DWG. NO. H349000-4133-10-035-0001

SETOUT POINTS FOR PLATEAU

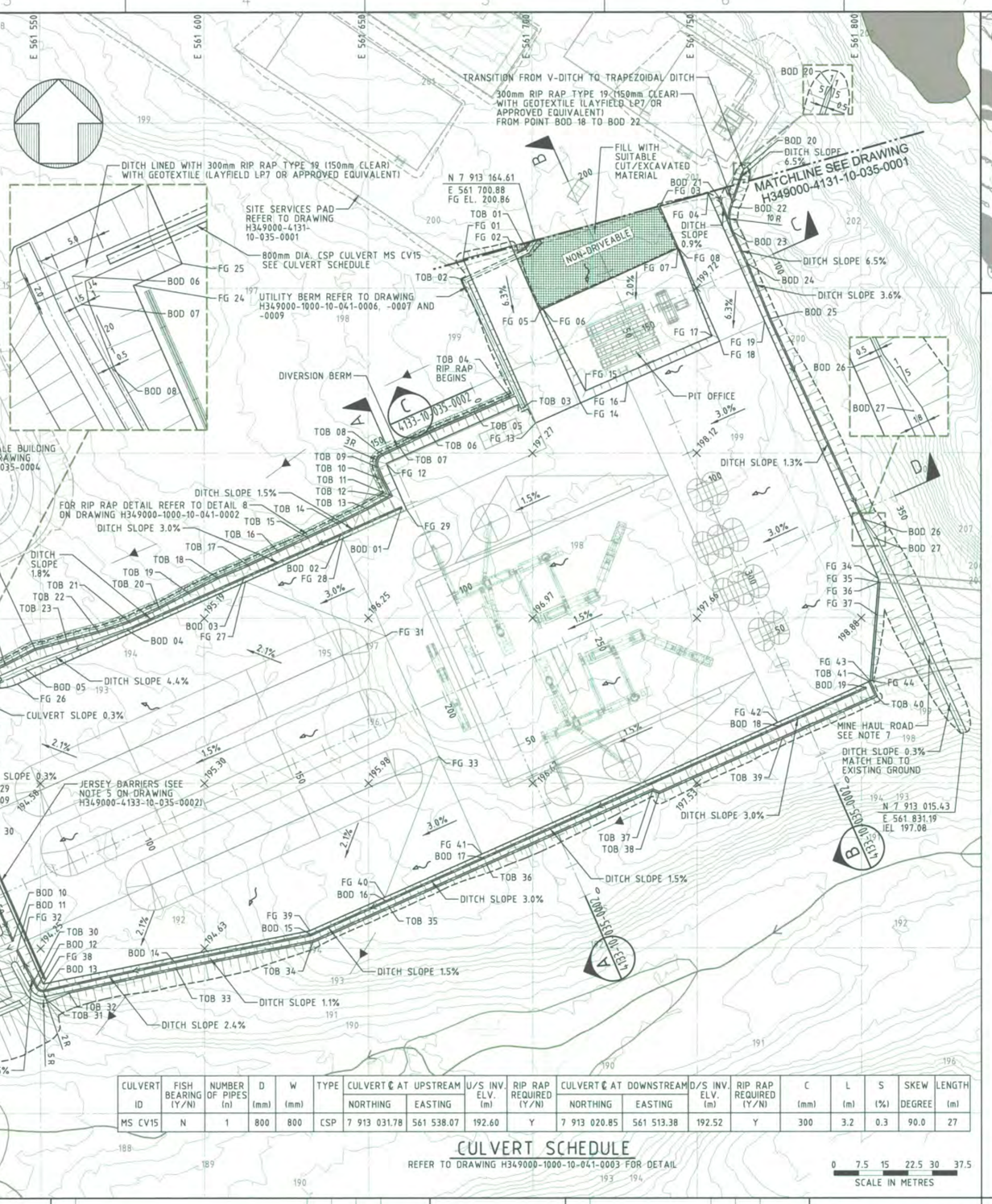
POINT No.	NORTHING	EASTING	EL.
FG 01	N 7 913 158.77	E 561 678.97	200.62
FG 02	N 7 913 162.68	E 561 693.65	200.78
FG 03	N 7 913 174.75	E 561 738.87	201.25
FG 04	N 7 913 178.80	E 561 753.50	201.41
FG 05	N 7 913 143.18	E 561 702.29	199.46
FG 06	N 7 913 143.64	E 561 703.24	199.95
FG 07	N 7 913 161.98	E 561 744.33	200.34
FG 08	N 7 913 162.04	E 561 744.51	200.46
FG 09	N 7 913 029.48	E 561 500.52	193.56
FG 10	N 7 913 036.00	E 561 514.03	193.59
FG 11	N 7 913 039.70	E 561 522.46	193.68
FG 12	N 7 913 096.89	E 561 655.49	196.64
FG 13	N 7 913 109.10	E 561 700.97	197.34
FG 14	N 7 913 115.18	E 561 714.72	197.57
FG 15	N 7 913 118.87	E 561 716.19	199.46
FG 16	N 7 913 121.47	E 561 728.93	197.80
FG 17	N 7 913 135.47	E 561 754.69	199.82
FG 18	N 7 913 133.90	E 561 757.01	198.72
FG 19	N 7 913 139.96	E 561 770.69	199.17
FG 20	N 7 913 025.80	E 561 502.14	193.62
FG 21	N 7 913 022.16	E 561 503.74	193.68
FG 22	N 7 913 028.68	E 561 517.24	193.71
FG 23	N 7 913 037.91	E 561 523.24	193.71
FG 24	N 7 913 018.25	E 561 515.91	193.77
FG 25	N 7 913 020.44	E 561 520.85	193.85
FG 26	N 7 913 030.25	E 561 543.03	194.21
FG 27	N 7 913 061.05	E 561 612.61	195.35
FG 28	N 7 913 074.15	E 561 642.20	196.32
FG 29	N 7 913 082.79	E 561 661.73	196.65
FG 30	N 7 912 988.65	E 561 529.01	194.25
FG 31	N 7 913 044.54	E 561 655.30	196.32
FG 32	N 7 912 952.23	E 561 545.10	194.25
FG 33	N 7 913 008.14	E 561 671.41	196.32
FG 34	N 7 913 061.83	E 561 805.26	199.17
FG 35	N 7 913 060.82	E 561 805.18	199.16
FG 36	N 7 913 060.78	E 561 805.73	198.70
FG 37	N 7 913 050.82	E 561 804.92	199.00
FG 38	N 7 912 939.32	E 561 550.82	194.04
FG 39	N 7 912 955.31	E 561 632.07	194.98
FG 40	N 7 912 965.42	E 561 654.91	195.35
FG 41	N 7 912 978.53	E 561 684.52	196.32
FG 42	N 7 913 018.38	E 561 774.55	197.80
FG 43	N 7 913 030.83	E 561 802.75	198.73
FG 44	N 7 913 031.05	E 561 803.32	198.41

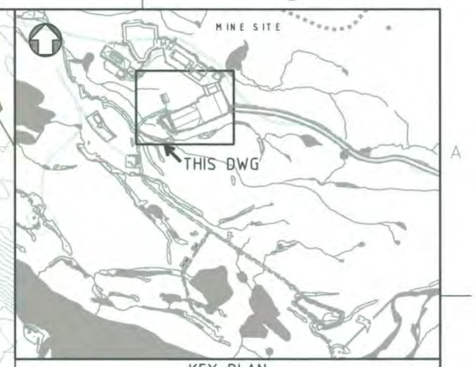
SETOUT POINTS FOR BOTTOM OF DITCH

POINT No.	NORTHING	EASTING	EL.
BOD 01	N 7 913 083.55	E 561 660.24	195.93
BOD 02	N 7 913 075.34	E 561 641.68	195.57
BOD 03	N 7 913 062.24	E 561 612.08	194.76
BOD 04	N 7 913 046.51	E 561 576.55	194.05
BOD 05	N 7 913 034.99	E 561 545.34	192.62
BOD 06	N 7 913 019.21	E 561 509.67	192.50
BOD 07	N 7 913 016.36	E 561 510.66	192.50
BOD 08	N 7 913 009.98	E 561 513.65	192.47
BOD 09	N 7 912 987.40	E 561 526.23	192.39
BOD 10	N 7 912 952.31	E 561 541.56	192.28
BOD 11	N 7 912 949.56	E 561 542.81	192.27
BOD 12	N 7 912 938.24	E 561 548.87	192.72
BOD 13	N 7 912 937.25	E 561 551.16	192.80
BOD 14	N 7 912 945.89	E 561 590.91	193.80
BOD 15	N 7 912 954.07	E 561 632.43	194.28
BOD 16	N 7 912 964.23	E 561 655.43	194.66
BOD 17	N 7 912 977.34	E 561 685.05	195.63
BOD 18	N 7 913 017.19	E 561 775.07	197.10
BOD 19	N 7 913 028.86	E 561 801.50	197.97
BOD 20	N 7 913 185.80	E 561 764.30	200.81
BOD 21	N 7 913 177.30	E 561 756.92	199.75
BOD 22	N 7 913 174.61	E 561 760.46	200.05
BOD 23	N 7 913 167.19	E 561 760.85	199.53
BOD 24	N 7 913 157.40	E 561 765.39	198.84
BOD 25	N 7 913 140.67	E 561 772.29	198.19
BOD 26	N 7 913 079.83	E 561 800.56	197.35
BOD 27	N 7 913 074.25	E 561 803.87	197.27

SETOUT POINTS FOR TOP OF BERM

POINT No.	NORTHING	EASTING	EL.
TOB 01	N 7 913 161.17	E 561 698.57	200.59
TOB 02	N 7 913 152.36	E 561 679.42	199.23
TOB 03	N 7 913 113.70	E 561 697.18	197.93
TOB 04	N 7 913 116.91	E 561 693.17	199.12
TOB 05	N 7 913 112.20	E 561 682.34	199.00
TOB 06	N 7 913 106.28	E 561 668.57	198.88
TOB 07	N 7 913 101.95	E 561 659.48	198.54
TOB 08	N 7 913 099.55	E 561 654.30	198.39
TOB 09	N 7 913 095.77	E 561 652.85	198.35
TOB 10	N 7 913 091.83	E 561 654.54	198.38
TOB 11	N 7 913 087.08	E 561 657.02	198.16
TOB 12	N 7 913 086.67	E 561 656.27	198.48
TOB 13	N 7 913 083.08	E 561 649.51	197.97
TOB 14	N 7 913 078.66	E 561 640.54	197.49
TOB 15	N 7 913 074.47	E 561 631.45	197.18
TOB 16	N 7 913 070.28	E 561 622.37	196.88
TOB 17	N 7 913 066.09	E 561 613.29	196.57
TOB 18	N 7 913 062.26	E 561 604.05	196.52
TOB 19	N 7 913 057.78	E 561 595.10	196.01
TOB 20	N 7 913 053.15	E 561 586.21	195.38
TOB 21	N 7 913 049.00	E 561 577.11	195.10
TOB 22	N 7 913 045.92	E 561 567.76	194.87
TOB 23	N 7 913 043.34	E 561 558.08	194.91
TOB 24	N 7 913 040.70	E 561 548.41	194.90
TOB 25	N 7 913 036.07	E 561 539.23	194.05
TOB 26	N 7 913 031.31	E 561 528.92	193.89
TOB 27	N 7 913 022.19	E 561 504.42	193.49
TOB 28	N 7 913 014.99	E 561 507.71	193.49
TOB 29	N 7 912 986.17	E 561 523.77	193.39
TOB 30	N 7 912 937.10	E 561 546.36	193.71
TOB 31	N 7 912 934.58	E 561 551.82	193.89
TOB 32	N 7 912 936.75	E 561 558.54	194.00
TOB 33	N 7 912 943.88	E 561 591.32	194.81
TOB 34	N 7 912 952.12	E 561 633.07	195.29
TOB 35	N 7 912 962.36	E 561 656.26	195.66
TOB 36	N 7 912 975.47	E 561 685.88	196.64
TOB 37	N 7 912 997.90	E 561 736.56	197.47
TOB 38	N 7 912 997.13	E 561 738.54	198.50
TOB 39	N 7 913 013.74	E 561 776.06	199.12
TOB 40	N 7 913 026.34	E 561 804.58	200.04
TOB 41	N 7 913 030.70	E 561 802.48	198.73





KEY PLAN

LEGEND:

204	EXISTING GROUND CONTOURS
	EXISTING STREAM
	FILL SLOPE
	CUT SLOPE
	TOE OF SLOPE
%	GRADING SLOPE
	CENTERLINE OF DITCH
	EXTERNAL FLOW DIRECTION
	FLOW DIRECTION
	SLOPE BREAKLINE
	RIP RAP
	LOCALIZED FILL
	CULVERT
197.66	FG EL. AT 50m x 50m GRID
IEL	INVERT ELEVATION
FG	FINISHED GRADE
BOD	BOTTOM OF DITCH
TOB	TOP OF BERM
CSP	CORRUGATED STEEL PIPE
FISH BEARING	(P=POTENTIAL, Y=YES, N=NO)
FG 28	SETOUT POINT NUMBER
100	CROSS SECTION DISTANCE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83)ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
5. FOR TYPICAL EARTHWORK DETAILS REFER TO DRAWINGS H349000-1000-10-041-0001 AND H349000-1000-10-041-0002.
6. ALL DITCH SECTIONS ARE TRAPEZOIDAL WITH 0.5m BOTTOM WIDTH AND 1.5H:1V SIDE SLOPES, EXCEPT 3H:1V SIDE SLOPE FACING POND BERM.
7. CULVERT SHALL REPLACE DITCH WHEN HAUL ROAD IS CONSTRUCTED. FOR CULVERT DETAIL SEE HAUL ROAD DRAWING H349000-4221-10-012-0001

FOR CONSTRUCTION

CULVERT ID	FISH BEARING (Y/N)	NUMBER OF PIPES (n)	D (mm)	W (mm)	TYPE	CULVERT ℄ AT UPSTREAM NORTHING	CULVERT ℄ AT UPSTREAM EASTING	U/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	CULVERT ℄ AT DOWNSTREAM NORTHING	CULVERT ℄ AT DOWNSTREAM EASTING	D/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	C (mm)	L (m)	S (%)	SKEW DEGREE	LENGTH (m)
MS CV15	N	1	800	800	CSP	7 913 031.78	561 538.07	192.60	Y	7 913 020.85	561 513.38	192.52	Y	300	3.2	0.3	90.0	27

CULVERT SCHEDULE

REFER TO DRAWING H349000-1000-10-041-0003 FOR DETAIL

0 7.5 15 22.5 30 37.5
SCALE IN METRES

H349000-4000-00-014-0003	MINE SITE – INFRASTRUCTURE LAYOUT		
DRAWING NO.	DRAWING TITLE		
REFERENCE DRAWINGS			

PERMIT TO PRACTICE HATCH LTD.
Signature
Date 29 Aug. 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

THIS DRAWING WAS PREPARED FOR THE EXCLUSIVE USE OF BAFFINLAND IRON MINES CORPORATION AND ITS AGENTS PURSUANT TO AGREEMENT BETWEEN BAFFINLAND AND HATCH. UNLESS OTHERWISE AGREED IN WRITING WITH CLIENT, USE BY ANYONE ON THIS DRAWING (AT HATCH DOES NOT ACCEPT AND DISCLAIMS ANY AND ALL LIABILITY AND RESPONSIBILITY ARISING FROM ANY USE, OR ANY MODIFICATION OR ADDITION TO ANY DRAWING BY CLIENT AND/OR BY ANYONE ON BEHALF OF CLIENT. CLIENT AGREES AND DO THIS DRAWING IS CONFIDENTIAL AND ALL INTELLECTUAL PROPERTY RIGHTS EMBODIED OR REFERENCED IN THIS DRAWING REMAIN THE PROPERTY OF HATCH.

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
	REVISIONS				

REGISTERED PROFESSIONAL ENGINEER M. M. S. HASSAN LICENSEE L/C#313 NT/NU

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH	MM 2013-08-29
	ISSUE AUTHORIZATION		

HATCH

DESIGNED BY	M. MCDOUGALD	DATE 2013-05-28
DRAWN BY	M. MCDOUGALD	DATE 2013-05-28
CHECKED BY	A. MOHAMMAD	DATE 2013-08-29
DISCIP. ENGR.	S. HASSAN	DATE 2013-08-29
PROJ. DESIGNER	T. THEOPHILUS	DATE 2013-08-29
PROJ. ENGR.	D. CLELAND	DATE 2013-08-29
PROJ. MGR.	S. PERRY	DATE 2013-08-29

Baffinland

MARY RIVER PROJECT

MINE SITE
ORE CRUSHING & SCREENING
EARTHWORKS & DRAINAGE – PLAN

SCALE	DWG. NO.	REV.
1:750 OR AS NOTED	H349000-4133-10-035-0001	0

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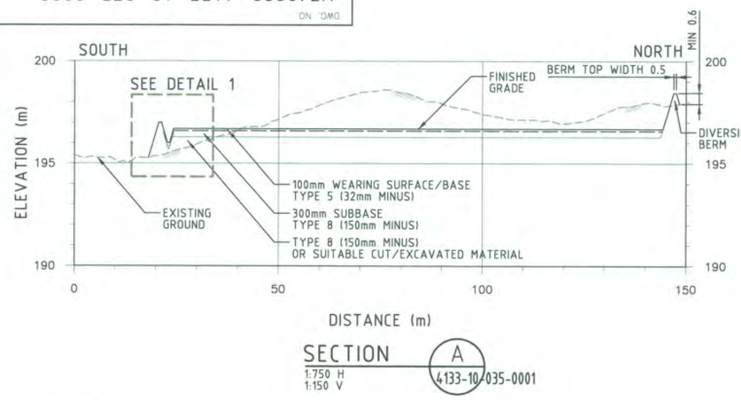
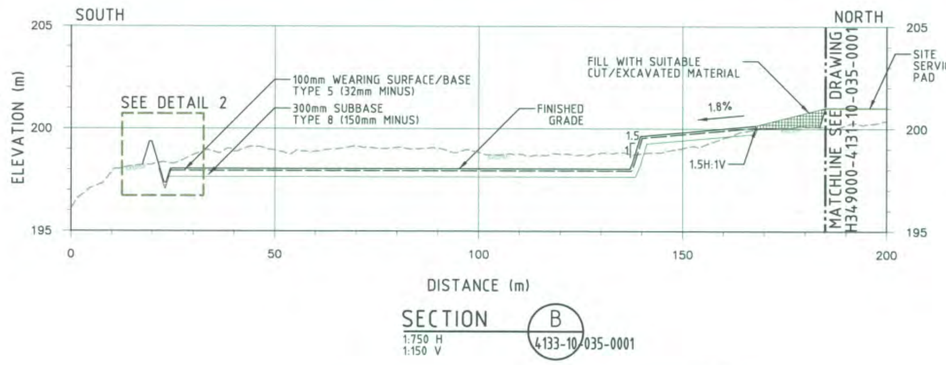
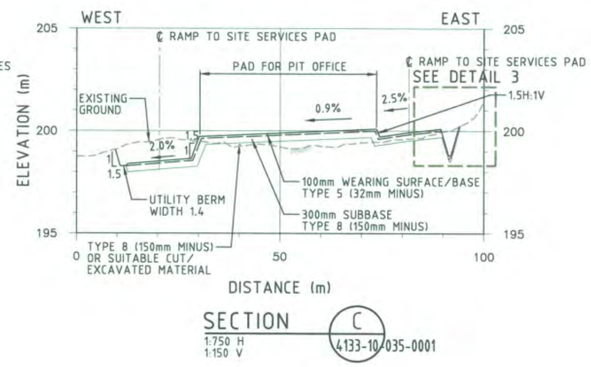
DWG. NO. H349000-4133-10-035-0002



