
<u> </u>		19.3m and 19.8m to 19.9m]
<u> </u>			<u>K</u>		Ļ					<u> </u>						
÷		GROUNDWATER ELE	VAT	TIONS	3											

 \overline{Y} SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Ametrano CHECKED : MB



Mary River Project **PROJECT**

> 18+100 - Quarry DRILLER: BOART LONGYEAR, LM-55

Project No. 19-1605-126

STARTED COMPLETED :

LOCATION

July 23, 2011 July 23, 2011

N 7 902 853 E 578 804

SHEET 2 OF 3 DATUM: CGVD28

ر	НОР	SOIL PROFILE	 			SAMI				EXC	ESS ICE	oic		CENT	를 들는 다음 이 기계를 받는다.	THERMISTER GROUND COI
DEP IN SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	V	⊥ 'ATER C vp ├──	20 ONTEN	30 I F, PERCE		ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
			(0)					ι¢	1 1 1 1							
21					8	RUN			TCR=100%							
23 24																
25					9	RUN			TCR=100%							
26 27																
28					10	RUN			TCR=100%							
29	ond Drill															
30 31	NQ Diamond Drill				11	RUN			TCR=100%							
32		uncemented sand interbeds from 32.26m to 33.30m														
33 34					12	RUN			TCR=100%							
35		sandy gravel layer from 35.0m and 35.4m, 35.7m to 35.8m														
36 37					13	RUN			TCR=100%							
38																
39					14	RUN			TCR=100%							
		I GROUNDWATER ELE	<u>IX∕∕</u> I VAT	TIONS	<u></u>					<u> </u>	<u> </u>				1	
		SHALLOW/SINGLE INSTA							P/DUAL INSTALLATION LEVEL (date)		LOGGE CHECK		Ametran MB	0		THURE



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 18+100 - Quarry STARTED

COMPLETED :

July 23, 2011 July 23, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 902 853 E 578 804

SHEET 3 OF 3 DATUM: CGVD28

DESCRIPTION DESCR		IVIPLE	T	SOIL PROFILE SAMPLES COMMENTS DYNAMIC CONF PENETRATION RESISTANCE PLOT SOIL PROFILE SAMPLES COMMENTS DYNAMIC CONF PENETRATION RESISTANCE PLOT SOIL PROFILE EXCESS ICE CONTENT, PERCENT ON WATER CONTENT, PERCENT WP UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN UNIFROZEN WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP WATER CONTENT, PERCENT WP UNIFROZEN UNIF													
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 GROUNDWATER ELEVATIONS	Щ	HOD					SAM	PLE	_		EXC	ESS ICE			CENT	Z G	THERMISTER/ GROUND COND
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 GROUNDWATER ELEVATIONS	SCA stres)	MET		PLOT	(m)	띪	l ш	0.3m	RY %	COMMENTS						FSTI	_
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 GROUNDWATER ELEVATIONS	EPTH (me	RING	DESCRIPTION	ATA	LEV.	IUMB	TYPI	/SMC	OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT						ADDIT AB. T	
## PROOF HORSENCIE AT 44 00m.		<u>B</u>		STR	Ш	z		BL(REC	50 100 150 200 250	7	10 2				, J	UNCERTAIN _
## PROOF HORSENCIE AT 44 00m.				TION													
## PROOF HORSENCIE AT 44 00m.				COMMENTS O													
43 44 45 46 47 48 49 50 51 52 53 54 55 56 67 58 59 GROUNDWATER ELEVATIONS ▼ SHALLOW/SINGLE INSTALLATION ▼ DEEP/DUAL INSTALLATION LOGGED: Americano	41		END OF BOREHOLE AT 41.00m.	## COMMENTS PRIOR 10 10 10 10 10 10 10 1													
43 44 45 46 47 48 49 50 51 52 53 54 55 56 67 58 59 GROUNDWATER ELEVATIONS ▼ SHALLOW/SINGLE INSTALLATION ▼ DEEP/DUAL INSTALLATION LOGGED: Americano																	
44 44 45 46 46 47 48 48 49 50 51 51 52 53 54 55 56 66 57 58 59 59 GROUNDWATER ELEVATIONS	-42																
44 44 45 46 46 47 48 48 49 50 51 51 52 53 54 55 56 66 57 58 59 59 GROUNDWATER ELEVATIONS																	
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 GROUNDWATER ELEVATIONS	43																
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 GROUNDWATER ELEVATIONS																	
GROUNDWATER ELEVATIONS GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEPIDUAL INSTALLATION LOGGED: Amediano	-44																
GROUNDWATER ELEVATIONS GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEPIDUAL INSTALLATION LOGGED: Amediano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametriano	45																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametriano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION MITCHIEF CHARACTER AMERICAN	-46																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION MITCHIEF CHARACTER AMERICAN																	
GROUNDWATER ELEVATIONS SHALLOWSINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	47																
GROUNDWATER ELEVATIONS SHALLOWSINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	-48																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	49																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	-50																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	51																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS Syshallow/single installation GROUNDWATER ELEVATIONS DEEP/DUAL INSTALLATION LOGGED: Ametrano	-52																
GROUNDWATER ELEVATIONS Syshallow/single installation GROUNDWATER ELEVATIONS DEEP/DUAL INSTALLATION LOGGED: Ametrano	F2																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	53																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano																	
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	54																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	. 55																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	55																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	-56																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	-30																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	. 57																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	٠, ا																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	-58																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	55																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED: Ametrano	. 59																
SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED : Ametrano	55																
SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION LOGGED : Ametrano																	
\\\ATED \(\frac{1}{2} \) \\\\ATED \(\frac{1}{2} \) \\\\						3	_	_									
WATER LEVEL (date) WATER LEVEL (date) CHECKED: MB THURB				_LA	TION							LOGGE) : .	Ametran	D		
			WATER LEVEL (date)					WA	ΓER	LEVEL (date)		CHECKE	D :	MB			THURBE



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION : 22+500 - Quarry

COMPLETED :

STARTED: July 22, 2011

July 22, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 901 663 E 583 415 SHEET 1 OF 4 DATUM: CGVD28

CC	MPL	ETED : July 22, 2011					N	7 90	D1 663 E 583 415		DATU	M: C	GVD28
щ	ОĢ	SOIL PROFILE			5	SAM	PLES	S		EXCESS ICE CONTE		٥٦	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		LOT	(н	Я		.3m	۲۲ %	OOMMENTO		30 40	ADDITIONAL LAB. TESTING	FROZEN
PTH (metr	NG	DESCRIPTION	TAP	ELEV. (m)	NUMBER	TYPE	NS/0	VER	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	WATER CONTENT		3. E	UNFROZEN
ä	BORI		STRATA PLOT	ELE	N	-	BLOWS/0.3m	RECOVERY %	RESISTANCE PLOT	wp		4 3	UNCERTAIN
	П	GROUND SURFACE	1 07	0.00					1 1 1 1		+		
[BOULDERS, granitic, moderately weathered, moderately spaced, grey to pink	00										
1			Γ		١.								:
l 1			200		1	RUN		75]
•			54	0.00									
-2		GRANITIC GNEISS, fresh, moderately fractured, medium to coarse grained, grey to pink		2.00									2.00
ŀ		to pink											
- 3]
ŀ					2	RUN			TCR=100% SCR=100% RQD=80%				;
-4													-
•													:
- - 5													
Ė]
-6													
•					3	RUN			TCR=100% SCR=100% RQD=100%				
7			M						TOTAL TOOM CONTINUE TOOM]
ļ '													:
ļ.,													1
- 8]
ļ.,													:
9	≣]
	NQ Diamond Drill				4	RUN			TCR=100% SCR=100% RQD=98%]
-10	jamo												-
Ė	N N]
- 11		moderately weathered											-
ŀ													;
12													-
ŀ					5	RUN			TCR=100% SCR=100% RQD=73%				:
13													-
ŀ]
14		Color the constant											
ŀ		faintly weathered	M										:
- 15]
"					۵	RUN			TCR=100% SCR=100% RQD=98%				:
1,					ľ	IXON			1011-100% 3CI1-100% 11QD-30%				:
-16]
!													
17		fresh											1
-18													
<u>.</u>					7	RUN			TCR=100% SCR=100% RQD=97%				
19													
<u> </u>													
<u> </u>	Ш	GROUNDWATER ELE	<u> </u>	IONIC	Ļ								
1		GROONDWATER ELE	٧AI	TONS	•								

GROUNDWATER ELEVATIONS

THURBER2S(5126) 5126.GPJ 11/9/11

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION : 22+500 - Quarry

STARTED : July 22, 2011
COMPLETED : July 22, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 901 663 F 583 415 SHEET 2 OF 4

CC	MPLE	ETED : July 22, 2011					Ν	7 90	01 663 E 583 415		DATU	M: C	GVD28
ш	ОО	SOIL PROFILE			5	SAM	PLE	s		EXCESS ICE CONTENT	, PERCENT	. (1)	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		P.		~		33	% /		10 20 30	40	⋖∠	FROZEN
TH S	<u>©</u>	DESCRIPTION	A PL	r) .	1BEF	TYPE	3/0.3	ER.	COMMENTS	WATER CONTENT, P	ERCENT	E	UNFROZEN
DEP	ORIN	BESON HOW	STRATA PLOT	ELEV. (m)	NUMBER	}	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp	—l wl	ADI	UNCERTAIN
	ă		ST		_		B	22	50 100 150 200 250	10 20 30	40		
-			W										
ļ													:
21													-
•					8	RUN	ı		TCR=100% SCR=100% RQD=80%				
-22													_
ŀ													-
23]
120		slightly fractured											-
ļ.,													-
-24						L							
ŀ					9	RUN	1		TCR=100% SCR=100% RQD=95%				-
- 25													-
-]
-26													-
ŀ													-
- 27													-
ŀ					10	RUN	1		TCR=100% SCR=100% RQD=92%				-
-28													
-													
- 29													-
ŀ	□												-
-30	Diamond Drill												
"	Diar				11	RUN			TCR=100% SCR=100% RQD=89%				-
31	ğ								101 100 / CON 100 / NQD 00 /				3
F 31													
ļ													-
-32 [
•													
- 33													-
Ė					12	RUN	1		TCR=100% SCR=100% RQD=92%				
-34													-
ŀ													-
35													-
ŀ													
-36													-
-					13	RUN	ı		TCR=100% SCR=100% RQD=90%				
- 37													
-													
-38]
"													
£													
- 39						L]
<u>}</u>					14	RUN	1		TCR=100% SCR=100% RQD=93%				
		GROUNDWATER ELE	VAT	IONS	╮	_				1 1			

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS



Mary River Project **PROJECT**

LOCATION 22+500 - Quarry

July 22, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED N 7 901 663 E 583 415 July 22, 2011 COMPLETED :

SHEET 3 OF 4 DATUM: CGVD28

Project No. 19-1605-126

4	Q P	SOIL PROFILE			5	SAM	PLE			EXCESS IC	E CONTE	NT, PERCENT	i e	THERMISTER GROUND CON
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp I—	20 CONTENT	30 40 T, PERCENT	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
,			STF	ш	_		B	REC	50 100 150 200 250	10		30 40		UNCERTAIN
			W											
41														
7'														
42														
					15	RUN			TCR=100% SCR=100% RQD=92%					
43														
44														
''														
45														
					16	RUN			TCR=100% SCR=100% RQD=90%					
46														
47														
48														
49					17	RUN			TCR=100% SCR=100% RQD=92%					
	Drill													
50	NQ Diamond													
	M M M													
51					10	RUN			TCR=100% SCR=100% RQD=95%					
52					10	KUN			TCR-100% SCR-100% RQD-95%					
53														
_														
54					19	RUN			TCR=100% SCR=100% RQD=97%					
55														
56														
57														
·					20	RUN			TCR=100% SCR=100% RQD=100%					
58														
_														
59														
		ODOLINGWATER TO			Ļ									<u> </u>
		GROUNDWATER ELE			j .	•	7 -		P/DUAL INSTALLATION					
		SHALLOW/SINGLE INST. WATER LEVEL (date)	ALLA	HON					P/DUAL INSTALLATION LEVEL (date)	LOGG		Khabbaznia KS		THURE



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION : 22+500 - Quarry

STARTED

July 22, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 901 663 E 583 415 SHEET 4 OF 4

1	ARTE MPLE	D : July 22, 2011 TED : July 22, 2011			DR	ILLI			OART LONGYEAR, LM-55 01 663 E 583 415						T 4 OF	F 4 GVD28
		SOIL PROFILE				SAM	PLE			EXC	ESS ICE		NT, PER			THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		LOT	<u></u>	r		3m	% >		1	0 2	o ice	30 4	0	I≤∠	FROZEN
PTH (NG N	DESCRIPTION	TA PI	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT		ATER CO	ONTENT	, PERCE		DDITI B. TE	UNFROZEN 💹
DE	BOR		STRATA PLOT	ELE	Ž	-	BLO	RECC	50 100 150 200 250		rp	20 3	I w		\ <u>\</u>	UNCERTAIN
			\/\													_
-					21	RUN	1		TCR=100% SCR=100% RQD=97%							
- - 61																-
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-62		END OF BOREHOLE AT 62.00m.	X	62.00												=
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\vdash		I GROUNDWATER ELE	VA٦	ION:	<u></u>		<u> </u>				<u> </u>					
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THURBER2S(5126) 5126.GPJ 11/9/11

WATER LEVEL (date)

ION

DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 25+500 - Quarry

STARTED

July 22, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2 DATUM: CGVD28

ا لٍا	НОР	SOIL PROFILE	1. 1		:	SAMI				EXCESS ICE CON	ITENT, PERCENT	ج ا ا	THERMISTI GROUND C
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 L L WATER CONTI	30 40 	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAII
\dashv	+	GROUND SURFACE BOULDERS, granitic, medium to coarse		0.00	\vdash							+	
1 2		BOULDERS , granitic, medium to coarse grained, trace cobbles, subrounded, dark grey to grey and pink, moderately fractured			1	RUN		76					
3					2	RUN			TCR=100% SCR=100% RQD=95%				
5		GRANITIC GNEISS, slightly weathered,		5.34									5.34
6 7 8		medium to coarse grained, slightly fractured, grey to pink			3	RUN			TCR=100% SCR=100% RQD=95%				
10	Q Diamond Drill	fresh			4	RUN			TCR=100% SCR=100% RQD=93%				
11 12	ON				5	RUN			TCR=100% SCR=100% RQD=97%				
14 15 16					6	RUN			TCR=100% SCR=100% RQD=100%				
17 18 19		very thickly foliated, very to extremely strong horizontal break at 18.2m and 19.9m			7	RUN			TCR=100% SCR=85% RQD=79%			FI 1 1 2 2 3 1 0 0	
		GROUNDWATER ELE $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$			<u> </u> 3	<u> </u>	7 D	EE	P/DUAL INSTALLATION	LOGGED :	Khabbaznia/Ame	1 etrano	

PROJECT Mary River Project

Project No. 19-1605-126

25+500 - Quarry LOCATION

dark greyish to black foliations from 26.68m to $26.89 \mathrm{m}$

medium to extremly strong, slightly

highly broken from 30.5m to 3.9m

vertical breaks from 30.0m to 31.5m

END OF BOREHOLE AT 32.34m.

weathered to fresh

27

28

29

30

31

32

33

34

36

37

38 11/9/1

5126.GPJ 39

JRBER2S(5126)

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 2

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3 >25

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July 22, 2011 STARTED N 7 900 221 E 586 954 COMPLETED July 22, 2011 DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SAMPLES SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING oice DEPTH SCALE (metres) 10 20 STRATA PLOT BLOWS/0.3m FROZEN NUMBER ELEV. (m) RECOVERY **COMMENTS** TYPE WATER CONTENT, PERCENT UNFROZEN DYNAMIC CONE PENETRATION RESISTANCE PLOT DESCRIPTION UNCERTAIN 30 100 150 200 250 10 20 40 0 0 21 RUN TCR=100% SCR=97% RQD=95% 2 1 1 0 23 3 dark greyish to black foliations from 23.34m to 23.54m and 23.86m to 24.13m 0 1 1 24 2 RUN TCR=100% SCR=93% RQD=87% 0 25 0 2 2 2 sub-vertical breaks from 26.3m to 26.7m

TCR=100% SCR=92% RQD=92%

TCR=100% SCR=47% RQD=47%

10 RUN

11 RUN

32.34

35

GROUNDWATER ELEVATIONS

abla shallow/single installation WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia/Ametrano CHECKED : KS

THURBER

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

28+400 - Quarry

STA	ARTE MPLE	• •			DR	ILLE			OART LONGYEAR, LM-55 98 617 E 588 240		DATU	T 1 OF	= 2 GVD28
щ	9	SOIL PROFILE				SAM	PLES	S		EXCESS ICE (CONTENT, PERCENT	י ט	THERMISTE GROUND CO
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 WATER CO wp — — — — — — — — — — — — — — — — — —	0 30 40 NTENT, PERCENT W	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
1 -2		GROUND SURFACE GRAVEL, occasional cobbles and boulders, grey to pink, subangular to subrounded, fines washed out		0.00		RUN		15					
3		no recovery	- ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	2.40									
4					2	RUN		0					
5				5.40									
6		GRAVEL, some cobbles, occasional boulders (<480mm), granitic, angular to subangular, grey to pink			3	RUN		25					
8		OAND		8.40									8.40
9	Diamond Drill	SAND, some silt, some gravel, brown, frozen (Nbn)			4	RUN		57					
11	Ø N	SAND and GRAVEL (INFERRED), with	9 4 6	11.40									11.40
12		cobbles and boulders (350mm), grey to pink, angular to subangular			5	RUN		41					
14 15		coarse sand, some gravel, some cobbles, trace silt, frozen (Nf)											14.40
16					6	RUN		73					
17				18.00									17.40
18 19		COBBLES and BOULDERS, granitic, trace to some coarse sand, grey to pink				RUN		100					
		GROUNDWATER ELE		IONI	Ļ								
		GROUNDWATER ELE			•				P/DUAL INSTALLATION LEVEL (date)	LOGGED CHECKEI			THUR



PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : 28+400 - Quarry

 STARTED
 :
 July 18, 2011
 DRILLER:
 BOART LONGYEAR, LM-55
 SHEET 2 OF 2

 COMPLETED
 :
 July 18, 2011
 N 7 898 617 E 588 240
 DATUM: CGVD28

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Щ	ДQ	SOIL PROFILE			5	SAM	PLE	S		EXCE	SS ICE	CONTE		CENT	٥٦	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		STRATA PLOT	Ê	e.		.3m	RECOVERY %	COMMENTS	10) 2	20 3	30 4	10 	ONA	GROUND COND. FROZEN UNFROZEN UNCERTAIN
PTH (met	ING.	DESCRIPTION	TAF	ELEV. (m)	NUMBER	TYPE	MS/0	OVEF	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTENT	, PERCE			UNFROZEN 🏻
핌	BOR		STRA	EF	N	-	BLOWS/0.3m	RECC	50 100 150 200 250	wp 10) — 2	<u></u> 0 3		wl 10	₹ ₹	UNCERTAIN
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- 23																-
ŀ			60			RUN		100								
-24			200	24.20		KUN		100								24.20
ļ.		END OF BOREHOLE AT 24.20m.														
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GROUNDWATER ELEVATIONS

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Schneider CHECKED : KS



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 31+500 - Quarry

STARTED

COMPLETED :

July 19, 2011 July 19, 2011

DRILLER: BOART LONGYEAR, LM-55

N 7 897 863 E 590 944

SHEET 1 OF 1 DATUM: CGVD28

	2	SOIL PROFILE				SAM	PLE:	s		EXC	ESS ICE		NT, PER	CENT	(D	THERMISTER GROUND CO
(metres)	BORING METHOD		Ъ		1		π̃	% /		1	10	20 ice		40	ADDITIONAL LAB. TESTING	FROZEN
netre	∑ ©	DESCRIPTION	A PL	E) .	BER	TYPE	8/0.3	ERY	COMMENTS	W	L ATER C	ONTENT	T, PERCE	L ENT	15E	UNFROZEN
ا ت	N N	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	≱	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	W	/p	o ^w			AB.	UNCERTAIN
	B		STF		Ĺ		BL	RF	50 100 150 200 250	1	10	20	30	40	┸	SNOLKIAIN
		GROUND SURFACE BOULDERS and COBBLES, some gravel,	60	0.00												
		pink to dark grey, angular to sub-angular, fines washed out	0													
₁					L	L										
.			0		1	RUN		54								
,			200													
2		no recovery	h ^O	2.20	⊬											
3																
					2	RUN		0								
4																
5			<u> </u>	5.20	$oxed{oxed}$											
	_	GRAVEL and COBBLES, some boulders, trace sand, pink to light grey and dark grey,	00	1												
6	d Dri	fines washed out		1												
	amon		00	1	,	DI IN		60								
7	NQ Diamond Drill			1	٥	RUN		66								
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		GROUNDWATER ELE	VA	TIONS	3											
		$\overline{igspace}$ shallow/single insta	ALLA	TION		Ţ	Z D	EEF	P/DUAL INSTALLATION		LOGGE	D :	Schneid	er		
		WATER LEVEL (date)							_EVEL (date)		CHECK		KS			THURE



PROJECT: Mary River Project

Project No. 19-1605-126

LOCATION : 35+500 - Quarry

STARTED

July 17, 2011 DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

July 17, 2011 N 7 896 244 E 595 477 COMPLETED DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SAMPLES SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE oice BLOWS/0.3m 10 20 STRATA PLOT FROZEN RECOVERY ELEV. (m) NUMBER **COMMENTS** TYPE WATER CONTENT, PERCENT UNFROZEN DYNAMIC CONE PENETRATION RESISTANCE PLOT DESCRIPTION -0^{W} UNCERTAIN 20 30 100 150 200 250 10 40 GROUND SURFACE 0.00 COBBLES, organics, subangular to 0.30 BOULDERS, trace cobbles, slightly weathered, fines washed out 1 RUN 70 2.45 2.45 **GRANITIC GNEISS**, medium to coarse grained, slightly weathered, highly to moderately jointed, dark grey to pink 3 2 RUN TCR=83% SCR=83% RQD=47% 5 6 RUN TCR=100% SCR=100% RQD=53% -8 9 RUN TCR=100% SCR=100% RQD=45% 12 TCR=100% SCR=100% RQD=88% RUN 15 6 RUN TCR=100% SCR=100% RQD=77% 16 becoming fresh, slightly jointed 18 RUN TCR=100% SCR=100% RQD=78% 19

GROUNDWATER ELEVATIONS

11/9/1

5126.GPJ

SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia/Schneider CHECKED : KS



Mary River Project **PROJECT** Project No. 19-1605-126

LOCATION 35+500 - Quarry

July 17, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 2 OF 2 N 7 896 244 E 595 477 July 17, 2011 COMPLETED : DATUM: CGVD28

	_	0011 550511 5						_		EXCESS ICE CON	NTENT, PERCENT	Т	THEDMISTED/
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE				SAM	PLE	S			ice	ق ر ا	THERMISTER/ GROUND COND.
S) CAL	Ė		5	_			Ε	%		10 20	30 40	ΑĔΕ	FROZEN
1 S	Σ		<u>ا</u> کا	ELEV. (m)	NUMBER	ш	/0.3	盗	COMMENTS			ADDITIONAL LAB. TESTING	FROZEN
E E	N N	DESCRIPTION	≰	EV.]ME	TYPE	WS	3	DYNAMIC CONE PENETRATION	WATER CONTI	ENT, PERCENT Э ^W	G G	UNFROZEN 💹
8	SOR.		STRATA PLOT	급	ž	l	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp) W Wl 30 40	∢	UNCERTAIN
\vdash	Ш		ίς.		_		ш	ď	50 100 150 200 250	10 20	+0	₩	
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1 1			NX/										
- 23			\mathbb{K}/\mathbb{A}										-
!			M										-
1		slightly weathered, closely jointed											
-24			M										-
1]
1			\mathbb{K}		9	RUN	1		TCR=100% SCR=91% RQD=60%]
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!		END OF BOREHOLE AT 26.20m.											-
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[GROUNDWATER ELE	VAT	IONS	5								

 \overline{Y} SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia/Schneider CHECKED : KS



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

STARTED

38+700 - Quarry

July 16, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 893 140 E 596 368

SHEET 1 OF 3 DATUM: CGVD28

ر	ДQ	SOIL PROFILE			_ :	SAM	PLE	_			ONTENT, PERCENT	2 بـ	THERMIST GROUND (
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 WATER CONT	30 40 TENT, PERCENT OW 30 40	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAI
耳		GROUND SURFACE		0.00									
1		GRAVEL, COBBLES and BOULDERS, granitic, angular to subangular, grey, fines washed out		2.40		RUN	l	28					
3		no recovery, all material washed out											
1					2	RUN		0					
5				5.40									
6		GRAVEL, trace sand, grey, very poor recovery, most material washed											
7					3	RUN	l	4					
}													
0	NQ Diamond				4	RUN		8					
1		no recovery	***	11.40									
2													
13					5	RUN		0					
4													
5					6	RUN		0					
6													
7 8		GRAVEL, some cobbles (<105mm), granitic, subangular, grey, fines washed out		17.40									
19					7	RUN	l	14					
		GROUNDWATER ELE $\overline{\Psi}$ shallow/single inst.			<u></u>	_			P/DUAL INSTALLATION				



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

STARTED

38+700 - Quarry

July 16, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 893 140 E 596 368

SHEET 2 OF 3 DATUM: CGVD28

<u>,</u> T	ᄋ	SOIL PROFILE	<u>,</u>			SAM	PLE			EXCES	SS ICE	CONTE	NT, PEF	RCENT	Ę Ļ	THERMISTER GROUND CO
DEFIN SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 WA ⁻ wp 10	TER C	20 L ONTENT	30 L , PERCI	40 L ENT wl 40	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
21		no recovery	***	20.40												
22		artesian condition encountered (2m above ground surface) at 22.0m			8	RUN	I	0								
23		GRAVEL, some cobbles (<70mm), granitic, subrounded to subangular, fines	***	23.40												
24		granitic, subrounded to subangular, fines washed out														
25					9	RUN	I	4								
26																
27																
28					10	RUN	I	10								
29	d Drill	SAND, some gravel, some silt, some		29.40												
30	NQ Diamond Drill	cobbles, brown								0						
31	2	GRANITIC GNEISS, slightly to faintly weathered, medium to coarse grained, closely jointed, pink to grey		31.20		RUN		84								31.20
32		closely jointed, pilik to grey														
33					12	RUN			TCR=100% SCR=100% RQD=64%							
34					12				16K 166% CGK 166% NGE 64%							
35																
36					10	RUN			TCR=100% SCR=93% RQD=57%							
37					13	IVOIN			101-100/0 001-33/0 NQD-31/0							
38		becoming fresh, moderately to widely jointed														
39					11	RUN			TCR=100% SCR=100% RQD=78%							
!		GROUNDWATER ELE							P/DUAL INSTALLATION			•		•	•	

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 38+700 - Quarry

STARTED

COMPLETED :

July 16, 2011 DRILLER: BOART LONGYEAR, LM-55 N 7 893 140 E 596 368 July 16, 2011

SHEET 3 OF 3 DATUM: CGVD28

		1ED : July 10, 2011			Γ.	244			93 140 E 596 368	EXCESS I	CE CONT	ENT. PEF	CENT		
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE	h		-	SAM T	PLE	_			• i	ce		ING ING	THERMISTER/ GROUND COND
H SC/ etres)	ME		STRATA PLOT	(m)	H	ш	BLOWS/0.3m	RECOVERY %	COMMENTS	10	20		40 	ADDITIONAL LAB. TESTING	FROZEN
EPTH (me	RING	DESCRIPTION	ATA	ELEV. (m)	NUMBER	TYPE)WS	Š	DYNAMIC CONE PENETRATION RESISTANCE PLOT	WATER wp I—	CONTEN	NT, PERCI		AB. T	UNFROZEN
٥	BO		STR		z		BLC	REC	50 100 150 200 250	10	20	30	40 	```	UNCERTAIN
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41															
-42															
43					15	RUN	1		TCR=100% SCR=100% RQD=87%						
	Drill														
- 11	NQ Diamond Drill														
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	ğ														
45															
					16	RUN	J		TCR=100% SCR=99% RQD=91%						
- 46					10	1,01			100/0 0011-00/0 RQD-81/0						
- 47															
-48															
49					17	RUN	1		TCR=100% SCR=97% RQD=80%						
-50				50.40											
		END OF BOREHOLE AT 50.40m.	1/2/	50.40											
- 51															
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		GROUNDWATER ELE	VA	IONS	5	_	_	1		1			1		
-58		$\overline{igspace}$ shallow/single inst				Ţ	Z n)EFI	P/DUAL INSTALLATION	LOGO	SED :	Schneid	er		
		WATER LEVEL (date)	/ \						LEVEL (date)		KED :	KS	6 1		THURBE
															THURBE



PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : 42+000 - Quarry

 STARTED
 :
 July 16, 2011
 DRILLER:
 BOART LONGYEAR, LM-55
 SHEET 1 OF 2

 COMPLETED
 :
 July 16, 2011
 N 7 890 881 E 598 151
 DATUM: CGVD28

									50 001 E 030 131	EXCESS ICE	CONTE	NT PFR		·····	THEDMOTED!
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE				SAM	PLE			LXOLOG IOL	ice		OLIVI	٩ ا	THERMISTER/ GROUND COND. FROZEN UNFROZEN UNCERTAIN
SCA res)	MET		STRATA PLOT	Ê	<u>~</u>		BLOWS/0.3m	RECOVERY %	COMMENTS	10 2			10 I	NO STI	FROZEN
TH:	Q V	DESCRIPTION	ΑP	. (r	/BE	TYPE	0/S/	VER	COMMENTS DYNAMIC CONF PENETRATION	WATER CC	NTENT	, PERCE	NT	1등뿐	UNFROZEN
DEF (ORII		I.RAI	ELEV. (m)	NUMBER	-	ρ	Ö	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp I	- OW	—— \		P B B	UNCERTAIN
	BK		ST				面	22	50 100 150 200 250	10 2	0 3	30 ²	10		
_		GROUND SURFACE		0.00										<u> </u>	<u> </u>
		GRAVEL, COBBLES and BOULDERS, granitic, subrounded to subangular, grey to pink, fines washed out	60												
		pink, fines washed out	000												
- 1			ρŎ		1	RUN	1	11							
			60												
-2			000												.
ļ ⁻			0												
ļ.															
- 3			00												
ļ.			60												
-4			00		2	RUN	1	5							.
			00												
			$h \hookrightarrow$												
- 5			00												
			$[\circ \bigcirc$	5.67											5.67
-6		GRANITIC GNEISS, fresh, medium to coarse grained, moderately spaced joints,													
Ľ		grey to pink													
ļ.					3	RUN			TCR=100% SCR=82% RQD=65%						
- 7					٦	INOIN	1		1CK-100% 3CK-02% KQD-03%						
			\mathbb{W}												
-8															
Ľ															
- 9	_	moderately to widely spaced	\bowtie												
	Ρ														
- -10	NQ Diamond Drill				4	RUN	1		TCR=80% SCR=71% RQD=59%						
	Diar														
	ğ														
- 11															
- 12		widely spaced													
. `~			\otimes												
			\mathbb{N}		_	RUN			TCR=100% SCR=100% RQD=74%						
- 13					١	INOIN	1		1CK-100% 3CK-100% KQD-14%						
ļ.			\mathbb{M}												
- 14															
ļ l															
- 15															
- -16					6	RUN	1		TCR=100% SCR=100% RQD=82%						
- 17															
- -18															
•															
					7	RUN			TCR=100% SCR=100% RQD=87%						
- 19					l	1,01			1011-100/0 3011-100/0 RQD-0/%						
			\otimes												
		GROUNDWATER ELE	١/٨٦		2										

