

Attachment 14

Mine Site Material Handling and Water Management

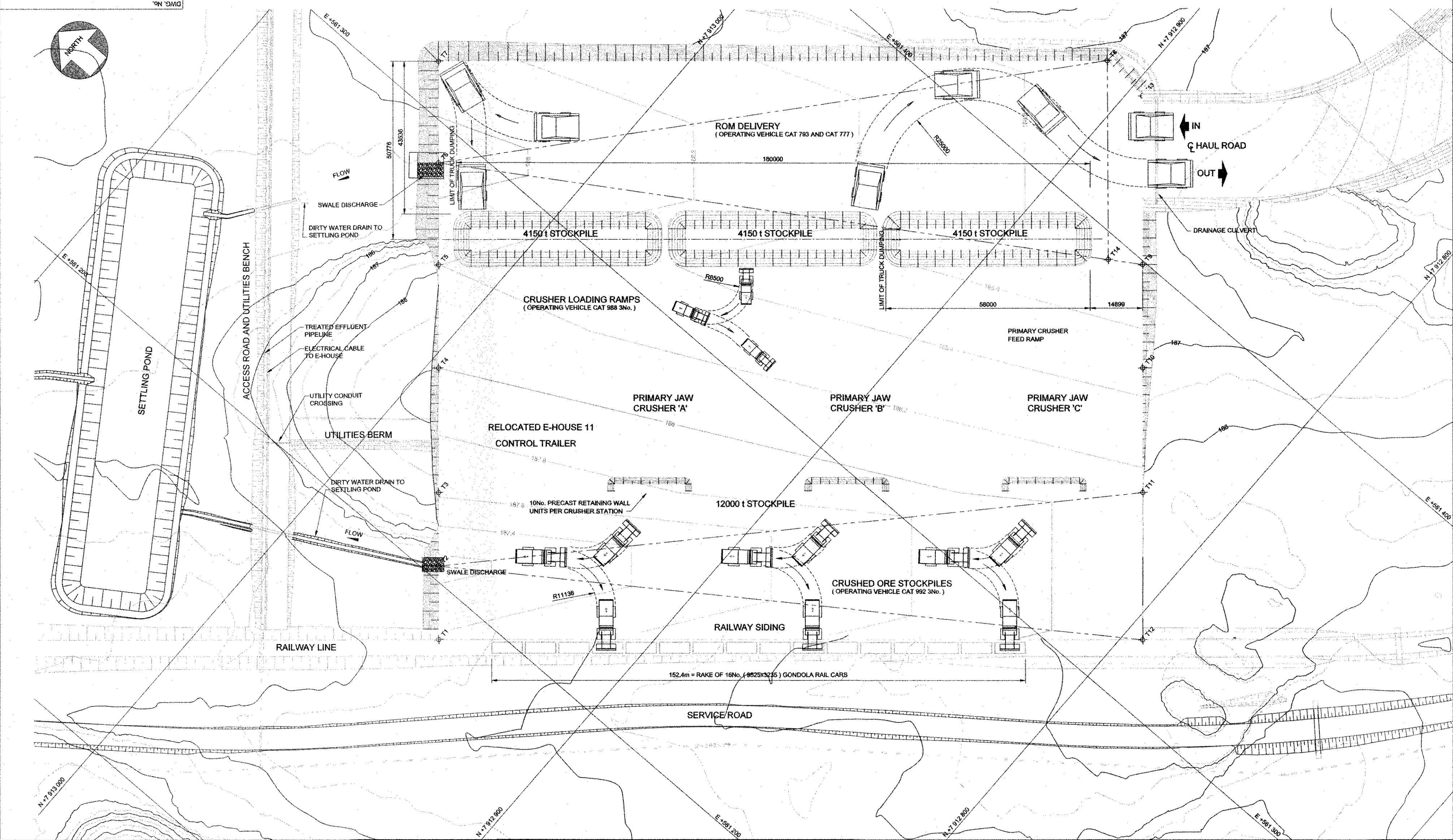
(33 Pages)

Attachment 14.1

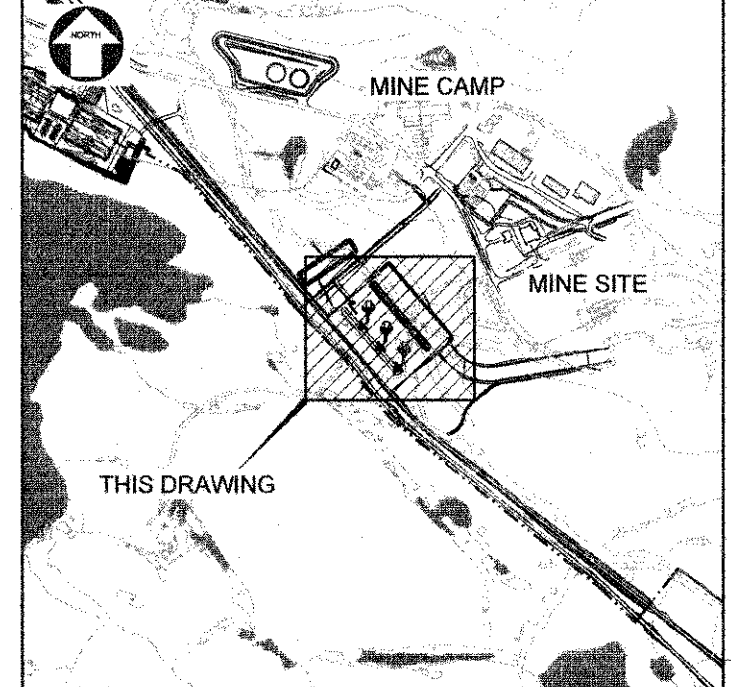
Mine Site Crusher Pad Drawings

(6 Pages)

H353004-10000-221-272-0006-0001



PLAN ON CRUSHER LOADING PAD
SCALE 1:500



KEY PLAN

NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTASAT (2016)
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

LEGEND:

- 158 CONTOUR
- EXISTING TREATED EFFLUENT
- NEW TREATED EFFLUENT
- ELECTRICAL CABLE

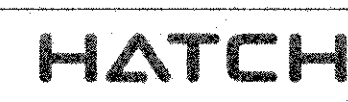
CRUSHER PAD
SETTING OUT CO-ORDINATES

POINT	E	N	LEVEL
T1	561 187.503	7 912 946.397	187.630
T2	561 203.499	7 912 960.095	187.430
T3	561 219.407	7 912 973.804	187.630
T4	561 248.299	7 912 996.979	188.000
T5	561 268.645	7 913 016.237	187.630
T6	561 290.613	7 913 035.168	187.630
T7	561 312.582	7 913 054.100	187.630
T8	561 436.553	7 912 910.245	188.130
T9	561 399.145	7 912 964.206	188.130
T10	561 376.815	7 912 945.028	188.480
T11	561 349.940	7 912 923.334	188.130
T12	561 318.095	7 912 794.551	188.130
T13	561 435.506	7 912 896.141	188.130
T14	561 393.858	7 912 873.106	188.700

REFERENCE DRAWINGS	DRAWING TITLE
H353004-00000-221-294-0008-0001	STANDARD DRAWINGS - TYPICAL PAD, DITCH AND BERM SECTIONS
H353004-00000-221-294-0008-0001	STANDARD DRAWINGS - EARTHWORKS AND DRAINAGE DETAILS
H353004-10000-228-272-0005-0001	CRUSHER PAD - DRAINAGE PLAN
H353004-10000-221-273-0003-0001	CRUSHER PAD - PAD CROSS SECTIONS
H353004-10000-221-272-0007-0001	CRUSHER PAD - CRUSHER BARRIER SETTING OUT PLAN
H353004-00000-224-272-0027-0001	RAILWAY PLAN AND LONGITUDINAL SECTION CH106.900m TO CH109.610m
H353004-10000-231-260-0003-0001	PRIMARY CRUSHER FEED RAMP - CONCRETE ARRANGEMENT AND DETAILS
H353004-10000-231-260-0001-0003	PRIMARY CRUSHER AREA - RETAINING WALL DETAILS
H353004-10000-231-260-0001-0001	PRIMARY JAW CRUSHER FOUNDATIONS - ARRANGEMENT AND DETAILS



FOR CONSTRUCTION			
No.	DESCRIPTION	BY	CHK'D
1	EDC NOTE REMOVED	JM	FH
0	APPROVED FOR CONSTRUCTION	IHB	FH
REVISIONS		DATE	DATE
1		02/09/2018	02/09/2018
2		13/04/2018	13/04/2018

