

Appendix D: Memos

Memo

To:	Mark Valeriotte (JDS) Greg Blaylock (JDS)	Date:	January 24, 2011
cc:	Maritz Rykaart (SRK)	From:	Lowell Wade (SRK)
Subject:	Doris North – North Dam Fillet Construction	Project #:	1CH008.033

Request for Information

The “fillet” is the area of material below the up-stream liner and the base of the key trench. The technical specifications call for the construction of the “fillet” to be placed and compacted in thin horizontal lifts. This will be difficult due to limited space and narrow width of each lift which will become progressively narrower as the “fillet” reaches the top of the key trench. It has been proposed the fillet be constructed in a series of wedge shaped layers using moisture conditioned core material which is slightly drier than specified for constructing the core of the North Dam. This will allow the core material to be placed on an incline and not slump prior to freezing in-place. The core material will be place and compacted using an excavator bucket. The sequencing of the lifts are shown in the attached three figures.

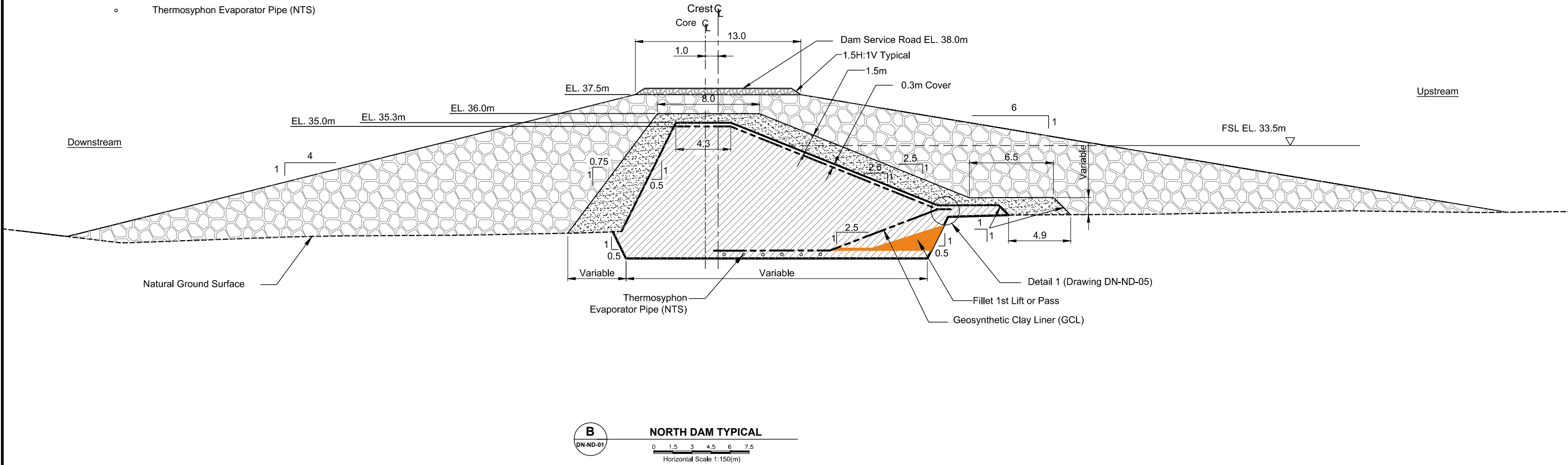
Response

SRK does not have an issue with the proposed construction methodology. No changes to the IFC drawing will be required

LEGEND

- Natural Ground
- Geosynthetic Clay Liner (GCL)
- Stratigraphic Boundary
- Core Material
- Transition Material
- Run of Quarry (ROQ)
- Surfacing Material
- Bedrock
- Peat
- Thermosyphon Evaporator Pipe (NTS)

- NOTES**
- North dam typical cross section taken from drawing, DN-ND-02 as SRK Engineering drawings for the North Dam, Doris North Project, Nunavut Canada. Drawing Issued for Construction, Revision 0, Project No. 1CH008.027, dated December 2010.



J:\01_SITES\Hope Bay\ACAD\2010 Drawings\North Dam\DN-ND-02_Fillet Cons 01.dwg

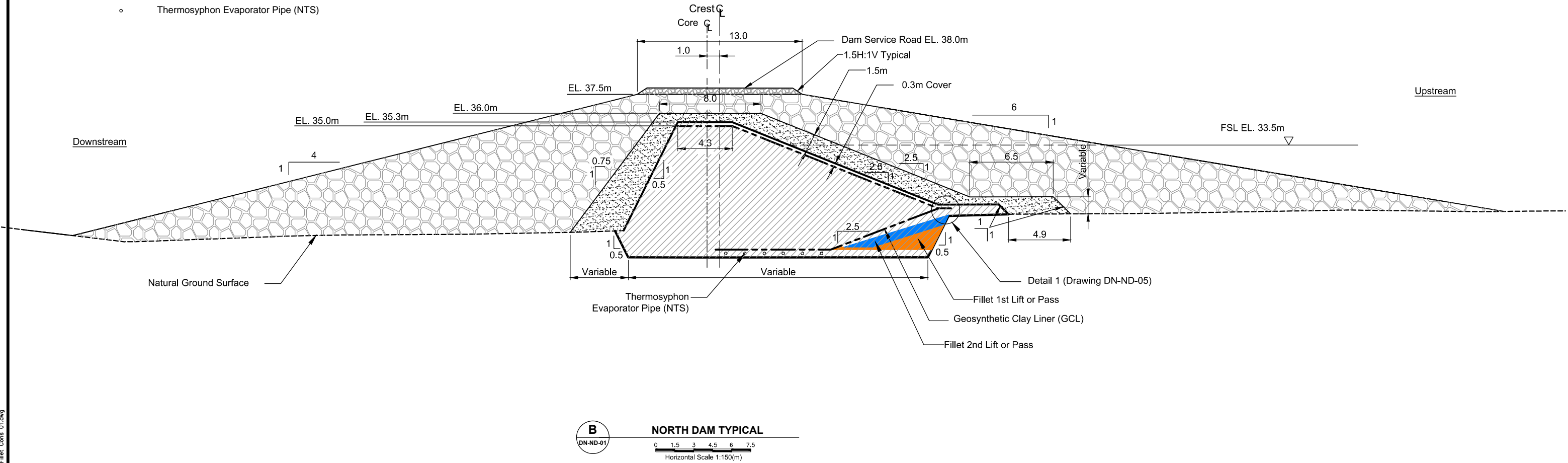
 SRK Consulting Engineers and Scientists Vancouver B.C.	 NEWMONT NORTH AMERICA	Doris North Project		
		North Dam Fillet Construction		
SRK JOB NO.: 1CH008.027	HOPE BAY MINING LTD.	DATE:	APPROVED:	FIGURE:
FILE NAME: DN-ND-02_Fillet Cons 01.dwg		Jan. 2011	LW	1

LEGEND

- Natural Ground
- Geosynthetic Clay Liner (GCL)
- Stratigraphic Boundary
- Core Material
- Transition Material
- Run of Quarry (ROQ)
- Surfacing Material
- Bedrock
- Peat
- Thermosyphon Evaporator Pipe (NTS)

NOTES

- North dam typical cross section taken from drawing, DN-ND-02 as SRK Engineering drawings for the North Dam, Doris North Project, Nunavut Canada. Drawing Issued for Construction, Revision 0, Project No. 1CH008.027, dated December 2010.



J:\01_SITES\Hope Bay\ACAD\2010 Drawings\North Dam\DN-ND-02_Fillet Cons 01.dwg

 SRK Consulting Engineers and Scientists Vancouver B.C.	 NEWMONT NORTH AMERICA	Doris North Project		
		North Dam Fillet Construction		
SRK JOB NO.: 1CH008.027	HOPE BAY MINING LTD.	DATE:	APPROVED:	FIGURE:
FILE NAME: DN-ND-02_Fillet Cons 01.dwg		Jan. 2011	LW	2

LEGEND

Natural Ground

Geosynthetic Clay Liner (GCL)

Stratigraphic Boundary

Core Material

Transition Material

Run of Quarry (ROQ)

Surfacing Material

Bedrock

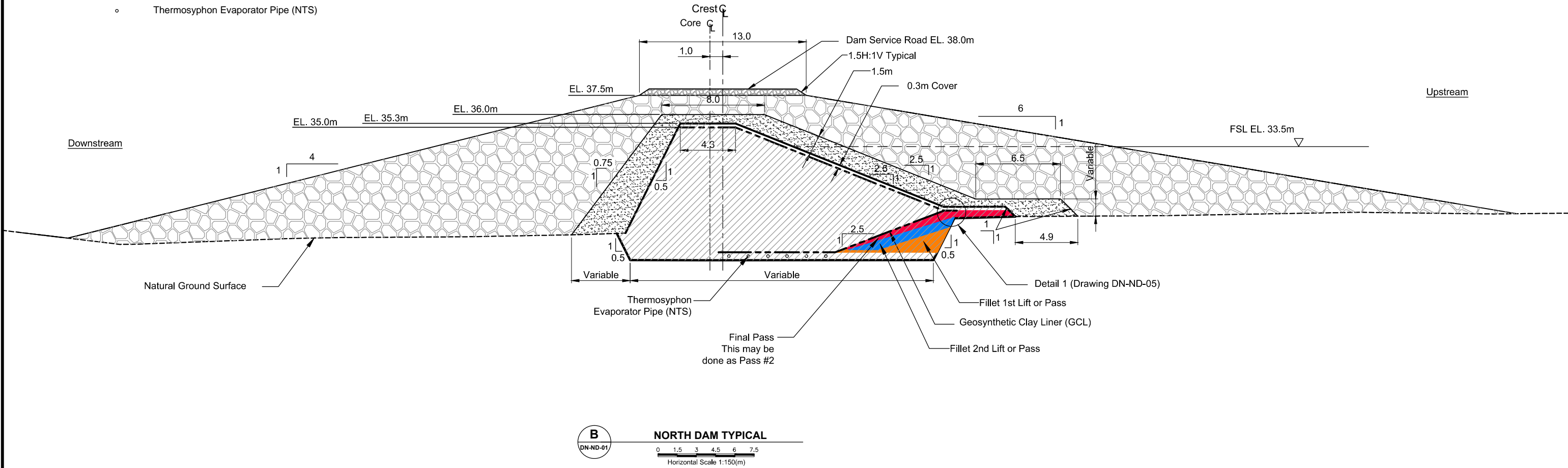
Peat

o

Thermosyphon Evaporator Pipe (NTS)

- NOTES
1.

North dam typical cross section taken from drawing, DN-ND-02 as SRK Engineering drawings for the North Dam, Doris North Project, Nunavut Canada. Drawing Issued for Construction, Revision 0, Project No. 1CH008.027, dated December 2010.



 SRK Consulting Engineers and Scientists Vancouver B.C.	 NEWMONT NORTH AMERICA	Doris North Project		
		North Dam Fillet Construction		
SRK JOB NO.: 1CH008.027	HOPE BAY MINING LTD.	DATE:	APPROVED:	FIGURE:
FILE NAME: DN-ND-02_Fillet Cons 01.dwg		Jan. 2011	LW	3

J:\01_SITES\Hope Bay\ACAD\2010 Drawings\North Dam\DN-ND-02_Fillet Cons 01.dwg

Memo

To:	Mark Valeriotte, Greg Blaylock	Date:	February 15, 2011
cc:		From:	Lowell Wade, Maritz Rykaart
Subject:	Hope Bay Project – North Dam Additional Key Trench Excavation in Peat Zone	Project #:	1CH008.033

A zone of peat within the base of the key trench had been identified during the detailed design stage, and as per the IFC Drawings additional characterization and subsequent further excavation of this zone would be done during construction. Nine drill holes were completed in this zone as part of the Percolation Test Program, and the results confirmed the presence of peat and ice rich material in six of these holes, extending to depths of about 5 m below original ground level.

This peat and ice rich material must be completely removed, and replaced with saturated core material to ensure the integrity and performance of the dam. The additional excavation is about 625 m³ and consists of a trapezoidal cut with a horizontal 5 m base width at chainage 0+095, and 2H:1V slopes in the west and east directions intercepting the design key trench base at changes 0+82 and 0+99 respectively. The north and south sides of the additional excavation will be consistent with the existing key trench side slopes of 0.5H:1V. The additional excavation is variable in depth, with a maximum depth of about 5 m below original ground, or 2.6 m below the original key trench base design depth.

The attached Figures 1 through 6 illustrate the extent of the excavation, and provide stake-out coordinates for the additional excavation. A digital ACAD file will be submitted for use by the contractor.

It should be noted that the north and south wall of the additional excavation will be near vertical high-walls in frozen ice rich material, and the Contractor must be instructed to take special precaution to ensure the safety of all workers when working in these areas.

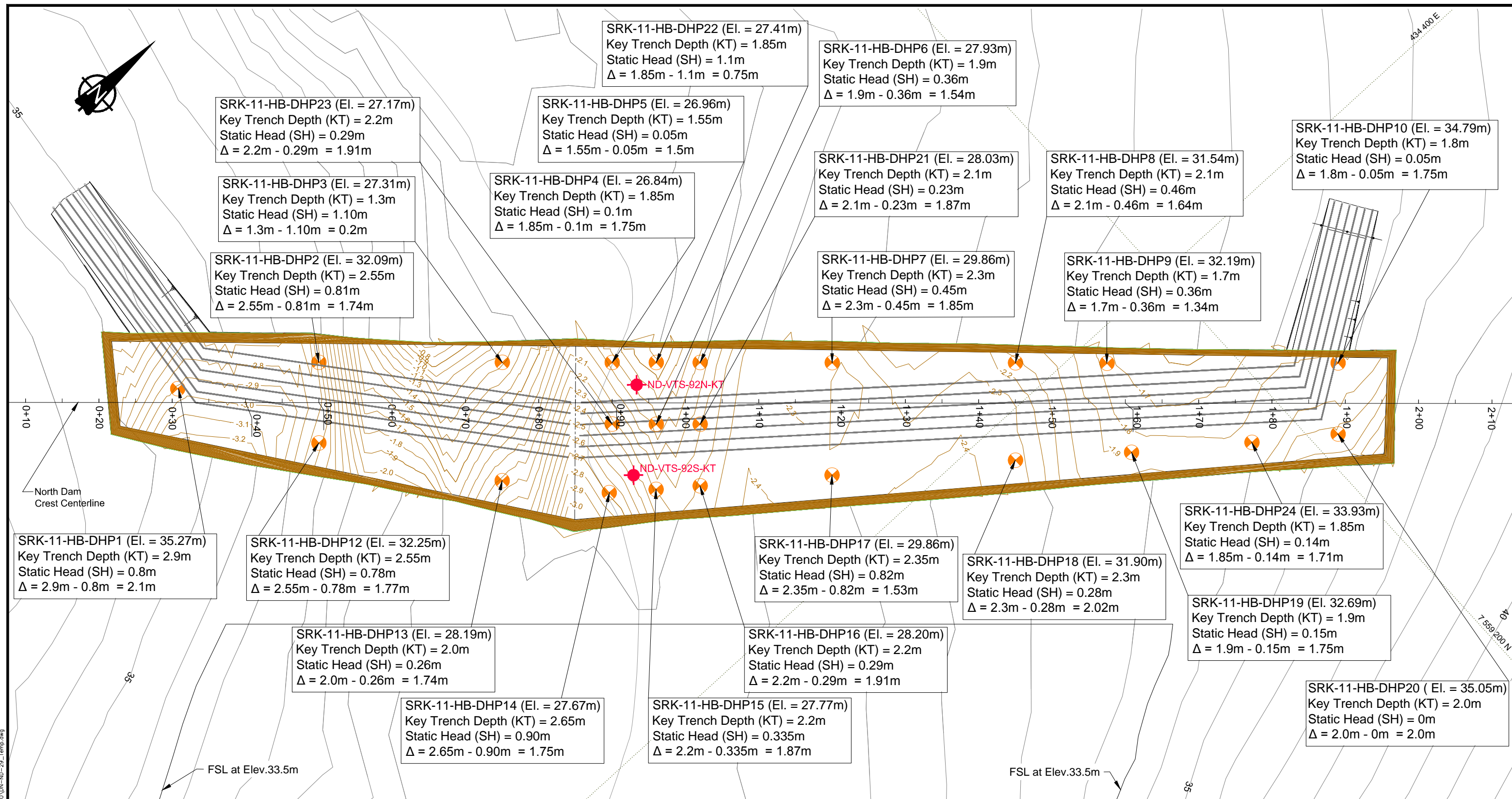
In is anticipated that this additional excavation will be sufficient to completely remove any remaining organic and ice rich material; however, final approval of the extent of the excavation will still be subject to a visual assessment of the excavated area, especially to the south, where complete definition of the organic zone was not confirmed through drilling.

This additional excavation will require backfilling with saturated core material, consistent with the specifications set out for the core superstructure. To potentially facilitate quicker freeze back of each lift, consideration could be given to placer thinner lifts and using fans to blow cold air over the placed material to accelerate freeze back.

Two additional vertical ground temperature cables are to be installed within this excavation after it has been backfilled. There are ground temperature cables already on site, intended for the bridge abutments which can be used for this purpose; however, the lead lengths of these cables will have to be extended. The quote for the additional lead lengths required is included in Attachment 1.


----- END OF MEMO -----

Figures




GROUND TEMPERATURE CABLE DETAILS															
STRING #	STRING NAME	SERIES #	STRING TYPE	CHAINGE (m)	ELEVATION (m)	OVERALL CABLE LENGTH (m)	CABLE LOCATION	BEAD LOCATION IN METERS (MEASURED FROM END)							
								#1	#2	#3	#4	#5	#6	#7	#8
25	ND-VTS-92N-KT	H	Vertical	92	n/a	128	Additional Keytrench Excavation	0	2.5	3.5	4	4.5	5	5.6	-
26	ND-VTS-92S-KT	H	Vertical	92	n/a	128	Additional Keytrench Excavation	0	2.5	3.5	4	4.5	5	5.6	-

ADDITIONAL VERTICAL GROUND TEMPERATURE CABLE STRING STAKE OUT POINTS		
ID	NORTHING	EASTING
ND-VTS-92N-KT	7559137.11	434362.88
ND-VTS-92S-KT	7559128.50	434371.70



SRK Consulting
Engineers and Scientists
Vancouver B.C.



NEWMONT
NORTH AMERICA

Doris North Project

North Dam
Percolation
Test Borehole Locations

SRK JOB NO.: 1CH008.033

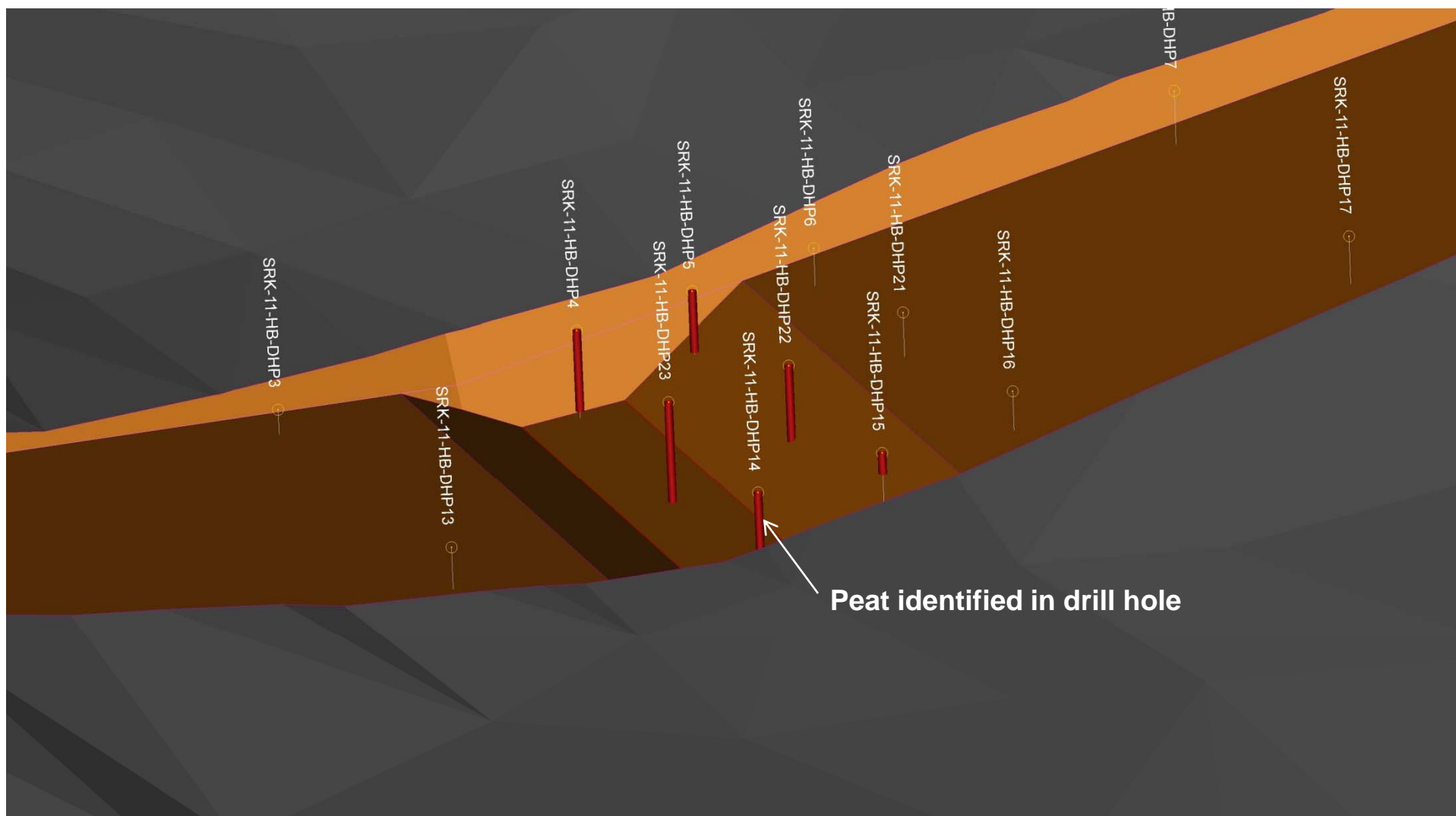
FILE NAME: DN-ND-29_Temp.dwg



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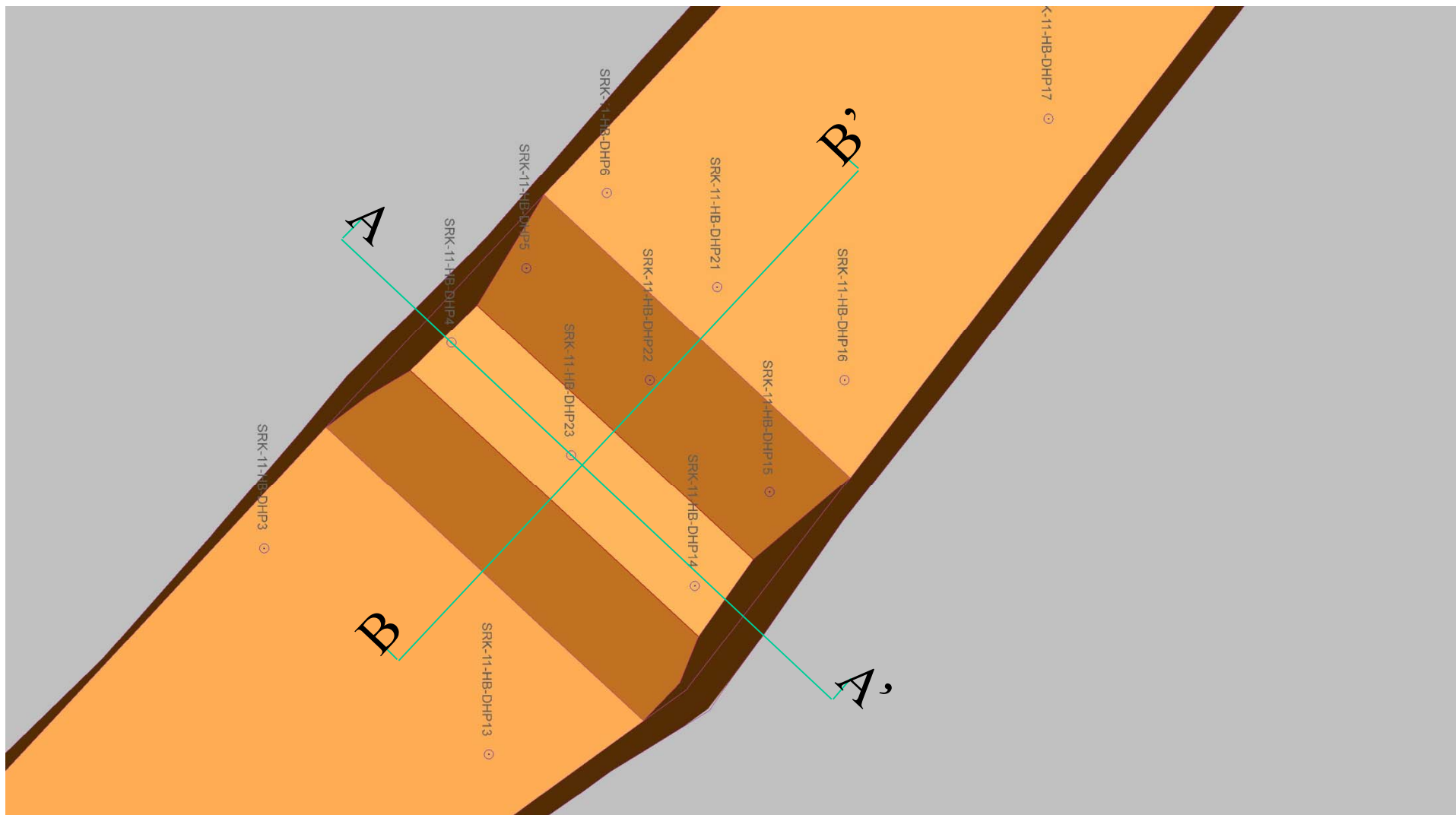
DATE: Feb. 2011

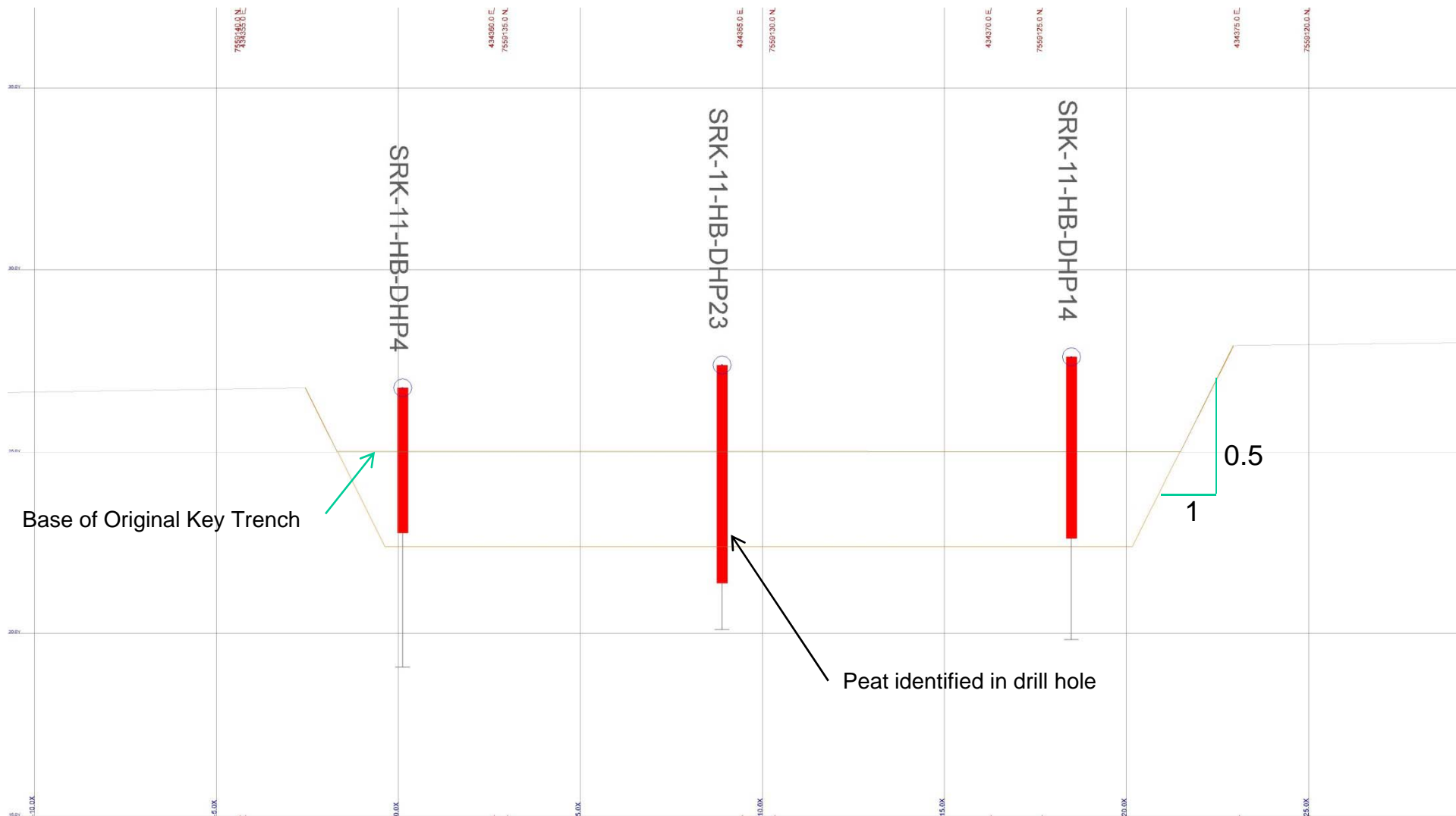
APPROVED: EMR/LW



FIGURE: 1

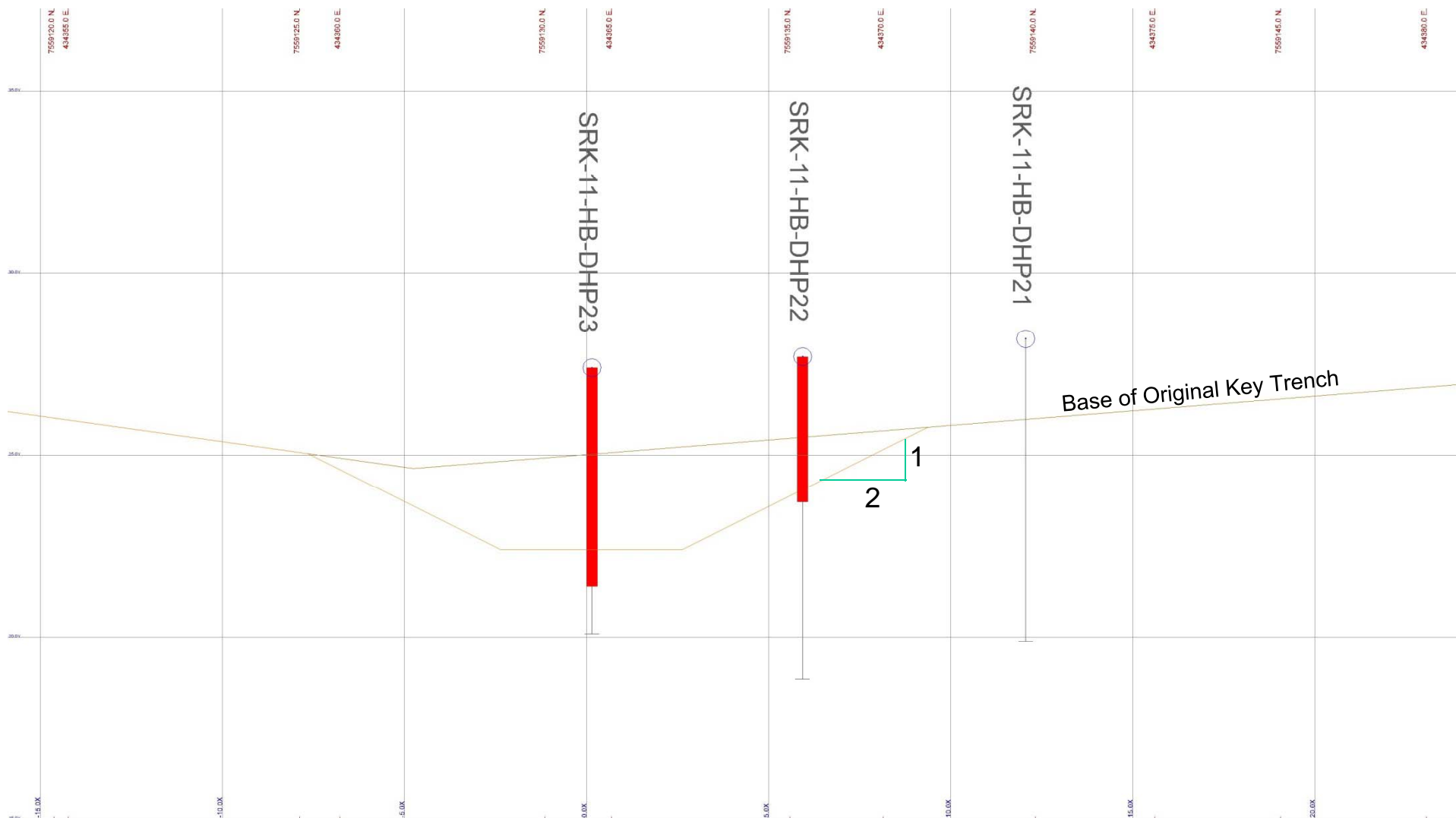


 <p>SRK Consulting Engineers and Scientists VANCOUVER</p>	 <p>NEWMONT NORTH AMERICA</p>	Doris North Project	
	<p>HOPE BAY MINING LTD.</p>	<p>North Dam Additional Key Trench Excavation 3D View</p>	
<p>Job No: 1CH008.033</p> <p>Filename: Figure 2_6_NorthDam_20110214.pptx</p>		<p>Date: February 2011</p>	<p>Approved: LW</p>
			<p>Figure: 2</p>





 <p>SRK Consulting Engineers and Scientists VANCOUVER</p>	 <p>NEWMONT NORTH AMERICA</p>	Doris North Project		
		North Dam Additional Key Trench Excavation Section A-A'		
Job No: 1CH008.033 Filename: Figure 2_6_NorthDam_20110214.pptx	HOPE BAY MINING LTD.	Date: February 2011	Approved: LW	Figure: 4



Doris North Project

**North Dam
Additional Key Trench Excavation
Section B-B'**

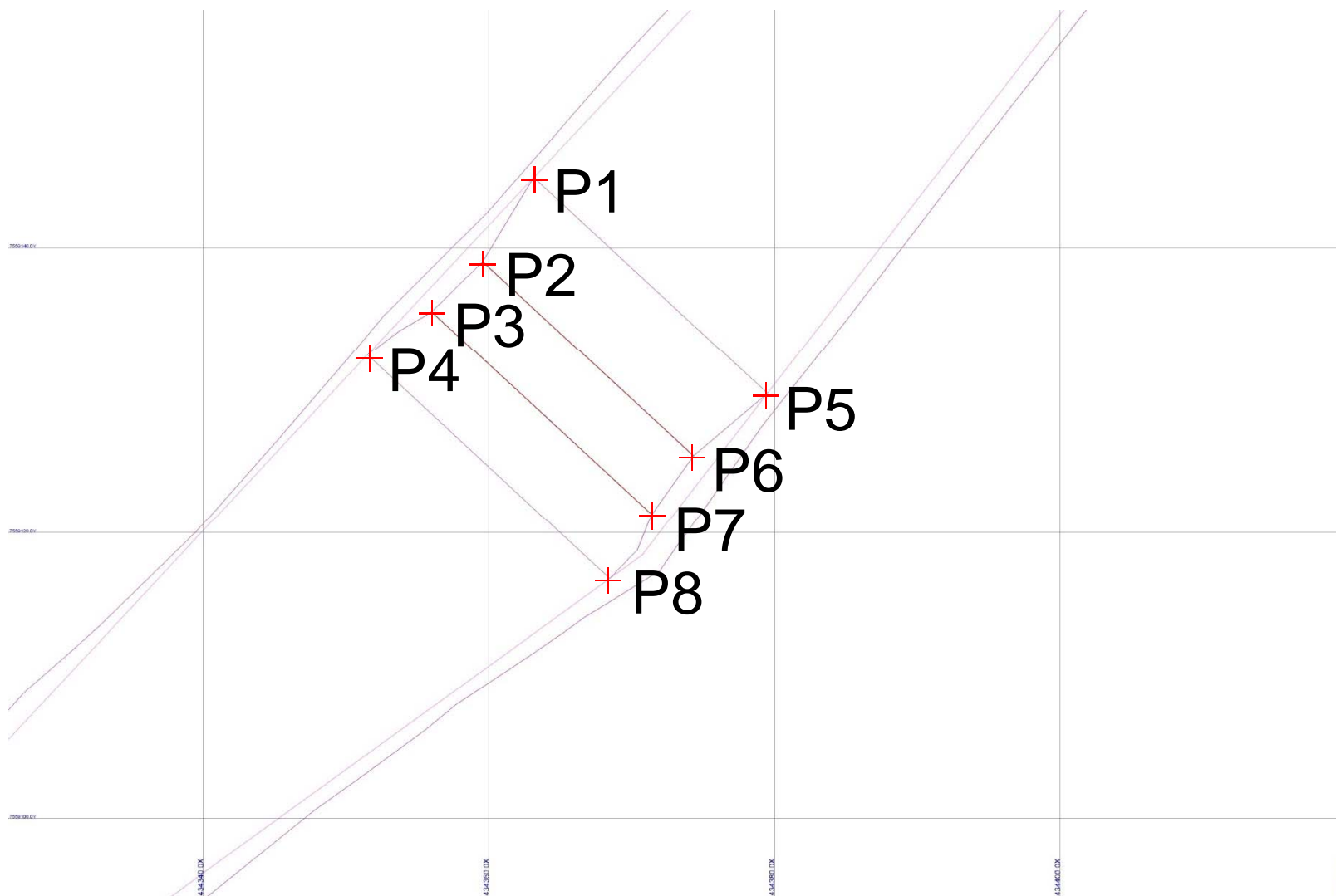
Job No: 1CH008.033
Filename: Figure 2_6_NorthDam_20110214.pptx

HOPE BAY MINING LTD.