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS



Mary River Project **PROJECT** Project No. 19-1605-126

LOCATION 42+000 - Quarry July 16, 2011 STARTED

DRILLER: BOART LONGYEAR, LM-55 N 7 890 881 E 598 151

SHEET 2 OF 2 DATUM: CGVD28

СО		TED : July 16, 2011			_				90 881 E 598 151	EXCESS IC	E CONTE	NT DED		M: C	GVD28
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 	20 : CONTENT	9 30 4 1 	IO L ENT	ADDITIONAL LAB. TESTING	THERMISTEI GROUND CO FROZEN UNFROZEN UNCERTAIN
21															
22					8	RUN			TCR=100% SCR=100% RQD=78%						
23		END OF BOREHOLE AT 23.37m.		23.37											
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
		GROUNDWATER ELE			5					<u> </u>		1	ı		
		SHALLOW/SINGLE INST WATER LEVEL (date)	'ALLA	TION					P/DUAL INSTALLATION LEVEL (date)	LOGGI		Khabbaz KS	nia		THUE



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 44+300 - Quarry

COMPLETED :

July 15, 2011 STARTED

July 15, 2011

DRILLER: BOART LONGYEAR, LM-55

N 7 888 054 E 598 208

SHEET 1 OF 1 DATUM: CGVD28

\neg	Ō	SOIL PROFILE			,	SAM	PI F	s		EXC	ESS ICE	CONTE	NT, PEF	RCENT		THERMISTER
(metres)	BORING METHOD	SOLITIONEL	F		H		_	_			40	oice		40	ADDITIONAL LAB. TESTING	THERMISTER GROUND COI
tres	ME		STRATA PLOT	ELEV. (m)	监	l	BLOWS/0.3m	RECOVERY %	COMMENTS					40 	FST	FROZEN
<u> </u>	NG	DESCRIPTION	IAI	<u>></u>	NUMBER	TYPE	NS/)VE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	V	/ATER C	ONTENT	, PERC		B. T. B	UNFROZEN
Ī	SORI		TRA	E	₽	-	LO S	E E	RESISTANCE PLOT	'	wp	 	———I 30	wl 40	\(\brace{3}{5}	UNCERTAIN
\dashv		GROUND SURFACE	Ω.		┝		ш	~	50 100 150 200 250		1	-	1	+	-	
		GRAVEL and COBBLES, some sand,	įΨ	0.00												
		trace silt, brown	60													
			0.													
'			0,7		1	RUN	1	65								
			5,4	1.90												1.90
2		GRANITIC GNEISS, slightly weathered,	K		1											
		medium to coarse grained, closely jointed, grey to pink														
3			\mathbb{N}													
									TOD 4000/ OOD 4000/ DOD 000/							
1					2	RUN	1		TCR=100% SCR=100% RQD=80%	l						
5										l						
										l						
3										l						
- [:										l						
.	ond				3	RUN	1		TCR=100% SCR=99% RQD=81%							
	NQ Diamond Drill									l						
[]	g									l						
· 2	ا															
		hacoming faintly worthorod, moderately to														
)		becoming faintly weathered, moderately to widely jointed	\mathbb{M}							l						
										l						
٦					4	RUN	1		TCR=99% SCR=99% RQD=81%	l						
0						[,				l						
										l						
1										l						
					-											
ر ا																
2																
						L				l						
3					5	RUN	1		TCR=100% SCR=98% RQD=84%							
										l						
4										l						
	\perp		M	14.40	$ldsymbol{ldsymbol{ldsymbol{eta}}}$					l						
		END OF BOREHOLE AT 14.40m.								l						
5										l						
6																
_																
7																
8																
_																
19										l						
										l						
\perp		0001111014147775		1011	Ļ					<u> </u>					<u> </u>	
		GROUNDWATER ELE			ó	_	_									
		$\overline{egin{array}{c} egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} arra$	ALLA [.]	TION		Ż		EEI	P/DUAL INSTALLATION		LOGGE	D :	Schneid	ler		
		WATER LEVEL (date)							LEVEL (date)				KS			



PROJECT : Mary River Project

Project No. 19-1605-126

LOCATION : 44+000 - Quarry

STARTED

July 15, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

	ARTE MPLE	:D : July 15, 2011 ETED : July 15, 2011			DR	ILLE			OART LONGYEAR, LM-55 85 927 E 596 138				ET 1 OF JM: C	
		SOIL PROFILE			5	SAME				EXCESS IC		ENT, PERCENT	Г	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		Ь	_			_			10	20 eic	e 30 40	ADDITIONAL LAB. TESTING	GROUND COND. FROZEN
TH S	NG M	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION			T, PERCENT	- ES	UNFROZEN
	BORII		STRA	EE	Ñ	í	BLOV	RECO	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp — 10	⊖ ^W	y wl 30 40	AB L	UNCERTAIN
		GROUND SURFACE	П	0.00					7 7 7 7					
ļ.		GRAVEL and COBBLES, granitic, subrounded to subangular, grey, fines	70											
1		washed out			1	RUN		9						
			$^{\circ}$											
- -2														-
-			ς O											
- 3			0											
			60		2	RUN		26						
-4			°O											-
				5.00										5.00
- 5 [GRANITIC GNEISS, slightly weathered, medium grained, closely spaced joints, grey	M	5.00										5.00
		to pink												-
-6 -					3	RUN			TCR=93% SCR=50% RQD=50%					-
- 7]	IXOIN			10N-33/6 30N-30/6 NQD-30/6]
]
-8		becoming fresh, moderately spaced] -
ŀ		becoming fresh, moderately spaced]
9														-
					4	RUN			TCR=97% SCR=97% RQD=55%					-
-10														
	=													
- 11	NQ Diamond Drill													-
	Diamo]
- 12	NO				_				TOD 000/ 00D 000/ DOD 570/					-
- 13					5	RUN			TCR=98% SCR=98% RQD=57%					
F 13]
-14														-
- - 15														-
[6	RUN			TCR=100% SCR=25% RQD=7%]
16														-
ŧ]
- 17														-
ŀ														
-18 [-
ļ ,,					7	RUN			TCR=100% SCR=92% RQD=59%					
- 19 -														
<u> </u>														
		GROUNDWATER ELE	VAT	IONS	3									

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS



Mary River Project **PROJECT**

44+000 - Quarry

Project No. 19-1605-126

STARTED COMPLETED :

LOCATION

July 15, 2011 July 15, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 885 927 E 596 138

SHEET 2 OF 2 DATUM: CGVD28

					Γ.	24.5			35 927 E 596 138	EXC	ESS ICE	CONTF	NT, PER	CENT		
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE	1 ⊢1		Ľ	SAM	_	_				oice			ADDITIONAL LAB. TESTING	THERMISTER/ GROUND COND
stres)	MET		STRATA PLOT	(E)	H	l ш	BLOWS/0.3m	RECOVERY %	COMMENTS					10 	TION	FROZEN
# # E	RING	DESCRIPTION	ATA	ELEV. (m)	NUMBER	TYPE	/SMC	OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		ATER CO	TNETNC			TOO!	UNFROZEN
	BOR		STR	H	Ž		BLC	REC	50 100 150 200 250					40 	4 1	UNCERTAIN
		mandagatah da widah canasad	\//													
		moderately to widely spaced														
21																
-					R	RUN			TCR=100% SCR=95% RQD=64%							
-22					"	IXOIX			1011-100% 3C11-35% 11QD-04%							
				23.00												
23		END OF BOREHOLE AT 23.00m.														
_																
-24																
25																
-26																
27																
-28																
29																
-30																
31																
-32																
33																
-34																
35																
-36																
"																
37																
31																
20																
-38 																
39																
		GROUNDWATER ELE	VA1	IONS	<u></u>		<u> </u>	<u> </u>				<u> </u>				
		∇ SHALLOW/SINGLE INSTA				_		\	P/DUAL INSTALLATION			_				
39		WATER LEVEL (date)	ALLA	IION					LEVEL (date)		LOGGEI CHECKE		Khabbaz KS	rnia		
		(,							(/			. ·				THURBE



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 45+000 - Quarry STARTED

COMPLETED :

July 14, 2011 July 14, 2011

DRILLER: BOART LONGYEAR, LM-55

N 7 884 724 E 596 201

SHEET 1 OF 1 DATUM: CGVD28

		SOIL PROFILE			Ţ :	SAM			54 724 E 590 201	EXCES	SS ICE		NT, PEF			THERMISTER/ GROUND CONI
DEPTH SCALE (metres)	BORING METHOD		PO.		_		33	%/		10) 2	o ^{ice}		40	ADDITIONAL LAB. TESTING	FROZEN
TH S	<u>R</u>	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS	WA.	TER CO	L ONTEN	, PERC	 ENT	E	UNFROZEN
- 등	RIN	DESCRIPTION	ZAT,	:LE	Į₽	≿	Š.	COV	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp	—	o <u>w</u>			AB.	UNCERTAIN
	B		STF	Ш	Ĺ		В	R	50 100 150 200 250	10) 2	20	30	40		ONOLINIAIN
		GROUND SURFACE GRAVEL, light grey to pink, sub-angular to	 	0.00 0.11												1
		sub-rounded	60	0.11												
		COBBLES and BOULDERS, some gravel, granitic, angular, grey	1) —													
1			00		1	RUN	ı	79								
			60													
-2			0	2.20												2.20
		GRANITIC GNEISS, faintly weathered, fine to medium grained, moderately to widely jointed, black to light grey	\mathbb{W}													
3		widely jointed, black to light grey														
Ŭ																
					2	RUN			TCR=99% SCR=98% RQD=89%							
-4					-											
- 5																
					-	<u> </u>										
6	_															
	[,	RUN			TCR=100% SCR=100% RQD=85%							
7	Diamond Drill				3	INON	1		1011-100/0 30N-100/0 KQD-00%							
	Dian															
-8	ջ															
١						_										
9																
-10					4	RUN	1		TCR=100% SCR=100% RQD=89%							
			\otimes													
11																
12																
13					5	RUN	ı		TCR=100% SCR=97% RQD=88%							
-14	\perp		\bigotimes	14.30	L	L	L									
ſ		END OF BOREHOEL AT 14.30m.														
15																
.,,																
-16																
17																
-18																
10																
19																
			Ш		L											
		GROUNDWATER ELE			3											
		abla shallow/single insta	ALLA	TION		7	Z D	EEI	P/DUAL INSTALLATION	10	OGGED) :	Schneid	ler		
		WATER LEVEL (date)	•						LEVEL (date)		HECKE		KS			THURST
		. ,														THURB



PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : 50+000 - Quarry

 STARTED : July 14, 2011
 DRILLER: BOART LONGYEAR, LM-55
 SHEET 1 OF 1

 COMPLETED : July 14, 2011
 N 7 881 100 E 597 357
 DATUM: CGVD28

		- July 14, 2011							31 100 E 331 331								5VD20
ш	ОО	SOIL PROFILE				SAMI	PLES	S		EXC	ESS IC		ice	IT, PER	CENT	. (2)	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		5				E	%			10	20	3	0 4	10	ŽŽ	GROUND COND. FROZEN UNFROZEN UNCERTAIN
⊣ S(etre	W.		STRATA PLOT	ELEV. (m)	NUMBER	ш	BLOWS/0.3m	RECOVERY	COMMENTS						l		FROZEN
H. ii	ING	DESCRIPTION	\4 ¥T	EV.	JME	TYPE	WS	OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	W	AIER	CONTE	=NI, 、W	PERCE		G G	UNFROZEN
ᆸ	30R		TR/	ᆸ	ž		зго	Ë	50 100 150 200 250	'	vp 10	20	3(—— I v	мі 10	⋖	UNCERTAIN
		GROUND SURFACE	0		⊢		_	Ľ	30 100 130 200 230	+	1	+	$\overline{}$			\vdash	
		GRAVEL and BOULDER	$+$ \cup	0.00						1	-					 	
-			1. 0	0.44	ł											1	0.44
. 1		GRANITIC GNEISS, slightly weathered, medium to coarse grained, strong, black,			١,	RUN		87								1	
-1		grey, red			l '	IXOIN		01								1	-
t l																1	
ا را																1	
-2			M													1	_
.																1	
3			\mathbb{M}													1	
:					2	RUN			TCR=100% SCR=91% RQD=84%							1	
ŀ I			\mathbb{M}													1	
-4																1	-
- 1			\mathbb{M}													1	
- 1																1	
- 5			\mathbb{K}													1	-
																1	
-6			$\mathbb{K}/\!\!\!/$													1	_
t I					3	RUN			TCR=100% SCR=85% RQD=93%							1	
- 1			K//													1	
7																1	
.			K/A													1	
	≣															1	
-8	NQ Diamond Drill	becoming fresh, moderately jointed														1	-
	amo															1	
- - 9	۵															1	
. 9	۶				4	RUN			TCR=97% SCR=97% RQD=78%							1	
- 1						INOIN			101(-31/0 001(-31/0 1(QD-10/0							1	
10																1	-
																1	
																1	
- 11		closely jointed	X //													1	-
:																1	
-12																1	_
F 12					_	DLIN			TCD-009/ CCD-009/ DOD-909/							1	_
.					5	RUN			TCR=99% SCR=99% RQD=89%							1	
13																1	
																1	
					L					1							
-14		faintly weathered, closely to moderately								1							-
<u> </u>		jointed			l												
- - 15										1] .
ا '' إ					6	RUN			TCR=100% SCR=99% RQD=84%								
-					۱	IVOIN			1011-100/0 3011-88% RQD-04%								
-16					l												-
					l												
				16.90	L												
- 17		END OF BOREHOLE AT 16.90m.															
<u> </u>					l												
-18																	_
- 10										1]
[1							
19										1							
										1							
					l												
		GROUNDWATER ELE	-\/^+	IONIC	<u> </u>					-							

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Van Luver/Schneider CHECKED : KS



Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 53+700 - Quarry

July 13, 2011 STARTED

DRILLER: BOART LONGYEAR, LM-55

July 13, 2011 COMPLETED

N 7 877 567 E 597 616

SHEET 1 OF 2 DATUM: CGVD28

ш	8	SOIL PROFILE				SAM	PLE	S		EXCE	SS ICE	CONTE		RCENT	. (1)	THERMISTE GROUND CO
DEPTH SCALE (metres)	BORING METHOD		TO.		_		3m	۲%		1	0 2	o ^{ice} 20 3		40	ADDITIONAL LAB. TESTING	FROZEN
netre	∑ S	DECODIDATION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY	COMMENTS	WA	ATER C	L ONTENT	PERCE	-NT		UNFROZEN
5	ž	DESCRIPTION	AT/	LEV	I≅	\(\(\)	NC O	SOV	DYNAMIC CONE PENETRATION RESISTANCE PLOT			OW OW		wl	AB.	l
ا د	BO		STR	Ш	Z		BL	REC	50 100 150 200 250	1				40 		UNCERTAIN
		GROUND SURFACE		0.00												
		COBBLES and BOULDERS, some gravel, granitic, angular to subangular, grey	7.0													
1			00		1	RUN	ı	43								
			60													
2			0	2.20												
		SAND and GRAVEL, some cobbles, some		2.20	┢											
		silt, wet, brown, some fines washed out														
3																
					١,	RUN		57								
ιl					_	KUN	1	31								
		BOULDERS and COBBLES, angular to		4.70	┨											
5		subangular, some gravel, pink and dark grey, some fines washed out	60		<u> </u>											
		5 - y, mass nation out	6													
3			7,9													
			54													
,			O _o		3	RUN	1	76								
			60													
		CDANITIC CNEISS fainthrusathard to		7.70	-											7.70
3		GRANITIC GNEISS, faintly weathered to fresh, medium to coarse grained, moderately jointed, grey to pink														
		moderately jointed, grey to pink														
	Ē															
	puc				4	RUN	ı		TCR=100% SCR=100% RQD=100%							
10	Diamond															
	Δ D															
11	-				L		L									
12																
'-																
					5	RUN			TCR=98% SCR=98% RQD=86%							
13																
14																
					T											
ی			\mathbb{M}													
15																
					6	RUN			TCR=99% SCR=99% RQD=96%							
6																
17																
<u> </u>					\vdash											
8																
					-	RUN			TCR=100% SCR=100% RQD=98%							
19					[_	INUN			1011-100/0 3011-100/0 KQD=90%							
		GROUNDWATER ELE	EVAT	TIONS	5		-							1		
		\overline{Y} SHALLOW/SINGLE INST.				1	Z -		P/DUAL INSTALLATION							
		WATER LEVEL (date)	ALLA	HON					LEVEL (date)		OGGE			er/Schne	ider	
		VVATER LEVEL (date)					v v A I		LEVEL (uale)		CHECKE	: ע	KS			THUR

Mary River Project **PROJECT**

LOCATION 53+700 - Quarry

July 13, 2011

Project No. 19-1605-126

July 13, 2011 STARTED

COMPLETED :

DRILLER: BOART LONGYEAR, LM-55 N 7 877 567 E 597 616

SHEET 2 OF 2 DATUM: CGVD28

		TED : July 13, 2011							77 567 E 597 616	EVOC	0 10-	CONTE	NT DEC		M: C	
IJ,	НОР	SOIL PROFILE				SAM	IPLE	_		EXCES	SS ICE	CONTE	NT, PER	CENI	Z G	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		STRATA PLOT	(m)	띪	 	BLOWS/0.3m	RECOVERY %	COMMENTS	10 				10 	ADDITIONAL LAB. TESTING	FROZEN
EPT)	RING	DESCRIPTION	RATA	ELEV. (m)	NUMBER	TYPE	OWS,	COVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	WA1 wp		ONTENT → OW	, PERCE		ADDI AB. T	UNFROZEN W
	BO		STF	ш	Ĺ		В	RE	50 100 150 200 250	10	2	0 3	30 4	10	_	ONCENTAIN
_																
21																
20					8	RUN	١		TCR=100% SCR=100% RQD=90%							
-22																
- 23																
	II Dri		M													
-24	NQ Diamond Drill															
	M D M				9	RUN	1		TCR=98% SCR=98% RQD=88%							
25																
-26																•
- 27																
-28					10	RUN	١		TCR=100% SCR=100% RQD=99%							
- 29				29.20												
		END OF BOREHOLE AT 29.20m.														
-30																•
0.4																
31																
-32																
- 33																
- 34																
- 35																
20																
-36																•
- 37																
•																
-38																
- 39																
		GROUNDWATER ELE	Ш VAT	IONS	<u></u>			<u> </u>								
		$^{ ot}$ shallow/single insta				Ţ		EEI	P/DUAL INSTALLATION	LC	OGGED	· :	Van Luv	er/Schnei	der	
		WATER LEVEL (date)							LEVEL (date)		HECKE		KS			THURBER

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION 56+750 - Quarry

STARTED

COMPLETED :

July 11, 2011 July 11, 2011

DRILLER: BOART LONGYEAR

N 7 875 280 E 598 852

SHEET 1 OF 1 DATUM: CGVD28

		SOIL PROFILE			Γ.	SAM			75 280 E 598 852	EXC	ESS ICE	CONTE	NT, PEF		лм: Со Т	
DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE	Τ⊢	1	Ľ	SAIVI	_					oic	Э		ADDITIONAL LAB. TESTING	THERMISTER GROUND COI
SC,	ME		PLO.	Œ	띪	l	BLOWS/0.3m	RY %	COMMENTS				1	40 	FST	FROZEN
E E	ING	DESCRIPTION	\TA	ELEV. (m)	NUMBER	TYPE	/S/	OVE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTEN	Γ, PERC		DDII	UNFROZEN
	BOR		STRATA PLOT	_ =	ž	ľ	BLO	RECOVERY %	50 100 150 200 250		vp	 20		wi 40		UNCERTAIN
		GROUND SURFACE		0.00												
		COBBLES and BOULDERS, some gravel, angular to subangular, pink to dark grey	00]												
			Γ	1												
1			000		1	RUN	ı	78								
			0	1												
2			00													
			60													
3			00	1												
			60	,												
4			000		2	RUN	1	100								
		CDANITIC CNEISS fainth weathered	F ~	4.41												4.41
5	≣	GRANITIC GNEISS, faintly weathered, closely jointed, medium grained, pink to grey														
,	J Dud L	fresh, moderately jointed, medium to very coarse grained, pink to dark grey]												
<u> </u>	NQ Diamond Drill	coarse grained, pink to dark grey														
6	a D															
	_	highly mafic from 6.40 to 6.80m			3	RUN			TCR=100% SCR=100% RQD=76%							
7																
				1												
3																
9																
10					4	RUN	l		TCR=100% SCR=100% RQD=87%							
11				1												
'' ⊦		END OF BOREHOLE AT 11.20m.	- Y//	11.20												
12																
13																
14																
15																
16																
'																
,																
17																
18																
19																
		ODOLINDA/ATED EL E			Ļ											
		GROUNDWATER ELE			Ś	_	_									
		$\overline{igspace}$ shallow/single inst	ALLA	TION					P/DUAL INSTALLATION		LOGGE	D :	Schneid	ler		
		WATER LEVEL (date)				,	WA٦	ΓER	LEVEL (date)		CHECK	ED :	KS			THUR



Mary River Project **PROJECT**

LOCATION 82+700 - Quarry

July 22, 2011 DRILLER: WALKER DRILLING, D-50 STARTED July 22, 2011 N 7 852 449 E 605 710 COMPLETED

SHEET 1 OF 1 DATUM: CGVD28

Project No. 19-1605-126

	2	SOIL PROFILE			:	SAM	PLE	S		EXC	ESS ICE	CONTE		CENT	. (0	THERMISTER/
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	W		20 3 L ONTENT	80 4 I		ADDITIONAL LAB. TESTING	GROUND COND. FROZEN UNFROZEN
□	BO		STR	ӹ	z		BLC	REC	50 100 150 200 250					10 	٠, ٦	UNCERTAIN
_		GROUND SURFACE GRAVEL, subrounded to subangular,	•,•,•	0.00												
- 1 - 1		pinkish grey GRANITIC GNEISS, slightly weathered fine grained, highly fractured, grey to pi	nk	1.65	1	RUN	1	62								1.65
- - 3					2	RUN	Į.		TCR=100% SCR=58% RQD=0%							
- 5 - 6					3	RUN	Į		TCR=100% SCR=92% RQD=42%						FI 6 2 1 3 3 3	
- 7	d Drill	occasional quartz seams			4	RUN	ı		TCR=100% SCR=100% RQD=67%						3 1 1 5 0	
-8 -8 - -9	NQ Diamond				5	RUN	ı		TCR=97% SCR=97% RQD=82%						1 1 1 1 2	
-10 -110 -11					6	RUN	ı		TCR=100% SCR=100% RQD=52%						2 1 1 0 1	
- 12		highly weathered, highly fractured			7	RUN	1		TCR=100% SCR=100% RQD=52%						2 2 2 8 8 5	
- 13 14		inginy wedatered, inginy nactured				RUN			TCR=97% SCR=29% RQD=29%						5 5 8 3 2	
- 15						RUN			TCR=99% SCR=72% RQD=52% TCR=100% SCR=100% RQD=100%						3	
-16 -17		END OF BOREHOLE AT 16.00m.		16.00												
- 17 - - -18																
19																
		GROUNDWATER E			5				P/DUAL INSTALLATION LEVEL (date)		LOGGE		Hill KS		<u> </u>	THURBER



Mary River Project **PROJECT**

85+200 - Quarry

Project No. 19-1605-126

STARTED COMPLETED

LOCATION

July 20, 2011 July 21, 2011

DRILLER: WALKER DRILLING, D-50 N 7 850 087 E 606 073

SHEET 1 OF 2 DATUM: CGVD28

	0	SOIL PROFILE			٦,	SAM		٥		EXCE	SS ICE	CONTE	NT, PERCENT		THERMISTE
(metres)	BORING METHOD	30IL FROITEL			Ľ			_				oice)	ADDITIONAL LAB. TESTING	GROUND CC
es)	ᇦ		[7]	<u> </u>	l ~		3m	٧.		1	0 :	20 3	30 40		FROZEN
(metres)	_დ		<u> </u>	<u>п</u>	開	Щ	0,0	ER	COMMENTS	١٨//	TED C		, PERCENT		
틸	ĭ	DESCRIPTION	Į.	ELEV. (m)	NUMBER	TYPE	×	S	DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTENT	, PERCENT	G 6	UNFROZEN
;	Ö		STRATA PLOT	핍	ź	Ι΄.	BLOWS/0.3m	RECOVERY %	RESISTANCE PLUT	W	p		———I wl 30 40	∢ ⊴	UNCERTAIN
_			S.				Ш	2	50 100 150 200 250			1	1 40		
_		GROUND SURFACE	-	0.00											
		GRAVEL and COBBLES, granitic, red/black/grey, fines washed out	0,0											1	
			$h \hookrightarrow$												
1 I			00		1	RUN		45							
.			6												
			60												
ا ۱			00		2	RUN		0							
2			6 O			<u> </u>									
			0	2.58	3a	RUN		33						1	2.58
		GRANITE, highly weathered, highly fractured, red/black			3h	RUN			TCR=100% SCR=0% RQD=0%						
3		tractured, red/black			55	IXOIV			1011-100% GOI1-0% 11QD-0%					FI 3	
			K//											4	
		vertical joint												3	
1			8//		4	RUN			TCR=95% SCR=22% RQD=12%					4	
														3	
														2	
5			K//											3	
				5.40	5	RUN			TCR=46% SCR=0% RQD=0%					2	
		GRANITIC GNEISS, slightly weathered,			\vdash	_								1	
3		moderately fractured, grey, black, red	K		6	RUN			TCR=86% SCR=82% RQD=56%					1	
'					-									1	
					7	RUN			TCR=100% SCR=96% RQD=96%					1	
.						RUN			TCR=100% SCR=100% RQD=100%					6	
7					9	RUN			TCR=100% SCR=100% RQD=100%					1	
					10	RUN			TCR=100% SCR=98% RQD=98%					1	
			K//		<u> </u>									3	
3														3	
			8//		11	RUN			TCR=100% SCR=45% RQD=36%					3	
														3	
9						_								2	
	Ē													2	
	틸				12	RUN			TCR=99% SCR=99% RQD=92%					1 1	
10	Diamond		\ <i>\</i> //		12	RUN			1CR-99% SCR-99% RQD-92%					1	
.	Jai													1	
	ğ	moderately weathered, medium strong,	$\langle \rangle / \rangle$											1	
11 l	_	grey/white and black, medium to coarse	\mathbb{N}											2	
''		grained			13	RUN			TCR=100% SCR=87% RQD=75%					0	
			K//											1	
12														3 2	
			8//											2	
														1 1	
ا ۱					14	RUN			TCR=100% SCR=78% RQD=78%					2	
13			K//											2	
					<u> </u>									2	
ا ر		alightly weathers d	K//		1									0	
14		slightly weathered			4.5	L			TCD=4000/ CCD=770/ DCD=770/					1	
			\/\		15	RUN			TCR=100% SCR=77% RQD=77%					2	
			\mathbb{K}		1									2	
15					\vdash									3	
			K//											3	
			\sim		16	RUN			TCR=100% SCR=95% RQD=68%					5	
16			8//		'`				1611 16070 COIT 6070 TRQD 6070					2	
														1	
		strong												1	
17		strong												1 0	
			NXI		17	RUN			TCR=100% SCR=93% RQD=92%					0	
			K//		1									3	
8					L									3	
٦			$\langle \rangle / \rangle$		_									0	
			\mathbb{K}		1									ő	
ا ما					18	RUN			TCR=100% SCR=97% RQD=93%					1	
19			K//		1									0	
					\vdash									1	
			8//											1	
—		GROUNDWATER EL	┸ ═\/∧٦	LIUNIC	ᠸ			ı							
					,	_	_								
		$\overline{\lor}$ SHALLOW/SINGLE INS	ΓΑΙΙΑ΄	TION		Ţ	<u>_</u> n	EFF	P/DUAL INSTALLATION		OGGE	D :	Letts		
			\												
		WATER LEVEL (date)				'	٧٧Al	ΙEΚ	_EVEL (date)	(CHECKI	ED :	KS		THUR



Mary River Project **PROJECT**

LOCATION 85+200 - Quarry July 20, 2011 STARTED

COMPLETED :

July 21, 2011

DRILLER: WALKER DRILLING, D-50 N 7 850 087 E 606 073

SHEET 2 OF 2 DATUM: CGVD28

Project No. 19-1605-126

		TED : July 21, 2011			Γ.				50 087 E 606 073	EXC	SS ICE	CONTE	NT, PEF) Ni C	GVD28
DEP IN SCALE (metres)	BORING METHOD	SOIL PROFILE			Ľ	SAM		_				oic	е		₽ B	THERMISTER GROUND CO
sc, tres)	MET		701	(E)	监	l	BLOWS/0.3m	RY %	COMMENTS	1	0 : L	20 	30 	40 	ADDITIONAL LAB. TESTING	FROZEN
E e	ING	DESCRIPTION	TA F	ELEV. (m)	NUMBER	TYPE	MS/(OVE!	DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTEN	Γ, PERC		B. TI	UNFROZEN
4	BOR		STRATA PLOT		ž	[BLO	RECOVERY %	50 100 150 200 250		rp			wl 40	₹≤	UNCERTAIN
					19	RUN			TCR=84% SCR=73% RQD=63%							
.					"				101.01% 001.10% 1142 00%						1	
21															1	
					20	RUN			TCR=100% SCR=100% RQD=100%						1	
22					21	RUN			TCR=99% SCR=96% RQD=80%						1 1	
					-				reit 55% Cert 55% Reg 55%						1	
23																
					22	RUN			TCR=100% SCR=95% RQD=95%							
24																
															1	
25						L									2 2	
_					23	RUN			TCR=99% SCR=86% RQD=86%						2	
26	_	END OF BOREHOLE AT 25.89m.	_	25.89	-											
_		LID OF BOILE IOLE AT 20.09III.														
27																
_																
28																
29																
30																
31																
32																
33																
34																
35																
~																
36																
ا ت																
37																
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_																
38																
39																
		I GROUNDWATER ELI	 F\/∆7		<u></u>											
					,	•	7 -		D/DITAL INIOTAL CONTROL							
		SHALLOW/SINGLE INST	ALLA	HON					P/DUAL INSTALLATION		LOGGE		Letts			
		WATER LEVEL (date)					v v / \	· L/\	LEVEL (date)		CHECK	: ט	KS			THUR