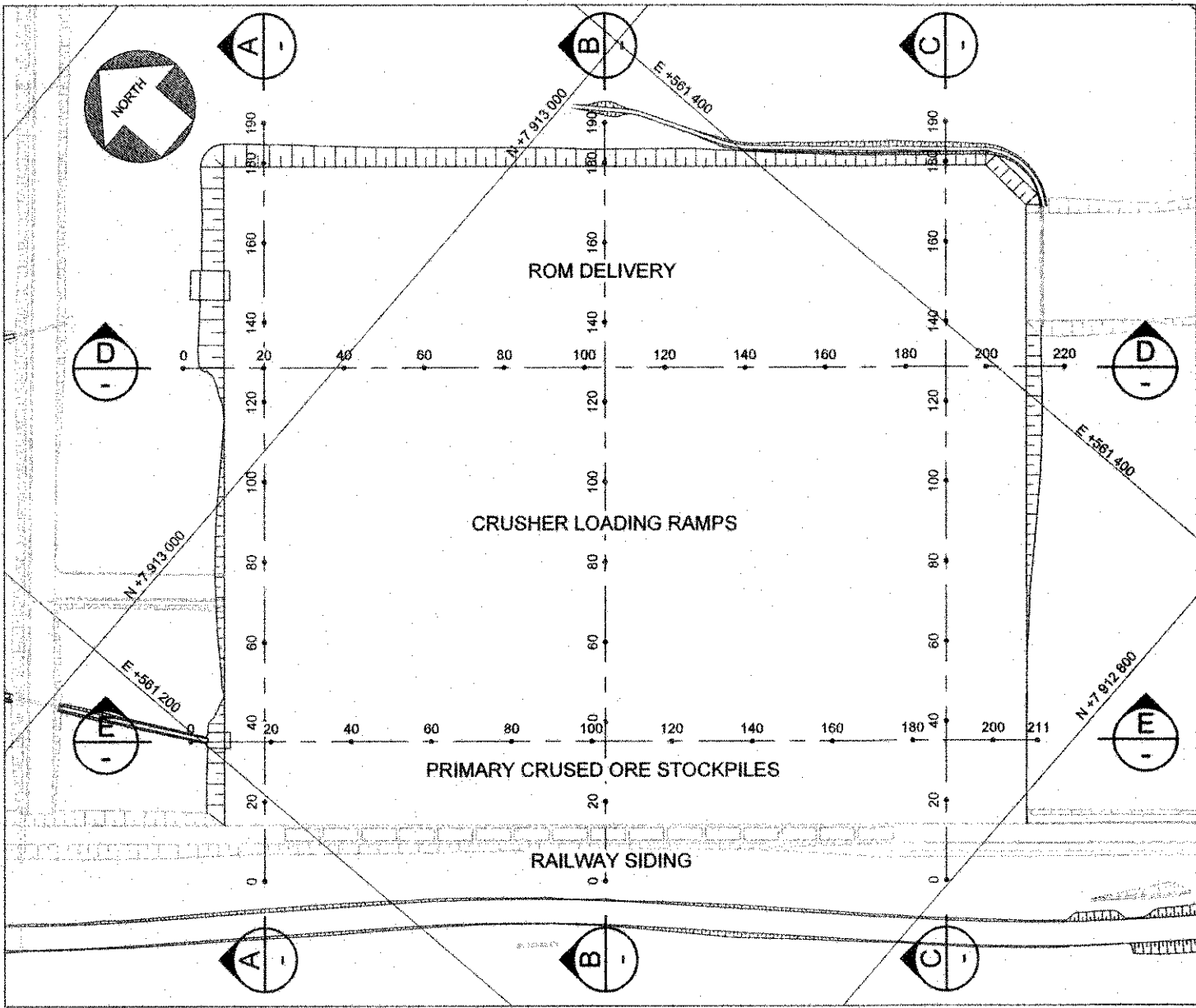


DRAFTSPERSON	DESIGNER	CHECKER	DESIGN COORD.	RESP. ENG.	LEAD DISC. ENG.	AREA LEAD	ENG. MANAGER	NAME	SIGNATURE	DATE
I BARNARD	I BARNARD	F HUSO	R GOOSEN	R HALIM	A GROBBELAAR	T ATIBA	D STANGER	T ATIBA	[Signature]	10/08/2018

Baffinland
BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT
MINE SITE
CRUSHER PAD
LAYOUT PLAN

PERMIT TO PRACTICE
HATCH LTD.
Signature: [Signature]
Date: 09/08/2018
PERMIT NUMBER: P 612
The Association of Professional Engineers
Geologists and Geophysicists of NOVA Scotia

SCALE: 1:500
DWG. No.: H353004-10000-221-272-0006-0001
REV: 1
SHEET SIZE: E



PLAN ON CRUSHER PAD
SCALE 1:1000

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:200

DATUM 182.000

PAD LEVEL	187.379	187.268	187.894	187.804	188.886	188.251	188.725	188.629	188.603	187.716
GROUND LEVELS ON CL	185.330	185.505	186.203	186.072	188.887	187.605	187.625	184.500	184.837	185.340
CUT (-) / FILL (+)	2.050	1.743	-0.508	-1.068	-0.801	0.286	0.440	3.429	3.168	2.376
DISTANCE (m)	20	40	60	80	100	120	140	160	180	190

SECTION A-A

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:200

DATUM 185.000

PAD LEVEL	187.877	187.602	187.800	188.113	188.205	188.440	188.476	188.290	188.208	187.871
GROUND LEVELS ON CL	186.896	186.542	187.588	188.289	188.525	188.440	188.435	185.367	186.160	186.305
CUT (-) / FILL (+)	1.011	1.061	0.212	-0.176	-0.320	2.805	3.041	2.923	2.138	1.566
DISTANCE (m)	20	40	60	80	100	115	120	140	160	180

SECTION B-B

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:200

DATUM 185.000

PAD LEVEL	188.020	188.020	188.120	188.317	188.510	188.706	188.725	188.674	188.657	188.228
GROUND LEVELS ON CL	188.103	188.643	187.787	188.120	188.860	188.596	188.545	188.813	188.705	186.920
CUT (-) / FILL (+)	-0.074	-0.614	0.333	-0.016	-0.350	2.110	2.180	-0.011	-0.048	1.308
DISTANCE (m)	20	40	60	80	100	120	121	140	160	180

SECTION C-C

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:200

DATUM 182.000

PAD LEVEL	188.150	188.210	188.268	188.320	188.377	188.435	188.436	188.435	188.433	188.520	188.611	188.708
GROUND LEVELS ON CL	185.523	185.443	185.435	185.151	185.248	185.288	185.534	185.436	186.004	186.160	186.393	186.611
CUT (-) / FILL (+)	2.626	2.767	2.833	3.168	3.129	2.947	2.901	2.999	2.429	2.345	2.218	2.097
DISTANCE (m)	20	40	60	80	100	115	120	140	160	180	200	210

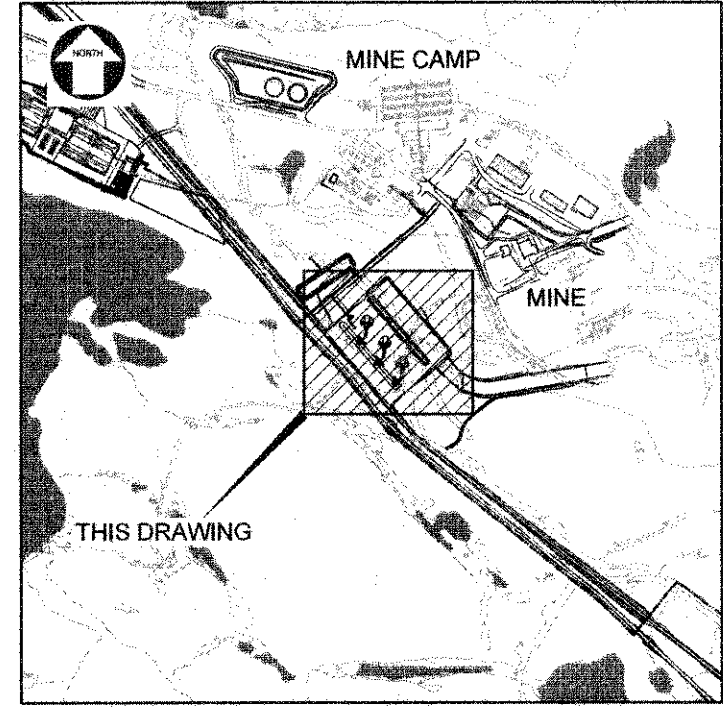
SECTION D-D

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:200

DATUM 183.000

PAD LEVEL	187.193	187.294	187.394	187.495	187.595	187.696	187.797	187.897	187.997	188.098	188.199
GROUND LEVELS ON CL	185.526	185.341	185.708	186.016	186.167	186.356	186.587	186.717	186.812	186.867	186.941
CUT (-) / FILL (+)	1.951	1.943	1.677	1.468	1.428	1.340	1.109	1.180	1.185	1.231	1.258
DISTANCE (m)	20	40	60	80	100	120	140	160	180	200	210

SECTION E-E



KEY PLAN

NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTOSAT (2016)
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

DRAWING No.	DRAWING TITLE
H353004-00000-221-294-0008-0001	STANDARD DRAWINGS - TYPICAL PAD, DITCH AND BERM SECTIONS
H353004-10000-221-272-0006-0001	CRUSHER PAD - LAYOUT PLAN
H353004-10000-231-260-0003-0001	PRIMARY CRUSHER STOCKPILE - RETAINING WALL DETAILS
H353004-10000-231-260-0002-0001	PRIMARY CRUSHER FEED RAMP - CONCRETE ARRANGEMENT AND DETAILS
H353004-10000-231-260-0001-0001	PRIMARY JAW CRUSHER - ARRANGEMENT AND DETAILS