Date:
February 2011

Approved:
LW

Figure: **5**



P1 434363.1 E
7559144.9 N
25.774 Z

P2 434359.6 E
7559139.0 N
22.400 Z

P3 434356.0 E
7559135.5 N
22.400 Z

P4 434351.5 E
7559132.5 N
25.035 Z

P5 434379.5 E
7559129.8 N
25.764 Z

P6 434374.3 E
7559125.4 N
22.400 Z

P7 434371.4 E
7559121.3 N
22.400 Z

P8 434368.5 E
7559116.8 N
25.057 Z



Doris North Project

North Dam
Additional Key Trench Excavation
Plan showing Stake Out Points

Job No: 1CH008.033

Filename: Figure 2_6_NorthDam_20110214.pptx

HOPE BAY MINING LTD.

Date:
February 2011

Approved:
LW

Figure:
6

Attachment 1

Ground Temperature Cable and Extension Quote

Certificate of Compliance

RST Instruments Ltd., 200 - 2050 Hartley Ave., Coquitlam, British Columbia, Canada V3K 6W5



Thermistor Strings

Customer: NUNA CONTRACTING
Work Order: Q017563
Thermistor Type: 3 k Ω

Number of Points: 7
Length: 18 m

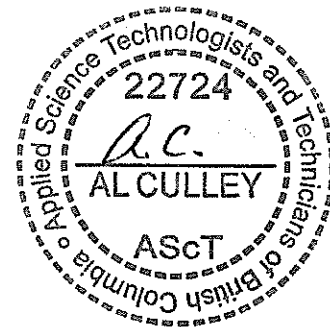
This is to certify that Thermistor Strings S/N: TS3014 –TS3025 meets the RST Instruments specifications for the product.

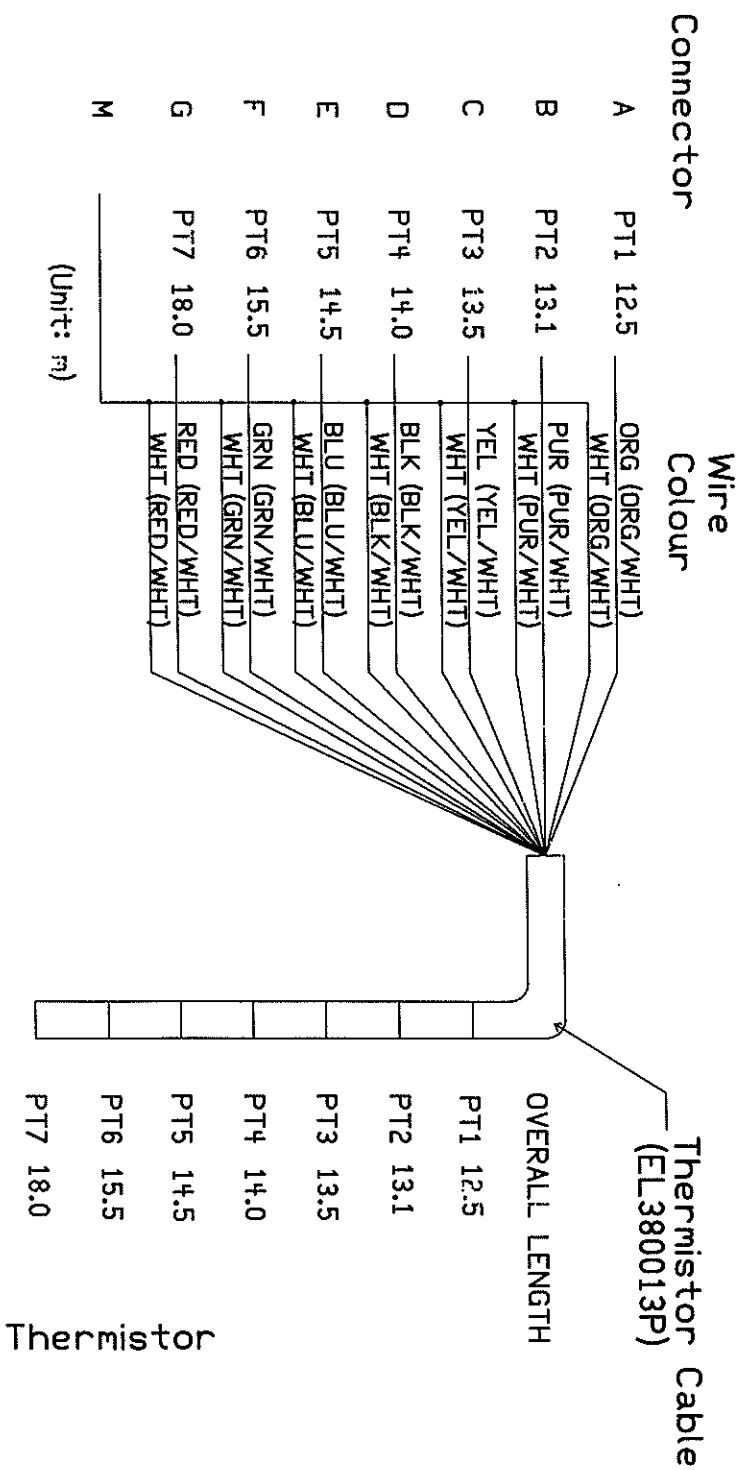
Technician: H. Chang

A handwritten signature in black ink, appearing to be 'HC' or 'H. Chang', written over a horizontal line.

Date: September 2, 2010

THM0008A





(Unit: m)

S/N: TS3014 - TS3025

Co:	RST INSTRUMENTS LTD		
Title:	THERMISTOR CABLE		
J/N:	WOG017563	Revision:	A
Author:	WY	Size:	A
Date:	2010/08/17	Sheet	1 of 1

Resistance versus Temperature Relationship 3000 Ohm NTC Thermistors

Ohms	Temp	Ohms	Temp	Ohms	Temp	Ohms	Temp	Ohms	Temp
201.1K	-50	16.60K	-10	2417	30	525.4	70	153.2	110
187.3K	-49	15.72K	-9	2317	31	507.8	71	149.0	111
174.5K	-48	14.90K	-8	2221	32	490.9	72	145.0	112
162.7K	-47	14.12K	-7	2130	33	474.7	73	141.1	113
151.7K	-46	13.39K	-6	2042	34	459.0	74	137.2	114
141.6K	-45	12.70K	-5	1959	35	444.0	75	133.6	115
132.2K	-44	12.05K	-4	1880	36	429.5	76	130.0	116
123.5K	-43	11.44K	-3	1805	37	415.6	77	126.5	117
115.4K	-42	10.86K	-2	1733	38	402.2	78	123.2	118
107.9K	-41	10.31K	-1	1664	39	389.3	79	119.9	119
101.0K	-40	9796	0	1598	40	376.9	80	116.8	120
94.48K	-39	9310	1	1535	41	364.9	81	113.8	121
88.46K	-38	8851	2	1475	42	353.4	82	110.8	122
82.87K	-37	8417	3	1418	43	342.2	83	107.9	123
77.99K	-36	8006	4	1363	44	331.5	84	105.2	124
72.81K	-35	7618	5	1310	45	321.2	85	102.5	125
68.30K	-35	7252	6	1260	46	311.3	86	99.9	126
64.09K	-33	6905	7	1212	47	301.7	87	97.3	127
60.17K	-32	6576	8	1167	48	282.4	88	94.9	128
56.51K	-31	6265	9	1123	49	283.5	89	92.5	129
53.10K	-30	5971	10	1081	50	274.9	90	90.2	130
49.91K	-29	56.92	11	1040	51	266.6	91	87.9	131
46.94K	-28	5427	12	1002	52	258.6	92	85.7	132
44.16K	-27	5177	13	965	53	250.9	93	83.6	134
39.13K	-25	4714	15	895.8	55	236.2	95	79.6	135
36.86K	-24	4500	16	863.3	56	229.3	96	77.6	136
34.73K	-23	4297	17	832.2	57	222.6	97	75.8	137
32.74K	-22	4105	18	802.3	58	216.1	98	73.9	138
30.87K	-21	3922	19	773.7	59	209.8	99	72.2	139
29.13K	-20	3748	20	746.3	60	203.8	100	70.4	140
27.49K	-19	3583	21	719.9	61	197.9	101	68.8	141
25.95K	-18	3426	22	694.7	62	192.2	102	67.1	142
24.51K	-17	3277	23	670.4	63	186.8	103	65.5	143
23.16K	-16	3135	24	647.1	64	181.5	104	64.0	144
21.89K	-15	3000	25	624.7	65	176.4	105	62.5	145
20.70K	-14	2872	26	603.3	66	171.4	106	61.1	146
19.58K	-13	2750	27	582.6	67	166.7	107	59.6	147
18.52K	-12	2633	28	562.8	68	162.0	108	58.3	148
17.53K	-11	2523	29	543.7	69	157.6	109	56.8	149
								55.6	150

Temperature calculated using:

Steinhart-Hart Linearization

$$T_c = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

3000 Ohm @ 25C NTC Thermistor

C₀= 0.0014051

C₁= 0.0002369

C₃= 0.0000001019

lnR= Natural Log of Resistance

T_c= Temperature in °C



R S T INSTRUMENTS LTD.

200 - 2050 Hartley Avenue
Coquitlam BC V3K 6W5
Phone: (604) 540-1100 Ext.
Fax: (604) 540-1005

www.rstinstruments.com



Quote

Q019160

CUSTOMER NO.

SRKRO1

BILL TO:

STEFFEN, ROBERTSON & KIRSTEN
OCEANIC PLAZA
2200 - 1066 WEST HASTINGS ST.
VANCOUVER BC V6E 3X2
(604) 681-4196 Ext.

SHIP TO:

STEFFEN, ROBERTSON & KIRSTEN
OCEANIC PLAZA
2200 - 1066 WEST HASTINGS ST.
VANCOUVER BC V6E 3X2
(604) 681-4196 Ext.
LOWELL WADE, M.SC., P.ENG.

EST. SHIP DATE	SHIP VIA	F.O.B.	TERMS	ORDER NUMBER
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TO BE DETERMINED

Our Dock

NET 30 DAYS

Q019160

ORDER DATE	P.O. NUMBER	SALESPERSON
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15-Feb-11

Rodrigo Camelo

L#	PART NUMBER	DESCRIPTION	QTY.	U/M	UNIT PRICE	TOTAL
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EXTENSION CABLE FOR EXISTING THERMISTOR STRINGS (SERIAL NUMBERS: TS3014 AND TS3025 AS
PER Q017563)

EL380013P

13 PAIR 24 AWG STC, 1xKEVLAR #49, WATER BLOCKED PU JACKET
Cable lengths: 2@110M

220.00 M 12.2500 2,695.00

VW2106-LC

19 PIN CONNECTOR & CAP INSTALLED ON CABLE
EACH CABLE LEAD HAS 1 MALE AND 1 FEMALE CONNECTOR

4.00 EA 106.0000 424.00

ELTM1030

AQUASEAL WATERPROOFING TAPE
ELECTRICAL TAPE SHOULD BE APPLIED ON TOP OF AQUASEAL TAPE

2.00 EA 55.0000 110.00

Validity of quote: 60 Days

Estimated delivery: TBA

Subject to RST Instruments Sales Terms and Conditions

(<http://www.rstinstruments.com/StandardTerms.pdf>).

NET AMOUNT	3,229.00
BC 12% HST	387.48
TOTAL DUE	3,616.48

CDN DOLLARS

Memo

To:	Mark Valeriotte, Greg Blaylock	Date:	February 18, 2011
cc:	Lowell Wade, Iozsef Miskolczi	From:	John Kurylo, Maritz Rykaart
Subject:	Hope Bay Project – North Dam Additional Excavation of Massive Surface Ice	Project #:	1CH008.033

Visual inspection of the upstream and downstream slopes of the key trench at chainage 0+95 to 1+00 confirms the presence of a zone of massive surface ice, as much as 0.5 m thick and about 4 to 6 m in width. It has been noted in the field that thinner lenses of ice interlaced with layers of ice saturated alluvium extend to a depth of about 1.5 m below ground; this is above the invert level of the key trench. Reconnaissance inspection suggests that the surface ice follows along the Tail Lake Creek course, and therefore its presence is directly related to the normal flow of the Creek. Due to the direct correlation to the Creek it is estimated that this zone of surface ice should be approximately constrained around the vicinity of chainage 0+80 to 1+00. If this ice remains in place, and should it thaw, it could lead to local differential settlement of the transition and ROQ zones in this area.

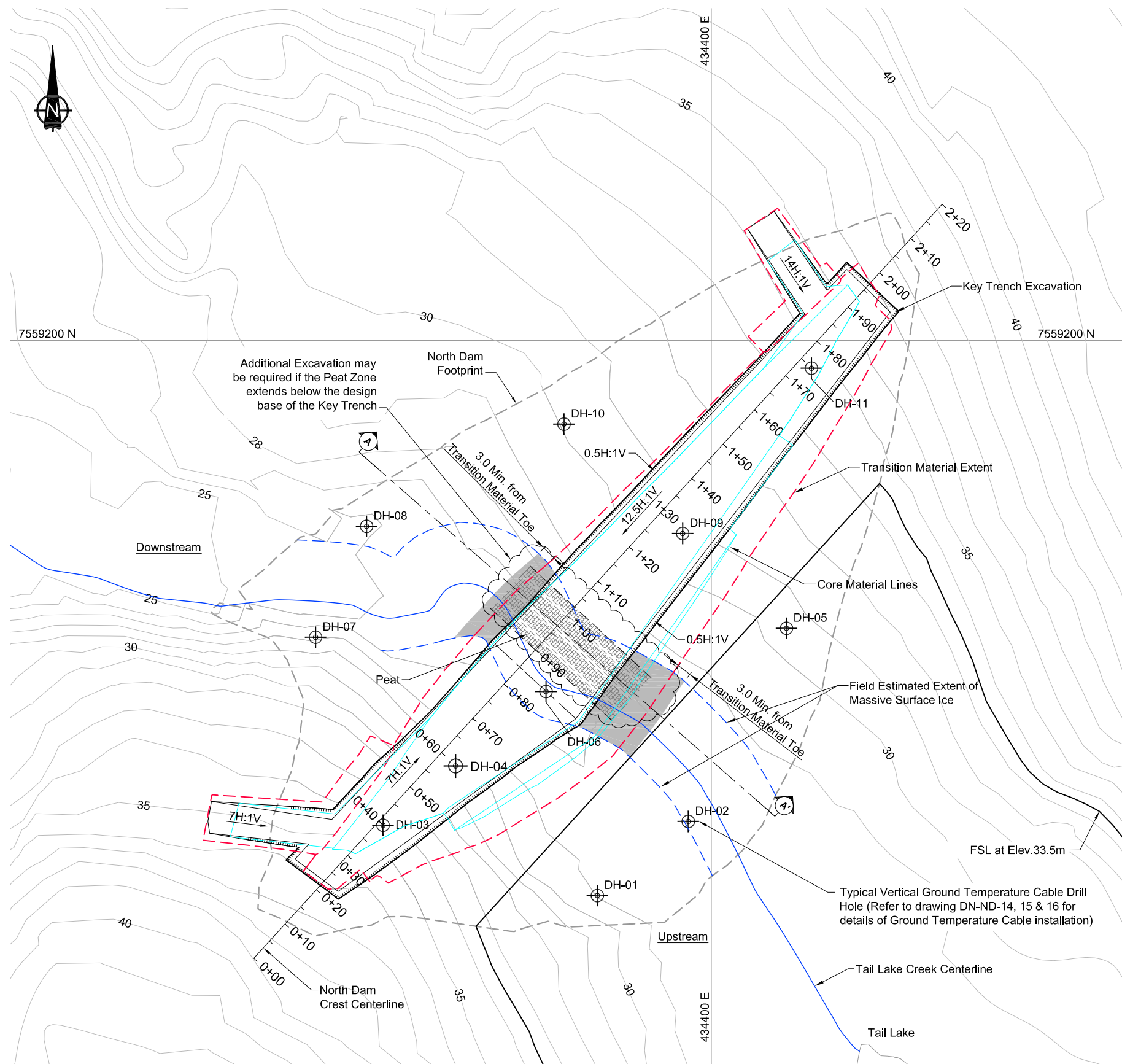
To prevent this settlement from happening, the zones of massive ice needs to be removed and replaced with suitable fill. Rather than using mass excavation techniques, SRK recommends that the ice be visually chased at surface and only relevant section be ripped out. Dental cleaning is not required, with the intent being to remove massive ice rather than smaller lenses of ice less than 10 cm. It should be noted that this ice should be chased to at least 3 m beyond the interface point between the Transition and ROQ zones, both upstream and downstream. Details on the required minimum upstream and downstream extents of this massive surface ice excavation can be found in figure ND-IE1 and ND-IE2.

Core material or out of spec core material (i.e. core reject) is a suitable fill material for the areas where surface ice is encountered outside of the key trench footprint. This material does not have to be placed saturated and compacted. Further details of the required excavation backfilling can be found on figure ND-IE2.

Detailed as-built surveys of the excavated and subsequently backfilled zones must be completed. Final approval of the extent of the excavation will be subject to a visual assessment of the excavated area.

----- END OF MEMO -----

Figures

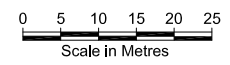


LEGEND

- Estimated Areas where Additional Massive Surface Ice Excavation Required
- Field Estimate of Area where Massive Surface Ice may be Encountered
- Extent of Transitional Material
- Core Material Crest/Toe Lines
- Toe of Dam ROQ

- NOTES**
- The final key trench and massive surface ice extent and depth will be determined in the field by the Engineer.
 - Volume presented is approximate and based on average excavation depth of 1.5m.

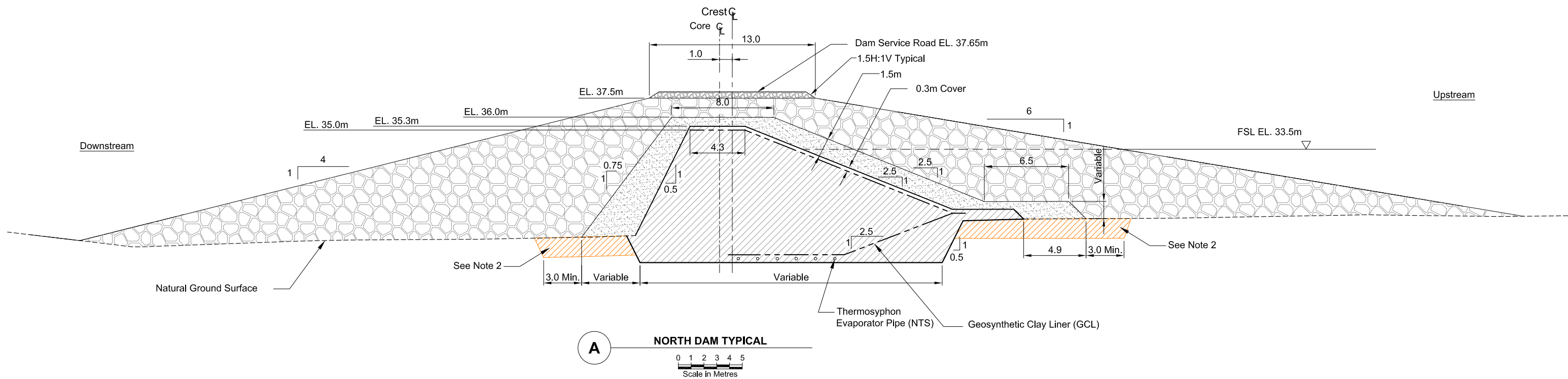
NORTH DAM QUANTITIES		
Item	Unit	Quantity
Estimated Massive Surface Ice Excavation	m³	760



 SRK Consulting Engineers and Scientists Vancouver B.C.	 NEWMONT NORTH AMERICA	Doris North Project		
		North Dam Additional Massive Surface Ice Excavation		
SRK JOB NO.: 1CH008.033 FILE NAME: 1CH008_033-Excavation Plan.dwg	HOPE BAY MINING LTD.	DATE: Feb. 18, 2011	APPROVED: JK/EMR	FIGURE: ND-IE1

J:\01_SITES\Hope Bay\UCAD\2010 Drawings\NorthDam\2010\1CH008_033-Excavation Plan.dwg

J:\01_SITES\Hope Bay\ACAD\2010 Drawings\North Dam\2010\1CH008_033-Excavation Section.dwg



LEGEND	
-----	Natural Ground
- - - - -	Geosynthetic Clay Liner (GCL)
	Core Material
	Transition Material
	Run of Quarry (ROQ)
	Surfacing Material
	Bedrock
	Peat
o	Thermosyphon Evaporator Pipe (NTS)

- NOTES**
1. The final key trench and massive surface ice extent and depth will be determined in the field by the Engineer.
 2. Surface ice and ice lenses to be excavated within this area, if encountered. Excavation is to be backfilled with core or out of spec. core material (ie. core reject). Material is not required to be saturated.

 SRK Consulting Engineers and Scientists Vancouver B.C.	 NEWMONT NORTH AMERICA	Doris North Project		
		North Dam Section Additional Massive Ice Excavation		
SRK JOB NO.: 1CH008.033	HOPE BAY MINING LTD.	DATE:	APPROVED:	FIGURE:
FILE NAME: 1CH008_033-Excavation Section.dwg		Feb. 18, 2011	JK/EMR	ND-IE2



MEMORANDUM

To: Lowell Wade (SRK), Maritz Rykaart (SRK)
C: Greg Blaylock (JDS), Jerry Graham (JDS), Doug Fielding (JDS)
Date: February 18, 2011
From: Mark Valeriote
RE: North Dam – Key Trench Access Ramp

Please be advised that we intend to excavate (drill and blast) an access ramp into the key trench to expedite construction activities. The access will be created on the downstream side of the key trench in the vicinity of Sta. 0+80. The surveyors will collect survey data to generate an as-built drawing.

The ramp will be backfilled using transition material. The ramp backfill operation will be ongoing while the core within the key trench gains elevation.

Should you wish to discuss this matter please contact me at your convenience.

Mark Valeriote
Construction Manager
JDS Energy & Mining Inc.

Memo

To:	Maritz Rykaart	Date:	February 25, 2011
cc:	Lowell Wade, Iozsef Miskolczi, Megan Miller, File	From:	John Kurylo
Subject:	Hope Bay Project – Core Material PSD Testing and Stockpile Volumes	Project #:	1CH008.033

This memorandum details the history of the North Dam core material development and testing, up until February 23rd, 2011.

In 2010 particle size distribution (PSD) testing was completed on the ¾” crush material to determine if the onsite material would be suitable as frozen core dam material. Between October and November 2010 the sampling and PSD test frequency was increased and the ¾” material was assessed in detail. At the end of the 2010 construction season the material being produced by the crusher was low in fines (out of SRK specification) and thus was deemed as unacceptable frozen core material. Results from the 2010 PSD testing of the ¾” crush are shown in Figure 1.

At the start of January 2011 a new crushing strategy was developed on site. On January 6th Nuna commenced production of an angular ($1/16$ ”) sand sized material at the Quarry #2 crusher. This sand size crushed material is referred to herein as the ‘crusher fines’. Nuna QC, with the assistance of EBA Yellowknife, collected and tested crusher fines samples from January 6th to 8th. Results from the crusher fines PSD testing are presented as Figure 2.

Based on favourable PSD results from EBA Yellowknife ‘theoretical lab blends’, a blend of 60% ¾” crush material with 40% crusher fines material, the crushing strategy was further refined. From January 9th to January 11th various combinations/blends of ROQ with crusher fines were tested. Primarily the following ratios were utilized by the loader when feeding the crusher:

- 1 bucket ROQ to 1 bucket of crusher fines; and
- 2 bucket of ROQ to 1 bucket of crusher fines.

Details of the exact ratios/blends utilized from January 9th and 10th are not detailed on the lab testing sheets. Results from the January 9th to 11th core blend trials are presented as Figure 3.

On January 12th, based on the PSD trial blend results, the strategy of utilizing 2 buckets of ROQ to every 1 bucket of crusher fines was agreed upon by Nuna and JDS. From January 12th to 16th the crusher produced and stockpiled 4,310 m³ of frozen core material at Quarry #2. Results of the January PSD testing are presented as Figure 3.

SRK mobilized to site on January 12th, 2011. From January 1st to January 12th SRK did not have a full-time engineering representative on site. Upon arrival to site it was communicated by Nuna that all failing material, i.e. 2010 material and material producing during the core blend trials, was not included in the core material stockpile. A reject core material pile, separate from the main core material stockpile, was observed on the

January 13th field inspections. No detailed records of the construction/early development of these two piles (core material and crusher fines) were available.

On January 16th the crusher fines pile was exhausted and the crusher switched back to producing the crusher fines material. Fines were produced until the crusher went down on the January 21st night shift with electrical issues, due to cold weather conditions. The crusher remained out of service until it was repaired on January 31st. The crusher fines production was recommenced and continued, with minor delays, until February 18th. On February 19th Nuna and JDS personnel determined that enough fines were available to blend with ROQ to produce the remainder of the frozen core material. On February 19th the crusher switched to producing frozen core material.

As of February 2011 the SRK/EBA team has been completing all PSD testing at the onsite lab facilities. Results of the February 2011 PSD testing are outlined in Figure 4.

A summary of all 2011 core material testing is presented in Table 1. Further, Table 2 and 3 summarize (by date, volume and number of PSD tests) the development of the Quarry #2 and Frozen Core Plant Pad core material stockpiles. As of February 23rd 8,233 m³ of frozen core material had been produced on site.

Overall the required crusher PSD testing/sampling frequency during the frozen core material production has been upheld, excluding 530 m³ that was produced on February 18th. This being stated until February 22nd the differentiation between QA and QC samples was not well defined.

At the Frozen Core Plant Pad area only one PSD sample has been tested. To meet the requirements outlined in the most recent SRK technical specifications, revision E, the testing frequency will need to be increased at the Frozen Core Plant Pad.

The individual 2011 laboratory test reports are included as Attachment 1.

----- END OF MEMO -----

Table 1: Hope Bay 2011 PSD Testing Tracking Table

File Last Updated:24-Feb-11

Date Tested	Date Sample Collected	Location/ Area	Material Type	Type of Test	QA or QC	Sample ID/ Name	Notes	Results Draft or Final	Tet Location
6-Jan-11	6-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 001 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
6-Jan-11	6-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 002 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
6-Jan-11	6-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 001	Belt sample, Quarry 2 Crusher; taken at 09:00	Final	On-Site Lab
6-Jan-11	6-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 002	Belt sample, Quarry 2 Crusher; taken at 16:00	Final	On-Site Lab
7-Jan-11	7-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 003 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
7-Jan-11	7-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 004 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
7-Jan-11	7-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 003	Belt sample, Quarry 2 Crusher; taken at 09:00	Final	On-Site Lab
7-Jan-11	7-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 004	Belt sample, Quarry 2 Crusher; taken at 16:00	Final	On-Site Lab
8-Jan-11	8-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 005 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
8-Jan-11	8-Jan-11	Crusher	Theoretical Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Blend 006 - Theoretical Blend	Exact date is not detailed in Lab Sheet, 60:40 mix	Final	On-Site Lab
8-Jan-11	8-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 005	Belt sample, Quarry 2 Crusher; taken at 09:00	Final	On-Site Lab
8-Jan-11	8-Jan-11	Crusher	Crusher Fines	PSD/ Moisture	QC	Nuna - 0.06 Crush Sample Sieve 006	Belt sample, Quarry 2 Crusher; taken at 14:00	Final	On-Site Lab
9-Jan-11	9-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 007	Belt sample, Quarry 2 Crusher; taken at 10:00	Final	On-Site Lab
9-Jan-11	9-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 008	Belt sample, Quarry 2 Crusher; taken at 21:00	Final	On-Site Lab
10-Jan-11	10-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 009	Belt sample, Quarry 2 Crusher; taken at 14:00	Final	On-Site Lab
11-Jan-11	11-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 010	Belt sample, Quarry 2 Crusher	Final	On-Site Lab
11-Jan-11	11-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 011	Belt sample, Quarry 2 Crusher; taken at 13:00	Final	On-Site Lab
12-Jan-11	12-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 012	Belt sample, Quarry 2 Crusher	Final	On-Site Lab
12-Jan-11	12-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 013	Belt sample, Quarry 2 Crusher; taken at 13:00	Final	On-Site Lab
13-Jan-11	13-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 014	Belt sample, Quarry 2 Crusher	Final	On-Site Lab
13-Jan-11	13-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 015	Belt sample, Quarry 2 Crusher; taken at 13:00	Final	On-Site Lab
14-Jan-11	14-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 016	Belt sample, Quarry 2 Crusher	Final	On-Site Lab
14-Jan-11	14-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 017	Belt sample, Quarry 2 Crusher; taken at 11:00	Final	On-Site Lab
16-Jan-11	16-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 018	Belt sample, Quarry 2 Crusher; taken at 02:00	Final	Yellowknife
16-Jan-11	16-Jan-11	Crusher	Core	PSD/ Moisture	QC	Nuna - 0.75 Crush Sample Sieve 019	Belt sample, Quarry 2 Crusher; taken at 13:00	Final	Yellowknife
16-Feb-11	15-Feb-11	Frozen Core Plant	Core	PSD/ Moisture	QA	HB-FCP-CORE-PSD 01-QA-20110215	Stockpile, 35m N of Frozen Core Plant	Draft	On-Site Lab
19-Feb-11	19-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 02-QA-20110219	Belt sample, Quarry 2 Crusher	Draft	On-Site Lab
19-Feb-11	19-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 03-QC-20110219	Belt sample, Quarry 2 Crusher	Draft	On-Site Lab
20-Feb-11	20-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 04-QA-20110220	Belt sample, Quarry 2 Crusher; taken at 02:30 Hrs	Draft	On-Site Lab
20-Feb-11	20-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 05-QA-20110220	Belt sample, Quarry 2 Crusher; taken at 05:00 Hrs	Draft	On-Site Lab
20-Feb-11	20-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 06-QC-20110220	Belt sample, Quarry 2 Crusher; taken at 11:00 Hrs	Draft	On-Site Lab
20-Feb-11	20-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 07-QC-20110220	Belt sample, Quarry 2 Crusher; taken at 17:00 Hrs	Draft	On-Site Lab
21-Feb-11	21-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 08-QA-20110221	Stockpile, Quarry 2 Crusher; taken at 01:00 Hrs	Draft	On-Site Lab
22-Feb-11	22-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 09-QC-20110222	Belt sample, Quarry 2 Crusher; taken at 11:00 Hrs	Draft	On-Site Lab
22-Feb-11	22-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 10-QC-20110222	Belt sample, Quarry 2 Crusher; taken at 17:00 Hrs	Draft	On-Site Lab
23-Feb-11	23-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 11-QA-20110223	Stockpile, Quarry 2 Crusher; taken at 03:00 Hrs	Draft	On-Site Lab
23-Feb-11	23-Feb-11	Crusher	Core	PSD/ Moisture	QA	HB-CR-CORE-PSD 12-QA-20110223	Belt sample, Quarry 2 Crusher; taken at 05:00 Hrs	Draft	On-Site Lab
23-Feb-11	23-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 13-QC-20110223	Belt sample, Quarry 2 Crusher; taken at 11:00 Hrs	Draft	On-Site Lab
23-Feb-11	23-Feb-11	Crusher	Core	PSD/ Moisture	QC	HB-CR-CORE-PSD 14-QC-20110223	Belt sample, Quarry 2 Crusher; taken at 17:00 Hrs	Draft	On-Site Lab

Table 2: Frozen Core Material Tracking (Crusher Production)

Date	11-Jan-11	12-Jan-11	13-Jan-11	14-Jan-11	16-Jan-11	18-Feb-11	19-Feb-11	20-Feb-11	21-Feb-11	22-Feb-11	23-Feb-11
From Nuna Dailies (m³)	312	587	958	512	475	529	754	504	79	945	1,112
From Nuna Survey (m³)	Survey Correction = 4,310										
Total Volume to Date (m³)	8,233										
# of PSD Tests Performed on Crusher Samples	2	2	2	2	2	0	2	4	1	2	4