Mary River Project **PROJECT**

88+800 - Quarry

Project No. 19-1605-126

LOCATION STARTED

COMPLETED

July 17, 2011 July 18, 2011

DRILLER: WALKER DRILLING, D-50

N 7 846 674 E 605 956

SHEET 1 OF 1 DATUM: CGVD28

ш	8	SOIL PROFILE			:	SAM	PLE	s		EXC	ESS ICE			CENT	. (2)	THERMISTER/ GROUND COND
DEPTH SCALE (metres)	BORING METHOD		, PLOT	. (m)	3ER	Ä	3/0.3m	ERY %	COMMENTS		10 2 L ATER CO		80 4 L	40 	ADDITIONAL LAB. TESTING	FROZEN
DEPT (m	BORING	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY	DYNAMIC CONE PENETRATION RESISTANCE PLOT	v	/p	o <u>w</u>			ADD LAB.	UNFROZEN W
		GROUND SURFACE		0.00												
		ORGANICS: (100mm) GRANITIC GNEISS, slightly weathered, medium grained, medium strong, black/pink/red	-	0.10											FI 2 2	0.10
1		black/pink/red			1	RUN	•		TCR=89% SCR=86% RQD=76%						4	
															3	
-2						L									2	
3					2	RUN			TCR=97% SCR=97% RQD=82%						1	
٥		strong to very strong			3	RUN									2	
4					4	RUN	ı		TCR=73% SCR=69% RQD=60%						4	
					5	RUN	ı		TCR=88% SCR=67% RQD=26%						3	
5						RUN			TCR=100% SCR=100% RQD=92%						3	
						RUN			TCR=100% SCR=83% RQD=48% TCR=100% SCR=100% RQD=100%						4 >5	
6															1	
7	Drill				9	RUN	ı		TCR=96% SCR=92% RQD=81%						2	
	puour					L									2	
8	NQ Diamond Dril				10	RUN			TCR=58% SCR=33% RQD=0%						2	
					11	RUN	I		TCR=100% SCR=88% RQD=70%						2	
9					12	RUN			TCR=100% SCR=100% RQD=68%						2	
10															3	
10					13	RUN	1		TCR=94% SCR=94% RQD=91%						2	
11					14	RUN			TCR=100% SCR=100% RQD=78%						3 0	
					15	RUN			TCR=79% SCR=79% RQD=74%						1	
12					13	IXOIX			101-19% 3011-19% 11QD-14%						1 2	
40					16	RUN	ı		TCR=100% SCR=98% RQD=96%						2 2	
13															1 1	
14					17	RUN			TCR=85% SCR=80% RQD=80%						1 1	
					_	RUN	-		TCR=100% SCR=100% RQD=100%						1 0	
15		END OF BOREHOLE AT 15.00m.	- X	15.00	19	RUN			TCR=100% SCR=100% RQD=100%							
16																
17																
18																
19																
					L				_							
		GROUNDWATER ELE			3	_	_									
		☐ SHALLOW/SINGLE INST	ALLA	TION					P/DUAL INSTALLATION		LOGGE		Selman/	Letts		
		WATER LEVEL (date)					vvA ⁻	ıER	LEVEL (date)		CHECKE	D :	KS			THURBE

Mary River Project **PROJECT**

100+700 - Quarry

DRILLER: BOART LONGYEAR, LM-55

STARTED COMPLETED :

LOCATION

July 14, 2011 July 14, 2011

N 7 833 967 E 609 448

SHEET 1 OF 1

Project No. 19-1605-126

DATUM: CGVD28

ц	ᄋ	SOIL PROFILE			S	SAMI	PLES			EXCE	SS ICE	CONTE	NT, PER	CENT	٥٦	THERMISTER GROUND COI
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250		TER C	20 L DNTENT	30 4 L T, PERCE		ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
\dashv	Т	GROUND SURFACE	+"	0.00				ш.	99 190 190 290 290						+	
1 2		GRAVEL and COBBLES (< 100mm), red/dark grey, angular to sub-angular		2.20	1	RUN		64								
3		COBBLES, BOULDERS (< 320mm) and GRAVEL, red/dark grey, angular to subangular		2.20	2	RUN		97								
5 6 7	ond Drill	GRANITIC GNEISS, faintly weathered, medium to coarse grained, strong, red/dark grey		5.00		RUN			TCR=100% SCR=100% RQD=82%							5.00
8 3 3 3 3 3 3 3 3 3	NQ Diamond Drill	slightly to moderately weathered, medium strong			4	RUN			TCR=100% SCR=81% RQD=45%							
11 12 13					5	RUN			TCR=98% SCR=98% RQD=97%							
14		strong to very strong				RUN			TCR=100% SCR=100% RQD=94%							
15 <u> </u>		END OF BOREHOLE AT 15.10m.		15.10												
17																
18 19																
		GROUNDWATER ELE $\ ^{ abla}$ shallow/single inst/			<u></u>		<u></u>	EEF	P/DUAL INSTALLATION	L	OGGEI) :	Young			



Mary River Project **PROJECT**

101+100 - Quarry

Project No. 19-1605-126

LOCATION

July 15, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 1 OF 2 July 15, 2011 N 7 836 190 E 610 857 DATUM: CGVD28 COMPLETED :

ч	ОР	SOIL PROFILE			_ ;	SAM	PLE			EXCESS ICE CONTENT, PERCENT	ا ∟ ق	THERMISTER GROUND COI
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 30 40 WATER CONTENT, PERCENT wp ———————————————————————————————————	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
		GROUND SURFACE		0.00								
1 2		COBBLES, GRAVEL and BOULDERS (<450mm), dark grey, pink/white, subangular to subrounded			1	RUN		95				
3		GRANITIC GNEISS, faintly to slightly weathered, medium strong to strong, medium to coarse grained, dark grey, white,	00	2.85					TOD 400Y 00D 07V D0D 40Y		FI 10	2.85
4 5		pink			2	RUN			TCR=100% SCR=97% RQD=43%			
6					3	RUN			TCR=100% SCR=100% RQD=92%		5	
10	NQ Diamond Drill				4	RUN			TCR=100% SCR=93% RQD=60%		10	
11 11 11 11 11 11 11 11 11 11 11 11 11	Z	slightly to moderately weathered			5	RUN			TCR=100% SCR=74% RQD=74%		1 1 2 2 1 2 1 2 2	
15					6	RUN			TCR=103% SCR=84% RQD=81%		1 0 2 2 3 1 2	
17											1 1 1 0 0	
18					7	RUN			TCR=97% SCR=65% RQD=65%		1 2 1 1 1	
		GROUNDWATER ELE			<u>L</u> 3				P/DUAL INSTALLATION LEVEL (date)	LOGGED : Young CHECKED : KS	0	THUR



PROJECT : Mary River Project

101+100 - Quarry

Project No. 19-1605-126

LOCATION : STARTED :

July 15, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 836 190 F 610 857 SHEET 2 OF 2

	ARTE MPLE	D : July 15, 2011 ETED : July 15, 2011			DK	ILLI			OART LONGYEAR, LM-55 36 190 E 610 857						ET 2 OI JM: C	- 2 GVD28
H.	ДОН	SOIL PROFILE	_		5	SAM	PLE	_		EXC	ESS ICE	CONTE	NT, PER	CENT	آ ٿ آ	THERMISTER/ GROUND COND
I SCA etres)	MET		PLOT	(E)	띪	 	0.3m	.RY %	COMMENTS			20 :	30 4	10 	TIONA	FROZEN
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	w	rp	ow		wl	ADDITIONAL LAB. TESTING	UNFROZEN W
	BC		STI		 		В	묎	50 100 150 200 250	1	0	20 :	30 4	10	 	ONO ENTITUE
-			W	20.50												
- - 21		END OF BOREHOLE AT 20.50m.	T													
-22																
-																
- 23																
- 24																
- 24																
- 25																
-																
-26																
- 27																
. 21																
- -28																
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34																
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- 35																
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37																
- -																
- 38																
- - 39																
. Ja																
		GROUNDWATER ELE			Ļ											

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Young CHECKED : KS



RECORD OF BOREHOLE NTUN-DH01

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION Cockburn Lake - North Tunnel

STARTED August 3, 2011 COMPLETED August 3, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 835 656 E 605 976

SHEET 1 OF 1 DATUM: CGVD28

CO	MPLE	ETED : August 3, 2011					N	7 8	35 656 E 605 976		JM: C	GVD28
щ	00	SOIL PROFILE				SAM	PLE	S		EXCESS ICE CONTENT, PERCENT	י ס	THERMISTER/ GROUND CON
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 30 40	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
		GROUND SURFACE		90.21								K
1 2		no recovery										
	NQ Diamond Drill	SAND and GRAVEL, some cobbles, granitic, rounded to subangular, fines washed out		2.60		RUN	ı	61				
5		washed out		4.80		RUN	1	100				
7		END OF SAMPLING AT 6.45m, START CORING. FOR ROCK DETAILS PLEASE REFER TO NTUN-DH01(R).	0	6.45								6.45
8												
10												
11												
12												
13												
15												
16												
17 18												
19												
		GROUNDWATER ELE\ \(\sqrt{2}\) SHALLOW/SINGLE INSTA			 S		<u> </u>) EFI	P/DUAL INSTALLATION	LOGGED : Durates	<u> </u>	
		WATER LEVEL (date)	LLM	I I I I I I					LEVEL (date)	LOGGED : Dunstan CHECKED : MB		THUR



Mary River Project **PROJECT**

INCLINATION: 64° AZIMUTH: 223°

LOCATION STARTED

Cockburn Lake - North Tunnel August 3, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

Project No. 19-1605-126

August 3, 2011 COMPLETED

N 7 835 656 E 605 976

DATUM CGVD28

		ETED : August 3, 2011	٥			SATE		7 835 656 E FR-FRACTURE CL-CLEAVAGE	F-FAI J-JOI	JLT		SM-SMOOTH R-ROUGH	FO-FOLIATED UE-UNEVEN			CGVD28 FIELD/LABORATO TESTING
(metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	PENETRATRATION RATE (m/min)	FLUSH COLO		P-PO S-SLI R.Q.D. FF	ISHE	DIP wrt Core Axis	ST-STEPPED PL-PLANAR DISCONTINUITY TYPE AND	W-WAVY C-CURVED 1 DATA	penfinod	Compressive Strength (Mpa)	' """
<u>'</u>	- BO	ODOLIND OLDE: CE	ίς			PEN	긥	8848 8848		548	0888	DESCR	RIPTION	Ş	366	■ Laboratory UCS Test
		GROUND SURFACE GRANITIC GNEISS, moderately		90.21 6.45								J		-	+	
7		weathered, strong, open joints with silty infill, dark grey evidence of water travel			2B	15	7,	2				J J J				
8		some heavily fractured zones weathered, stepped joint with silty infill at 7.90m weathered, heavily shattered zone at 8.25										J J J				
9		and 8.90m diagonal, weathered, closed joint at 8.44 and 8.69m			3	_	60				•	J J				
10		sub-horizontal to diagonal, weathered joints (3) at 9.47m			3	11	9					J J J				
11		very strong, moderately spaced discontinuities, coarse grained									•]]				
12		sub-vertical weathered joint at 11.23m										J J J - along vein				
13		diagonal, weathered joint at 12.40 and 12.60m			4	12	09				•	J J				
14		horizontal, weathered joint at 13.75m					-					J				
15		weathered, open joint at 14.20m fresh, strong, very widely spaced, sub-horizontal, pink with grey foliation			5	14	90					J				
16	NQ Diamond Drill															
17	ב מ מ	slightly weathered, moderately spaced, pink with dark grey foliation														
18		joint with black staining on surface, green, soft, waxy infill at 17.63m			_	7	09					J				
_		slightly weathered joint, soft, brown, clay infill at 18.20m			6	17	"									
19		joint with black staining on surface, green, soft, waxy infill at 19.01m										J				
20		dark grey biotite schist banding at 19.70m widely spaced, dark grey with pink banding														
21		biotite schist seam with 2 parallel sub-horizontal breaks at 20.87m			7	6	9					J J				
22																
23		dark grey and pink foliations mechanical joints														
24					8	8	09									
25																
26		slightly weathered, moderately spaced														
		GROUNDWATER ELE	VAT	IONS	<u> </u>		_	0212012121								
		☐ SHALLOW/SINGLE INSTA WATER LEVEL (date)	LLA	TION				DEEP/DUAL II TER LEVEL (dat		ATIC	ON	LOGGE CHECKI				THURE



Mary River Project **PROJECT**

INCLINATION: 64° AZIMUTH: 223°

LOCATION

Cockburn Lake - North Tunnel

SHEET 2 OF 2

Project No. 19-1605-126

DRILLER: BOART LONGYEAR, LM-55 STARTED August 3, 2011 N 7 835 656 E 605 976 August 3, 2011 COMPLETED : DATUM CGVD28

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	ATRATION RATE (m/min)	COLOUR % RETURN	CL-CL SH-SH VN-VE	OVERY		F-FAULT J-JOINT P-POLISH S-SLICKE	NSIDE		R-ROUGH UE ST-STEPPED W	D-FOLIATED E-UNEVEN -WAVY -CURVED	Unconfined Compressive	trength (Mpa)	FIELD/LABORATOR' TESTING RESULTS Point Load Test Diametral Point Load Test
DEP	BORIN		SYME	Ш	2	PENETR	FLUSH	TOTAL CORE %		8848 %	PER .3		IP wrt re Axis	TYPE AND SURI DESCRIPTIO	FACE DN	50 U		Axial Laboratory UCS Test
		GROUND SURFACE							10000000			ĬĬ						1000
27		parallel, sub-horizontal fresh joints (2) at 26.74m			9	1	09						•	J				
-28		heavily fractured zone at 28.22 to 28.80m												J				
- 29		fresh, widely spaced, pink with grey foliation all joints are mechanical breaks									2.4.1.4.2							
-30	ond Drill				10	10	Og.	8										
· 31	NQ Diamond Drill																	
-32		massive																
33					11	1	9	8										
-34		sub-vertical, weathered, stepped open joint																
35		with sity infill at 34.45m END OF BOREHOLE AT 34.80m.		34.80										J				
-36																		
37																		
-38																		
39																		
-40																		
· 41																		
-42																		
43																		
-44																		
45																		
-46																		
		GROUNDWATER ELE			<u>. </u>			<u> </u>										
		SHALLOW/SINGLE INSTA	ALLA ⁻	TION					OUAL I VEL (da		LLAT	ION		LOGGED :				THURBE



RECORD OF BOREHOLE NTUN-DH03

PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : Cockburn Lake - North Tunnel

 STARTED
 : August 1, 2011
 DRILLER: BOART LONGYEAR, LM-55
 SHEET 1 OF 1

 COMPLETED
 : August 2, 2011
 N 7 835 382 E 605 698
 DATUM: CGVD28

	JIVIFL	ETED : August 2, 2011					IN	1 0.	33 362 E 603 696					DATO	ivi. C	GVD28
삨	QQ.	SOIL PROFILE				SAM	PLE	_		EXC	ESS ICE	CONTEI oice		CENT	i c	THERMISTER/ GROUND COND.
SCA tres)	MET		-LOT	Ē	监	l	0.3m	RY %	COMMENTS		10 2 1			0 I	ION/	FROZEN
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT		ATER C	TNETNC	, PERCE		ADDITIONAL LAB. TESTING	UNFROZEN
ă	BOF		STR	Ш	Ž		BLC	REC	50 100 150 200 250	,	10 2 1	20 3 I		0 L	4 2	UNCERTAIN
_		GROUND SURFACE no sampling		146.68												
ŀ		no sampling														
1				1.17												
•	l≡	GRAVEL and COBBLES (<170mm), granitic, fine to medium grained, subangular to subrounded, pinkish red to greyish black	00]												
-2	nd Di	to subrounded, pinkish red to greyish black	0													-
Ė	NQ Diamond Drill															
- - 3	N D			1	1A	RUN	1	30								-
ŧ			60													
-4			$P \sim$	1												-
		END OF SAMPLING AT 4 50m START	00	4.50												4.50
- - 5		END OF SAMPLING AT 4.50m, START CORING. FOR ROCK DETAILS PLEASE REFER TO														-
-		NTUN-DH03(R).]
-6																_
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7																-
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-8																
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9																-
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19																
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		ODOLINDAMATED ELE														

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan
CHECKED : MB



Mary River Project **PROJECT**

INCLINATION: 44° AZIMUTH: 63°

LOCATION

Cockburn Lake - North Tunnel August 1, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 6

Project No. 19-1605-126

STARTED August 2, 2011 COMPLETED

N 7 835 382 E 605 698

DATUM CGVD28

CON	/IPLE	TED : August 2, 2011					IN .	7 835 382 E	605	098					DAT	UM	CGVD28
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	I No.	PENETRATRATION RATE (m/min)	COLOUR % RETURN	FR-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN	J. P	-FAUL -JOINT -POLIS	T SHEI KENS		SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR	FO-FOLIATED UE-UNEVEN W-WAVY C-CURVED	nfined	Compressive Strength (Mpa)	FIELD/LABORATO TESTING RESULTS Point Load Test
me.	SING	DESCRIPTION	MBOI	ELEV	RUN	TRATR (m/n		RECOVERY TOTAL SOLID	R.Q.D.	FRA IND PER	CT. EX	DIP wrt	DISCONTINUIT	/ DATA) SURFACE	Choco	Stren	Diametral ▲ Point Load Test Axial
<u> </u>	BOR		SYI	-		PENE	FLUSH	TOTAL SOLID CORE %	8848	PER S		Core Axis	DESCI	SURFACE RIPTION	20	- 1	■ Laboratory UCS Test
士		GROUND SURFACE		146.68					244			3,000			(y) F		1001
5		GRANITIC GNEISS, slightly weathered, strong, moderately to thinly spaced, pink		4.50	1B	45	\dashv		HHF	$\ \ $		•	J J				
٦		with dark and light grey foliations			2							lat	J				
													·				
6													J				
,					3	19	75					lack	J			$\ \ $	
7																	
						H											
8													J				
		diagonal, faintly weathered joints (2) at											J				
9		8.72m diagonal open joint, some weathering at 8.88 and 9.05m			4	7	100						J				
,		8.88 and 9.05m multi-planar, open joint at 9.25m											J J				
10		diagonal, faintly weathered joint at 10.00m											J J				
		fresh, massive, very widely spaced discontinuities, sub-horizontal foliation				Н											
11												$ \downarrow $	J				
.		diagonal, fresh open joint at 11.30m															
12					5	7	100										
13																$\ \ $	
.	<u> </u>					Н											
14 5	Olig F																
14 15 15 15 15 15 15 15		diagonal open joint at 14.42m										ullet	J				
15	Ž				6	6	100										
16																$\ \ $	
						Н										$\ \ $	
17		biotite schist banding at 17.22m															
		Mound Soriist Daniumy at 17.22111															
18		diagonal, irregular fresh joint at 18.10m horizontal, irregular slightly weathered joint			7	7	100					•	J				
		horizontal, irregular slightly weathered joint at 18.26m sub-vertical open joint with rust at 18.57m										ullet	J - partially open J				
19		sub-vertical open joint with rust at 18.5/m															
		mechanical breaks				Н										$\ \ $	
20																	
21					8	12	100										
22																$\ \ $	
		faintly weathered, moderately spaced discontinuities, trace biotite schist				H										$\ \ $	
23		alscontinuities, trace biotite schist															
		diagonal, faintly weathered joint at 23.60										$ \blacktriangleright $	J .I				
24		and 23.67m			9	10	100						j			$\ \ $	
		GROUNDWATER ELE	VAT	IONS	<u> </u>	ш		10000000000			ш						
						-	7 _										
		abla shallow/single insta	ALLA I	TION		_₹	- D	EEP/DUAL I	NSTAI	LLA	TIC	NC	LOGGE	D : Dunstan	/Hill		

RECORD OF BOREHOLE NTUN-DH03(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 44° AZIMUTH: 63° Cockburn Lake - North Tunnel LOCATION DRILLER: BOART LONGYEAR, LM-55 August 1, 2011 STARTED SHEET 2 OF 6 August 2, 2011 N 7 835 382 E 605 698 COMPLETED DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR DEPTH SCAL W-WAVY (metres) ELEV. (m) ġ C-CURVED DESCRIPTION RUN Diametral FRACT INDEX PER .3 RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 245 ୦ ଚଟି ଚଟି GROUND SURFACE 25 diagonal, irregular, fresh closed joint at 25.60m 26 quartz veins (30mm) at 25.90 and 26.10m 27 10 15 28 4 29 diagonal, faintly weathered open joint at 29.40m 30 31 12 fresh, very widely spaced discontinuities, foliations are sub-horizontal 33 100 13 12 diagonal, slightly weathered closed joint at 33.64m 34 foliations are sub-vertical 35 36 100 14 37 38 39 15 40 41 quartz vein (50mm) at 41.55m 42 10 16 43 44 **GROUNDWATER ELEVATIONS** abla shallow/single installation ▼ DEEP/DUAL INSTALLATION LOGGED : Dunstan/Hill

WATER LEVEL (date)

CHECKED :

MB

5126.GPJ 11/9/11

ROCKM(5126)

WATER LEVEL (date)

Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 44° AZIMUTH: 63° Cockburn Lake - North Tunnel LOCATION DRILLER: BOART LONGYEAR, LM-55 August 1, 2011 STARTED SHEET 3 OF 6 August 2, 2011 N 7 835 382 E 605 698 COMPLETED DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR DEPTH SCAL W-WAVY (metres) ELEV. (m) ġ C-CURVED DESCRIPTION RUN Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial TOTAL SOLIC TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 100 150 8848 8848 245 ୦ ଚଟି ଚଟି GROUND SURFACE 45 17 pale white infill on joint surfaces partially open slightly weathered, banded, fine grained, pinkish grey to greyish black 47 18 49 .50 51 12 19 ·52 53 -54 20 55 -56 J - partially open 57 21 ω -58 59 -60 22 61 62 63 23 soft white infill in joints up to 1mm thick 64 **GROUNDWATER ELEVATIONS** abla shallow/single installation ▼ DEEP/DUAL INSTALLATION LOGGED : Dunstan/Hill WATER LEVEL (date) WATER LEVEL (date) CHECKED : MB

5126.GPJ 11/9/11

ROCKM(5126)

RECORD OF BOREHOLE NTUN-DH03(R)

RECORD OF BOREHOLE NTUN-DH03(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 44° AZIMUTH: 63° Cockburn Lake - North Tunnel LOCATION DRILLER: BOART LONGYEAR, LM-55 STARTED August 1, 2011 SHEET 4 OF 6 August 2, 2011 N 7 835 382 E 605 698 COMPLETED DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG DEPTH SCALE SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR W-WAVY ELEV. (m) ġ C-CURVED DESCRIPTION RUNI Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLIC TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 245 ୦ ଚଟି ଚଟି GROUND SURFACE 65 -66 24 67 68 69 soft white infill in joints up to 1mm thick 25 26 soft white infill in joints 73 75 27 soft greyish green mud in joints up to 3mm thick 77 78 28 -80 81 29 82 83 84 J - partially open **GROUNDWATER ELEVATIONS** \overline{Y} SHALLOW/SINGLE INSTALLATION ▼ DEEP/DUAL INSTALLATION LOGGED : Dunstan/Hill WATER LEVEL (date) WATER LEVEL (date) CHECKED : MB

5126.GPJ 11/9/11

ROCKM(5126)

RECORD OF BOREHOLE NTUN-DH03(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 44° AZIMUTH: 63° LOCATION Cockburn Lake - North Tunnel August 1, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 5 OF 6 August 2, 2011 COMPLETED N 7 835 382 E 605 698 DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG J-JOINT SH-SHEAR VN-VEIN ST-STEPPED PL-PLANAR P-POLISHED W-WAVY DEPTH SCAL E ટું (metres) S-SLICKENSIDED C-CURVED DESCRIPTION ELEV. RUN Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 2345 ~888 GROUND SURFACE 85 moderately weathered, moderately spaced, pink with dark grey diagonal foliations -86 diagonal, planar, dark brown, weathered joint at 86.08m sub-horizontal, planar, dark grey, weathered joint at 86.34m 87 31 88 diagonal, planar, weathered joint at 88.90, 91.30, and 91.50m 89 90 32 91 grey silty infill diagonal, planar, slightly weathered, closed joint at 91.74 and 92.05m 92 93 10 33 94 fresh, very widely spaced, mechanical joints 95 96 34 97 slightly weathered, widely spaced -98 99 35 4 100 101 diagonal, faintly weathered, parallel planar joints (3) at 100.95 to 101.12m 102 36 103 dark grey biotite schist banding at 103.10m faintly weathered, very widely spaced discontinuities **GROUNDWATER ELEVATIONS** abla shallow/single installation ▼ DEEP/DUAL INSTALLATION LOGGED : Dunstan/Hill WATER LEVEL (date) WATER LEVEL (date)

CHECKED

MB

GPJ 11/9/17

ROCKM(5126)

RECORD OF BOREHOLE NTUN-DH03(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 44° AZIMUTH: 63° LOCATION Cockburn Lake - North Tunnel August 1, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 6 OF 6 August 2, 2011 COMPLETED N 7 835 382 E 605 698 DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR W-WAVY DEPTH SCAL ELEV. (m) ટું (metres) C-CURVED DESCRIPTION RUN Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 245 ~888 GROUND SURFACE sub-horizontal, planar, weathered joint at 104.83m 105 37 106 very widely spaced discontinuities diagonal, parallel, planar, slightly weathered joints (2) at 106.60m 107 108 38 10 109 diagonal, planar, weathered joint at 110.02m 110 111 39 50 diagonal, planar, weathered joint at 112.54m 113 diagonal, irregular, weathered open joint at 113.86m 9 40 115 117 41 \$ quartz vein, crystalline structure, 2 mechanical breaks with irregular rough surfaces 118 widely spaced discontinuities 119 120 42 8 121 diagonal, planar, weathered joint at 120.97 and 121.43m END OF BOREHOLE AT 121.60m. 121.60 122 123 124 **GROUNDWATER ELEVATIONS** abla shallow/single installation ▼ DEEP/DUAL INSTALLATION LOGGED : Dunstan/Hill WATER LEVEL (date) WATER LEVEL (date)

CHECKED

MB

.GPJ 11/9/11

5126.0

ROCKM(5126)

RECORD OF BOREHOLE NTUN-DH05

PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : Cockburn Lake - North Tunnel

 STARTED
 :
 July 30, 2011
 DRILLER:
 BOART LONGYEAR, LM-55
 SHEET 1 OF 1

 COMPLETED
 :
 July 31, 2011
 N 7 835 245 E 605 535
 DATUM: CGVD28

$\overline{}$	_				Г.					FXC	SS ICE	CONTE	NT PFR	CENT		THE DAMAGE D
끸	BORING METHOD	SOIL PROFILE				SAM	PLE:	_		LXO	-00 101	ice		OLIVI	일	THERMISTER/ GROUND COND. FROZEN UNFROZEN UNCERTAIN
DEPTH SCALE (metres)	Æ		STRATA PLOT	<u> </u>	~		.3m	RECOVERY %	00111151170	1	0 :		0 4	4 0	STIN	FROZEN
metr H	<u>5</u>	DESCRIPTION	AP	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	Æ	COMMENTS	W	ATER C	ONTENT	PERCE		ĒН.	UNFROZEN
<u>Д</u>		BESSIAII NOIV	RAT	Ë	Ž	}	ŏ.	00	DYNAMIC CONE PENETRATION RESISTANCE PLOT	w	rp	o <u>w</u>			AB AB	UNCERTAIN
	M		ST				В	R	50 100 150 200 250	1	0 :	20 3	0 4	40 		0110211171111
		GROUND SURFACE		148.79												
		no sampling														
	Ęĺ															
-1	Δ			1.30												
	JOE	GRAVEL and COBBLES, granitic, boulders up to 710mm	5													
-2	NQ Diamond Drill	boulders up to 7 Tornim	000													
-	8		S		1A	RUN	1	100								
			$\frac{1}{2}$													
- 3	\vdash	END OF SAMPLING AT 2.99m, START		2.99												2.99
		CORING.														
-4		FOR ROCK DETAILS PLEASE REFER TO NTUN-DH05(R).														
-4																
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GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan
CHECKED : MB



Mary River Project **PROJECT**

INCLINATION: 70° AZIMUTH: 45°

LOCATION

Cockburn Lake - North Tunnel

Project No. 19-1605-126

July 30, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 1 OF 4 N 7 835 245 E 605 535 July 31, 2011 DATUM CGVD28 COMPLETED

(metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	No.	RATION RATE min)	COLOUR % RETURN	FR-FRACTU CL-CLEAVAI SH-SHEAR VN-VEIN	GE.	J- P-		T SHEI KEN:	D SIDED	R-R	SMOOTH DUGH STEPPED PLANAR	FO-FOL UE-UNE W-WAV C-CURV	VEN Y	Unconfined	ngth (Mpa)	FIELD/LABORATOI TESTING RESULTS Point Load Test Diametral
(me	BORING	BESOMI HON	SYMBO	ELE	RUN	PENETRATRATION RATE (m/min)	FLUSH	RECOVERY TOTAL SOL CORE % COR 8898 88	LID E %	R.Q.D. %	FRAI INDI PER	.3 m	DIP wr Core Ax		TYPE /	JITY DATA AND SURFACE SCRIPTION		50 Unco 100 Com		▲ Point Load Test Axial ■ Laboratory UCS Test
		GROUND SURFACE		148.79							Ï	Π	ĨĬ					Ш	\blacksquare	
		GRANITIC GNEISS, faintly weathered, medium grained, strong, widely spaced, pink with dark grey sub-horizontal foliation		2.99																
					1B	19								_J						
4		diagonal, open joint at 3.87m diagonal, stepped joint at 4.17m diagonal, faintly weathered, open joint at						No.					8	J J-FO						
		diagonal, faintly weathered, open joint at 4.30m	M											3-10						
5																				
		diagonal, faintly weathered, open joint at 5.40m			2	3	light grey 100							J						
3		diagonal, weathered, stepped open joint at 5.50m			_	_	light 10							IJ						
		biotite schist banding at 5.55m diagonal, closed joint at 5.70m																		
7																				
8																				
		diagonal, closed joint at 8.12m					<u>></u>							IJ						
					3	12	light grey 100													
9		six quartz veins (2-10mm)					<u>lig</u>							J-VN J-VN						
														J-VN J-VN						
0																				
		very widely spaced, pink with dark grey and white diagonal foliation							₩											
11									₩											
							grey 0		₩											
2	_				4	9	light grey 100		₩											
1	NQ Diamond Drill	diagonal, open joint with faint black mineral infill at 12.39m					_		₩				$ _{ullet}$,						
13	uou U	infill at 12.39m							₩											
	ğ	sand seam, fine grained, trace silt, medium grey at 13.30m (~50mm)																		
14	ž	grey at 13.30m (~50mm)																		
'		sub-vertical, weathered, open joint at												J						
ا ۔،		14.25m			5	16														
15																				
16																				
		pink with dark grey and light grey sub-horizontal foliation																		
17																				
						_	<u></u> }.c													
18					6	1	grey 100													
19																				
		pink with dark grey and light grey diagonal																		
20		foliation																		
							<u>~</u>													
,					7	6	light grey 100													
21							lig													
22																				
- 1		pink with dark grey and light grey sub-horizontal foliation																		
		GROUNDWATER ELE	_ <u>r∨∕/l</u> VДТ	IONS	<u></u>	<u> </u>	_		a14186		Ш	Ш		Ц				ш	Ш	
		∇ shallow/single inst			•	•	, ,	EEP/DUA		NOTA:	1 4	T1/	SNI							
		→ SHALLOW/SINGLE INSTA WATER LEVEL (date)	ALLA	IION				EEP/DUA TER LEVEL			_LA	ш	Ν		LOG		ounstan/Hill			
		vv/ (i Li \ LL v LL (uale)				'			(uai	,					CHE	CKED : N	1B			THUR