FOR CONSTRUCTION

No.	DESCRIPTION	DATE
1	EDC NOTE REMOVED	13/04/2018
0	APPROVED FOR CONSTRUCTION	13/04/2018

HATCH

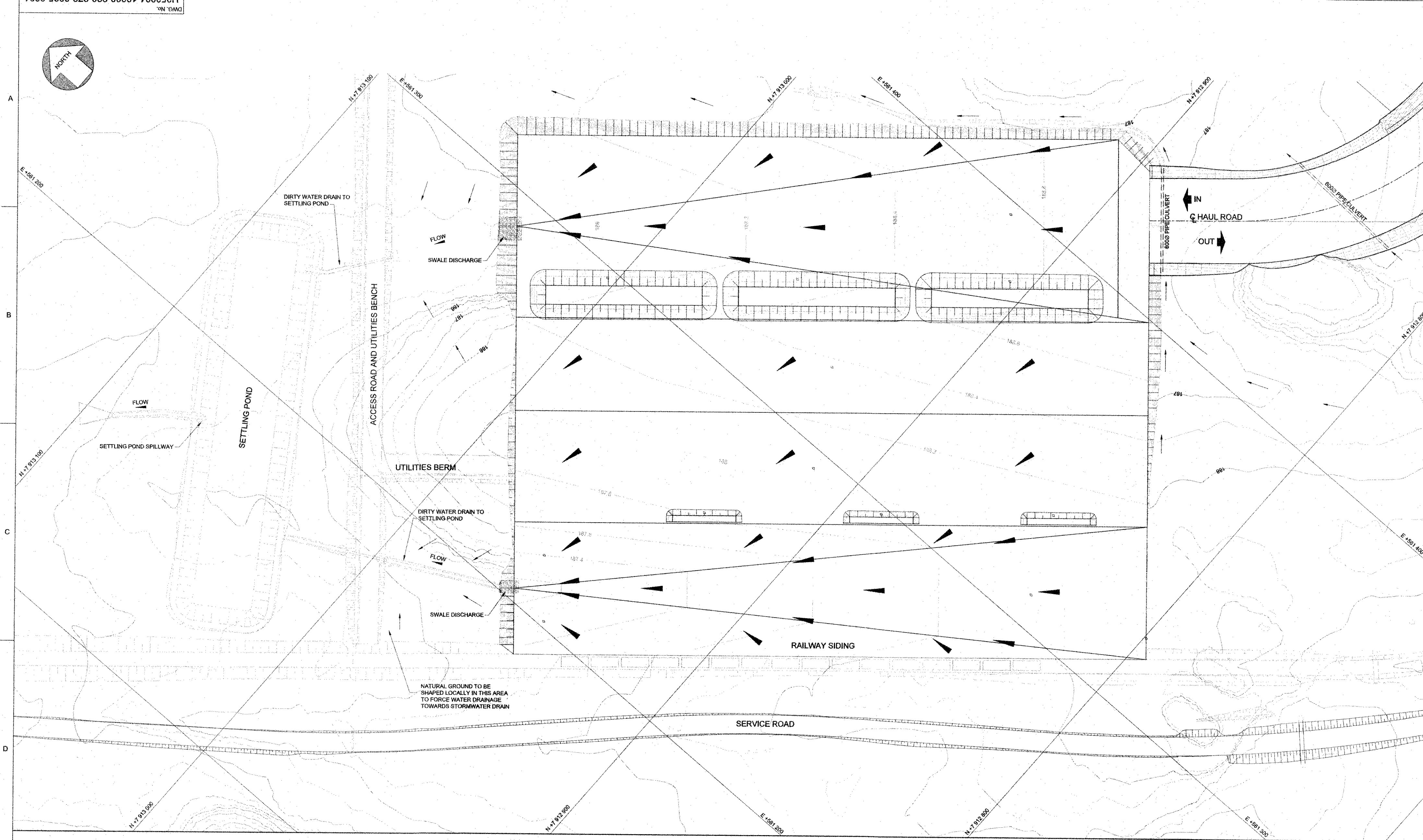
DRAFTSPERSON	DESIGNER	CHECKER	DESIGN COORD.	RESP. ENG.	LEAD DISC. ENG.	AREA LEAD	ENG. MANAGER	DATE
I. BARNARD	I. BARNARD	F. HUGO	R. GOOSEN	R. HALIM	A. GROBBELAAR	T. ATIBA	D. STANGER	2018-08-03

Baffinland

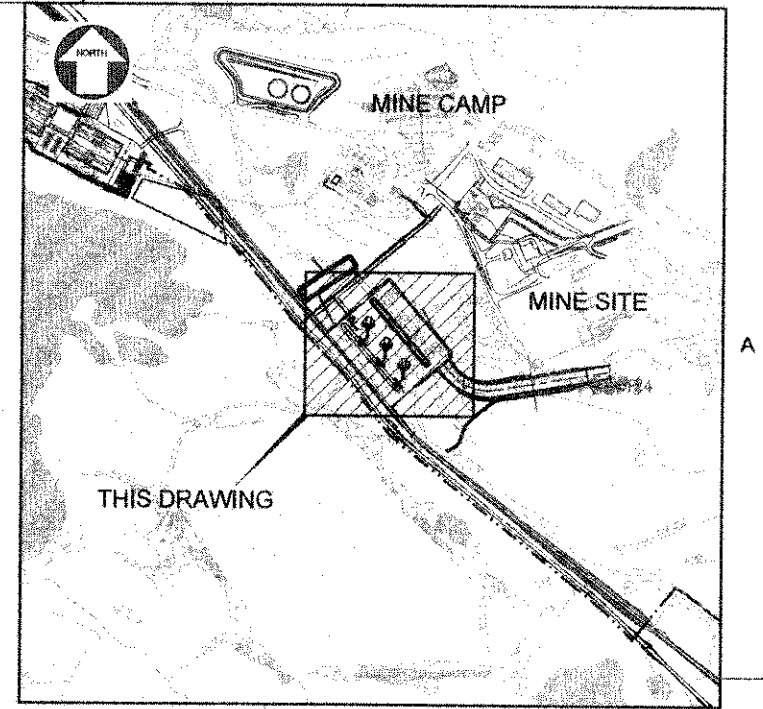
BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT

MINE SITE
CRUSHER PAD
PAD CROSS SECTIONS

SCALE: 1:1000
DWG. No. H353004-10000-221-273-0003-0001
REV 1



PLAN ON CRUSHER PAD
SCALE 1:500



KEY PLAN

NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTSAF (2016).
2. CO-ORDINATE GRID IS SHOWN IN UTM (NAD83), ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. THE CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
5. THE POND IS DESIGNED TO BE OPERATED EMPTY.
6. IT IS ASSUMED THAT ALL RUN OFF COLLECTED BY THE SETTLING POND IS NON-ACID GENERATING AND CAN BE DISCHARGED TO THE ENVIRONMENT ONCE THE REQUIREMENTS OF BM ENVIRONMENTAL DESIGN CRITERIA HAS BEEN ACHIEVED. WATER TO BE DISCHARGED TO AN APPROVED POINT, IN ACCORDANCE WITH THE CLIENT'S (BM) ENVIRONMENTAL REQUIREMENTS.
7. THE INSTALLATION OF THE GEOMEMBRANE (ENVIRO LINER 6000HD) IS TO BE IN STRICT ACCORDANCE WITH THE SPECIALIST PROVIDERS SPECIFICATIONS.

LEGEND:

- OFF PAD FLOW DIRECTION
- ON PAD FLOW DIRECTION

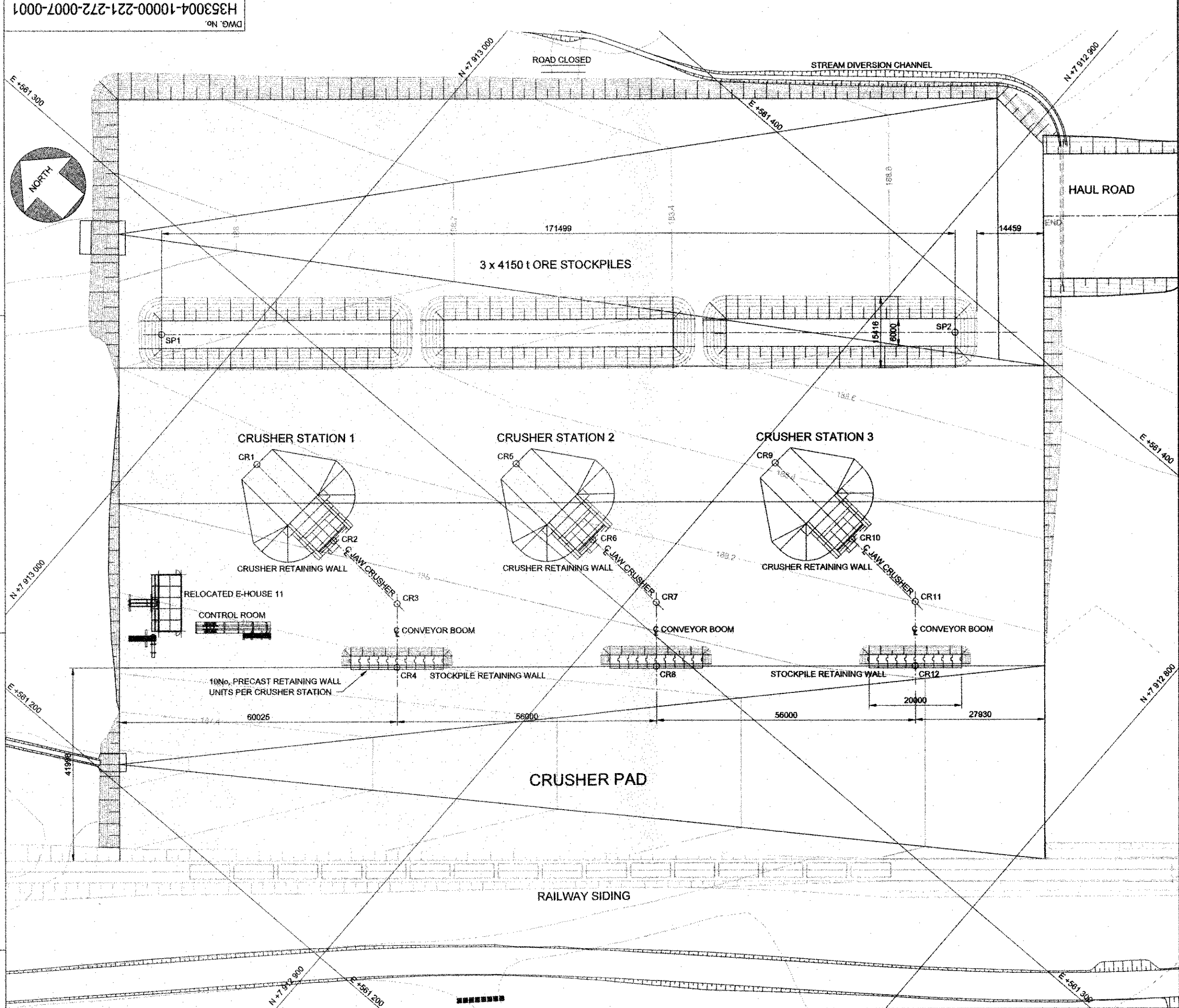
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H353004-10000-228-272-0005-0001	CRUSHER PAD SETTLING POND - PLAN AND PROFILES
H353004-10000-221-273-0003-0001	CRUSHER PAD - PAD CROSS SECTIONS
H353004-10000-221-272-0006-0001	CRUSHER PAD - LAYOUT PLAN

REFERENCE DRAWINGS	DRAWING TITLE
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2	
3	
4	
5	
6	
7	
8	