Table 3: Frozen Core Material Hauled to Frozen Core Plant Pad

Date	5-Feb-11	6-Feb-11	7-Feb-11	8-Feb-11	9-Feb-11	10-Feb-11	15-Feb-11	20-Feb-11	21-Feb-11	22-Feb-11	23-Feb-11
From Nuna Daily Haul Sheets (m³)	12	1,111	0	319	1,846	354	0	634	1,309	397	200
Total Volume to Date (m³)	6,182										
# of PSD Tests Performed on FCP Pad Stockpile							1				

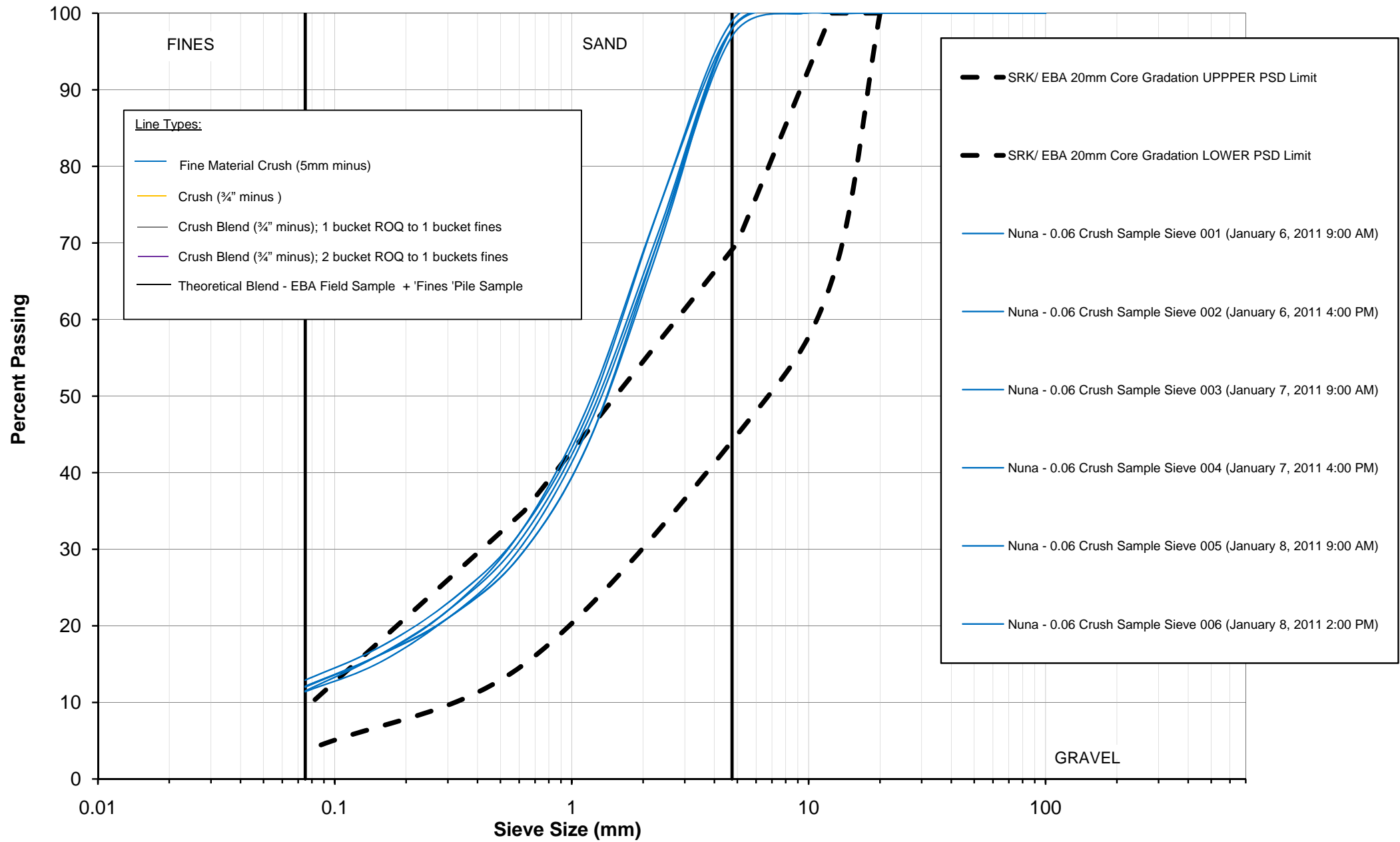
Figures

GRAIN SIZE DISTRIBUTION

Figure. 2

DESCRIPTION:	PSD Plots
COMMENTS:	Development of 2011 Quarry #2 Crusher Material
	- All Nuna PSD results for 'crusher fines' are plotted on this figure
	- Plotted/last updated on Feb. 24, 2011

PROJECT #:	1CH008.033
CLIENT/PROJECT:	Newmont
LOCATION:	Doris North, Nunavut
SITE:	Hope Bay - Quarry #2 Crusher



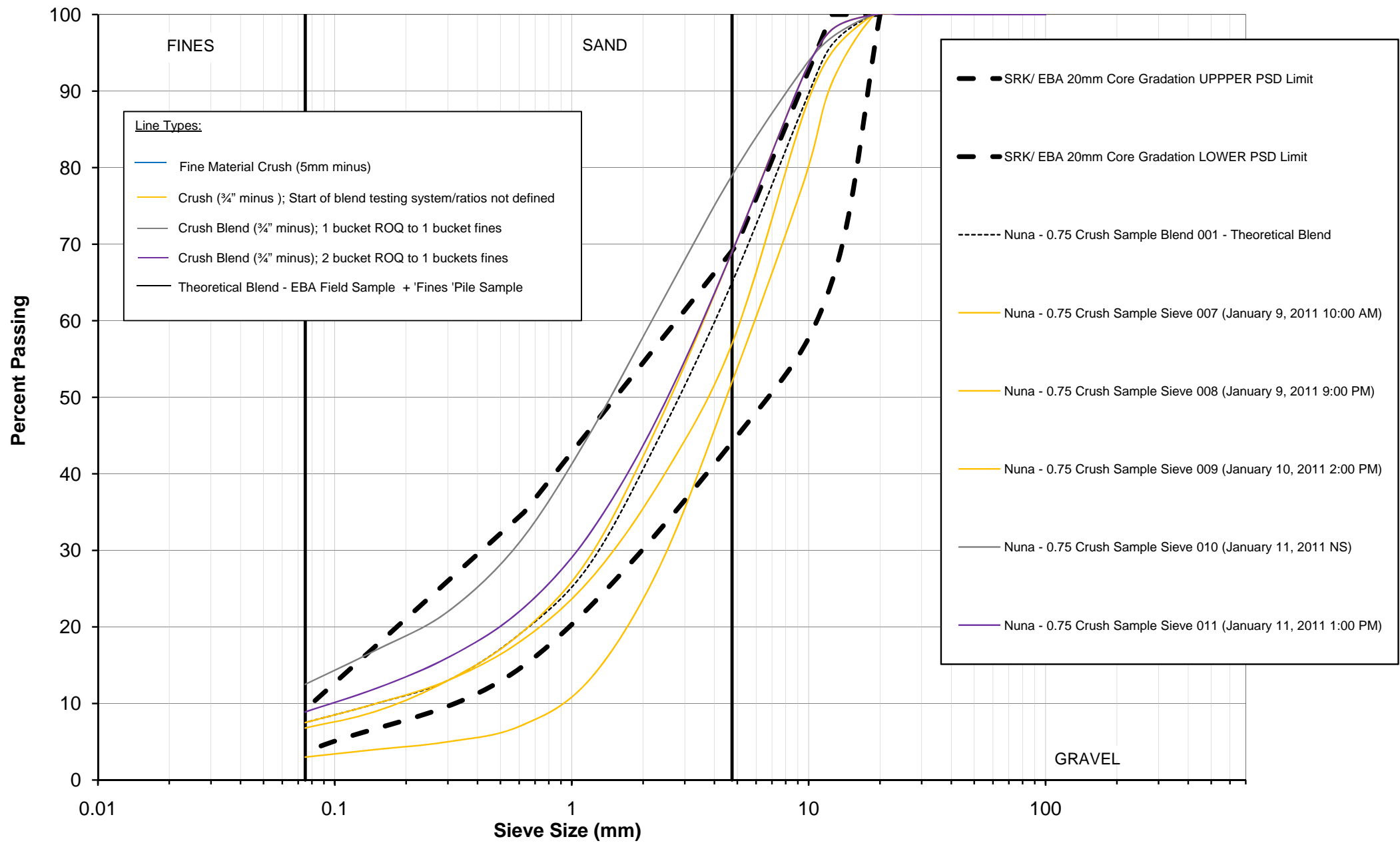
Note: This Figure has been plotted as an internal SRK tool to assist in visualizing the % passing data presented in the preliminary PSD testing results. EBA lab PSD sheets can be referenced for official results.

GRAIN SIZE DISTRIBUTION

Figure. 3

DESCRIPTION: PSD Plots
COMMENTS: Development of 2011 Quarry #2 Crusher Material
- All Nuna PSD blend trial results for 2011 are plotted on this figure
- Plotted/last updated on Feb. 24, 2011

PROJECT #: 1CH008.033
CLIENT/PROJECT: Newmont
LOCATION: Doris North, Nunavut
SITE: Hope Bay - Quarry #2 Crusher



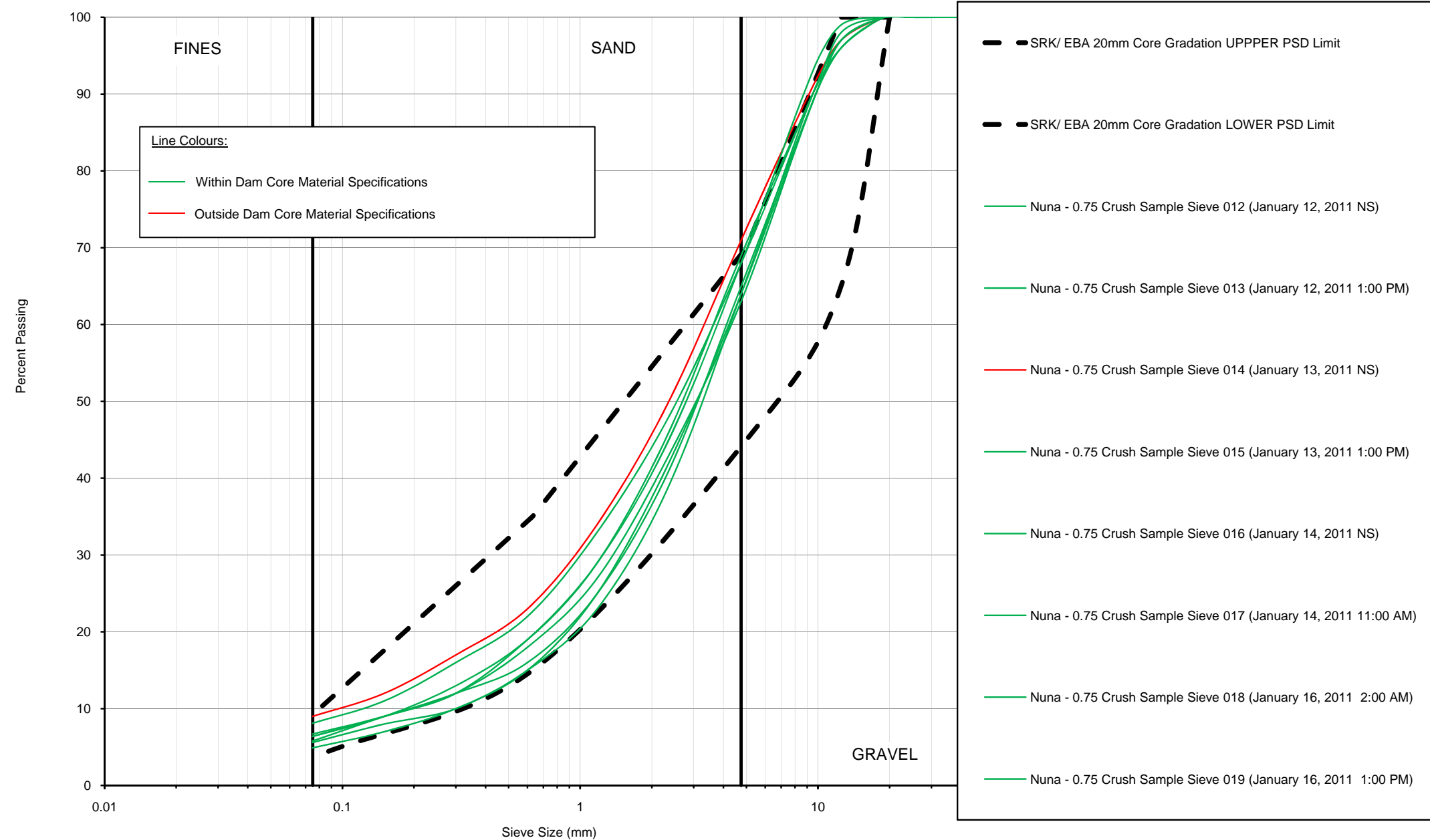
Note: This Figure has been plotted as an internal SRK tool to assist in visualizing the % passing data presented in the preliminaly PSD testing results. EBA lab PSD sheets can be referenced for official results.

GRAIN SIZE DISTRIBUTION

Figure. 4

DESCRIPTION: 3/4" PSD Plots
COMMENTS: Dam Core Material Testing/ QC & QA
- All Jan 2011 Core PSD testing is plotted on this Figure
- Plotted on Feb 24, 2011

PROJECT #: 1CH008.033
CLIENT/PROJECT: Newmont
LOCATION: Doris North, Nunavut
SITE: Hope Bay - Quarry #2 Crusher



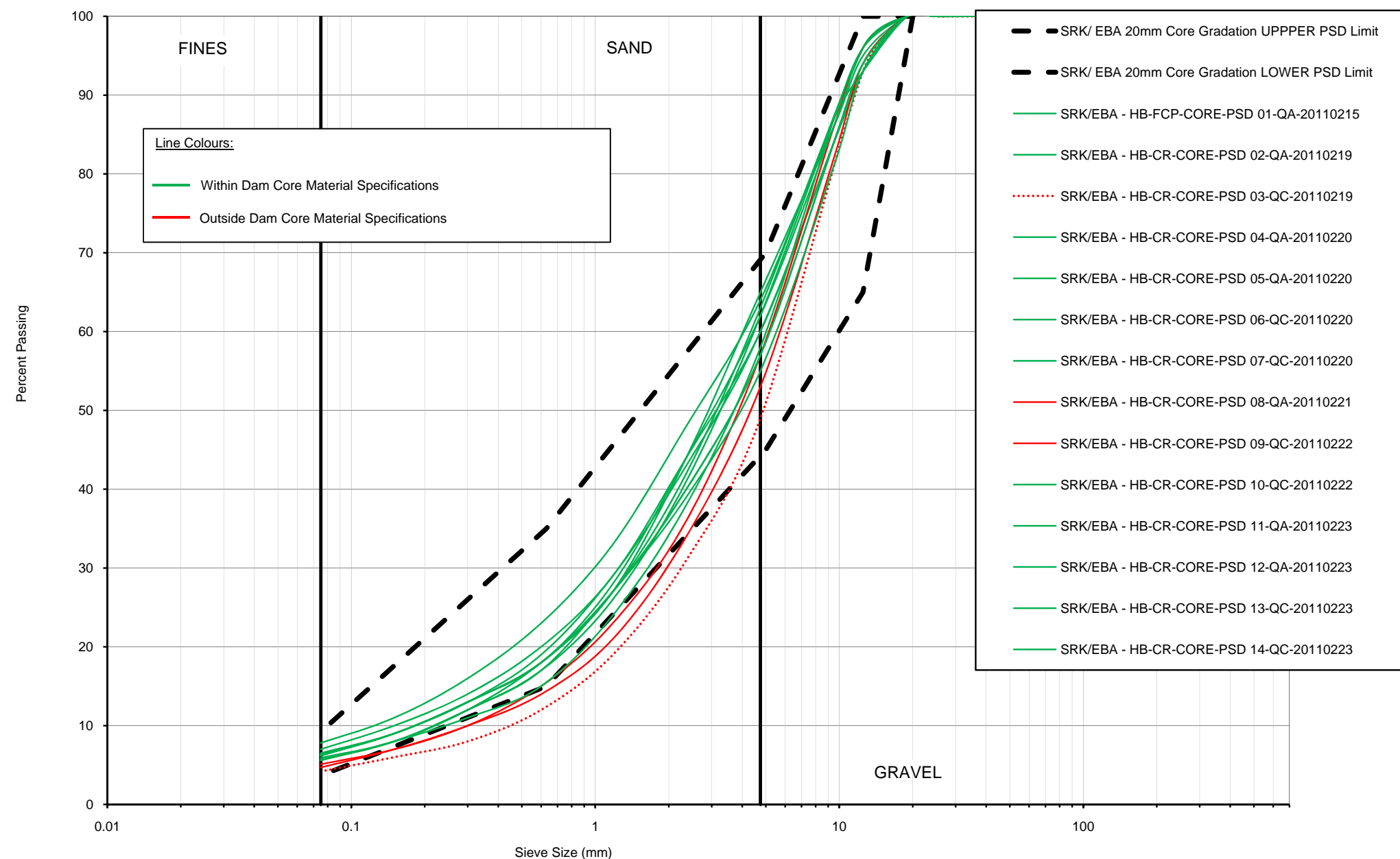
Note: This Figure has been plotted as an internal SRK tool to assist in visualizing the % passing data presented in the preliminary PSD testing results. EBA lab PSD sheets can be referenced for official results.

GRAIN SIZE DISTRIBUTION

Figure. 5

DESCRIPTION: 3/4" PSD Plots
COMMENTS: Dam Core Material Testing/ QC & QA
- Feb 2011 Core PSD testing is plotted on this Figure
- Plotted on Feb 24, 2011

PROJECT #: 1CH008.027
CLIENT/PROJECT: Newmont
LOCATION: Doris North, Nunavut
SITE: Hope Bay - Quarry #2 Crusher



Note: This Figure has been plotted as an internal SRK tool to assist in visualizing the % passing data presented in the preliminary PSD testing results. EBA lab PSD sheets can be referenced for official results.

Attachment 1
2011 PSD Test Data

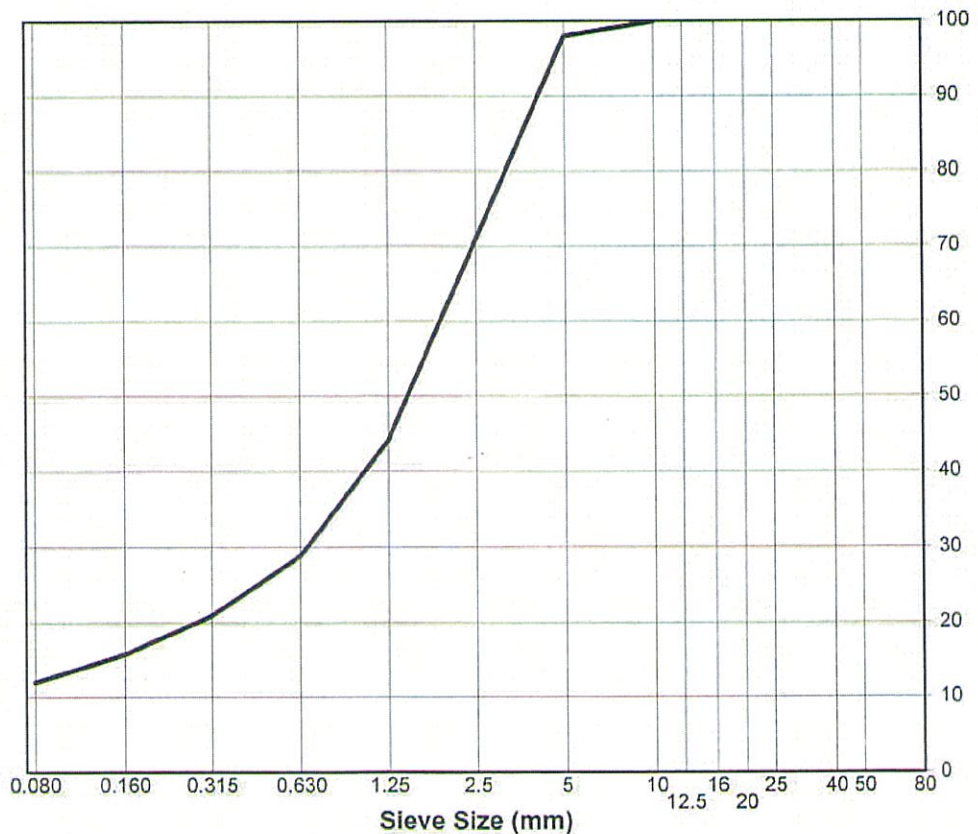
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - some fines, trace gravel
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 1
Date Received: January 6, 2011
Sample Time: 9:00 AM
Sampled by: AJC
Date Tested: January 6, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 6.4%
Screen(s) size: 5/8 " and 3/16 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	98
2.5	71
1.25	44
0.630	29
0.315	21
0.160	16
0.080	12.0



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus)

Reviewed By:  P.Eng.

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SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002

Project: Doris North - North Dam

Client: Nuna Logistics Ltd.

Attention: Bradford Watkin QA/QC Manager

Dan Buriac QA/QC Coordinator

Description: SAND - gravelly, trace fines

Source: Quarry 2

Supplier: Nuna Logistics Ltd.

Sample Location: Belt

Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: Theoretical Blend 1

Date Received:

Sample Time:

Sampled by:

Date Tested:

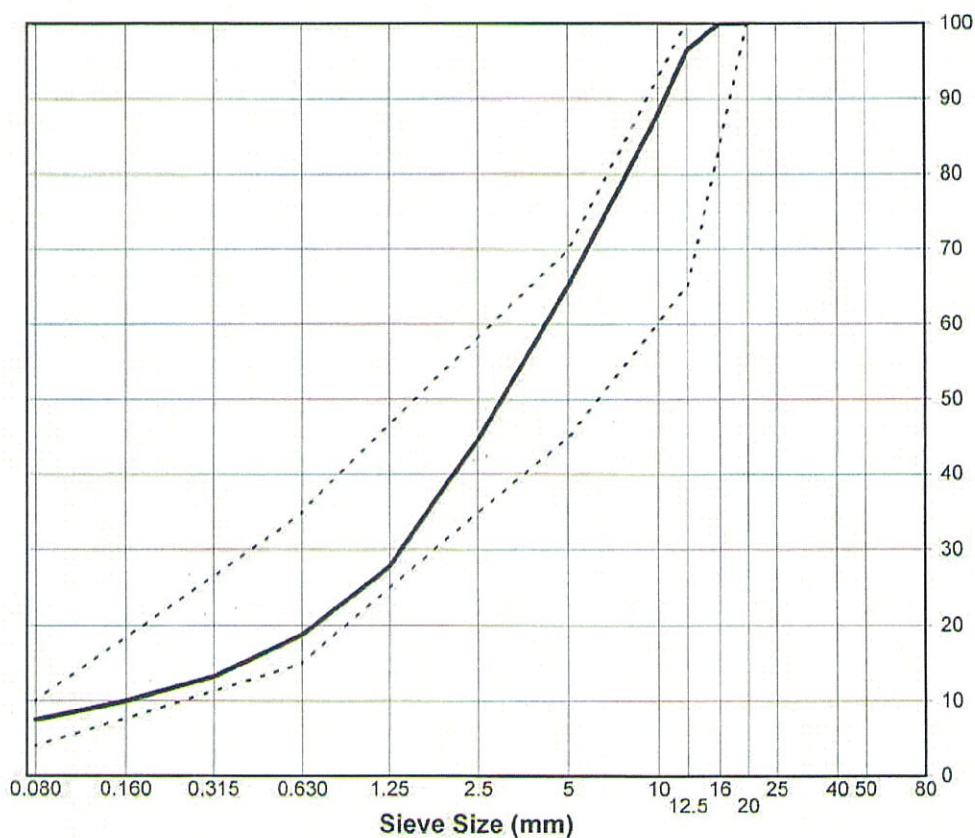
Tested by: AJC Office: Site

Moisture Content (as received):

Screen(s) size:

Cone Type:

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	88
5	65
2.5	45
1.25	28
0.630	19
0.315	13
0.160	10
0.080	7.5



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 1 and EBA Sample 5426. (60% 20 mm minus crush, 40 % 5 mm crush)

Reviewed By:  P.Eng.

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SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002

Project: Doris North - North Dam

Client: Nuna Logistics Ltd.

Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator

Description: SAND - some fines, trace gravel

Source: Quarry 2

Supplier: Nuna Logistics Ltd.

Sample Location: Belt

Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 2

Date Received: January 6, 2011

Sample Time: 4:00 PM

Sampled by: AJC

Date Tested: January 6, 2011

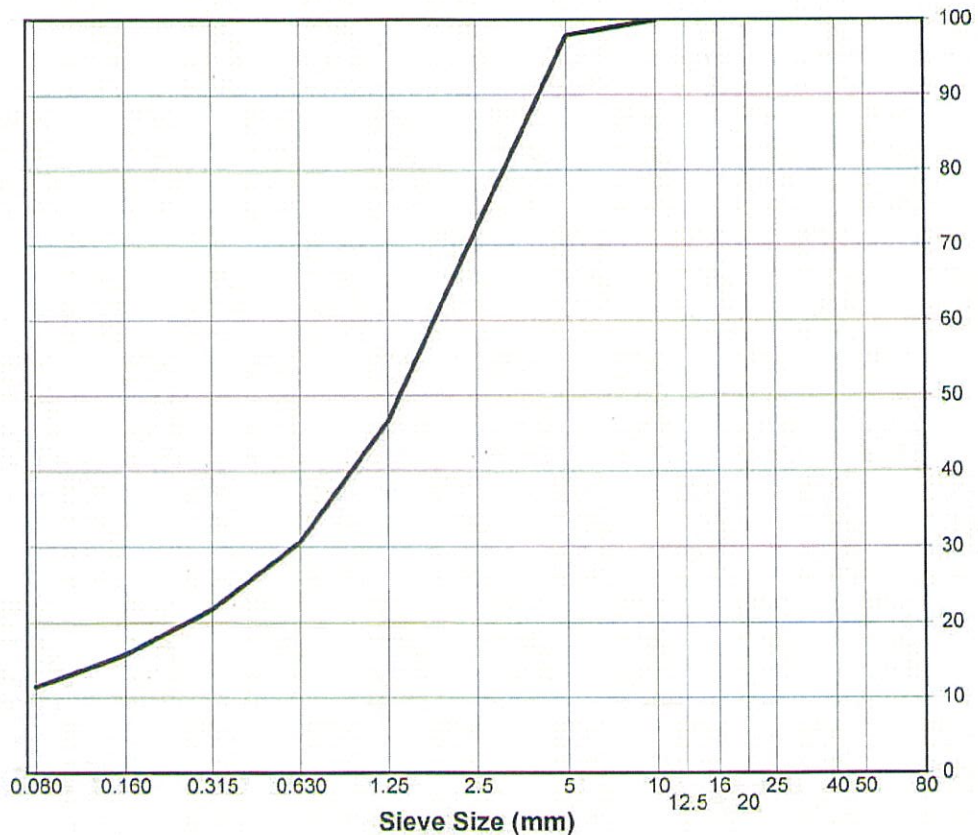
Tested by: AJC Office: Site

Moisture Content (as received): 10.1%

Screen(s) size: 5/8 " and 3/16 "

Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	98
2.5	72
1.25	47
0.630	31
0.315	22
0.160	16
0.080	11.5



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus)

Reviewed By:  P.Eng.

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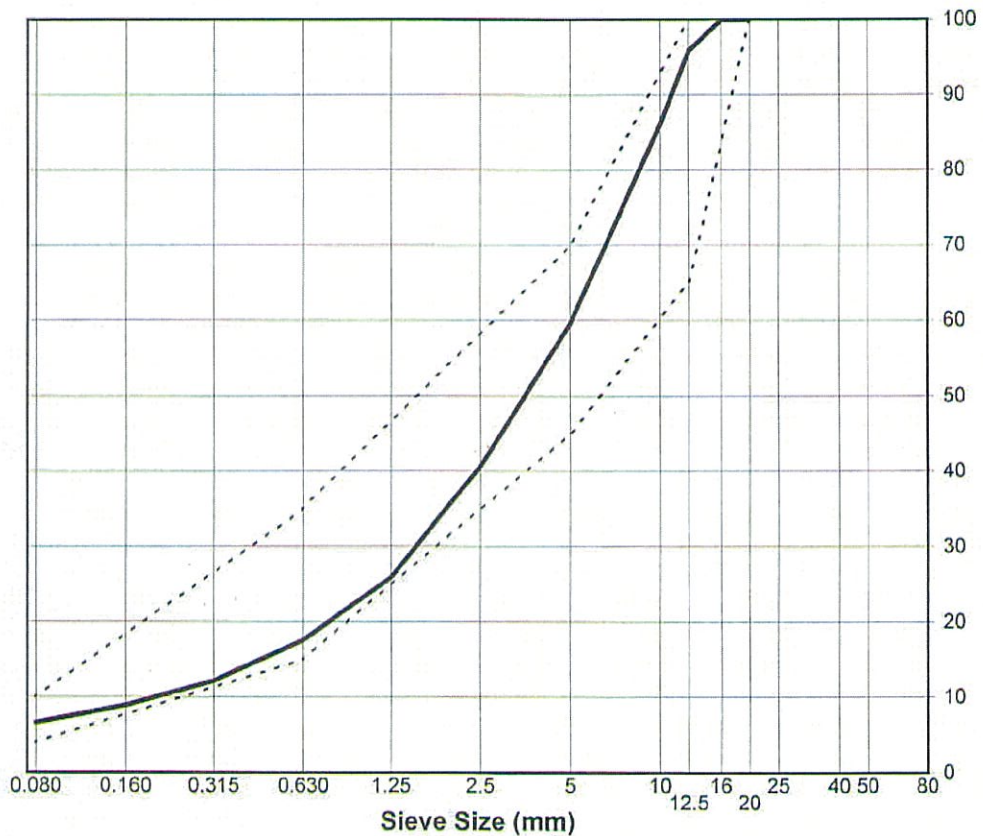
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND AND GRAVEL - trace fines
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: Theoretical Blend 2
Date Received:
Sample Time:
Sampled by:
Date Tested:
Tested by: AJC Office: Site
Moisture Content (as received):
Screen(s) size:
Cone Type:

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	86
5	59
2.5	41
1.25	26
0.630	18
0.315	12
0.160	9
0.080	6.6



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 2
and EBA Sample 5426. (60% 20 mm minus crush, 40 % fine crush)

Reviewed By:  P.Eng.

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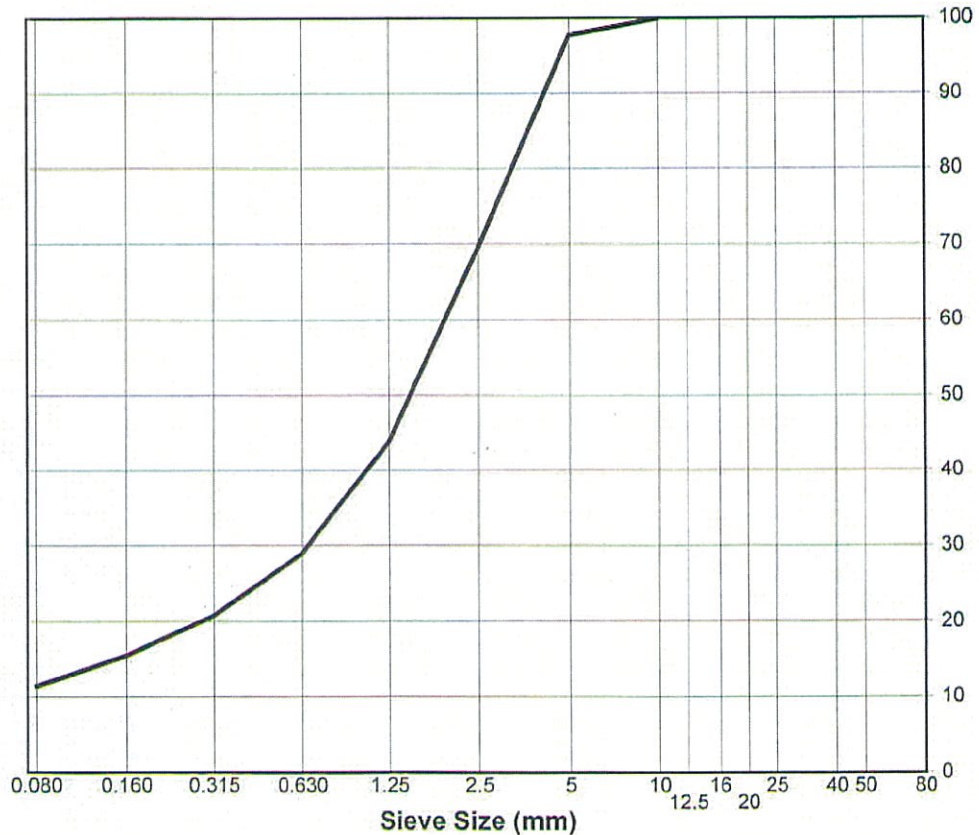
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - some fines, trace gravel
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 3
Date Received: January 7, 2011
Sample Time: 9:00 AM
Sampled by: AJC
Date Tested: January 7, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 3.1%
Screen(s) size: 5/8 " and 3/16 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	98
2.5	70
1.25	44
0.630	29
0.315	21
0.160	15
0.080	11.4



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus)

Reviewed By:  P.Eng.

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SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002

Sample No.: Theoretical Blend 3

Project: Doris North - North Dam

Date Received:

Client: Nuna Logistics Ltd.

Sample Time:

Attention: Bradford Watkin QA/QC Manager

Sampled by:

Dan Buriac QA/QC Coordinator

Date Tested:

Description: SAND - gravelly, trace fines

Tested by: AJC Office: Site

Moisture Content (as received):

Source: Quarry 2

Screen(s) size:

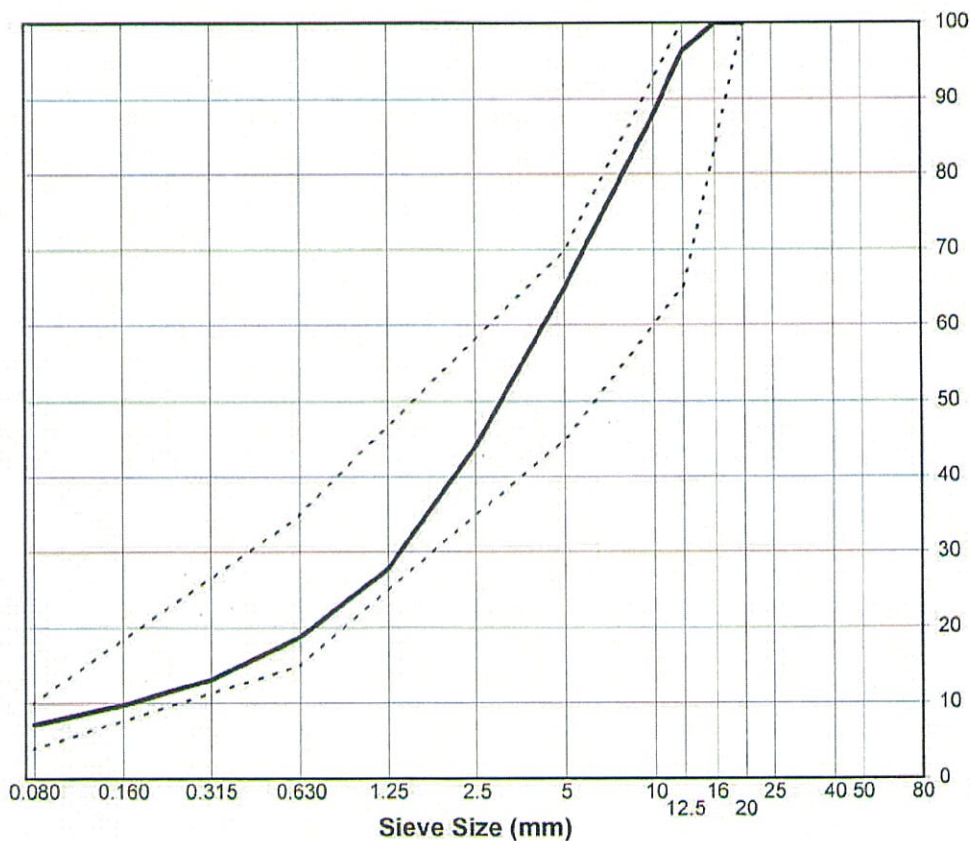
Supplier: Nuna Logistics Ltd.