Mary River Project **PROJECT**

INCLINATION: 70° AZIMUTH: 45°

LOCATION

Cockburn Lake - North Tunnel

Project No. 19-1605-126

July 30, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 2 OF 4 N 7 835 245 E 605 535 July 31, 2011 DATUM CGVD28 COMPLETED :

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	UN No.	PENETRATRATION RATE (m/min)	4 COLOUR % RETURN	FR-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN RECOVERY	·		IT .ISHE	ISIDED	SM-SMOOTH FO-FOLIATED R-ROUGH UE-UNEVEN ST-STEPPED W-WAVY PL-PLANAR C-CURVED DISCONTINUITY DATA	pouluod	Compressive Strength (Mpa)	FIELD/LABORATOR TESTING RESULTS Point Load Test Diametral Point Load Test
- - -	SORIN		SYME	山	2	ENETR	FLUSH	TOTAL SOLID CORE %	%	PER	k .3 m	OUIC AXIS	TYPE AND SURFACE DESCRIPTION			1 , 0
\dashv	Ť	GROUND SURFACE	\vdash		\vdash	g.	ч	8848 8848	8848	92	11	-888 		5	11 35 6	■ Laboratory UCS Test
		sub-horizontal, open joint with silty infill at 22.95m	M								Ħ	Ш	J	T		
24		diagonal, closed joint at 23.65m			8	8	light grey						J			
25		diagonal, irregular joint at 24.72m											J			
26		diagonal, faintly weathered, closed joint at 25.47m										$ \phi $	J			
26		diagonal, irregular, open joint with mineral infill at 25.79m	M													
27		diagonal, weathered, open joint with rust at 26.42m			9	9										
28		diagonal, planar, parallel open joints with mineral infill at 28.30, 28.82, and 28.97m										•	J			
29		тынстан ини at 20.30, 20.02, and 20.9/ M					yrey J						J			
30		heavily fractured zone with multiple joints on different axis, weathered, with mineral infill, sub-vertical at 29.75 to 29.90m diagonal, weathered joints at 30.34, 30.55, and 30.99m			10	8	light grey 100					•	J-VN J-FO J			
31 32		closely spaced discontinuities, numerous diagonal and sub-vertucal open joints with heavy weathering, rust, and mineral infill											FR J J			
	NQ Diamond Drill	fractured zone at 32.70 to 33.00m			11	7	brown 25					•	n n			
34 35		fractured zone at 34.20m heavily fractured zone at 34.30 to 35.30m											J-VN			
36		fractured zone at 36.10 to 36.40m			12	6	red 25						7 7 7			
37 38		slightly weathered, banded, fine to medium grained, pinkish grey to black											J-FO J-FO J-FO			
39					13	14							J-FO J-FO J-FO J-FO			
40													J-FO			
41												•	J-FO			
42					14	8	20						J			
		GROUNDWATER ELE	<u>Κ//</u> /	IONIS	Ļ						П		J		Ш	
		SHALLOW/SINGLE INSTA			J			EEP/DUAL I		LLA	λΤΙ	NC	LOGGED : Dunstan/	Hill		THURB



Mary River Project **PROJECT**

Cockburn Lake - North Tunnel

INCLINATION: 70° AZIMUTH: 45°

LOCATION

July 30, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 3 OF 4 July 31, 2011 N 7 835 245 E 605 535 DATUM CGVD28 COMPLETED :

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	ETRATRATION RATE (m/min)	FLUSH COLOUR WRETURN	CL-CLI SH-SH VN-VE RECO	IN	J. P	-FAUL -JOIN -POLI -SLIC FRA IND PER	T SHEI KENS	SIDE	D wrt	SM-SMOOTH	Inconfined	Compressive Strength (Mpa)	FIELD/LABORATOR TESTING RESULTS Point Load Test Diametral Point Load Test Axial
	- BO		S			PEN	FLU		8848 COKE %	8848	92			388 888	DESCRIPTION	5	120	■ Laboratory UCS Test
	+	GROUND SURFACE fractures with greenish clay infill at 42.84 to				Н					H	\mathbb{H}	\coprod	+	F	+	+	
-44 · 45 -46		42.94m			15	3	20								F J-FO J			
47		greenish clay infill in all fractures in run			16	7	90						•]			
-48 · 49					10	7	2								7 7-^N 1 1-^N			
-50 -51					17	12	25											
-52	I Drill														J			
53 -54 55	NQ Diamond Drill	fractures with greyish green clay infill at 53.93m fractured zone at 54.20 to 54.50m			18	8	22								J-VN J J J J-FO			
·56 57 ·58		some fractures with greenish grey clay infill at 55.30 to 58.30m			19	6	75								J J-FO J			
59															J-VN			
60					20	8												
61 ·62																		
		talc infill			21	7	25								J			
!	-1	GROUNDWATER ELE SHALLOW/SINGLE INSTA			_	Ţ		EEP/C			LLA	TIC	N		LOGGED : Dunstan/F CHECKED : MB			THURB



Project No. 19-1605-126

RECORD OF BOREHOLE NTUN-DH05(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 70° AZIMUTH: 45° Cockburn Lake - North Tunnel LOCATION July 30, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 4 OF 4 July 31, 2011 N 7 835 245 E 605 535 COMPLETED DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD DEPTH SCALE (metres) SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR W-WAVY ELEV. (m) Š C-CURVED DESCRIPTION RUNI Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial TOTAL SOLIC TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 2242 ୦ ନିତ୍ରର GROUND SURFACE 64 some fractures with greyish green clay infill 65 8 22 66 67 -68 13 23 69 24 72 73 soft infill in joints, possibly talc 25 75 talc coating in joints 77 12 26 78 J-FO 79 J-FO -80 J-FO 10 27 50 81 82 END OF BOREHOLE AT 82.30m.

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

5126.GPJ 11/9/11

ROCKM(5126)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan/Hill CHECKED : MB



PROJECT : Mary River Project Project Project Project Project Project No. 19-1605-126

LOCATION : Cockburn Lake - South Tunnel

 STARTED
 :
 July 29, 2011
 DRILLER:
 BOART LONGYEAR, LM-55
 SHEET 1 OF 1

 COMPLETED
 :
 July 29, 2011
 N 7 832 812 E 601 490
 DATUM: CGVD28

		, ,											
	Ö	SOIL PROFILE				SAM	PLE	s		EXCESS ICE CO	NTENT, PERCENT	·	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		 -		Н						•ice	ADDITIONAL LAB. TESTING	GROUND COND.
SC	M		STRATA PLOT	Ê	ĸ	l	BLOWS/0.3m	RECOVERY %	COMMENTS	10 20	30 40	NS	FROZEN
H H	9	DESCRIPTION	Α̈́	ELEV. (m)	NUMBER	TYPE)/S/	ΥË	DYNAMIC CONF PENETRATION	WATER CONT	TENT, PERCENT	갸ᇊ	UNFROZEN 🏻
<u>Б</u>			RA I		ĺ	-	ó	S	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp I	⊖ ^W wl	188	UNCERTAIN
ľ	8		STI	"	-		В	R	50 100 150 200 250	10 20	30 40	-	CHOZINIA L
		GROUND SURFACE		111.22									
-		no sampling											
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ţ.	NQ Diamond Drill												
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- 3													
-				3.30									3.30
ŀ		END OF SAMPLING AT 3.30m, START]
-4		CORING. FOR ROCK DETAILS PLEASE REFER TO STUN-DH03(R).											
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GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill CHECKED : MB



PROJECT : Mary River Project

INCLINATION: 56° AZIMUTH: 268°

LOCATION : Cockburn Lake - South Tunnel

STARTED : July 29, 2011 DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 5

Project No. 19-1605-126

cc		ETED : July 29, 2011					Ν	7 832 8											CGVD28
щ	dot		98	ELEV. (m)		RATE	JURN JURN	FR-FRA	ACTURE AVAGE	J-	FAULT JOINT				SM-SMOOTH R-ROUGH	FO-FOLIATED UE-UNEVEN		e pa)	FIELD/LABORATORY TESTING RESULTS Point Load Test
DEPTH SCALE (metres)	BORING METHOD	DECODIDATION	SYMBOLIC LOG	ELEV. (m)	ġ	ATION nin)	COLC % RET	SH-SHE VN-VEII	EAR	S-	POLISH SLICKE	NSI	DED		ST-STEPPED PL-PLANAR	W-WAVY C-CURVED	nfined	Compressive Strength (Mpa)	RESULTS Point Load Test
PTH (met	ING I	DESCRIPTION	/BOL	ELEV	NS.	'RATR'	Į,	RECO ¹	VERY	R.Q.D.	FRACT INDEX PER .3	Т. К	DIP w	vrt	DISCONTINUIT			Stren	Diametral ▲ Point Load Test Axial
ㅂ	BOR		SYI	_		PENET	FLUS	TOTAL CORE %		l		- 1	DIP w Core A	- 1	DESC	D SURFACE RIPTION	- 1	120	Laboratory UCS Test
		GROUND SURFACE		111.22				1111				Ì		Ĭ			Ĭ	Ì	1631
ŀ		GRANITIC GNEISS, slightly weathered, fine to medium grained, weakly banded, pinkish grey to black		3.30											J]
-4		pinkish grey to black																	-
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-10		possible silty sand seam at 9.95m																	-
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ļ.,	d Drill																		-
- 13	mong	potassium feldspar vein (130mm) at 13.20m											•	N	VN				<u> </u>
ļ.,	NQ Diamond Drill				4	15	0												-
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GROUNDWATER ELEVATIONS

ROCKM(5126) 5126.GPJ 11/9/11

SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan
CHECKED : MB

THURBER

Mary River Project **PROJECT** Cockburn Lake - South Tunnel LOCATION

INCLINATION: 56° AZIMUTH: 268° Project No. 19-1605-126

July 29, 2011 STARTED

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 5 July 29, 2011 COMPLETED N 7 832 812 E 601 490 DATUM CGVD28 FIELD/LABORATORY
TESTING
RESULTS
Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR DEPTH SCAL W-WAVY (metres) ELEV. (m) ġ C-CURVED DESCRIPTION RUN Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLIC TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 2345 ୦ ନିତ୍ରର GROUND SURFACE clay coating in joint surfaces 24 25 8 26 possible sand seam in joint at 26.40m 27 28 9 9 29 30 31 10 32 J-FO 33 g 34 35 11 J-FO small fault (20mm) with clay guage infill at 35.20m potassium feldspar vein (120mm) at 35.60m 36 37 15 12 38 VN potassium feldspar vein at 38.60m J J-VN 39 40 FR-FO 13 41 FR-FO 43

GROUNDWATER ELEVATIONS

abla shallow/single installation WATER LEVEL (date)

5126.GPJ 11/9/11

ROCKM(5126)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan CHECKED : MB

THURBER

PROJECT : Mary River Project

____ INCLINATION: 56°

AZIMUTH: 268°

Project No. 19-1605-126

LOCATION : Cockburn Lake - South Tunnel STARTED : July 29, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 832 812 E 601 490 SHEET 3 OF 5 DATUM CGVD28

DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION RECOVERY ROLD FRACT. INDEX DIP wit DISCONTINUITY DATA DIP wit DIP wit Type AND SURFACE Diameter Discontinuity DATA Axial	:	July 29, 2011 July 29, 2011					7 832 812 E			IVI-55			JM	3 OF 5 CGVD28
GROLAND SURFACE 14 15 15 16 17 17 18 18 18 18 18 18		DESCRIPTION	SYMBOLIC LOG	RUN No.	PENETRATRATION RATE	Main)	SH-SHEAR VN-VEIN RECOVERY TOTAL SOLID CORE %	P-P S-S R.Q.D.	DLISHE LICKEN RACT. NDEX ER .3 m	DIP wrt Core Axis	R-ROUGH ST-STEPPED PL-PLANAR DISCONTINUIT	UE-UNEVEN W-WAVY C-CURVED	Streng	FIELD/LABORATOR TESTING RESULTS Point Load Test Diametral Point Load Test Axial Laboratory UCS Test
14-46 1-46 1-47 1-48 1-47 1-48 1-47 1-48 1-48 1-47 1-48	OUND	SURFACE			İ		00444						Ì	1651
15 w \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$				14	m	25					J-FO			
Sub-vertical fracture at 48.45m]]]			
Sub-vertical fracture at 48.45m Sub-vertical fracture at 55.60m Sub-				15	22	25				•	J			
51 52 53 56 57 56 57 58 58 59 59 59 59 59 59	o-vertica	al fracture at 48.45m								•	J J			
17 0 5 18 0 18 18 0 18 19 0 19 19 19 19 19 19 19 19 19 19 19 19 19				16	10	25								
17 m 18 m 19										•	J			
fault, 560mm aperture at 55.60m 18 up 8 faintly weathered, strong, sub-horizontal foliation, moderate spacing, pink motited with dark grey and white diagonal, weathered joint at 58.37m 19 9 19 19 19 19 19 19 19 19 19 19 19 19				17	83	25				•	J-FO			
fault, 560mm aperture at 55.60m 18 v										•	J			
faintly weathered, strong, sub-horizontal foliation, moderate spacing, pink mottled with dark grey and white diagonal, weathered joint at 58.37m 19 0 19 19 19 19 19 19 19 19 19 19 19 19 19	lt, 560m	nm aperture at 55.60m		18	22	25 25				•	J J F			
with dark grey and white diagonal, weathered joint at 58.37m 19										•	F J J			
19 0 19 0 19 0 19 0 19 0 19 0 19 0 19 0	n dark g	grey and white					127				J			
diagonal, faintly weathered, planar joint at 59.50m heavily fractured at 61.11 to 61.29m 20	yonal, w	weatnered joint at 58.3/m		19	10	dark grey					ı 1			
-62 heavily fractured at 61.11 to 61.29m 20 =	gonal, fa 50m	faintly weathered, planar joint a	at Signature of the state of th								J			
	avily frac	ctured at 61.11 to 61.29m		20	11	tht grey 100					J J J			
						ligi					J			

ROCKM(5126) 5126.GPJ 11/9/11

GROUNDWATER ELEVATION

SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan
CHECKED : MB



Mary River Project **PROJECT**

INCLINATION: 56° AZIMUTH: 268°

LOCATION Cockburn Lake - South Tunnel

July 29, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 4 OF 5

STARTED COMPLETED July 29, 2011

N 7 832 812 E 601 490

DATUM CGVD28

Project No. 19-1605-126

CO	MPLE	TED : July 29, 2011					N :	7 832 812 E	601	490	0	_				DA	TUM	CGVD28
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	PENETRATRATION RATE (m/min)	FLUSH COLOUR WRETURN	FR-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN RECOVERY TOTAL CORE % SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	J F	FR IN PE	NT LISHE	DIP	wrt Axis	SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR DISCONTINUIT TYPE AN DESC	FO-FOLIATED UE-UNEVEN W-WAVY C-CURVED Y DATA D SURFACE RIPTION		50 Unconfined 100 Compressive 150 Strength (Mpa)	1
\dashv		GROUND SURFACE	+			ш.	_	<u>8044 8044</u>	2044	120		100	00			+	111	lest
64 65 66		horizontal, irregular, closed joint at 65.15m			21	6							••	J				
67		fresh, very wide spacing, medium grey with dark grey and pink sub-horizontal foliations					y											
68 69					22	15	light grey 100											
70 71		diagonal, planar, weathered joints at 70.46 and 70.70m			23	13	light grey 100							J			•	
72	=						lig											
73 74	NQ Diamond Drill				24	14	light grey 100											
75 76																		
77					25	10	light grey 100										•	
78																	•	
79 80		diagonal, irregular, closed joint at 79.65m			26	12	light grey 100							J J-FO J				
81 82																		
83		becoming pinker diagonal, planar, weathered, open joints at 82.59 to 84.22m			27	11	light grey 100					•		J			4	
		GROUNDWATER ELE SHALLOW/SINGLE INSTA WATER LEVEL (date)			8			EEP/DUAL IN		LL	ΑΤΙ	ON		LOGGE CHECK		stan		THURB



RECORD OF BOREHOLE STUN-DH03(R) Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: 56° AZIMUTH: 268° Cockburn Lake - South Tunnel LOCATION DRILLER: BOART LONGYEAR, LM-55 July 29, 2011 STARTED SHEET 5 OF 5 July 29, 2011 COMPLETED N 7 832 812 E 601 490 DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG DEPTH SCALE SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR W-WAVY (metres) ELEV. (m) Š C-CURVED DESCRIPTION RUNI Diametral FRACT INDEX PER .3 RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 2458 ୦ ନିତ୍ରର GROUND SURFACE 84 85 10 28 -86 g sub-vertical, undulating to planar, weathered, open joint with mineral infill at 86.55m 87 END OF BOREHOLE AT 87.45m. 87.45 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 **GROUNDWATER ELEVATIONS** \overline{Y} SHALLOW/SINGLE INSTALLATION T DEEP/DUAL INSTALLATION LOGGED : Hill/Dunstan

WATER LEVEL (date)

CHECKED :

MB

THURBER

5126.GPJ 11/9/11

ROCKM(5126)

WATER LEVEL (date)

RECORD OF BOREHOLE Q114+600

PROJECT : Mary River Project

114+600 - Quarry
July 25, 2011 DRILLER: BOART LONGYEAR

Project No. 19-1605-126

STARTED : July COMPLETED : July

LOCATION

July 25, 2011 N 7 827 828 E 597 850

SHEET 1 OF 2 DATUM: CGVD28

CC	OMPL	ETED : July 25, 2011					N	7 82	27 828 E 597 850		M: C	GVD28
щ	ОО	SOIL PROFILE			Ş	SAM	PLE	S		EXCESS ICE CONTENT, PERCENT	را	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD		LOT	ر (~		3m	γ %		10 20 30 40	ADDITIONAL LAB. TESTING	FROZEN
TH 8	9	DESCRIPTION	A PI	ELEV. (m)	NUMBER	TYPE	/S/0	VER	COMMENTS DYNAMIC CONF PENETRATION	WATER CONTENT, PERCENT	ĬĔË.	UNFROZEN
	ORII		STRATA PLOT	ELE	Ž	←	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	wp I → → W wl 10 20 30 40	A B	UNCERTAIN
\vdash	<u> </u>	GROUND SURFACE	S		L		Δ.	~	50 100 150 200 250	10 20 30 40	├	
-		TOPSOIL	3	0.00							-	
•		BOULDERS and COBBLES, granitic, grey	00									:
<u>-</u> 1			n a			RUN						
ŀ			000		l	KUN						
-2			64]
_		CPANITIC CNEISS slightly weathered		2.30								2.30
		GRANITIC GNEISS , slightly weathered, fine grained, slightly fractured, black, grey										-
- 3												1
ŀ]
-4			M		2	RUN	ı		TCR=100% SCR=100% RQD=77%]
ŀ												-
- 5]
ļ												
•												
- 6]
•]
7									TOD-400% COD-04% DOD-04%			-
į.					3	RUN			TCR=100% SCR=81% RQD=81%			
-8												-
ŀ												-
- 9]
1	Ē											
İ	NQ Diamond Drill											
-10	jamo				4	RUN	ı		TCR=100% SCR=100% RQD=100%			-
ŀ	ğ											-
- 11	-											-
ŀ												
12												
ŀ		layers of biotite interbeds										1
13					5	RUN	ı		TCR=100% SCR=100% RQD=100%			1
F 13]
ŀ												
-14												-
ŀ		quartz crystal										
- 15]
ŀ			M			L						
16					6	RUN	1		TCR=100% SCR=100% RQD=100%			
"												-
1,-		biotite schist at 16.90m										:
17		DIOLIC SCHIST AT 10.30111			\vdash							
-												
-18		biotite schist (100mm) at 18.2m										-
:[7	RUN			TCR=100% SCR=100% RQD=92%			
19					′	NOIN			1017-100/0 3017-100/0 RQD-32/0			
<u> </u>												
(OZ					L	L						
2		GROUNDWATER ELE	VAT	IONS	3							

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Khabbaznia
CHECKED : KS



RECORD OF BOREHOLE Q114+600

Mary River Project **PROJECT**

> 114+600 - Quarry DRILLER: BOART LONGYEAR

Project No. 19-1605-126

STARTED

LOCATION

July 25, 2011 July 25, 2011

SHEET 2 OF 2 DATUM: CGVD28

	MPLE	TED : July 25, 2011							27 828 E 597 850						M: C	GVD28
щ	GOI	SOIL PROFILE			,	SAM	PLE	S		EXC	ESS ICE	CONTE	NT, PER	CENT	١٥	THERMISTER/ GROUND CON
DEPTH SCALE (metres)	BORING METHOD		чот	(m.	监		J.3m	۶۲ %	COMMENTS	1	0 : I	_		10 	ADDITIONAL LAB. TESTING	FROZEN
EPTH (me	RING	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT		ATER C ′p I——	ONTENT	, PERCE		ADDIT AB. TI	UNFROZEN
	BOI		STR	Ш	z		BLO	REC	50 100 150 200 250		0 :			10	′ ′	UNCERTAIN
- 21																
-22					8	RUN	ı		TCR=100% SCR=100% RQD=90%							
23																
		biotite interbeds														
-24	_															
	and Drill				۵	RUN			TCR=100% SCR=100% RQD=77%							
25	Diamond				"	IXOIX			101-100% 301-100% 1QD-11%							
	Ø															
-26																
- 27																
-28					10	RUN	ı		TCR=100% SCR=100% RQD=100%							
29																
-30																
-30																
31																
					11	RUN	ı		TCR=100% SCR=100% RQD=100%							
-32																
33																
-24		END OF BOREHOLE AT 33.60m.	_\Y/2	33.60												
-34																
35																
-36																
37																
-38																
- 39																
		ODOLINDA/ATED E			Ļ											
		GROUNDWATER EL)	•	7 -		D/DIIAI INGT							
		SHALLOW/SINGLE INST	IALLA	ITON					P/DUAL INSTALLATION LEVEL (date)		LOGGE CHECKI		Khabbaz KS	nia		
		(3000)							V/			- - .				THUE



Mary River Project **PROJECT**

116+500 - Quarry

Project No. 19-1605-126

LOCATION STARTED COMPLETED :

July 25, 2011 July 26, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 826 260 E 600 261

SHEET 1 OF 2 DATUM: CGVD28

щ	0	SOIL PROFILE				SAM	PLE	S		EXCESS ICE CONTENT, PERCENT	ر ا	THERMISTER GROUND CO
DEPTH SCALE (metres)	BORING METHOD		PLOT	(m)	H.	l	0.3m	RY %	COMMENTS	10 20 30 40	ADDITIONAL LAB. TESTING	FROZEN
EPTH (me	RING	DESCRIPTION	STRATA PLOT	ELEV. (NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	WATER CONTENT, PERCENT wp I————————————————————————————————————	AB. TI	UNFROZEN
_	<u>B</u>		STR	ш	Z		BL(REC	50 100 150 200 250	10 20 30 40		UNCERTAIN
		GROUND SURFACE COBBLES(150mm) and GRAVEL	60	0.00							\vdash	0.30
		GRANITIC GNEISS, fresh, very strong, light grey and pink			1							
1					1	RUN	1		TCR=63% SCR=54% RQD=31%			
2												
3												
4					2	RUN	1		TCR=103% SCR=100% RQD=100%			
5												
6												
7					3	RUN	1		TCR=100% SCR=97% RQD=97%			
′												
8												
9	_											
	nd Drill											
10	NQ Diamond				4	RUN	1		TCR=100% SCR=100% RQD=99%			
	ă											
11												
12												
_												
13					5	RUN	1		TCR=100% SCR=98% RQD=93%			
14												
15												
16					6	RUN	1		TCR=100% SCR=100% RQD=95%			
17												
18												
					_	P:			TOD-4000/ 00D 4000/ === ===:			
19					7	RUN	1		TCR=100% SCR=100% RQD=97%			
_		GROUNDWATER ELE			S	1						
		$\overline{egin{array}{c} egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} \egin{array}{c} arra$	ALLA	TION					P/DUAL INSTALLATION	LOGGED : Mediwake/Braver	man	
		WATER LEVEL (date)					WA	ΓER	LEVEL (date)	CHECKED : KS		THUR

Mary River Project **PROJECT**

116+500 - Quarry

Project No. 19-1605-126

LOCATION STARTED

July 25, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 2

July 26, 2011 COMPLETED

N 7 826 260 E 600 261

DATUM: CGVD28

ш	8	SOIL PROFILE			;	SAM	PLE	S		EXCESS ICE CONTENT, PERCENT	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 20 30 40	GROUND COND. FROZEN UNFROZEN UNFROZEN UNFROZEN UNCERTAIN
									7 77 77 77		
- 21 - 22 - 22					8	RUN	1		TCR=100% SCR=100% RQD=100%		
-24											
- 25	NQ Diamond Drill				9	RUN	1		TCR=100% SCR=100% RQD=100%		
27	Ž										
-28					10	RUN	1		TCR=100% SCR=97% RQD=77%		
- 29											
-30											
31					11	RUN	1		TCR=100% SCR=100% RQD=100%		
-32		END OF BOREHOLE AT 32.40m.		32.40							
- 33 -											
-34 -											
- 35 -											
-36											
- 37											
-38 -38											
- 39 -											
-38 -39		GROUNDWATER ELE			 }						
		SHALLOW/SINGLE INST. WATER LEVEL (date)	ALLA	TION					P/DUAL INSTALLATION LEVEL (date)	LOGGED : Mediwake/Braver CHECKED : KS	man THURBER



RECORD OF BOREHOLE Q116+800

Mary River Project **PROJECT**

116+800 - Quarry

Project No. 19-1605-126

LOCATION STARTED

July 26, 2011 July 26, 2011

DRILLER: BOART LONGYEAR, LM-55 N 7 826 194 E 597 422

SHEET 1 OF 2 DATUM: CGVD28

co		ETED : July 26, 2011							26 194 E 597 422	EVO	EGG IOF	CONTE	NT DEC		IM: C	GVD28
پ	BORING METHOD	SOIL PROFILE	1.		:	SAM				EXC	ESS ICE	CONTE oice		CENÍ	후	THERMIST GROUND (
DEP IN SCALE (metres)	METI		LOT	Ê	ik.		1.3m	% X>	COMMENTS		10 I	_		10 	NON/	FROZEN
(me	NG.	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT			ONTENT	, PERCE		ADDITIONAL LAB. TESTING	UNFROZE
4	BOR		STR		۱ź	[BLO	RECO	50 100 150 200 250		vp			wl 10	₹≤	UNCERTA
		GROUND SURFACE		0.00												
		COBBLES and GRAVEL, fines washed out	000													
, I			00													
'			00		1	RUN	ı	61								
,				1.93											FI 1	1.9
2		GRANITIC GNEISS, fresh, moderately spaced, very strong, with diagonal foliations horizontal to subhorizontal closed joints,	, 🚫												0	
		grey, pink, white													1	
3															3 4	
					,	RUN			TCR=100% SCR=92% RQD=92%						1	
4					_	Itolt			1011-100/0 0011-32/0 11QD-32/0						1	
															1	
5															1	
															0	
3															0 2	
															1 2	
7					3	RUN	l		TCR=100% SCR=94% RQD=94%						1	
															1 0	
3															2	
															1	
9															1 2	
	Ē	open diagonal joint with black weathering at 9.20m													0	
10	NQ Diamond Drill	0.25.11			4	RUN	ı		TCR=100% SCR=96% RQD=96%						0	
	Diar														1	
11	ž														1 2	
`															1	
12															1 0	
ا ۲					5	RUN	ı		TCR=100% SCR=97% RQD=94%						0	
13															0	
13															3 1	
					6	RUN			TCR=100% SCR=93% RQD=93%						0	
14															2 2	
ا ٍ ,		white questrite handing at 44.0													2	
15		white quartzite banding at 14.8m													0	
					-	RUN			TCR=100% SCR=93% RQD=93%						0	
16					′	KUN			1011-100% SUK-93% KQD-93%						2 1	
															0	
17															1	
		becoming widely spaced massive													0	
18		5 - 2 - 3 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2													0	
															0	
19					8	RUN	ı		TCR=100% SCR=100% RQD=100%						0	
															0	
		CDOLINDWATED ELS			\perp										1	
		GROUNDWATER ELE ▽			>		,									
		∑ SHALLOW/SINGLE INST	ALLA	TION					P/DUAL INSTALLATION		LOGGE		Dunstan			
		WATER LEVEL (date)				,	VVA٦	ΕR	LEVEL (date)		CHECK	ED :	KS			THU



RECORD OF BOREHOLE Q116+800

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

116+800 - Quarry

July 26, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 2 OF 2 July 26, 2011 N 7 826 194 E 597 422 COMPLETED DATUM: CGVD28

ш	8	SOIL PROFILE				SAM	PLE	S		EXCESS	ICE (NT, PER	CENT	. (1)	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 WATE wp H 10 I	20 R CO 20	NTENT,	PERCE		ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
_															0	
· 21		biotite schist interbeds from 22.32m to 22.49m			9	RUN	1		TCR=100% SCR=96% RQD=96%						0 0 0 1 0 3 0 3 0 1 3	
-24	III.	very widely spaced joints													0 0 0 0	
- 25	NQ Diamond Drill				10	RUN	1		TCR=100% SCR=99% RQD=99%						0 0 0 0	
-26	Z	closely spaced joints													0 1 0 0	
· 27 -28					11	RUN	1		TCR=100% SCR=90% RQD=90%						0 0 0 1	
29															3 0 0	
-30															0 0 5 0	
· 31					12	RUN	1		TCR=100% SCR=100% RQD=100%						0 0 0 0	
-32				32.39											3	
33		END OF BOREHOLE AT 32.39m.														
-34																
· 35 -36																
· 37																
-38																
. 39																
		GROUNDWATER ELI	 F\/∆7		Ĭ L		<u> </u>								<u> </u>	
		SHALLOW/SINGLE INST			ی				P/DUAL INSTALLATION LEVEL (date)		GED CKEI		Dunstan KS			THURBER