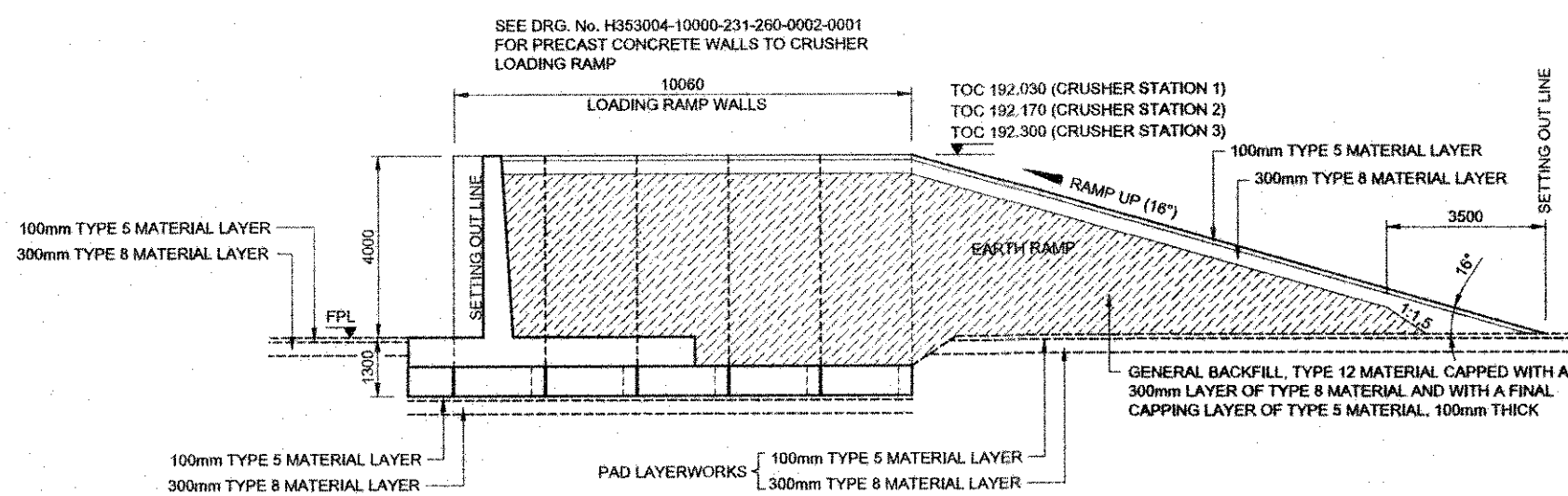
FOR CONSTRUCTION		HATCH	
1 EDC NOTE REMOVED		DRAFTSPERSON I BARNARD	
0 APPROVED FOR CONSTRUCTION		DESIGNER S HALL	
DESCRIPTION		CHECKER F HUGO	
BY		DESIGN COORD. R GOOSEN	
CHKD		RESP. ENG. R HALIM	
DATE		LEAD DISC. ENG. A GROBBELAAR	
ROLE		AREA LEAD T ATTIBA	
NAME		ENG. MANAGER D STANGER	
SIGNATURE		T ATTIBA	
DATE		DATE	
DRAWING APPROVAL STATUS:		Approved for Construction	

PERMIT TO PRACTICE	
HATCH LTD.	
Signature	2018-09-03
Date	2018-09-03
PERMIT NUMBER P 512	
The Association of Professional Engineers, Technicians and Geographers of South Africa	
Baffinland	
BAFFINLAND IRON MINES LP	
MARY RIVER EXPANSION PROJECT	
MINE SITE	
CRUSHER PAD	
DRAINAGE PLAN	
SCALE	DWG. No.
1:500	H353004-10000-228-272-0005-0001
OR AS NOTED	

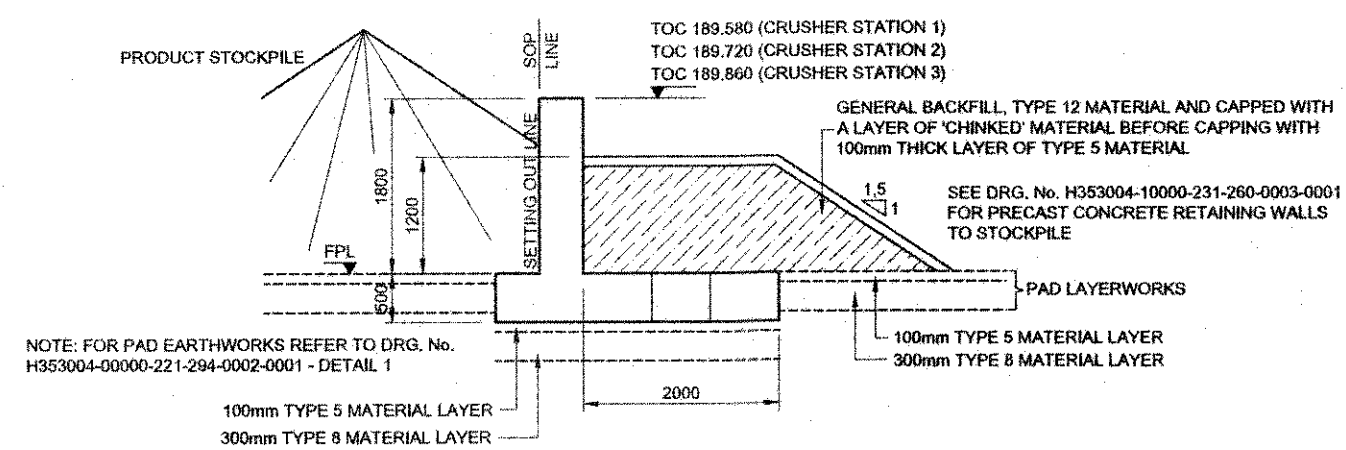
SHEET SIZE E



PLAN ON CRUSHER LOADING PAD
SCALE 1:500



TYPICAL ELEVATION ON CRUSHER LOADING RAMP
SCALE 1:100



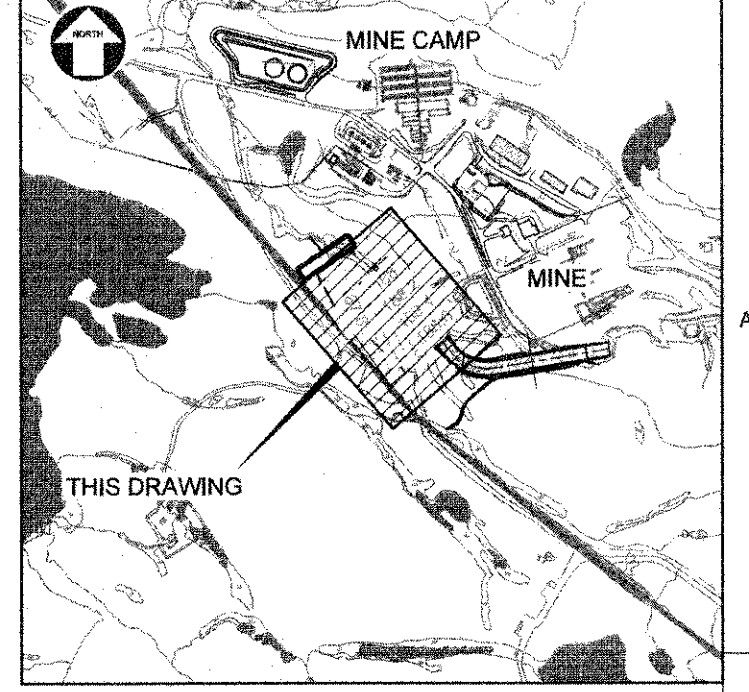
TYPICAL ELEVATION ON STOCKPILE RETAINING WALL
SCALE 1:50

SETTING OUT CO-ORDINATES

POINT	E	N
ORE STOCKPILES		
SP1	561 280.150	7 913 013.946
SP2	561 392.157	7 912 884.075
CRUSHER STATIONS		
CR1	561 272.137	7 912 979.908
CR2	561 270.406	7 912 956.622
CR3	561 268.074	7 912 937.297
CR4	561 268.561	7 912 928.370
CR5	561 306.711	7 912 937.501
CR6	561 306.982	7 912 914.215
CR7	561 305.549	7 912 894.912
CR8	561 295.155	7 912 885.939
CR9	561 345.285	7 912 895.094
CR10	561 343.556	7 912 871.808
CR11	561 342.123	7 912 852.505
CR12	561 331.728	7 912 843.532

LEGEND:

---	CONTOUR
---	TREATED EFFLUENT PIPELINE
---	TOP OF CONCRETE
---	FINAL PAD LEVEL



KEY PLAN

NOTES:

- LIDAR SURVEY PROVIDED BY PHOTOSAT (2016)
- COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
- CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
- ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

MATERIAL AND COMPACTION SPECIFICATION:

SUBGRADE PREPARATION:
THE SUBGRADE SHOULD BE PROOF-ROLLED AND INSPECTED PRIOR TO PLACING FILL MATERIALS. THE IDENTIFIED SOFT AREAS SHALL BE FURTHER COMPACTED, OR IF NECESSARY, BE MITIGATED USING GRANULAR OR ROCK FILL. A QUALIFIED GEOTECHNICAL ENGINEER SHALL INSPECT AND APPROVE THE SUBGRADE.
THE ROCKFILL SHALL NOT BE PLACED IN WATER OR ON ICE. DEWATERING IS REQUIRED WHERE PONDING WATER IS ENCOUNTERED. OVER-EXCAVATION IS REQUIRED FOR GROUND ICE, IF ENCOUNTERED.
THE SUBGRADE ON THE GROUND SHALL BE LEFT AS IT IS NATURALLY BEFORE CONSTRUCTION AS MUCH AS POSSIBLE. THE OVER-EXCAVATION SHOULD BE MINIMIZED TO AVOID DISTURBANCE OF THE EXISTING PERMAFROST.

TYPE 5 (CRUSHER RUN 32mm MINUS MATERIAL) OR TYPE 3 (CRUSHER RUN 50mm MINUS):
THE MATERIAL MUST BE PLACED IN LIFTS NOT EXCEEDING 200mm AND SHALL BE COMPACTED BY MINIMUM 5 PASSES OF A MINIMUM 15 TON VIBRATORY ROLLER WITH VIBRATIONS IN THE RANGE OF 1200 TO 1500 vpm AND THE ROLLER SPEED OF ABOUT 2mph (3.2km/h). ALTERNATIVELY, THE COMPACTION SHOULD ACHIEVE A MINIMUM OF 100 PERCENT OF MAXIMUM DRY DENSITY AS DETERMINED BY TEST METHOD ASTM D698.