Cone Type:

Sample Location: Belt

Specification: SRK Consulting - Technical Specification - Revision D

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	88
5	65
2.5	44
1.25	28
0.630	19
0.315	13
0.160	10
0.080	7.2



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 3
and EBA Sample 5426. (60% 20 mm minus crush, 40 % fine crush)

Reviewed By:  P.Eng.

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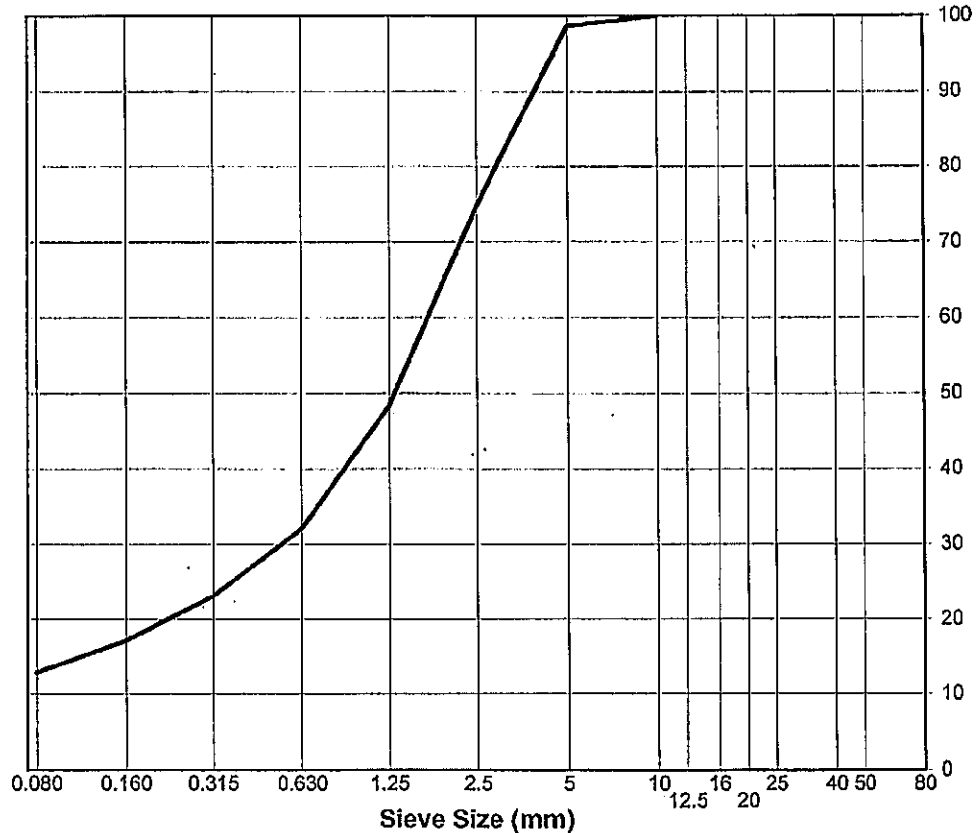
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - some fines, trace gravel
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 4
Date Received: January 7, 2011
Sample Time: 4:00 PM
Sampled by: AJC
Date Tested: January 7, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 2.0%
Screen(s) size: 5/8 " and 3/16 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	99
2.5	75
1.25	48
0.630	32
0.315	23
0.160	17
0.080	12.9



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus)

Reviewed By: _____

P.Eng.

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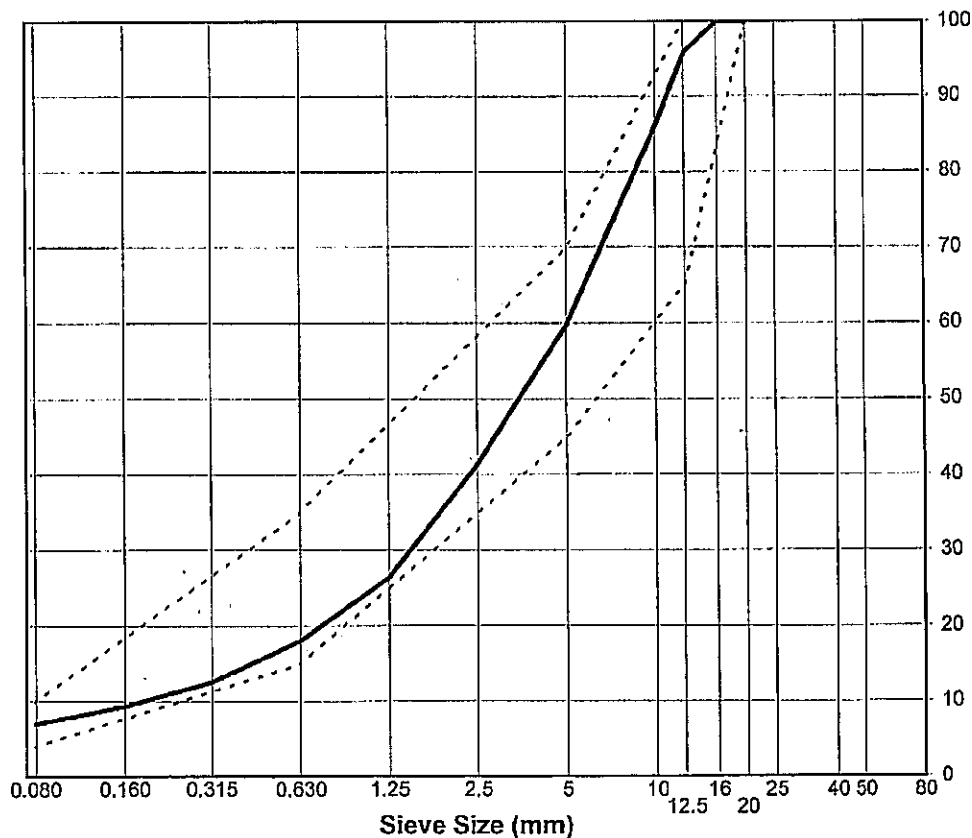
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND AND GRAVEL - trace fines
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: Theoretical Blend 4
Date Received: _____
Sample Time: _____
Sampled by: _____
Date Tested: _____
Tested by: AJC Office: Site
Moisture Content (as received): _____
Screen(s) size: _____
Cone Type: _____

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	86
5	60
2.5	41
1.25	26
0.630	18
0.315	13
0.160	9
0.080	7.0



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 4
and EBA Sample 5426. (60% 20 mm minus crush, 40 % fine crush)

Reviewed By: _____ P.Eng.

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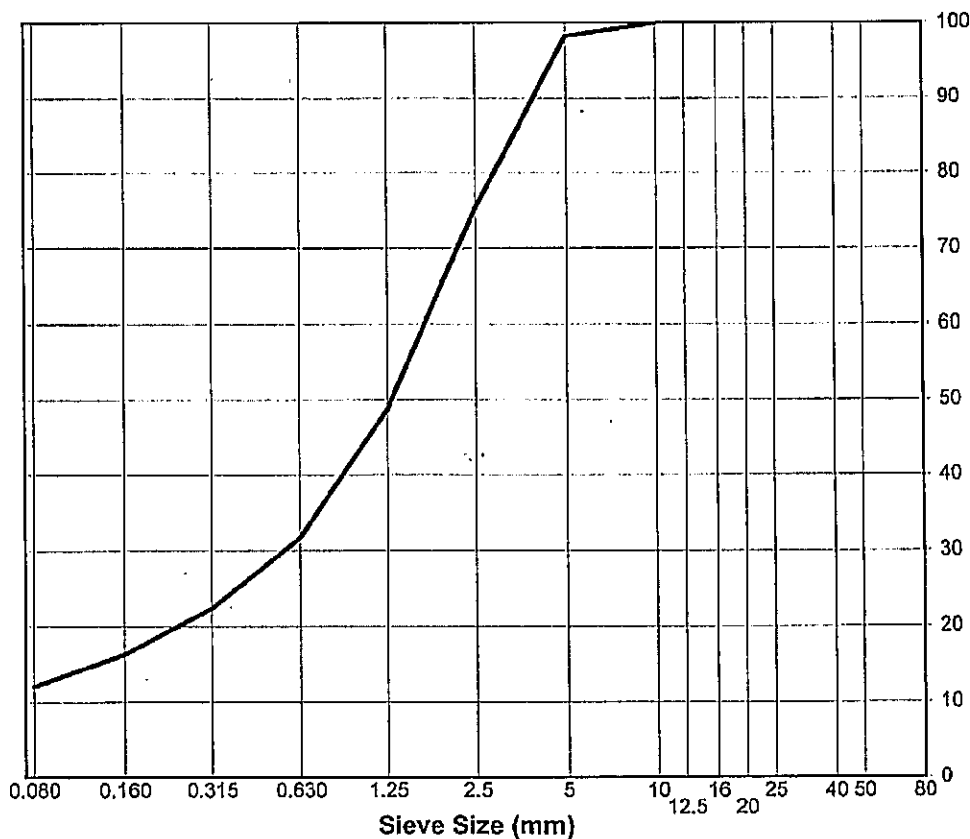
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - some fines, trace gravel
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 5
Date Received: January 8, 2011
Sample Time: 9:00 AM
Sampled by: AJC
Date Tested: January 8, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 2.2%
Screen(s) size: 5/8 " and 3/16 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	98
2.5	75
1.25	49
0.630	32
0.315	22
0.160	16
0.080	12.1



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus)

Reviewed By: _____

P.Eng.

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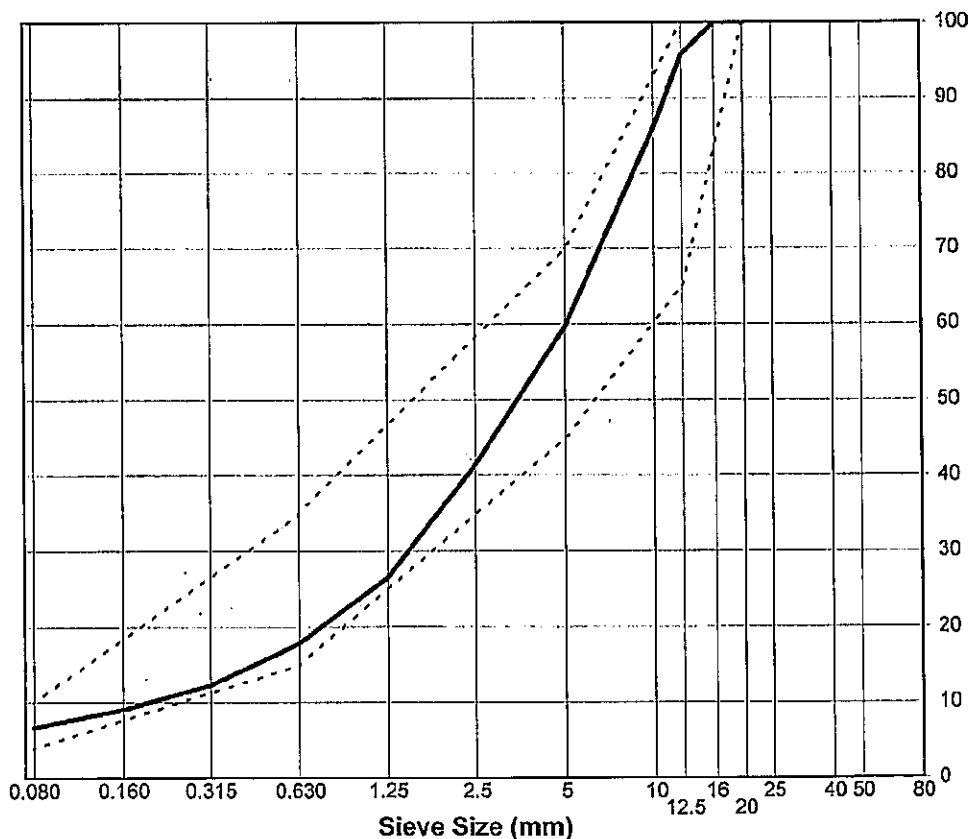
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND AND GRAVEL - trace fines
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: Theoretical Blend 5
Date Received:
Sample Time:
Sampled by:
Date Tested:
Tested by: AJC Office: Site
Moisture Content (as received):
Screen(s) size:
Cone Type:

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	86
5	60
2.5	41
1.25	27
0.630	18
0.315	12
0.160	9
0.080	6.8



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 5
and EBA Sample 5426. (60% 20 mm minus crush, 40 % fine crush)

Reviewed By: _____

P.Eng.

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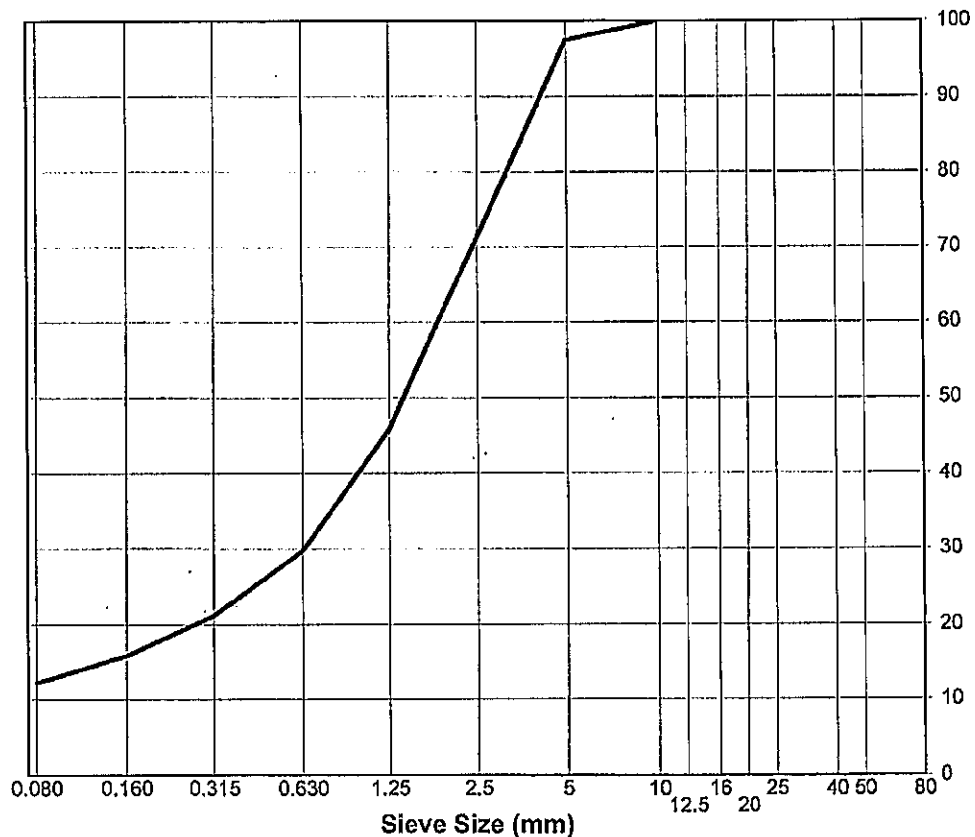
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - some fines, trace gravel
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 6
Date Received: January 8, 2011
Sample Time: 2:00 PM
Sampled by: AJC
Date Tested: January 8, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 7.4%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
10	100
5	97
2.5	71
1.25	46
0.630	30
0.315	21
0.160	16
0.080	12.3



Remarks: January 2011 Crusher Run. Fine material crush. (5 mm minus) Less airborne dust
at quarry from crushing, sample appears more moist than Sample 5 (possible cause of dust reduction).

Reviewed By:  P.Eng.

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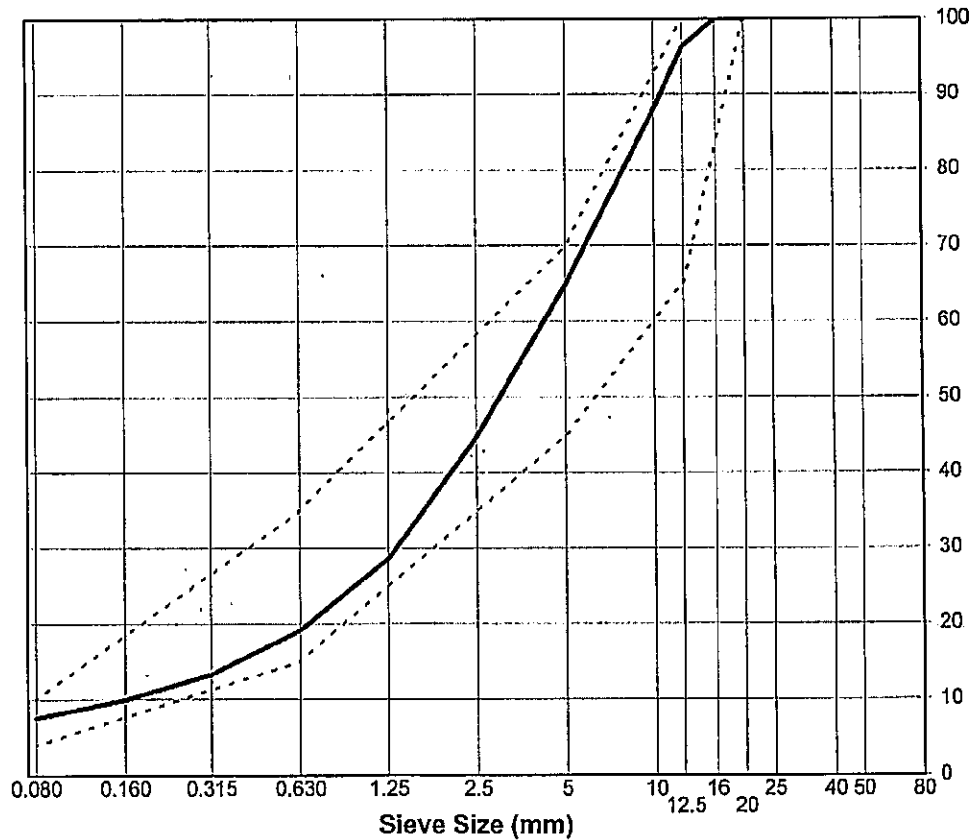
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: Theoretical Blend 6
Date Received: _____
Sample Time: _____
Sampled by: _____
Date Tested: _____
Tested by: AJC Office: Site
Moisture Content (as received): _____
Screen(s) size: _____
Cone Type: _____

Sieve Size	Percent Passing
20	100
16	100
12.5	96
10	88
5	65
2.5	45
1.25	29
0.630	19
0.315	13
0.160	10
0.080	7.6



Remarks: January 2011 Crusher Run. Theoretical Blend of Jan 2011 Sample 6
and EBA Sample 5426. (60% 20 mm minus crush, 40 % fine crush)

Reviewed By: _____ P.Eng.

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SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002

Project: Doris North - North Dam

Client: Nuna Logistics Ltd.

Attention: Bradford Watkin QA/QC Manager

Dan Buriac QA/QC Coordinator

Description: SAND - gravelly, trace fines (silt/clay)

Source: Quarry 2

Supplier: Nuna Logistics Ltd.

Sample Location: Belt

Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 7

Date Received: January 9, 2011

Sample Time: 10:00 AM

Sampled by: AJC

Date Tested: January 9, 2011

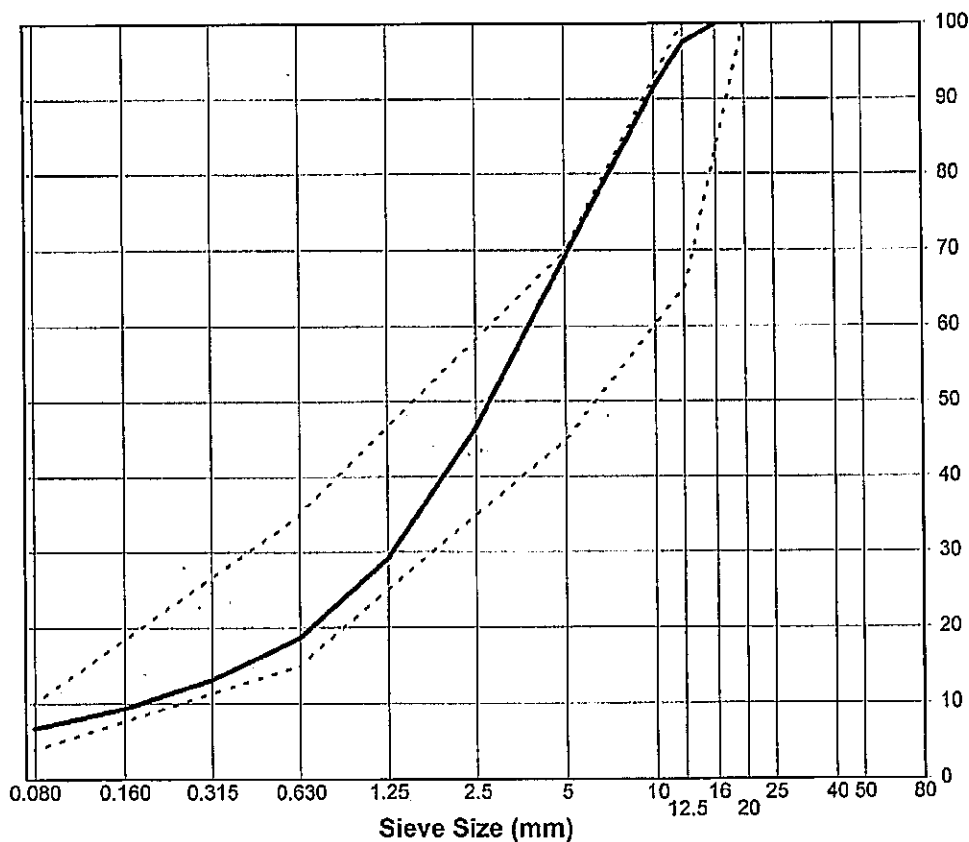
Tested by: AJC Office: Site

Moisture Content (as received): 3.3%

Screen(s) size: 5/8 "

Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	98
10	92
5	69
2.5	47
1.25	29
0.630	19
0.315	13
0.160	9
0.080	6.8



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand. Very windy, high amount of airborne dust.

Reviewed By:  P.Eng.

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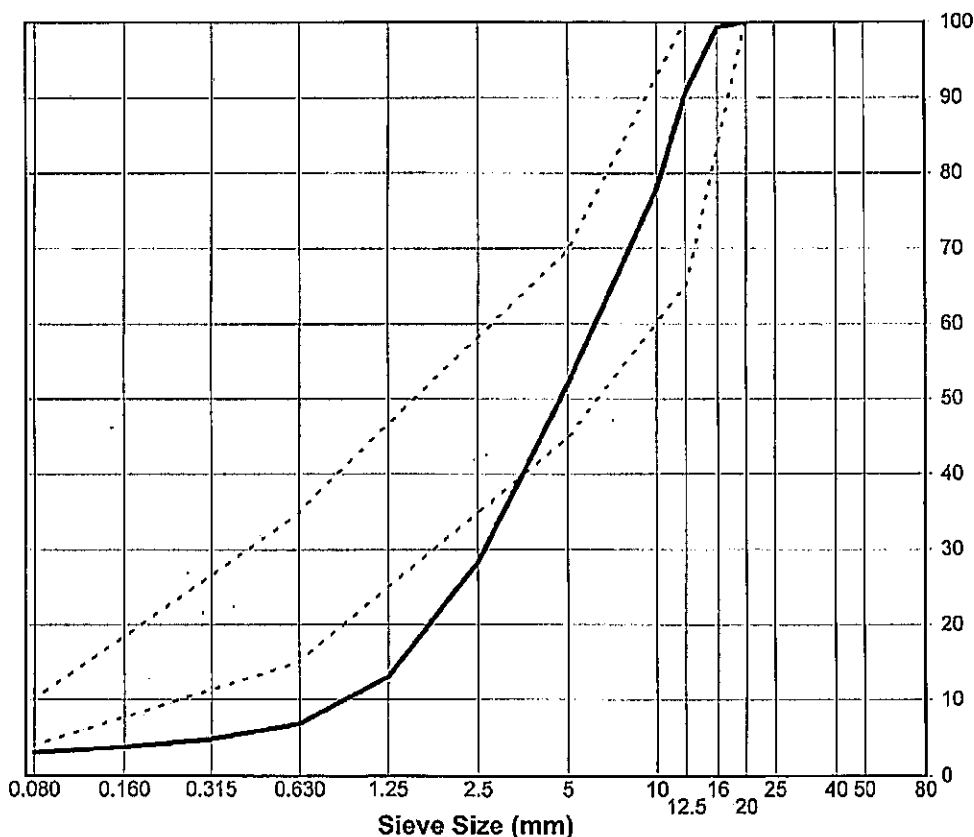
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND AND GRAVEL - trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 8
Date Received: January 9, 2011
Sample Time: 9:00 PM
Sampled by: Nuna
Date Tested: January 10, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 0.8%
Screen(s) size: 3/4" and 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
20	100
16	99
12.5	91
10	78
5	52
2.5	28
1.25	13
0.630	7
0.315	5
0.160	4
0.080	3.0



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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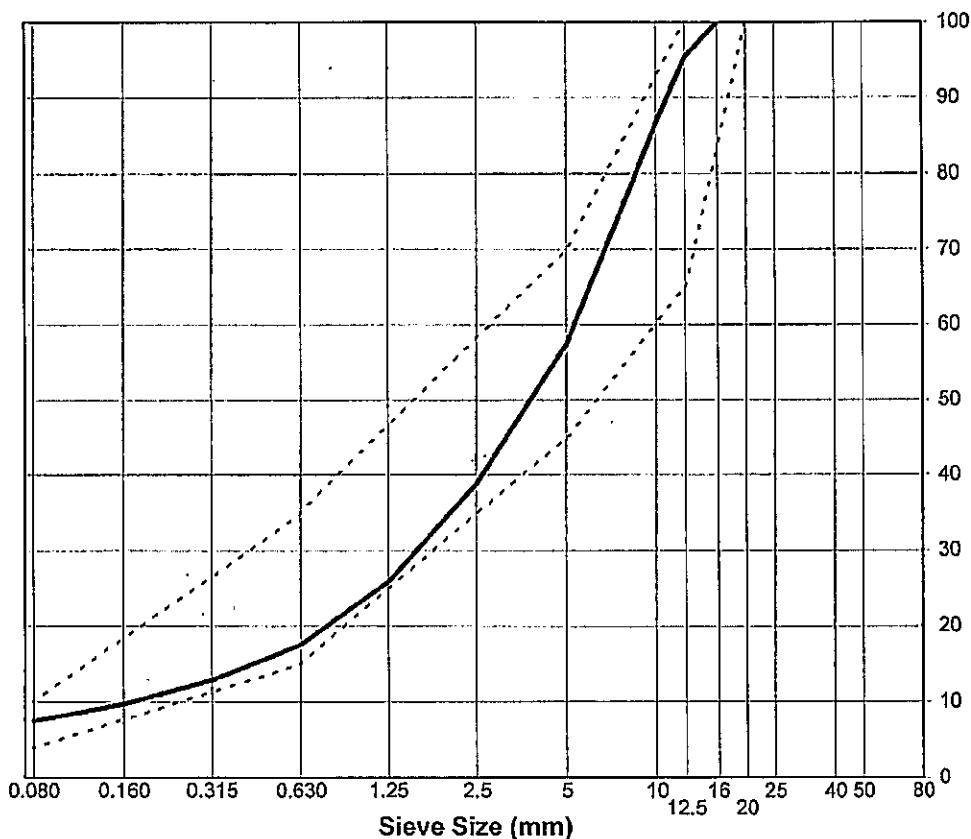
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND AND GRAVEL - trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 9
Date Sampled: January 10, 2011
Sample Time: 2:00 PM
Sampled by: AJC
Date Tested: January 10, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 1.9%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	95
10	87
5	57
2.5	39
1.25	26
0.630	18
0.315	13
0.160	10
0.080	7.5



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By: _____

P.Eng.

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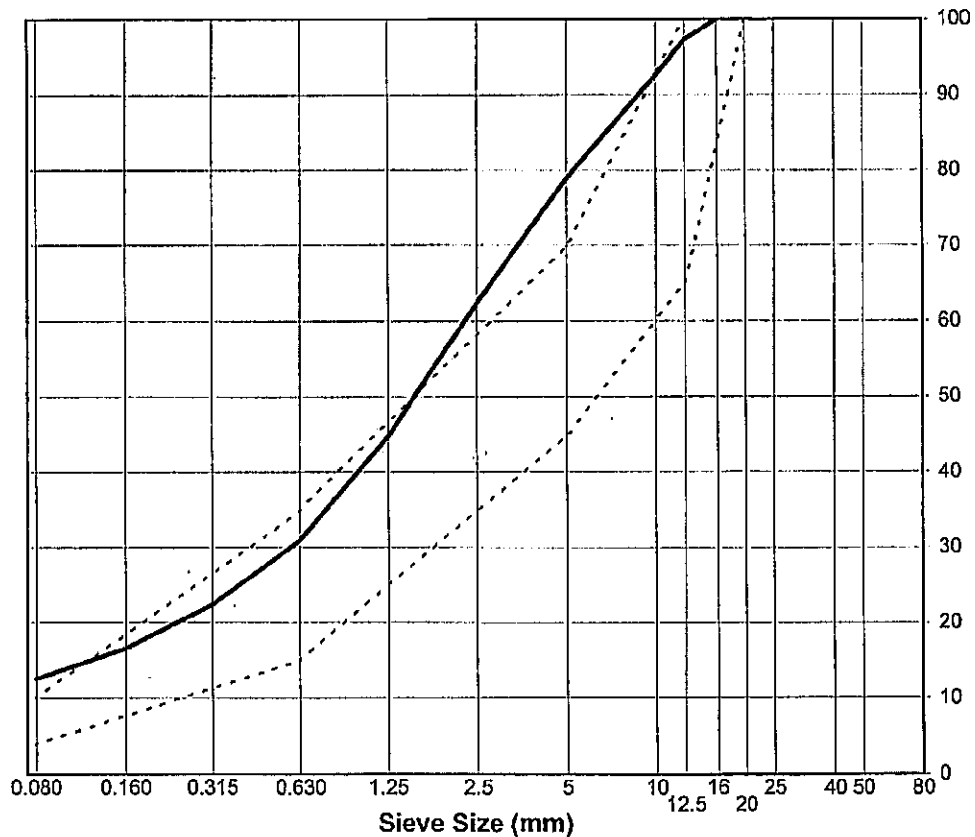
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, some fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 10
Date Received: January 11, 2011
Sample Time: Night Shift
Sampled by: Nuna
Date Tested: January 11, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 2.9%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	97
10	93
5	79
2.5	62
1.25	45
0.630	31
0.315	22
0.160	17
0.080	12.5



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 1 bucket quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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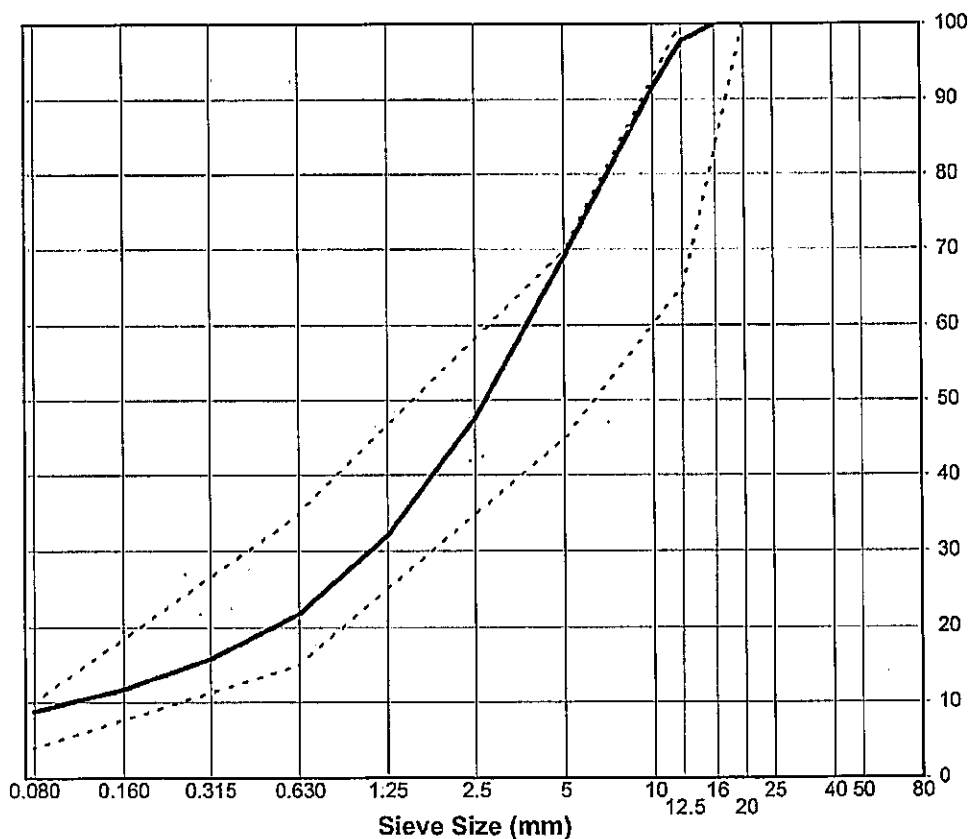
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 11
Date Sampled: January 11, 2011
Sample Time: 1:00 PM
Sampled by: AJC
Date Tested: January 11, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 2.0%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	98
10	92
5	69
2.5	48
1.25	32
0.630	22
0.315	16
0.160	12
0.080	8.9