PROJECT: Mary River Project

123+000 - Quarry

LOCATION : 123 STARTED : Aug

August 4, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

Project No. 19-1605-126

N 7 820 410 E 598 555 COMPLETED August 4, 2011 DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SAMPLES SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING oice DEPTH SCAL 20 STRATA PLOT BLOWS/0.3m 10 FROZEN NUMBER RECOVERY ELEV. (m) **COMMENTS** TYPE WATER CONTENT, PERCENT UNFROZEN DYNAMIC CONE PENETRATION RESISTANCE PLOT DESCRIPTION OW UNCERTAIN 20 30 100 150 200 250 10 40 GROUND SURFACE **GRAVEL**, granitic, light grey to reddish brown, sub-angular to sub-rounded, fine to 1A RUN 0.51 0.51 medium grained GRANITIC GNEISS, slightly to moderately weathered, closely spaced foliations, medium grained, strong, grey to pink 1B RUN TCR=84% SCR=62% 3 0 0 2 0 2 RUN TCR=100% SCR=98% RQD=69% 5 6 2 6 0 0 0 2 3 RUN TCR=100% SCR=100% RQD=71% 3 >25 >25 -8 1 0 0 9 1 slightly weathered, moderately spaced 0 0 RUN TCR=100% SCR=98% RQD=82% 0 0 1 1 0 12 0 0 TCR=100% SCR=94% RQD=71% 3 RUN 1 3 0 moderately to highly weathered, closely spaced joints, numerous open joints with silt/sand infill 15 6 RUN TCR=100% SCR=8% RQD=0% 16 heavily fractured from 17.45m to 21.05m 18 11/9/1

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

5126.GPJ

19

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

TCR=100% SCR=100% RQD=90%

RUN

LOGGED : Hill/Dunstan
CHECKED : KS



0

PROJECT : Mary River Project

123+000 - Quarry

Project No. 19-1605-126

LOCATION : STARTED :

August 4, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 2

CC	OMPL	ETED : August 4, 2011					Ν	7 8	20 410 E 598 555				DATU	M: C	GVD28
ш	9	SOIL PROFILE			5	SAM	PLE	S		EXCESS ICE	CONTE		ENT	. (5)	THERMISTER/ GROUND COND.
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	WATER C	20 S CONTENT	30 40 	NT I	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
-			W											0	
-21					8	RUN			TCR=100% SCR=90% RQD=81%					0 1 5 3 1 1 0 1 0	-
- 25 - 26	NQ Diamond Drill				9	RUN			TCR=100% SCR=89% RQD=78%					0 1 1 1 0 0 4 2	
- 27 - 28 - 29	NON				10	RUN			TCR=100% SCR=90% RQD=85%					3 0 0 0 2 1 0 0	-
-31 -32		trace biotite schist banding sub-vertical joints with red silty infill from 30.0m to 30.3m		32.45		RUN			TCR=100% SCR=95% RQD=84%					0 1 4 3 0 0 1	1
- 33 - 34		END OF BOREHOLE AT 32.45m.												0	
- 35															
-36 -37															

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

-38

39

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan
CHECKED : KS



RECORD OF BOREHOLE Q131+100

Mary River Project **PROJECT**

Project No. 19-1605-126

LOCATION

COMPLETED :

STARTED

131+100 - Quarry

August 5, 2011

August 5, 2011

DRILLER: BOART LONGYEAR

N 7 813 509 E 600 177

SHEET 1 OF 2 DATUM: CGVD28

<u></u>	НОР	SOIL PROFILE	1. 1		Ľ	SAM	_	_		EXCESS	CE CONT		RCEINT	۵ ا	THERMISTER GROUND CON
(metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 50 100 150 200 250	10 WATEF wp	20 R CONTEN	30 IT, PERC V 30	40 	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
ヿ		GROUND SURFACE		0.00										1	
1 2		SAND and GRAVEL (INFERRED), some cobbles (< 170mm), trace silt, occasional boulders (< 740mm), granitic, pinkish red to greyish black, moist			1	RUN	ı	19							
3					2	RUN		67							
5		SAND and CRAVEL some sitt trace		5.48											
6 7		SAND and GRAVEL, some silt, trace cobbles and boulders (< 210mm), granitic			3	RUN	I	100							
3		GRANITIC GNEISS, moderately weathered, fine grained, banded, strong		8.35											8.35
9 10 11	NQ Diamond Drill				4	RUN	I		TCR=100% SCR=90% RQD=72%						
12		highly fractured zone at 11.1m (0.10m) with clayey infill			5	RUN			TCR=100% SCR=84% RQD=75%					FI 1 1 1 >25 3 >25 1 0	
14 15 16		becoming moderately spaced, with white foliations			6	RUN			TCR=100% SCR=98% RQD=89%					0 0 0 1 0	
17									23. 35.6 1.40 55.6					1 1 0 0 0 0 1	
18					7	RUN	l		TCR=100% SCR=98% RQD=94%					0 1 0 0 0	
		GROUNDWATER ELE			<u></u>									0	
		SHALLOW/SINGLE INSTA WATER LEVEL (date)	ALLA ⁻	TION					P/DUAL INSTALLATION LEVEL (date)	LOG(GED :	Hill/Dur	ıstan		THURE

RECORD OF BOREHOLE Q131+100

Mary River Project **PROJECT**

August 5, 2011

131+100 - Quarry

Project No. 19-1605-126

LOCATION August 5, 2011 STARTED

COMPLETED :

DRILLER: BOART LONGYEAR N 7 813 509 E 600 177

SHEET 2 OF 2 DATUM: CGVD28

COMPLETED : August 5, 2011									13 509 E 600 177	DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/								
щ	ООН	SOIL PROFILE				SAM	PLE	S		EXC	ESS ICE	CONTE	آ گ	THERMISTER/ GROUND COND.				
DEPTH SCALE (metres)	BORING METHOD			ELEV. (m)	ik.	l	.3m	RECOVERY %	COMMENTS	10 20 30 40					ADDITIONAL LAB. TESTING	FROZEN		
PTH (met	ING	DESCRIPTION STRATA PLOT			NUMBER	TYPE	BLOWS/0.3m	OVER	DYNAMIC CONE PENETRATION RESISTANCE PLOT	WATER CONTENT, PERCENT					B. 75	UNFROZEN 💹		
B	BOR		STR/	핍	ž	ľ	BLO	REC	50 100 150 200 250	W	wp 				⋖₹	UNCERTAIN		
ŀ		END OF BOREHOLE AT 20.48m.	M	20.48											0			
- 21		END OF BOREHOLE AT 20.46III.														-		
Ė																:		
-22																_		
Ė]		
- 23																-		
•]		
- -24																		
•]		
- - 25																-		
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- -26																		
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- 27																-		
																-		
-28																		
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29																		
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-30																		
-																-		
- 31																<u> </u>		
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-38																-		
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- 39																-		
]		
		GROUNDWATER ELE	VAT	IONS	5		_	L						<u> </u>				
1		7				_	_											

WATER LEVEL (date)

THURBER2S(5126) 5126.GPJ 11/9/11

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill/Dunstan CHECKED : KS



RECORD OF BOREHOLE Q138+100

Mary River Project **PROJECT**

138+100 - Quarry

Project No. 19-1605-126

July 16, 2011 STARTED July 17, 2011 COMPLETED

LOCATION

DRILLER: WALKER DRILLING

SHEET 1 OF 2

N 7 807 612 E 598 865 DATUM: CGVD28

	0	SOIL PROFILE			,	SAM	PLE	s		EXCE	SS ICE		NT, PER	CENT	(1)	THERMISTER GROUND CO
DEP IN SCALE (metres)	BORING METHOD		Ь О				E	%		1	0 2	o ice		0	ADDITIONAL LAB. TESTING	FROZEN
n or netre	_ნ	DECODED TO A	PL	ELEV. (m)	NUMBER	Щ	BLOWS/0.3m	RECOVERY %	COMMENTS				PERCE		를	
֡֡֓֞֞֜֞֜֞֡֡֞֜֞֜֞֡֞֞֜֞֜֞֞֓֓֡֡֞֞֡֞֡֡֡֞֡֞֜֞֡֡֡֡֡֡֡֡	N N	DESCRIPTION	ATA	EV.	M	TYPE) WS	8	DYNAMIC CONE PENETRATION RESISTANCE PLOT			OW	, FERCE 			UNFROZEN
בֿ	BO		STRATA PLOT	ӹ	z		BLC	REC	50 100 150 200 250	1		0 3		0	~ ``	UNCERTAIN
		GROUND SURFACE		0.00												
		GRANITIC GNEISS, moderately weathered, medium to coarse grained, pink														
		to grey			1	RUN			TCR=86% SCR=69% RQD=52%							
1																
		becoming moderately strong, slightly			_											
2		weathered														
_																
					2	RUN			TCR=97% SCR=82% RQD=70%							
3																
4																
·																
			\mathbb{K}													
5					3	RUN	l		TCR=98% SCR=80% RQD=47%							
6																
		with black bands (mm scale), greenish clay														
,		infilled gouge at 6.24m														
7					4	RUN			TCR=99% SCR=99% RQD=80%							
					-				161 3676 GGI 3676 11QD 3676							
8																
9					5	RUN			TCR=98% SCR=97% RQD=85%							
	≣															
	NQ Diamond Drill															
10	amo		\mathbb{K}													
	g				6	RUN			TCR=98% SCR=98% RQD=68%							
11	z	and a sately at some all solutions at least of														
		moderately strong, slightly weathered														
,					7	RUN			TCR=86% SCR=76% RQD=52%							
12																
					_			-								
13																
					8	RUN			TCR=97% SCR=87% RQD=81%							
14																
'4		medium strong to strong, moderately			_											
		weathered	\mathbb{M}													
15					9	RUN			TCR=100% SCR=96% RQD=96%							
					L			L								
16																
					10	RUN			TCR=92% SCR=81% RQD=73%							
,					'				. S. COZ/O SOIN-01/O INQU-13/0							
17								_								
l		strong, faintly weathered														
18					11	RUN			TCR=99% SCR=93% RQD=81%							
19																
וש																
l					12	RUN	l		TCR=97% SCR=90% RQD=79%							
		I GROUNDWATER ELE	<u> </u>		Ļ								<u> </u>			
					•	_	,									
		$\overline{igspace}$ shallow/single inst	ALLA [.]	TION		7	<u>-</u> c	EE	P/DUAL INSTALLATION	L	.OGGE) : ;	Singh			
		WATER LEVEL (date)				,	WA	TER	LEVEL (date)	(CHECKE	:D : I	KS			THUR



RECORD OF BOREHOLE Q138+100

Mary River Project **PROJECT**

Project No. 19-1605-126

138+100 - Quarry LOCATION STARTED

COMPLETED

July 16, 2011 July 17, 2011

DRILLER: WALKER DRILLING SHEET 2 OF 2 N 7 807 612 E 598 865 DATUM: CGVD28

]	۵	SOIL PROFILE				SAMI	PLE	s					EXC	SS ICE		NT, PER	CENT	Ι	THERMISTER GROUND CO
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAN RESIS	COMME MIC CONE I	PENETF OT	ration >	W.	L ATER C∈ ′p I——	TUSTINC	30 4 L , PERCE	wl	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
_	<u> </u>		S				В	R	50	100 150	200	250	'	0 2	20 3	30 4	40 	<u> </u>	
21					13	RUN			TCR=98%	SCR=92%	RQD=	-88%							
22					14	RUN			TCR=99%	SCR=95%	RQD=	- 90%							
24	ond Drill	becoming strong, fresh			15	RUN			TCR=90%	SCR=90%	RQD=	÷80%							
25 26	NQ Diamond Drill				16	RUN			TCR=97%	SCR=93%	RQD=	- 70%							
27 28					17	RUN			TCR=94%	SCR=91%	RQD=	-86%							
29					18	RUN			TCR=100%	SCR=93%	6 RQD	9=91%							
30 31		END OF BOREHOLE AT 30.95m.		30.93		RUN			TCR=97%	SCR=92%	RQD=	-88%							
32																			
33 34																			
35																			
36 37																			
38																			
39																			
		GROUNDWATER ELI			3				P/DUAL IN		1OITA	١		LOGGEI		Singh KS	•		THURE



RECORD OF BOREHOLE Q139+600

Mary River Project **PROJECT**

139+600 - Quarry

Project No. 19-1605-126

LOCATION

SHEET 1 OF 1

July 19, 2011 DRILLER: WALKER DRILLING STARTED July 19, 2011 N 7 806 105 E 598 727 COMPLETED DATUM: CGVD28

ш		ОО	SOIL PROFILE				SAM	PLE	S		EXC	ESS ICE	CONTE		CENT	. (1)	THERMISTER/ GROUND COND.
DEPTH SCALE	etres)	BORING METHOD		PLOT	(E)	Ä	ш	/0.3m	ERY %	COMMENTS			20 3	80 4 I	40 	ADDITIONAL LAB. TESTING	FROZEN
DEPT	Ĕ	ORING	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	v	ATER C0	o <u>w</u>			ADDI LAB. T	UNFROZEN W
	+		GROUND SURFACE	\top	0.00			ш	~	50 100 150 200 250					1		
E			GRANITIC GNEISS, slightly weathered, medium strong, medium to coarse grained, grey, pink, black													FI 0 2	
1			groy, print, black			1	RUN	1		TCR=99% SCR=99% RQD=96%						3	
ŀ																0	
-2						2	RUN	ı		TCR=100% SCR=100% RQD=100%						0	
: - 3																0	
•										TOD 05% 00D 04% DOD 04%						2	
-4						3	RUN			TCR=95% SCR=91% RQD=91%						1	
•																3 2	
5						4	RUN	ı		TCR=95% SCR=89% RQD=77%						2	
-6																1 3	
E		Diamond Drill				5	RUN			TCR=99% SCR=96% RQD=84%						0	
7	l	Diamo				ľ				TON 35% SON 35% NQD 54%						2	
-8	:	o N															
ļ						6	RUN			TCR=100% SCR=100% RQD=100%							
9																2	
ļ.,						7	RUN			TCR=91% SCR=91% RQD=88%						0	
F10	1															0	•
11	1																
ŀ						8	RUN			TCR=100% SCR=100% RQD=98%							
-12	2																•
13																	
"							RUN			TCR=99% SCR=80% RQD=80%							
-14	1		END OF BOREHOLE AT 13.89m.		13.89												
Ĺ,																	
- 15 -	1																
16	3																
E																	
F 17	7																
-18																	
-18																	
- 19	9																
ţ																	
			GROUNDWATER ELE			5	_					1	ı		ı		
			☐ SHALLOW/SINGLE INSTA	ALLA [.]	TION					P/DUAL INSTALLATION		LOGGE		Santos/S	Singh		
L			WATER LEVEL (date)					ννΑ	ıER	LEVEL (date)		CHECKE	D :	KS			THURBER



RECORD OF BOREHOLE QS-3A

Mary River Project **PROJECT**

LOCATION Steensby Inlet - Quarry Project No. 19-1605-126

STARTED COMPLETED :

July 23, 2011 July 23, 2011

DRILLER: WALKER DRILLING N 7 800 000 E 595 698

SHEET 1 OF 1 DATUM: CGVD28

	<u></u>	SOIL PROFILE			Τ	SAN			00 000 E 595 698	EXCESS ICI	E CONTE	NT, PER			THERMISTER GROUND CO
DEPTH SCALE (metres)	BORING METHOD	301211101122	E		+	Т	_			10	20 ice		40	ADDITIONAL LAB. TESTING	
etres) ME		PLC	ELEV. (m)	NUMBER	<u>і</u> ш	BLOWS/0.3m	Z.	COMMENTS					TIO	FROZEN
֓֞֝֝֟֝֓֓֓֓֓֓֓֓֓֓֟֝֟֝֟֝֟֝ <u>֚֚֚֚֟֟֟֟</u>	SI NG	DESCRIPTION	ΥTΑ	∑	JMB	TYPE	NS/		DYNAMIC CONE PENETRATION RESISTANCE PLOT	WATER 0	141			B. T. B.	UNFROZEN
5	BOR		STRATA PLOT		=	-	BLO	RECOVERY %	50 100 150 200 250	wp ⊢— 10			wl 10	⁴ ≦	UNCERTAIN
\dashv	$\overline{}$	GROUND SURFACE	\Box	0.0		+	$^{-}$	+-							
		GRANITIC GNEISS, highly weathered and fractured, coarse grained, weak, pinkish				D	N		TCD=270/ CCD=250/ DCD=250/						
		grey			Ľ	RUI	IN		TCR=37% SCR=25% RQD=25%						
1															
					2	RUI	N		TCR=98% SCR=56% RQD=40%						
2					\vdash	+	+	+							
۱ ا														FI 5	
														>10 3	
3														2 2	
- 1					3	RUI	N		TCR=100% SCR=69% RQD=26%					5	
4														3 0	
- 1		clovinfill at 4 Arr												1 2	
_		clay infill at 4.4m												4	
5														5 >10	
														1 2	
6					4	RUI	N		TCR=100% SCR=74% RQD=41%					2	
- 1														4 3	
,				1		\perp	1							4 >10	
' '	NQ Diamond Drill	moderately to highly weathered												1	
	jam 	,			5	RUI	N		TCR=100% SCR=74% RQD=33%					2	
3	ğ					_	1							4 3	
- [-				6	RUI	N		TCR=100% SCR=88% RQD=35%					4	
,					Ľ		1							>10 4	
		moderately weathered			,	RUI	N		TCD-100% SCD-05% DOD-90%					2	
					'	KUI	I N		TCR=100% SCR=95% RQD=89%					5	
10		highly woothors d			H	1	+	1						3 >10	
		highly weathered		1										>10	
11		vertical joint, clay infill			٥	RUI	N		TCR=100% SCR=53% RQD=27%					2	
		vortical joint, day IIIIII			°				1511-100/0 3011-03/0 RQD-21/0					2	
, [3	
12						_	1							1 >10	
- 1					9	RUI	N		TCR=100% SCR=100% RQD=69%					>10 >10	
13		slightly to moderately weathered												6	
		5 .,												2 0	
14					10	RUI	N		TCR=100% SCR=94% RQD=92%					7 >10	
'					``									>10	
														2 1	
15	-	END OF BOREHOLE AT 15.13m.	 	15.1	3	+	+	-						2	
		END OF BOILEHOLE AT 10.10III.													
16															
, ,															
17															
18															
19															
ן פּי															
		GROUNDWATER ELE	\/\\\ \/\\\		<u></u>				<u> </u>					L	
					J	,	_								
		$\overline{igspace}$ shallow/single insta	ALLA	TION					P/DUAL INSTALLATION	LOGGE	D :	Singh/Ra	amos		
		WATER LEVEL (date)					WA	ATER	LEVEL (date)	CHECK	ED :	KS			THUR



RECORD OF BOREHOLE QS-2

Mary River Project **PROJECT**

LOCATION Steensby Inlet - Quarry

DRILLER: WALKER DRILLING

STARTED COMPLETED :

July 24, 2011 July 25, 2011

N 7 801 066 E 595 200

SHEET 1 OF 2 DATUM: CGVD28

Project No. 19-1605-126

_ц Т	0	SOIL PROFILE				SAM	IPLE	s		E	XCES	SS ICE	CONT	ENT ce	, PER	CENT	ی ا	THERMISTE GROUND CO
DEP IN SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT			TER C	20 ONTEN	30 NT, F	PERCE		ADDITIONAL LAB. TESTING	FROZEN UNFROZEN UNCERTAIN
-		GROUND SURFACE	S)	0.0	+	-	ш	2	50 100 150 200 250	_	Ť		1	Ť		+	-	
1		GRANITIC GNEISS, faintly to slightly weathered, coarse grained, medium strong black, grey, pink		0.0		RUN	7		TCR=100% SCR=100% RQD=95%								FI 0 0 3 1 1 1 1 1 1 1	
3 4					2	RUN	,		TCR=100% SCR=100% RQD=100%								0 0 0 3 0 2	
5					3	RUN	7		TCR=98% SCR=98% RQD=98%								0 0 1 0 0	
7					4	RUN	٧		TCR=100% SCR=97% RQD=97%								0 0 1 0 0 0	
10	NQ Diamond Drill				5	RUN	٧		TCR=91% SCR=91% RQD=86%								0 2 0 0 0 1 1 0	
12					6	RUN	٧		TCR=100% SCR=100% RQD=92%								0 1 0 3 0 2	
14					7	RUN	1		TCR=100% SCR=96% RQD=92%								0 0 0 0 0	
15		slightly weathered, medium to coarse grained			8	RUN	١		TCR=98% SCR=93% RQD=81%								2 3 1 0	
16 17		strong, fresh to faintly weathered			9	RUN	,		TCR=99% SCR=95% RQD=91%								0 0 0	
18		massive			10	RUN	٧		TCR=100% SCR=92% RQD=88%								1 2	
		GROUNDWATER ELI	EVAT	ΓΙΟΝ	L s												0	
		☐ SHALLOW/SINGLE INST WATER LEVEL (date)							P/DUAL INSTALLATION LEVEL (date)			OGGE HECK		Ra KS	amos/S	Singh		THUE

RECORD OF BOREHOLE QS-2

Mary River Project **PROJECT**

Steensby Inlet - Quarry

Project No. 19-1605-126

LOCATION STARTED

COMPLETED

July 24, 2011 July 25, 2011

DRILLER: WALKER DRILLING

SHEET 2 OF 2

N 7 801 066 E 595 200

DATUM: CGVD28

Section Sec			9	SOIL PROFILE				SAM	PLE	S		EXC	ESS ICE	CONTEN	NT, PER	CENT	. (1)	THERMISTER/ GROUND COND.
21 22 23 24 25 26 27 28 29 29 20 20 20 20 20 20	DEPTH SCAL	(sanaii)	BORING METH	DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE	BLOWS/0.3m	RECOVERY %	DYNAMIC CONE PENETRATION RESISTANCE PLOT	W	L ATER Co /p ├──	20 3 L DNTENT,	0 4 L PERCE	NT vl	ADDITIONAL LAB. TESTING	FROZEN UNFROZEN
21 22 23 24 25 26 27 28 29 29 20 20 20 20 20 20					\//												0	_
12 RIN TCR=100% SCR=0% RQD=100% 13 RIN TCR=100% SCR=100% RQD=100% 14 RIN TCR=100% SCR=100% RQD=100% 15 RIN TCR=100% SCR=91% RQD=79%							11	RUN	N		TCR=100% SCR=53% RQD=47%						0 >10 >10 >10 >10	
23 13 RUN TGR=100% SCR=100% RQD=100% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							12	RUN	1		TCR=100% SCR=0% RQD=0%							
13 RUN TCR=100% SCR=100% RQD=100% 14 RUN TCR=100% SCR=100% RQD=100% 15 RUN TCR=100% SCR=100% RQD=100% 15 RUN TCR=100% SCR=100% RQD=100% 15 RUN TCR=100% SCR=91% RQD=79% 15 RUN TCR=100% SCR=91% RQD=79% 16 RUN TCR=100% SCR=91% RQD=79% 17 RUN TCR=100% SCR=91% RQD=79% 18 RUN TCR=100% SCR=100% RQD=100% 19 RUN TCR=100% SCR=100% RQD=100% 10 RUN TCR=100% SCR=100% RQD=100% 10 RUN TCR=100% SCR=100% RQD=100% 10 RUN TCR=100% SCR=100% RQD=100% 10 RUN TCR=100% SCR=100% RQD=100% 11 RUN TCR=100% SCR=100% RQD=100% 12 RUN TCR=100% SCR=100% RQD=100% 13 RUN TCR=100% SCR=100% RQD=100% 14 RUN TCR=100% SCR=100% RQD=100% 15 RUN TCR=100% SCR=100% RQD=100% 16 RUN TCR=100% SCR=100% RQD=100% 17 RUN TCR=100% SCR=100% RQD=100% 18 RUN TCR=100% SCR=100% RQD=100% 19 RUN TCR=100% SCR=100% RQD=100% 10 RUN TCR=100% RQD=100% 23	3																	
25	-24	5					13	RUN	1		TCR=100% SCR=100% RQD=100%						0 0 0	-
-26 2 14 RUN TCR=100% SCR=100% RQD=100% 0 0 0 0 0 0 0 0 0	: - 25		DI OLI OLI OLI OLI OLI OLI OLI OLI OLI OL														0	
14 RUN TCR=100% SCR=100% RQD=100% TCR=100% SCR=91% RQD=79% TCR=100% SCR=100% RQD=79% TCR=100% SCR=10	ŀ	5	אַר (אַר														1	
14 RUN TCR=100% SCR=100% RQD=100% 15 RUN TCR=100% SCR=91% RQD=79% TCR=100% SCR=100% RQD=79% TCR=100% SCR=100% RQD=79%	-26																0	-
-28 -29 -30 -31 END OF BOREHOLE AT 30.00m. -31 -32 -33 -34 -35 -36 -37	27	,					14	RUN	1		TCR=100% SCR=100% RQD=100%						0	
29 Is run TCR=100% SCR=91% ROD=79% CR=100% SCR=91% ROD=79% CR=																	0	
15 RUN TCR=100% SCR=91% RQD=79% 15 RUN TCR=100% SCR=91% RQD=79% 15 RUN TCR=100% SCR=91% RQD=79% 15 RUN TCR=100% SCR=91% RQD=79%	-28	3															0	-
15 RUN TCR=100% SCR=91% RQD=79% 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ŀ																0	
30.00 30.00	- 29	1					15	RUN	1		TCR=100% SCR=91% RQD=79%						2	
- 31	: -30	,		END OF DODELIOUS AT 22 22		30.00												-
-32 -33 -34 -35 -36 -37				END OF BOREHOLE AT 30.00m.														
-34 -35 -36 -37	- 31																	
-34 -35 -36 -37	ŀ																	
-34 -35 -36 -37	-32	2																-
-34 -35 -36 -37	: - 33	,																
- 35 - 36 - 37																		
37	-34																	-
37	•																	
	- 35																	
	: -36	,																_
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) GROUNDWATER ELEVATIONS CHECKED: KS THURBER	- 37	·																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) GROUNDWATER ELEVATIONS CHECKED: KS THURBER																		
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) GROUNDWATER ELEVATIONS UGGED: Ramos/Singh CHECKED: KS THURBER	1/9/1 1/9/1	·																-
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) WATER LEVEL (date) GROUNDWATER ELEVATIONS LOGGED: Ramos/Singh CHECKED: KS THURBER	39 - 39	,																
GROUNDWATER ELEVATIONS SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) WATER LEVEL (date) GROUNDWATER ELEVATIONS LOGGED: Ramos/Singh CHECKED: KS THURBER	5126																	
SHALLOW/SINGLE INSTALLATION WATER LEVEL (date) WATER LEVEL (date) WATER LEVEL (date) CHECKED: KS THURBER	(5126)			GROUNDWATER ELE	LLI VA1	IONS	 S		<u> </u>									
WATER LEVEL (date) WATER LEVEL (date) CHECKED : KS THURBER	3ER28							Ž		DEE	P/DUAL INSTALLATION		LOGGEI	D : I	Ramos/S	ingh		
	THUR.																	THURBER

RECORD OF BOREHOLE QS-1

Mary River Project **PROJECT**

Steensby Inlet - Quarry

Project No. 19-1605-126

LOCATION STARTED

August 6, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 1

August 6, 2011 N 7 803 054 E 593 500 COMPLETED DATUM: CGVD28 EXCESS ICE CONTENT, PERCENT THERMISTER/ GROUND COND SAMPLES SOIL PROFILE BORING METHOD ADDITIONAL LAB. TESTING DEPTH SCALE oice 10 20 STRATA PLOT BLOWS/0.3m FROZEN NUMBER RECOVERY ELEV. (m) **COMMENTS** TYPE WATER CONTENT, PERCENT UNFROZEN DYNAMIC CONE PENETRATION RESISTANCE PLOT DESCRIPTION UNCERTAIN 20 30 100 150 200 250 10 40 GROUND SURFACE **GRANITIC GNEISS**, slightly weathered, medium grained, foliated, pinkish grey FI 3 0 3 1 RUN TCR=89% SCR=86% RQD=84% 2 1 P clay infill in some joints 3 1 4 0 TCR=100% SCR=100% RQD=94% 2 RUN 2 1 3 0 5 4 2 2 6 0 1 3 7 3 RUN TCR=100% SCR=100% RQD=72% 1 2 1 -8 3 9 g 1 1 4 RUN TCR=100% SCR=100% RQD=93% 2 4 2 1 3 1 12 0 4 5 RUN TCR=100% SCR=100% RQD=76% 0 2 highly weathered from 14.52m to 16.00m, vertical joint 15 0 16 6 RUN TCR=100% SCR=56% RQD=50% 0 0 0 0 0 17.52 END OF BOREHOLE AT 17.52m. 18 5126.GPJ 19

GROUNDWATER ELEVATIONS

abla shallow/single installation WATER LEVEL (date)

11/9/1

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill CHECKED : KS



AZIMUTH:

PROJECT : Mary River Project

ary River Project INCLINATION:

LOCATION : Steensby Inlet - Ore Loading Dock

STARTED : August 8, 2011 DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

Project No. 19-1605-126

	COMPL	LETED : August 8, 2011					N	7 798 314 E								CGVD28
DEPTH SCALE	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	. No.	PENETRATRATION RATE (m/min)	COLOUR % RETURN	FR-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN	J- P- S-	FAULT JOINT POLISHE SLICKEN	NSIDE	ED	SM-SMOOTH FO-FOLIATED R-ROUGH UE-UNEVEN ST-STEPPED W-WAVY PL-PLANAR C-CURVED	Unconfined	ngth (Mpa)	FIELD/LABORATORY TESTING RESULTS Point Load Test Diametral
DEPTH	BORING	Beer un nen	SYMBO	ELE	RU	PENETRATE (m	FLUSH	RECOVERY TOTAL SOLID CORE % CORE % 8898 8898		FRACT. INDEX PER .3 m	1	IP wrt re Axis	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	- 100 100 100 100 100 100 100 100 100 100	- 1	▲ Point Load Test Axial ■ Laboratory UCS Test
		GROUND SURFACE		4.54							П				\prod	
- 1		GRANITIC GNEISS, faintly weathered, moderately wide horizontal foliation, strong, pink with dark and light grey foliations			1								J, open (25mm), irregular J, closed, planar, horizontal J, planar, diagonal J, planar, horizontal J, closed, planar, horizontal			-
-2					2								J, closed, irregular, horizontal J, closed, irregular, horizontal, weather J, closed, diagonal, black staining J, closed, black crystalline intrusion J, closed, black crystalline intrusion	ed		
-4 -5		slightly weathered											J, closed, irregular, diagonal, black staining			
-6													J, open, sub-vertical, weathered (5.48 5.69m) J, open, diagonal, weathered	o		-
7					3								J, closed, sub-horizontal, black staining			-
-8 -9													J, closed, sub-horizontal J, 2mm aperture, stepped, vertical, silt (8.23 to 10.36m)	infill		-
-10	NO Di	becoming coarse grained			4			B-2-2-2-								- - -
- 12 - 13		strong to very strong, wide spacing			5								J, closed, horizontal, weathered J, sub-vertical, weathered (12.06 to 12.25m)			
-14										70 P			J, closed, horizontal, black staining J, closed, horizontal, black staining			
- 15					6											-
-16 - - - 17																
-18 -18					7											- -
—	\perp	GROUNDWATER ELE	17/1		<u> </u>		ь_	101001010010				ш	I.	\perp	Ш	