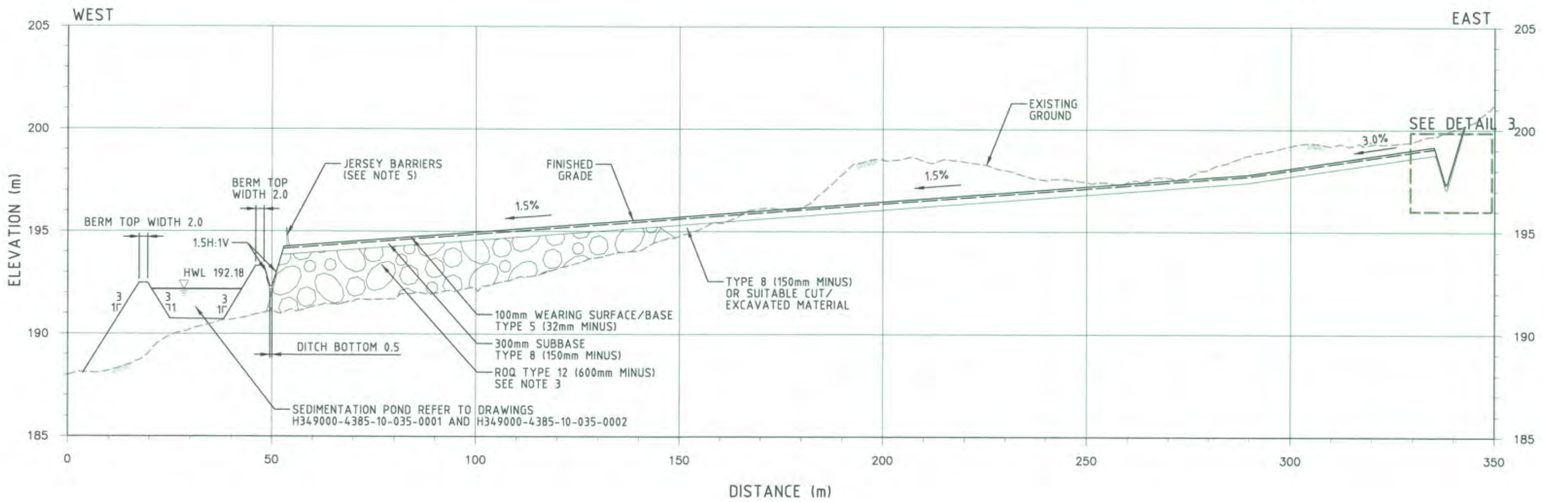
SECTION A
1:750 H
1:150 V
4133-10-035-0001



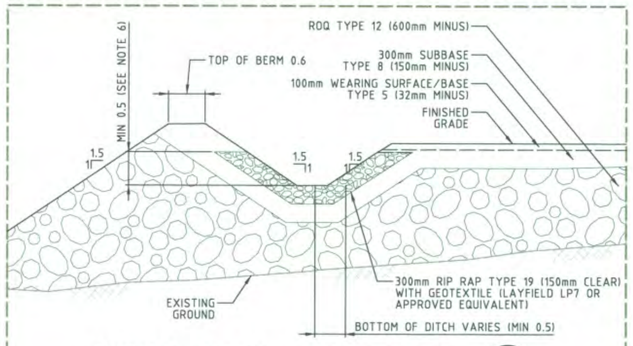
SECTION B
1:750 H
1:150 V
4133-10-035-0001



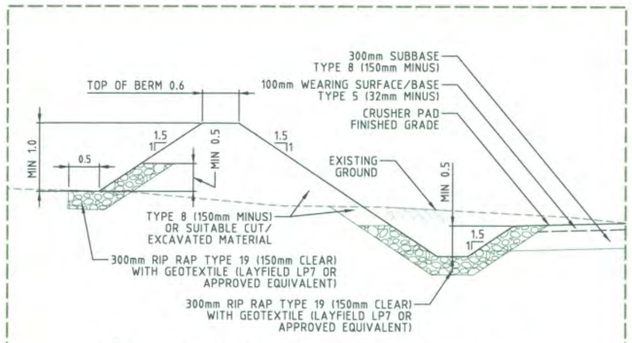
SECTION C
1:750 H
1:150 V
4133-10-035-0001



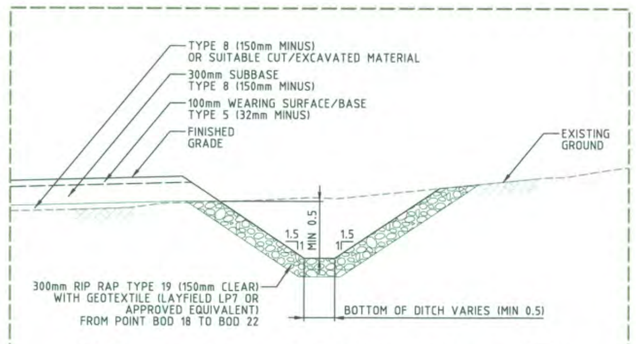
SECTION D
1:750 H
1:150 V
4133-10-035-0001



TYPICAL DETAIL - DITCH IN FILL 1
1:50



2 TYPICAL DETAIL - DITCH IN CUT
1:50



TYPICAL DETAIL - DIVERSION DITCH 3
1:50

LEGEND:

HWL	HIGH WATER LEVEL
ROQ	RUN OF QUARRY
	RUN OF QUARRY MATERIAL TYPE 12 (600mm MINUS) (FOR TOTAL FILL DEPTH > 1.0m)
	RIP RAP TYPE 19 (150mm CLEAR)
	LOCALIZED FILL

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
3. FOR STANDARD EARTHWORK DETAILS REFER TO DRAWINGS H349000-1000-10-041-0001 AND H349000-1000-10-041-0002.
4. FOR RIP RAP DETAIL REFER TO DETAIL 8 ON DRAWING H349000-1000-10-041-0002.
5. JERSEY BARRIER: HY-GRADE PRECAST CONCRETE J-J HOOK CONCRETE BARRIER, LENGTH 4.000m x HEIGHT 0.900m, OR EQUIVALENT.
6. DEPTH VARIES ALONG DITCH. FOR TOP OF BERM ELEVATION SEE TABLE "SETOUT POINTS FOR TOP OF BERM" ON DRAWING H349000-4133-10-035-0001.
7. POND MAXIMUM CAPACITY IS 2730m3 WITH 0.3m FREEBOARD AND HIGH WATER LEVEL (HWL) EL. 192.18m.

FOR CONSTRUCTION

REFERENCE DRAWINGS

DRAWING NO. | DRAWING TITLE

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 29 AUG 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REVISIONS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REGISTERED PROFESSIONAL ENGINEER
M. M. S. HASSAN
LICENSEE
NT/NU

ISSUE AUTHORIZATION

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH	2013-08-29

HATCH

DESIGNED BY	DRAWN BY
M. MCDOUGALD	M. MCDOUGALD
DATE 2013-05-28	DATE 2013-05-28
CHECKED BY	DISCIP. ENGR.
A. MONTERRANI	S. HASSAN
DATE 2013-08-29	DATE 2013-08-29
PROJ. DOC. COORD.	PROJ. ENGR.
T. THERRIEN	J. CLELAND
DATE 2013-08-29	DATE 2013-08-29
PROJ. MGR.	
S. PERRY	
DATE 2013-08-29	

Baffinland

MARY RIVER PROJECT

MINE SITE
ORE CRUSHING & SCREENING
EARTHWORKS & DRAINAGE – SECTIONS

SCALE	DWG. NO.	REV.
1:750 OR AS NOTED	H349000-4133-10-035-0002	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

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DWG. NO. H349000-2133-10-035-0001

SETOUT POINTS FOR ORE STOCKPILE PAD

POINT No.	NORTHING	EASTING	EL.
001	N 7 976 443.58	E 503 232.75	7.55
002	N 7 976 445.32	E 503 280.96	7.55
003	N 7 976 427.12	E 503 275.61	7.60
004	N 7 976 427.34	E 503 281.61	7.60
005	N 7 976 390.55	E 503 234.66	7.71
006	N 7 976 391.97	E 503 274.50	7.71
007	N 7 976 387.23	E 503 234.78	9.93
008	N 7 976 388.75	E 503 277.00	9.90
009	N 7 976 388.97	E 503 283.00	9.89
010	N 7 976 381.84	E 503 251.73	10.76
011	N 7 976 345.24	E 503 161.98	9.74
012	N 7 976 345.81	E 503 177.78	9.81
013	N 7 976 347.84	E 503 235.90	9.53
014	N 7 976 342.49	E 503 162.09	10.25
015	N 7 976 343.06	E 503 177.88	10.32
016	N 7 976 345.17	E 503 236.30	10.03
017	N 7 976 351.02	E 503 285.84	9.03
018	N 7 976 349.25	E 503 285.92	9.03
019	N 7 976 349.32	E 503 287.62	9.03
020	N 7 976 347.69	E 503 284.48	10.03
021	N 7 976 349.27	E 503 328.15	10.25
022	N 7 976 350.04	E 503 349.68	10.14
023	N 7 976 327.50	E 503 162.63	10.32
024	N 7 976 328.15	E 503 178.42	10.40
025	N 7 976 329.85	E 503 225.58	10.16
026	N 7 976 332.36	E 503 281.19	10.09
027	N 7 976 334.07	E 503 328.7	10.33
028	N 7 976 334.85	E 503 350.24	10.22
029	N 7 976 319.51	E 503 162.97	10.14
030	N 7 976 320.22	E 503 178.71	10.24
031	N 7 976 321.59	E 503 216.77	10.05
032	N 7 976 325.14	E 503 288.95	9.98
033	N 7 976 326.15	E 503 328.98	10.16
034	N 7 976 326.92	E 503 350.48	10.06
035	N 7 976 310.32	E 503 095.05	9.56
036	N 7 976 308.81	E 503 097.35	10.07
037	N 7 976 314.81	E 503 418.90	9.99
038	N 7 976 314.81	E 503 441.25	10.22
039	N 7 976 293.75	E 503 082.57	9.58
040	N 7 976 295.03	E 503 086.93	10.09
041	N 7 976 299.77	E 503 109.32	10.18
042	N 7 976 294.92	E 503 115.68	10.02
043	N 7 976 296.84	E 503 441.25	9.86
044	N 7 976 285.99	E 503 098.90	10.19
045	N 7 976 281.20	E 503 105.30	10.03
046	N 7 976 240.24	E 503 065.95	9.75
047	N 7 976 240.70	E 503 069.79	10.26
048	N 7 976 241.24	E 503 084.78	10.33
049	N 7 976 241.45	E 503 092.77	10.17
050	N 7 976 271.90	E 503 409.61	10.06
051	N 7 976 272.23	E 503 417.54	10.22
052	N 7 976 275.04	E 503 432.41	10.13
053	N 7 976 276.96	E 503 435.54	9.58
054	N 7 976 160.64	E 503 068.72	10.14
055	N 7 976 160.78	E 503 072.67	10.66
056	N 7 976 161.32	E 503 087.66	10.73
057	N 7 976 161.61	E 503 095.55	10.57
058	N 7 976 164.81	E 503 184.31	11.01
059	N 7 976 166.24	E 503 223.78	10.82
060	N 7 976 166.52	E 503 231.48	10.98
061	N 7 976 167.40	E 503 255.90	10.87
062	N 7 976 158.99	E 503 263.43	10.85
063	N 7 976 159.85	E 503 287.41	10.95
064	N 7 976 160.14	E 503 295.34	10.79
065	N 7 976 161.57	E 503 334.92	10.99
066	N 7 976 164.40	E 503 413.57	10.59
067	N 7 976 164.69	E 503 421.42	10.76
068	N 7 976 165.23	E 503 436.40	10.68
069	N 7 976 165.44	E 503 439.85	10.17
070	N 7 976 075.22	E 503 072.51	9.72
071	N 7 976 075.33	E 503 075.75	10.23
072	N 7 976 075.88	E 503 090.74	10.23
073	N 7 976 077.51	E 503 095.14	10.14
074	N 7 976 078.44	E 503 422.34	10.03
075	N 7 976 077.66	E 503 424.55	10.08
076	N 7 976 078.20	E 503 439.54	10.08
077	N 7 976 078.30	E 503 442.29	9.57

SETOUT POINTS FOR UTILITY BERM

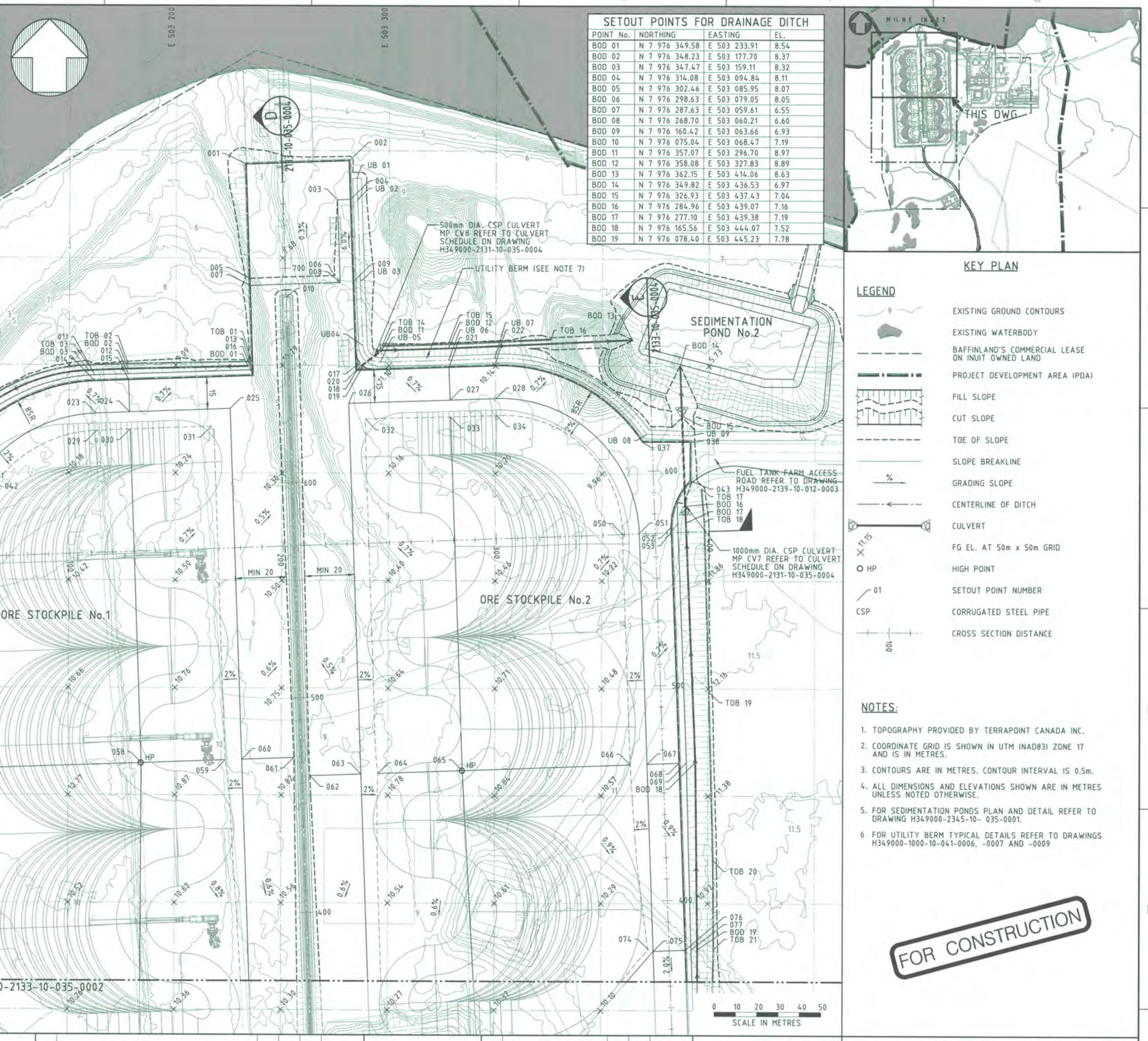
POINT No.	NORTHING	EASTING	EL.
UB 01	N 7 976 437.03	E 503 284.76	8.57
UB 02	N 7 976 427.46	E 503 285.11	8.60
UB 03	N 7 976 389.33	E 503 286.48	10.87
UB 04	N 7 976 359.37	E 503 287.73	11.10
UB 05	N 7 976 351.62	E 503 295.95	11.10
UB 06	N 7 976 352.54	E 503 328.03	11.11
UB 07	N 7 976 353.48	E 503 349.56	11.11
UB 08	N 7 976 318.42	E 503 420.86	11.10
UB 09	N 7 976 317.70	E 503 441.39	11.21

SETOUT POINTS FOR DRAINAGE BERM

POINT No.	NORTHING	EASTING	EL.
TOB 01	N 7 976 351.70	E 503 235.44	9.60
TOB 02	N 7 976 350.57	E 503 177.64	9.60
TOB 03	N 7 976 349.89	E 503 159.01	9.60
TOB 04	N 7 976 315.76	E 503 092.68	9.60
TOB 05	N 7 976 304.19	E 503 083.75	9.60
TOB 06	N 7 976 300.65	E 503 078.77	9.06
TOB 07	N 7 976 287.60	E 503 057.68	7.50
TOB 08	N 7 976 273.38	E 503 056.47	8.65
TOB 09	N 7 976 238.86	E 503 056.81	9.26
TOB 10	N 7 976 213.85	E 503 057.30	9.54
TOB 11	N 7 976 173.85	E 503 058.45	9.74
TOB 12	N 7 976 143.78	E 503 059.84	9.81
TOB 13	N 7 976 079.27	E 503 063.73	9.84
TOB 14	N 7 976 359.12	E 503 296.62	9.97
TOB 15	N 7 976 360.13	E 503 327.75	9.89
TOB 16	N 7 976 362.41	E 503 375.99	9.75
TOB 17	N 7 976 293.01	E 503 446.70	12.10
TOB 18	N 7 976 277.42	E 503 448.06	12.64
TOB 19	N 7 976 198.59	E 503 450.28	12.15
TOB 20	N 7 976 120.19	E 503 452.44	12.50
TOB 21	N 7 976 078.40	E 503 452.81	12.50

SETOUT POINTS FOR DRAINAGE DITCH

POINT No.	NORTHING	EASTING	EL.
BOD 01	N 7 976 349.58	E 503 233.91	8.54
BOD 02	N 7 976 348.23	E 503 177.70	8.37
BOD 03	N 7 976 347.47	E 503 159.11	8.32
BOD 04	N 7 976 314.08	E 503 094.84	8.11
BOD 05	N 7 976 302.46	E 503 085.95	8.07
BOD 06	N 7 976 298.63	E 503 079.05	8.05
BOD 07	N 7 976 287.63	E 503 059.61	6.55
BOD 08	N 7 976 268.70	E 503 060.21	6.60
BOD 09	N 7 976 160.42	E 503 063.66	6.93
BOD 10	N 7 976 075.04	E 503 068.47	7.19
BOD 11	N 7 976 357.07	E 503 296.70	8.97
BOD 12	N 7 976 358.08	E 503 327.83	8.89
BOD 13	N 7 976 362.15	E 503 414.06	8.63
BOD 14	N 7 976 349.82	E 503 436.53	6.97
BOD 15	N 7 976 326.93	E 503 437.43	7.04
BOD 16	N 7 976 284.96	E 503 439.07	7.16
BOD 17	N 7 976 277.10	E 503 439.38	7.19
BOD 18	N 7 976 165.56	E 503 444.07	7.52
BOD 19	N 7 976 078.40	E 503 445.23	7.78



KEY PLAN

LEGEND

- EXISTING GROUND CONTOURS
- EXISTING WATERBODY
- BAFFINLAND'S COMMERCIAL LEASE ON INUIT OWNED LAND
- PROJECT DEVELOPMENT AREA (PDA)
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- SLOPE BREAKLINE
- % GRADING SLOPE
- CENTERLINE OF DITCH
- CULVERT
- FG EL. AT 50m x 50m GRID
- HP HIGH POINT
- 01 SETOUT POINT NUMBER
- CSP CORRUGATED STEEL PIPE
- 100 CROSS SECTION DISTANCE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
5. FOR SEDIMENTATION PONDS PLAN AND DETAIL REFER TO DRAWING H349000-2345-10- 035-0001.
6. FOR UTILITY BERM TYPICAL DETAILS REFER TO DRAWINGS H349000-1000-10-041-0006, -0007 AND -0009

FOR CONSTRUCTION

REFERENCE DRAWINGS	
H349000-2345-10-035-0001	MILNE PORT-ORE STOCKPILE SEDIMENTATION PONDS-EARTHWORKS & DRAINAGE
H349000-2000-00-014-0001	MILNE PORT-SITE LAYOUT
DRAWING NO.	DRAWING TITLE