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend stockpile: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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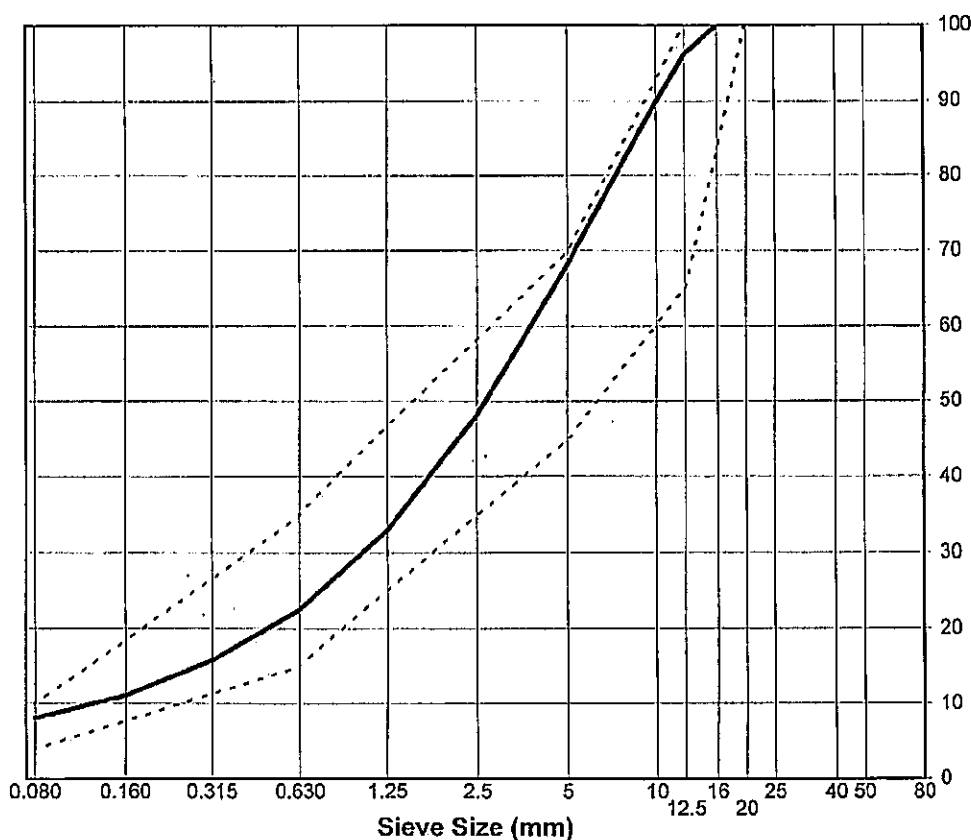
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 12
Date Received: January 12, 2011
Sample Time: Night Shift
Sampled by: Nuna
Date Tested: January 12, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 3.3%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	96
10	90
5	68
2.5	48
1.25	33
0.630	22
0.315	16
0.160	11
0.080	8.1



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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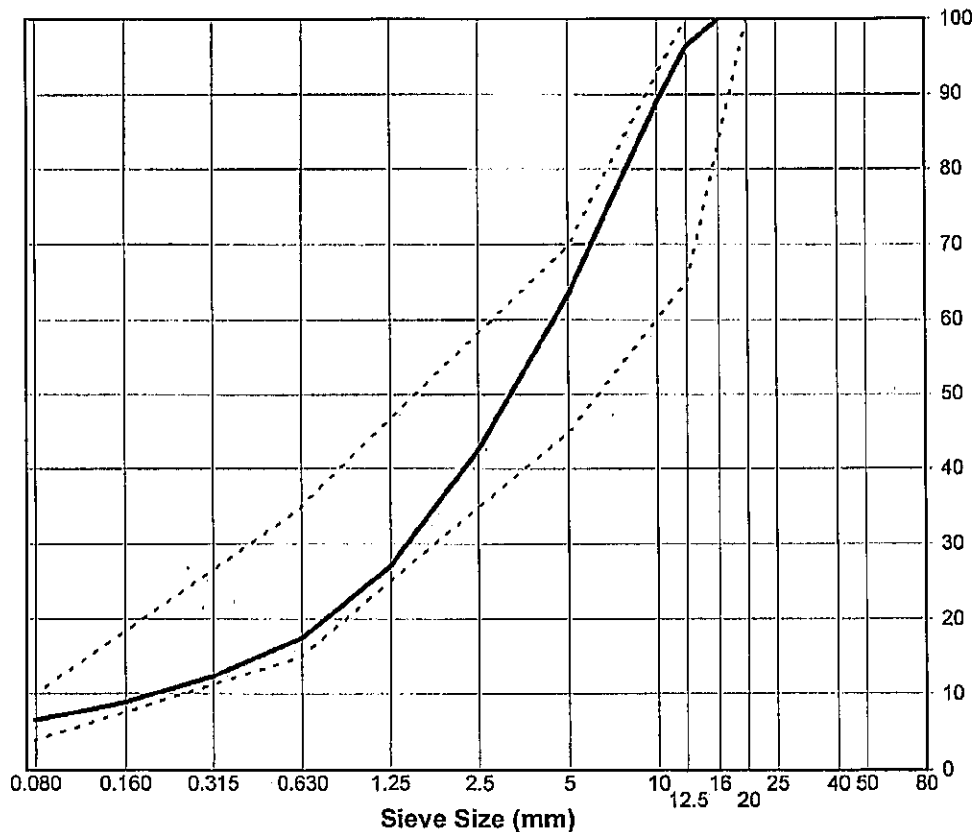
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND and GRAVEL - trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 13
Date Sampled: January 12, 2011
Sample Time: 1:00 PM
Sampled by: AJC
Date Tested: January 12, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 3.2%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	96
10	89
5	63
2.5	43
1.25	27
0.630	18
0.315	12
0.160	9
0.080	6.7



Remarks: January 2011 Crusher Run, 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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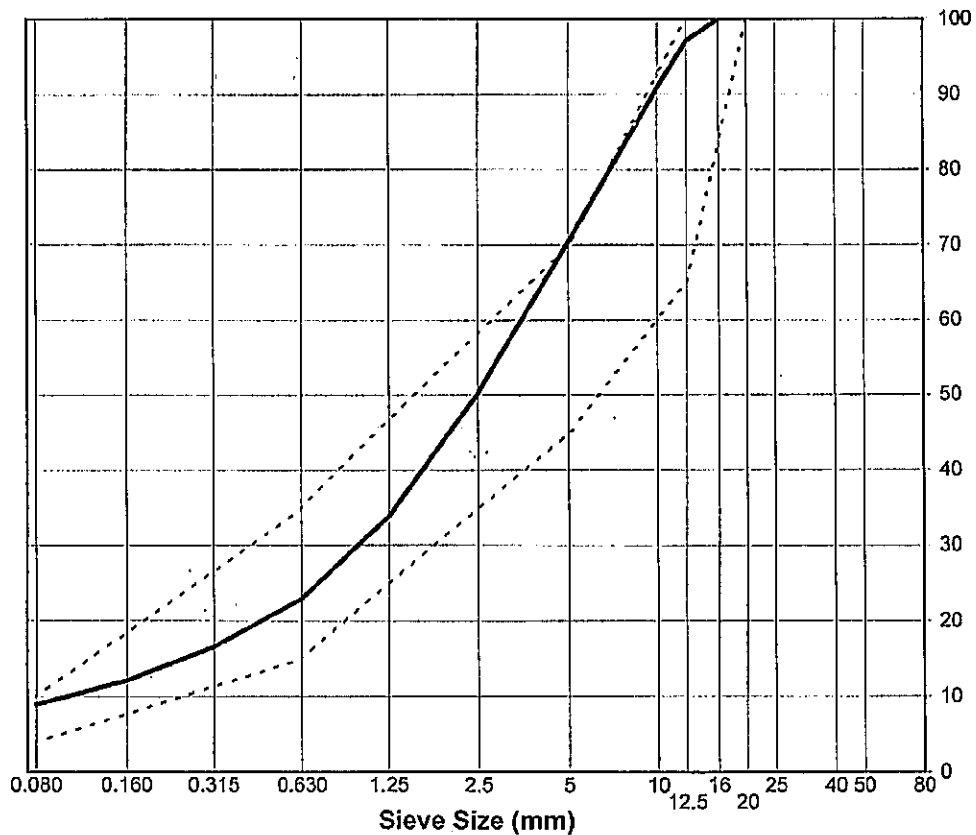
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 14
Date Received: January 13, 2011
Sample Time: Night Shift
Sampled by: Nuna
Date Tested: January 13, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 1.8%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	97
10	91
5	71
2.5	50
1.25	34
0.630	23
0.315	17
0.160	12
0.080	9.0



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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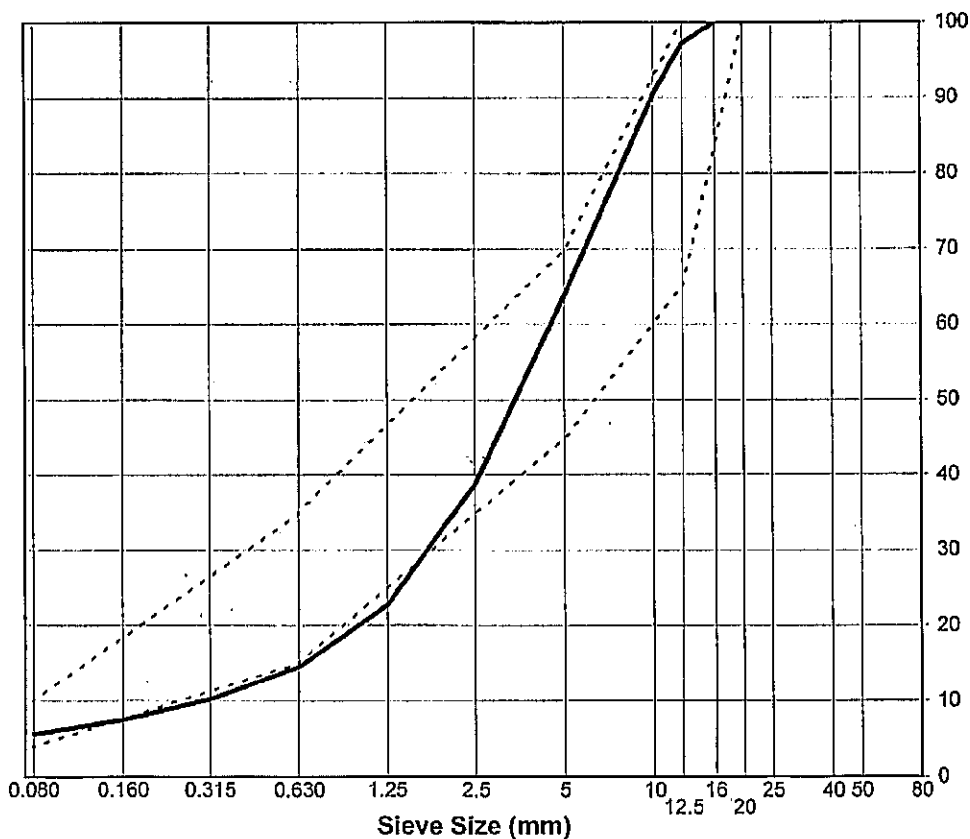
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND and GRAVEL - trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 15
Date Sampled: January 13, 2011
Sample Time: 1:00 PM
Sampled by: AJC
Date Tested: January 13, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 2.2%
Screen(s) size: 5/8"
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	97
10	90
5	64
2.5	39
1.25	23
0.630	15
0.315	10
0.160	8
0.080	5.6



Remarks: January 2011 Crusher Run. 3/4" minus crush. Prior to 14:30 blast in quarry 2.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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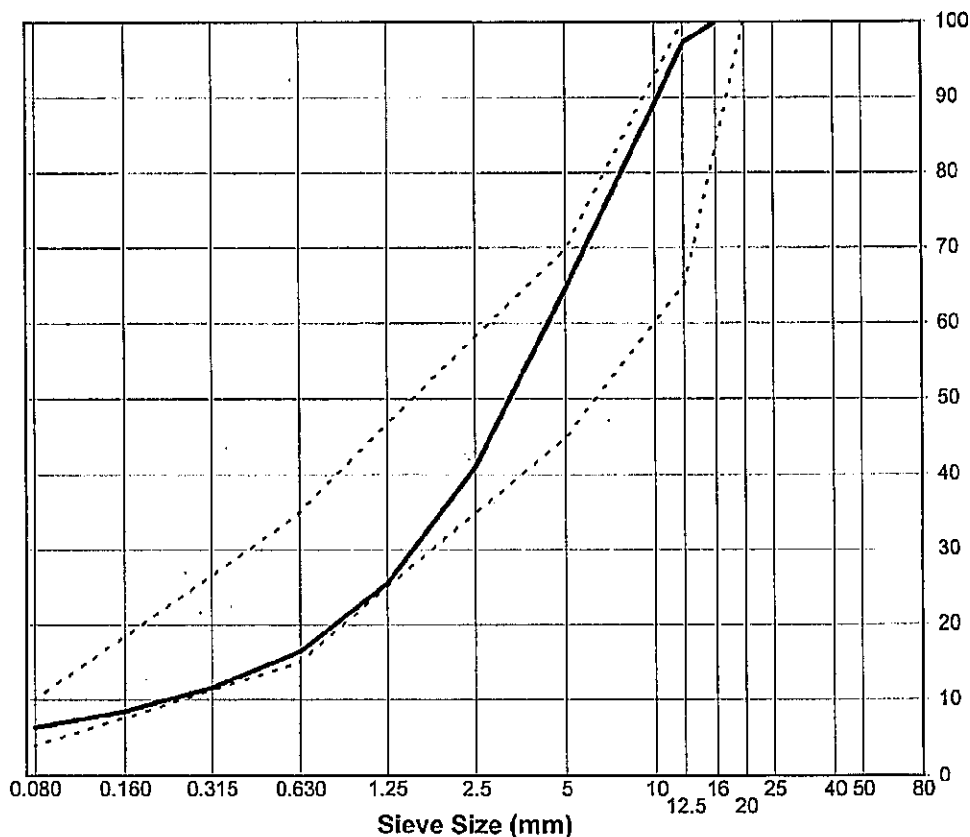
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 16
Date Received: January 14, 2011
Sample Time: Night Shift
Sampled by: Nuna
Date Tested: January 14, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 3.1%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	97
10	89
5	65
2.5	41
1.25	25
0.630	16
0.315	12
0.160	9
0.080	6.4



Remarks: January 2011 Crusher Run. 3/4" minus crush.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By: _____

P.Eng.

Data presented herein is for the sole use of the stipulated client. EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA. The testing services reported herein have been performed by an EBA technician to recognized industry standards, unless otherwise noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, EBA will provide it upon written request.

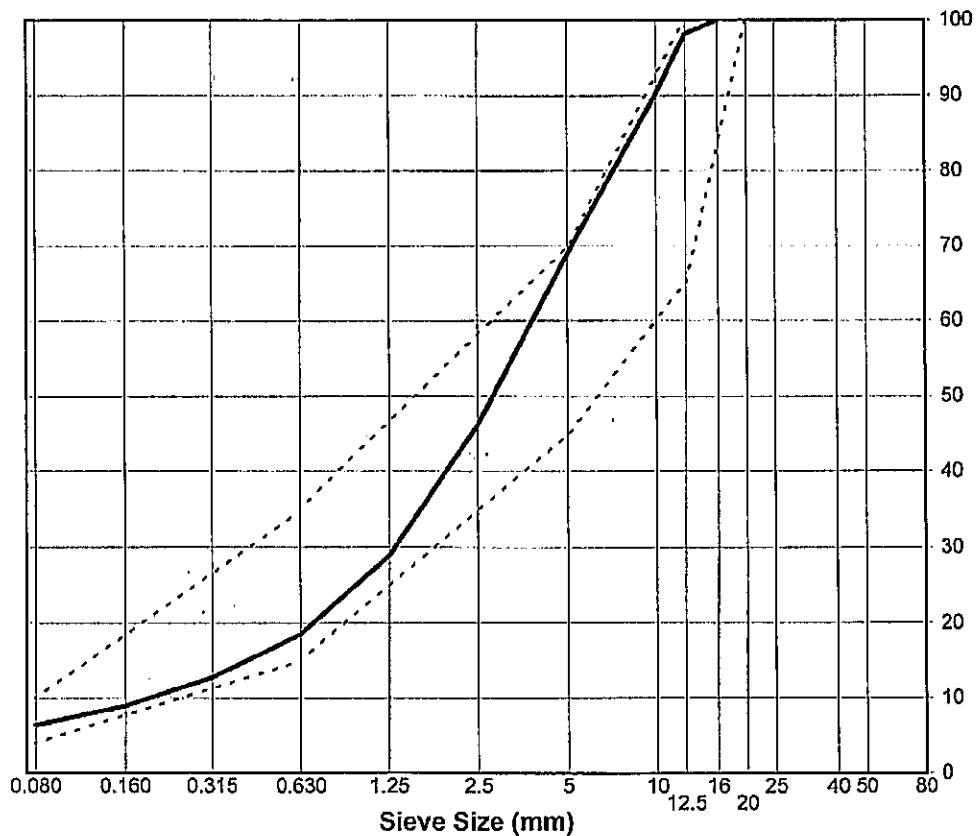
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 17
Date Sampled: January 14, 2011
Sample Time: 11:00 AM
Sampled by: AJC
Date Tested: January 14, 2011
Tested by: AJC Office: Site
Moisture Content (as received): 3.6%
Screen(s) size: 5/8 "
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	98
10	90
5	69
2.5	46
1.25	29
0.630	19
0.315	13
0.160	9
0.080	6.4



Remarks: January 2011 Crusher Run. 3/4" minus crush. Extremely windy during sampling.

Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand.

Reviewed By:  P.Eng.

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SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002

Project: Doris North - North Dam

Client: Nuna Logistics Ltd.

Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator

Description: SAND and GRAVEL - trace fines (silt/clay)

Source: Quarry 2

Supplier: Nuna Logistics Ltd.

Sample Location: Belt

Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 18 (EBA 5479)

Date Sampled: January 16, 2011

Sample Time: 2:00 AM

Sampled by: Nuna

Date Tested: January 21, 2011

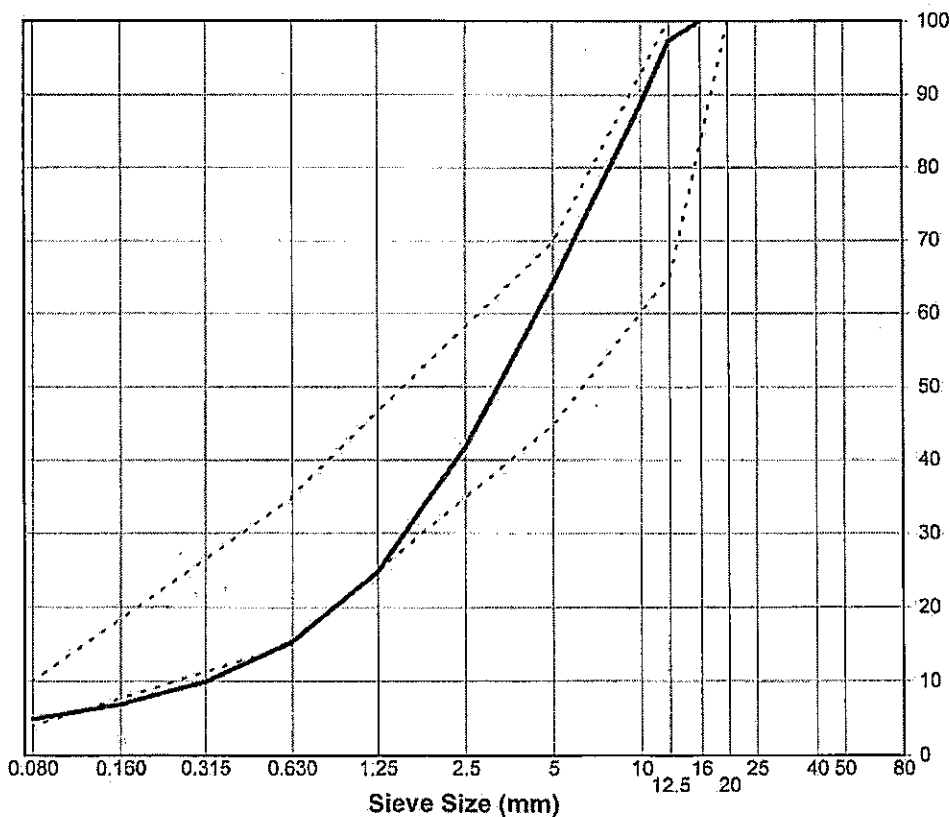
Tested by: AJC Office: YK

Moisture Content (as received): 1.6%

Screen(s) size: 5/8 "

Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	97
10	89
5	64
2.5	42
1.25	25
0.630	15
0.315	10
0.160	7
0.080	4.9



Remarks: January 2011 Crusher Run. 3/4" minus crush. Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand. Shipped Jan 17, 2011 (Forms 0028, 3968), received by EBA Jan 19, 2011.

Reviewed By: _____

P.Eng.

Data presented herein is for the sole use of the stipulated client. EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA. The testing services reported herein have been performed by an EBA technician to recognized industry standards, unless otherwise noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, EBA will provide it upon written request.



A TETRA TECH COMPANY

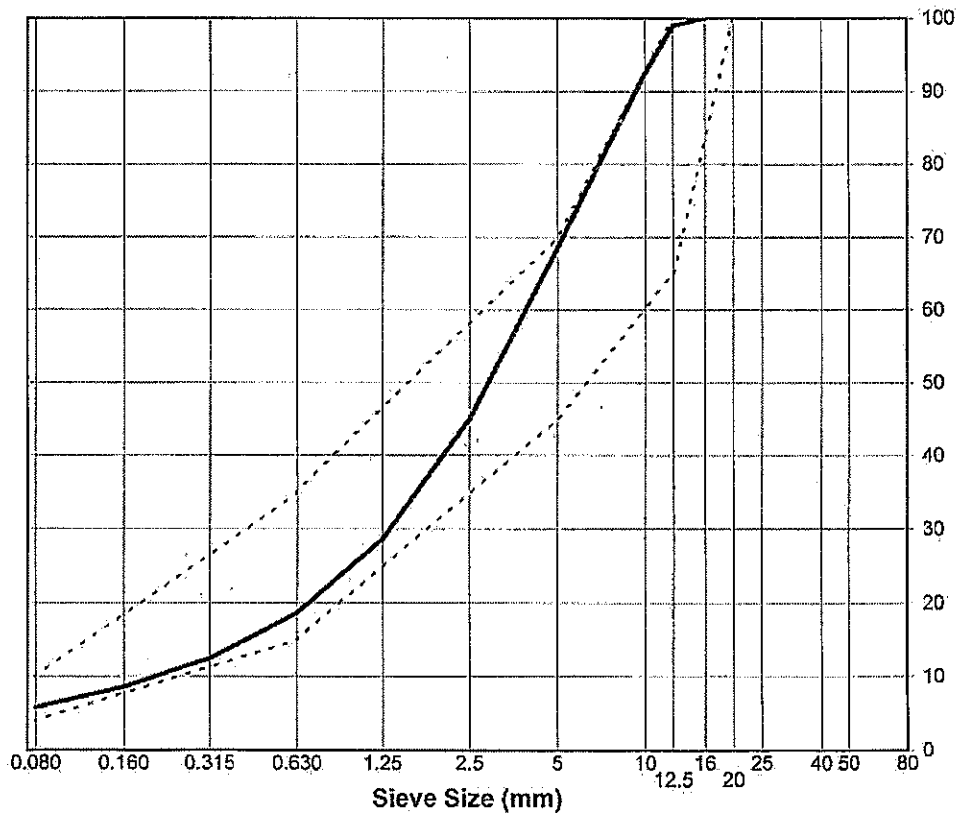
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: Y14101245.002
Project: Doris North - North Dam
Client: Nuna Logistics Ltd.
Attention: Bradford Watkin QA/QC Manager
Dan Buriac QA/QC Coordinator
Description: SAND - gravelly, trace fines (silt/clay)
Source: Quarry 2
Supplier: Nuna Logistics Ltd.
Sample Location: Belt
Specification: SRK Consulting - Technical Specification - Revision D

Sample No.: 19 (EBA 5480)
Date Sampled: January 16, 2011
Sample Time: 1:00 PM
Sampled by: Nuna
Date Tested: January 21, 2011
Tested by: AJC Office: YK
Moisture Content (as received): 2.2%
Screen(s) size: 5/8"
Cone Type: Standard Coarse

Sieve Size	Percent Passing
16	100
12.5	99
10	93
5	68
2.5	45
1.25	29
0.630	19
0.315	12
0.160	9
0.080	5.8



Remarks: January 2011 Crusher Run. 3/4" minus crush. Blend feedstock: 2 buckets quarry rock to 1 bucket crushed sand. Shipped Jan 17, 2011 (Forms 0029, 3968), received by EBA Jan 19, 2011.

Reviewed By: [Signature] P.Eng.

Data presented herein is for the sole use of the stipulated client. EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA. The testing services reported herein have been performed by an EBA technician in accordance with industry standards, unless otherwise noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, EBA will provide it upon written request.



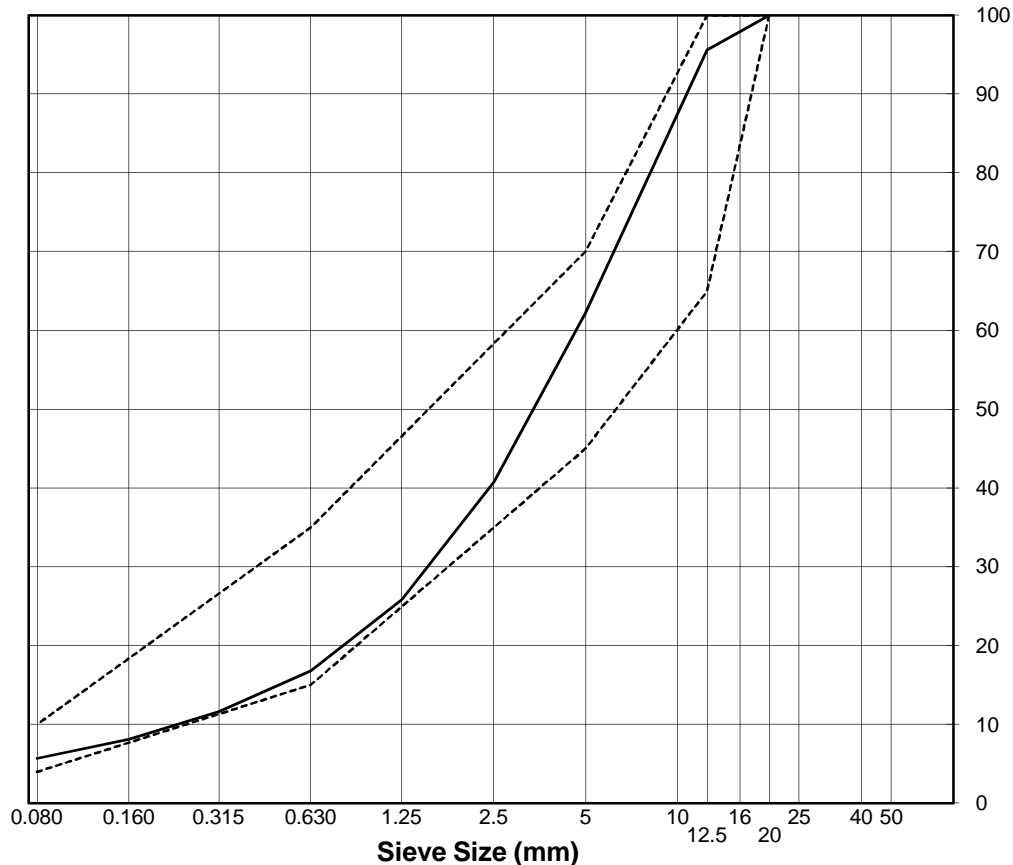
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Stockpile, 35mN of Frozen Core Plant.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 01
Date Received: February 15, 2011
Sampled by: GDV
Date Tested: February 16, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 2.1%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	96
5	62
2.5	41
1.25	26
0.630	17
0.315	12
0.160	8
0.080	5.6



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Reviewed By: _____

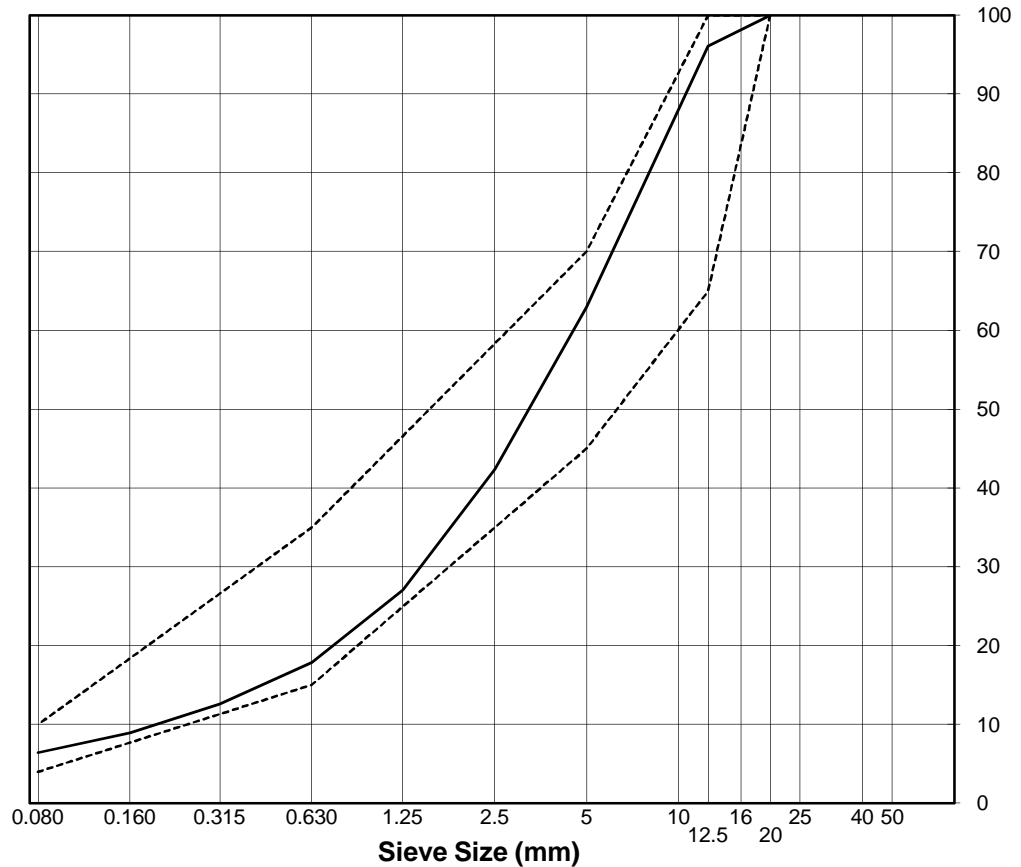
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 02
Date Received: February 19, 2011
Sampled by: GDV
Date Tested: February 19, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.2%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	96
5	63
2.5	42
1.25	27
0.630	18
0.315	13
0.160	9
0.080	6.4



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken by QC, time unknown.

Reviewed By: _____

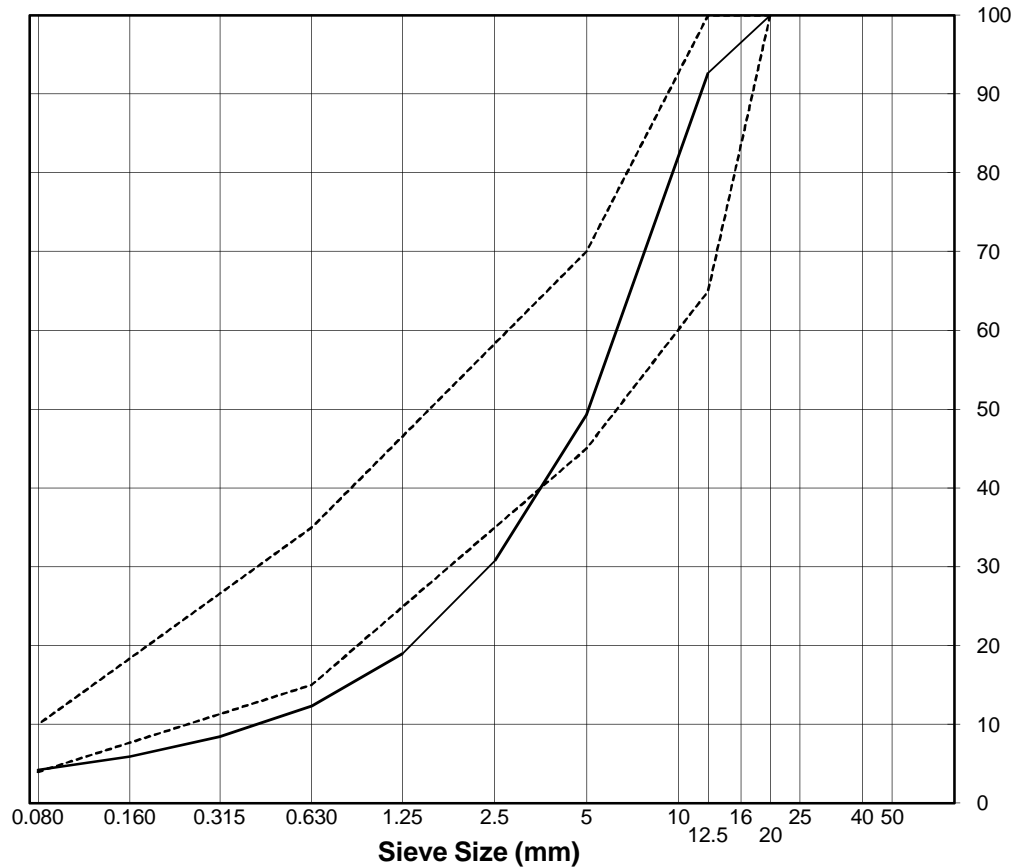
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 03
Date Received: February 19, 2011
Sampled by: QC
Date Tested: February 19, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.9%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	93
5	49
2.5	31
1.25	19
0.630	12
0.315	8
0.160	6
0.080	4.2



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken by QC, time unknown.