GROUNDWATER ELEVATIONS

ROCKM(5126) 5126.GPJ 11/9/11

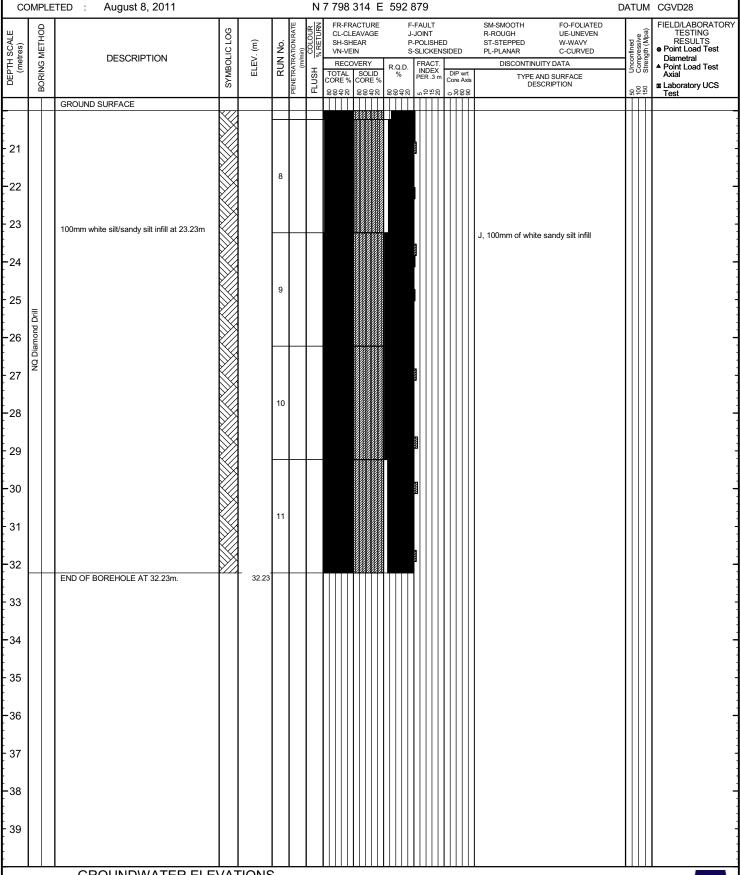
SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan/Hill CHECKED : MB

THURBER

PROJECT : Mary River Project INCLINATION: AZIMUTH: Project No. 19-1605-126 STARTED : August 8, 2011 DRILLER: BOART LONGYEAR, LM-55 SHEET 2 OF 2



GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

5126.GPJ 11/9/11

ROCKM(5126)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan/Hill CHECKED : MB



PROJECT: Mary River Project

Steensby Inlet - Ore Loading Dock

INCLINATION: AZIMUTH:

Project No. 19-1605-126

LOCATION : STARTED :

August 9, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

COMPLETED August 10, 2011 N 7 798 331 E 592 860 DATUM CGVD28 FIELD/LABORATORY
TESTING
RESULTS
Point Load Test FR-FRACTURE CL-CLEAVAGE SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG J-JOINT ST-STEPPED PL-PLANAR SH-SHEAR P-POLISHED W-WAVY DEPTH SCAL E ટું S-SLICKENSIDED C-CURVED VN-VEIN ELEV. DESCRIPTION RUN Diametral FRACT INDEX PER .3 RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH SOLID CORE 9 TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 120 130 8848 8848 245 ~888 GROUND SURFACE J, closed, sub-vertical, brown weathering (0.12 to 0.24m) **GRANITIC GNEISS**, faintly weathered, closely spaced sub-horizontal foliation, strong, pink, white and grey J, 3 parallel, closed, diagonal (0.64 to 0.84m) J, open, 4mm silty infill J, open, 3mm, diagonal 3 2 J, closed, diagonal, black staining J, closed, diagonal, black staining J, closed, irregular, horizontal, brown weathering J, closed, horizontal, black weathering 5 becoming strong to very strong, widely spaced foliation J, closed, horizontal to sub-horizontal 6 J, closed, horizontal to sub-horizontal J. closed, horizontal to sub-horizontal J, closed, horizontal to sub-horizontal 3 J, closed, horizontal to sub-horizontal J, closed, horizontal to sub-horizontal J, closed, horizontal to sub-horizontal 8 J, closed, vertical, red weathering (9.08 to 9.36m) 9 becoming very coarse grained moderately weathered J, closed, vertical, red weathering (9.98 to 10.39m) J. closed, horizontal 12 J. closed, horizontal J, open, 2mm, horizontal becoming fresh J, closed, horizontal 15 J, open, 3mm, horizontal 6 16 J, open, 2mm, irregular, horizontal J, open, 2mm, irregular, horizontal biotite schist, dark grey banding (150mm) at 16.6m J, closed, sub-horizontal J, closed, vertical, black weathering (17.37 to 17.66m) 18 J, closed, planar, diagonal 19 J, closed, horizontal

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

5126.GPJ 11/9/11

ROCKM(5126)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan/Hill
CHECKED : MB

THURBER

Mary River Project **PROJECT**

Steensby Inlet - Ore Loading Dock

AZIMUTH: INCLINATION:

Project No. 19-1605-126

STARTED

LOCATION

August 9, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 2 August 10, 2011 COMPLETED N 7 798 331 E 592 860 DATUM CGVD28 FIELD/LABORATORY
TESTING
RESULTS
Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR DEPTH SCAL W-WAVY ENETRATRATION ELEV. (m) Š C-CURVED DESCRIPTION RUN Diametral FRACT INDEX PER .3 RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 50 150 8848 8848 2458 ୦ ନିତ୍ରର GROUND SURFACE J, closed, planar, vertical (20.23 to 20.46m) 21 23 24 J, closed, planar, sub-vertical, black 25 veathering (24.90 to 25.02m) J, closed, planar, diagonal, grey and black weathering (25.89 to 25.96m) J, sub-vertical, 70° J, sub-vertical, 70° 27 10 J, sub-vertical, 70° J, horizontal
J, horizontal 28 J, sub-vertical, 70° 29 J. horizontal 30 J, horizontal J, sub-vertical J, sub-vertical 31 J, sub-vertical 32 END OF BOREHOLE AT 31.96m. 33 34 35 36 37 38 39

GROUNDWATER ELEVATIONS

5126.GPJ 11/9/11

ROCKM(5126)

abla shallow/single installation WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan/Hill CHECKED MB

PROJECT : Mary River Project

Steensby Inlet - Ore Loading Dock

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

Project No. 19-1605-126

STARTED : August 10, 2011 COMPLETED : August 11, 2011

LOCATION

N 7 798 409 E 592 876

AZIMUTH:

DATUM CGVD28

Part	L	CC	ואועונ	LETED : August 11, 2011					IN 7	190 2	+U9 E	592	570				DATO	JΙVΙ	CGVD28
GROUND CRIPATED CRIPATES approximation of photoling grey to Base, spray workmand, photoling grey to Base, strength of Base and Streng		DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	PENETRATRATION RATE (m/min)	HSN	CL-CLE SH-SHE VN-VEII RECOV TOTAL CORE %	EAVAGE EAR N VERY SOLID CORE %	R.Q.D.	JOINT -POLISHE -SLICKEN FRACT. INDEX PER .3 m	DIP wrt Core Axi	R-ROUGH ST-STEPPED PL-PLANAR DISCONTINU S TYPE AI DES	UE-UNEVEN W-WAVY C-CURVED TY DATA ND SURFACE			RESULTS Point Load Test Diametral Point Load Test Axial
GRANTIC CARLES, stylery washined, from the first is die no to the control of the	t			GROUND SURFACE	⇈	0.00		Т	+ + +	777	1111	11111			·		TT	Ħ	1001
		1				9.09													-
10	ŀ			heavily fractured zone from 2.3m to 2.6m moderately weathered, sub-vertical foliation									1		J, sub-horizontal J, sub-vertical, 80°				- - - -
5.38m 1. sub-vertical 3. J. sub-vertical 4. sub-vertical J. horizontal J. horizontal J. sub-vertical Tolorm white silly sand seam at 15.35m 6. sub-vertical Tolorm white silly sand seam at 15.35m Tolorm white silly sand seam at 15.35m Tolorm white silly sand infill from 16.6m to 17.3m most fractures have silty sand infill from 16.6m to 17.3m most fractures have silty sand infill from 16.7m Tolorm white silty sand seam at 15.35m Tolor white silty sand seam at 15.35m Tolor white silty sand seam at 15.35m Tolor white silty sand seam at 15.35m Tolor white silty sand seam at 15.35m Tolor white silty sand seam at 15.35m Tolor white silty sand seam a		4					2								J. closed, sub-vert	ical, rusty weathering ical, rusty weathering			
10															J, sub-vertical J. sub-vertical				- - -
10 10 10 10 10 10 10 10		7					3												- - - -
100mm white silty sand seam at 15.35m 11 12 13 15 16 17 18 19 10 10 10 10 10 10 10 10 10	ŀ														J, horizontal				<u>-</u> - - -
11	ŀ		Diamond Drill				4								J, sub-vertical				-
13		11	NOI																- -
100mm white silty sand seam at 15.35m 100mm white silty sand seam at 15.35m 6 17 18 19 7	ŀ						5								J, sub-vertical, 60°				<u>-</u>
100mm white silty sand seam at 15.35m 6 17 18 100mm white silty sand seam at 15.35m 6 7	ŀ																		-
fractures have silty sand infill from 16.6m to 17.3m most fractures have trace silty sand infill from 17.38 to 20.38m 7	-	15		100mm white silty sand seam at 15.35m															- -
most fractures have trace silty sand infill from 17.38 to 20.38m 7	ŀ			fractures have silty sand infill from 16.6m to			6												-
	ŀ			most fractures have trace silty sand infill															
		19																	

ROCKM(5126) 5126.GPJ 11/9/11

GROUNDWATER ELEVATIONS

☐ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Hill CHECKED : MB



RECORD OF BOREHOLE SI-OLD-006 Mary River Project **PROJECT** Project No. 19-1605-126 INCLINATION: AZIMUTH: Steensby Inlet - Ore Loading Dock LOCATION August 10, 2011 DRILLER: BOART LONGYEAR, LM-55 STARTED SHEET 2 OF 2 August 11, 2011 N 7 798 409 E 592 876 COMPLETED DATUM CGVD28 FIELD/LABORATORY TESTING RESULTS Point Load Test FR-FRACTURE CL-CLEAVAGE F-FAULT J-JOINT SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD DEPTH SCALE (metres) SYMBOLIC LOG SH-SHEAR VN-VEIN P-POLISHED S-SLICKENSIDED ST-STEPPED PL-PLANAR W-WAVY C-CURVED ELEV. (m) Š RUN DESCRIPTION Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS Test 50 150 8848 8848 2458 ୦ ନିତ୍ରର GROUND SURFACE 21 23 24 25 26 27 10 28 29 30 31 32 33 12 34 35 36 13 37 38 END OF BOREHOLE AT 38.38m. 38.38 39 **GROUNDWATER ELEVATIONS** \overline{Y} SHALLOW/SINGLE INSTALLATION ▼ DEEP/DUAL INSTALLATION LOGGED : Hill WATER LEVEL (date) WATER LEVEL (date) CHECKED : MB

5126.GPJ 11/9/11

ROCKM(5126)

Mary River Project **PROJECT**

AZIMUTH: INCLINATION:

LOCATION

August 11, 2011

Steensby Inlet - Ore Loading Dock

DRILLER: BOART LONGYEAR, LM-55

SHEET 1 OF 2

Project No. 19-1605-126

STARTED August 11, 2011 COMPLETED

N 7 798 424 E 592 840

DATUM CGVD28

		ETED : August 11, 2011	, ,			l	-	7 798 424 E						011010071	— —			CGVD28
,	ᄋ		g			RATE	JUR TURN	FR-FRACTURE CL-CLEAVAGE		F-FAL J-JOI	NT			SM-SMOOTH FO-FOLIATED R-ROUGH UE-UNEVEN		9 (ра) Н	FIELD/LABORAT
(metres)	BORING METHOD		SYMBOLIC LOG	ELEV. (m)	ģ.	PENETRATRATION RATI (m/min)	COLOUR % RETURN	SH-SHEAR VN-VEIN			LISHI CKE		DED	ST-STEPPED W-WAVY PL-PLANAR C-CURVED	- [Unconfined Compressive Strength (Mna)	<u>ق</u> و	RESULTS Point Load Test
(metres)	∑ (¹)	DESCRIPTION	<u>j</u>	<u>;</u>	Z	TRA1		RECOVERY		FR	ACT	Т	,LU	DISCONTINUITY DATA	⊢'	mpre	.engi	Diametral
<u>ا</u> ڪ ا	ΣK		Μ̈́B	ELE	R	TRA	SH	TOTAL SOLID	R.Q.D. %	IN	IDEX R .3 n	.	OIP wrt	TYPE AND CUREACE	\dashv	50°	ਲੋ 🖣	Point Load Tes Axial
í	BOF		l y			ENE	FLUSH					- 1 -	ore Axis	DESCRIPTION		100	- I _	Laboratory UCS
+	Ŧ	GROUND SURFACE	++	0.00	\vdash	L	۳	8848 8848	8888	1 2	111 5 to 8	ic	888 		\dashv	111 22 5 4	+	Test
\dashv	+	GRANITIC GNEISS, moderately	k	2.93						+	₩	+	+++		+	+++	+	
		weathered, closely spaced sub-horizontal															П	
.		foliation, strong, pinkish grey highly fractured at 0.45m to 0.64m												J, open, fresh (0.84 to 0.91m)			П	
1					1									J, closed, sub-vertical, white weathering	ng		П	
										37				(0.95 to 2.10m) J, closed, diagonal, fresh			П	
			M											o, closed, diagonal, fresh			П	
2																	П	
			\mathbb{N}							23							П	
,																	П	
3		highly fractured, some sand infill in open	$\mathbb{K}/\!\!\!/$														П	
		joints, sub-vertical joint running through 80% of run	\mathbb{K}														П	
4					2												П	
'																	П	
5																		
			Y //															
														J, open, diagonal, black weathering				
3														J, open, diagonal, black weathering				
			\mathbb{N}											J, open, diagonal, black weathering				
														J, closed, vertical, weathered (6.80 to				
7			$\mathbb{K}/\!\!\!/$		3									6.90m)			П	
			NXI.											J, closed, vertical, weathered (7.11 to 7.20m)			П	
			\mathbb{K}/\mathbb{A}											J, open, vertical, weathering and infill			П	
3														(7.32 to 8.40m)			П	
						-				41				I along impositor discond weathers			П	
		dark grey biotite schist zones, slightly weathered								Ш				J, closed, irregular, diagonal, weathere	,a		П	
9	.	weathered								11							П	
	NQ Diamond Drill		M											J, closed, irregular, diagonal, weathered			П	
- 1	g				4					Ш				J, closed, irregular, diagonal, weathere	;d		П	
10	<u>a</u>		\mathbb{N}		4												П	
100	3	highly fractured biotite schist at 10.43m to												J, closed, irregular, diagonal, weathere	∌d		П	
	ž	10.56m	\mathbb{K}/\mathbb{A}							M							П	
11			NXI.														П	
		becoming slightly weathered, moderately															П	
۱. ا		spaced foliation	\bowtie														П	
12														J, closed, diagonal, brown weathering			П	
			\mathbb{N}														П	
13					5					221				J, open, irregular, vertical, brown			П	
'										81				weathering (12.98 to 13.23m)			П	
														L desert discount				
14			\mathbb{N}							1				J, closed, diagonal				
														J, closed, sub-vertical, black weatherir (14.29 to 14.40m)	ng			
			\mathbb{N}											J, closed, planar, vertical, brown				
15			NXI							劃				weathering (14.62 to 14.87m)				
16					6													
														J, closed, diagonal, weathered				
17																		
						\vdash	<u> </u>			20				J, closed, diagonal, weathered (17.52)	to			
			\mathbb{N}							4				17.78)	_			
8		becoming very coarse grained																
]	\mathbb{K}/\mathbb{A}											J, closed, diagonal, black weathering				
		biotite seam with diagonal closed joint at	NX/		_													
19		18.74 to 18.89m			7													
														J, closed, diagonal, black weathering J, closed, sub-vertical, black weathering	_			
														J, closed, sub-vertical, black weathering (19.50 to 19.60m)	ıg			
		GROUNDWATER ELE	1///	IUNIC	<u> </u>	_	_	100101000	4		Ш	ш	ш	, 	—	ш	щ.	
					,	_	,											
		$\overline{igspace}$ shallow/single inst	4LLA1	ΓΙΟΝ		Ā	- D	EEP/DUAL I	NSTA	LL	ATI	10	٧	LOGGED : Dunstan				
		WATER LEVEL (date)				١	WAT	ER LEVEL (da	te)					CHECKED : MB				
									/					OFFICINED . IVID				TH



PROJECT Mary River Project

Steensby Inlet - Ore Loading Dock

AZIMUTH: INCLINATION:

Project No. 19-1605-126

LOCATION STARTED

August 11, 2011

DRILLER: BOART LONGYEAR, LM-55

SHEET 2 OF 2

COMPLETED August 11, 2011 N 7 798 424 E 592 840 DATUM CGVD28 FIELD/LABORATORY
TESTING
RESULTS
Point Load Test FR-FRACTURE CL-CLEAVAGE SM-SMOOTH R-ROUGH FO-FOLIATED UE-UNEVEN BORING METHOD SYMBOLIC LOG J-JOINT ST-STEPPED PL-PLANAR SH-SHEAR P-POLISHED W-WAVY DEPTH SCAL ELEV. (m) ટું S-SLICKENSIDED C-CURVED VN-VEIN DESCRIPTION RUN Diametral FRACTINDEX RECOVERY DISCONTINUITY DATA ▲ Point Load Test Axial FLUSH TOTAL SOLID TYPE AND SURFACE DESCRIPTION ■ Laboratory UCS 120 22 8848 245 ~888 GROUND SURFACE J, closed, diagonal, black weathering

J, closed, vertical, black weathering (20.40 to 20.48m) J. closed, horizontal, black weathering 21 J, open, 3mm, white crystalline infill, weathered (21.34 to 21.55m) white crystaline infill from 21.3m to 21.5m J, heavily fractured, vertical, black weathering (22.33 to 22.63m) heavily fractured vertical joint from 22.3m to 22.6m $\,$ 23 becoming faintly weathered 24 J, closed, planar, sub-vertical, red weathering (24.18 to 24.29m) 9 J, closed, irregular, horizontal, fresh 25 J, closed, irregular, horizontal, fresh J, closed, planar, sub-vertical, grey weathering (25.90 to 26.02m) J, closed, planar, sub-vertical, black weathering (26.82 to 27.04m) J, closed, irregular, horizontal, brown weathering 27 weathering 10 28 29 biotite schist banding (<300mm) 30 J, closed, irregular, horizontal, weathered 31 J, closed, irregular, horizontal, weathered J, closed, sub-vertical, black weathering (31.30 to 31.62m) 32 END OF BOREHOLE AT 32.40m. 32.40 33 34 35 36 37 38 5126.GPJ 11/9/11 39

GROUNDWATER ELEVATIONS

abla shallow/single installation WATER LEVEL (date)

ROCKM(5126)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan CHECKED MB

INCLINATION:

Mary River Project **PROJECT** LOCATION

Steensby Inlet - Ore Loading Dock

DRILLER: BOART LONGYEAR, LM-55

Project No. 19-1605-126

STARTED

August 12, 2011 August 12, 2011

AZIMUTH:

SHEET 1 OF 2 DATUM CGVD28

	ARTE OMPLI	ED : August 12, 2011 ETED : August 12, 2011			DK	ILL		7 798				LI	/I-55			SHEE1 DATUN		CGVD28
DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	TRATRATION RATE	SH COLOUR RETURN	CL-CL SH-SH VN-VE	OVERY	J P	FAULT JOINT -POLISH -SLICKEI FRACT INDEX PER .3 r	NSI	DIP wrt	SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR DISCONTINUIT		Unconfined Compressive	Strength (Mpa)	FIELD/LABORATORY TESTING RESULTS Point Load Test Diametral Point Load Test Axial
	BOR		SYI			PENE	FLUSH	TOTAL CORE %	SOLID CORE %	8848	°548	- 1 -	Core Axis - ೫ 8 8	DESC	D SURFACE RIPTION	100	- 1	■ Laboratory UCS Test
		GROUND SURFACE		5.80					Maria				Ш	J, closed, planar, su	ub vertical block		П	-
1		GRANITIC GNEISS, moderately weathered, medium grained, closely spaced foliation, strong, pink with grey			1									weathering (0.00 to	0.34m)			
-2 -2		heavily weathered zones, frequent black biotite schist seams, frequent sub-vertical bands																
- 3 - -4					2													
5		slightly weathered			3									J, closed, horizontal				
-6 -7		dark grey biotite schist zones, highly fractured zones			4									J, closed, diagonal, to 6.71m) J, closed, sub-vertice	I, black weathering diagonal, weathered black weathering (6.9 cal, heavily weathered	52		
-8					7									(6.77 to 6.86m) J, closed, horizontal J, closed, horizontal				
9	NQ Diamond Drill				5									J, closed, irregular, J, closed, planar, di weathering (9.31 to	horizontal agonal, black 9.47m)			
11	NO													J, open, 2mm, sub- weathering (10.75 to	vertical, dark brown o 11.11m)			
-12 - 13					6									J, closed, planar, ho weathering J, closed, planar, ho weathering J, closed, irregular, vertical, brown weat	orizontal, red			
-14														13.16m) J, closed, planar, di weathering (13.59 to	agonal, brown o 13.71m)			
15		dark grey biotite schist banding broken schist seam, irregular and horizontal												J, closed, diagonal, (14.73 to 14.86m)	ыаск weathering			
-16 - 17		fractured zone			7													
-18		some coarse grained zones																
- 19 -					8									J, open, 2mm, stepp weathering J, closed, irregular, weathering (19.57 to	ped, diagonal, brown			
<u> </u>		GROUNDWATER ELE	<u> </u>	IONIC	Ļ						Ш	Ш	Ш	wearriering (19.57 to	u 2U.49IN)		Ц	

GROUNDWATER ELEVATIONS

ROCKM(5126) 5126.GPJ 11/9/11

 \overline{Y} SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : Dunstan CHECKED : MB



Mary River Project **PROJECT**

INCLINATION: Steensby Inlet - Ore Loading Dock

DRILLER: BOART LONGYEAR, LM-55

AZIMUTH:

Project No. 19-1605-126

STARTED

LOCATION

August 12, 2011

SHEET 2 OF 2 DATUM CGVD28

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	SYMBOLIC LOG	ELEV. (m)	RUN No.	PENETRATRATION RATE (m/min)	FLUSH COLOUR WRETURN	FR-FRACTURI CL-CLEAVAGE SH-SHEAR VN-VEIN RECOVERY TOTAL SOLIE CORE % CORE	ROD	J-JC P-PC S-SI	AULT DINT DLISH LICKE RACT NDEX ER .3 r	NSI	DED DIP wrt	SM-SMOOTH FO-FOLIATED R-ROUGH UE-UNEVEN ST-STEPPED W-WAVY PL-PLANAR C-CURVED DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION		Unconfined Compressive Strength (Mpa)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
_	<u> </u>	GROUND SURFACE	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			PE	F	8848 8848		ı u	11 548	3 6	-888 		- 1	111 8	■ Laboratory UCS Test
21 22 23		medium grained with dark grey diagonal foliations			9									J, closed, diagonal, red weathering J, closed, sub-vertical, red weatherin (21.41 to 21.52m) J, closed, diagonal, red weathering J, closed, diagonal, red weathering	9		
24	NQ Diamond Drill	coarse grained, massive, occasional biotite schist banding			10												
27	S N	very coarse grained												J closed irregular diagonal black			
28		300mm biotite schist band at 27.75m			11									J, closed, irregular, diagonal, black weathering (27.45 to 27.60m) J, closed, irregular, diagonal, black weathering (28.12 to 28.36m) J, closed, irregular, vertical, black			
29 30 31 32		medium grained, with fine seams of dark grey biotite schist bands			12									J, closed, planar, sub-vertical, fresh (30.04 to 31.34m) J, closed, planar, diagonal, fresh (31.32.04m) J, closed, diagonal, black weathering			
33 34		dark grey biotite schist from 32.61m to 32.24m fractured zone, weathered at 33.20 to 33.90m			13									J, closed, diagonal, black and red weathering (33.37 to 33.50m)			
35					10									J, closed, sub-vertical, black weather (34.45 to 34.80m)	ing		
36		END OF BOREHOLE AT 35.61m.		35.61													
37																	
38 39																	
		GROUNDWATER ELE															
		SHALLOW/SINGLE INSTA	ALLA ⁻	TION				EEP/DUAL		LL	AT	Ю	N	LOGGED : Dunsta	า		







Baffinland Iron Mines Corporation - Mary River Project 2011 Potential Quarry and Borrow Investigations

Appendix C: Point Load Test Data





Job No :	19-	1605-126	Client :	HATCH	
_			Date Drilled :	7/28/2011	
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/30/2011	
Core Size :	NQ BH No:	Q7+500	Tester :	AS	

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	10	26.0	D	0.5	47.5	138.3	5.2	Sandstone	Weak
2	13	35.1	D	0.5	47.5	110.5	5.2	Sandstone	Weak
3	13	37.5	D	3.5	47.5	114.8	36.4	Sandstone	Medium Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



lob No :	19	9-1605-126	Client :	HATCH
			Date Drilled :	7/25/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/30/2011
Core Size :	NQ BH No:	Q10+250	Tester :	SH

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	4	8.0	D	21.5	47.5	88.8	223.5	Granitic Gneiss	Very Strong
2	4	8.1	Α	24.5	47.5	48.8	206.9	Granitic Gneiss	Very Strong
3	4	9.7	D	0.5	47.5	85.0	5.2	Granitic Gneiss	Weak
4	5	12.5	D	-	47.5	102.8		Granitic Gneiss	
5	5	12.7	D	15.5	47.5	60.5	161.1	Granitic Gneiss	Very Strong
6	6	15.7	Α	0.5	47.5	60.9	3.6	Granitic Gneiss	Very Weak
7	7	18.0	D	13.5	47.5	75.3	140.3	Granitic Gneiss	Very Strong
8	7	18.2	Α	8.0	47.5	74.1	48.8	Granitic Gneiss	Medium Strong
9	8	20.4	D	11.5	47.5	63.7	119.5	Granitic Gneiss	Very Strong
10	8	22.3	Α	16.0	47.5	68.5	103.8	Granitic Gneiss	Very Strong
11	9	23.5	D	6.5	47.5	78.1	67.6	Granitic Gneiss	Strong
12	9	23.5	Α	12.0	47.5	54.0	93.6	Granitic Gneiss	Strong
13	10	26.5	Α	16.5	47.5	73.9	101.0	Granitic Gneiss	Very Strong
14	10	26.6	D	16.5	47.5	51.2	171.5	Granitic Gneiss	Very Strong
15	10	27.0	Α	11.5	47.5	53.1	90.9	Granitic Gneiss	Strong
16	10	28.1	D	18.0	47.5	85.3	187.1	Granitic Gneiss	Very Strong
17	11	30.5	Α	-	47.5	62.0		Granitic Gneiss	
18	11	30.5	D	5.0	47.5	94.4	52.0	Granitic Gneiss	Strong
19	11	31.9	Α	7.0	47.5	36.5	74.0	Granitic Gneiss	Strong
20	12	34.0	D	5.5	47.5	54.4	57.2	Granitic Gneiss	Strong
21	12	34.8	Α	27.0	47.5	55.3	207.0	Granitic Gneiss	Very Strong
22	12	34.7	D	16.0	47.5	73.4	166.3	Granitic Gneiss	Very Strong
23	12	34.9	D	12.0	47.5	66.8	124.7	Granitic Gneiss	Very Strong

It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/24/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/30/2011
Core Size :	NQ BH No:	Q14+500	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	5	11.2	D	4.0	47.5	118.6	41.6	Granitic Gneiss	Medium Strong
2	6	14.8	D	23.0	47.5	88.7	239.1	Granitic Gneiss	Very Strong
3	7	17.8	D	1.0	47.5	113.7	10.4	Granitic Gneiss	Weak

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	-1605-126	Client :	HATCH	
_			Date Drilled :	7/23/2011	
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/29/2011	
Core Size :	NQ BH No:	Q18+100	Tester :	AS	

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	3	7.8	D	0.5	47.5	129.8	5.2	Sandstone	Weak
2	5	11.4	D	0.5	47.5	116.1	5.2	Sandstone	Weak
3	6	14.1	D	0.5	47.5	133.0	5.2	Sandstone	Weak
4	6	14.5	D	0.5	47.5	126.8	5.2	Sandstone	Weak
5	6	15.0	D	0.5	47.5	171.0	5.2	Sandstone	Weak
6	6	16.0	D	3.5	47.5	141.6	36.4	Sandstone	Medium Strong
7	9	26.0	D	0.8	47.5	85.2	7.8	Sandstone	Weak
8	12	33.0	D	0.5	47.5	87.8	5.2	Sandstone	Weak
9	14	38.0	D	0.8	47.5	120.9	7.8	Sandstone	Weak

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

^{*} Diametral Test should have 0.7 x D on either side of test point.



lob No :	19	-1605-126	Client :	HATCH
			Date Drilled :	7/22/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q22+500	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	2.3	D	0.5	47.5	105.5	5.2	Granitic Gneiss	Weak
2	2	4.5	D	13.0	47.5	147.2	135.1	Granitic Gneiss	Very Strong
3	3	5.2	D	16.0	47.5	105.4	166.3	Granitic Gneiss	Very Strong
4	4	8.2	D	23.5	47.5	122.9	244.3	Granitic Gneiss	Very Strong
5	4	10.0	D	1.5	47.5	89.2	15.6	Granitic Gneiss	Weak
6	4	10.8	D	2.0	47.5	120.2	20.8	Granitic Gneiss	Weak
7	6	16.8	D	21.0	47.5	108.9	218.3	Granitic Gneiss	Very Strong
8	8	20.6	D	7.0	47.5	100.4	72.8	Granitic Gneiss	Strong
9	9	23.5	D	5.5	47.5	81.0	57.2	Granitic Gneiss	Strong
10	10	26.0	D	7.0	47.5	78.4	72.8	Granitic Gneiss	Strong
11	10	29.1	D	19.0	47.5	99.8	197.5	Granitic Gneiss	Very Strong
12	11	29.3	D	7.5	47.5	132.9	78.0	Granitic Gneiss	Strong
13	14	39.8	D	35.0	47.5	86.8	363.8	Granitic Gneiss	Extremely Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
_			Date Drilled :	7/22/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q25+500	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	3	5.4	D	30.0	47.5	74.2	311.8	Granitic Gneiss	Extremely Strong
2	5	11.6	D	26.0	47.5	88.3	270.3	Granitic Gneiss	Extremely Strong
3	6	14.3	D	17.5	47.5	86.8	181.9	Granitic Gneiss	Very Strong
4	11	32.1	D	18.0	47.5	108.6	187.1	Granitic Gneiss	Very Strong