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 30 Aug 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER M. M. S. HASSAN LICENSEE NT/NU

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH MM	2013-08-30

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	K FALLAHI	DRAWN BY	M. MCDOUGALD
DATE	2013-08-23	DATE	2013-08-23
CHECKED	A. MOHEBKHANI	DISCIP. ENGR.	S. HASSAN
DATE	2013-08-30	DATE	2013-08-30
PROJ. DES. COORD.	T. THERTELL	PROJ. ENGR.	S. PERRY
DATE	2013-08-30	DATE	2013-08-30
PROJ. MGR.	J. CLELAND		
DATE	2013-08-30		

Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILES NO. 1 & 2
EARTHWORKS & DRAINAGE – PLAN

SCALE	DWG. NO.	REV.
1:1000 OR AS NOTED	H349000-2133-10-035-0001	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

mcdo64322
30/08/2013 11:07:20 AM
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DWG. NO. H349000-2133-10-035-0002

MATCHLINE REFER TO DRAWING H349000-2133-10-035-0001

ORE STOCKPILE No.3

ORE STOCKPILE No.4

B 2133-10-035-0003

C 2133-10-035-0003

D 2133-10-035-0003

E 2133-10-035-0004

TOTE ROAD

INFRASTRUCTURE PAD ACCESS ROAD REFER TO DRAWING H349000-2139-10-012-0001

SETOUT POINTS FOR ORE STOCKPILE PAD

POINT No.	NORTHING	EASTING	EL.
078	N 7 976 037.17	E 503 232.90	10.16
079	N 7 976 036.30	E 503 236.18	10.23
080	N 7 976 037.02	E 503 256.17	10.23
081	N 7 976 044.13	E 503 271.58	10.37
082	N 7 976 044.85	E 503 291.57	10.37
083	N 7 976 046.68	E 503 297.69	10.24
084	N 7 976 017.25	E 503 075.10	8.56
085	N 7 976 017.35	E 503 077.85	9.07
086	N 7 976 017.89	E 503 092.84	9.15
087	N 7 976 026.32	E 503 130.29	10.04
088	N 7 976 025.67	E 503 229.56	10.11
089	N 7 976 023.09	E 503 236.66	9.86
090	N 7 976 023.81	E 503 256.64	9.96
091	N 7 976 024.57	E 503 272.29	9.98
092	N 7 976 025.30	E 503 292.27	9.88
093	N 7 976 028.74	E 503 301.33	10.14
094	N 7 976 035.91	E 503 387.89	10.11
095	N 7 976 030.14	E 503 426.28	9.21
096	N 7 976 030.68	E 503 441.26	9.13
097	N 7 976 030.78	E 503 444.00	8.62
098	N 7 976 012.18	E 503 130.79	10.04
099	N 7 976 019.79	E 503 228.36	10.12
100	N 7 976 022.58	E 503 301.29	10.13
101	N 7 976 021.68	E 503 388.71	10.10
102	N 7 975 995.84	E 503 229.48	10.31
103	N 7 975 998.37	E 503 237.55	10.46
104	N 7 975 999.09	E 503 257.54	10.46
105	N 7 976 005.19	E 503 272.99	10.36
106	N 7 976 005.91	E 503 292.98	10.36
107	N 7 976 010.70	E 503 302.71	10.13
108	N 7 975 959.28	E 503 077.19	9.72
109	N 7 975 959.38	E 503 079.94	10.23
110	N 7 975 959.92	E 503 094.93	10.23
111	N 7 975 958.61	E 503 099.43	10.14
112	N 7 975 967.87	E 503 420.05	10.17
113	N 7 975 970.11	E 503 428.43	10.33
114	N 7 975 970.65	E 503 443.42	10.33
115	N 7 975 970.75	E 503 446.17	9.82
116	N 7 975 852.57	E 503 081.04	10.25
117	N 7 975 852.67	E 503 083.79	10.76
118	N 7 975 853.22	E 503 098.78	10.84
119	N 7 975 853.50	E 503 106.70	10.68
120	N 7 975 856.71	E 503 195.43	11.12
121	N 7 975 858.12	E 503 234.68	10.93
122	N 7 975 858.41	E 503 242.61	11.09
123	N 7 975 859.25	E 503 265.96	10.99
124	N 7 975 859.59	E 503 275.21	10.98
125	N 7 975 860.42	E 503 298.23	11.10
126	N 7 975 860.72	E 503 306.38	10.93
127	N 7 975 862.14	E 503 345.72	11.13
128	N 7 975 864.96	E 503 424.06	10.74
129	N 7 975 865.26	E 503 432.22	10.90
130	N 7 975 865.80	E 503 447.21	10.83
131	N 7 975 865.90	E 503 449.95	10.32
132	N 7 975 780.61	E 503 273.42	11.66
133	N 7 975 738.81	E 503 239.09	10.33
134	N 7 975 731.22	E 503 247.19	10.45
135	N 7 975 733.23	E 503 302.82	10.47
136	N 7 975 741.69	E 503 310.68	10.34
137	N 7 975 748.40	E 503 426.64	10.17
138	N 7 975 753.12	E 503 428.21	10.18
139	N 7 975 754.09	E 503 436.23	10.35
140	N 7 975 754.63	E 503 451.22	10.27
141	N 7 975 755.68	E 503 453.93	9.77
142	N 7 975 726.03	E 503 103.37	10.20
143	N 7 975 726.40	E 503 111.28	10.04
144	N 7 975 719.50	E 503 118.70	10.04
145	N 7 975 722.45	E 503 200.28	10.45
146	N 7 975 723.28	E 503 224.62	10.33
147	N 7 975 727.24	E 503 326.21	10.34
148	N 7 975 728.12	E 503 350.56	10.47
149	N 7 975 730.03	E 503 406.72	10.18
150	N 7 975 731.93	E 503 411.32	10.17
151	N 7 975 743.33	E 503 432.22	10.32
152	N 7 975 733.11	E 503 443.20	10.21
153	N 7 975 731.24	E 503 445.22	9.70
154	N 7 975 711.58	E 503 118.90	10.20
155	N 7 975 714.52	E 503 200.56	10.61
156	N 7 975 715.68	E 503 232.75	10.45
157	N 7 975 718.78	E 503 318.35	10.47
158	N 7 975 719.95	E 503 350.85	10.63
159	N 7 975 721.96	E 503 406.34	10.35
160	N 7 975 726.73	E 503 416.78	10.32
161	N 7 975 716.51	E 503 427.76	10.21
162	N 7 975 714.61	E 503 429.75	9.70
163	N 7 975 695.25	E 503 086.72	9.47
164	N 7 975 695.35	E 503 089.47	9.98
165	N 7 975 699.38	E 503 201.11	10.54
166	N 7 975 701.81	E 503 268.26	10.20

SETOUT POINTS FOR ORE STOCKPILE PAD

POINT No.	NORTHING	EASTING	EL.
167	N 7 975 702.17	E 503 276.09	10.21
168	N 7 975 704.97	E 503 351.40	10.55
169	N 7 975 707.00	E 503 407.55	10.27
170	N 7 975 692.60	E 503 089.48	9.47
171	N 7 975 696.63	E 503 201.21	10.03
172	N 7 975 698.38	E 503 249.66	9.78
173	N 7 975 700.19	E 503 296.90	9.79
174	N 7 975 702.22	E 503 351.50	10.04
175	N 7 975 704.25	E 503 407.65	9.76
176	N 7 976 028.26	E 503 183.94	10.31
177	N 7 976 014.32	E 503 189.53	10.33
178	N 7 976 034.25	E 503 341.98	10.34
179	N 7 976 020.01	E 503 342.50	10.34

SETOUT POINTS FOR BOTTOM OF DITCH

POINT No.	NORTHING	EASTING	EL.
BOD 20	N 7 976 017.16	E 503 073.05	7.36
BOD 21	N 7 975 958.85	E 503 073.67	7.53
BOD 22	N 7 975 852.44	E 503 077.19	7.85
BOD 23	N 7 975 693.68	E 503 084.82	8.30
BOD 24	N 7 975 690.59	E 503 088.17	8.32
BOD 25	N 7 975 694.33	E 503 201.29	8.66

SETOUT POINTS FOR BOTTOM OF DITCH

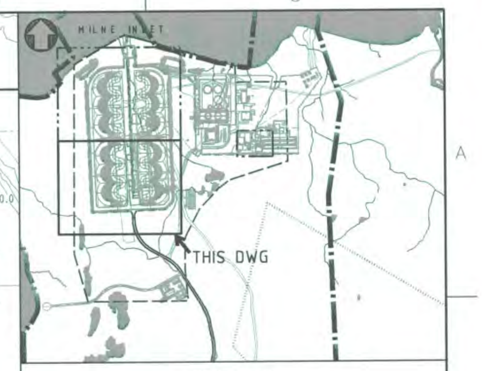
POINT No.	NORTHING	EASTING	EL.
BOD 26	N 7 975 696.68	E 503 250.09	8.81
BOD 27	N 7 976 030.82	E 503 445.30	7.92
BOD 28	N 7 975 970.78	E 503 447.02	8.10
BOD 29	N 7 975 866.02	E 503 453.06	8.41
BOD 30	N 7 975 753.57	E 503 455.69	8.75
BOD 31	N 7 975 730.65	E 503 446.87	8.83
BOD 32	N 7 975 713.19	E 503 430.36	8.90
BOD 33	N 7 975 702.82	E 503 407.50	8.98
BOD 34	N 7 975 700.63	E 503 351.56	9.15
BOD 35	N 7 975 699.21	E 503 296.48	9.32

SETOUT POINTS FOR DRAINAGE BERM

POINT No.	NORTHING	EASTING	EL.
TOB 22	N 7 976 017.50	E 503 068.71	9.93
TOB 23	N 7 975 964.33	E 503 069.27	10.07
TOB 24	N 7 975 848.27	E 503 073.37	10.20
TOB 25	N 7 975 794.32	E 503 075.69	10.53
TOB 26	N 7 975 701.29	E 503 081.47	10.00
TOB 27	N 7 975 691.41	E 503 082.09	9.94
TOB 28	N 7 975 687.56	E 503 086.36	9.94
TOB 29	N 7 975 692.11	E 503 221.81	10.53

SETOUT POINTS FOR DRAINAGE BERM

POINT No.	NORTHING	EASTING	EL.
TOB 30	N 7 975 693.64	E 503 257.79	10.77
TOB 31	N 7 975 980.14	E 503 450.88	10.49
TOB 32	N 7 975 869.25	E 503 458.09	11.56
TOB 33	N 7 975 790.17	E 503 459.29	11.27
TOB 34	N 7 975 751.71	E 503 459.07	10.63
TOB 35	N 7 975 730.58	E 503 450.59	10.42
TOB 36	N 7 975 709.86	E 503 430.99	10.43
TOB 37	N 7 975 700.21	E 503 411.17	10.55
TOB 38	N 7 975 698.21	E 503 373.74	10.94
TOB 39	N 7 975 696.35	E 503 291.20	10.79



KEY PLAN

LEGEND

- EXISTING GROUND CONTOURS
- EXISTING WATERBODY
- BAFFINLAND'S COMMERCIAL LEASE ON INUIT OWNED LAND
- PROJECT DEVELOPMENT AREA (PDA)
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- SLOPE BREAKLINE
- GRADING SLOPE
- CENTERLINE OF SWALE/DITCH
- FG EL. AT 50m x 50m GRID
- HP HIGH POINT
- 01 SETOUT POINT NUMBER
- CROSS SECTION DISTANCE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.

FOR CONSTRUCTION

0 10 20 30 40 50
SCALE IN METRES

DRAWING NO.	DRAWING TITLE
H349000-3000-10-012-0001	TOTE ROAD – PLAN AND PROFILE
H349000-2000-10-014-0001	MILNE PORT – SITE LAYOUT

REFERENCE DRAWINGS

PERMIT TO PRACTICE HATCH LTD.
Signature
Date 30 Aug 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER M. M. S. HASSAN LICENSEE 30 Aug 13 NT/NU

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH MM	2013-08-30

ISSUE AUTHORIZATION

HATCH

DESIGNED BY K. FALLAHI DATE 2013-08-23	DRAWN BY M. MCDOUGALD DATE 2013-08-23
CHECKED BY A. MOHEBKHANI DATE 2013-08-30	DISCIP. ENGR. S. HASSAN DATE 2013-08-30
PROJ. DES. COORD. T. THERTELL DATE 2013-08-30	PROJ. ENGR. S. PERRY DATE 2013-08-30
PROJ. MGR. J. CLELAND DATE 2013-08-30	

Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILES NO. 3 & 4
EARTHWORKS & DRAINAGE – PLAN

SCALE	DWG. NO.	REV.
1:1000 OR AS NOTED	H349000-2133-10-035-0002	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

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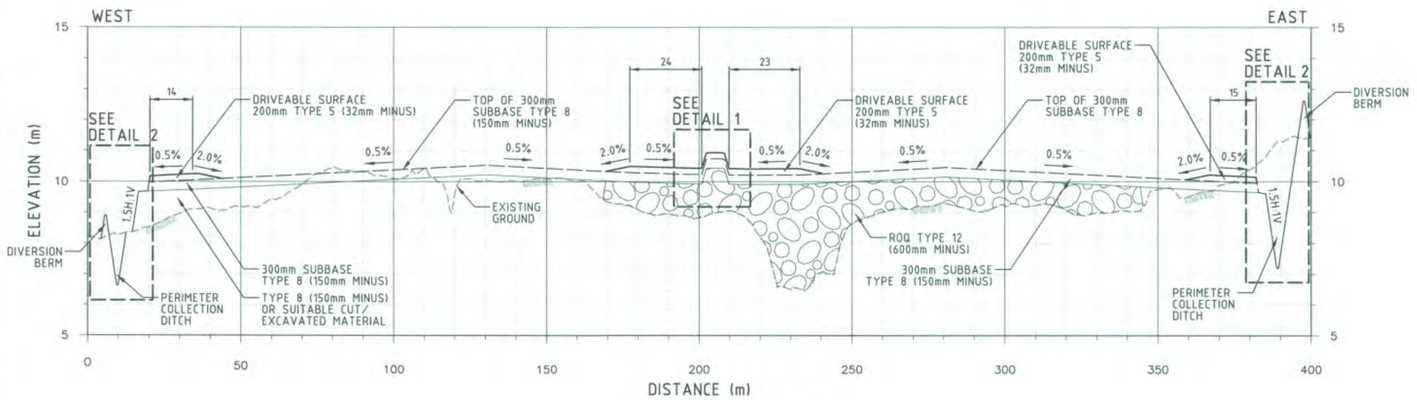
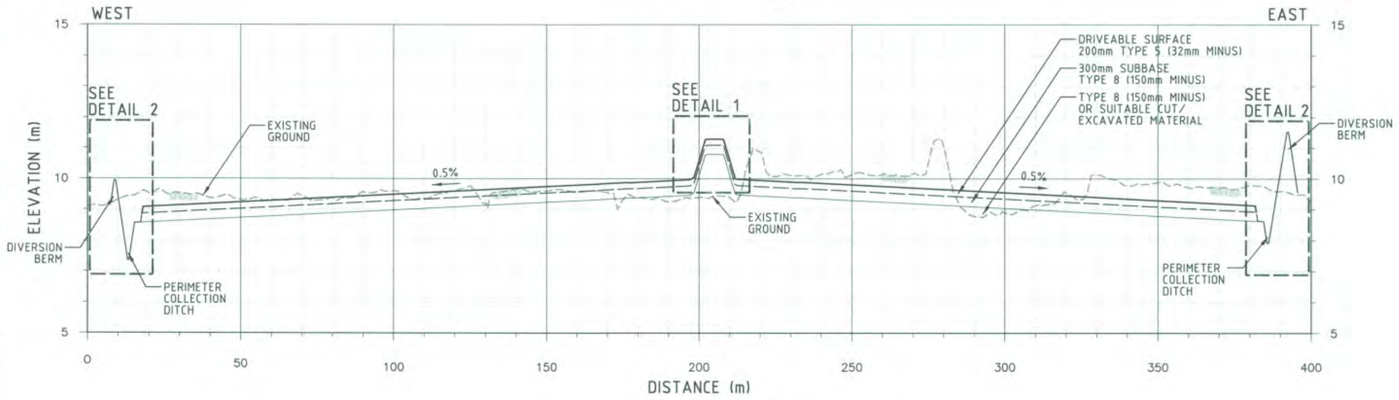
DWG. NO. H349000-2133-10-035-0003



SECTION A
1:1000 H
1:100 V
2133-10-035-0001



SECTION B
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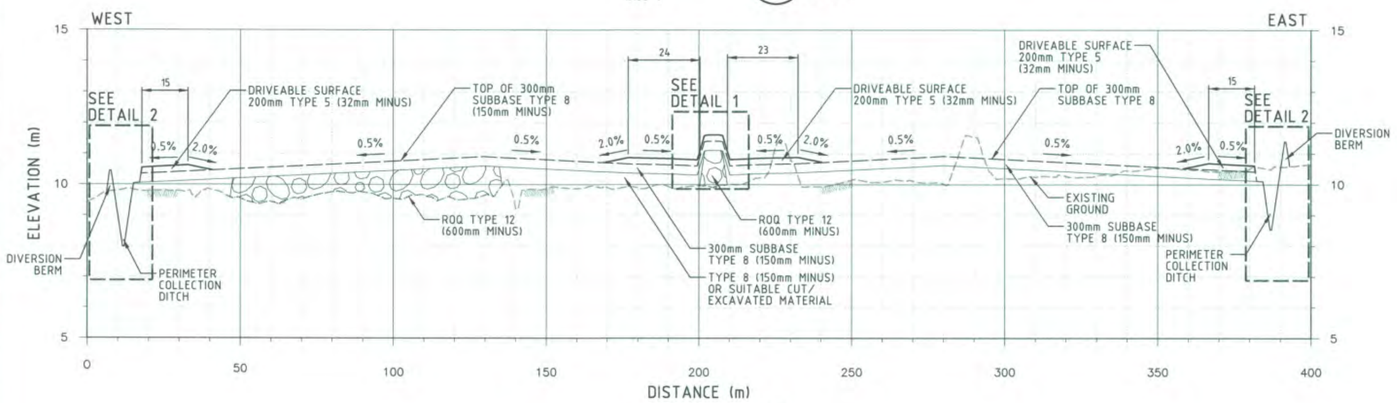
1:100 V
2133-10-035-0002



SECTION C
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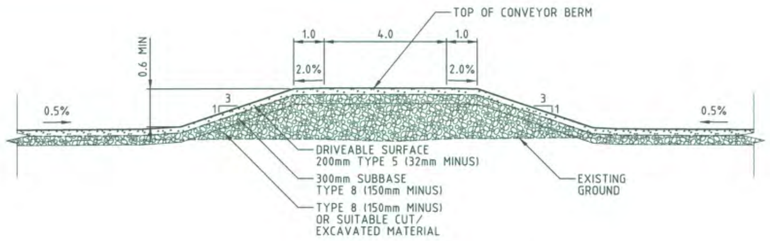
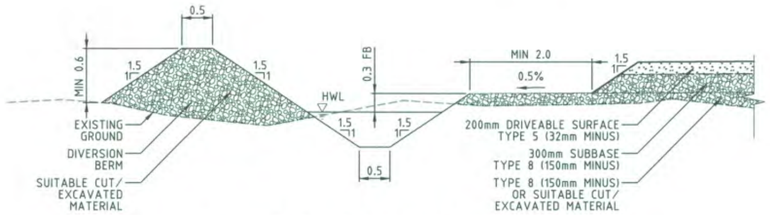
1:100 V
2133-10-035-0002



CONVEYOR BERM DETAIL 1
NTS



PERIMETER DITCH DETAIL 2
NTS

LEGEND:

HWL	HIGH WATER LEVEL
FB	FREE BOARD
ROQ	RUN OF QUARRY
	RUN OF QUARRY MATERIAL TYPE 12 (600mm MINUS) (FOR TOTAL FILL DEPTH > 1.0m)

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
3. FOR STANDARD EARTHWORK DETAILS REFER TO DRAWINGS H349000-1000-10-041-0001 AND -0002.

FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 29 Aug 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
REVISIONS					

REGISTERED PROFESSIONAL ENGINEER
M. M. S. HASSAN
LICENSEE
29 Aug 13
NT/NU

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH MM	2013-08-29
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY	DRAWN BY
K. FALLAHI	M. MCDOUGALD
DATE 2013-08-23	DATE 2013-08-23
CHECKED BY	DISCIP. ENGR.
A. MOHEBKHANI	S. HASSAN
DATE 2013-08-29	DATE 2013-08-29
PROJ. DES. COORD.	PROJ. ENGR.
T. THERTELL	J. CLELAND
DATE 2013-08-29	DATE 2013-08-29
PROJ. MGR.	
S. PERRY	
DATE 2013-08-29	

Baffinland

MARY RIVER PROJECT

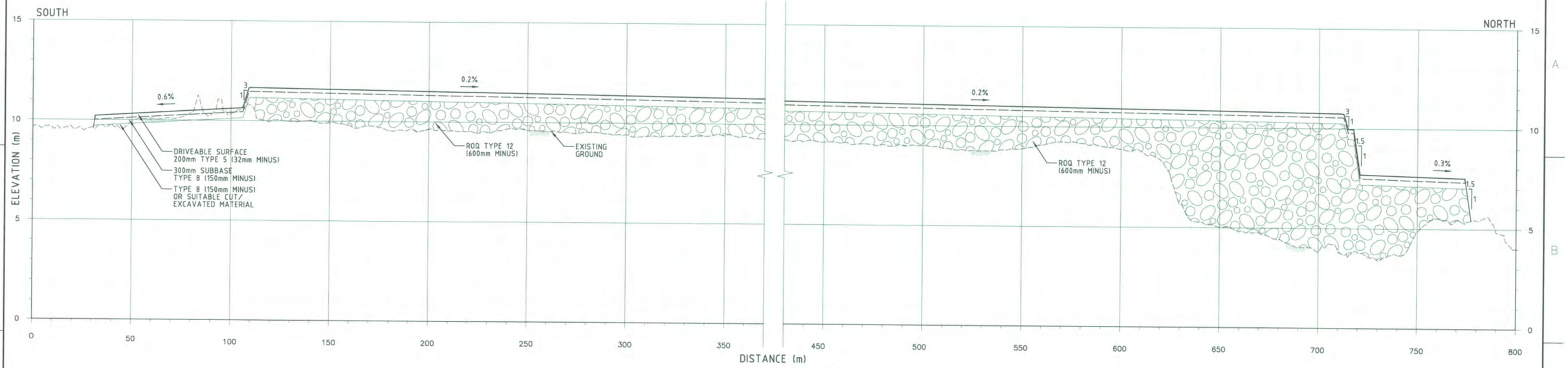
MILNE PORT
ORE STOCKPILES
EARTHWORKS & DRAINAGE–SECTIONS SHEET 1 OF 2

SCALE	DWG. NO.	REV.
1:1000 OR AS NOTED	H349000-2133-10-035-0003	0

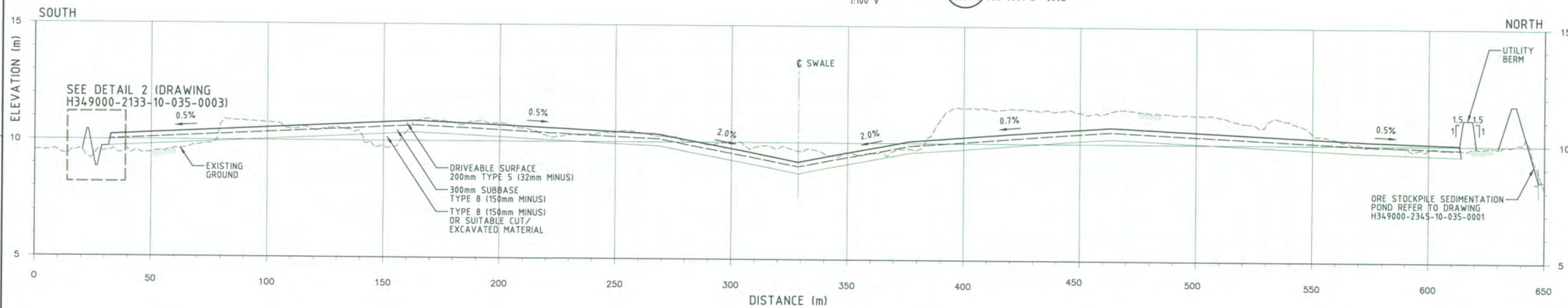
ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

mcdo64322 29/08/2013 2:52:32 PM c:\prj\projectwise\mcdo64322\dms74793\H349000-2133-10-035-0003.dgn

H349000-2131-10-035-0004
DWG. NO.



SECTION D
1:1000 H
1:100 V
2133-10-035-0001 & -0002



SECTION E
1:1000 H
1:100 V
2133-10-035-0001 & -0002

FOR CONSTRUCTION

CULVERT ID	FISH BEARING (P/Y/N)	NUMBER OF PIPES (n)	D (mm)	W (mm)	TYPE	CULVERT ℄ AT UPSTREAM NORTHING	CULVERT ℄ AT UPSTREAM EASTING	U/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	CULVERT ℄ AT DOWNSTREAM NORTHING	CULVERT ℄ AT DOWNSTREAM EASTING	D/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	C (mm)	L (m)	S (%)	SKEW DEGREE	LENGTH (m)
MP CV7	N	1	1000	1000	CSP	7 976 284.96	503 439.07	7.16	Y	7 976 326.93	503 437.43	7.04	Y	500	4.2	0.3	92.3	42
MP CV8	N	1	500	500	CSP	7 976 349.79	503 286.98	9.03	Y	7 976 357.01	503 296.57	8.97	Y	300	2.0	.5	-	12

CULVERT SCHEDULE

REFER TO DRAWING H349000-1000-10-041-0003 FOR DETAIL.

LEGEND:

HWL	HIGH WATER LEVEL
ROQ	RUN OF QUARRY
CSP	CORRUGATED STEEL PIPE
FISH BEARING	(P=POTENTIAL, Y=YES, N=NO)
	RUN OF QUARRY MATERIAL TYPE 12 (600mm MINUS) (FOR TOTAL FILL DEPTH > 1.0m)

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.

DRAWING NO. | DRAWING TITLE
REFERENCE DRAWINGS

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 29 Aug 13
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REGISTERED PROFESSIONAL ENGINEER
M. M. S. HASSAN
LICENSEE
NT/NU

NO. | DESCRIPTION | BY | CHK'D | APP'D | DATE
REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
0	CONSTRUCTION	SH MM	2013-08-29

ISSUE AUTHORIZATION

HATCH

DESIGNED BY K. FALLAHI	DATE 2013-08-23	DRAWN BY M. MCDOUGALD DATE 2013-08-23
CHECKED A. MOHEBKHANI	DATE 2013-08-29	DISCIP. ENGR. S. HASSAN DATE 2013-08-29
PROJ. DES. ENGR. T. PERTERS	DATE 2013-08-29	PROJ. ENGR. J. CLELAND DATE 2013-08-29
PROJ. MGR. S. PERRY	DATE 2013-08-29	

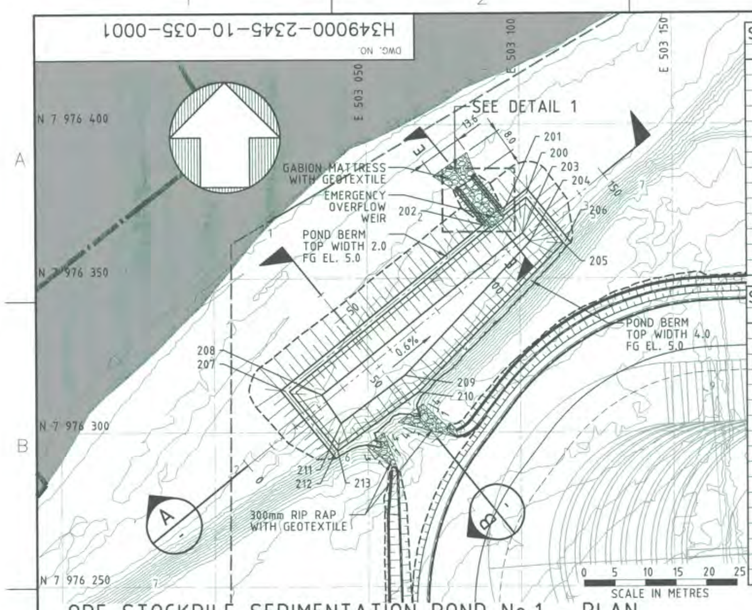
Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILES
EARTHWORKS & DRAINAGE-SECTIONS SHEET 2 OF 2

SCALE 1:1000 OR AS NOTED
DWG. NO. H349000-2133-10-035-0004
REV. 0

DWG. NO. H349000-2345-10-035-0001

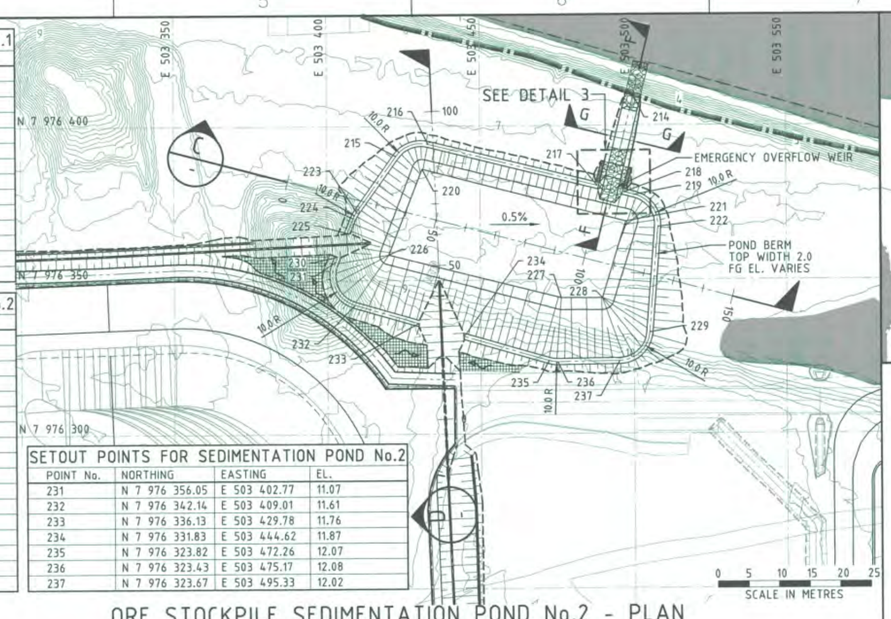


SETOUT POINTS FOR SEDIMENTATION POND No.1

POINT No.	NORTHING	EASTING	EL.
200	N 7 976 377.64	E 503 102.31	5.00
201	N 7 976 371.41	E 503 094.61	5.00
202	N 7 976 366.89	E 503 089.01	5.00
203	N 7 976 364.63	E 503 100.93	2.25
204	N 7 976 361.86	E 503 103.36	2.25
205	N 7 976 361.33	E 503 114.21	5.00
206	N 7 976 361.95	E 503 114.99	5.00
207	N 7 976 313.51	E 503 022.99	5.00
208	N 7 976 312.24	E 503 034.94	2.79
209	N 7 976 318.62	E 503 062.13	2.63
210	N 7 976 313.20	E 503 066.70	5.00
211	N 7 976 302.99	E 503 041.27	2.80
212	N 7 976 293.35	E 503 039.29	5.00
213	N 7 976 293.98	E 503 040.06	5.00

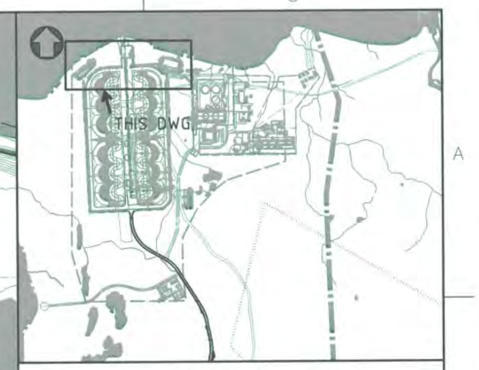
SETOUT POINTS FOR SEDIMENTATION POND No.2

POINT No.	NORTHING	EASTING	EL.
214	N 7 976 409.68	E 503 500.08	6.07
215	N 7 976 390.21	E 503 422.54	8.77
216	N 7 976 394.12	E 503 433.11	8.07
217	N 7 976 380.46	E 503 488.20	8.05
218	N 7 976 378.30	E 503 496.93	8.04
219	N 7 976 377.45	E 503 500.36	8.04
220	N 7 976 386.08	E 503 431.12	5.71
221	N 7 976 368.82	E 503 497.44	5.43
222	N 7 976 366.96	E 503 507.93	8.70
223	N 7 976 372.22	E 503 409.69	10.55
224	N 7 976 370.09	E 503 408.52	10.67
225	N 7 976 365.29	E 503 406.55	10.79
226	N 7 976 358.23	E 503 420.17	5.76
227	N 7 976 344.14	E 503 476.36	5.48
228	N 7 976 344.09	E 503 489.80	5.48
229	N 7 976 332.84	E 503 505.17	11.32
230	N 7 976 357.62	E 503 403.41	11.02



SETOUT POINTS FOR SEDIMENTATION POND No.2

POINT No.	NORTHING	EASTING	EL.
231	N 7 976 356.05	E 503 402.77	11.07
232	N 7 976 342.14	E 503 409.01	11.61
233	N 7 976 336.13	E 503 429.78	11.76
234	N 7 976 331.83	E 503 444.62	11.87
235	N 7 976 323.82	E 503 472.26	12.07
236	N 7 976 323.43	E 503 475.17	12.08
237	N 7 976 323.67	E 503 495.33	12.02



KEY PLAN

LEGEND:

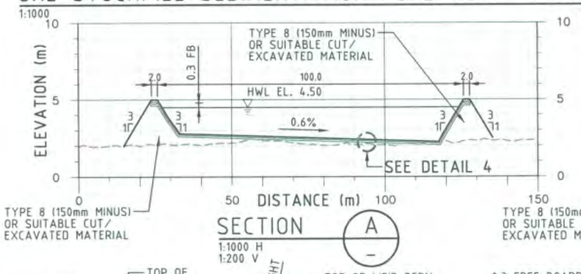
- 188 — EXISTING GROUND CONTOURS
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- % — GRADING SLOPE
- 100 — CROSS SECTION DISTANCE
- FG EL. — FINISHED GRADE ELEVATION
- HWL — HIGH WATER LEVEL
- HAT — HIGHEST ASTRONOMICAL TIDE
- FB — FREEBOARD
- GRADE TO FLOW TOWARDS DITCH TO AVOID LOCAL PONDING

ORE STOCKPILE SEDIMENTATION POND No.1 - PLAN

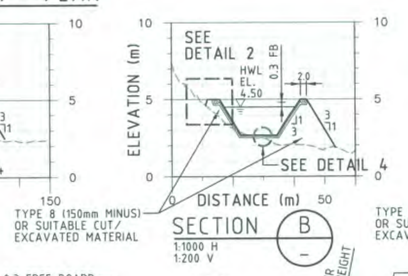
1:1000

ORE STOCKPILE SEDIMENTATION POND No.2 - PLAN

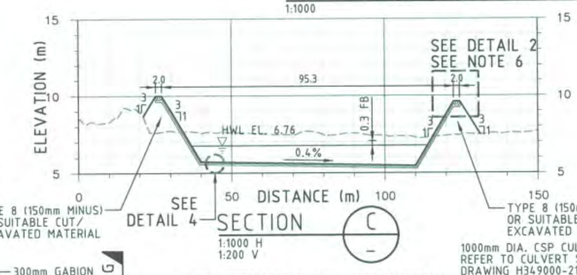
1:1000



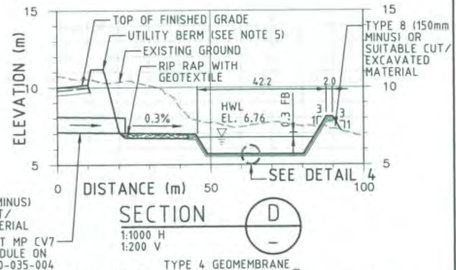
SECTION A — 1:1000 H, 1:200 V



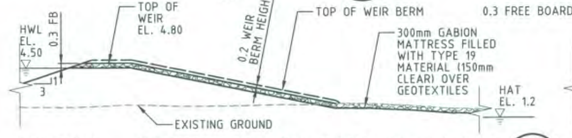
SECTION B — 1:1000 H, 1:200 V



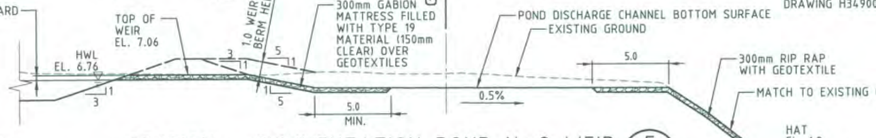
SECTION C — 1:1000 H, 1:200 V



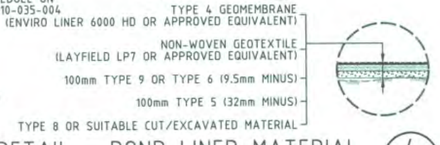
SECTION D — 1:1000 H, 1:200 V



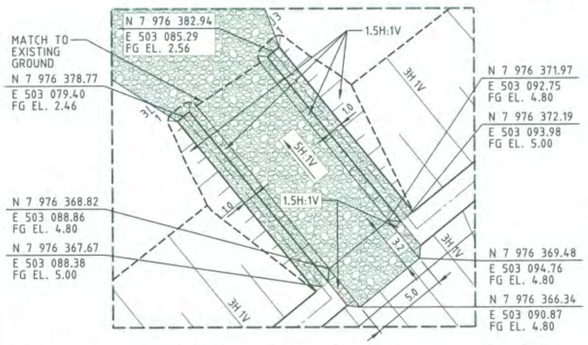
SECTION - SEDIMENTATION POND No.1 WEIR E — NTS



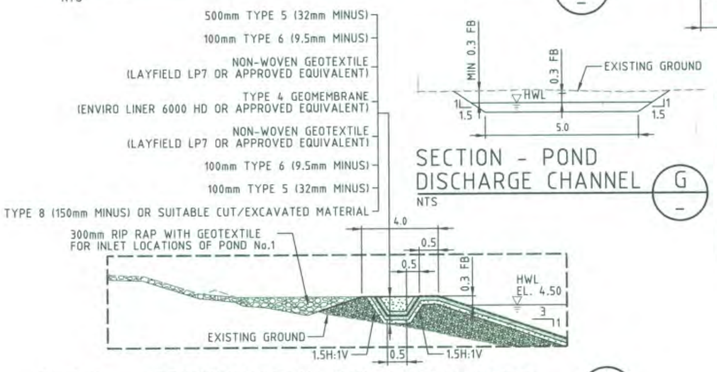
SECTION - SEDIMENTATION POND No.2 WEIR F — NTS



DETAIL - POND LINER MATERIAL 4 — NTS

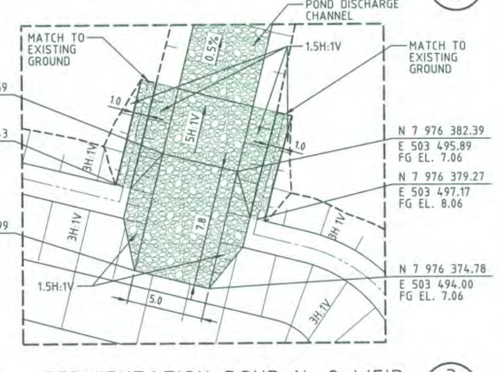


DETAIL - SEDIMENTATION POND No.1 WEIR 1 — 1:200



SECTION - POND DISCHARGE CHANNEL G — NTS

DETAIL - SEDIMENTATION POND BERM LINER 2 — 1:100



DETAIL - SEDIMENTATION POND No.2 WEIR 3 — 1:200

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 2.0m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
5. FOR UTILITY BERM TYPICAL DETAILS REFER TO DRAWINGS H349000-1000-10-041-0006, -0007 AND -0009.
6. APPLY SAME LINER DETAIL AT ALL LOCATIONS.
7. POND No.1 MAXIMUM CAPACITY IS 2,660m3 WITH 0.3m FREEBOARD AND HIGH WATER LEVEL (HWL) EL. 4.50m.
8. POND No.2 MAXIMUM CAPACITY IS 2,800m3 WITH 0.3m FREEBOARD AND HIGH WATER LEVEL (HWL) EL. 6.76m.