TYPE 8 (CRUSHER RUN 150mm MINUS):
THE ROCKFILL MUST BE PLACED IN LIFTS NOT EXCEEDING 500mm. THE PLACEMENT SHALL AVOID SEGREGATION AND NESTING OF COARSE PARTICLES. IT SHALL BE COMPACTED BY MINIMUM 5 PASSES OF A MINIMUM 15 TON VIBRATORY ROLLER WITH VIBRATIONS IN THE RANGE OF 1200 TO 1500 vpm AND THE ROLLER SPEED OF ABOUT 2mph (3.2km/h). ALTERNATIVE COMPACTION METHODS SHALL BE APPROVED BY THE ENGINEER.

TYPE 12 (RUN OF QUARRY):
THE ROCKFILL, IF USED, MUST BE PLACED IN LIFTS NOT EXCEEDING 1000mm. THE ROCKFILL SHALL BE COMPACTED BY MINIMUM 5 PASSES OF A MINIMUM 15 TON VIBRATORY ROLLER WITH VIBRATIONS IN THE RANGE OF 1200 TO 1500 vpm AND THE ROLLER SPEED OF ABOUT 2mph (3.2km/h). ALTERNATIVE COMPACTION METHODS SHALL BE APPROVED BY THE ENGINEER.

DRAWING No.	DRAWING TITLE
H353004-00000-221-294-0002-0001	STANDARD DRAWINGS - TYPICAL PAD, DITCH AND BERM SECTIONS
H353004-00000-221-294-0003-0001	STANDARD DRAWINGS - EARTHWORKS AND DRAINAGE DETAILS
H353004-10000-221-272-0006-0001	CRUSHER PAD - LAYOUT PLAN
H353004-10000-221-260-0002-0001	PRIMARY CRUSHER FEED RAMP - CONCRETE ARRANGEMENT AND DETAILS
H353004-10000-221-260-0001-0003	PRIMARY CRUSHER AREA - RETAINING WALL DETAILS
H353004-10000-221-260-0001-0001	PRIMARY JAW CRUSHER FOUNDATIONS - ARRANGEMENT AND DETAILS



REG. PROFESSIONAL

FOR CONSTRUCTION

No.	DESCRIPTION	BY	CHK'D	DATE
1	EDC NOTE REMOVED	JM	FH	02/08/2018
0	APPROVED FOR CONSTRUCTION	JHB	FH	13/04/2018

REVISIONS

HATCH

DRAFTSPERSON	I. BARNARD	NR	01/08/2018
DESIGNER	I. BARNARD	NR	01/08/2018
CHECKER	P. HUGO		2018-08-02
DESIGN COORD.	R. GOOSEN		2018-08-03
RESP. ENG.	R. HALIM		2018-08-03
LEAD DISC. ENG.	A. GROBBELAAR		2018-08-03
AREA LEAD	T. ATIBA		
ENG. MANAGER	D. STANGER		

DRAWING APPROVAL STATUS: Approved for Construction

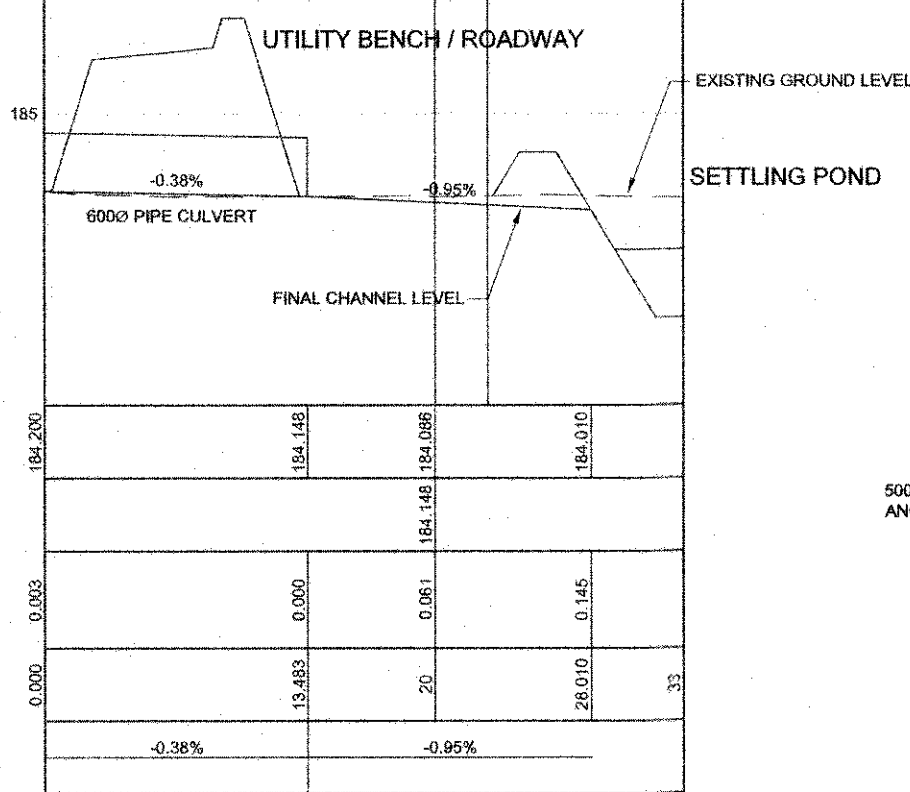
Baffinland

BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT

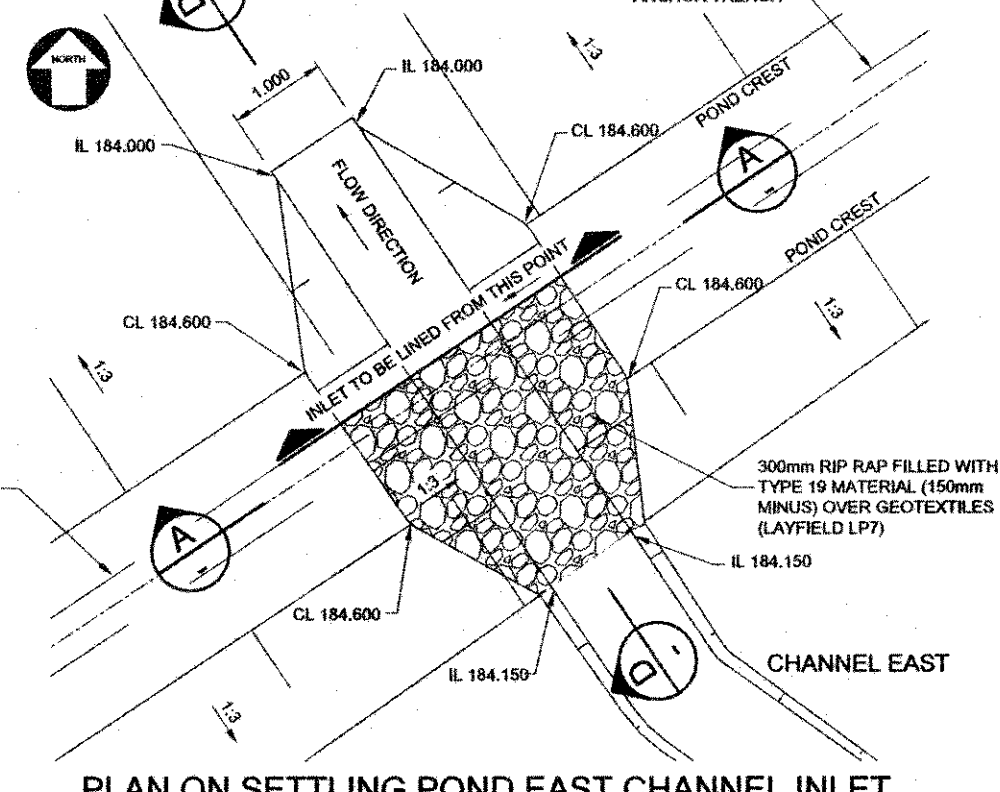
MINE SITE
CRUSHER PAD
CRUSHER RAMP & WALLS SETTING OUT

SCALE: 1:500
DWG. No. H353004-10000-221-272-0007-0001
REV 1

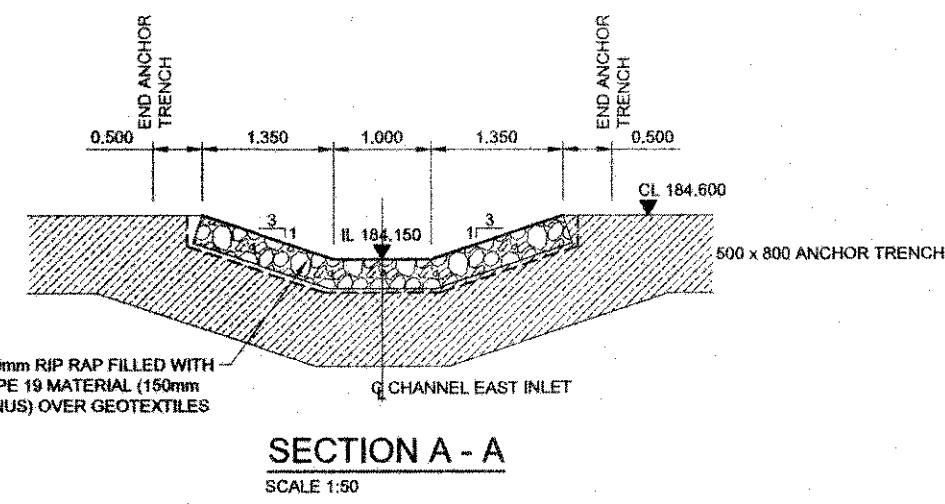
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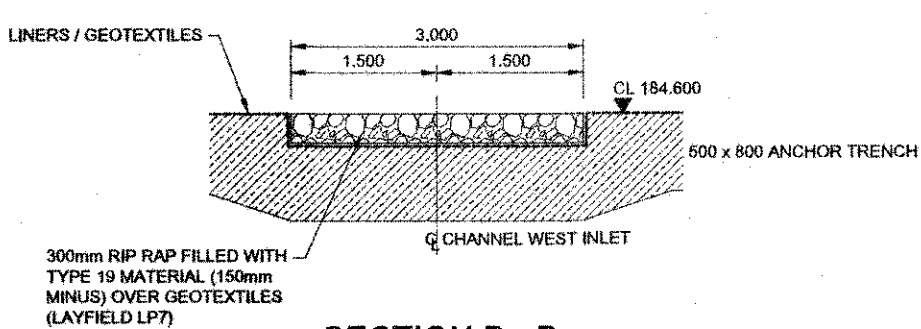
EAST CHANNEL - PROFILE