 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/17/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q35+500	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	2.6	D	14.5	47.5	190.0	150.7	Granitic Gneiss	Very Strong
2	3	7.5	D	13.5	47.5	101.2	140.3	Granitic Gneiss	Very Strong
3	5	11.5	D	13.0	47.5	131.7	135.1	Granitic Gneiss	Very Strong
4	5	14.4	D	18.5	47.5	125.9	192.3	Granitic Gneiss	Very Strong
5	7	18.2	D	16.0	47.5	190.0	166.3	Granitic Gneiss	Very Strong
6	8	21.5	D	25.0	47.5	76.0	259.9	Granitic Gneiss	Extremely Strong
7	9	25.5	D	14.0	47.5	155.0	145.5	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1605	-126	Client :	HATCH
_			Date Drilled :	7/16/2011
Project Name :	Mary River Project - Geot	echnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q38+700	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	11	32.3	D	25.0	47.5	126.5	259.9	Granitic Gneiss	Extremely Strong
2	12	33.0	D	22.5	47.5	135.3	233.9	Granitic Gneiss	Very Strong
3	14	38.5	D	16.5	47.5	161.0	171.5	Granitic Gneiss	Very Strong
4	14	41.5	D	21.0	47.5	77.2	218.3	Granitic Gneiss	Very Strong
5	16	47.1	D	14.5	47.5	99.7	150.7	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/16/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q42+000	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	3	7.8	D	20.5	47.7	113.9	211.7	Granitic Gneiss	Very Strong
2	3	8.2	D	11.5	47.5	89.8	119.5	Granitic Gneiss	Very Strong
3	6	14.5	D	15.8	47.5	164.0	163.7	Granitic Gneiss	Very Strong
4	7	19.5	D	0.5	47.5	107.0	5.2	Granitic Gneiss	Weak
5	8	20.5	D	22.5	47.5	97.5	233.9	Granitic Gneiss	Very Strong

It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1605- ⁻	Client :	HATCH
		Date Drilled :	7/15/2011
Project Name :	Mary River Project - Geote	chnical Investigation Date Tested :	8/27/2011
Core Size :	NQ BH No:	Q44+000 Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	7	17.4	D	5.5	47.5	106.6	57.2	Granitic Gneiss	Strong
2	7	18.6	D	30.0	47.5	84.9	311.8	Granitic Gneiss	Extremely Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/15/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/28/2011
Core Size :	NQ BH No:	Q44+300	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	2.5	D	17.0	47.5	94.8	176.7	Granitic Gneiss	Very Strong
2	2	5.3	D	1.0	47.5	75.5	10.4	Granitic Gneiss	Weak
3	3	8.2	D	19.5	47.5	93.9	202.7	Granitic Gneiss	Very Strong
4	4	9.3	D	20.0	47.5	77.7	207.9	Granitic Gneiss	Very Strong
5	4	11.2	D	27.0	47.5	118.5	280.6	Granitic Gneiss	Extremely Strong
6	5	14.3	D	26.0	47.5	101.7	270.3	Granitic Gneiss	Extremely Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1
Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/14/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q45+000	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	2.5	D	21.5	47.5	105.5	223.5	Granitic Gneiss	Very Strong
2	2	4.9	D	2.0	47.5	147.2	20.8	Granitic Gneiss	Weak
3	3	5.1	D	29.0	47.5	105.4	301.4	Granitic Gneiss	Extremely Strong
4	4	9.5	D	0.5	47.5	122.9	5.2	Granitic Gneiss	Weak
5	5	11.8	D	13.0	47.5	89.2	135.1	Granitic Gneiss	Very Strong

It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1	605-126	Client :	HATCH
			Date Drilled :	7/14/2011
Project Name :	Mary River Project - C	Seotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q50+000	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	1.9	D	1.0	47.5	101.8	10.4	Granitic Gneiss	Weak
2	3	4.9	D	18.0	47.5	133.6	187.1	Granitic Gneiss	Very Strong
3	4	8.6	D	15.5	47.5	47.1	161.1	Granitic Gneiss	Very Strong
4	5	13.7	D	1.5	47.5	137.4	15.6	Granitic Gneiss	Weak
5	6	14.7	D	14.0	47.5	114.4	145.5	Granitic Gneiss	Very Strong

It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
			Date Drilled :	7/13/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/28/2011
Core Size :	NQ BH No:	Q53+700	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	4	10.6	D	1.3	47.5	63.2	13.0	Granitic Gneiss	Weak

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/22/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/13/2011
Core Size :	NQ BH No:	Q82+700	Tester :	CC

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	6	9.8	D	23.5	47.5	107.8	244.3	Granitic Gneiss	Very Strong
2	6	9.8	Α	30.0	47.5	39.4	299.1	Granitic Gneiss	Extremely Strong
3	7	11.1	D	26.0	47.5	61.3	270.3	Granitic Gneiss	Extremely Strong
4	7	11.1	Α	22.8	47.5	33.7	256.2	Granitic Gneiss	Extremely Strong
5	7	12.1	D	12.0	47.5	85.2	124.7	Granitic Gneiss	Very Strong
6	7	12.1	D	15.8	47.5	85.2	163.7	Granitic Gneiss	Very Strong
7	7	12.1	Α	22.5	47.5	39.3	224.8	Granitic Gneiss	Very Strong
8	9	14.8	D	24.0	47.5	85.7	249.5	Granitic Gneiss	Very Strong
9	9	14.8	Α	28.0	47.5	41.8	266.3	Granitic Gneiss	Extremely Strong
10	10	15.9	D	27.0	47.5	102.5	280.6	Granitic Gneiss	Extremely Strong
11	10	15.9	Α	22.5	47.5	46.1	198.4	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/18/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/27/2011
Core Size :	NQ BH No:	Q88+800	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	1	1.4	D	11.5	47.5	182.0	119.5	Granitic Gneiss	Very Strong
2	3	3.4	D	18.0	47.5	152.2	187.1	Granitic Gneiss	Very Strong
3	6	5.0	D	20.8	47.5	102.1	215.7	Granitic Gneiss	Very Strong
4	13	9.6	D	17.5	47.5	122.5	181.9	Granitic Gneiss	Very Strong
5	15	12.5	D	2.0	47.5	151.6	20.8	Granitic Gneiss	Weak

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1	1605-126	_Client :	HATCH
_			Date Drilled :	7/25/2011
Project Name :	Mary River Project - 0	Geotechnical Investigation	Date Tested :	8/12/2011
Core Size :	NQ BH No:	Q114+600	Tester :	ВТ

Test	D 11	Depth	Axial or	Force	Diameter	Length	UCS		Neteri
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
1	2	2.5	D	21.0	47.5	89.3	218.3	Granitic Gneiss	Very Strong
2	2	2.5	Α	31.0	47.5	47.8	266.0	Granitic Gneiss	Extremely Strong
3	2	3.8	D	13.3	47.5	101.6	137.7	Granitic Gneiss	Very Strong
4	2	3.8	Α	26.5	47.5	50.7	217.1	Granitic Gneiss	Very Strong
5	2	5.0	D	18.5	47.5	100.0	192.3	Granitic Gneiss	Very Strong
6	2	5.0	Α	26.5	47.5	51.3	215.3	Granitic Gneiss	Very Strong
7	3	5.8	D	19.8	47.5	78.8	205.3	Granitic Gneiss	Very Strong
8	3	5.8	Α	24.5	47.5	44.8	220.9	Granitic Gneiss	Very Strong
9	3	7.1	D	11.8	47.5	86.5	122.1	Granitic Gneiss	Very Strong
10	3	7.2	Α	31.0	47.5	45.4	276.6	Granitic Gneiss	Extremely Strong
11	3	8.0	D	20.5	47.5	88.6	213.1	Granitic Gneiss	Very Strong
12	3	8.0	Α	24.0	47.5	39.0	241.1	Granitic Gneiss	Very Strong
13	4	9.3	D	21.3	47.5	88.6	220.9	Granitic Gneiss	Very Strong
14	6	14.5	D	18.0	47.5	92.4	187.1	Granitic Gneiss	Very Strong
15	6	15.6	Α	27.0	47.5	52.2	216.3	Granitic Gneiss	Very Strong
16	6	16.6	D	16.7	47.5	93.9	173.6	Granitic Gneiss	Very Strong
17	6	16.6	Α	23.0	47.5	44.3	209.3	Granitic Gneiss	Very Strong
18	7	17.7	D	19.5	47.5	74.6	202.7	Granitic Gneiss	Very Strong
19	7	17.8	Α	28.0	47.5	42.6	262.5	Granitic Gneiss	Extremely Strong
20	7	18.5	D	15.3	47.5	76.3	158.5	Granitic Gneiss	Very Strong
21	7	18.6	Α	12.5	47.5	47.5	107.7	Granitic Gneiss	Very Strong
22	7	19.6	Α	34.0	47.5	58.8	248.3	Granitic Gneiss	Very Strong
23	7	19.7	D	19.8	47.5	84.5	205.3	Granitic Gneiss	Very Strong
24	8	20.7	Α	19.3	47.5	79.7	111.1	Granitic Gneiss	Very Strong
25	8	20.7	D	24.3	47.5	42.0	252.1	Granitic Gneiss	Extremely Strong
26	8	21.6	Α	24.5	47.5	49.0	206.3	Granitic Gneiss	Very Strong
27	8	21.8	D	19.0	47.5	86.5	197.5	Granitic Gneiss	Very Strong
28	8	22.2	Α	15.8	47.5	48.5	133.6	Granitic Gneiss	Very Strong
29	8	22.5	D	23.0	47.5	87.5	239.1	Granitic Gneiss	Very Strong
30	9	23.9	D	19.8	47.5	91.9	205.3	Granitic Gneiss	Very Strong
31	9	23.9	Α	35.0	47.5	47.9	299.9	Granitic Gneiss	Extremely Strong
32	9	24.6	D	19.5	47.5	90.3	202.7	Granitic Gneiss	Very Strong
33	9	24.7	Α	29.0	47.5	50.5	238.4	Granitic Gneiss	Very Strong
34	9	25.7	D	12.0	47.5	113.6	46.3	Granitic Gneiss	Medium Strong
35	9	25.8	Α	14.8	47.5	49.9	122.5	Granitic Gneiss	Very Strong

36	10	26.8	D	13.3	47.5	87.6	137.7	Granitic Gneiss	Very Strong
37	10	26.9	Α	24.3	47.5	44.7	219.0	Granitic Gneiss	Very Strong
38	10	27.0	D	13.0	47.5	75.4	135.1	Granitic Gneiss	Very Strong
39	10	27.0	Α	27.0	47.5	50.2	223.0	Granitic Gneiss	Very Strong
40	10	28.1	D	16.3	47.5	81.0	168.9	Granitic Gneiss	Very Strong
41	10	28.1	Α	20.0	47.5	50.8	163.6	Granitic Gneiss	Very Strong
42	10	28.9	D	12.8	47.5	87.8	132.5	Granitic Gneiss	Very Strong
43	10	28.9	Α	24.3	47.5	49.4	202.8	Granitic Gneiss	Very Strong
44	11	29.9	D	22.5	47.5	82.7	233.9	Granitic Gneiss	Very Strong
45	11	29.9	Α	19.5	47.5	45.0	175.3	Granitic Gneiss	Very Strong
46	11	31.2	D	18.0	47.5	85.3	187.1	Granitic Gneiss	Very Strong
47	11	31.3	Α	24.3	47.5	44.5	219.9	Granitic Gneiss	Very Strong
48	11	32.2	D	20.0	47.5	85.9	207.9	Granitic Gneiss	Very Strong
49	11	32.3	Α	24.3	47.5	50.6	199.2	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1605-126	Client :	HATCH
_		Date Drilled :	7/26/2011
Project Name :	Mary River Project - Geotechnical	Investigation Date Tested :	8/13/2011
Core Size :	NQ BH No: Q11	6+800 Tester :	ВТ

Test	D 11	Depth	Axial or	Force	Diameter	Length	UCS	T	Negative
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
1	1	2.8	Α	21.3	47.5	45.0	191.1	Granitic Gneiss	Very Strong
2	2	3.2	D	14.8	47.5	83.8	153.3	Granitic Gneiss	Very Strong
3	2	4.5	D	14.5	47.5	98.3	150.7	Granitic Gneiss	Very Strong
4	2	4.6	Α	22.5	47.5	39.2	225.1	Granitic Gneiss	Very Strong
5	3	5.6	D	13.8	47.5	84.8	142.9	Granitic Gneiss	Very Strong
6	3	5.7	Α	20.8	47.5	50.3	171.0	Granitic Gneiss	Very Strong
7	3	6.7	D	10.5	47.5	96.1	109.1	Granitic Gneiss	Very Strong
8	3	6.7	Α	25.0	47.5	52.8	198.6	Granitic Gneiss	Very Strong
9	3	7.8	D	17.3	47.5	95.5	179.3	Granitic Gneiss	Very Strong
10	3	7.8	Α	32.0	47.5	52.3	256.1	Granitic Gneiss	Extremely Strong
11	4	8.5	Α	11.0	47.5	43.4	101.6	Granitic Gneiss	Very Strong
12	4	8.9	D	23.5	47.5	90.3	244.3	Granitic Gneiss	Very Strong
13	4	9.6	D	13.5	47.5	87.0	140.3	Granitic Gneiss	Very Strong
14	4	10.0	Α	13.3	47.5	42.2	125.1	Granitic Gneiss	Very Strong
15	4	10.6	D	15.3	47.5	76.9	158.5	Granitic Gneiss	Very Strong
16	5	11.4	D	18.8	47.5	86.7	194.9	Granitic Gneiss	Very Strong
17	5	11.4	Α	22.0	47.5	47.5	189.8	Granitic Gneiss	Very Strong
18	5	12.7	D	16.3	47.5	91.6	168.9	Granitic Gneiss	Very Strong
19	5	12.7	А	26.5	47.5	46.4	232.6	Granitic Gneiss	Very Strong
20	8	18.0	D	18.5	47.5	89.7	192.3	Granitic Gneiss	Very Strong
21	8	18.1	Α	15.3	47.5	48.8	128.7	Granitic Gneiss	Very Strong
22	8	19.1	А	30.0	47.5	91.1	156.1	Granitic Gneiss	Very Strong
23	8	19.2	D	20.5	47.5	50.2	213.1	Granitic Gneiss	Very Strong
24	9	20.4	D	18.5	47.5	79.4	192.3	Granitic Gneiss	Very Strong
25	9	20.4	Α	19.8	47.5	47.7	169.6	Granitic Gneiss	Very Strong
26	9	21.6	D	18.5	47.5	95.6	192.3	Granitic Gneiss	Very Strong
27	9	21.7	Α	26.0	47.5	47.8	223.2	Granitic Gneiss	Very Strong
28	9	22.4	D	17.8	47.5	79.2	184.5	Granitic Gneiss	Very Strong
29	10	23.6	D	16.8	47.5	85.8	174.1	Granitic Gneiss	Very Strong
30	10	23.6	А	15.5	47.5	49.1	130.1	Granitic Gneiss	Very Strong
31	10	24.7	D	20.3	47.5	70.5	210.5	Granitic Gneiss	Very Strong
32	10	24.7	А	23.3	47.5	51.1	189.3	Granitic Gneiss	Very Strong
33	11	26.4	D	18.5	47.5	99.2	46.3	Granitic Gneiss	Medium Strong
34	11	26.4	Α	21.8	47.5	49.8	180.8	Granitic Gneiss	Very Strong
35	11	27.3	D	16.8	47.5	94.0	174.1	Granitic Gneiss	Very Strong

36	11	27.4	Α	18.3	47.5	50.6	149.8	Granitic Gneiss	Very Strong
37	11	28.6	D	16.8	47.5	92.2	174.1	Granitic Gneiss	Very Strong
38	11	28.8	Α	21.8	47.5	48.2	185.4	Granitic Gneiss	Very Strong
39	12	29.8	D	21.0	47.5	111.2	218.3	Granitic Gneiss	Very Strong
40	12	29.8	Α	19.8	47.5	49.1	165.9	Granitic Gneiss	Very Strong
41	12	30.9	D	18.5	47.5	95.6	192.3	Granitic Gneiss	Very Strong
42	12	30.9	Α	23.3	47.5	47.6	200.1	Granitic Gneiss	Very Strong
43	12	32.1	D	19.5	47.5	96.0	202.7	Granitic Gneiss	Very Strong
44	12	32.1	Α	22.8	47.5	46.3	199.9	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



lob No :	19	-1605-126	Client :	HATCH
			Date Drilled :	8/5/2011
Project Name :	Mary River Project	Geotechnical Investigation	Date Tested :	8/12/2011
Core Size :	NQ BH No:	Q131+100	Tester :	CC

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	4	8.6	D	21.3	47.5	104.3	220.9	Granitic Gneiss	Very Strong
2	4	8.7	Α	25.7	47.5	39.0	257.9	Granitic Gneiss	Extremely Strong
3	4	9.8	D	24.0	47.5	102.3	249.5	Granitic Gneiss	Very Strong
4	4	9.8	Α	28.0	47.5	44.2	255.3	Granitic Gneiss	Extremely Strong
5	4	10.7	D	22.8	47.5	77.0	236.5	Granitic Gneiss	Very Strong
6	4	10.8	Α	18.5	47.5	34.9	202.5	Granitic Gneiss	Very Strong
7	6	16.3	D	16.0	47.5	108.0	166.3	Granitic Gneiss	Very Strong
8	6	16.3	Α	14.5	47.5	46.2	127.7	Granitic Gneiss	Very Strong
9	6	17.3	D	24.3	47.5	79.9	252.1	Granitic Gneiss	Extremely Strong
10	6	17.3	Α	26.5	47.5	44.3	241.3	Granitic Gneiss	Very Strong
11	7	18.5	D	17.8	47.5	106.8	184.5	Granitic Gneiss	Very Strong
12	7	18.5	Α	18.0	47.5	43.1	167.4	Granitic Gneiss	Very Strong
13	7	19.4	D	22.0	47.5	101.1	228.7	Granitic Gneiss	Very Strong
14	7	19.5	Α	27.5	47.5	47.5	237.2	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1	605-126	Client :	HATCH	
_			Date Drilled :	7/16/2011	
Project Name :	Mary River Project - G	eotechnical Investigation	Date Tested :	8/12/2011	
Core Size :	NO BH No:	Q138+100	Tester :	CC	

Test	D 11	Depth	Axial or	Force	Diameter	Length	UCS	D F	Notes
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
1	1	0.3	D	11.3	47.5	130.3	116.9	Granitic Gneiss	Very Strong
2	1	0.6	Α	25.8	47.5	48.1	219.9	Granitic Gneiss	Very Strong
3	2	1.5	D	10.0	47.5	97.2	103.9	Granitic Gneiss	Very Strong
4	2	1.5	Α	16.8	47.5	42.9	156.1	Granitic Gneiss	Very Strong
5	2	2.6	D	9.0	47.5	111.8	93.5	Granitic Gneiss	Strong
6	2	2.6	Α	25.5	47.5	50.8	208.7	Granitic Gneiss	Very Strong
7	2	3.5	D	11.0	47.5	89.2	114.3	Granitic Gneiss	Very Strong
8	2	3.5	Α	17.5	47.5	41.2	168.5	Granitic Gneiss	Very Strong
9	3	4.6	D	11.0	47.5	100.4	114.3	Granitic Gneiss	Very Strong
10	3	4.6	Α	10.0	47.5	41.9	95.1	Granitic Gneiss	Strong
11	3	5.6	D	17.3	47.5	80.2	179.3	Granitic Gneiss	Very Strong
12	3	5.6	Α	9.5	47.5	30.8	114.5	Granitic Gneiss	Very Strong
13	4	6.7	D	15.0	47.5	90.6	155.9	Granitic Gneiss	Very Strong
14	4	6.8	Α	21.8	47.5	46.1	191.8	Granitic Gneiss	Very Strong
15	4	7.9	D	16.0	47.5	74.7	166.3	Granitic Gneiss	Very Strong
16	4	7.8	Α	18.0	47.5	47.0	156.3	Granitic Gneiss	Very Strong
17	5	8.8	D	12.3	47.5	77.0	127.3	Granitic Gneiss	Very Strong
18	5	8.8	Α	20.0	47.5	42.0	189.6	Granitic Gneiss	Very Strong
19	6	9.8	D	13.5	47.5	95.1	140.3	Granitic Gneiss	Very Strong
20	6	9.8	Α	25.5	47.5	44.4	231.5	Granitic Gneiss	Very Strong
21	6	10.8	D	10.0	47.5	82.8	103.9	Granitic Gneiss	Very Strong
22	6	10.8	Α	16.5	47.5	36.6	173.9	Granitic Gneiss	Very Strong
23	7	11.9	D	15.3	47.5	85.8	158.5	Granitic Gneiss	Very Strong
24	7	11.9	Α	19.8	47.5	34.6	217.7	Granitic Gneiss	Very Strong
25	8	13.1	D	11.0	47.5	82.6	114.3	Granitic Gneiss	Very Strong
26	8	13.0	Α	16.3	47.5	34.0	181.5	Granitic Gneiss	Very Strong
27	8	13.7	D	16.5	47.5	101.6	171.5	Granitic Gneiss	Very Strong
28	8	13.8	Α	19.8	47.5	43.4	182.4	Granitic Gneiss	Very Strong
29	9	15.3	D	12.0	47.5	97.2	124.7	Granitic Gneiss	Very Strong
30	9	15.4	Α	15.5	47.5	30.1	190.4	Granitic Gneiss	Very Strong
31	10	16.2	D	19.5	47.5	98.2	202.7	Granitic Gneiss	Very Strong
32	10	16.2	А	34.0	47.5	48.6	288.0	Granitic Gneiss	Extremely Strong
33	10	17.1	D	14.0	47.5	85.0	145.5	Granitic Gneiss	Very Strong
34	10	17.1	Α	15.3	47.5	35.9	46.3	Granitic Gneiss	Medium Strong
35	14	22.4	D	10.0	47.5	94.8	103.9	Granitic Gneiss	Very Strong

36	14	22.5	Α	15.0	47.5	51.4	121.7	Granitic Gneiss	Very Strong
37	15	23.6	D	11.0	47.5	90.4	114.3	Granitic Gneiss	Very Strong
38	15	23.6	Α	22.5	47.5	42.8	210.2	Granitic Gneiss	Very Strong
39	15	24.7	D	9.5	47.5	105.0	98.7	Granitic Gneiss	Strong
40	15	24.8	Α	14.5	47.5	42.9	135.3	Granitic Gneiss	Very Strong
41	16	25.9	D	14.0	47.5	84.6	145.5	Granitic Gneiss	Very Strong
42	16	25.9	Α	22.5	47.5	38.9	226.5	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	•	19-1605-126	Client :	HATCH
			Date Drilled :	7/19/2011
Project Name :	Mary River Projec	t - Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	Q139+600	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	4	4.6	D	1.5	47.5	105.5	15.6	Granitic Gneiss	Weak
2	6	9.0	D	7.0	47.5	147.2	72.8	Granitic Gneiss	Strong
3	7	10.7	D	9.5	47.5	105.4	98.7	Granitic Gneiss	Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1
Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1605-12	Client :	HATCH
_		Date Drilled	8/7/2011
Project Name :	Mary River Project - Geotech	nnical Investigation Date Tested	3 : 8/13/2011
Core Size :	NQ BH No:	QMR2 Tester:	CC

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	1	1.3	Α	20.3	47.5	112.0	89.8	Granitic Gneiss	Strong
2	1	1.3	D	22.8	47.5	48.7	236.5	Granitic Gneiss	Very Strong
3	3	7.2	Α	ı	47.5	94.1		Granitic Gneiss	
4	3	7.2	D	10.3	47.5	44.7	106.5	Granitic Gneiss	Very Strong
5	4	8.8	Α	15.5	47.5	104.3	72.6	Granitic Gneiss	Strong
6	4	8.8	D	17.0	47.5	39.0	176.7	Granitic Gneiss	Very Strong
7	4	9.4	Α	16.3	47.5	102.3	77.3	Granitic Gneiss	Strong
8	4	9.3	D	22.5	47.5	44.2	233.9	Granitic Gneiss	Very Strong
9	4	10.4	Α	23.3	47.5	77.0	137.9	Granitic Gneiss	Very Strong
10	4	10.4	D	11.3	47.5	34.9	116.9	Granitic Gneiss	Very Strong
11	5	11.8	Α	12.3	47.5	108.0	55.9	Granitic Gneiss	Strong
12	5	11.6	D	19.0	47.5	108.0	197.5	Granitic Gneiss	Very Strong
13	5	12.8	Α	19.0	47.5	46.2	167.3	Granitic Gneiss	Very Strong
14	5	12.8	D	12.5	47.5	79.9	129.9	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



lob No :	19	-1605-126	Client :	HATCH
			Date Drilled :	6/8/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/12/2011
Core Size :	NQ BH No:	QS1	Tester :	ВТ

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	1	1.2	D	16.0	47.5	47.5	166.3	Granitic Gneiss	Very Strong
2	1	1.2	Α	20.0	47.5	47.5	172.3	Granitic Gneiss	Very Strong
3	1	2.4	D	21.3	47.5	47.6	220.9	Granitic Gneiss	Very Strong
4	1	2.4	Α	23.3	47.5	47.5	200.3	Granitic Gneiss	Very Strong
5	2	3.4	D	17.0	47.5	71.0	176.7	Granitic Gneiss	Very Strong
6	2	3.4	Α	24.5	47.5	46.0	216.4	Granitic Gneiss	Very Strong
7	2	4.3	D	19.5	47.5	79.4	202.7	Granitic Gneiss	Very Strong
8	2	4.3	Α	25.3	47.5	45.8	224.1	Granitic Gneiss	Very Strong
9	2	4.7	D	21.3	47.5	88.4	220.9	Granitic Gneiss	Very Strong
10	2	4.9	Α	30.0	47.5	55.9	227.9	Granitic Gneiss	Very Strong
11	3	6.1	D	15.3	47.5	85.2	158.5	Granitic Gneiss	Very Strong
12	3	6.2	Α	22.0	47.5	44.5	199.4	Granitic Gneiss	Very Strong
13	3	7.2	D	16.8	47.5	80.9	174.1	Granitic Gneiss	Very Strong
14	3	7.2	Α	27.0	47.5	51.0	220.4	Granitic Gneiss	Very Strong
15	3	8.4	D	19.8	47.5	92.7	205.3	Granitic Gneiss	Very Strong
16	4	10.6	D	19.3	47.5	76.0	200.1	Granitic Gneiss	Very Strong
17	4	10.7	Α	19.0	47.5	53.8	148.7	Granitic Gneiss	Very Strong
18	4	11.4	D	20.3	47.5	85.4	210.5	Granitic Gneiss	Very Strong
19	6	16.0	D	20.3	47.5	72.9	210.5	Granitic Gneiss	Very Strong
20	6	16.0	Α	25.3	47.5	48.4	214.5	Granitic Gneiss	Very Strong
21	6	17.3	D	17.5	47.5	85.2	181.9	Granitic Gneiss	Very Strong
22	6	17.4	Α	13.3	47.5	49.5	110.6	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :		19-1605-126	Client :	HATCH
			Date Drilled :	7/24/2011
Project Name :	Mary River Pr	oject - Geotechnical Investigation	Date Tested :	8/26/2011
Core Size :	NQ BH No	: QS2	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	1	2.0	D	24.0	47.5	88.3	249.5	Granitic Gneiss	Very Strong
2	1	2.0	Α	2.0	47.5	42.9	18.7	Granitic Gneiss	Weak
3	3	5.0	D	24.5	47.5	84.9	254.7	Granitic Gneiss	Extremely Strong
4	3	5.0	Α	22.0	47.5	39.1	220.5	Granitic Gneiss	Very Strong
5	4	11.2	D	22.0	47.5	110.0	228.7	Granitic Gneiss	Very Strong
6	5	12.2	D	24.0	47.5	101.1	249.5	Granitic Gneiss	Very Strong
7	9	17.5	D	21.2	47.5	73.8	220.4	Granitic Gneiss	Very Strong
8	13	22.9	D	25.0	47.5	94.0	259.9	Granitic Gneiss	Extremely Strong
9	14	26.3	D	19.7	47.5	142.8	205.2	Granitic Gneiss	Very Strong
10	15	29.5	D	16.8	47.5	145.0	174.6	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



lob No :	19	-1605-126	Client :	HATCH
			Date Drilled :	7/11/2011
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/13/2011
Core Size :	NQ BH No:	QS3A	Tester :	CC

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	1.2	D	20.0	47.5	112.0	207.9	Granitic Gneiss	Very Strong
2	2	1.2	Α	21.3	47.5	48.7	179.7	Granitic Gneiss	Very Strong
3	3	1.9	Α	7.5	47.5	94.1	38.1	Granitic Gneiss	Medium Strong
4	3	3.8	D	23.0	47.5	44.7	239.1	Granitic Gneiss	Very Strong
5	3	4.7	D	19.0	47.5	104.3	197.5	Granitic Gneiss	Very Strong
6	8	11.0	D	23.5	47.5	39.0	244.3	Granitic Gneiss	Very Strong
7	8	11.1	Α	25.0	47.5	102.3	118.9	Granitic Gneiss	Very Strong
8	8	12.2	D	20.3	47.5	44.2	210.5	Granitic Gneiss	Very Strong
9	9	12.5	Α	18.0	47.5	77.0	106.8	Granitic Gneiss	Very Strong
10	10	13.5	D	19.5	47.5	34.9	202.7	Granitic Gneiss	Very Strong
11	10	13.5	Α	25.5	47.5	108.0	116.3	Granitic Gneiss	Very Strong
12	10	14.5	D	11.0	47.5	46.2	114.3	Granitic Gneiss	Very Strong
13	10	14.5	Α	21.5	47.5	79.9	123.9	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19	9-1605-126	Client :	HATCH	
			Date Drilled :	8/4/2011	
Project Name :	Mary River Project	- Geotechnical Investigation	Date Tested :	8/12/2011	
Core Size :	NQ BH No:	QTR4-1	Tester :	BT	

