Steensby Construction Docks Options

Impact on Construction Capital Costs

Trade-off Study

Rev. 0

June 22, 2011

2011-06-30	0	Final	for K. Skebo	for L. Flowers	J. Casson	
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY
			HATCH			CLIENT

Table of Contents

Appendix

1. General Background

1.1 Motivation

This trade-off study provides information on the cost of providing construction docks at Steensby Inlet. The intent of the construction dock is to reduce the risk for the delivery of materials and support the construction and operation of the Port, Rail System, Infrastructure and Mary River Mine Site for the first two to three years.

The capital cost estimates for the proposed docks are to assist with the logistics, constructions service providers and the operation service providers to determine if there is an overall project cost benefit to installing the docks.

1.2 Description of EIS proposed Steensby Inlet Construction Dock(s)

The current AMEC baseline option (as defined in the Environmental Impact Study [EIS] by Knight Piésold) addressed the installation of construction docks on the Mainland and the Island.

Both the Island and Mainland construction docks had proposed locations identified as shown in Figure 1 (AMEC Drawing Number A1-165926-7440-121-0980)

AMEC Document No. TDM-159952-0000-000-047 identified a capital estimate of $47 million dollars for the Island Construction Dock. No capital costs were identified for the Mainland Construction Dock.

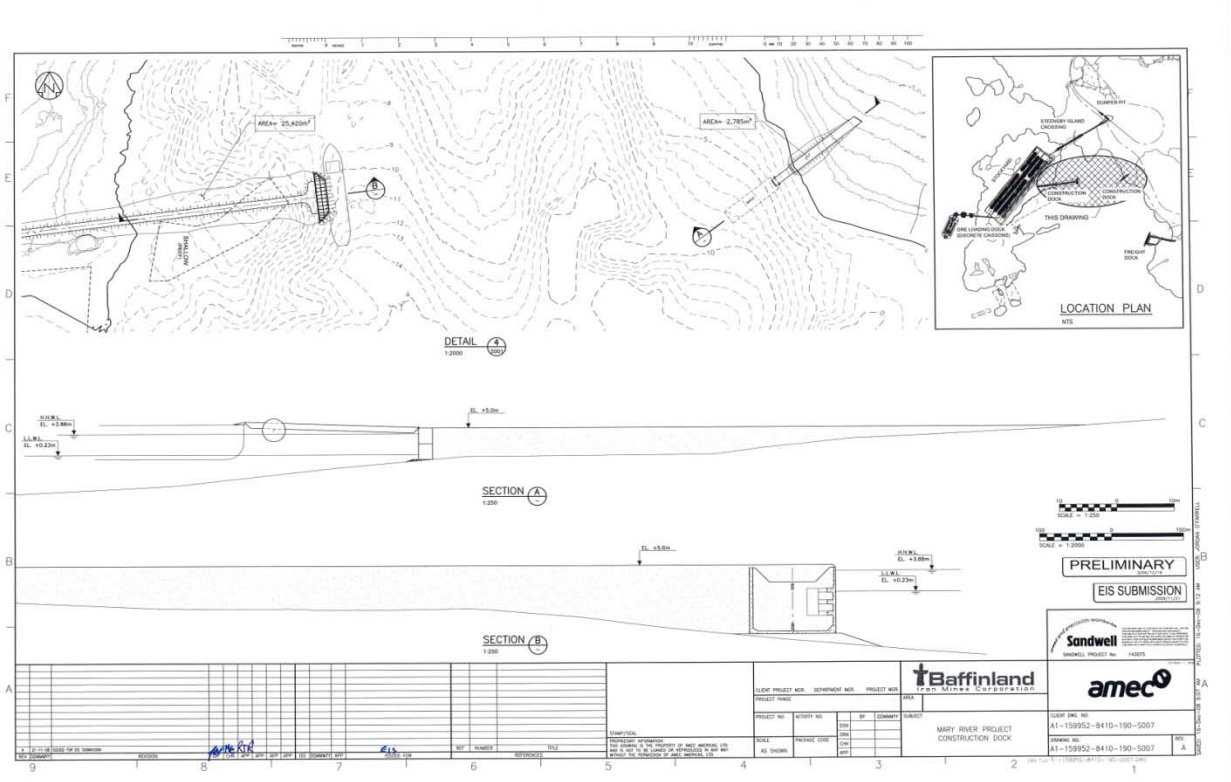


Figure 1: AMEC Drawing Number A1-165926-7440-121-0980 (also see Appendix A).

1.2.1 Mainland Construction Dock

A basic description of the AMEC proposed Steensby Inlet Mainland Construction Dock is as follows;

- Water depth of 7 metres
- 80 metre long floating Barge – end on ship
- 30 metre long bridge – supported on barge and on shore abutment
- On-shore abutment at tidal low water mark
- 120 metre long causeway to the mainland
- No specific vessels identified

1.2.2 Island Construction Dock

A basic description of the AMEC Proposed Steensby Inlet Island Construction Dock is as follows;

- Water depth of 7 metres
- Concrete caisson dock construction