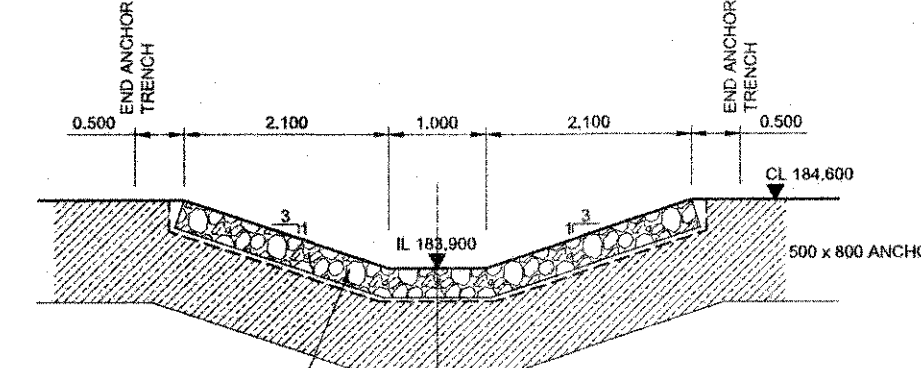
PLAN ON SETTLING POND EAST CHANNEL INLET



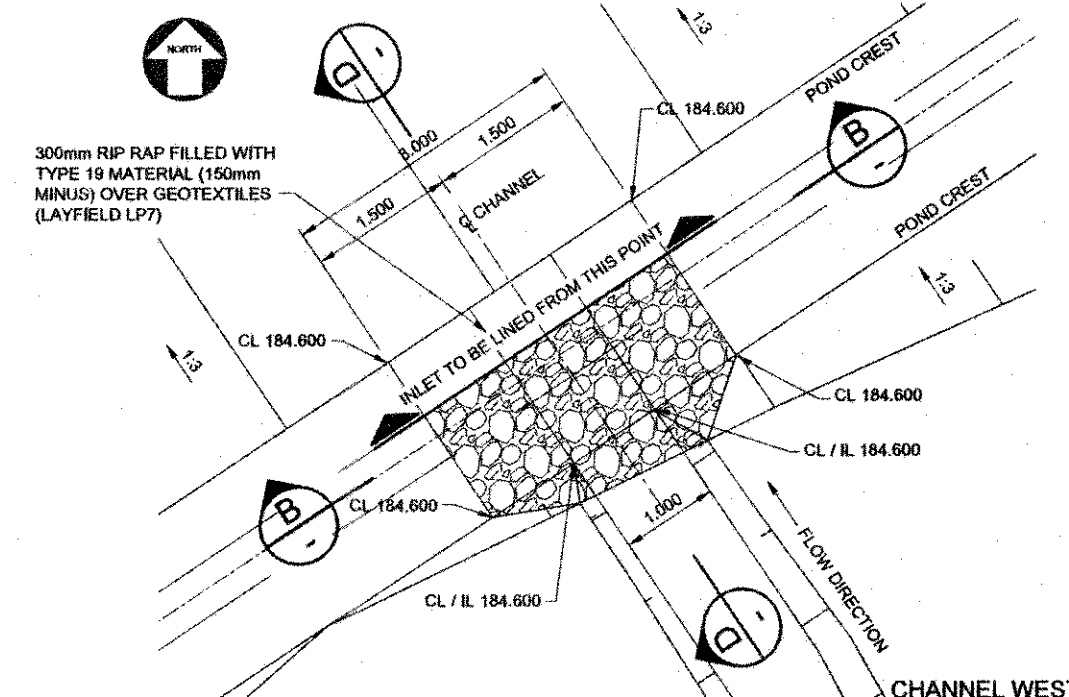
SECTION A - A



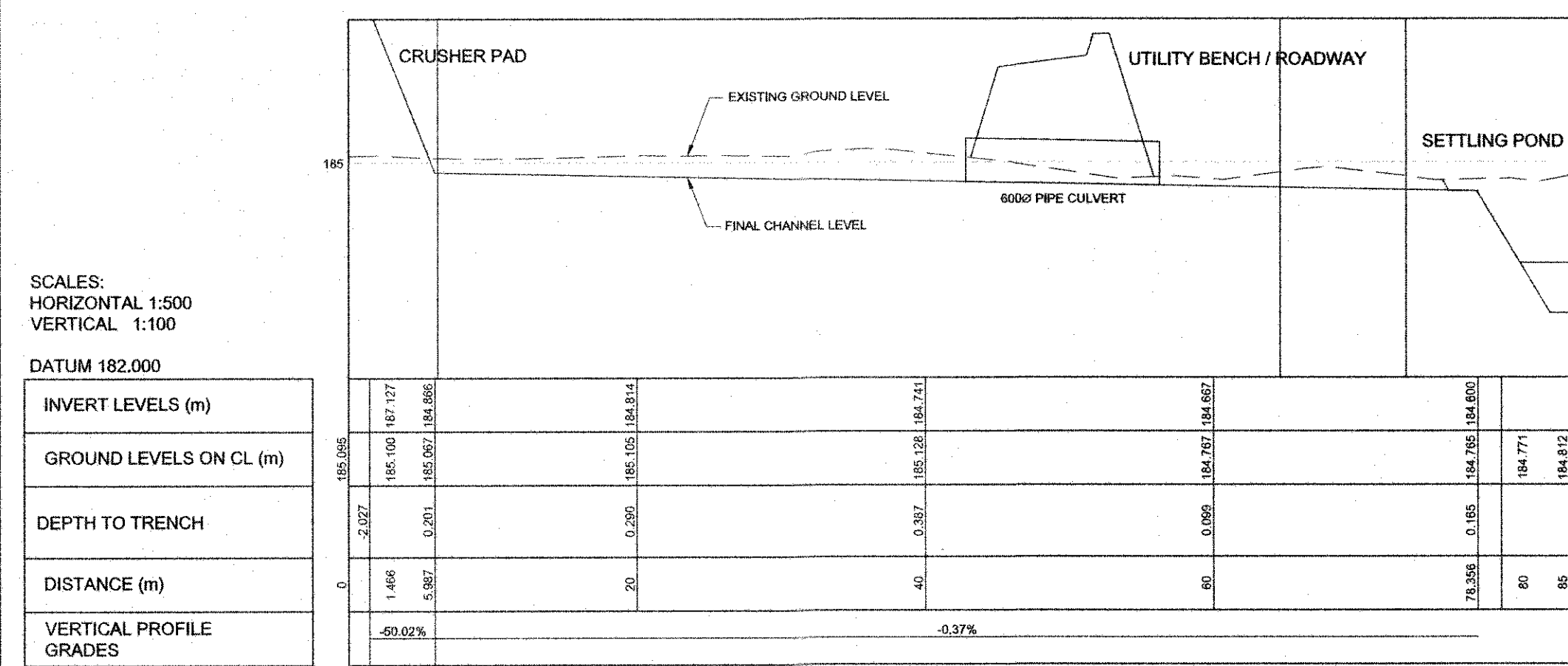
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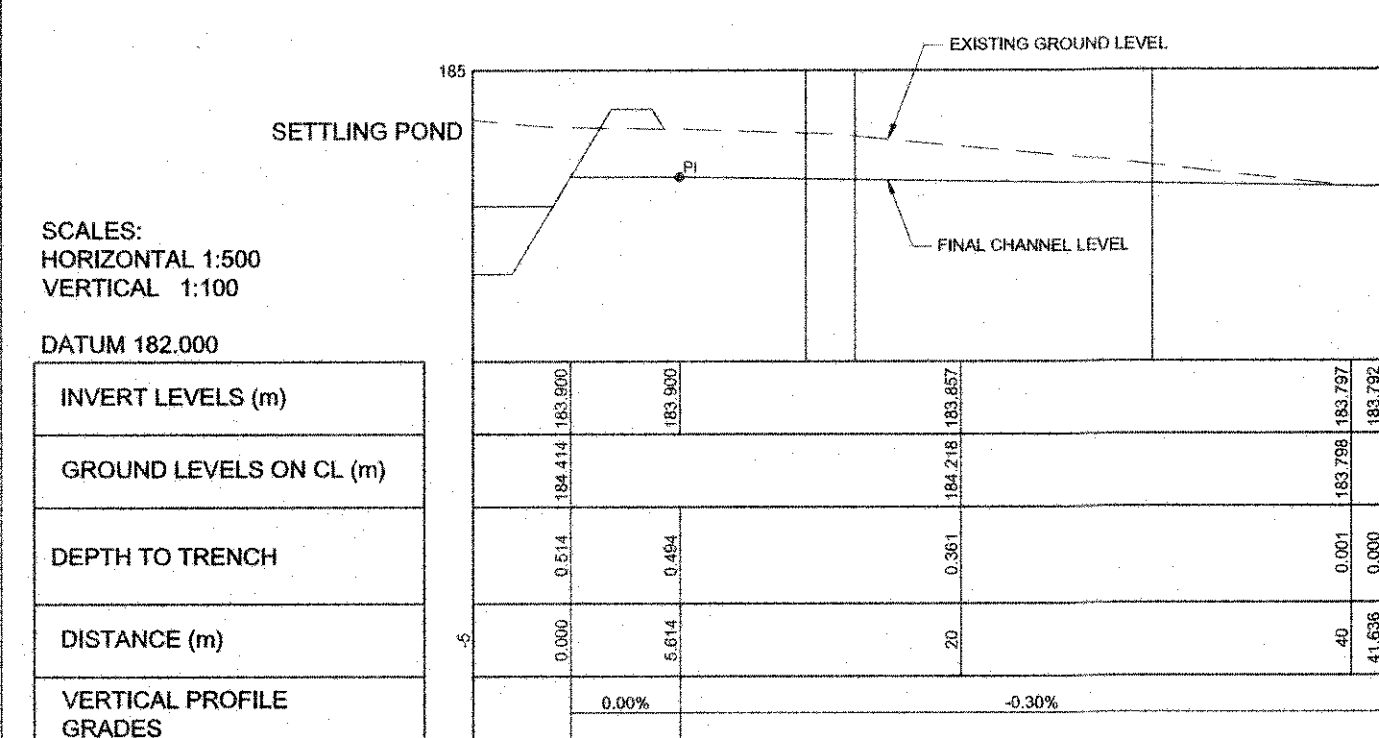
SECTION C - C