Reviewed By: _____

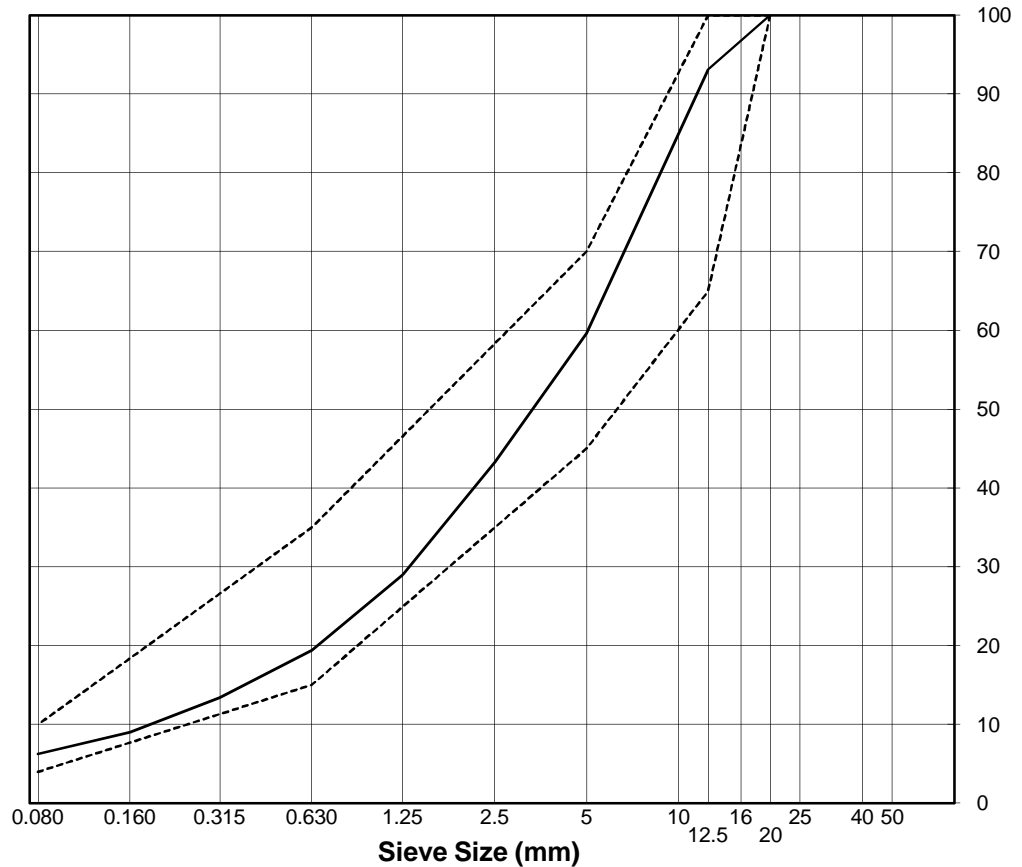
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 04
Date Received: February 20, 2011
Sampled by: GDV
Date Tested: February 20, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.6%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	93
5	60
2.5	43
1.25	29
0.630	19
0.315	13
0.160	9
0.080	6.2



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 0230 Hrs.

Reviewed By: _____

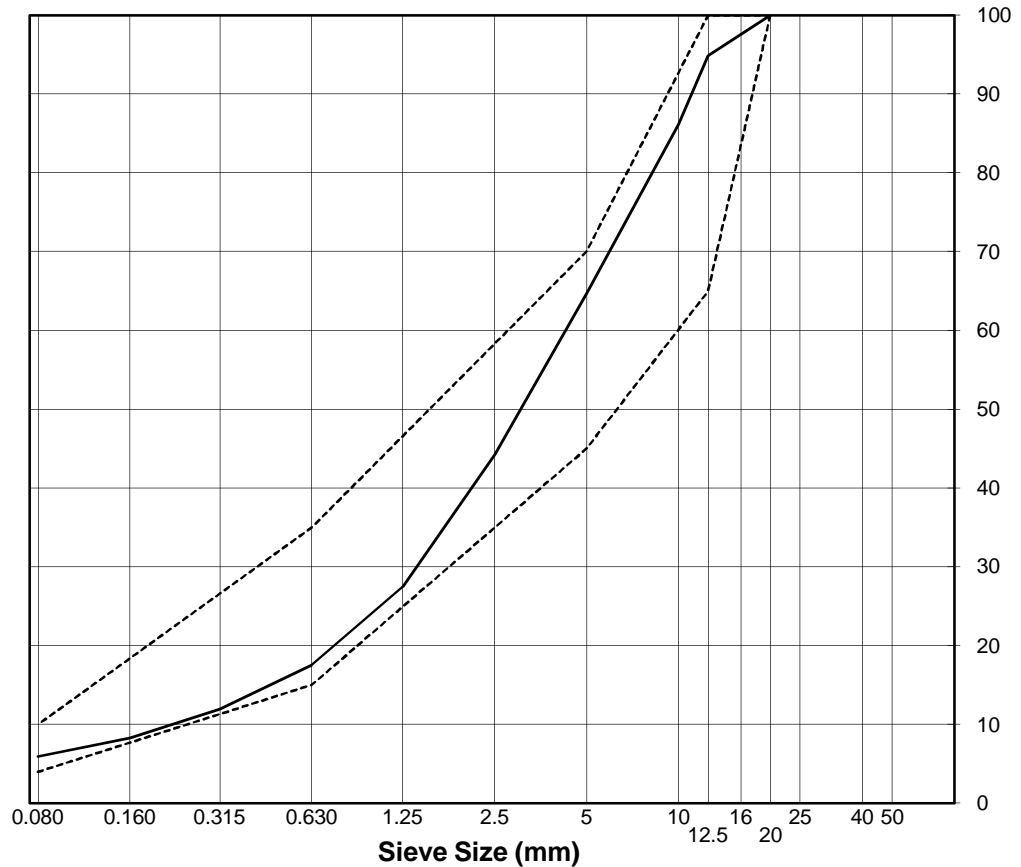
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 05
Date Received: February 20, 2011
Sampled by: GDV
Date Tested: February 20, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.8%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	95
10.0	86
5	65
2.5	44
1.25	27
0.630	18
0.315	12
0.160	8
0.080	5.9



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 0500 Hrs.

Reviewed By: _____

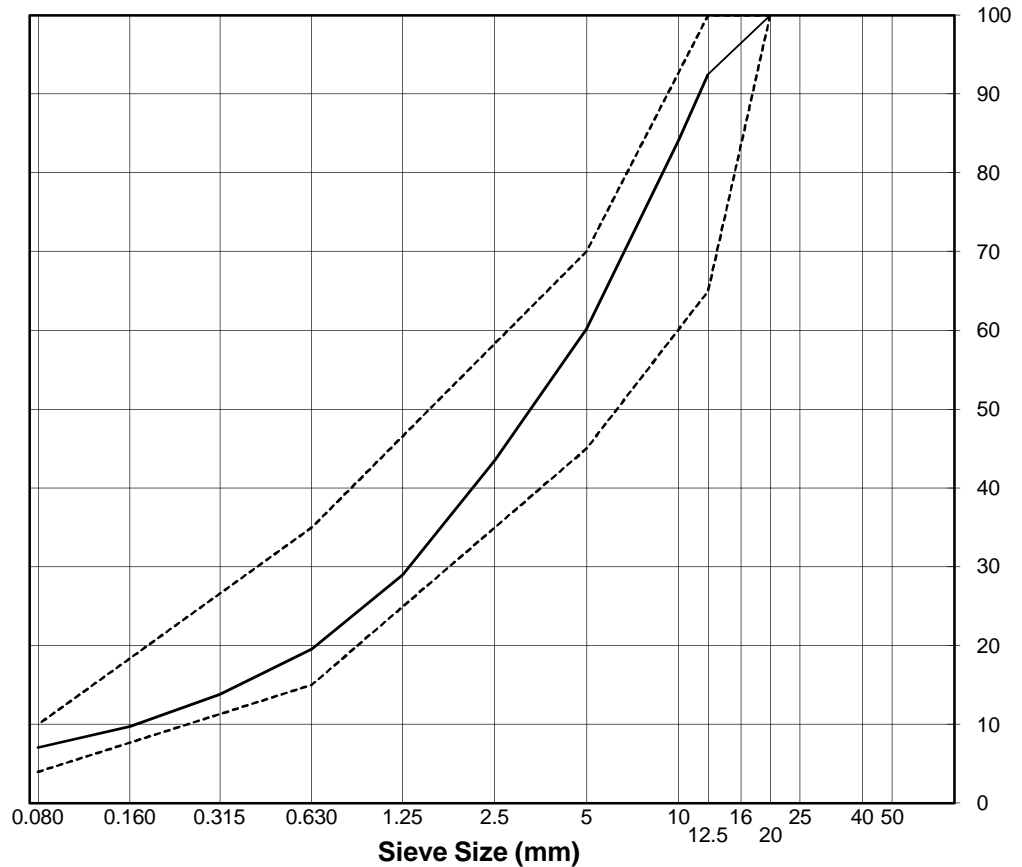
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 06
Date Received: February 20, 2011
Sampled by: QC
Date Tested: February 20, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 4.1%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	93
10.0	84
5	60
2.5	44
1.25	29
0.630	20
0.315	14
0.160	10
0.080	7.0



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 1100 Hrs.

Reviewed By: _____

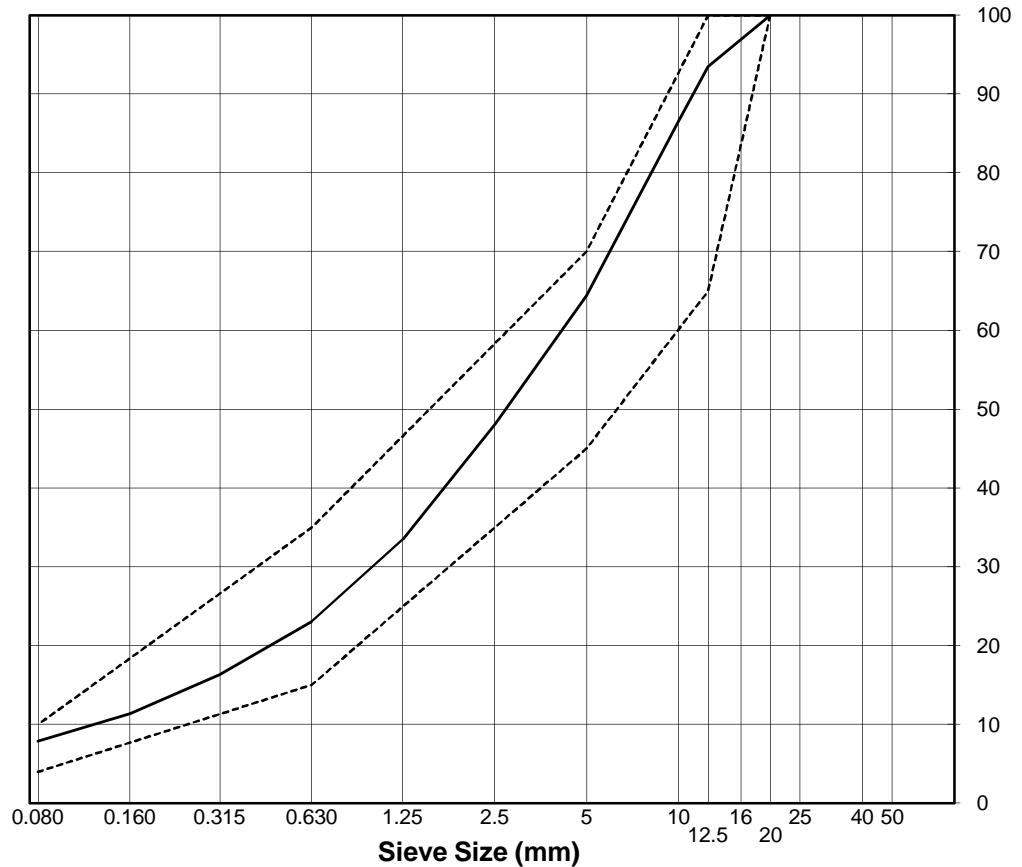
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample.
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 07
Date Received: February 20, 2011
Sampled by: QC
Date Tested: February 20, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 3.3%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	93
10.0	87
5	64
2.5	48
1.25	33
0.630	23
0.315	16
0.160	11
0.080	7.8



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 1700 Hrs.

Reviewed By: _____

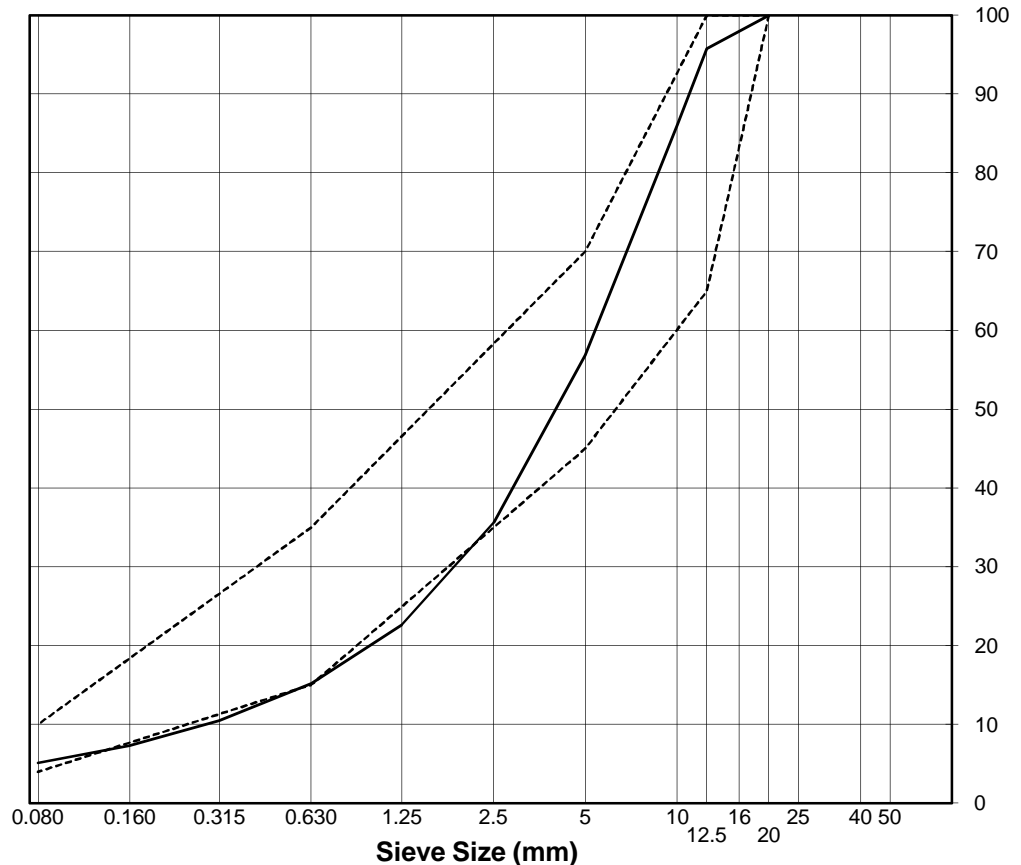
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, STOCKPILE sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 08
Date Received: February 21, 2011
Sampled by: GDV
Date Tested: February 21, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 2.4%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	96
10.0	86
5	57
2.5	36
1.25	23
0.630	15
0.315	10
0.160	7
0.080	5.1



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 0100 Hrs.

Reviewed By: _____

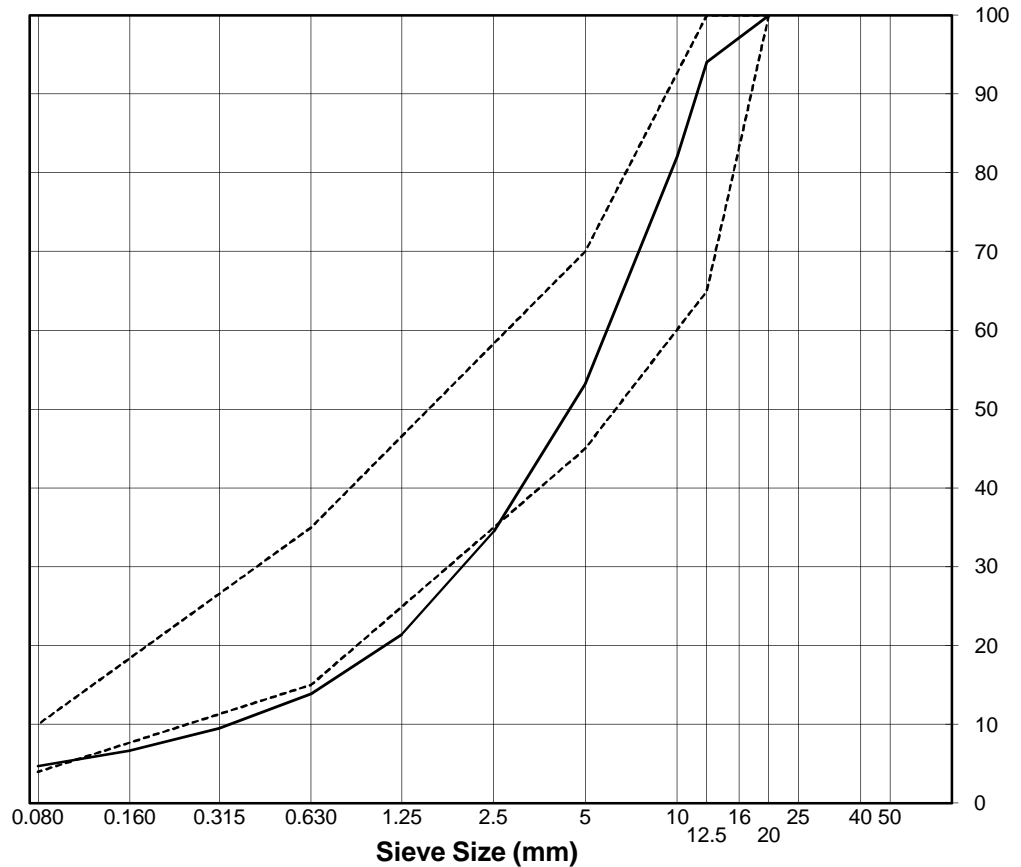
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 09
Date Received: February 22, 2011
Sampled by: QC
Date Tested: February 22, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.5%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	94
10.0	82
5	53
2.5	34
1.25	21
0.630	14
0.315	10
0.160	7
0.080	4.7



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 1100 Hrs. (First sample taken after Nuna changed damaged crusher parts.)

Reviewed By: _____

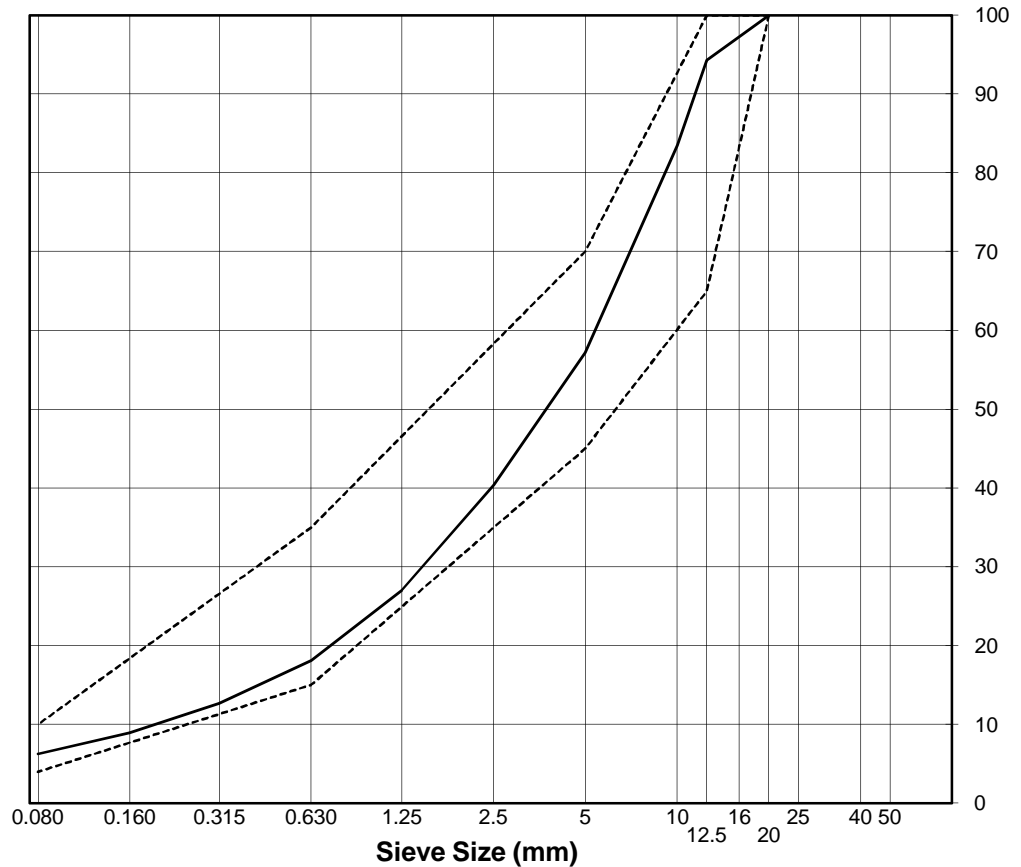
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 10
Date Received: February 22, 2011
Sampled by: QC
Date Tested: February 22, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 3.0%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	94
10.0	84
5	57
2.5	40
1.25	27
0.630	18
0.315	13
0.160	9
0.080	6.2



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 1700 Hrs.

Reviewed By: _____

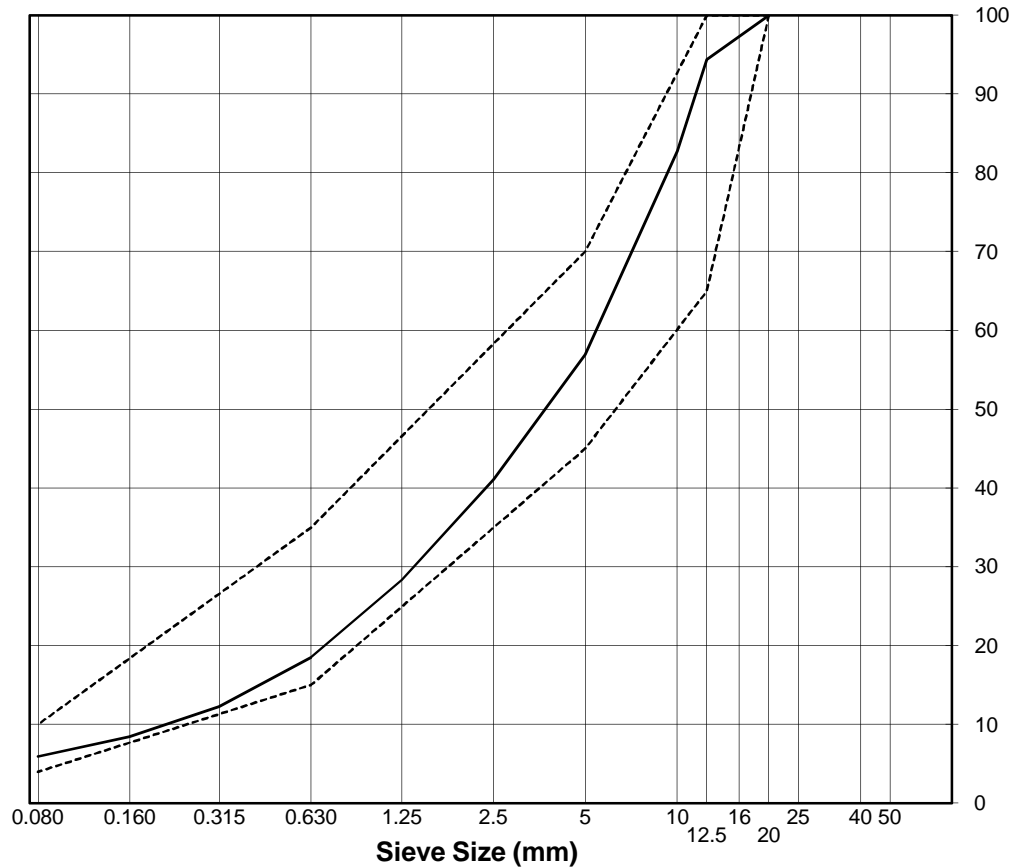
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, STOCKPILE sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 11
Date Received: February 23, 2011
Sampled by: QA
Date Tested: February 23, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 2.4%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	94
10.0	83
5	57
2.5	41
1.25	28
0.630	18
0.315	12
0.160	8
0.080	5.9



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 0300 Hrs.

Reviewed By: _____

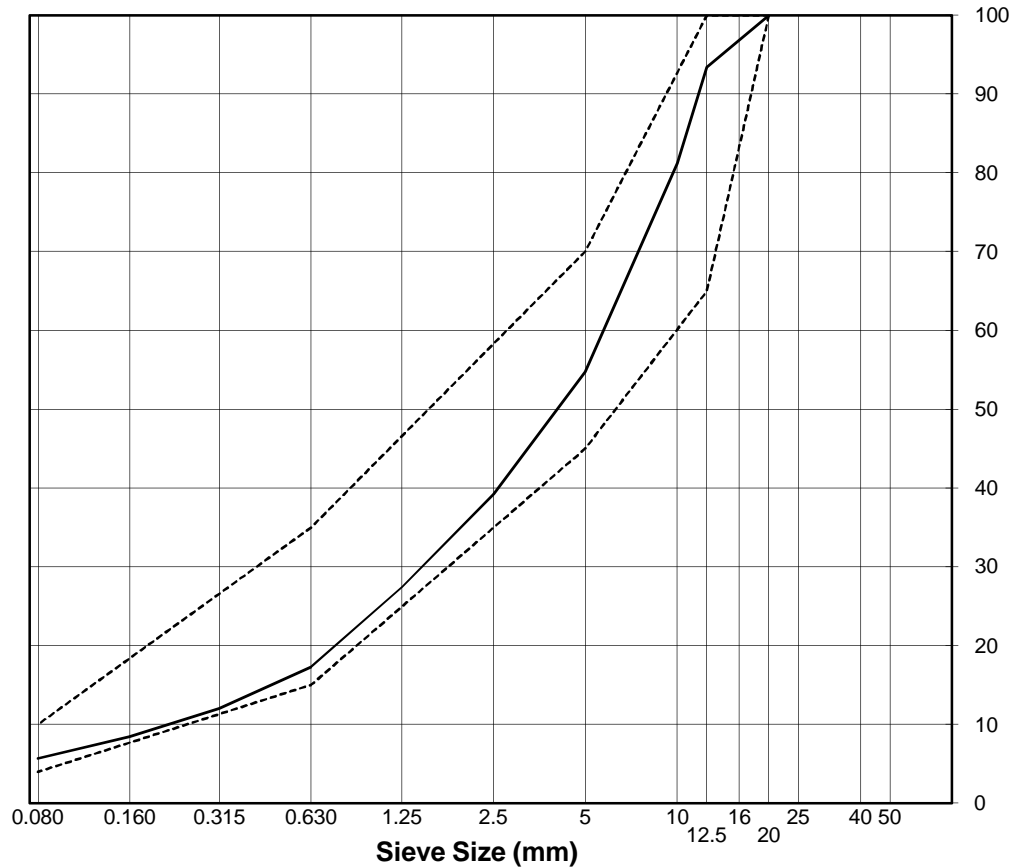
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 12
Date Received: February 23, 2011
Sampled by: QA
Date Tested: February 23, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.6%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	93
10.0	81
5	55
2.5	39
1.25	27
0.630	17
0.315	12
0.160	8
0.080	5.7



Remarks: This particle size analysis represents the Core blend, prior to saturation.

Sample taken 0500 Hrs.

Reviewed By: _____

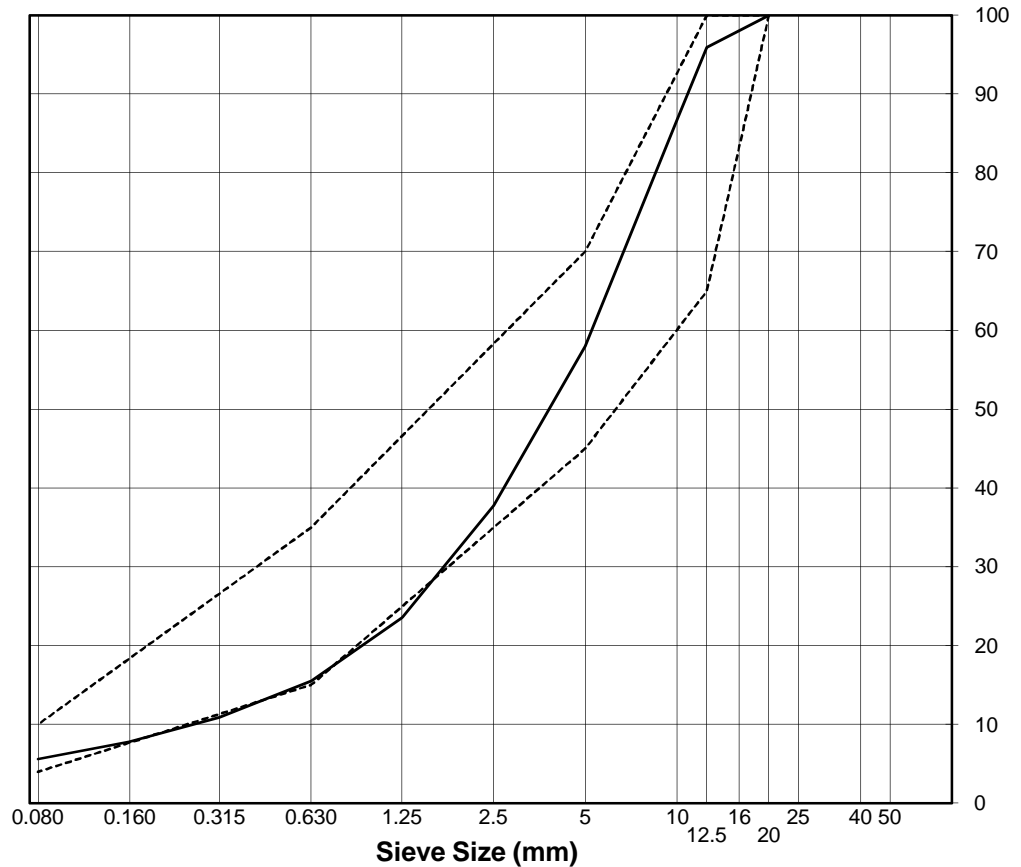
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 13
Date Received: February 23, 2011
Sampled by: QC
Date Tested: February 23, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 1.6%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	96
10.0	87
5	58
2.5	38
1.25	24
0.630	15
0.315	11
0.160	8
0.080	5.6



Remarks: File name: HB-CR-CORE-PSD 13-QC-20110223.xls

This particle size distribution represents the Core blend, prior to saturation. Sample was taken at 1100 hrs.

Reviewed By: _____

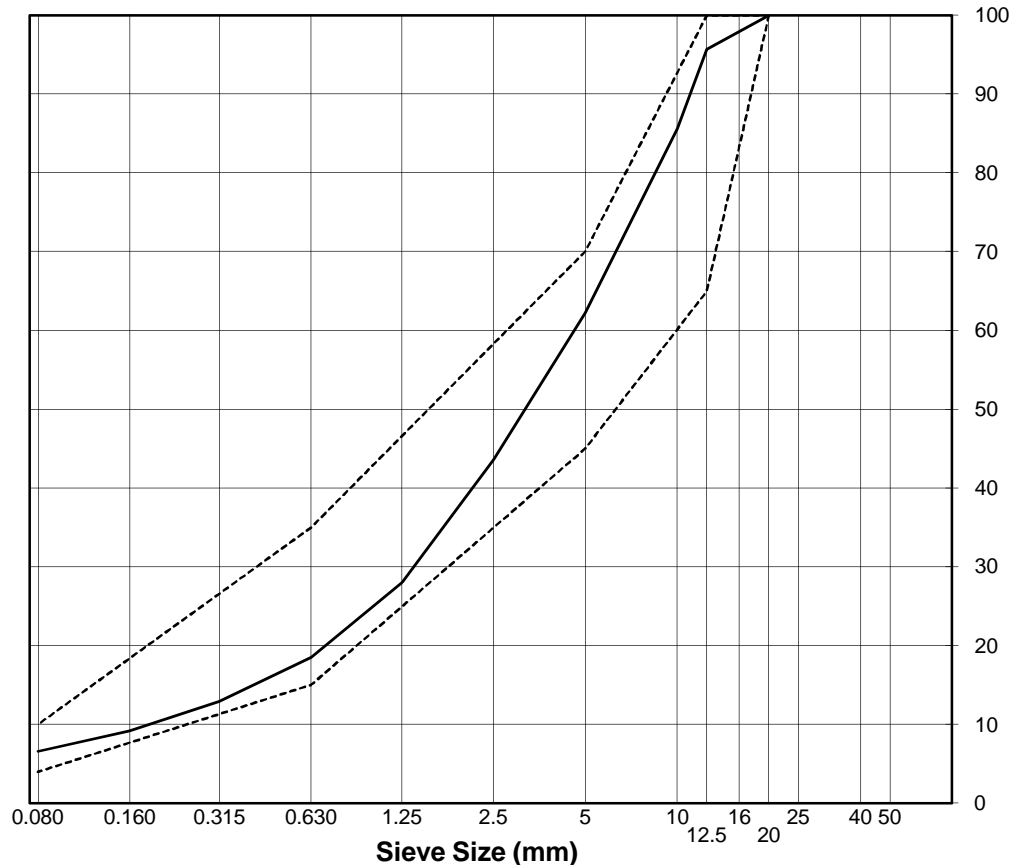
SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.: E14101112
Project: Doris North - North Dam
Client: SRK Consulting
Attention: Lowell Wade
Email: HopeBay@SRK.com
Description: Sand & Gravel (20mm max, crush), trace silt, grey.
Source: Quarry 2
Supplier: Crusher
Sample Location: Quarry 2, BELT sample
Specification: SRK Consulting Specification Revision E Core Material

Sample No.: Core 14
Date Received: February 23, 2011
Sampled by: QC
Date Tested: February 23, 2011
Tested by: GDV Office: On-site lab
Moisture Content (as received): 2.3%
No. Crushed Faces: Two (2) or Three (3)
By Particle Mass: _____

Sieve Size	Percent Passing
20	100
12.5	96
10.0	86
5	62
2.5	44
1.25	28
0.630	18
0.315	13
0.160	9
0.080	6.5



Remarks: File name: HB-CR-CORE-PSD 14-QC-20110223.xls

This particle size distribution represents the Core blend, prior to saturation. Sample was taken at 1700 hrs.

Reviewed By: _____

Technical Memo

To:	Mark Valeriote	Date:	April 15, 2011
Company:	Hope Bay Mining Limited	From:	Maritz Rykaart, Lowell Wade
Copy to:	Greg Blaylock, Kevin Mather	Project #:	1CH008.033.0213
Subject:	North Dam Close-out Plan for April/May 2011 - FINAL		

1 Introduction

Construction of the North Dam will have to be suspended in the near future due to the onset of warmer temperatures, which is preventing the timely and effective freeze-back of the core material. Furthermore, unless the Doris Creek Bridge is completed before the Doris Creek ice bridge becomes impassable, there will be no means to haul Run of Quarry (ROQ) and core material to the dam site.

This Technical Memo documents SRK's recommendations for thermal protection of the partially completed North Dam. It outlines plans for water management during the next seven months, until construction activities can resume when ambient air temperatures are consistently below -10°C. This should be in late fall or early winter of 2011.

2 Minimum Design Height

Based on the current construction schedule, the earliest tailings will be deposited into Tail Lake in the fall of 2012. To allow for tailings deposition, the fish-out of Tail Lake is scheduled for the summer of 2011. Once the fish-out is completed at the end of summer 2011, Tail Lake can also receive water from the Doris North Sedimentation and Pollution Control Ponds as well as the treated sewage effluent from Doris North Camp.

SRK reassessed the water balance for Tail Lake, taking into consideration the expected rise in water levels for the summer and fall season of 2011 and the only natural inflows from the Tail Lake catchment, and zero outflows due to the presence of the North Dam. Under this scenario, the water level is expected to rise from the normal level in Tail Lake of 28.3 m to between 28.9 m and 29.3 m, depending on which combination of anticipated climatic events are modelled. Based on that analysis, SRK is recommending that a minimum interim design height for the North Dam be set at 29.8 m which includes 0.5 m freeboard over the maximum anticipated water level rise in Tail Lake for the 2011 summer and fall seasons.