- 120 metre long causeway to island
- Support the docking of 10,000 DWT Barges

1.3 Description of Hatch's Work Plan Trade off Study Construction Dock Options

A basic description of Hatch's proposed Steensby Mainland and Island Construction Dock Options is as follows;

- 50 metre long wharf face
- Water Depth of 9 metres
- Approximately 0.25 hectare traffic area behind the dock face
- Mooring buoys anchored to shore or to anchorage system
- A 15 metre wide causeway to shore
- 3-5 year life expectancy
- Support the docking of 15,000 DWT multi-purpose and fuel tankers
    - Woodward Oil Tanker MT Tuvaq - LOA 165 metres – Draft 9.8 metres (to be coordinated with high tide)
    - Typical 15,000 DWT Multipurpose Vessel – LOA 150 metres – Draft 8.0 metres
- Review several options of construction including steel, concrete, and timber.

1.4 Environmental / Archaeological Impact of Change

There are no apparent additional environmental or archaeological impacts with the construction of the proposed construction options.

In all likelihood the impact would be much less, as the footprints are slightly smaller.

2. General Background

2.1 AMEC / Sandwell Proposed Construction Dock Locations

The location and type of proposed AMEC / Sandwell island and mainland construction docks were reviewed by shipping companies including Desganges, Nuna and Fednav, their comments were consistent and as follows;

The island construction dock should be moved as it is too close to shallow bathymetry and this location would place shippers vessels at risk of grounding out. The shippers noted some captains may refuse to take their vessel in to this location (could be classified as a fatal flaw).

The mainland construction dock should be moved as it is too close to shallow bathymetry and would place their vessels at risk of grounding out.

2.2 Trade off Study Proposed Construction Dock Locations

As part of the trade off study Hatch's was to review locations that were safe for the vessels to approach, dock and leave without assistance. Figure 2 was prepared for shippers to review and advise on their thoughts regarding navigation to six proposed construction dock locations.