Test	D 11	Depth	Axial or	Force	Diameter	Length	UCS		NI . C
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
1	1	2.4	D	10.0	47.5	106.1	103.9	Granitic Gneiss	Very Strong
2	1	2.4	Α	15.8	47.5	43.9	144.2	Granitic Gneiss	Very Strong
3	1	3.1	D	18.8	47.5	84.3	194.9	Granitic Gneiss	Very Strong
4	1	3.1	Α	18.8	47.5	42.6	175.8	Granitic Gneiss	Very Strong
5	1	3.5	D	17.8	47.5	99.7	184.5	Granitic Gneiss	Very Strong
6	1	3.5	Α	17.3	47.5	44.5	156.4	Granitic Gneiss	Very Strong
7	2	3.9	Α	15.0	47.5	36.2	159.6	Granitic Gneiss	Very Strong
8	2	3.9	D	12.5	47.5	107.6	129.9	Granitic Gneiss	Very Strong
9	2	4.9	Α	24.5	47.5	47.7	210.6	Granitic Gneiss	Very Strong
10	2	4.9	D	18.3	47.5	93.3	189.7	Granitic Gneiss	Very Strong
11	3	6.3	D	16.0	47.5	126.4	166.3	Granitic Gneiss	Very Strong
12	3	6.4	Α	29.0	47.5	51.8	233.7	Granitic Gneiss	Very Strong
13	3	7.2	Α	30.0	47.5	45.2	268.7	Granitic Gneiss	Extremely Strong
14	3	7.3	D	13.3	47.5	121.1	137.7	Granitic Gneiss	Very Strong
15	4	8.6	Α	19.5	47.5	52.9	154.7	Granitic Gneiss	Very Strong
16	4	8.7	D	24.8	47.5	102.0	257.3	Granitic Gneiss	Extremely Strong
17	4	9.3	D	30.0	47.5	110.5	311.8	Granitic Gneiss	Extremely Strong
18	4	9.4	Α	29.8	47.5	47.0	258.5	Granitic Gneiss	Extremely Strong
19	4	10.3	D	12.0	47.5	92.4	124.7	Granitic Gneiss	Very Strong
20	4	10.7	Α	23.0	47.5	53.9	179.7	Granitic Gneiss	Very Strong
21	4	11.3	D	17.3	47.5	99.7	179.3	Granitic Gneiss	Very Strong
22	4	11.4	Α	21.0	47.5	52.9	166.5	Granitic Gneiss	Very Strong
23	5	12.2	D	12.8	47.5	101.7	132.5	Granitic Gneiss	Very Strong
24	5	12.2	Α	17.0	47.5	55.1	130.6	Granitic Gneiss	Very Strong
25	5	13.4	Α	27.5	47.5	50.2	227.0	Granitic Gneiss	Very Strong
26	5	13.4	D	20.0	47.5	89.9	207.9	Granitic Gneiss	Very Strong
27	5	14.1	Α	14.0	47.5	38.1	143.2	Granitic Gneiss	Very Strong
28	5	14.1	D	9.8	47.5	87.3	101.3	Granitic Gneiss	Very Strong
29	6	14.5	D	11.0	47.5	106.3	114.3	Granitic Gneiss	Very Strong
30	7	17.8	D	16.3	47.5	89.6	168.9	Granitic Gneiss	Very Strong
31	7	20.4	D	14.0	47.5	87.0	145.5	Granitic Gneiss	Very Strong
32	7	20.4	А	24.8	47.5	44.6	224.1	Granitic Gneiss	Very Strong
33	9	25.8	Α	16.8	47.5	41.7	159.6	Granitic Gneiss	Very Strong
34	9	25.8	D	18.8	47.5	102.5	46.3	Granitic Gneiss	Medium Strong
35	10	27.0	D	13.5	47.5	67.1	140.3	Granitic Gneiss	Very Strong

36	10	27.1	А	6.3	47.5	48.1	53.4	Granitic Gneiss	Strong
37	10	27.9	D	17.5	47.5	75.7	181.9	Granitic Gneiss	Very Strong
38	10	27.9	Α	19.3	47.5	43.5	177.6	Granitic Gneiss	Very Strong
39	10	28.9	D	31.5	47.5	48.2	327.4	Granitic Gneiss	Extremely Strong
40	10	29.1	Α	18.8	47.5	91.9	96.9	Granitic Gneiss	Strong
41	11	29.6	Α	27.0	47.5	49.3	52.6	Granitic Gneiss	Strong
42	11	29.9	D	21.3	47.5	87.3	100.1	Granitic Gneiss	Very Strong
43	11	31.2	D	17.8	47.5	74.2	86.8	Granitic Gneiss	Strong
44	11	31.2	Α	22.5	47.5	49.6	48.7	Granitic Gneiss	Medium Strong
45	11	32.3	Α	23.5	47.5	49.6	99.0	Granitic Gneiss	Strong
46	11	32.3	D	17.3	47.5	91.3	46.3	Granitic Gneiss	Medium Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19- ⁻	1605-126	Client :	HATCH
_			Date Drilled :	7/25/2011
Project Name :	Mary River Project - 0	Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	QTR-9	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	1	0.7	D	18.5	47.5	87.3	192.3	Granitic Gneiss	Very Strong
2	1	1.6	D	28.0	47.5	66.3	291.0	Granitic Gneiss	Extremely Strong
3	1	5.5	D	23.0	47.5	86.6	239.1	Granitic Gneiss	Very Strong
4	5	12.9	D	17.5	47.5	94.7	181.9	Granitic Gneiss	Very Strong
5	5	15.7	D	15.5	47.5	86.9	161.1	Granitic Gneiss	Very Strong
6	8	20.3	D	20.5	47.5	132.5	213.1	Granitic Gneiss	Very Strong
7	8	23.5	D	16.5	47.5	106.8	171.5	Granitic Gneiss	Very Strong
8	11	30.7	D	8.0	47.5	79.5	83.2	Granitic Gneiss	Strong
9	11	30.8	D	23.5	47.5	103.0	244.3	Granitic Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1
Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :		19-1605-126	Client :	HATCH
			Date Drilled :	7/15/2011
Project Name :	Mary River Projec	t - Geotechnical Investigation	Date Tested :	7/25/2011
Core Size :	NQ BH No:	QTR-12	Tester :	ВТ

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	2	3.0	D	5.0	47.5	76.8	52.0	Granitic Gneiss	Strong
2	2	3.2	Α	15.8	47.5	53.2	124.3	Granitic Gneiss	Very Strong
3	2	4.3	Α	26.0	47.5	53.8	203.5	Granitic Gneiss	Very Strong
4	3	5.4	Α	16.0	47.5	47.4	138.1	Granitic Gneiss	Very Strong
5	3	5.4	D	8.0	47.5	88.6	83.2	Granitic Gneiss	Strong
6	3	6.3	Α	10.5	47.5	44.9	94.5	Granitic Gneiss	Strong
7	3	6.3	D	8.0	47.5	87.3	83.2	Granitic Gneiss	Strong
8	3	7.4	D	2.5	47.5	80.9	26.0	Granitic Gneiss	Medium Strong
9	3	7.5	Α	14.3	47.5	47.1	123.6	Granitic Gneiss	Very Strong
10	4	8.5	D	0.5	47.5	66.1	5.2	Granitic Gneiss	Weak
11	4	8.5	Α	3.0	47.5	43.4	27.8	Granitic Gneiss	Medium Strong
12	4	9.0	Α	18.0	47.5	42.9	167.9	Granitic Gneiss	Very Strong
13	4	9.3	D	0.5	47.5	80.9	5.2	Granitic Gneiss	Weak
14	4	9.4	D	17.5	47.5	80.0	181.9	Granitic Gneiss	Very Strong
15	4	10.3	D	9.5	47.5	73.4	98.7	Granitic Gneiss	Strong
16	4	10.3	Α	0.5	47.5	40.7	4.9	Granitic Gneiss	Very Weak
17	5	11.4	Α	4.5	47.5	45.3	40.2	Granitic Gneiss	Medium Strong
18	5	11.4	D	0.5	47.5	91.1	5.2	Granitic Gneiss	Weak
19	5	12.5	Α	9.5	47.5	43.5	87.7	Granitic Gneiss	Strong
20	5	12.5	D	11.5	47.5	85.9	119.5	Granitic Gneiss	Very Strong
21	5	13.7	Α	9.5	47.5	48.8	80.2	Granitic Gneiss	Strong
22	5	13.7	D	3.0	47.5	87.5	31.2	Granitic Gneiss	Medium Strong
23	6	14.8	Α	15.5	47.5	40.5	151.3	Granitic Gneiss	Very Strong
24	6	15.1	D	16.0	47.5	76.5	166.3	Granitic Gneiss	Very Strong
25	6	16.6	D	0.5	47.5	72.9	5.2	Granitic Gneiss	Weak
26	6	16.7	Α	12.5	47.5	53.4	98.4	Granitic Gneiss	Strong
27	7	18.2	Α	16.3	47.5	44.4	52.6	Granitic Gneiss	Strong
28	7	18.2	D	7.5	47.5	73.8	100.1	Granitic Gneiss	Very Strong
29	7	19.1	D	1.0	47.5	46.1	86.8	Granitic Gneiss	Strong
30	7	19.2	Α	12.8	47.5	104.3	48.7	Granitic Gneiss	Medium Strong
31	7	20.3	Α	20.0	47.5	53.1	99.0	Granitic Gneiss	Strong
32	7	20.3	D	25.5	47.5	85.0	46.3	Granitic Gneiss	Medium Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1
Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	1	9-1605-126	Client :	HATCH
			Date Drilled :	7/14/2011
Project Name :	Mary River Projec	t - Geotechnical Investigation	Date Tested :	8/29/2011
Core Size :	NQ BH No:	QTR-13	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	4	11.4	D	24.0	47.5	123.4	249.5	Granitic Gneiss	Very Strong
2	5	13.2	D	24.5	47.5	102.2	254.7	Granitic Gneiss	Extremely Strong
3	6	14.8	D	32.0	47.5	72.9	332.6	Granitic Gneiss	Extremely Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1

Long pieces of core can be tested diametrically to produce suitable lengths for axial testing

* Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
_			Date Drilled :	8/2/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/18/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	Sharif

Test	D No.	Depth	Axial or	Force	Diameter	Length	UCS	De ele Terre	Mata
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
19	17	43.7	Α	20.0	47.7	52.6	158.7	Gneiss	Very Strong
20	17	43.7	D	16.0	47.6	53.9	165.6	Gneiss	Very Strong
21	17	43.9	Α	16.5	47.5	56.6	124.2	Gneiss	Very Strong
22	17	43.9	D	14.0	47.6	54.7	145.1	Gneiss	Very Strong
23	17	44.8	Α	12.5	47.7	53.8	97.6	Gneiss	Strong
24	17	44.8	D	16.0	47.6	63.4	166.0	Gneiss	Very Strong
25	17	45.1	Α	13.0	47.5	58.3	95.6	Gneiss	Strong
26	17	45.5	D	17.5	47.6	69.6	181.6	Gneiss	Very Strong
27	17	45.9	Α	15.5	47.6	40.8	150.2	Gneiss	Very Strong
28	17	45.9	D	14.5	47.6	69.0	150.1	Gneiss	Very Strong
29	17	46.5	Α	17.5	47.5	46.3	153.9	Gneiss	Very Strong
30	17	46.5	D	18.5	47.8	67.8	190.3	Gneiss	Very Strong
3	18	46.9	Α	22.0	47.9	46.7	190.9	Gneiss	Very Strong
4	18	47.0	D	16.0	47.5	60.0	166.4	Gneiss	Very Strong
5	18	47.5	Α	11.0	47.5	44.8	99.2	Gneiss	Strong
6	18	47.5	D	16.5	48.6	49.2	165.4	Gneiss	Very Strong
7	18	47.9	А	26.0	48.0	54.4	200.2	Gneiss	Very Strong
8	18	47.9	D	23.5	47.8	72.4	241.7	Gneiss	Very Strong
9	18	48.5	А	15.5	48.5	46.6	133.4	Gneiss	Very Strong
10	18	48.9	D	13.5	47.7	63.4	139.5	Gneiss	Very Strong
11	18	49.4	Α	16.5	48.3	48.0	139.3	Gneiss	Very Strong
12	18	49.4	D	20.5	47.5	64.8	213.3	Gneiss	Very Strong
13	19	49.6	Α	12.5	48.1	47.4	107.0	Gneiss	Very Strong
14	19	49.7	D	21.5	47.4	61.8	223.9	Gneiss	Very Strong
15	19	50.5	Α	14.0	48.2	40.7	134.6	Gneiss	Very Strong
16	19	50.5	D	18.0	47.4	45.4	187.6	Gneiss	Very Strong
17	19	50.8	А	20.0	47.6	40.4	195.4	Gneiss	Very Strong
18	19	50.8	D	18.0	48.1	52.1	183.3	Gneiss	Very Strong
1	20	54.2	А	21.5	47.8	47.2	185.4	Gneiss	Very Strong
2	20	54.2	D	21.0	48.0	48.8	214.6	Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No:	19-	1605-126	Client :	HATCH
			Date Drilled :	8/2/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/18/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	Sharif

Test	D 11	Depth	Axial or	Force	Diameter	Length	ucs	5.1.	N. C.
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
15	19	50.5	Α	18.0	47.9	40.0	176.0	Gneiss	Very Strong
16	19	50.5	D	20.0	47.8	48.0	205.8	Gneiss	Very Strong
17	19	51.1	Α	20.5	47.7	52.8	162.3	Gneiss	Very Strong
18	19	51.1	D	20.5	47.5	54.8	212.8	Gneiss	Very Strong
19	19	51.6	Α	21.0	47.4	43.8	193.2	Gneiss	Very Strong
20	19	51.6	D	18.5	47.6	57.3	191.7	Gneiss	Very Strong
21	19	52.4	Α	14.0	48.1	37.8	142.5	Gneiss	Very Strong
22	19	52.4	D	11.5	47.4	51.7	119.8	Gneiss	Very Strong
24	19	52.5	Α	18.0	47.7	67.4	117.9	Gneiss	Very Strong
23	19	52.6	D	16.5	48.4	70.9	166.6	Gneiss	Very Strong
25	20	52.9	Α	23.5	47.8	47.3	202.2	Gneiss	Very Strong
26	20	53.0	D	17.0	48.1	56.3	173.5	Gneiss	Very Strong
27	20	53.4	Α	17.0	47.7	50.4	139.5	Gneiss	Very Strong
28	20	53.4	D	21.0	47.8	67.5	216.0	Gneiss	Very Strong
29	20	53.8	Α	17.0	48.2	52.7	133.8	Gneiss	Very Strong
30	20	53.8	D	22.5	47.9	73.2	231.2	Gneiss	Very Strong
2	21	54.5	D	21.5	47.5	64.3	223.4	Gneiss	Very Strong
1	21	55.0	Α	17.0	47.5	61.7	119.6	Gneiss	Very Strong
3	21	55.5	Α	21.5	47.5	44.3	195.8	Gneiss	Very Strong
4	21	55.6	D	21.0	47.5	54.3	218.1	Gneiss	Very Strong
5	22	55.8	Α	26.0	47.5	49.0	219.0	Gneiss	Very Strong
6	22	55.9	D	21.5	48.3	56.6	217.8	Gneiss	Very Strong
7	22	56.3	D	20.5	47.5	73.3	212.8	Gneiss	Very Strong
8	22	56.3	Α	22.5	47.5	41.6	215.0	Gneiss	Very Strong
9	22	57.0	А	13.5	47.5	40.0	132.8	Gneiss	Very Strong
10	22	57.1	D	17.0	48.0	62.5	173.8	Gneiss	Very Strong
11	22	58.0	Α	20.5	47.6	65.2	137.9	Gneiss	Very Strong
12	22	58.0	D	17.5	47.4	64.6	182.3	Gneiss	Very Strong
13	22	58.5	Α	25.0	47.5	51.3	202.9	Gneiss	Very Strong
14	22	58.6	D	23.0	47.5	53.7	239.1	Gneiss	Very Strong

^{*} It is ideal to perform axial test on core specimens with D/L ratio of 1.1 ± 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
			Date Drilled :	8/2/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/17/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	BT/CC

Test	Dun Na	Depth	Axial or	Force	Diameter	Length	UCS	Dook Turns	Notes
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
27	22	59.5	D	16.8	47.4	108.5	174.5	Gneiss	Very Strong
28	22	59.5	Α	15.0	47.4	45.0	135.2	Gneiss	Very Strong
25	22	60.5	D	21.3	47.4	99.2	221.7	Gneiss	Very Strong
26	22	60.5	Α	25.3	47.4	45.6	225.0	Gneiss	Very Strong
23	23	61.6	D	19.3	47.5	104.6	200.4	Gneiss	Very Strong
24	23	61.6	Α	12.3	47.4	49.7	102.0	Gneiss	Very Strong
22	23	62.6	D	1.5	47.4	105.8	15.6	Gneiss	Weak
20	23	63.6	D	1.5	47.5	95.2	15.6	Gneiss	Weak
21	23	63.7	D	19.0	47.4	105.6	198.0	Gneiss	Very Strong
18	23	64.5	D	25.8	47.4	111.8	268.3	Gneiss	Extremely Strong
19	24	64.7	Α	15.8	47.4	34.5	174.3	Gneiss	Very Strong
16	24	65.6	D	16.0	47.5	110.7	166.5	Gneiss	Very Strong
17	24	65.6	Α	18.8	47.4	57.0	140.4	Gneiss	Very Strong
14	24	66.6	D	21.0	47.4	100.2	218.9	Gneiss	Very Strong
15	24	66.7	Α	25.8	47.5	50.4	212.2	Gneiss	Very Strong
12	25	67.6	D	17.3	47.5	77.9	179.5	Gneiss	Very Strong
13	25	67.6	Α	20.0	47.5	38.4	203.5	Gneiss	Very Strong
10	25	68.7	D	17.0	47.4	91.2	177.3	Gneiss	Very Strong
11	25	68.7	Α	14.0	47.4	37.0	146.8	Gneiss	Very Strong
9	25	69.7	Α	8.0	47.5	40.9	77.5	Gneiss	Strong
8	25	69.7	D	10.0	47.4	122.4	104.2	Gneiss	Very Strong
7	26	70.6	D	17.3	47.4	100.8	179.9	Gneiss	Very Strong
6	26	72.0	Α	22.8	47.4	50.8	186.4	Gneiss	Very Strong
5	26	72.1	D	18.3	47.4	92.7	190.1	Gneiss	Very Strong
4	26	73.4	А	13.8	47.4	42.5	129.3	Gneiss	Very Strong
3	26	73.6	D	17.8	47.4	92.5	185.0	Gneiss	Very Strong
2	27	74.8	Α	24.8	47.4	47.2	214.7	Gneiss	Very Strong
1	27	74.8	D	21.5	47.4	98.3	223.9	Gneiss	Very Strong
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 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
			Date Drilled :	8/2/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/14/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	CC

Test	D N.	Depth	Axial or	Force	Diameter	Length	UCS	Dools Tons	Notes
No.	Run No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
25	26	74.9	Α	14.5	47.5	36.0	154.9	Gneiss	Very Strong
24	26	75.0	D	24.3	47.5	84.2	252.4	Gneiss	Extremely Strong
23	27	76.0	Α	17.5	47.6	36.9	183.2	Gneiss	Very Strong
22	27	76.0	D	23.0	47.5	88.8	239.1	Gneiss	Very Strong
20	28	77.2	D	21.5	47.5	106.0	223.6	Gneiss	Very Strong
21	28	77.2	Α	16.3	47.5	44.8	146.4	Gneiss	Very Strong
18	28	78.2	D	22.0	47.5	92.6	228.8	Gneiss	Very Strong
19	28	78.3	Α	24.5	47.6	41.8	232.9	Gneiss	Very Strong
16	28	79.1	D	19.5	47.5	94.6	203.0	Gneiss	Very Strong
17	28	79.2	Α	21.0	47.5	41.8	200.2	Gneiss	Very Strong
15	29	80.4	Α	19.5	47.5	51.5	157.9	Gneiss	Very Strong
14	29	80.4	D	13.0	47.5	101.4	135.0	Gneiss	Very Strong
13	29	81.6	Α	19.0	47.5	40.9	184.0	Gneiss	Very Strong
12	29	81.6	D	18.5	47.6	86.1	191.9	Gneiss	Very Strong
11	29	82.5	D	19.3	47.5	97.0	200.2	Gneiss	Very Strong
9	30	83.4	D	17.0	47.4	89.1	177.1	Gneiss	Very Strong
10	30	83.4	Α	14.5	47.5	38.4	147.5	Gneiss	Very Strong
7	30	84.5	D	19.5	47.6	91.0	202.2	Gneiss	Very Strong
8	30	84.6	Α	16.5	47.5	35.5	178.0	Gneiss	Very Strong
5	30	85.4	D	13.0	47.6	104.4	134.8	Gneiss	Very Strong
6	30	85.5	Α	12.0	47.6	36.7	126.2	Gneiss	Very Strong
3	31	86.6	D	18.0	47.2	117.9	188.9	Gneiss	Very Strong
4	31	86.7	Α	18.5	47.1	53.3	146.7	Gneiss	Very Strong
1	31	87.7	D	27.0	47.6	104.3	279.7	Gneiss	Extremely Strong
2	31	87.7	А	23.0	47.6	50.3	189.2	Gneiss	Very Strong
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 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	•	9-1605-126	Client :	HATCH
			Date Drilled :	8/2/2011
Project Name :	Mary River Projec	t - Geotechnical Investigation	Date Tested :	8/14/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	CC

Test	Run No.	Depth	Axial or	Force	Diameter	Length	UCS	Rock Type	Notes
No.	Ruii NO.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Nock Type	Notes
29	32	88.6	D	21.5	47.6	83.2	222.8	Gneiss	Very Strong
30	32	88.6	Α	16.0	47.6	36.0	170.6	Gneiss	Very Strong
28	32	89.7	Α	30.5	47.6	46.3	267.7	Gneiss	Extremely Strong
27	32	89.8	D	29.0	47.7	114.1	300.0	Gneiss	Extremely Strong
25	32	90.6	D	25.3	47.5	94.3	262.3	Gneiss	Extremely Strong
26	32	90.6	Α	24.0	47.6	42.4	225.6	Gneiss	Very Strong
23	33	91.6	D	23.0	47.6	90.4	238.1	Gneiss	Very Strong
24	33	91.6	Α	21.3	47.6	41.9	201.4	Gneiss	Very Strong
22	33	92.6	D	21.5	47.5	105.7	223.3	Gneiss	Very Strong
20	33	93.6	D	17.5	47.6	99.5	181.2	Gneiss	Very Strong
21	33	93.6	Α	16.3	47.6	47.5	139.8	Gneiss	Very Strong
18	34	94.6	D	19.5	47.5	104.3	202.4	Gneiss	Very Strong
19	34	94.6	Α	15.3	47.5	48.3	129.7	Gneiss	Very Strong
17	34	96.0	Α	21.8	47.6	44.3	197.5	Gneiss	Very Strong
16	34	96.1	D	19.8	47.6	108.1	204.5	Gneiss	Very Strong
14	34	97.2	D	24.0	47.6	101.2	248.8	Gneiss	Very Strong
15	34	97.2	Α	26.5	47.6	41.5	253.2	Gneiss	Extremely Strong
12	35	98.0	D	22.0	47.7	110.1	227.5	Gneiss	Very Strong
13	35	98.0	Α	25.5	47.6	55.1	195.4	Gneiss	Very Strong
11	35	99.1	D	26.5	47.6	107.2	274.9	Gneiss	Extremely Strong
10	35	100.2	Α	14.8	47.6	36.1	157.0	Gneiss	Very Strong
9	35	100.2	D	17.0	47.5	96.0	176.6	Gneiss	Very Strong
7	36	101.3	D	19.5	47.6	97.9	202.0	Gneiss	Very Strong
8	36	101.3	Α	14.5	47.7	43.1	134.5	Gneiss	Very Strong
5	36	102.7	D	19.0	47.5	116.0	197.7	Gneiss	Very Strong
6	36	102.8	Α	22.5	47.5	52.3	180.0	Gneiss	Very Strong
3	37	103.8	D	16.5	47.5	96.6	171.5	Gneiss	Very Strong
4	37	103.8	Α	17.0	47.6	45.5	151.2	Gneiss	Very Strong
1	37	104.9	D	21.0	47.6	85.9	217.5	Gneiss	Very Strong
2	37	104.9	Α	15.8	47.6	37.5	162.6	Gneiss	Very Strong

 $^{^{\}star}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-	1605-126	Client :	HATCH
			Date Drilled :	8/2/2011
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/14/2011
Core Size :	NQ BH No:	NTUN-DH03	Tester :	CC

Test	Run No.	Depth	Axial or	Force	Diameter	Length	UCS	Rock Type	Notes
No.		(m)	Diametral	(kN)	(mm)	(mm)	(MPa)		
29	37	105.8	D	23.3	47.6	97.7	241.0	Gneiss	Very Strong
30	37	105.8	Α	21.3	47.6	46.0	187.7	Gneiss	Very Strong
27	38	107.0	D	19.8	47.5	108.8	205.3	Gneiss	Very Strong
28	38	107.0	Α	21.0	47.6	52.8	166.7	Gneiss	Very Strong
25	38	108.2	D	16.0	47.5	102.9	166.4	Gneiss	Very Strong
26	38	108.2	Α	22.5	47.6	47.5	193.8	Gneiss	Very Strong
23	38	109.1	D	16.8	47.6	94.3	173.3	Gneiss	Very Strong
24	38	109.1	Α	15.0	47.6	47.2	129.8	Gneiss	Very Strong
21	39	110.4	D	21.8	47.7	108.9	224.6	Gneiss	Very Strong
22	39	110.4	Α	16.0	47.6	50.6	131.0	Gneiss	Very Strong
20	39	111.2	Α	35.0	47.6	52.6	278.3	Gneiss	Extremely Strong
19	39	111.3	D	23.0	47.6	110.3	238.3	Gneiss	Very Strong
17	40	112.6	D	24.0	47.5	76.4	249.1	Gneiss	Very Strong
18	40	112.6	Α	19.3	47.6	35.5	207.5	Gneiss	Very Strong
15	40	113.7	D	20.5	47.7	95.6	212.0	Gneiss	Very Strong
16	40	113.7	Α	22.0	47.7	43.0	204.5	Gneiss	Very Strong
13	40	114.6	D	21.0	47.6	100.5	217.6	Gneiss	Very Strong
14	40	114.7	Α	13.8	47.7	45.5	122.2	Gneiss	Very Strong
11	41	115.6	D	22.0	47.6	98.2	227.6	Gneiss	Very Strong
12	41	115.6	Α	27.5	47.6	48.0	234.7	Gneiss	Very Strong
8	41	117.1	D	20.0	47.7	83.7	206.7	Gneiss	Very Strong
10	41	117.1	Α	17.0	47.7	46.2	149.4	Gneiss	Very Strong
9	41	117.1	Α	13.5	47.7	37.7	138.9	Gneiss	Very Strong
7	41	118.5	D	23.5	47.6	87.5	243.3	Gneiss	Very Strong
6	42	118.6	Α	24.0	47.6	44.3	217.8	Gneiss	Very Strong
5	42	118.6	D	16.3	47.6	80.2	168.1	Gneiss	Very Strong
3	42	119.5	D	21.0	47.7	95.0	217.1	Gneiss	Very Strong
4	42	119.6	Α	6.0	47.7	33.2	68.0	Gneiss	Strong
1	42	120.8	D	19.0	47.6	108.3	197.2	Gneiss	Very Strong
2	42	120.9	Α	16.5	47.6	36.0	176.0	Gneiss	Very Strong

 $^{^{\}star}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



lob No :	19-	1605-126	Client :	HATCH
_			Date Drilled :	
Project Name :	Mary River Project -	Geotechnical Investigation	Date Tested :	8/27/2011
Core Size :	NQ3 BH No:	NTUN-DH05	Tester :	AS

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
1	22	65.4	D	7.0	47.2	98.6	73.5	gneiss	Strong
2	22	65.8	D	17.3	47.6	74.3	178.8	gneiss	Very Strong
3	22	66.2	D	17.5	47.2	181.0	183.8	gneiss	Very Strong
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 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :		19	-1605-126	Client :	HATCH
				Date Drilled :	7/28/2011
Project Name :	Mary Riv	er Project -	Geotechnical Investigation	Date Tested :	8/2/2011
Core Size :	NQ BI	H No :	STUN-DH03	Tester :	BT

Test No.	Run No.	Depth (m)	Axial or Diametral	Force (kN)	Diameter (mm)	Length (mm)	UCS (MPa)	Rock Type	Notes
2	22	70.1	D	12.0	47.7	89.4	124.1	Gneiss	Very Strong
3	22	70.4	Α	18.5	47.7	43.6	170.1	Gneiss	Very Strong
1	22	71.3	Α	19.8	47.7	46.2	173.5	Gneiss	Very Strong
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 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.



Job No :	19-1	605-126	Client :	HATCH	
_			Date Drilled :	7/29/2011	
Project Name :	Mary River Project - 0	Geotechnical Investigation	Date Tested :	8/2/2011	
Core Size :	NQ BH No:	STUN-DH03	Tester :	BT	

Test	Run No.	Depth	Axial or	Force	Diameter	Length	UCS	Deek Type	Notes
No.	Kull No.	(m)	Diametral	(kN)	(mm)	(mm)	(MPa)	Rock Type	Notes
30	23	71.3	D	18.8	47.6	106.7	194.0	Gneiss	Very Strong
28	23	72.5	D	12.0	47.6	95.5	124.2	Gneiss	Very Strong
29	23	72.5	Α	20.3	47.6	42.0	191.6	Gneiss	Very Strong
26	24	73.6	D	15.5	47.7	88.5	160.2	Gneiss	Very Strong
27	24	73.6	Α	17.0	47.7	47.5	146.2	Gneiss	Very Strong
24	24	74.5	D	18.0	47.6	88.6	186.4	Gneiss	Very Strong
25	24	74.5	Α	25.0	47.6	54.8	192.5	Gneiss	Very Strong
22	25	75.5	D	15.0	47.6	109.1	155.6	Gneiss	Very Strong
23	25	75.5	Α	13.0	47.6	46.0	114.7	Gneiss	Very Strong
21	25	76.4	D	9.5	47.6	74.5	98.3	Gneiss	Strong
19	25	77.7	D	16.5	47.6	78.0	170.8	Gneiss	Very Strong
20	25	77.7	Α	24.0	47.6	43.2	222.3	Gneiss	Very Strong
17	26	79.1	D	17.0	47.6	102.6	176.0	Gneiss	Very Strong
18	26	79.2	Α	24.0	47.7	46.8	208.9	Gneiss	Very Strong
15	26	80.0	D	16.5	47.6	98.9	170.7	Gneiss	Very Strong
16	26	80.1	Α	21.5	47.7	47.4	185.2	Gneiss	Very Strong
13	26	80.8	D	16.5	47.7	93.1	170.4	Gneiss	Very Strong
14	26	80.8	Α	23.0	47.7	47.3	198.2	Gneiss	Very Strong
11	27	82.0	D	18.5	47.7	79.4	190.9	Gneiss	Very Strong
12	27	82.1	Α	19.5	47.7	42.0	184.2	Gneiss	Very Strong
9	27	82.7	D	17.0	47.7	78.7	175.6	Gneiss	Very Strong
10	27	82.7	Α	20.0	47.7	47.7	171.4	Gneiss	Very Strong
7	27	83.9	D	18.0	47.7	88.5	185.8	Gneiss	Very Strong
8	27	84.0	Α	21.3	47.7	43.5	195.6	Gneiss	Very Strong
5	28	85.1	D	21.0	47.7	88.3	216.7	Gneiss	Very Strong
6	28	85.1	Α	16.0	47.7	42.4	150.2	Gneiss	Very Strong
3	28	86.5	D	18.0	47.7	80.6	185.7	Gneiss	Very Strong
4	28	86.5	Α	26.5	47.7	47.2	228.7	Gneiss	Very Strong
1	28	87.0	D	16.5	47.7	78.1	170.3	Gneiss	Very Strong
2	28	87.1	Α	23.0	47.7	40.1	225.4	Gneiss	Very Strong

 $^{^{*}}$ It is ideal to perform axial test on core specimens with D/L ratio of 1.1 \pm 0.1 Long pieces of core can be tested diametrically to produce suitable lengths for axial testing * Diametral Test should have 0.7 x D on either side of test point.