3 Preferred Close-out Plan

The preferred close-out plan (Figure 1) will continue the construction of the North Dam in accordance with the design, but with temporary modifications as follows:

- Install all evaporator pipes and radiators and commission the thermosyphons.
- Cover all evaporator pipes with saturated core material.
- Install all of the lower GCL (even those at elevation greater than 29.8 m), and cover with at least 500 mm (2 lifts) of saturated core material.
- Continue to construct the frozen core superstructure, as per design to elevation 29.8 m. This includes the installation of the upper CGL as appropriate, and covering it with saturated core material.

- It is expected that at least a portion of the uppermost saturated core material will degrade over the summer season, and will have to be removed when construction commences. Therefore, adequate cover is required over the elements embedded within the core (i.e. the evaporator pipes, GCL and ground temperature cables) such that when this sacrificial layer is removed there is no risk of damaging embedded elements.
- Sacrificial single bead ground temperature cables should be installed within the upper zone of the core material and in the layer containing embedded elements to allow monitoring of the sacrificial core material to assist with defining how much needs to be removed when dam construction commences.
- Complete the construction of both upstream and downstream abutments of the dam to elevation 29.8 m (this includes both ROQ and Transition material).
- Cover all of the exposed core material with 3 m of ROQ to act as temporary thermal protection until dam construction commences (a "marker" material layer could be placed if deemed necessary from a constructability perspective).

4 Contingency Close-out Plans

In the event there are not enough sufficiently cold days remaining this season to allow this plan from being implemented, a contingency close-out plan is required.

It is anticipated that construction on the dam will proceed as long as practical, with the goal of achieving the preferred close-out plan as documented above. However, it is realized that construction may have to cease, at any day, due to the inability to achieve timely freeze-back of the individual lifts of saturated core material. Under this scenario the upper elevation of the placed core material and associated liner will be at a lower elevation than the minimum interim design elevation of 29.8 m. Therefore, alternate measures need to be implemented to manage the rising water level in Tail Lake, to minimize the risk of degrading any placed core material which may lead to costly and time consuming rework when construction recommences. Two possible contingency plans are presented below.

4.1 Contingency Close-out Plan A

This contingency close-out plan, illustrated on Figure 2, consists of the following elements:

- Install a geosynthetic clay liner (GCL) on the upstream face of the dam up to elevation 29.8 m (note that this could be substituted with a HDPE liner if necessary; however, the HDPE would have to be sandwiched between two 12-oz geotextile layers, and/or appropriate bedding layers). The neat line quantity for this liner (not accounting for overlap and wastage) is about 1,100 m².
- The liner (GCL or HDPE) should be keyed as far as practical, into original ground at the toe of the dam to penetrate below the active zone (about 0.5 to 1 m deep) and be embedded into frozen ground. It is recognized that the ground will be frozen, therefore excavation of this trench will not be easy; however, to cut off the seepage path leading to the exposed core material an effective key trench is required.
- At the crest, the liner (GCL or HDPE) does not need a tuck trench but it needs to extend at least 1.5 m beyond the crest and should be covered with at least 0.5 m of select ROQ to act as ballast.
- On the slope, the HDPE liner needs to be covered with at least 1 m of select ROQ to ensure a confining load (should HDPE be used, no confining load is required; however, covering the liner with a nominal lift (300 mm) of crush material would be advantageous to counter the heat sink created by the black surface of the HDPE).
- The key trench should be backfilled with core material to ensure protection of the liner. If the key trench bottom surface is highly irregular, bentonite powder should be used to ensure a good seal between the liner and the excavation. The backfilled key trench should be covered with at least 1 m of select ROQ extending 1 m upstream of the key trench limit to provide thermal insulation.

- A primary sump, excavated at least 1 m below the lowest original ground level needs to be installed through the existing ROQ material downstream of the liner (approximately at station 0+85), but upstream of the core material (at least 10 m upstream). The sump should consist of a vertical corrugated steel pipe culvert (at least 24-inches in diameter), perforated at the base. A trash pump with an automated level switch should be installed in the pipe culvert to transfer any seepage bypassing the liner back to Tail Lake. *SRK will provide an estimate of the seepage rate to allow sizing of the pump.*
- A secondary sump, complete with trash pump and level sensor, similar to the first is required in the low spot of the key trench on top of the core material (approximately at station 0+85). *SRK will provide an estimate of the seepage rate to allow sizing of the pump.*
- It is anticipated that at least a portion of the uppermost saturated core material will degrade over the summer season, and will have to be removed when construction recommences. Therefore, an adequate cover is required over the elements embedded within the core (i.e. the evaporator pipes, GCL and ground temperature cables) such that when this sacrificial layer is removed there is less risk of damaging embedded elements. As stated above, the minimum saturated core over these elements prior to close-out is therefore 0.5 m (2 lifts)
- If there is not sufficient time to cover the embedded elements within the core with at least 0.5 m (2 lifts) of saturated core material prior to close-out, the embedded elements should not be installed at this time.
- Cover all of the exposed core material with 3 m of ROQ to act as a temporary thermal protection until dam construction commences (a "marker" material layer could be placed if deemed necessary from a constructability perspective).
- Sacrificial single bead ground temperature cables should be installed within the sacrificial upper zone of the core material and in the layer with embedded elements to allow monitoring of the sacrificial core material to assist with defining how much material needs to be removed when dam construction recommences.
- Sacrificial single bead ground temperature cables need to be installed in the liner key trench to monitor ground temperatures during the summer months.
- A pump system should be put in place to allow for the water level in Tail Lake to be maintained at its pre-impoundment level of 28.3 m. Water should be discharged past the dam to its natural outflow downstream of the dam. It is recognized that approval for this may have to be obtained from the Regulatory bodies, and authorization will need to be obtained very quickly; such that the water levels can be controlled.

5 Contingency Close-out Plan B

The following elements describe this contingency close-out plan, as illustrated on Figure 3:

- Rather than terminating the fillet zone at the design elevation for the lower GCL, extend the fillet zone to elevation of 29.8 m where appropriate. This additional fillet will be constructed in accordance with the approved variance for fillet construction, and will continue rising at a slope of 2.5:1.
- The final crest width of the extended fillet zone, at elevation 29.8 m, must be at least 3.5 m wide. The upstream slope of the extended fillet can be 1:1 down to original ground.
- Prior to extending the fillet zone as described above, the tundra vegetation must be stripped from the footprint where this extended fillet material will be placed.
- Cover the extended fillet with GCL by extending the lower GCL coming from the key trench. Terminate the GCL 1 m beyond the crest of the 29.8 m elevation on the horizontal surface.
- Cover the entire GCL surface with at least 500 mm (2 lifts) of saturated core material.
- It is anticipated that at least a portion of the uppermost saturated core material will degrade over the summer season, and will have to be removed when construction recommences. Therefore, adequate cover is required over the elements embedded within the core (i.e. the evaporator pipes, GCL and ground temperature cables) such that when this sacrificial layer is removed there is less risk of damaging embedded elements. As stated above, the minimum saturated core over these elements prior to close-out is 0.5 m (2 lifts)

- If there is not sufficient time to cover the embedded elements within the core with at least 0.5 m (2 lifts) of saturated core material prior to close-out, the embedded elements should not be installed at this time.
- Cover all of the exposed core material with 3 m of ROQ to act as temporary thermal protection until dam construction commences (a “marker” material layer could be placed if deemed necessary from a constructability perspective).
- Sacrificial single bead ground temperature cables should be installed within the sacrificial upper zone of the core material and in the layer with embedded elements. This will allow for monitoring of the sacrificial core material to assist with defining how much material will be needed to be removed when the dam construction recommences.
- Sacrificial single bead ground temperature cable needs to be installed in the upstream zone of the extended fillet zone to monitor ground temperatures during the summer months.
- A sump needs to be installed in the low spot of the key trench on top of the core material (approximately at station 0+85). The sump should consist of a vertical corrugated steel pipe culvert (at least 24-inches in diameter), perforated at the base. A trash pump with an automated level switch should be installed in the pipe culvert to transfer surface inflows downstream of the extended fillet zone back to Tail Lake. *SRK will provide an estimate of the inflow rate to allow sizing of the pump.*
- A pump system should be put in place to allow the water level in Tail Lake to be maintained at its pre-impoundment level of 28.3 m. Water should be discharged past the dam to its natural outflow downstream of the dam. It is recognized that approval for this may have to be obtained from the Regulatory bodies, and authorization will need to be obtained very quickly; such that the water levels can be controlled.

6 Risks Associated with Close-out Plan

Given the circumstances, not completing the North Dam at this time is not a choice, but a necessity. The recommended close-out plans as described in this memo should allow for minimal damage to rework, but is not without risk, as documented below:

- The upstream liner will not result in a perfect seal, and therefore the success of the system relies heavily on the ability to pump back seepage via the primary sump. Should this seepage pump back station fail, there is a possibility that a portion of the core may get flooded which could result in thermal degradation and damage to the core. Upon recommencement of construction, these damaged sections will have to be excavated and replaced, which could be extremely difficult and time consuming.
- It should also be noted that it may not be possible to visually ascertain how much of the core may have been compromised.
- Removal of the ROQ or sacrificial core when dam construction recommences could result in damage to embedded elements in the core, as well as the exposed ground temperature cable leads. Any damaged elements will have to be replaced.
- Excavation of the key trench along the upstream toe of the dam could result in increased early thaw degradation of the toe. Remedial work may be required.
- There may be climatic conditions which exceed the water balance scenarios simulated in determining the interim maximum water level rise in Tail Lake. Under such conditions the liner may overtop, the seepage pumps may be inundated and the core could be flooded and damaged.
- It is possible that if seepage and/or overtopping occur there may be a discharge of water downstream of Tail Lake that could exceed the Water Licence Limits (including TDS, Salinity and Ammonia).

7 Selection of a Close-out Plan

SRK recommends that contingency close-out Plan B be implemented. Specific details on placement of the single bead ground temperature cables, placement of the sump and extent of the ROQ cover,

etc. will be developed collaboratively between SRK, the EPCM Manager and the Contractor, but the concept described in this Technical Memo will need to be adhered to.
It should also be noted that SRK will prepare a re-commissioning plan, to determine how the dam construction is to proceed when construction recommences later in 2011.

8 Initiation of Close-Out Plan

A decision to cease placing frozen core material, and implement either of the close-out plans as presented should be made based on a review of the long-term (7-day) weather forecast for Cambridge Bay. The trigger should be a warming trend of three or more days where the daily high temperature is above -10°C , or as agreed between HBML and SRK.

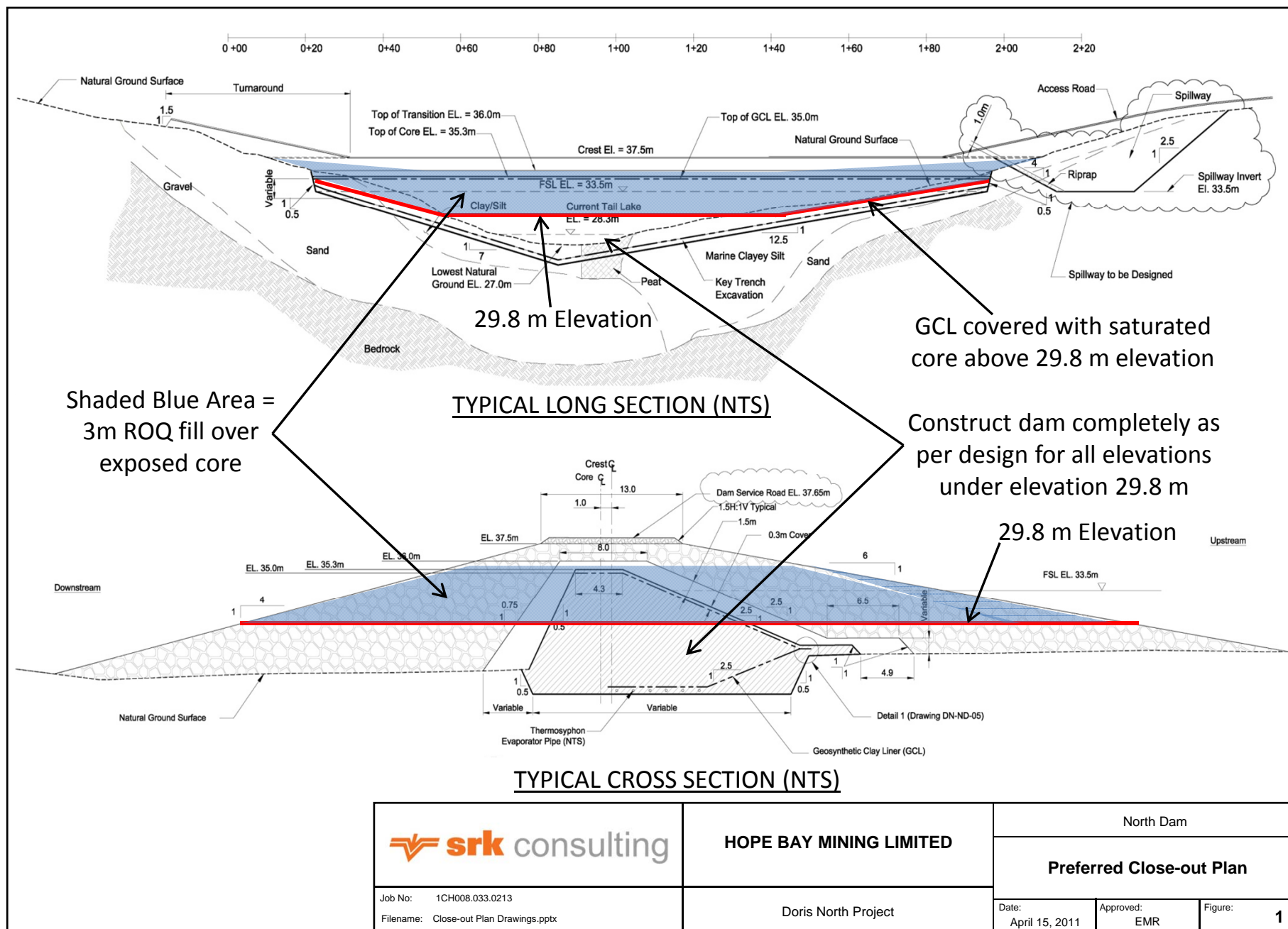
Regards


SRK Consulting (Canada) Inc.

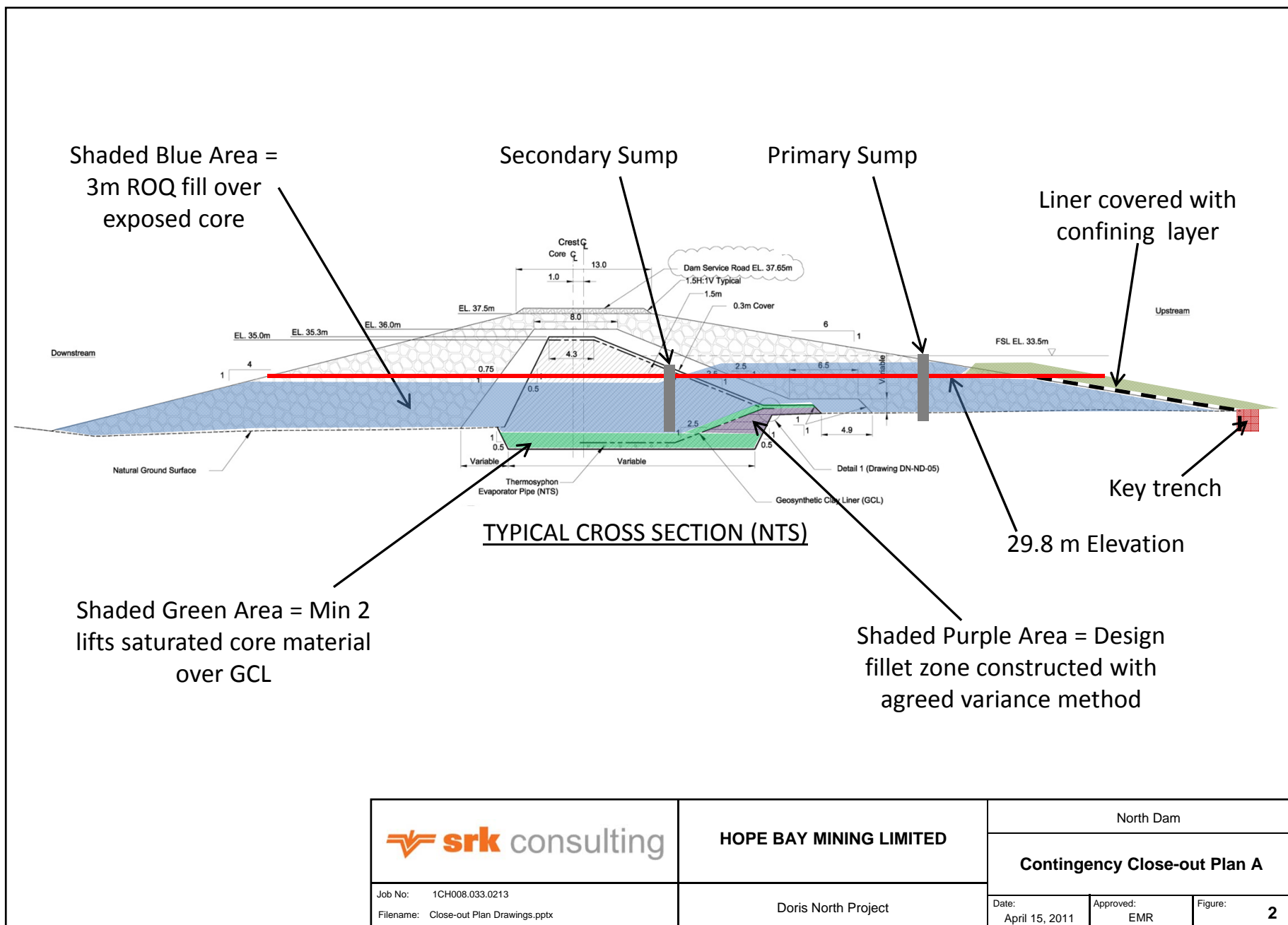
A handwritten signature in black ink, appearing to read 'Maritz Rykaart', with a stylized flourish at the end.


Maritz Rykaart, Ph.D., P.Eng.
Principal Consultant

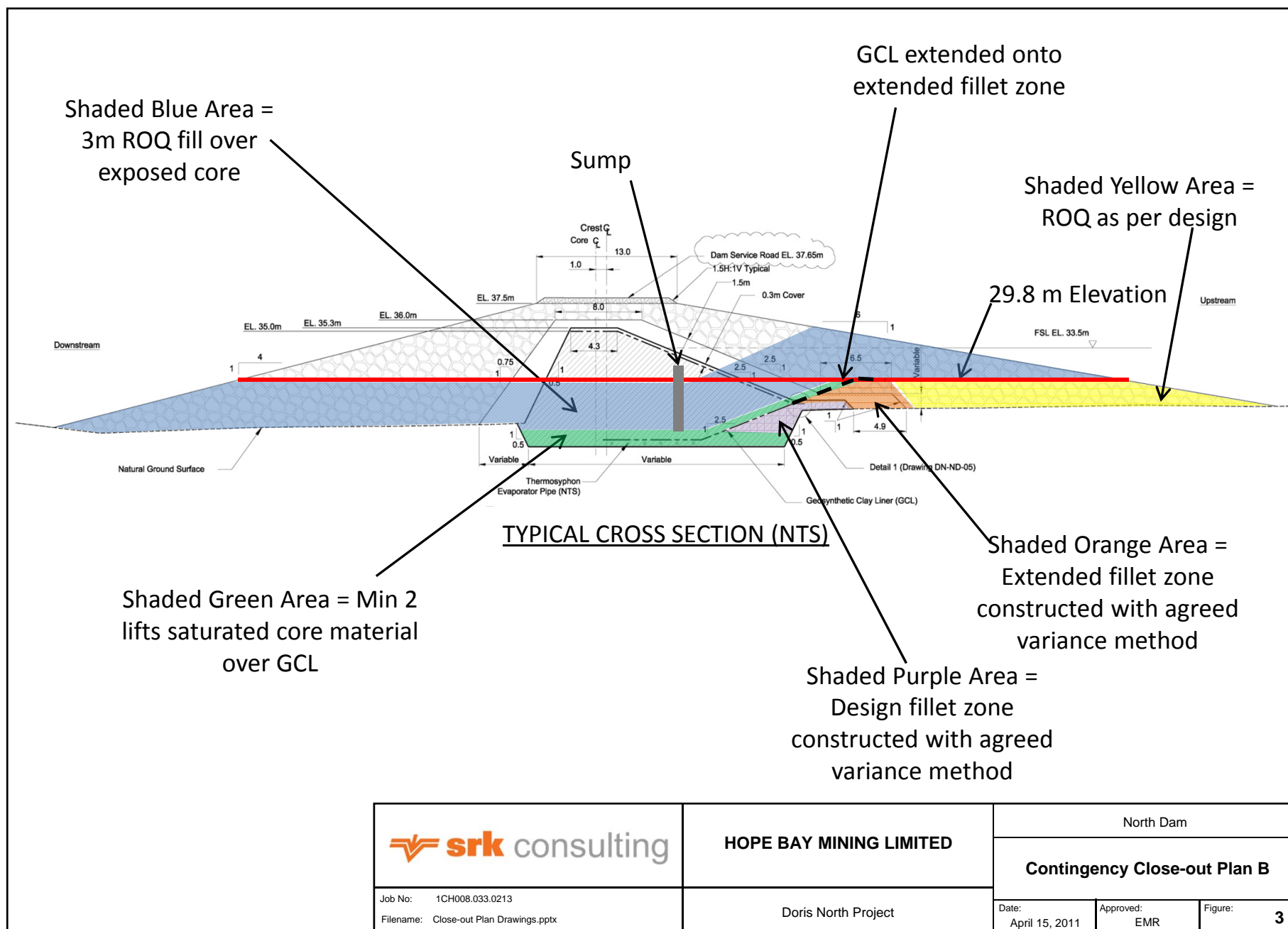
Figures




	HOPE BAY MINING LIMITED		North Dam		
			Preferred Close-out Plan		
Job No: 1CH008.033.0213	Doris North Project		Date: April 15, 2011	Approved: EMR	Figure: 1
Filename: Close-out Plan Drawings.pptx					



	HOPE BAY MINING LIMITED		North Dam		
			Contingency Close-out Plan A		
Job No: 1CH008.033.0213	Doris North Project		Date: April 15, 2011	Approved: EMR	Figure: 2
Filename: Close-out Plan Drawings.pptx					



	HOPE BAY MINING LIMITED		North Dam		
			Contingency Close-out Plan B		
Job No: 1CH008.033.0213	Doris North Project		Date: April 15, 2011	Approved: EMR	Figure: 3
Filename: Close-out Plan Drawings.pptx					

Memo

To:	Kevin Mather	Date:	July 8, 2011
Company:	JDS Engineering	From:	Maritz Rykaart
Copy to:	Chris Hanks, Christine Kowbel	Project #:	1CH008.033
Subject:	Tail Lake Water Level		

On April 15, 2011 SRK prepared a close-out plan for temporary cessation of construction of the North Dam due to the onset of warmer temperatures, which prevented timely freeze-back of the core material.

At that time SRK reassessed the water balance for Tail Lake, taking into consideration the expected rise in water levels for the summer and fall season of 2011. Considering only natural inflows from the Tail Lake catchment, and zero outflows due to the presence of the North Dam, the water level in Tail Lake was estimated to rise from the normal level in Tail Lake of 28.3 m to between 28.9 m and 29.3 m, depending on which combination of anticipated climatic events were modeled. Based on that analysis, SRK recommended that a minimum interim design height for the North Dam core be set at 29.8 m which included 0.5 m freeboard over the maximum anticipated water level rise in Tail Lake for the 2011 summer and fall seasons. This was subsequently implemented and the dam core was constructed to an elevation of 29.8 m.

Water level measurements in Tail Lake taken since June 17, 2011 has confirmed that the level is raising significantly faster than what was anticipated, most likely due to the water in Tail Lake having been at an above normal initial elevation when dam construction started. By July 8, 2011 the water level in Tail Lake has reached the interim FSL of 29.3 m leaving only the design freeboard remaining.

Further re-evaluation of the water balance, using the available rate of infill as calibration leads SRK to conclude that emergency measures should be put in place to manage the water level in Tail Lake to prevent overtopping of the partially completed frozen core structure. Such overtopping would lead to complex, time-consuming and expensive repairs once dam construction resumes in November or December of 2011.

The water balance was rerun once again considering a number of different anticipated climatic events, including average precipitation, wetter than normal precipitation, reduced evaporation potential, and inflow of extreme storm events and we have concluded that should the water level in Tail Lake reach 29.5 m immediate measures should be put in place to lower the water level in Tail Lake. This is based on the fact that a 1:100 year, 24-hr duration storm event would result in a water level rise in Tail Lake of about 0.25 m.

Regards

SRK Consulting (Canada) Inc.



Maritz Rykaart, Ph.D., P.Eng.
Principal

Memo

To:	Calvin Goldschmidt (Newmont/JDS)	Date:	March 20, 2012
Company:	Hope Bay Mining Limited	From:	Lowell Wade (SRK) Maritz Rykaart (SRK)
Copy to:	Silkie Wong (SRK)	Project #:	1CH008.058.0300.50
Subject:	Doris North Project – North Dam Slope Indicator Instrumentation		

Slope indicator instrumentation is required to be installed within the downstream face of the North Dam as shown in drawings DN-ND-30 (HB+T-CIV-CIV-OND-0061), Issued for Construction, Rev 0 and DN-ND-31 (HB+T-CIV-CIV-OND-0062), Issued for Construction, Rev 1.

SRK recommends the Slope Indicator Instrumentation, from Durham Geo Slope Indicator, be installed in the North Dam (Table 1). Selected pages from Durham Geo Slope Indicator's 2011 Catalogue are provided in Attachment 1. Should the Contractor prefer another supplier, the equivalent instrumentation, meeting these specifications, is required and to be verified by the engineer.

The slope indicator instrumentation is to be installed in boreholes which are to be backfilled with Slurry Material as specified in Section 11.2.1 of Technical Specifications, Earthworks and Geotechnical Engineering, Hope Bay Project, Nunavut, Canada, Revision G – Issue for Construction.

Table 1. Slope Indicator Instrumentation for the North Dam

Description	Part Number	Quantity	Comment
Shear Wire Casing 85 mm (3.34") diameter 10' (3.05 m) Sections	51160310	35 Sections (total) ¹	Quantity includes 3 sections as spares ²
Casing Anchor 85 mm (3.34") diameter	51104385	7 Anchors (total)	Quantity includes 1 anchor as a spare ²
Anchor + Grout Valve 85 mm (3.34") diameter	51104485	7 Anchors + Grout Valve (total)	This part is optional depending on Contractors method of installation Quantity includes 1 spare ²
Digitilt Inclinometer Probe Metric-Unit Probe	50302510	1 Inclinometer Probe	
Control Cable 30 m Control Cable Complete	50601030	1 Complete Control Cable (30 m in length)	
Control Cable Metric Cable, Custom Length	50601010	20 m	Order either the 30 m Complete Control Cable or Custom Control Cable and Connectors

Connector for Readout	50301800	1 Connector	Order either the 30 m Complete Control Cable or Custom Control Cable and Connectors
Connector for Probe	50303100	1 Connector	Order either the 30 m Complete Control Cable or Custom Control Cable and Connectors
Pulley Assembly Large	51104606	1 Assembly	
Dummy Probe Metric Wheel Base	50304810	1 Dummy Probe	
Dummy Probe Reel & Line for Dummy Probe	50304900	1 Reel with 60 m (200') of nylon line	
Slip-Ring Reel 200 m (650') Capacity	50503100	1 Reel for Control Cable	
Digitilt DataMate II Readout	50310900	1 Readout	
DMM for Windows	50310970	1 DataMate Manager Program	
DigiPro Inclinometer Software for Windows 3 User License	50310000	1 DigiPro Software Package	

Notes:

1. These quantities were determined based on the neat lines of the IFC drawings included with this Memo. The Contractor should determine the quantities required based on the as-built survey of for the North Dam.
2. Recommended number of spares. Contractor may choose alternate quantity.

Attachment 1
Selected Pages from Durham Geo Slope Indicator
2011 Catalogue

Inclinometer Casing



Inclinometer Casing

Inclinometer casing is a special purpose, grooved pipe used in inclinometer installations. It is typically installed in boreholes, but can also be embedded in fills, cast into concrete, or attached to structures.

Inclinometer casing provides access for the inclinometer probe, allowing it to obtain subsurface measurements. Grooves inside the casing control the orientation of the probe and provide a surface from which repeatable tilt measurements can be obtained.

Choosing Inclinometer Casing

Although Slope Indicator casing is competitively priced, price should never be the deciding factor in choosing inclinometer casing. The cost of casing is quite small relative to the cost of mobilizing a drill rig, and very small relative to the cost of a failed installation.

This page summarizes the most important factors to consider when choosing casing.

Casing Diameter

Casing is designed to deform with movement of the adjacent ground or structure. The useful life of the casing ends when continued movement of the ground pinches or shears the casing, preventing passage of the inclinometer probe. Larger diameter casing generally provides longer life.

85mm (3.34") Casing is suitable for landslides and long term monitoring. It is also appropriate for monitoring multiple shear zones or very narrow shear zones, and it is required for the horizontal Digitilt inclinometer probe.

70mm (2.75") Casing is suitable for construction projects. It can also be used for slope stability monitoring when only a moderate degree of deformation is anticipated.

48mm (1.9") Casing is suitable for applications where small deformations are distributed over broad zones. It is generally not installed in soils.

Casing Grooves

Measurement accuracy is directly influenced by the quality of casing grooves. Slope Indicator optimizes casing grooves for the wheels of the Digitilt inclinometer probe, providing a flat surface for the wheels and also the extra width needed when the probe must pass through cross-axis curvature. Groove spiral is also tightly controlled.

Casing Strength

In borehole installations, the annular space around the casing is usually backfilled with grout. The grouting process can generate pressure high enough to cause the casing to collapse. In deep installations, the pressure of grout must be controlled by stage grouting, but in other cases, the casing must be strong enough to withstand the normal pressure of grouting. Slope Indicator uses thick-walled pipe and carefully controls the depth of the grooves.

Sealable Couplings

If casing joints are not adequately sealed, grout can force its way into the casing and later prevent the probe from reaching its intended depth.

Slope Indicator offers several types of couplings and casings, all of which can be sealed easily and consistently. Our newest designs feature O-ring seals, and our older designs feature tight-fitting surfaces that are fused together with solvent cement.

Assembly

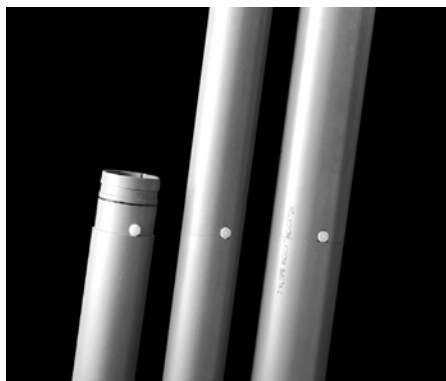
Inclinometer casing should be easy to assemble, even with an untrained crew. Slope Indicator's QC casing, which snaps together, is the current leader in quick and easy assembly. Other types of casing are assembled with shear wires or with solvent cement.

Casing Materials

Slope Indicator uses only ABS plastic for its casing for several reasons. ABS plastic retains its shape and flexibility over a wider range of temperatures than PVC plastic. ABS plastic is much easier to handle and seal than fiberglass casing. Finally, ABS plastic is suitable for long term contact with all types of soils, grouts, and ground water, unlike aluminum casing, which is no longer recommended for any application.

Installation Information

Visit the technical support section at www.slopeindicator.com to find recommended grout mixes, ways to counter casing buoyancy, and notes on other installation issues.



QC CASING

QC (Quick Connect) casing features snap-together convenience and strong, flush joints.

Grooves: Grooves are machine broached for excellent control of width, chamfer, depth, straightness, and spiral.

Sealing: O-ring seals prevent entry of grout.

Coupling: Built-in couplings snap together to make a flush joint. Unique locking mechanism engages full inner circumference of casing, providing much stronger joints than other snap-type casings.

Assembly: Press casing sections together until joint snaps closed. The resulting joint is strong, flush, and grout-proof. Solvent cement, rivets, or tape are not required. O-ring lubricant is applied at factory. Extra O-rings and lubricant are supplied with each box of casing.

Best for: General use.

QC Casing 85mm • 3.34"

Casing OD: 85 mm, 3.34 inches.

Casing ID: 73 mm, 2.87 inches.

Collapse Rating: 12.4 bar, 180 psi.

Load Rating: 635 kg, 1400 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

QC Casing 70mm • 2.75"

Casing OD: 70 mm, 2.75 inches.

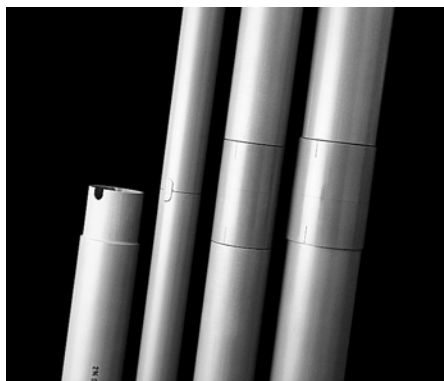
Casing ID: 59 mm, 2.32 inches.

Collapse Rating: 16.5 bar, 240 psi.

Load Rating: 635 kg, 1400 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.



STANDARD CASING

Slope Indicator's traditional inclinometer casing features high-strength, flush joints and is available in three diameters.

Grooves: Grooves are machine broached for excellent control of width, chamfer, depth, straightness, and spiral.

Sealing: Solvent cement and tape.

Coupling: Precision molded couplings have interference fit for high-strength bonding. Small diameter version has integral couplings.

Assembly: Casing and couplings are glued together with ABS solvent cement, riveted, and wrapped with tape.

Best for: General use. The extra-strong joints are helpful in very deep boreholes and oversize boreholes in which casing is not well supported.

Standard Casing 85mm • 3.34"

Coupling OD: 89 mm, 3.51 inches.

Casing OD: 85 mm, 3.34 inches.

Casing ID: 73 mm, 2.87 inches.

Collapse Rating: 10.6 bar, 155 psi.

Load Rating: 320 kg, 700 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

Standard Casing 70mm • 2.75"

Coupling OD: 70 mm, 2.75 inches.

Casing OD: 70 mm, 2.75 inches.

Casing ID: 59 mm, 2.32 inches.

Collapse Rating: 15 bar, 220 psi.

Load Rating: 320 kg, 700 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

Standard Casing 48mm • 1.9"

Casing OD: 48 mm, 1.9 inches.

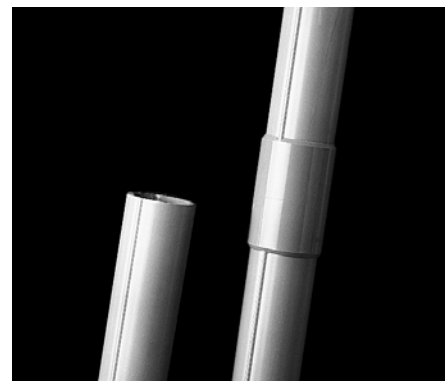
Casing ID: 38 mm, 1.5 inches.