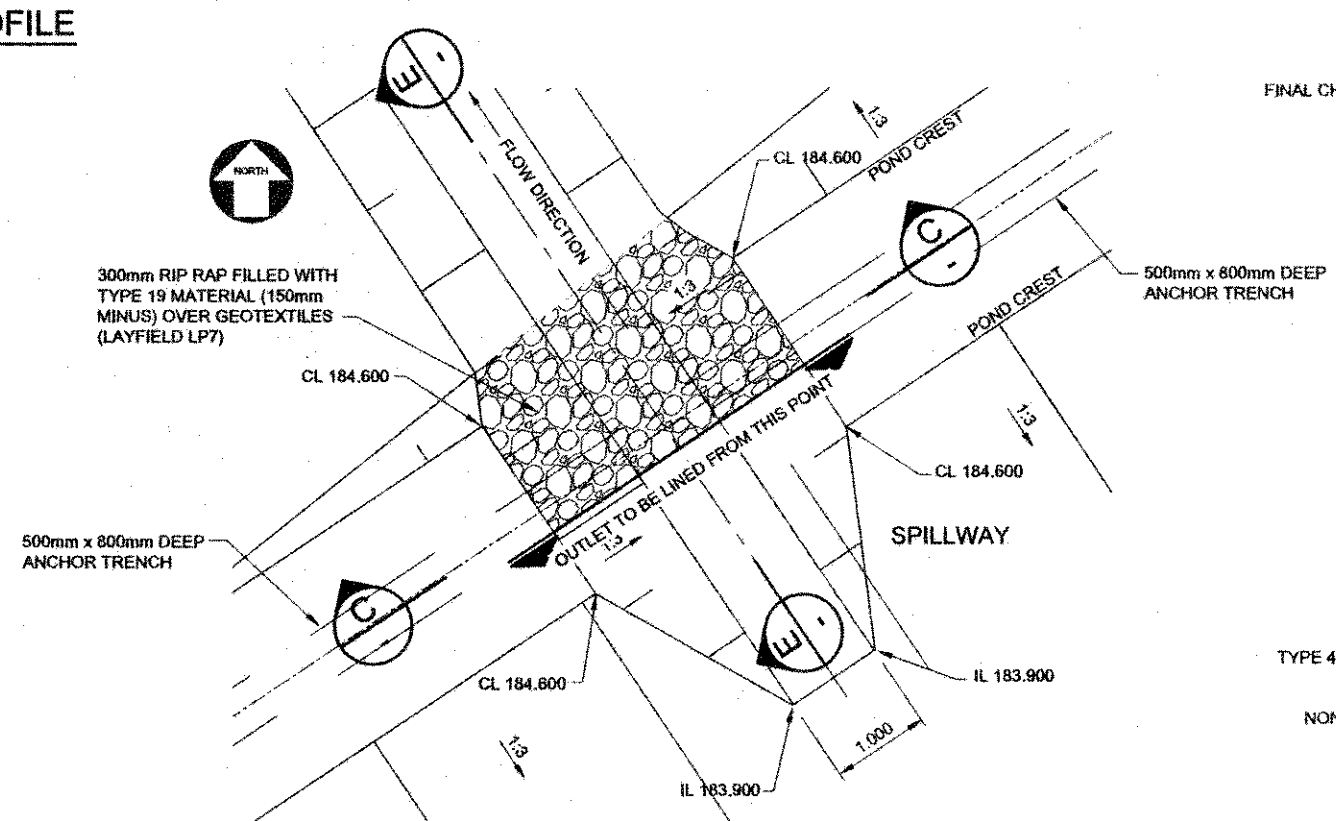
PLAN ON SETTLING POND WEST CHANNEL INLET