FOR CONSTRUCTION

PERMIT TO PRACTICE HATCH LTD. Signature — Date 30 Aug 13 — PERMIT NUMBER: P 512 — The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REGISTERED PROFESSIONAL ENGINEER — M. M. S. HASSAN — LICENSEE — NT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
0	CONSTRUCTION	SH	MM		2013-08-30

REVISIONS

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	K. FALLAHI	DRAWN BY	M MCDOUGALD
DATE	2013-08-27	DATE	2013-08-27
CHECKED BY	A. MOHEBKHANI	DISCIP. ENGR.	S. HASSAN
DATE	2013-08-30	DATE	2013-08-30
PROJ. DES. COORD.	T. THERTELL	PROJ. ENGR.	J. CLELAND
DATE	2013-08-30	DATE	2013-08-30
PROJ. MGR.	S. PERRY		
DATE	2013-08-30		

Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILE SEDIMENTATION PONDS
EARTHWORKS & DRAINAGE-PLAN & SECTIONS

DRAWING NO.	DRAWING TITLE
H349000-2133-10-035-0001	MILNE PORT-ORE STOCKPILES No.1&2-EARTHWORKS & DRAINAGE-PLAN

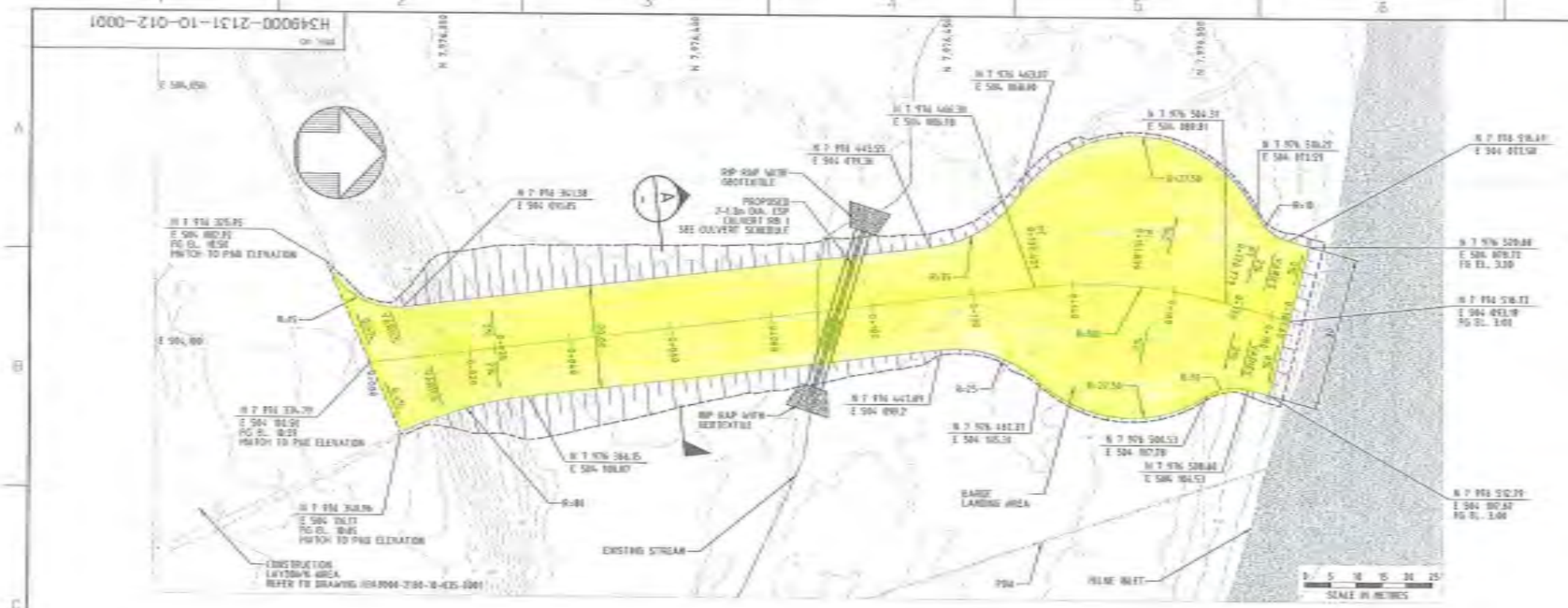
REFERENCE DRAWINGS

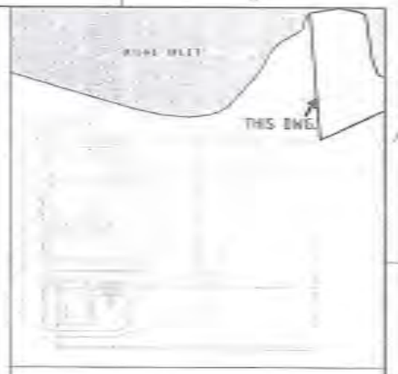
SCALE	DWG. NO.	REV.
1:1000 OR AS NOTED	H349000-2345-10-035-0001	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

mcdo64322 30/08/2013 12:00:07 PM C:\pw\projectwise\mcdo64322\dms74793\H349000-2345-10-035-0001.dgn

H349000-2131-10-012-0001





KEY PLAN

LEGEND:

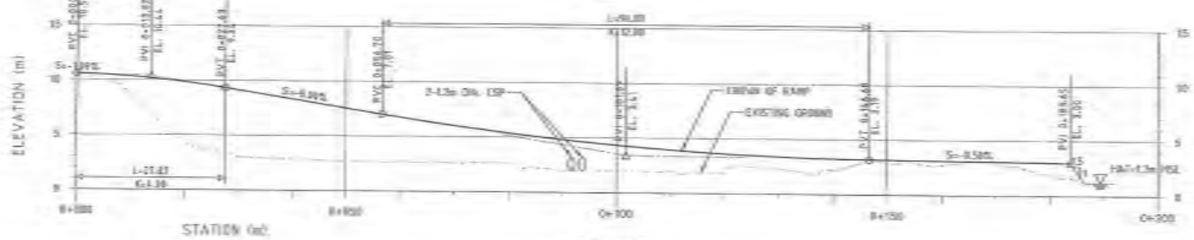
	EXISTING WATERBODY
	EXISTING STREAM
	PROJECT DEVELOPMENT BOUNDARY (PDA)
	FILL SLOPE
	CUT SLOPE
	TOE OF SLOPE
S=	GRADING SLOPE
	EXISTING GROUND CONTOURS
PT	POINT OF TANGENT
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
POE	POINT OF END
PVC	POINT OF VERTICAL CURVE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
ROR	RUN OF QUARRY
HAT	HIGHEST ASTRONOMICAL TIDE
MSL	MEAN SEA LEVEL
K	RATE OF VERTICAL CURVATURE

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
2. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
3. COORDINATE GRID IS SHOWN IN 10TH MAGNETIC ZONE 17 AND IS IN METRES.
4. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 0.5 METRES.
5. SAFETY BERM NEEDS TO BE ADDED AS PER SITE REQUIREMENTS AND REQUEST, AS APPROVED BY COMPANY'S REPRESENTATIVE.
6. THE CULVERT UPSTREAM AND DOWNSTREAM LOCATIONS AND INVERT ELEVATIONS ARE BASED ON LIDAR DATA. NO STREAM CROSS-SECTION SURVEY DATA IS AVAILABLE.
7. ADJUST CULVERT START AND END COORDINATES AND INVERT ELEVATIONS AT FIELD.
8. FLOW DIRECTION MUST BE FROM UPSTREAM TO DOWNSTREAM. PROVIDE AVERAGE STREAM SLOPE ALONG THE CULVERT AS CULVERT SLOPE BASED ON ACTUAL FIELD CONDITIONS.

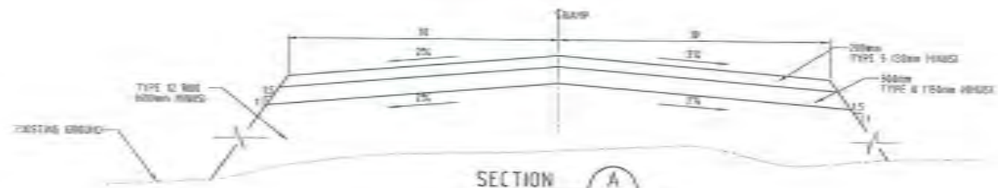
PLAN

1:500



PROFILE

1:500 H
1:250 V



SECTION A

1:100 H
1:50 V

CULVERT ID	FISH BEARING (Y/N)	NUMBER OF PIPES	D (mm)	M (mm)	TYPE	CULVERTS AT UPSTREAM NORTHING	CULVERTS AT UPSTREAM EASTING	W/S INV. EL. (m)	CULVERTS AT DOWNSTREAM NORTHING	CULVERTS AT DOWNSTREAM EASTING	B/S INV. EL. (m)	C (mm)	L (m)	S (%)	SKEW (DEGREES)	LENGTH (m)
RS 1	N	3	1200	2000	CSP	7 976 413.38	504 986.74	2.20	7 976 430.21	504 976.37	1.80	500	4.3	1.00	15.00	32

CULVERT SCHEDULE

REFER TO DRAWING H349000-1000-10-SKE-0001 FOR DETAIL

REFERENCE DRAWINGS

REVISIONS

ISSUE AUTHORIZATION

HATCH

Baffinland

MARY RIVER PROJECT

MILNE PORT
RAMP TO BEACH
PLAN, PROFILE & SECTION

SCALE: 1:500 (AS NOTED)

DWG. NO. H349000-2131-10-012-0001

REV. 0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

H349000-4133-10-035-0001

SETOUT POINTS FOR PLATEAU

POINT No.	NORTHING	EASTING	EL.
PG 01	N 7 913 158.57	E 561 678.91	208.63
PG 02	N 7 913 163.68	E 561 690.65	208.38
PG 03	N 7 913 174.75	E 561 708.61	209.25
PG 04	N 7 913 178.88	E 561 758.94	208.42
PG 05	N 7 913 141.18	E 561 780.29	209.46
PG 06	N 7 913 143.61	E 561 799.24	209.95
PG 07	N 7 913 161.98	E 561 744.39	208.34
PG 08	N 7 913 162.84	E 561 744.52	208.44
PG 09	N 7 913 109.48	E 561 590.52	210.56
PG 10	N 7 913 108.60	E 561 596.80	210.59
PG 11	N 7 913 108.76	E 561 502.46	210.88
PG 12	N 7 913 106.89	E 561 651.49	196.64
PG 13	N 7 913 169.82	E 561 706.97	197.24
PG 14	N 7 913 116.18	E 561 716.72	197.57
PG 15	N 7 913 118.87	E 561 716.59	197.46
PG 16	N 7 913 120.47	E 561 708.53	197.80
PG 17	N 7 913 135.47	E 561 754.49	199.82
PG 18	N 7 913 133.90	E 561 753.61	198.22
PG 19	N 7 913 149.96	E 561 796.69	199.10
PG 20	N 7 913 205.81	E 561 581.16	195.82
PG 21	N 7 913 182.18	E 561 583.74	195.68
PG 22	N 7 913 188.68	E 561 597.24	195.71
PG 23	N 7 913 187.91	E 561 583.24	195.71
PG 24	N 7 913 198.25	E 561 595.89	195.77
PG 25	N 7 913 206.44	E 561 594.85	195.85
PG 26	N 7 913 206.25	E 561 643.63	194.21
PG 27	N 7 913 241.88	E 561 492.67	195.35
PG 28	N 7 913 194.35	E 561 441.38	196.83
PG 29	N 7 913 183.79	E 561 441.73	196.65
PG 30	N 7 913 186.65	E 561 534.87	194.25
PG 31	N 7 913 144.54	E 561 495.38	196.33
PG 32	N 7 913 133.23	E 561 545.18	194.25
PG 33	N 7 913 188.14	E 561 471.47	196.32
PG 34	N 7 913 141.83	E 561 805.26	196.17
PG 35	N 7 913 144.82	E 561 805.18	196.16
PG 36	N 7 913 148.78	E 561 805.73	196.38
PG 37	N 7 913 158.82	E 561 806.92	196.86
PG 38	N 7 913 159.32	E 561 556.80	194.04
PG 39	N 7 913 155.38	E 561 432.87	194.98
PG 40	N 7 913 165.42	E 561 454.91	195.35
PG 41	N 7 913 138.53	E 561 486.52	196.10
PG 42	N 7 913 118.34	E 561 374.55	197.84
PG 43	N 7 913 138.89	E 561 802.75	198.73
PG 44	N 7 913 157.65	E 561 803.30	198.41

SETOUT POINTS FOR BOTTOM OF DITCH

POINT No.	NORTHING	EASTING	EL.
BOD 01	N 7 913 169.55	E 561 660.24	195.89
BOD 02	N 7 913 175.34	E 561 663.68	195.57
BOD 03	N 7 913 162.24	E 561 622.88	194.76
BOD 04	N 7 913 164.57	E 561 576.85	194.85
BOD 05	N 7 913 134.99	E 561 545.24	192.62
BOD 06	N 7 913 116.71	E 561 538.61	192.50
BOD 07	N 7 913 114.36	E 561 584.66	192.50
BOD 08	N 7 913 089.98	E 561 583.65	192.47
BOD 09	N 7 913 087.48	E 561 526.23	192.39
BOD 10	N 7 913 052.31	E 561 541.56	192.28
BOD 11	N 7 913 048.56	E 561 542.89	192.27
BOD 12	N 7 913 038.24	E 561 548.89	192.25
BOD 13	N 7 913 037.25	E 561 561.16	192.80
BOD 14	N 7 913 045.89	E 561 580.91	193.08
BOD 15	N 7 913 058.87	E 561 600.43	194.28
BOD 16	N 7 913 064.23	E 561 605.43	194.65
BOD 17	N 7 913 107.24	E 561 685.85	195.68
BOD 18	N 7 913 093.19	E 561 705.83	197.33
BOD 19	N 7 913 028.86	E 561 804.50	197.91
BOD 20	N 7 913 085.00	E 561 764.38	196.00
BOD 21	N 7 913 131.36	E 561 754.93	199.75
BOD 22	N 7 913 154.61	E 561 748.44	194.65
BOD 23	N 7 913 167.19	E 561 764.85	199.33
BOD 24	N 7 913 151.44	E 561 785.89	198.84
BOD 25	N 7 913 148.67	E 561 772.29	198.19
BOD 26	N 7 913 109.83	E 561 804.56	197.35
BOD 27	N 7 913 104.25	E 561 804.83	197.21

SETOUT POINTS FOR TOP OF BERM

POINT No.	NORTHING	EASTING	EL.
TOB 01	N 7 913 161.57	E 561 698.52	200.58
TOB 02	N 7 913 163.36	E 561 699.42	199.53
TOB 03	N 7 913 163.70	E 561 697.36	197.93
TOB 04	N 7 913 156.99	E 561 693.07	198.12
TOB 05	N 7 913 152.20	E 561 682.34	199.88
TOB 06	N 7 913 164.38	E 561 668.52	198.88
TOB 07	N 7 913 161.95	E 561 658.48	198.54
TOB 08	N 7 913 099.56	E 561 654.39	198.39
TOB 09	N 7 913 095.77	E 561 652.86	198.35
TOB 10	N 7 913 091.83	E 561 651.54	198.38
TOB 11	N 7 913 087.58	E 561 650.08	198.34
TOB 12	N 7 913 086.87	E 561 656.27	198.48
TOB 13	N 7 913 080.84	E 561 649.52	197.57
TOB 14	N 7 913 078.64	E 561 649.54	197.49
TOB 15	N 7 913 074.47	E 561 651.45	197.38
TOB 16	N 7 913 070.28	E 561 652.91	196.38
TOB 17	N 7 913 066.09	E 561 653.29	196.57
TOB 18	N 7 913 062.36	E 561 654.36	196.52
TOB 19	N 7 913 057.38	E 561 595.18	196.39
TOB 20	N 7 913 053.15	E 561 596.21	195.38
TOB 21	N 7 913 048.90	E 561 597.18	195.36
TOB 22	N 7 913 045.92	E 561 597.96	194.87
TOB 23	N 7 913 043.24	E 561 558.68	194.90
TOB 24	N 7 913 043.20	E 561 543.67	194.90
TOB 25	N 7 913 056.07	E 561 588.23	194.35
TOB 26	N 7 913 061.51	E 561 528.93	193.88
TOB 27	N 7 913 062.19	E 561 504.42	193.63
TOB 28	N 7 913 106.59	E 561 583.71	193.63
TOB 29	N 7 913 106.19	E 561 583.73	193.39
TOB 30	N 7 913 151.10	E 561 546.36	193.71
TOB 31	N 7 913 154.38	E 561 551.82	193.86
TOB 32	N 7 913 156.76	E 561 558.54	194.30
TOB 33	N 7 913 143.80	E 561 591.20	194.88
TOB 34	N 7 913 153.10	E 561 633.67	195.29
TOB 35	N 7 913 161.36	E 561 656.26	195.84
TOB 36	N 7 913 175.47	E 561 695.88	196.84
TOB 37	N 7 913 193.50	E 561 736.56	197.47
TOB 38	N 7 913 197.18	E 561 750.54	198.54
TOB 39	N 7 913 210.74	E 561 774.06	198.52
TOB 40	N 7 913 234.34	E 561 804.58	198.84
TOB 41	N 7 913 238.78	E 561 842.68	198.33

CULVERT SCHEDULE

REFER TO DRAWING H349000-1004-10-013-0003 FOR DETAIL

CULVERT ID	FISH BEARING (Y/N)	NUMBER OF PIPES (no)	D (mm)	W (mm)	TYPE	CULVERT AT UPSTREAM NORTHING	CULVERT AT UPSTREAM EASTING	U/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	CULVERT AT DOWNSTREAM NORTHING	CULVERT AT DOWNSTREAM EASTING	D/S INV. ELV. (m)	RIP RAP REQUIRED (Y/N)	C (mm)	L (m)	S (%)	SKEW (DEGREE)	LENGTH (m)
MS DITCH	N	1	800	800	CSP	7 913 611.18	561 578.34	192.69	Y	7 913 638.85	561 573.34	192.52	Y	300	33	8.3	90.0	33

SCALE IN METRES

KEY PLAN

LEGEND:

- EXISTING GROUND CONTOURS
- EXISTING STREAM
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- GRADING SLOPE
- CENTERLINE OF DITCH
- EXTERNAL FLOW DIRECTION
- FLOW DIRECTION
- SLOPE BREAKLINE
- RIP RAP
- LOCALIZED FILL
- CULVERT
- FG EL. AT 50m x 50m GRID
- INVERT ELEVATION
- FINISHED GRADE
- BOTTOM OF DITCH
- TOP OF BERM
- CORRUGATED STEEL PIPE
- RIP-RAP/NATURAL FINES, W.MAT
- SETOUT POINT NUMBER
- CROSS SECTION DISTANCE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN WITH RANGERSTONE 'B' AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
5. FOR TYPICAL EARTHWORKS DETAILS REFER TO DRAWINGS H349000-1000-10-042-0001 AND H349000-1000-10-013-0002
6. ALL DITCH SECTIONS ARE TRAPEZOIDAL WITH 0.5m BOTTOM WIDTH AND 1.5H:1V SIDE SLOPES, EXCEPT 3H:1V SIDE SLOPE FACING POND BERM.
7. CULVERT SHALL REPLACE DITCH WHEN HAUL ROAD IS CONSTRUCTED. FOR CULVERT DETAIL SEE HAUL ROAD DRAWING H349000-4229-10-013-0009