Collapse Rating: 24 bar, 350 psi.

Load Rating: 320 kg, 700 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.



EPIC CASING

EPIC casing is an economical casing that can be cut and coupled at any point along its length.

Grooves: Grooves are formed during extrusion and are less precise than broached grooves.

Sealing: Solvent cement, mastic, and tape.

Coupling: Oversize couplings make very strong joints.

Assembly: Casing and couplings are glued together with ABS solvent cement. The joint must then be sealed with mastic and tape.

Best for: General use. Some care must be taken to seal the coupling.

EPIC Casing 70mm • 2.75" Only

Coupling OD: 78 mm, 3.07 inches.

Casing OD: 70 mm, 2.75 inches.

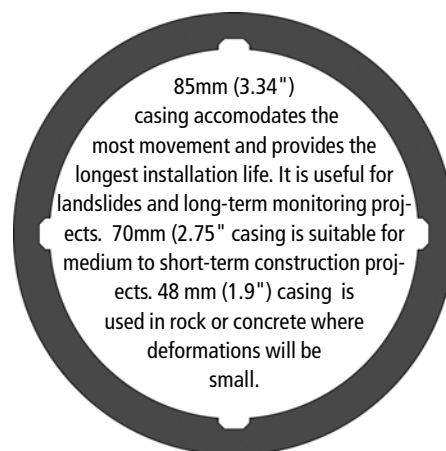
Casing ID: 60 mm, 2.32 inches.

Collapse Rating: 15 bar, 220 psi.

Load Rating: 320 kg, 700 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.5^\circ$ per 3m or 10' section.





CPI CASING

CPI casing features quick assembly and disassembly and is available in 3 diameters.

Grooves: Grooves are machine broached for excellent control of width, chamfer, depth, straightness, and spiral.

Sealing: O-ring seals prevent entry of grout.

Coupling: Oversize couplings and shear wires make high strength joint.

Assembly: Apply grease to O-rings, press coupling onto casing, and insert shear wire.

Best for: Cold weather assembly or temporary installations that involve repeated disassembly.

CPI Casing 85mm · 3.34"

Coupling OD: 94 mm, 3.7 inches.

Casing OD: 85 mm, 3.34 inches.

Casing ID: 73 mm, 2.87 inches.

Collapse Rating: 11 bar, 155 psi.

Load Rating: 635 kg, 1400 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

CPI Casing 70mm · 2.75"

Coupling OD: 76 mm, 3 inches.

Casing OD: 70 mm, 2.75 inches.

Casing ID: 59 mm, 2.32 inches.

Collapse Rating: 15 bar, 220 psi.

Load Rating: 400 kg, 900 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

CPI Casing, 48mm · 1.9"

Coupling OD: 54 mm, 2.12 inches.

Casing OD: 48 mm, 1.9 inches.

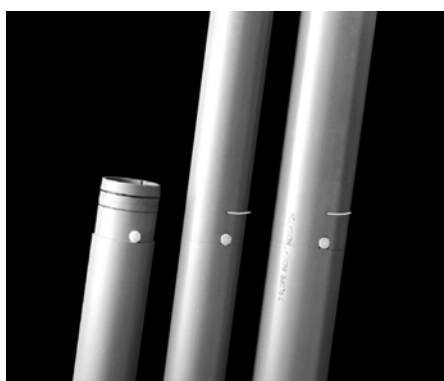
Casing ID: 38 mm, 1.5 inches.

Collapse Rating: 24 bar, 350 psi.

Load Rating: 320 kg, 900 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3 m or 10' section.



SHEAR-WIRE CASING

Shear-Wire casing features flush joints that can be assembled easily in cold weather.

Grooves: Grooves are machine broached for excellent control of width, chamfer, depth, straightness, and spiral.

Sealing: O-ring seals prevent entry of grout.

Coupling: Built-in couplings lock together with removable nylon shear wire to make flush joint.

Assembly: Press casing sections together, then insert shear wire. The result is a flush, grout-proof joint. Solvent cement, rivets, and tape are not required. O-ring lubricant is applied at the factory. Extra O-rings, lubricant, and shear wires are supplied with each box of casing.

Best for: Easy assembly in weather that is too cold for solvent cement or snap-together joints. Generally used in water-filled boreholes.

Shear Wire Casing 85mm · 3.34"

Casing OD: 85 mm, 3.34 inches.

Casing ID: 73 mm, 2.87 inches.

Collapse Rating: 12.4 bar, 180 psi.

Load Rating: 225 kg, 500 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.

Shear Wire Casing 70mm · 2.75"

Casing OD: 70 mm, 2.75 inches.

Casing ID: 59 mm, 2.32 inches.

Collapse Rating: 16.5 bar, 240 psi.

Load Rating: 225 kg, 500 lb.

Temp rating: -29 to 88 °C, -20 to 190 °F.

Spiral: $\leq 0.33^\circ$ per 3m or 10' section.



GROUT VALVES

Grout valves allow placement of grout backfill in boreholes that cannot accommodate an external grout pipe. The one-way valve is installed in the bottom section of casing. A grout pipe is lowered through the casing to mate with the grout valve and deliver the grout.

TELESCOPING SECTIONS

Optional telescoping sections accommodate 150 mm (6 inches) of compression or extension. Fully extended, each telescoping section adds 0.76 m (2.5 feet) of length to the casing.

CASING ANCHORS

In its fluid state, grout exerts an uplift force that can push even water-filled casing out of the borehole. Holding the casing down from the top has unfortunate side-effects: the casing goes into compression and snakes from side to side in the borehole. Thus casing curvature is present from the start, and slight variations in the positioning of the probe are more likely to produce reading errors..

The casing anchor, installed in place of the bottom cap, provides a convenient way to counter casing buoyancy and reduces casing curvature, since the casing self-centers in the borehole. The anchor has spring loaded arms that are activated when a pin is pulled. Anchors are available for 70 mm and 85 mm casing.



QC CASING 85MM · 3.34"

Casing Section, 10' (3.05 m)	51150310
Casing Section, 5' (1.52 m)	51150311
Section, Telescoping	51150320
Cap, Bottom	51150330
Cap, Bottom, Heavy Duty	51100520
Grout Valve, Gasket Type	51100830
Cap, Top	51100500
Cap, Locking	51100550
Splice Kit, Male	51150350
Splice Kit, Female	51150351

QC CASING 70mm · 2.75"

Casing Section, 10' (3.05 m)	51150210
Casing Section, 5' (1.52 m)	51150211
Section, Telescoping	51150220
Cap, Bottom	51150230
Cap, Bottom, Heavy Duty	51101520
Grout Valve, Gasket Type	51100820
Cap, Top	51101500
Cap, Locking	51101550
Splice Kit, Male	51150250
Splice Kit, Female	51150251

STANDARD CASING 85mm · 3.34"

Casing Section, 10' (3.05 m)	51100100
Casing Section, 5' (1.52 m)	51100105
Telescoping Section	51106400
Coupling	51100200
Cap, Bottom, Heavy Duty	51100520
Grout Valve, Gasket Type	51100830
Cap	51100500
Cap, Locking	51100550
Pop Rivet AD44H	51103301

STANDARD CASING 70mm · 2.75"

Casing Section, 10' (3.05 m)	51101100
Casing Section, 5' (1.52 m)	51101105
Telescoping Section	51107400
Coupling	51101200
Cap, Bottom, Heavy Duty	51101520
Grout Valve, Gasket Type	51100820
Cap	51101500
Locking Cap with Padlock	51101550
Pop Rivet AD42H	51003303

STANDARD CASING 48mm · 1.9"

Casing Section, 5' (1.52 m)	51102305
Cap	51102500
Locking Cap with Padlock	51102550
Grout Valve, Gasket Type	51104000

EPIC CASING 70mm · 2.75"

Casing Section, 10' (3.05 m)	51111100
Coupling	51111200
Telescoping Coupling	51111400
Cap, Bottom, Heavy Duty	51101520
Grout Valve, Gasket Type	51100820
Cap	51111500
Locking Cap with Padlock	51101550
Pop Rivet AD46H	51003310
Lubricant for Telescoping Coupling	57504000

CPI CASING 85mm · 3.34"

Casing Section, 10' (3.05 m)	57500100
Casing Section, 5' (1.52 m)	57500105
Telescoping Section	57506400
Coupling with 2 Shear Wires	57500200
Cap with Shear Wire	57500500
Cap, Bottom, Heavy Duty	51100520
Grout Valve, Gasket Type	51100830
Cap, Top	51100500
Spare Nylon Shear Wire	57500700
O-Ring Lubricant	57504000

CPI CASING 70mm · 2.75"

Casing Section, 10' (3.05 m)	57501100
Casing Section, 5' (1.52 m)	57501105
Telescoping Section	57507400
Coupling with 2 Shear Wires	57501200
Cap with Shear Wire	57501500
Cap, Bottom, Heavy Duty	51101520
Grout Valve, Gasket Type	51100820
Cap, Top	51101500
Spare Nylon Shear Wire	57501700
O-Ring Lubricant	57504000

CPI CASING 48mm · 1.9"

Casing Section, 5' (1.52 m)	57502105
Coupling with 2 Shear Wires	57502200
Cap with Shear Wire	57502500
Grout Valve, Gasket Type	57503700
Cap, Top	51102500
Spare Nylon Shear Wire	57502700
O-Ring Lubricant	57504000

SHEAR WIRE CASING 85mm · 3.34"

10' (3.05 m) Casing Section	51160310
5' (1.52 m) Casing Section	51160311
Section, Telescoping	51160320
Cap, Bottom	51160330
Cap, Bottom, Heavy Duty	51100520
Grout Valve, Gasket Type	51100830
Cap, Top	51100500
Cap, Locking	51100550

SHEAR WIRE CASING 70mm · 2.75"

Casing Section, 10' (3.05 m)	51160210
Casing Section, 5' (1.52 m)	51160211
Section, Telescoping	51160220
Cap, Bottom	51160230
Cap, Bottom, Heavy Duty	51101520
Grout Valve, Gasket Type	51100820
Cap, Top	51101500
Cap, Locking	51101550

CASING ANCHORS

Casing Anchor, 85 mm (3.34")	51104385
Casing Anchor, 70 mm (2.75")	51104370
Anchor + Grout Valve, 85mm(3.34")	51104485
Anchor + Grout Valve, 70mm(2.75")	51104470

INSTALLATION ACCESSORIES

Mastic Sealing Tape	51003800
Vinyl Tape	51003900
Duct Tape	51004000
ABS Solvent Cement, 1/2 pint	51103401
ABS Solvent Cement, 1 pint	51103402
Pop Rivet Gun	50100202
Casing Clamp	50100200

Digitilt Inclinometer Probe



Advantages

Proven Performance: Digitilt inclinometer probes have earned a world-wide reputation for durability, high precision, and rapid response.

Repeatable Tracking: To ensure consistent tracking in all types of casing, the probe is equipped with robust wheel carriages, sealed wheel bearings, and specially designed wheels.

Extended Installation Life: The compact size of the Digitilt probe allows it to pass through small radius curves, extending the useful life of the installation beyond that provided by other inclinometer probes.

Computerized Testing: Each probe undergoes thorough testing on a computerized calibration table.

Reliable Control Cable: Digitilt control cable is durable and easy to handle, stays flexible in cold weather, resists chemicals and abrasion, and provides excellent dimensional stability. Flexible rubber depth marks are permanently vulcanized to the cable jacket. The marks cannot loosen and have no rigid edges that can damage the cable jacket and conductors.

Consistent Depth Control: The pulley assembly, a recommended accessory, helps the operator achieve uniform depth control. The one-way action of its cable clamp ensures consistent positioning of the probe.

Complete Solutions: Slope Indicator's inclinometer system includes high-quality casing, vertical and horizontal traversing probes, vertical and horizontal in-place sensors, recording readouts, graphing software, and specialized accessories.

Applications

Digitilt® inclinometers are used to monitor subsurface movements of earth in landslide areas and deep excavations. They are also used to monitor deformations in structures such as dams and embankments.

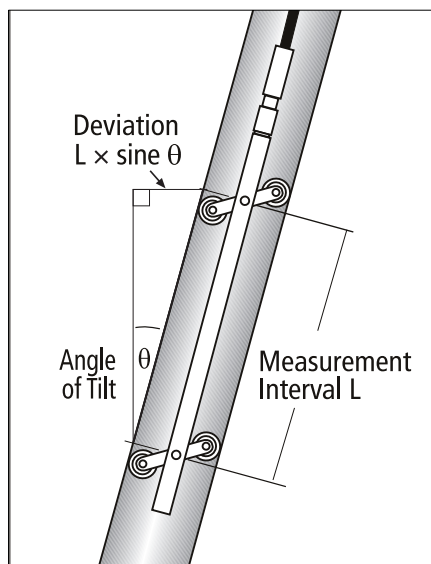
Operation

Inclinometer casing is typically installed in a vertical borehole that passes through suspected zones of movement into stable ground. The Digitilt inclinometer probe, control cable, pulley assembly, and readout are used to survey the casing. The first survey establishes the initial profile of the casing. Subsequent surveys reveal changes in the profile if ground movement occurs.

During a survey, the probe is drawn upwards from the bottom of the casing to the top, halted in its travel at 0.5 m or 2' intervals for tilt readings. The inclination of the probe body is measured by two force-balanced, servo-accelerometers. One accelerometer measures tilt in the plane of the inclinometer wheels, which track the longitudinal grooves of the casing. The other accelerometer measures tilt in the plane perpendicular to the wheels.

Inclination measurements are converted to lateral deviations, as shown in the drawing below. Changes in deviation, determined by comparing current and initial surveys, indicate ground movement.

Plotting changes in deviation yields a high resolution displacement profile. Displacement profiles are useful for determining the magnitude, depth, direction, and rate of ground movement.



DIGITILT INCLINOMETER PROBE

Metric-Unit Probe50302510
English-Unit Probe50302500

Digitilt inclinometer probe includes a carrying case and instruction manual. Control cable, pulley, and readout are not included.

METRIC PROBE SPECIFICATIONS

Wheel base: 500 mm.

Range: $\pm 53^\circ$ from vertical.

Resolution: 0.02 mm per 500 mm.

Repeatability: $\pm 0.01\%$ FS.

Calibration: 14 point calibration with NIST traceable calibration device.

Temperature Rating: -20 to +50 °C.

Dimensions: 25.4 x 653 mm. Control cable connector adds 92 mm to length of probe.

Weight: 1.8 kg.

Material: Stainless steel.

ENGLISH PROBE SPECIFICATIONS

Wheel base: 24".

Range: $\pm 35^\circ$ from vertical.

Resolution: 0.0012 inch per 24 inches.

Repeatability: $\pm 0.01\%$ FS.

Calibration: 14 point calibration with NIST traceable calibration device.

Temperature Rating: -4 to +122 °F.

Dimensions: 1 x 30". Control cable connector adds 3.75" to length of probe.

Weight: 4 lb.

Material: Stainless steel.

ACCURACY SPECIFICATIONS

Metric Systems: ± 0.25 mm per reading and ± 6 mm per 50 readings.

English Systems: ± 0.01 inch per reading and ± 0.3 inch per 50 readings.

These system accuracy specifications were derived empirically from the analysis of a large number of surveys and include both random and systematic errors introduced by casing, probe, cable, readout, and operator. Casing was installed within 3 degrees of vertical, and operators followed recommended reading practices.

When corrections for systematic error are made, the remaining error is random. It accumulates with the square root of the number of readings. Thus the best precision obtainable with a metric system is approximately ± 1.4 mm per fifty readings, and the best precision of an English unit system is approximately ± 0.05 inch per fifty readings.

CONTROL CABLE

30m Control Cable, Complete . . . 50601030

50m Control Cable, Complete . . . 50601050

100m Control Cable, Complete . . 50601100

100 ft Control Cable, Complete . . 50601002

150 ft Control Cable, Complete . . 50601003

300 ft Control Cable, Complete . . 50601004

Metric Cable, Custom Length . . . 50601010

English Cable, Custom Length . . . 50601000

Connector for Readout 50301800

Connector for Probe 50303100

Control cables listed as complete are standard lengths of cable and include connectors. If you order a custom length cable, you must also order connectors.

Control cable is supplied with no splices or surface defects and has a rated strength of 480 lb and a working strength of 120 lb.

Metric cable is graduated with yellow 0.5-meter marks and red 1-meter marks. English cable is graduated with yellow 2-foot marks and red 10-foot marks.

Cable has a steel core wire to control stretching, a torsion braid to counter cable torque, a binder layer to eliminate slipping of cable jacket relative to the steel core, and depth marks that are vulcanized onto the cable jacket. The Neoprene cable jacket resists chemicals and abrasions and is flexible in cold temperatures.



PULLEY ASSEMBLY

Small Pulley 51104604

Large Pulley 51104606

Pulley assembly clamps onto top of casing to help operator control depth of probe. Cable clamp serves as reference for depth marks. Removable pulley wheel facilitates insertion of probe into casing.

Use small pulley with 48 or 70 mm (1.9 or 2.75") casing. Use large pulley with 70 or 85mm (2.75 or 3.34") casing.

READOUTS

Digitilt DataMate50310900

The Digitilt DataMate is a recording readout. The Digitilt 09 is a manual readout. See separate data sheets for details.

DUMMY PROBE

Metric Wheel Base50304810

English Wheel Base50304800

Reel & Line for Dummy Probe . . . 50304900

Dummy probe is used to test for casing continuity, groove continuity, and obstructions or severe distortions of casing that could hinder retrieval of Digitilt probe and control cable. Dummy probe is stainless steel and has dimensions and wheels identical to those of Digitilt probe.

Reel with 60 m (200') of nylon line is used to lower and retrieve dummy probe.



SLIP-RING REEL

200 m (650') capacity50503100

300 m (1150') capacity50503300

Slip-ring cable reel allows the readout to remain connected while the reel is operated. Includes jumper cable to connect reel to readout.

STORAGE REEL

30m (100') capacity50502030

50 m (164') capacity50502050

100 m (360') capacity50502110

Sturdy storage reel with large diameter hub keeps cable neat when not in use.

Digitilt DataMate II



Simple to operate, the compact Digitilt DataMate runs 16 hours on one charge, stores up to 320 surveys, and transfers data to a PC for processing.

The Digitilt DataMate II

The DataMate records data from inclinometer probes, tiltmeters, and spiral sensors. It stores up to 320 complete inclinometer surveys and can power a Digitilt inclinometer probe for 16 hours.

The DataMate II is compatible with the original DataMate but features updated electronics for faster operation, a USB port, and increased storage capacity.

The DataMate is designed for hard use in difficult environments. The case is sealed against humidity, and the bright, backlit display is visible under all lighting conditions. Connector sockets are located on the face panel, away from contact with mud, water, or snow.

Recording Surveys

The Digitilt DataMate keeps a list of inclinometer installations in its memory. To begin a survey, the operator selects an installation from the list.

The DataMate then displays the starting depth for that installation, and the operator positions the probe at that depth.

The display shows the depth, the A-axis reading, and the B-axis reading. When both readings are stable and ready to record, the DataMate displays a graphic "ready" signal, and the operator uses the hand switch or the keypad to record the readings.

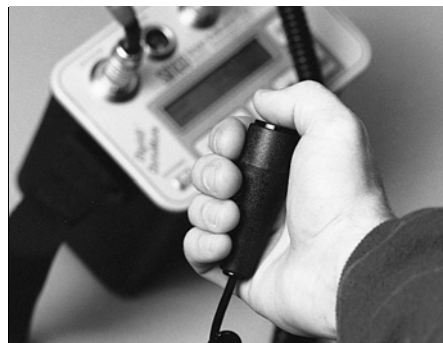
The DataMate beeps to confirm that the readings were recorded and then displays the next depth. The operator raises the probe to this depth, waits for the ready signal, and then records the readings, repeating these steps until the probe reaches the top of the casing. The DataMate then prompts the operator to rotate the probe 180 degrees and begin the second pass through the casing.

The operator can correct a mistake at any time by simply scrolling through the data to any depth, repositioning the probe, and continuing the survey from that point.

Validating Surveys

The DataMate provides checksum statistics to help the operator validate the survey. By comparing the mean and standard deviation of checksums for the current survey with those of previous surveys, the operator can be confident that the data are good.

The DataMate provides routines to help the operator identify questionable readings, which can then be corrected by repositioning the probe. The DataMate displays "live" and recorded readings side by side for comparison, and the operator can overwrite the recorded reading with the live reading, if appropriate.



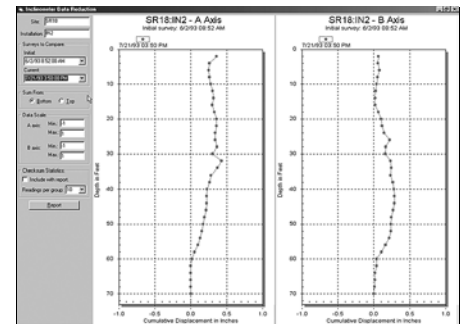
Convenient hand switch reduces fatigue and lets you keep the DataMate clear of the work area.

Retrieving Surveys

Returning to the office, the operator connects the DataMate to a PC, and then runs the DataMate Manager program. The manager program retrieves the recorded surveys and stores them in a database for easy access.

Processing Surveys

Slope Indicator inclinometer software eliminates repetitive work, ensures that calculations are performed accurately, and dramatically reduces the time required to process data.



DMM for Windows software lets you retrieve surveys and produce reports containing readings and graphics.

The DataMate Manager program is included with the DataMate. It can print reports containing inclinometer readings, checksum statistics, and simple graphs. It also provides routines for settlement correction, spiral data set expansion, and bias shift analysis.

DigiPro for Windows is an optional graphing program that provides additional types of graphs, including some diagnostic plots, and a number of sophisticated correction routines. A trial version is available for download from the Slope Indicator web site.

DIGITILT DATAMATE II READOUT

Digitilt DataMate II50310900

The Digitilt DataMate is a portable readout for Digitilt sensors. It provides depth prompts and stores readings in memory for transfer to a PC. Includes hand switch, battery charger, USB interface cable for PC, and CD with DMM for Windows and manual. Specify 100, 115, 220, or 240 volts and 50 or 60Hz for charger. DigiPro software is not included.

Sensor Compatibility: English and metric versions of vertical and horizontal Digitilt inclinometer probes, tiltmeters, and spiral sensors.

Displayed Units: Metric indicator displays readings as $25000 \times$ the sine of the angle of tilt. English indicator displays readings as $20000 \times$ the sine of the angle of tilt.

Survey Types: 2-pass survey for inclinometer probes; 4-pass survey for spiral sensors.

Memory Capacity: Stores 160 installations and up to 320 surveys (32,000 depths with 4 data values at each depth).

Maximum Survey Depth: 500m or 2000 feet.

Reading Intervals: Fixed intervals. Minimum interval is 0.5 m with metric probe or 1 foot with English-unit probes.

Menu-Selected Functions

Record: Prompts operator with starting depth. Displays A and B axis readings. Displays ready signal when readings are stable. Displays next depth after readings are recorded.

Manual Read: Allows use of DataMate when memory is full or depth display is not required.

Validate: Calculates checksum statistics.

Correct: Allows user to correct mistakes.

Compare: Calculates a single value for cumulative deviation or cumulative displacement.

Comm: For communication with PC.

Print: Outputs ASCII data to a terminal program running on a non-DOS/Windows computer.

Operating Time: 16 hours @ 20°C (68°F) of continuous power to probe. Backup battery preserves data for six months.

Temperature Rating: -20 to 50°C (-4 to 122°F).

Display: 20 x 2 backlit LCD rated for extended temperatures.

Battery: 6 volt, 6 Ah, gelled electrolyte, lead-acid battery. Recharges to 80% capacity in 16 hours using the included charger.

Case: Splashproof, non-submersible, aluminum case with plastic shell. Connectors are waterproof when capped or in use.

Dimensions: 127 x 178 x 178 mm (5 x 7 x 7").

Weight: 3 kg (6.5 lb).

DMM FOR WINDOWS

DMM for Windows50310970

The DataMate Manager program (DMM) transfers readings from Digitilt DataMate to a PC. DMM also processes, plots, and prints reports.

DMM is supplied on a Resource CD with the purchase of the Digitilt DataMate and can be downloaded free from www.slopeindicator.com.

System Requirements: Windows computer with USB port.

Data Retrieval: DMM communicates with DataMate through a USB connection.

Data Storage: Surveys retrieved from DataMate are stored in an MDB database. DMM supports drag-and-drop operations between databases and provides easy functions for editing, renaming, moving, and archiving installations and surveys. Surveys retrieved from the DataMate can also be saved as ASCII files.

Data Manipulation: DMM provides a settlement correction routine and a spiral set expansion routine. Both routines generate new surveys.

Import Capabilities: DMM imports legacy data from Slope Indicator's previous formats and from GTILT®. The program also allows manual entry of data.

Report Capabilities: DMM prints inclinometer readings with checksums, compares two surveys (typically current vs initial) to generate A and B-axis graphs of cumulative displacement. The program generates graphs of cumulative deviation. Graphs are displayed on screen and can be printed in a report. Reports can also include checksum statistics, bias-shift analysis tables, and tabular data in digi units (differences and changes).



DIGITILT 09 INDICATOR

Digitilt 09, Metric50300910

Digitilt 09, English50300900

The Digitilt 09 Indicator is a portable readout for Digitilt sensors. It displays readings, but does not record them. The user must keep track of depths and readings on a field data sheet. A battery charge is included. Please specify 100, 115, 220, or 240 volt and 50 or 60Hz.

Compatibility: Digitilt inclinometer probes, Digitilt tiltmeters, and spiral sensors.

Displayed Units: Metric indicator displays readings as $2.5 \times$ the sine of the angle of tilt. English indicator displays readings as $2 \times$ the sine of the angle of tilt.

Readings can be entered into the DMM for Windows database and graphed with DigiPro for Windows. If you chose to do this, write down readings without the displayed decimal point and enter the readings as integers.

Resolution: Metric indicator provides resolution of 1 in 25,000. English indicator provides resolution of 1 in 20,000.

Display: Large, backlit 4.5 digit LCD with heater for cold weather operation.

Battery: Rechargeable 6 volt, 6 Ah gelled electrolyte, lead-acid battery. Battery life is 12 hours with fully charged battery. LCD heater reduces operating time up to 50% when temperature is below 5°C (40°F).

Temperature Rating: -20 to 50°C (-4 to 122°F).

Dimensions: 127 x 178 x 178 mm (5 x 7 x 7").

Weight: 3.4 kg (7.5 lb).

DigiPro Inclinometer Software

Applications

DigiPro software processes and plots inclinometer data recorded by the Digitilt DataMate readout. It creates high-resolution graphs and supports advanced routines for identifying and correcting systematic error.

Productivity Features

Easy Graphing: Choose an installation, choose the type of graph that you want, and click OK. With just three clicks, your inclinometer data is reduced and plotted. Generating the same results from spreadsheets would take hours of repetitive work.

Reusable Settings: When you save a graph, DigiPro automatically stores scales labels, legends, and other settings as a "report." To process new inclinometer surveys, just click on the report. DigiPro retrieves your graph settings, automatically finds the new data, and creates an updated graph.

Uniform Style and Format: DigiPro supplies standard templates that you can customize, adding your company logo, standardizing scales, etc. These customized templates will ensure that all new reports have a uniform format and style.

Technical Features

Standard Plots: DigiPro supports all of the standard types of inclinometer plots that are used to analyze movements and deformations of soil, rock, and structures. Cumulative displacement plots show movement relative to a fixed point of origin, incremental displacement plots reveal shear planes, and time plots show acceleration or deceleration of movement.

Diagnostic Plots: To help identify and evaluate errors in the data, DigiPro provides various plots that help you check for instrument drift,

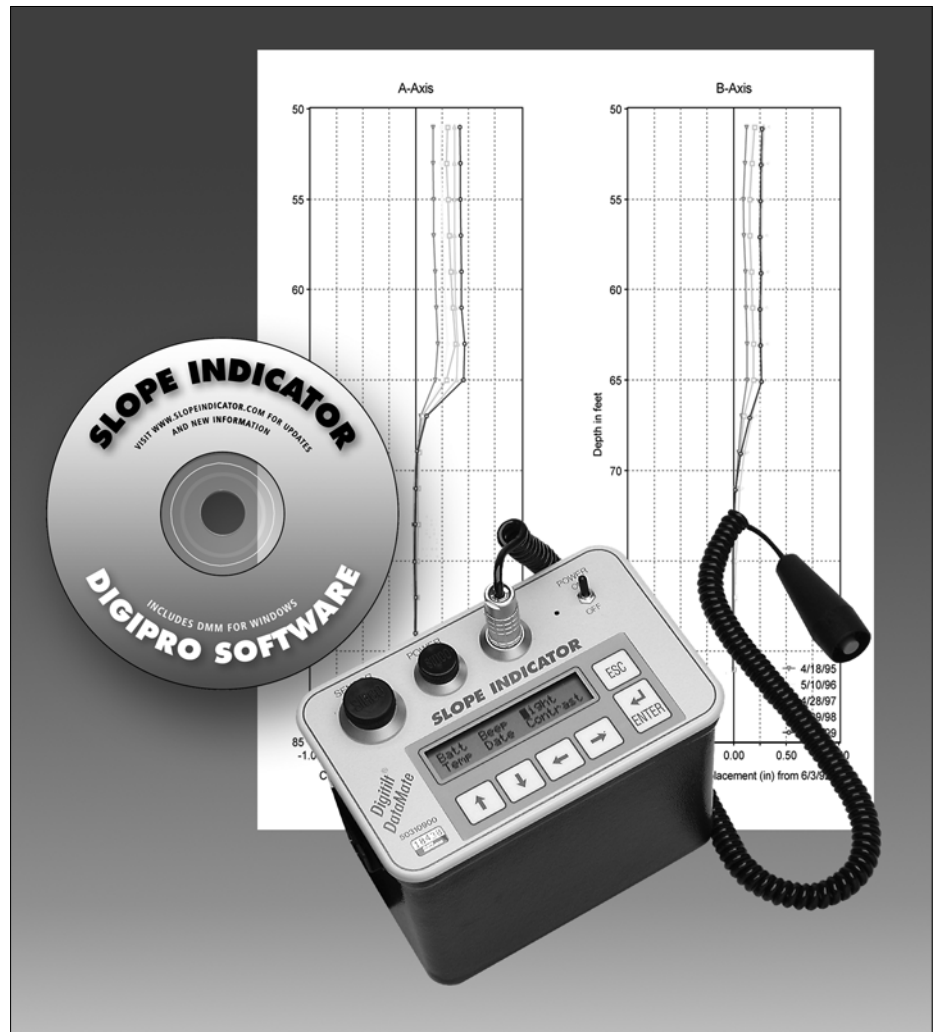
evaluate the potential for depth errors, and identify errors caused by changes in cross-axis sensitivity of the probe (tilt in the B axis influencing A-axis readings and vice versa).

Advanced Corrections: DigiPro lets you correct for bias shift and changed cross-axis sensitivity. In addition, it uses spiral corrections and settlement corrections generated by DMM for Windows.

Note that correction values can be applied and removed at any time. the original data is not affected.

Automatic Conversions: DigiPro can produce metric-unit reports from English-unit data. DigiPro can also convert the depths stored with your inclinometer data to elevations.

Data Listings: When you print a report, you can choose to print a listing of the most recent data in addition to the graph. You can also print a listing of the plotted data points or export the listing to a file for use with a spreadsheet.



DIGIPRO FEATURES

Graph Types: Graph types include cumulative and incremental displacements, cumulative and incremental deviations, displacement vs time, and checksums and difference checksums. Different types of graphs can be displayed on the same page and you can specify top or bottom reference and different scales for each graph.

Reports: When you save a graph, DigiPro automatically creates a report so you can reuse scales, labels, legends, title block, and other settings. To process new surveys, you just click on the report. DigiPro automatically retrieves your settings, finds the new data and displays an updated graph.

Templates: DigiPro's graph templates provide a way for your organization to standardize the format and presentation of inclinometer reports. DigiPro's templates are preformatted graphs of various types that include title blocks with your company logo, standard scales, text, etc.

Data Listings: When you print a report, you can choose to print a listing of the most recent survey. You can also print a listing of the plotted data points.

GRAPH CONTROLS

Survey Selection: The total number of surveys (datasets) per graph is limited only by memory and legibility requirements. You can mark one survey as the initial, and you can control the number of most recent surveys that will be auto-selected for the graph. You can mark other surveys as permanently selected or permanently excluded from the graph (unmarked surveys are also excluded).

Data Units: You can choose millimeters, meters, inches, or feet for displacements and deviations. DigiPro can convert English-unit data to metric and vice versa.

Depth Units: You can choose depths or elevations and meters or feet for depth unit labels. DigiPro automatically converts units as required.

Corrections: Correction values are stored separately from data and do not affect stored data. The application of the various corrections can be toggled on and off. DigiPro supports corrections for spiralled casing and misaligned casing. Spiral correction requires a spiral dataset obtained with a spiral sensor. DigiPro supports corrections for systematic errors caused by bias shifts or changes in cross-axis sensitivity. Corrections for settlement are calculated by DMM for Windows and plotted by DigiPro as normal datasets.

Page Layout: Paper size, paper orientation, margins, graph size and placement have default settings that can be changed for individual reports. The layout of the default templates provides two graphs on the page with a title block at the bottom. You can specify A-axis or B-axis and top or bottom reference. Each report holds two graphs, and you can specify different types of graphs in the same report.

Graph Labels: Labels are supplied automatically or you can enter your own. You can change fonts and font sizes. Dataset identifiers can be toggled between date-only and date-and-time. The dataset legend can be placed in any corner of the graph.

Title Block and Logo: The title block provides two columns of four lines each to enter information about the graph. You can change fonts and font sizes for the text. You can also include your company name and logo. The logo must be a bit-map (.bmp) file

DATA COMPATIBILITY

Project Database: DigiPro works with data stored in Slope Indicator's project database format created by DMM for Windows or DMM for DOS. The DMM program can be downloaded free from Slope Indicator's website.

Legacy Data: TDMM imports legacy data from Slope Indicator's previous formats (PCSLIN, RPP, and DOS DMM) and from the GTILT program. DMM also provides a means of entering data manually.

SYSTEM REQUIREMENTS

Computer Requirements: DigiPro for Windows requires a Windows 95, 98, ME, NT4, 2000, or XP computer. The program does not run on Windows 3.x or DOS. A display resolution of 800 x 600 or higher is recommended, and a mouse or similar pointing device is required. DigiPro prints on any printer supported by Windows.

Network Information: Project databases can be stored on network file servers, but DigiPro itself must be installed on client computers (individual work stations).

Copy Protection: The program is copy protected, but a run-limited version can be installed and used immediately for 45 sessions. The user must then contact Slope Indicator by fax, phone, or e-mail to obtain an unlocking code that permits continued use of the program.

DIGIPRO PART NUMBERS

DigiPro for Windows Trial Download
DigiPro, 3-User License 50310000
DigiPro, 1-User License 50310001
DigiPro, Site License 50310002

DigiPro is distributed on the Slope Indicator Resource CD and can also be downloaded from the Slope Indicator website. When installed, the software operates in trial mode for 45 runs. After that, continued use requires purchase of a license.