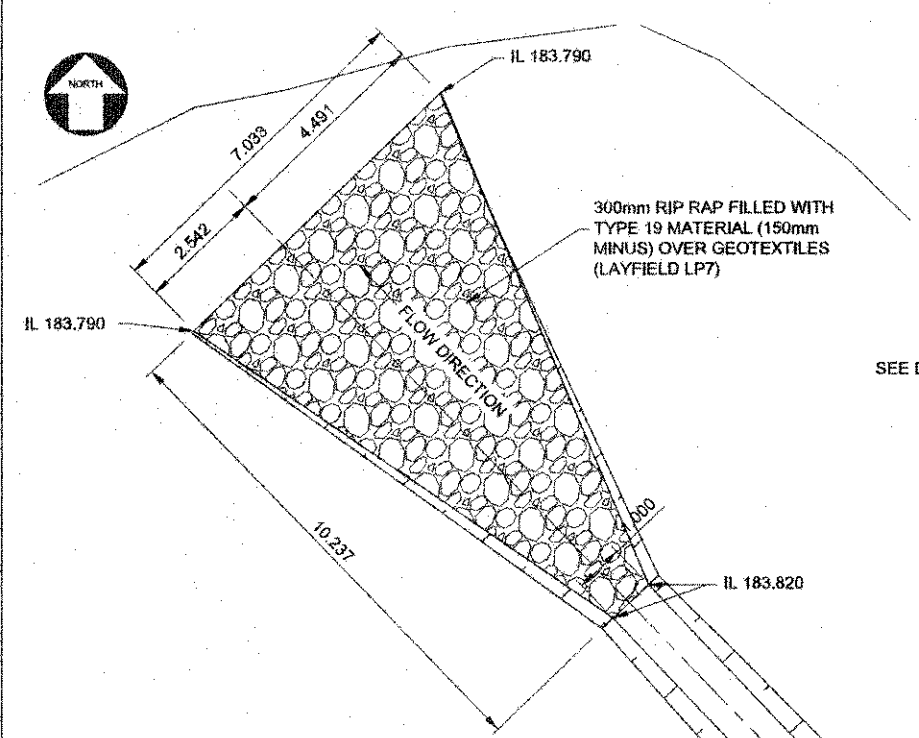
WEST CHANNEL - PROFILE



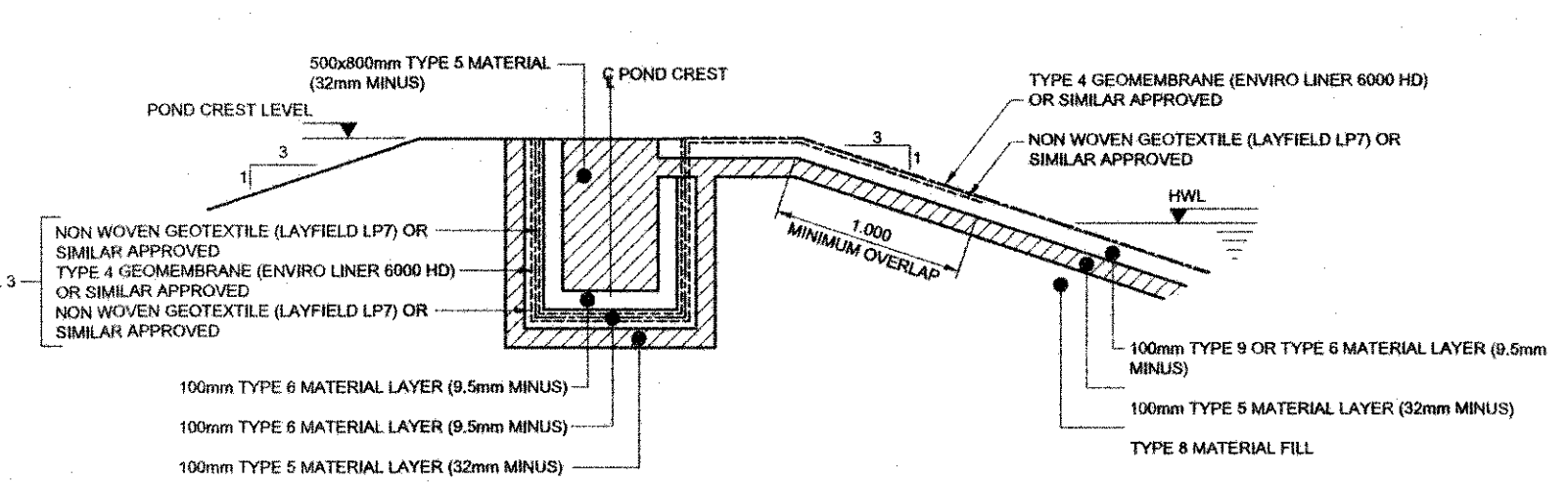
SPILLWAY OUTLET - PROFILE



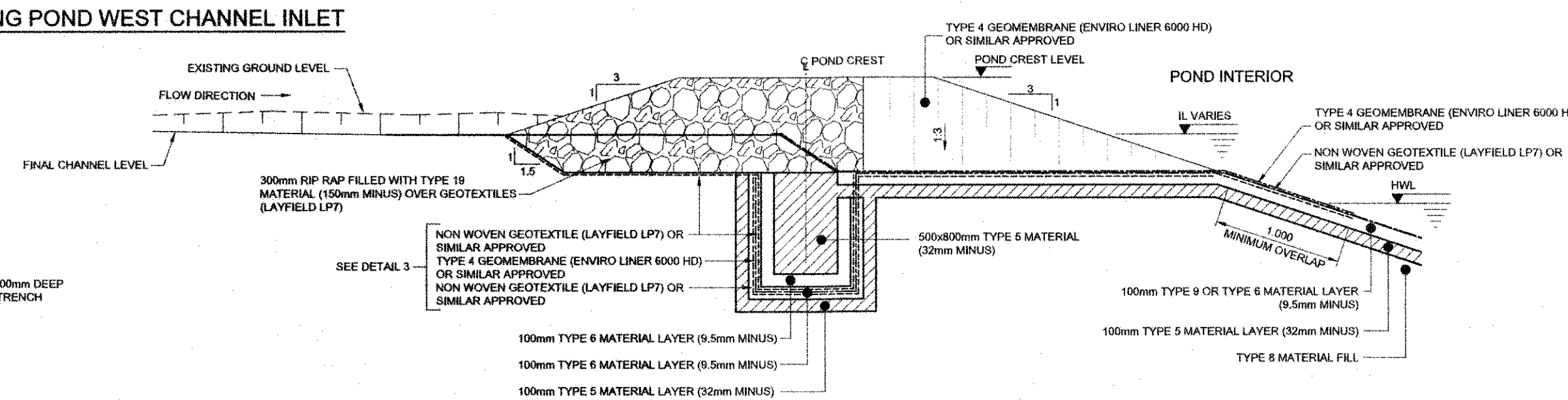
PLAN ON SETTLING POND SPILLWAY OUTLET



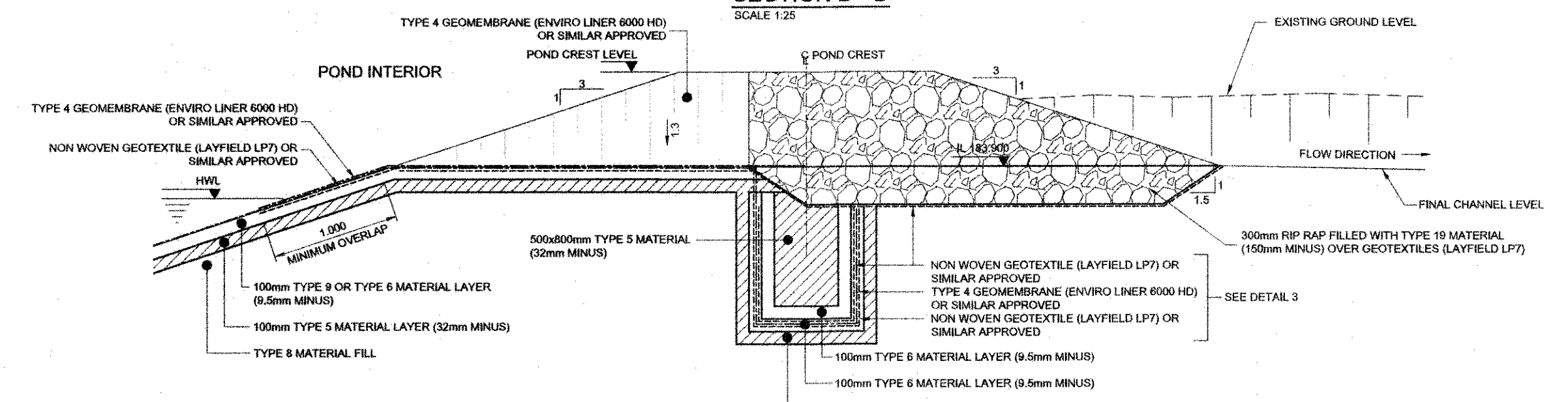
PLAN ON SPILLWAY OUTLET DISCHARGE



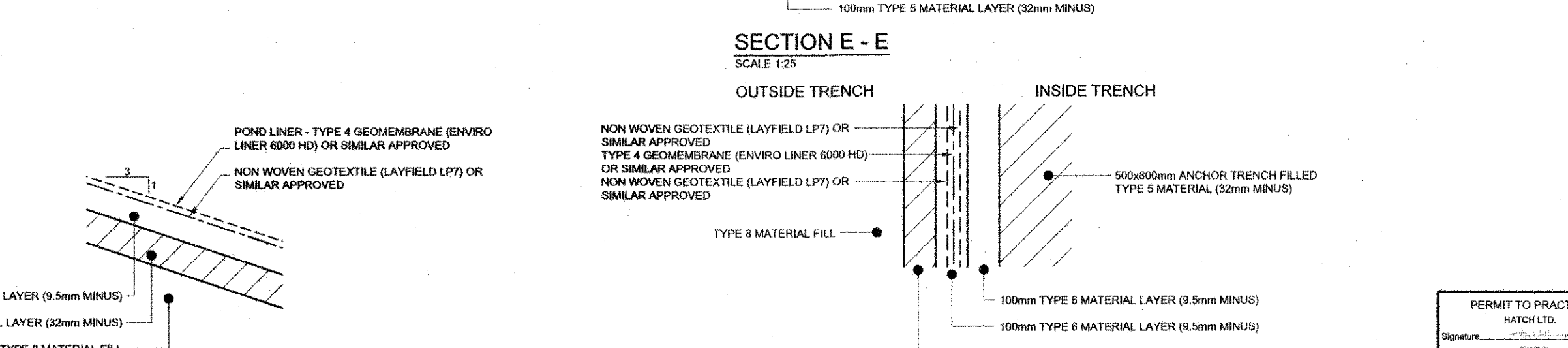
DETAIL 1 - POND LINER ANCHOR TRENCH



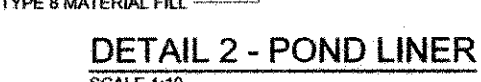
SECTION D - D



SECTION E - E



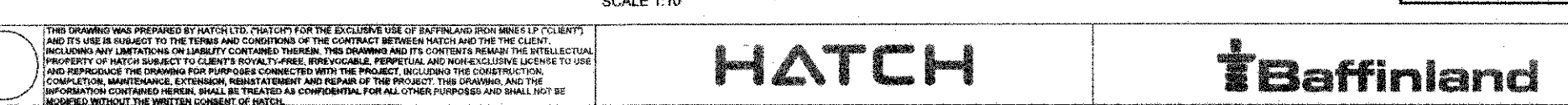
DETAIL 3 - TRENCH LINER



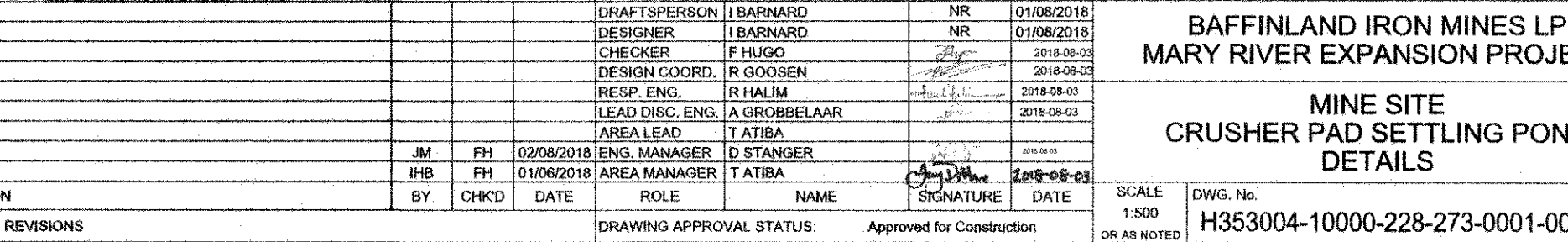
DETAIL 2 - POND LINER



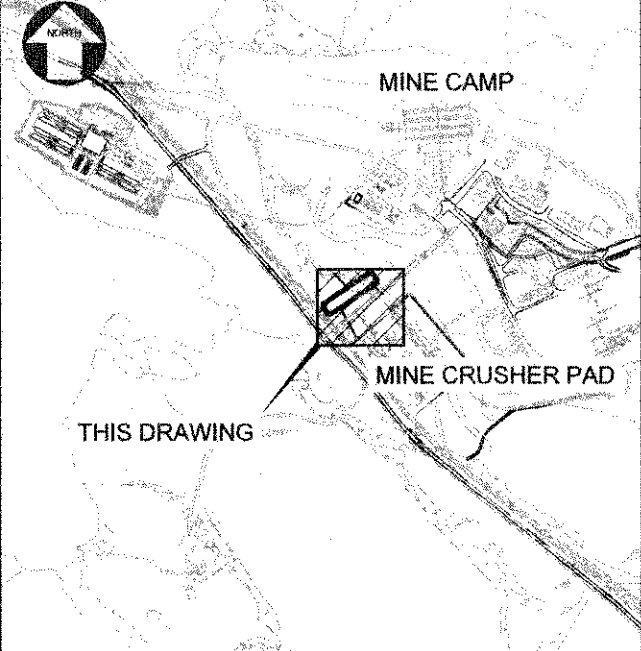
FOR CONSTRUCTION



НАТГУ



DRAWING APPROVAL STATUS:		Approved for Construction
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KEY PLAN

- NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTSAF (2016).
2. CO-ORDINATE GRID IS SHOWN IN UTM (NAD83), ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. THE CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
5. THE POND IS DESIGNED TO BE OPERATED EMPTY.
6. IT IS ASSUMED THAT ALL RUN OFF COLLECTED BY THE SETTLING POND IS NON-AQUATIC GENERATING AND CAN BE DISCHARGED TO THE ENVIRONMENT ONCE THE REQUIREMENTS OF BM ENVIRONMENTAL DESIGN CRITERIA HAS BEEN ACHIEVED. WATER TO BE DISCHARGED TO A DRAINAGE POINT IN ACCORDANCE WITH THE CLIENTS (BM) ENVIRONMENTAL REQUIREMENTS.
7. THE INSTALLATION OF THE GEOMEMBRANE (ENVIRO LINER 6000HD) IS TO BE IN STRICT ACCORDANCE WITH THE SPECIALIST PROVIDERS SPECIFICATIONS.

- LEGEND:

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| CL | CREST LEVEL |
| IL | INVERT LEVEL |
| HWL | HIGH WATER LEVEL |
| FBL | FREE BOARD LEVEL |
- TYPE 4 GEO-MEMBRANE (ENVIRO LINER 6000 HD) OR SIMILAR APPROVED
- NON WOVEN GEO-TEXTILE (LAYFIELD LP7) OR SIMILAR APPROVED