FOR CONSTRUCTION

REFERENCE DRAWINGS

PERMIT TO PRACTICE
PERMIT NUMBER: P 512

REVISIONS

ISSUE AUTHORIZATION

HATCH

Baffinland

MARY RIVER PROJECT

MINE SITE
ORE CRUSHING & SCREENING
EARTHWORKS & DRAINAGE – PLAN

SCALE: 1:250
DWG. NO: H349000-4133-10-035-0001
REV: 0

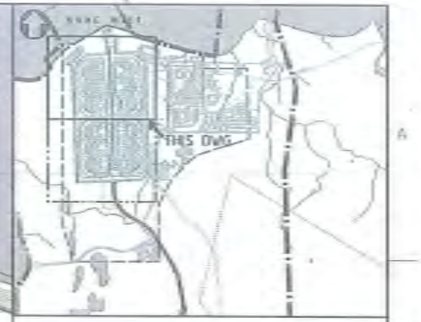
H349000-2133-10-035-0001

SETOUT POINTS FOR ORE STOCKPILE PAD			
POINT No.	NORTHING	EASTING	EL.
001	N 7 916 448.58	E 503 332.75	7.55
002	N 7 916 445.33	E 503 388.36	7.55
003	N 7 916 421.10	E 503 335.84	7.60
004	N 7 916 421.36	E 503 388.61	7.60
005	N 7 916 390.55	E 503 336.66	7.71
006	N 7 916 390.91	E 503 374.50	7.71
007	N 7 916 387.25	E 503 376.78	9.93
008	N 7 916 388.25	E 503 297.90	9.90
009	N 7 916 388.97	E 503 280.60	9.89
010	N 7 916 389.84	E 503 258.73	10.16
011	N 7 916 365.24	E 503 361.98	9.74
012	N 7 916 365.08	E 503 177.78	9.80
013	N 7 916 367.86	E 503 295.94	9.53
014	N 7 916 362.49	E 503 162.80	10.25
015	N 7 916 363.06	E 503 117.88	10.33
016	N 7 916 365.61	E 503 294.34	10.03
017	N 7 916 351.82	E 503 285.84	9.93
018	N 7 916 349.25	E 503 285.92	9.80
019	N 7 916 349.58	E 503 361.62	9.80
020	N 7 916 347.89	E 503 284.48	10.03
021	N 7 916 348.29	E 503 338.15	10.35
022	N 7 916 394.64	E 503 349.88	10.16
023	N 7 916 337.50	E 503 362.83	10.32
024	N 7 916 338.15	E 503 378.42	10.40
025	N 7 916 329.85	E 503 335.58	10.16
026	N 7 916 333.36	E 503 381.89	10.09
027	N 7 916 334.67	E 503 338.7	10.33
028	N 7 916 334.85	E 503 358.24	10.22
029	N 7 916 318.51	E 503 361.91	10.24
030	N 7 916 338.22	E 503 381.71	10.24
031	N 7 916 320.59	E 503 214.77	10.05
032	N 7 916 305.24	E 503 288.95	9.98
033	N 7 916 326.35	E 503 329.98	10.36
034	N 7 916 326.90	E 503 359.48	10.36
035	N 7 916 304.32	E 503 895.95	9.56
036	N 7 916 308.84	E 503 899.25	10.01
037	N 7 916 284.81	E 503 438.98	9.99
038	N 7 916 284.81	E 503 447.25	10.23
039	N 7 916 290.75	E 503 380.51	9.58
040	N 7 916 295.63	E 503 386.93	10.09
041	N 7 916 299.31	E 503 389.52	10.18
042	N 7 916 294.35	E 503 915.68	10.42
043	N 7 916 284.84	E 503 443.25	9.86
044	N 7 916 285.99	E 503 398.98	10.19
045	N 7 916 281.29	E 503 385.36	10.43
046	N 7 916 248.24	E 503 445.95	9.75
047	N 7 916 248.36	E 503 445.79	10.26
048	N 7 916 241.24	E 503 386.36	10.33
049	N 7 916 241.45	E 503 453.37	10.18
050	N 7 916 271.98	E 503 449.61	10.06
051	N 7 916 272.23	E 503 437.54	10.22
052	N 7 916 235.84	E 503 432.61	10.18
053	N 7 916 236.96	E 503 435.54	9.58
054	N 7 916 180.64	E 503 868.72	10.14
055	N 7 916 184.38	E 503 870.67	10.46
056	N 7 916 181.32	E 503 887.46	10.73
057	N 7 916 181.61	E 503 895.55	10.52
058	N 7 916 184.81	E 503 184.31	10.81
059	N 7 916 186.34	E 503 202.78	10.80
060	N 7 916 166.52	E 503 226.48	10.78
061	N 7 916 167.48	E 503 265.94	10.81
062	N 7 916 150.90	E 503 260.43	10.85
063	N 7 916 159.85	E 503 287.61	10.95
064	N 7 916 169.14	E 503 295.34	10.79
065	N 7 916 161.91	E 503 304.91	10.99
066	N 7 916 164.48	E 503 443.57	10.59
067	N 7 916 164.69	E 503 421.47	10.76
068	N 7 916 165.29	E 503 438.40	10.68
069	N 7 916 165.44	E 503 438.85	10.10
070	N 7 916 175.32	E 503 670.51	9.70
071	N 7 916 175.33	E 503 675.75	10.33
072	N 7 916 175.88	E 503 698.74	10.33
073	N 7 916 177.51	E 503 695.14	10.14
074	N 7 916 178.44	E 503 433.34	10.03
075	N 7 916 177.66	E 503 434.95	10.08
076	N 7 916 178.29	E 503 439.54	10.08
077	N 7 916 178.38	E 503 441.39	9.91

SETOUT POINTS FOR UTILITY BERM			
POINT No.	NORTHING	EASTING	EL.
UB 01	N 7 916 427.03	E 503 284.76	8.51
UB 02	N 7 916 427.46	E 503 295.11	10.68
UB 03	N 7 916 380.28	E 503 298.48	10.87
UB 04	N 7 916 350.01	E 503 281.33	12.10
UB 05	N 7 916 352.62	E 503 295.85	12.10
UB 06	N 7 916 352.64	E 503 308.43	10.71
UB 07	N 7 916 353.48	E 503 349.56	10.73
UB 08	N 7 916 288.42	E 503 429.86	10.58
UB 09	N 7 916 283.29	E 503 442.39	10.29

SETOUT POINTS FOR DRAINAGE BERM			
POINT No.	NORTHING	EASTING	EL.
TDB 01	N 7 916 358.78	E 503 335.44	9.60
TDB 02	N 7 916 358.01	E 503 377.64	9.60
TDB 03	N 7 916 349.89	E 503 458.91	9.60
TDB 04	N 7 916 395.74	E 503 843.68	9.60
TDB 05	N 7 916 384.39	E 503 883.75	9.60
TDB 06	N 7 916 396.45	E 503 878.77	9.66
TDB 07	N 7 916 285.66	E 503 453.68	7.56
TDB 08	N 7 916 291.88	E 503 456.43	8.65
TDB 09	N 7 916 284.86	E 503 456.87	9.26
TDB 10	N 7 916 210.85	E 503 453.38	9.54
TDB 11	N 7 916 170.85	E 503 458.65	9.34
TDB 12	N 7 916 143.79	E 503 458.84	9.81
TDB 13	N 7 916 474.37	E 503 463.73	9.84
TDB 14	N 7 916 359.12	E 503 396.62	9.91
TDB 15	N 7 916 368.18	E 503 337.75	9.89
TDB 16	N 7 916 362.41	E 503 375.89	9.75
TDB 17	N 7 916 393.80	E 503 446.78	10.30
TDB 18	N 7 916 373.62	E 503 448.86	10.64
TDB 19	N 7 916 394.59	E 503 458.29	10.15
TDB 20	N 7 916 401.89	E 503 452.44	10.58
TDB 21	N 7 916 408.48	E 503 452.88	10.54

SETOUT POINTS FOR DRAINAGE DITCH			
POINT No.	NORTHING	EASTING	EL.
DDB 01	N 7 916 349.58	E 503 333.39	8.54
DDB 02	N 7 916 348.33	E 503 361.30	8.37
DDB 03	N 7 916 343.47	E 503 384.81	8.33
DDB 04	N 7 916 316.38	E 503 404.84	8.31
DDB 05	N 7 916 302.46	E 503 885.95	8.69
DDB 06	N 7 916 298.63	E 503 879.85	8.45
DDB 07	N 7 916 287.63	E 503 859.61	8.55
DDB 08	N 7 916 268.42	E 503 850.78	8.49
DDB 09	N 7 916 264.12	E 503 853.84	8.43
DDB 10	N 7 916 236.96	E 503 849.47	7.91
DDB 11	N 7 916 253.80	E 503 296.78	8.93
DDB 12	N 7 916 258.88	E 503 307.80	8.89
DDB 13	N 7 916 262.95	E 503 419.34	8.63
DDB 14	N 7 916 309.82	E 503 436.53	8.97
DDB 15	N 7 916 326.70	E 503 437.43	7.84
DDB 16	N 7 916 286.96	E 503 439.87	7.78
DDB 17	N 7 916 272.31	E 503 439.38	7.78
DDB 18	N 7 916 185.56	E 503 444.67	7.52
DDB 19	N 7 916 108.48	E 503 445.23	7.78



KEY PLAN

LEGEND

- EXISTING GROUND CONTOURS
- EXISTING WATERBODY
- BAFFINLAND'S COMMERCIAL LEASE OR MINE MINERAL LAND
- PROJECT DEVELOPMENT AREA (PDA)
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- SLOPE BREAKLINE
- GRADING SLOPE
- CENTRELINE OF DITCH
- CULVERT
- FG EL. AT 50m x 50m GRID
- HP HIGH POINT
- SETOUT POINT NUMBER
- CSP CORRUGATED STEEL PIPE
- CROSS SECTION DISTANCE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM MAGNETIC ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES, CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS AND ELEVATIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.
5. FOR SEDIMENTATION PONDS PLAN AND DETAIL REFER TO DRAWING H349000-2133-10-035-0001.
6. FOR UTILITY BERM TYPICAL DETAILS REFER TO DRAWINGS H349000-1200-10-041-0004, -0007 AND -0009.

FOR CONSTRUCTION

SEDIMENTATION POND No.1

SEDIMENTATION POND No.2

ORE STOCKPILE No.1

ORE STOCKPILE No.2

UTILITY BERM (SEE NOTE 6)

FUEL TANK FARM ACCESS ROAD REFER TO DRAWING H349000-2100-10-042-0001

1800mm DIA. CSP CULVERT MP CVT REFER TO CULVERT SCHEDULE ON DRAWING H349000-2100-10-035-0004

500mm DIA. CSP CULVERT MP CVE REFER TO CULVERT SCHEDULE ON DRAWING H349000-2100-10-035-0004

MATCHLINE REFER TO DRAWING H349000-2133-10-035-0002

SCALE IN METRES

REFERENCE DRAWINGS

PERMIT TO PRACTICE

REVISIONS

ISSUE AUTHORIZATION

HATCH

Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILES NO. 1 & 2
EARTHWORKS & DRAINAGE – PLAN

SCALE 1:1000

DWG. NO. H349000-2133-10-035-0001

REV. 0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

H349000-2133-10-035-0002

SETOUT POINTS FOR ORE STOCKPILE PAD

POINT No.	NORTHING	EASTING	EL.
078	N 7 974 837.37	E 503 259.30	10.16
079	N 7 974 836.30	E 503 256.38	10.23
080	N 7 974 837.30	E 503 256.17	10.23
081	N 7 974 844.10	E 503 259.58	10.21
082	N 7 974 844.85	E 503 284.57	10.21
083	N 7 974 844.68	E 503 297.69	10.24
084	N 7 974 851.35	E 503 305.38	8.56
085	N 7 974 851.35	E 503 307.85	9.47
086	N 7 974 851.89	E 503 892.84	9.15
087	N 7 974 826.32	E 503 184.29	10.34
088	N 7 974 825.67	E 503 229.56	10.21
089	N 7 974 823.89	E 503 236.66	9.86
090	N 7 974 823.84	E 503 256.64	9.96
091	N 7 974 826.57	E 503 270.29	9.98
092	N 7 974 825.30	E 503 292.27	9.84
093	N 7 974 828.74	E 503 301.83	10.06
094	N 7 974 835.99	E 503 307.88	10.21
095	N 7 974 838.54	E 503 436.28	9.21
096	N 7 974 838.68	E 503 441.26	9.10
097	N 7 974 836.78	E 503 444.30	8.61
098	N 7 974 812.30	E 503 450.79	10.06
099	N 7 974 818.79	E 503 338.36	10.02
100	N 7 974 833.58	E 503 301.29	10.23
101	N 7 974 837.68	E 503 300.79	10.16
102	N 7 974 995.84	E 503 339.48	10.28
103	N 7 974 998.37	E 503 337.55	10.46
104	N 7 974 999.89	E 503 353.54	10.46
105	N 7 974 995.18	E 503 372.99	10.26
106	N 7 974 995.91	E 503 392.98	10.36
107	N 7 974 818.79	E 503 363.71	10.13
108	N 7 974 958.38	E 503 477.19	9.72
109	N 7 974 959.38	E 503 479.96	10.29
110	N 7 974 959.92	E 503 494.93	10.29
111	N 7 974 958.61	E 503 499.63	10.14
112	N 7 974 947.87	E 503 420.85	10.17
113	N 7 974 946.18	E 503 428.43	10.33
114	N 7 974 946.85	E 503 443.62	10.33
115	N 7 974 946.75	E 503 446.87	9.86
116	N 7 974 851.53	E 503 881.84	10.25
117	N 7 974 853.47	E 503 883.79	10.26
118	N 7 974 853.33	E 503 898.78	10.46
119	N 7 974 853.56	E 503 906.70	10.40
120	N 7 974 864.71	E 503 895.63	11.02
121	N 7 974 858.82	E 503 854.88	10.93
122	N 7 974 858.41	E 503 842.61	11.09
123	N 7 974 859.25	E 503 865.96	10.99
124	N 7 974 859.59	E 503 895.31	10.98
125	N 7 974 860.42	E 503 898.33	11.09
126	N 7 974 860.33	E 503 906.38	10.93
127	N 7 974 861.14	E 503 915.57	10.93
128	N 7 974 868.81	E 503 268.26	10.29

MATCHLINE REFER TO DRAWING H349000-2133-10-035-0001

B 2133-10-035-0003

C 2133-10-035-0003

D 2133-10-035-0004

E 2133-10-035-0004

THIS DWG

ORE STOCKPILE No.3

ORE STOCKPILE No.4

ROUTE ROAD

INFRASTRUCTURE PAD ACCESS ROAD REFER TO DRAWING H349000-2133-10-035-0001

SETOUT POINTS FOR ORE STOCKPILE PAD

POINT No.	NORTHING	EASTING	EL.
N27	N 7 975 700.07	E 503 294.69	16.35
N28	N 7 975 704.39	E 503 308.68	16.55
N29	N 7 975 708.04	E 503 407.35	16.27
ET10	N 7 975 693.84	E 503 388.48	9.47
ET11	N 7 975 694.43	E 503 284.29	16.03
ET12	N 7 975 698.38	E 503 249.84	9.78
ET13	N 7 975 706.19	E 503 284.98	9.29
ET14	N 7 975 700.33	E 503 383.58	16.06
ET15	N 7 975 704.25	E 503 407.65	9.26
ET16	N 7 975 708.38	E 503 503.96	16.31
ET17	N 7 975 694.32	E 503 383.53	16.33
ET18	N 7 975 704.25	E 503 342.98	16.34
ET19	N 7 975 708.01	E 503 342.58	16.34

SETOUT POINTS FOR BOTTOM OF DITCH

POINT No.	NORTHING	EASTING	EL.
BOD 26	N 7 975 696.68	E 503 254.09	8.88
BOD 27	N 7 975 696.82	E 503 445.30	7.92
BOD 28	N 7 975 976.78	E 503 447.04	8.16
BOD 29	N 7 975 846.67	E 503 458.84	8.41
BOD 30	N 7 975 753.57	E 503 458.49	8.75
BOD 31	N 7 975 706.65	E 503 446.87	8.83
BOD 32	N 7 975 710.39	E 503 438.34	8.59
BOD 33	N 7 975 743.83	E 503 440.94	8.78
BOD 34	N 7 975 746.63	E 503 351.54	9.15
BOD 35	N 7 975 695.21	E 503 294.68	9.32

SETOUT POINTS FOR DRAINAGE BERM

POINT No.	NORTHING	EASTING	EL.
TOB 22	N 7 976 007.58	E 503 266.71	9.93
TOB 23	N 7 975 964.30	E 503 268.21	10.01
TOB 24	N 7 975 846.29	E 503 275.31	10.20
TOB 25	N 7 975 794.30	E 503 275.49	10.18
TOB 26	N 7 975 704.29	E 503 281.47	10.06
TOB 27	N 7 975 695.41	E 503 282.09	9.94
TOB 28	N 7 975 687.54	E 503 286.34	9.94
TOB 29	N 7 975 695.81	E 503 225.80	10.53

SETOUT POINTS FOR DRAINAGE BERM

POINT No.	NORTHING	EASTING	EL.
TOB 30	N 7 975 695.84	E 503 252.29	10.71
TOB 31	N 7 975 980.34	E 503 458.88	10.49
TOB 32	N 7 975 860.25	E 503 458.89	10.56
TOB 33	N 7 975 796.83	E 503 459.29	10.37
TOB 34	N 7 975 752.71	E 503 459.87	10.60
TOB 35	N 7 975 738.58	E 503 459.59	10.62
TOB 36	N 7 975 709.86	E 503 436.99	10.43
TOB 37	N 7 975 700.21	E 503 438.87	10.55
TOB 38	N 7 975 698.29	E 503 373.24	10.94
TOB 39	N 7 975 696.35	E 503 295.36	10.79

SCALE 1:1000 METRES

KEY PLAN

LEGEND

- EXISTING GROUND CONTOURS
- EXISTING WATERBODY
- BAFFINLANDS ESMPERIAL LEASE ON INUIT OWNED LAND
- PROJECT DEVELOPMENT AREA (PDA)
- FILL SLOPE
- CUT SLOPE
- TOE OF SLOPE
- SLOPE BREAKLINE
- GRADING SLOPE
- CENTERLINE OF SWALE/DITCH
- XYZ.0 AS BUILT GRID AT 50m x 50m GRID
- HIGH POINT
- SETOUT POINT NUMBER
- CROSS SECTION CHAINAGE

NOTES:

1. TOPOGRAPHY PROVIDED BY TERRAPOINT CANADA INC.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
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0	CONSTRUCTION	SW			2015-12-03

REF	ISSUE FOR	AUTH'D	BY	DATE
0	CONSTRUCTION		SW	2015-12-03

DRAWING NO.	TITLE
H349000-2100-10-240-0001	SITE ROAD - PLAN AND PROFILE
H349000-2100-10-244-0001	WATER POINT - SITE LAYOUT

REFERENCE DRAWINGS

REVISIONS

ISSUE AUTHORIZATION

DESIGNED BRK | DRAWN W | CHECKED | APP'D | DATE
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J. CLEMENS | 2015-12-03

HATCH

Baffinland

MARY RIVER PROJECT

MILNE PORT
ORE STOCKPILES NO. 3 & 4
EARTHWORKS & DRAINAGE – PLAN

SCALE	DWG. NO.	REV.
1:1000 (AT A1 SIZE)	H349000-2133-10-035-0002	0

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

ISO9848-2013
2015-12-03 11:25:37 AM
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Civil

2013-08-28	1	Approved for Use	A. Mohebkhani	S. Hassan	S. Perry	D. Matthews
2013-03-20	0	Approved for Use	A. Mohebkhani	S. Hassan	S. Perry	D. Matthews
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY

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1. Introduction

- The Mary River project site is located in northern Baffin Island, in Nunavut Territory of the Canadian Arctic. The Project currently consists of activities which entail mining high grade iron ore, at a production rate of 3.5 million tonnes per annum, stockpiling it throughout the year at the Milne Port, and shipping the material during the summer months. Development of this Project includes the infrastructure construction and operational activities associated with the Milne Port and Mine Site areas along with upgrading the 100 km Tote Road connecting the two sites. All associated project infrastructure shall be based on a 5 year design life, with the exception of the laydown areas, for which a 1 year design life shall be considered. 1
- The purpose of this document is to provide the necessary information required for the design of infrastructure at the two project sites (Milne Port and Mine Site). The works covered by this criteria include earthworks, site grading, internal roads, stormwater drainage system and the earthworks for service utilities, to be implemented at the project sites. The design criteria proposed in this document shall be treated as minimum requirements for the intended infrastructure design. Refer to Section 2 of this document for a list of other design criteria and technical design documents from the pertinent disciplines. Where a conflict between the various design criteria occurs, the most stringent shall apply.
- This document is intended to address the key criteria required for the design of site infrastructure.

1.1 Safety

The consideration of personnel safety in all stages of the design, construction and operation is paramount. Prime consideration shall be given to safety and reliability to:

- Maximize health and safety for all personnel.
- Minimize environmental impacts.
- Maximize the security of equipment.

2. Other Project Design Criteria

2.1 This design criteria document shall be read in conjunction with other documents which may already exist or will be developed as the project proceeds. These documents include the following:

- Tote Road Design Criteria (H349000-3100-10-122-0001).
- Structural Design Criteria (H349000-1000-35-122-0001).
- ~~Foundation Design Criteria (H349000-1000-35-122-0002).~~ 1
- Aerodrome Design Criteria (H349000-1000-00-109-0001).
- Layout Design Criteria (H349000-1000-50-122-00030. 1
- Foundation Design Basis (H349000-1000-30-109-0001) □ For Non-Process buildings. 1

3. Units and Coordinate System

3.1 The International System of Units (SI units and prefixes) shall be used for all design calculations and on all drawings.

3.2 The grid coordinates shall be based on: projection - Universal Transverse Mercator (UTM) Zone 17 and horizontal datum - NAD 83 Canadian Spatial Reference System (CSRS).

3.3 Vertical datum shall based on the Canadian Geodetic Vertical Datum of 1928 (CGVD28).

4. References

4.1 Codes, Regulations and Standards

4.1.1 Unless specifically stated otherwise, civil design shall be based on the applicable sections of the latest revisions of the following codes, specifications, standards, regulations and other reference documents. In addition, the design must comply with all laws or regulations of federal and Nunavut territorial authorities.

4.2 General

4.2.1 All applicable federal, territorial (Nunavut) and local laws and regulations.

- OHSA Occupational Health and Safety Act
- CSA Canadian Standards Association
- MHSA Mine Health and Safety Act (Nunavut □ S.N.W.T. 1994)
- OHSR Occupational Health and Safety Regulations
- NBCC National Building Code of Canada (2010)
- ASTM American Society for Testing and Materials
- ASCE American Society of Civil Engineers
- NFPA National Fire Protection Association
- NRC Natural Resources Canada □ Explosives Safety and Security Branch 1

4.3 Roads

- TAC Transportation Association of Canada □ Geometric Design Guide for Canadian Roads
- AASHTO American Association of State Highway and Transportation Officials
- USBM Design of Surface Mine Haulage Roads □ A Manual (US Department of the Interior, Bureau of Mines)
- MSHA Haul Road Inspection Handbook □ MSHA Document Number PH99-I-4
- MTO Ministry of Transportation, Ontario □ Ontario Traffic Manual 1

4.4 Stormwater Management

- MOE Ministry of the Environment - Stormwater Management Planning and Design Manual
- MTO Ministry of Transportation, Ontario □ Drainage Manual
- CDA Canadian Dam Association □ Dam Safety Guidelines

4.5 Reference Documents

Reference will be made to/contents have been used from the following documents, articulated during the previous phases of the project, during the development of these criteria:

- H337697-0000-10-122-0001: Stormwater Management and Drainage System Design.
- H337697-6170-10-122-0001: Milne Port Drainage System and Stormwater Management Ponds.
- H337697-6170-10-122-0002: Mine Site Drainage System, Stormwater and Sediment Management.
- H337697-0000-15-124-0004: Geotechnical Data Report □ Infrastructure.
- Standard Specification S311213: □uarried Fill Materials.
- Standard Specification S003120: Site Conditions.
- NB 102-181/30-7: Baseline Hydrology Report, Knight Piesold, Jan 04, 2012.
- BIM - Early Revenue Phase Mine Haul Road Design Criteria.
- BIM - Early Revenue Phase Tote Road Design Criteria.
- H349000-3000-00-124-0001: NB102-00181 Bulk Sampling Program □ Road Upgrade Design Summary.
- Final Environmental Impact Statement (FEIS), Mary River Project, February 2012.
- Nunavut Impact Review Board (NIRB) Project Certificate (No.:005), Dec 28, 2012.
- H349000-4221-10-220-0001: Number of Runaway Truck Arresting Provisions for the Mine Haul Road, Project Memo.
- H349000-2133-10-220-0001: Runoff Coefficient for the Milne Port Ore Stockpile Pad, Project Memo.
- H349000-1000-15-122-0001: Geotechnical Design Criteria
- H349000-1000-10-220-0001: Stormwater Sedimentation Pond Design Criteria, Project Memo.
- E349000-1000-00-124-0005: Design Brief □ Milne Inlet Landfarm, November 2012, EBA File E14101174.

5. Site Development

Site development refers to construction of civil infrastructure to support construction and operation of facilities. The following sections list the site development activities and establish criteria that shall be adhered to when carrying out site development design works.

5.1 Site Preparation

5.1.1 Construction areas shall be cleared of vegetation, and temporary drainage systems shall be provided prior to construction activities taking place within the proposed areas for the new site facilities.

5.1.2 Topsoil and/or existing roots shall be removed to a minimum depth of 150 mm, if required, from all areas where buildings, roads, yards and services are to be constructed, and shall be stockpiled in designated areas. Disposal options shall include on-site reuse, development of a designated stockpile area for disposal, or removal by truck to off-site areas, as instructed by the Company.

5.1.3 During the summer months, wetlands or areas with standing water shall be drained and the drying of such shall be promoted prior to construction. Watercourses shall be re-routed with the use of cut-off ditches, or re-aligned engineered channels.

5.1.4 Waste material shall be stockpiled in designated areas with the appropriate erosion and sedimentation control measures in place. 1

5.2 Earthworks

5.2.1 Earthworks is defined as the activity of moving soil and/or rock. Earth-moving activities are required in order to obtain the required design elevations of the ground surface. Earthworks includes cut (if required) and fill for roads, buildings and equipment pads, utility berms, foundation excavation, and construction of ditches, diversion channels and berms, dikes, etc. Earthworks shall be carried out in accordance with the following general guidelines: 1

- Existing unsuitable soils shall be removed and replaced with suitable material.
- Fill materials shall be placed and compacted over the proof-rolled subgrade in order to achieve adequate bearing capacities, as required for specific construction activities.
- Rocks/boulders and similar objects adjacent to areas which shall undergo excavation must be removed or secured, if they potentially endanger workers/machinery.
- The following criteria shall be used to determine the suitability of the soil for fill:
  - Satisfactory soil: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and, SM, or a combination of these groups; non ice-rich, free of debris, waste, vegetation and other deleterious matter. 1
  - Unsatisfactory soil: According to ASTM D 2487 Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH and PT; according to AASHTO M145 Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6 and A-7 or a combination of these groups. Also, ice-rich soils or soils containing traces of contamination and/or organic materials. 1
  - Water shall be diverted away from excavations, so it does not saturate the side slopes.

- If pipes are located in the vicinity of the slopes, erosion control measures shall be in place as mitigation for eventual leaks.
- No loads, including excavated material, traffic of vehicles or heavy machinery shall be allowed near the crest of the slopes (at a distance equal to the height of the excavation) if the slope-support solutions did not take such loads into account.
- Dust control measures shall be in place.
- For delineation of the project development boundaries, the minimum setback from freshwater aquatic environments, including fish-bearing streams and water bodies shall be as per NIRB Project Certification No.005. In general, a minimum 5 m set back shall be provided for non fish-bearing water bodies and streams, due to the potential risks of erosion and slope stability.
- Culvert installation in fish-bearing streams shall follow DFO guidelines.

5.2.2 Table 5-1 provides the minimum slope ratios that shall be used in cuts/excavations or fills/embankments. It must be noted that specific studies must be carried out by geotechnical engineers, if these slopes are to be modified with the aim of lowering costs of cut and/or fill.

Table 5-1: Minimum Slope Ratios

Type of Earthworks	Layer	Ratio H:V	
Permanent unsupported cuts	Overburden (ice-rich)	2:1	1
	Overburden (non ice-rich)	1.5:1	1
	Rock (less than 4m)	1:8	1
Permanent fills (on natural, firm ground)	Granular fill	1.5:1	
	Base and Subbase	1.5:1	
	Rock fill	1.5:1	1

Notes:
1. The maximum heights and ratios shall be determined considering slopes with typical geometry and no surcharge.
2. The above-listed parameters serve as minimum requirements, and shall be updated/modified based on confirmation/update of the site-specific conditions and/or geotechnical recommendations, or as per BIM□s directions.
3. Any geometry and load condition not covered by the table above shall be reviewed by the geotechnical engineer.
4. The granular fill is assumed to be in a drained condition.
5. If the total fill height is greater than 2 m, geotechnical stability analysis and benching requirements shall be considered on a case-specific basis. 1
6. For overburden cut/fill heights of greater than 5 m, 1.5 m wide benching with minimum 2□ cross slope shall be provided. 1
7. The absolute minimum fill slope for granular material is 1.5H:1V. However, the desirable slope is 2H:1V.
8. The absolute minimum fill slope for rock fill material is 1.25H:1V. However, the desirable slope is 1.5H:1V.
9. For the haul road, the fill side slopes shall be 2H:1V, depending on the site conditions and slope stability.
10. Stability assessments of some cut and fill slopes may be required. 1
11. For rock cut heights greater than 4 m, 1H:4V slope shall be used with 2 m wide benching and minimum 2□ cross slope at every 6 m.

5.2.3 In general, cut activities in permafrost shall be avoided/minimized. However, cut may be required to reduce large fills and high embankments that may affect/endanger slope stability. In addition, within areas where the cut materials can be reused as fill, the suitability of performing cuts in the native soil shall be reviewed by BIM and the geotechnical engineer for requirements of soil treatment/improvement, including geogrids and geotextiles, prior to implementation into the final design. 1

5.3 Backfilling

5.3.1 The gradation of fill material shall be within the Type 5 (32 mm minus) gradation limit for finish grading, within the Type 8 (150 mm minus) and/or suitable earth fill material gradation limit for rough grading, and Type 12 (600 mm minus) and/or suitable earth fill material gradation limit for the rest of the mass backfill. The surface voids of each layer of Type 12 (i.e. Run-of-□uarry material) shall be filled with rock fragments prior to the next layer being placed. 1

5.4 Site Grading

5.4.1 If applicable, finish grade elevations for roads and yards shall be set a minimum of 100 mm below the finish floor elevation of buildings/sheltered areas, with local ramps provided at doorways, as required. 1

5.4.2 Finish grading and yard grading shall be set to slope away from planned structures at a minimum of 0.5□ to 2□, and drain to a storm drainage collection system. For very long-run and localized areas, the slope shall be reduced or increased, depending on the existing ground slope and the grading around the buildings and facilities.

5.4.3 Site grading shall produce a useable and easily maintainable ground surface, not subject to flooding or erosion. The rough grades and finish grades shall adhere to the following:

- Final road and site grades shall ensure suitable pedestrian and vehicular access to buildings and facilitate adequate drainage of the site.
- Building floor elevations shall be established such that the ground floor of the buildings will not be subject to flooding in the event that the storm drainage system fails.
- Elevations of buildings/sheltered areas shall be established to permit gravity connections into sanitary sewers if possible, to avoid the need for pumps.

5.5 Infrastructure Facilities, Laydown and Ore Stockpile Areas

5.5.1 Temporary/permanent equipment and construction material laydown areas shall be provided as per the applicable Contract Drawings. The sizes of the footprints shall be optimized to keep disturbed areas to a minimum and still provide enough room for storage of material/equipment and circulation of mobile cranes/vehicles.

5.5.2 The subgrades shall be prepared via cut/fill activities prior to pavement installation/placement. If the height of the subgrade fill is less than 600 mm, Type 8 (150 mm minus) fill shall be used. If the height of the subgrade fill is greater than 600 mm, Type 12 Run-of-□uarry (600 mm minus) and/or suitable earth fill material shall be used. The voids of each layer of Type 12 shall be filled with rock fragments prior to placement of the next layer. 1

5.5.3 In general, following attainment of the subgrade, the pavement shall be laid on top, with the following minimum thicknesses/material types for infrastructure facility pads and other areas:

- 300 mm, Type 8 (150 mm minus) subbase.
- 100 mm, Type 5 (32 mm minus) base/wearing surface course. 1

5.5.4 Depending upon the area and specific requirements such as insulation for permafrost protection, the minimum pavement thicknesses and placement of wearing courses may differ from the above-listed.

5.5.5 There shall be no insulation under □fold-away□and □fabric□buildings constructed on non-frost susceptible ground material (typical for Milne Port). 1

5.5.6 Insulation shall be provided under □fold-away□and □fabric□buildings constructed on frost susceptible ground material (typical for Mine Site). 1

5.5.7 Frost susceptible and ice-rich soils shall be excavated to the extent required and backfilled with Type 12 Run-of-□uarry (600 mm minus). Non-frost susceptible soils with no visible ice shall not be excavated. 1

5.6 Landfarm

~~5.6.1 Both the Milne Port and Mine Site landfarms shall be designed as per the criteria listed in Section 3.2 of Annex 5 in the FEIS, Attachment 5: Waste Management Plan for Construction Operation, and Closure; Appendix 10D-4.~~ 1

~~5.6.2 The overall geometry as well as the liner details shall be as per Figure 3, □Hydrocarbon Impacted Soils Storage and Landfarm Facility □ Preliminary Design of Landfarm Facility□ contained within Attachment 5.~~ 1

5.6.3 EBA Engineering Consultants Ltd. has already carried out the design for the Milne Port Landfarm. 1

5.6.4 Milne Port and Mine Site Hazardous Waste Containment designs shall be carried out as per environmental requirements. They shall be lined, and shall contain sumps. 1

5.7 Milne Port Design High Tide

5.7.1 The design High Tide levels for the Project shall be as follow: 1

- The Higher High Water Level (HHWL) for large tides at the Milne Port is □2.3 m above Chart Datum (CD) which corresponds to □1.1 m above Mean Sea Level (MSL). 1
- The Highest Astronomical Tide (HAT) at the Milne Port is □2.4m above CD which corresponds to □1.2 m above MSL. 1
- The Lower Low Water Level (LLWL) for large tides at the Milne Port is □0.0 m above CD which corresponds to -1.2 m below MSL. 1

5.7.2 The toe of ramp and earthworks pad leading down to the sea lift from the laydown area, including the designated turnaround area at the beach within the Milne Port shall have a design elevation greater than □1.2 m above MSL. 1

5.7.3 Landing pad elevation at the beach shall be minimum 7□(2.15 m) above the average between the HHWL and LLWL (i.e. □3.3 m above CD which corresponds to □2.1 m above MSL). 1

5.8 Retaining Walls

5.8.1 Retaining walls and structures shall be designed based on site-specific conditions. Lateral pressure coefficients for design of retaining walls shall be as per the geotechnical recommendation.

5.8.2 Retailing walls shall be avoided to the greatest extent possible. Concrete, gabion walls, crib walls, reinforced earth and/or other systems of retaining structures shall be used, if required.

5.9 Erosion and Sediment Control

5.9.1 Erosion and sediment control measures shall be installed as required, in and around the project sites in order to minimize sediment transport off the site.

5.9.2 Control measures shall be designed to:

- Minimize the size of disturbed areas.
- Remove sediments from on-site runoffs prior to the runoff leaving the sites.
- Prevent sediments from off-site runoffs flowing across disturbed areas.
- Reduce runoff velocity flowing across the site.
- Meet local requirements for erosion and sediment control plans as defined in the FEIS.

5.9.3 A minimum set back of 30 m from fish-bearing streams and lakes or water bodies shall be provided. Any exception to this shall be consulted with and approved by the Project□s environmental team. 1

5.10 Construction and Permanent Fencing

5.10.1 Chain link fence, where required, shall be galvanized, with a minimum height of 1.8 m.

5.10.2 Two strands of barbed wire shall be bracketed off the top of the fence for safety reasons, where required by the Company.

5.10.3 Fencing within the sites shall be provided as required and as directed by the Company.

5.11 Explosives Magazine Pads and Earth Barricades 1

5.11.1 Explosives magazine pads shall be designed as per the criteria in Section 5.5 of this document. 1

5.11.2 Geometry of the Explosives Magazine Earth Barricades shall be designed in accordance with the □uantity-Distance Principles Manual from the Natural Resources Canada, Explosives Safety and Security Branch. 1

6. Road Design

6.1 General

6.1.1 The access roads at the two project sites may be temporary or permanent. An access road is defined as temporary if it will be used only during the construction period, including site predevelopment or site capturing. If an access road will be used during the operational period as well, it is defined as permanent. A 100 km roadway provides access from the Mine Site to the Milne Port (Tote Road), the design criteria for which is included in a separate document. In addition, there is a mine haul road along with internal site roads at the Mine Site, and internal site roads only within the Milne Port, in order to accomodate the mining operations.

6.1.2 The design and construction of mine haul roads, access and internal site roads at the project sites shall provide a safe environment for construction, operations and maintenance personnel, and shall facilitate the mining operations, ore transport and port operations in an efficient manner. In addition, the design shall comply with the relevant standards, guidelines, acts, approvals, permits, and other contractual environmental requirements of Baffinland as defined in Section 2 of this document.

6.2 Road Category

6.2.1 For the purposes of this design criteria, the roads are classified in three categories:

- **Mine Haul Roads -** The purpose of this type of road is for the mining operation at the mine site - hauling of ore from the open pit to the crusher pad and for maintenance purposes, from the crusher pad to the maintenance building. The mine haul road shall be segregated from the other project roads for safety considerations, and shall comply with the applicable Nunavut MHSA.
- **Permanent Access and Internal Site Roads –** These roads provide two way access to and link the various facilities/areas within each site, where B-Trains will travel in both directions.
- **Facility Service Roads –** These roads provide two way access to various facilities/areas within each site, where light vehicles will travel in both directions.
- **Tote Road –** 100 km road providing access from the Mine Site to the Milne Port.

6.3 Design Vehicle

6.3.1 The following design vehicles shall be utilized for the design of the associated project roadways:

- CAT 777G Haul Truck for the Mine Haul Road.
- B-Train (12 axle) for Permanent Access Roads and Internal Plant Roads (150 metric tonnes payload) that need to be utilized by the Tote Road trucks. 1
- CAT 740B for Waste Rock Drainage Pond/Berm. 1
- Other types of design vehicles have been used for the remainder of the Project roadways and a fire truck has been considered as the minimum design vehicle for fire access routes. 1

6.4 Geometric Design Criteria

6.4.1 All roads shall be designed as gravel roads and shall accommodate the design vehicle specified in Section 6.3 of this document. The roads geometric design parameters are specified below.

Table 6-1: Geometric Design Criteria

Road Type	Permanent Internal Plant Road	Infrastructure Facility Service Road	Haul Road – Open Pit to Crusher Pad	Waste Rock Dump Road	Haul Road Switchback	Truck Escape Ramps
Number of Lanes	2	2	2	1	2	1
Design Speed (km/h)	30	30	50	30	30	90
Posted Speed (km/h)	20	20	40	20	20	-
Total Road Width (m)	9.2	8 or 6	20	13	20	9
Minimum Horizontal Curve C/L Radius (m)	35	35	100	50	35	280
Minimum Intersection Inner Radius (m)	15	15	30	30	30	-
Minimum Cross Slope ( )	2	2	3	3	3	3
Maximum Grade ( )	10	10	10	10	8	20
Minimum K Value (Vertical Sag Curve)	8	8	12	8	8	3
Minimum K Value (Vertical Crest Curve)	4	4	16	4	4	-
Maximum Super-elevation ( )	4	4	4	4	4	6
Minimum Vertical Clearance	7	5	9	9	9	-

Notes:
1. The road design parameters are based on the desirable design speeds. Specific parameters such as the minimum turn radii may be modified for some areas locally on a case-by-case basis, via adjustment of the design speeds.
2. The Haul Road width shall be based on the Nunavut Mine Health and Safety Act which requires a minimum travel width three times the width of the widest haulage vehicle for dual lane traffic and two times the width of the widest haulage vehicle for single lane traffic.
3. Shoulder barriers (safety berms or guardrails) for the Haul Road shall be based on the Nunavut Mine Health and Safety Act which requires shoulder barriers of at least the height of the largest tire of any vehicle using the road and shall be provided along the edge of the haul road wherever a drop-off greater than 3.0m exists. For CAT 777G, the shoulder barrier (safety berm or guardrail) height shall be 2.0 m based on standard tire 27.00 R49 (E4).
4. Total road width includes shoulder width and snow allowance but doesn include the safety berm width for the haul road.
5. ~~For the single lane Haul Road from the crusher pad to the maintenance building, pullouts shall be provided at every 100m.~~
6. Widening shall be provided in roadway curves as necessary.
7. Need for geotextiles or geogrids shall be considered on a case-specific basis.
8. For the Tote Road design criteria, refer to H349000-3100-10-122-0001.
9. Provide safety stations, emergency ramps or escape lanes in accordance with the local and mine safety requirements. Hatch will only provide two escape ramps at the most critical locations as per BIM s instruction. Escape ramp design shall be carried out as per the USBM manual.
10. For cut/fill heights of greater than 5 m, provide 1.5 m wide benching with minimum 2 cross slope at every 5 m.
11. The ramp leading down to the sea lift from the laydown area at the Milne Port shall have a maximum grade of 8 .
12. The maximum grade for ramps to the buildings is 6 .
13. Fill toe key shall be provided in areas where the existing ground is steeper than 3H:1V away from the road.
14. Design speeds may be reduced locally if needed.

6.4.2 The following general rules shall apply to the geometric design of the project roads:

- Roadway grades shall not exceed the maximum grades specified in Table 6-1, except for short ramps which shall be considered on a case-specific basis.
- Signage shall be provided for speed and caution at steep horizontal and/or vertical curves, and where the design criteria can□t be met.
- Light poles, traffic signs and shoulder barriers (safety berms or guardrails), shall be placed at the outer edges of the roads, as required.

6.5 Pavement Design

6.5.1 The design of pavement structures requires information such as the expected pavement service life, design vehicle traffic volume, loads, and geotechnical information such as soil type and California Bearing Ratio (CBR).

6.6 Pavement Thickness

6.6.1 For the project internal site roads, the subgrades shall be prepared via cut/fill activities prior to pavement installation/placement. If the height of the subgrade fill is less than 600 mm, Type 8 (150 mm minus) material shall be used. If the height of the subgrade fill is greater than 600 mm, Type 12 Run-of-□uarry and/or suitable earth fill material shall be used. The voids of each layer of Type 12 material shall be filled with rock fragments prior to placement of the next layer. 1

6.6.2 The following minimum internal site road pavement thicknesses shall be used throughout the project:

- 300 mm, Type 8 (150 mm minus) subbase.
- 100 mm, Type 5 (32 mm minus) base/surface course for low speed light vehicle traffic roads and low speed B-Train traffic roads. 1
- 200 mm, Type 5 (32 mm minus) base/surface course for medium to high speed B-Train traffic roads. 1

6.6.3 The following minimum haul road pavement thicknesses shall be used throughout the project:

- 300 mm, Type 8 (150 mm minus) subbase.
- 300 mm, Type 8 (150 mm minus) base.
- 200 mm, Type 5 (32 mm minus) base/surface course. 1
- ~~900 mm, Type 12 Run-of-Mine structural subgrade (varies depending on the actual site conditions).~~ 1

6.6.4 The ramp and earthworks pad leading down to the sea lift from the laydown area, including the designated turnaround area at the beach within the Milne Port shall contain the following pavement thickness:

- 300 mm, Type 8 (150 mm minus) subbase.
- 200 mm, Type 5 (32 mm minus) base/surface course. 1
- ~~100 mm Type 3 (19 mm minus) wearing course.~~ 1

6.6.5 *Pavement Service Life*

6.6.5.1 The service life of the site pavements, prior to any structural rehabilitation work being required, shall be 5 years, unless noted otherwise for specific items.

6.6.6 *Design Vehicles, Traffic Volume and Load*

6.6.6.1 Vehicle types have been selected for the project roads based on the expected usage and transportation requirements of the area (Section 6.3).

6.6.6.2 All pavement, slabs, bridges, trenches, trench covers and underground installations accessible to trucks shall be designed to withstand the load associated with an HS 20-44 wheel load or its equivalent, as defined by the American Association of State Highway and Transportation Officials (AASHTO) under Standard Specification for highway bridges. However, within areas of special equipment operation, this shall be considered as per the actual vehicle loading.

6.7 Parking

6.7.1 Parking areas shall be designed to accommodate their intended use. In general, all parking areas shall be surfaced with granular materials.

6.7.2 Vehicle parking area design shall adhere to the following:

- The area shall be graded to direct stormwater away from the parking. 1
- Alignment and gradients shall be coordinated with the grading plans to control drainage.
- Walking distance from parking areas shall be kept to a minimum.
- Barrier-free parking spaces as well as walkways shall be provided according to the applicable regulations.
- Designated turnaround areas shall be provided at dead ends.
- Parking lot design criteria shall be as shown in Table 6-2.

Table 6-2: Parking Lot Design Criteria

Topic	Criteria
Gradient	Maximum 5□ Minimum 0.5□ Optimum 2□
Cross Slope	Maximum 5□ Minimum 2□ Optimum 3□
Pavement Structure	300 mm Type 8 (150 mm minus) subbase 1 100 mm Type 5 (32 mm minus) base/wearing surface course 1 ~~50mm wearing course~~
Parking Stall Dimensions	Driving Lane • Width 7.5 m Standard

Topic	Criteria
	• Depth 6 m • Width 2.75 m Barrier-free • Depth 6 m • Width 3.5 m • Access Aisle Width 1.5 m

6.8 Signage

6.8.1 Traffic control signs and road edge markers shall be provided as required to ensure safe movement in and about the site.

6.8.2 Direction and information signs for both vehicle and pedestrian traffic shall be provided for parking areas, restricted areas, shipping and receiving.

6.8.3 Primary identification signs shall be free-standing and sited according to the applicable standards as listed in Section 4.3.

6.8.4 Other signs shall be free-standing, fence-mounted or wall-mounted.

6.8.5 Security signs shall be provided at the sites and along the site property boundaries.

6.8.6 Signs for the site access roads shall be compliant with the local traffic regulations.

6.8.7 Signs shall be lighted, if deemed necessary.

6.8.8 All signs and pavement markings (if applicable) shall be well maintained during the construction and operational periods.

6.9 Bollards

6.9.1 Bollards, if required, shall be provided at building entrances and around hazardous areas such as tanks and transformers. Bollards shall be 1.2 m high, 150 mm diameter schedule 40 CS pipes. 1

6.9.2 Bollards shall be filled with concrete.

6.9.3 Bollards shall be painted and coated such that they provide clear reflection off of vehicle headlights.

6.10 Shoulder Barriers (Safety Berms/Guardrails)

6.10.1 Shoulder barriers (earth safety berms or guardrails) shall be provided where a 3.0 m or more drop-off exists at the edge of roads. 1

~~6.10.2~~ ~~Shoulder barriers shall be installed where the horizontal distance from the edge of a travelled lane to an obstruction is less than 1.0 m~~ 1

6.10.3 Earth/safety berms for the Mine Haul Road from the open pit to the crusher pad and from the crusher pad to the maintenance building shall have heights of 2.0 m, and side slopes of 1H:1V. 1

6.10.4 Safety berms for the internal roads shall have heights of 1.0 m and side slopes of 1H:1V. 1

6.10.5 Discontinuous openings shall be provided in berms at maximum 25 m spacing for drainage and snow clearance, with openings smaller than half the blade width of vehicles constructing or maintaining the berms. 1

6.10.6 Runaway vehicle collision berms or escape lanes shall be provided in accordance with industry requirements as described in the Nunavut MHSA.

6.11 Utility Berms

6.11.1 Utility Berms shall travel along the project roadways to the greatest extent possible, shall be of trapezoidal cross-sections, shall be minimum 0.6 m high from the road edge or the existing ground, and shall have maximum fill side slopes of 1.5H:1V, as validated by the geotechnical engineer. They shall be constructed with the use of 300 mm of granular Type 8 (150 mm minus) and 100 mm of granular Type 5 (32 mm minus) material. If the height of the subgrade fill is less than 600 mm, Type 8 (150 mm minus) fill shall be used. If the height of the subgrade fill is greater than 600 mm, Type 12 Run-of-□uarry and/or suitable earth fill material shall be used. The voids of each layer of Type 12 material shall be filled prior to placement of the next layer. The top width of utility berms will depend on the pipe and cable duct sizes. Utility berms shall cross roadway intersections through utility sleeves. After crossing the intersections, they shall resume the alignments within the utility berms. 1

7. Stormwater Management System

7.1 Internal Surface Drainage

7.1.1 The general criteria for the site internal stormwater management system are described below.

- All interior site grading and roads shall be designed to provide continuous overland flow without erosion to a drainage ditch system.
- All drainage ditches should be of trapezoidal cross sections, where possible. 1
- Ditches shall be designed to convey a 1 in 25 year flood event.
- Provision must be made to ensure that there is a safe flow path for events up to the 1 in 100 year event, such that the runoff will not flood key mining areas, cause significant erosion, pick up excessive contaminants or cause other significant problems.
- Ditch freeboard, minimum depth, minimum width, side slope, longitudinal slope and maximum permissible velocities shall be as per Table 7-2.
- Minimum set back distance of structures from top of drainage ditch slopes shall be 3 m.
- Roof and yard drainage shall be collected in open ditches.

- Rip rap shall be provided at locations throughout the storm drainage system which are susceptible to erosion, including ditch sections subject to high-velocities (greater than 1.5 m/s), sections of super critical flow, ditch outlets, storm sewers outfalls, and culverts inlets and outlets.
- If the ditch is in rock, no rip rap is required.
- Energy dissipaters shall be used where the flow velocities may reach values high enough to cause severe erosion or hydraulic jumps.

7.2 External Surface Drainage

Criteria for drainage of the external area are as follow:

- Runoff from undisturbed areas surrounding the mine site shall be collected in perimeter ditches and diverted around and/or through the site perimeter.
- To the extent possible, these perimeter ditches shall be designed to discharge at locations that best retain the characteristics of the existing (i.e. pre-development) natural drainage patterns.
- Diversion ditches shall be designed to convey the 1 in 100 year flood event.
- Ditch freeboard, minimum depth, minimum width, side slope, longitudinal slope and maximum permissible velocities shall be as per Table 7-2.

7.2.1 Peak Flow Estimation

- **For catchment areas greater than 0.5 km^2:** 1

Runoff peak flow estimation shall be based on the following equations developed by Knight Pi□sold Consulting:

$□_2 = 1.1\ A^{0.79}$

$□_5 = 1.7\ A^{0.77}$

$□_{10} = 2.0\ A^{0.76}$

$□_{25} = 2.6\ A^{0.75}$

$□_{100} = 3.5\ A^{0.73}$

$□_{200} = 3.9\ A^{0.73}$

Where:

□=peak flow instantaneous flow in m^3/s

A = drainage area in km^2 (0.5 km^2 ≤ A ≤ 1000 km^2)

- **For catchment areas less than 0.5 km^2:** 1

The Rational Method shall be used for peak flow estimation, as follows:

□ = 0.28 CIA

Where:

□ = peak instantaneous flow in m^3/s

A = drainage area in km^2

C = runoff coefficient = 0.90 (for all drainage areas except the Milne Port Ore Stockpile footprint, for which C = 0.0, as per BIM's instructions). 1

I = rainfall intensity corresponding to the time of concentration (mm/hr), estimated using Table 7-1 below.

- Time of Concentration shall be computed with the modified Kirpich equation:

$T_c = 0.06628 (L^{0.77}/S^{0.385})$

Where:

T_c = time of concentration (hours)

L = main channel length (km)

S = main channel slope (m/m)

Minimum T_c = 10 min

7.3 Rainfall Intensity

7.3.1 Table 7-1 displays the Intensity-Duration-Frequency data which shall be used for peak flow runoff approximation, developed by Knight Piesold consulting:

Table 7-1: Rainfall Intensity (mm/h)

Duration	2 yrs	5 yrs	10 yrs	15 yrs	20 yrs	25 yrs	50 yrs	100 yrs	200 yrs
5 min	9.5	12.0	14.0	15.1	15.9	16.5	18.3	20.1	22.0
10 min	7.2	9.0	10.5	11.3	11.9	12.4	13.7	15.1	16.5
15 min	6.0	7.5	8.7	9.4	9.9	10.3	11.4	12.6	13.7
30 min	5.0	6.3	7.3	7.9	8.3	8.6	9.5	10.5	11.4
1 hr	4.0	5.2	6.1	6.6	7.0	7.3	8.1	9.0	9.9
2 hr	3.0	3.9	4.6	5.0	5.2	5.5	6.1	6.8	7.4
6 hr	2.0	2.7	3.3	3.6	3.9	4.0	4.6	5.1	5.7
12 hr	1.3	1.8	2.2	2.4	2.6	2.7	3.1	3.4	3.8
24 hr	1.0	1.4	1.7	1.9	2.0	2.1	2.4	2.7	3.0

7.3.2 Figure 7-1 displays the 200 year design storm distribution:

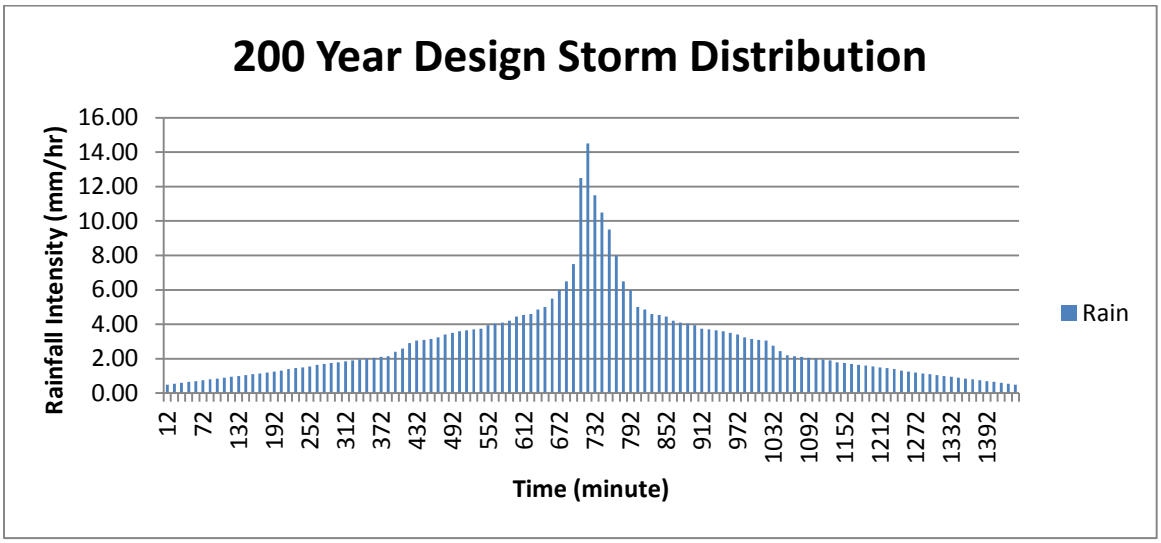

Figure 7-1: 200 Year Storm Distribution

7.3.3 The 200 year 24-hour balanced storm depth is 71 mm.

7.4 Sedimentation Ponds

7.4.1 Sedimentation ponds shall only be provided at the Milne Port Ore Stockpile area, Mine Site Crushing and Screening area and the Mine Site Waste Rock Drainage area. For all other areas, including infrastructure facility pads, laydown areas and roads, the water is considered to be clean and no sedimentation ponds shall be provided. 1

7.4.2 The general design criteria for the project sedimentation ponds are as follow:

- Ponds shall be sized based on 1 in 10 year, 24 hour design storm volumes. 1
- Runoff coefficient to estimate runoff shall be 0.9 for all drainage areas except the Milne Port Ore Stockpile footprint, for which the runoff coefficient shall be 0.0 as per BIM's instructions. 1
- Sedimentation shall be for Total Suspended Solids (TSS) ≤ 30 mg/l for a single sample and TSS ≤ 15 mg/l for the monthly average.
- Sedimentation ponds shall contain emergency overflow weirs of sufficient capacity to safely convey a 1 in 200 year return period storm event or the Probable Maximum Flood (PMF), maximum wind-induced waves, or unexpected operational difficulties. 1
- Emergency overflow weirs shall be designed to handle applicable design storms, such that the pond high water level does not increase past the set freeboard elevation. 1
- Emergency overflow weirs shall be designed as broad-crested weirs with rip rap. 1
- Gabion mattresses shall be provided at the downstream locations of emergency overflow weirs as energy dissipation measures to protect against erosion. 1
- The following broad-crested weir capacity flow equation shall be used for sizing the Project emergency overflow weirs:

□ = $CLH^{3/2}$ Where: 1

□ = Peak instantaneous flow (m^3/s)

C = Weir discharge coefficient

L = Width of weir (m)

H = Depth of flow (m), measured 2.5H upstream of the weir discharge point

- Deep sedimentation ponds shall be avoided as much as possible. Sedimentation pond depths shall be kept to less than 5 m, to avoid non-compliant TSS removal/efficiency and other safety concerns. 1
- Berm/embankment side slopes for the ponds shall be 3H:1V. 1
- Mine Site Ore Crushing and Screening and Waste Rock Drainage sedimentation ponds shall be lined and the discharge from the ponds shall be controlled. 1
- Milne Port Ore Stockpile pond(s) can be lined/unlined and depending on its impact to the environment and permafrost as well as geotechnical stability, the discharge from the pond(s) can be controlled/uncontrolled. 1
- Ponds with storage volumes greater than 30,000 m3 and heights exceeding 2.5 m shall be classified as dams and shall meet the dam safety requirements as per the Canadian Dam Association□s Dam Safety Guidelines (CDA 2007). 1

7.5 Off-Spec and Treated Effluent Ponds

7.5.1 The off-spec effluent pond at the Milne Port shall be sized based on the storage requirements specified in the event that the sewage treatment plant does not meet effluent discharge criteria and/or the system halts operations due to technical difficulties. 1

7.5.2 The treated effluent pond at the Mine Site shall be sized based on the requirements for 10 months storage of treated sewage generated at the Mine Site during the period in which the body of water receiving the discharge (i.e. Mary River) is frozen. 1

7.5.3 The ponds shall have minimum freeboards of 0.3 m. 1

7.5.4 The ponds shall have side slopes of not steeper than 3H:1V.

7.5.5 The effluent ponds shall be lined.

7.6 Culverts and Roadside Ditches

7.6.1 Drainage ditches and culverts for all internal/access roadways and vehicle access points shall be designed to convey the runoff peak flow from a 1 in 25 year return period storm, such that the inlet headwater level does not exceed the bottom of the road subbase. Their analysis and design shall consider design flow, culvert size and material, entrance structure layout, outlet structure layout and erosion protection.

7.6.2 Drainage ditch design shall also be subject to the criteria stated in Table 7-2.

Table 7-2: Drainage Ditch and Culvert Design Criteria

Maximum permissible flow velocity in ditch without rip rap (m/s)		1.5
Minimum ditch and culvert slope (□)		0.3
Minimum freeboard for ditch (mm)		300
Minimum ditch depth for internal roads and other areas (mm)		300
Minimum ditch bottom width for internal roads and other areas (mm)		500
Minimum rock ditch depth for haul road (mm)		500
Minimum ditch bottom width for haul road (mm)		1000
Ditch side slopes (H:V)	Rock	1:4
	Soil	2:1
Minimum culvert diameter (mm)		500

~~7.6.3 All culverts shall have 50 mm diameter steam pipes welded at the top inner sides for prevention of water from freezing.~~

7.6.4 Loading over culverts and pipes shall be in accordance with AASHTO HS 20-44, except for areas of special equipment operation, which shall consider actual vehicle loading. The minimum cover for culverts shall be 600 mm, or as required by the differing specific design vehicle.

7.6.5 Fish-bearing culverts shall be minimum 1,000 mm diameter and only one pipe shall be embedded by 10□ of the pipe diameter.

7.6.6 All culverts shall be Corrugated Steel Pipe (CSP).

7.6.7 Apply Manning□s n values as per the following:

- n = 0.025 for gravel ditches
- n = 0.040 for rip rap ditches
- n = 0.024 for all CSP pipe.

7.7 Drainage Interceptor/Collector Berms

7.7.1 Drainage berms diverting overland flow from the waste rock drainage area to the sedimentation ponds shall be a minimum of 1.0 m high with 1.5H:1V side slopes and 0.5 m top width.

7.7.2 Rip rap and other energy dissipation measures shall be provided to protect against erosion.