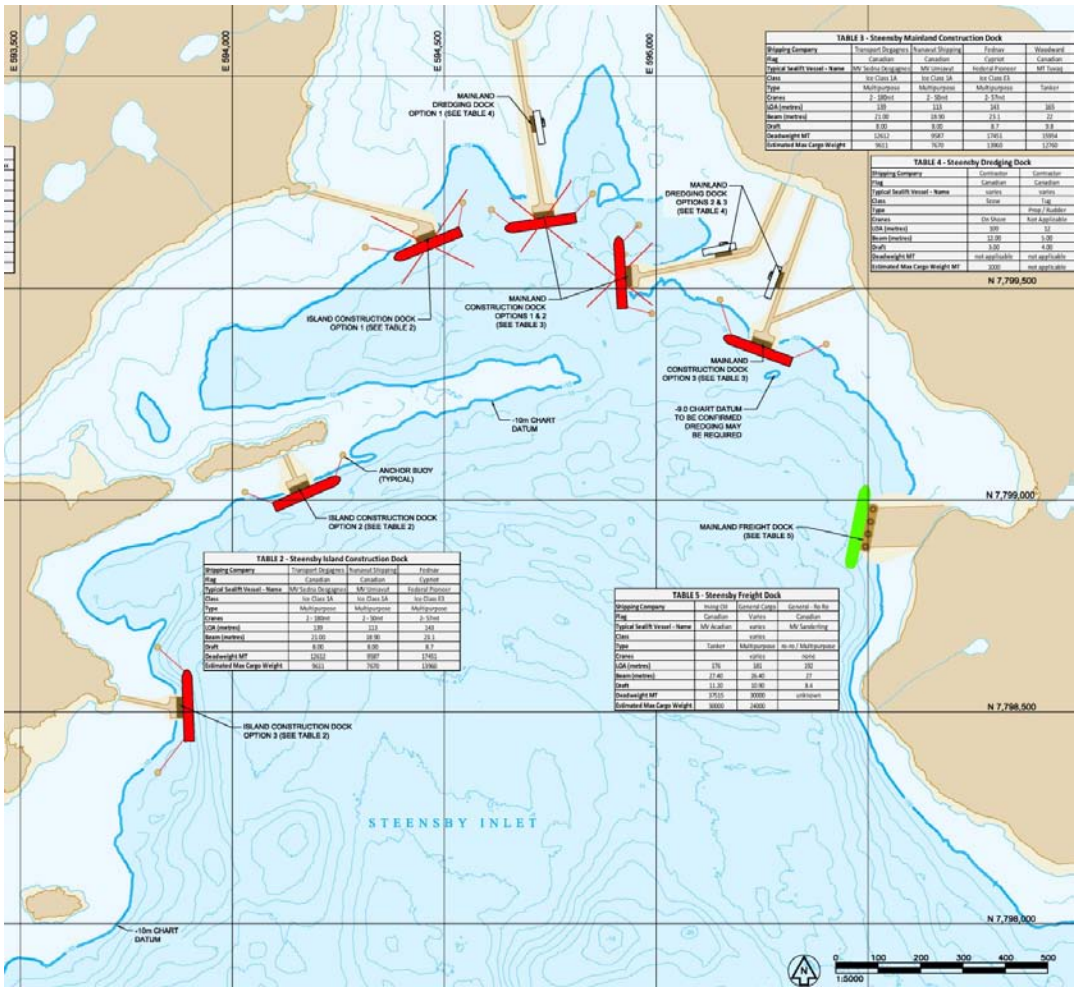


Figure 2: Proposed construction dock locations (also see Appendix B).

Both Desgagnes and Fednav returned comments that the three most northern proposed construction docks place their vessels at risk on approach or when they leave. Therefore these three locations have been considered to have a fatal flaw.

The three most southern locations are acceptable from a navigation aspect. Therefore these three locations have been considered for construction docks locations.

The most easterly mainland construction dock has a point that is at Chart -9.0. This bathymetry requires checking to ensure it is not higher than -9.0.

2.3 2011 Steensby Inlet Geotechnical Program for Various Construction Dock Locations

In the spring of 2011 Hatch / Thurber completed a limited on-ice geotechnical program completing eight probes finding unsuitable material at the harbour bottom varying in depths of 5 to 8 metres. The location of probes are identified in Figure 3.

From the 2011 geotechnical investigation it was determined that the harbour bottom contained a surface layer which was unsuitable for a gravity base structure. Therefore all proposed gravity structures, including concrete caissons, timber cribs, and steel caissons had a fatal flaw as a viable option. It was apparent that a rock fill mattress could not be installed and prepared to permit a gravity structure to be installed in a time frame where it would be operational in the first year of construction.

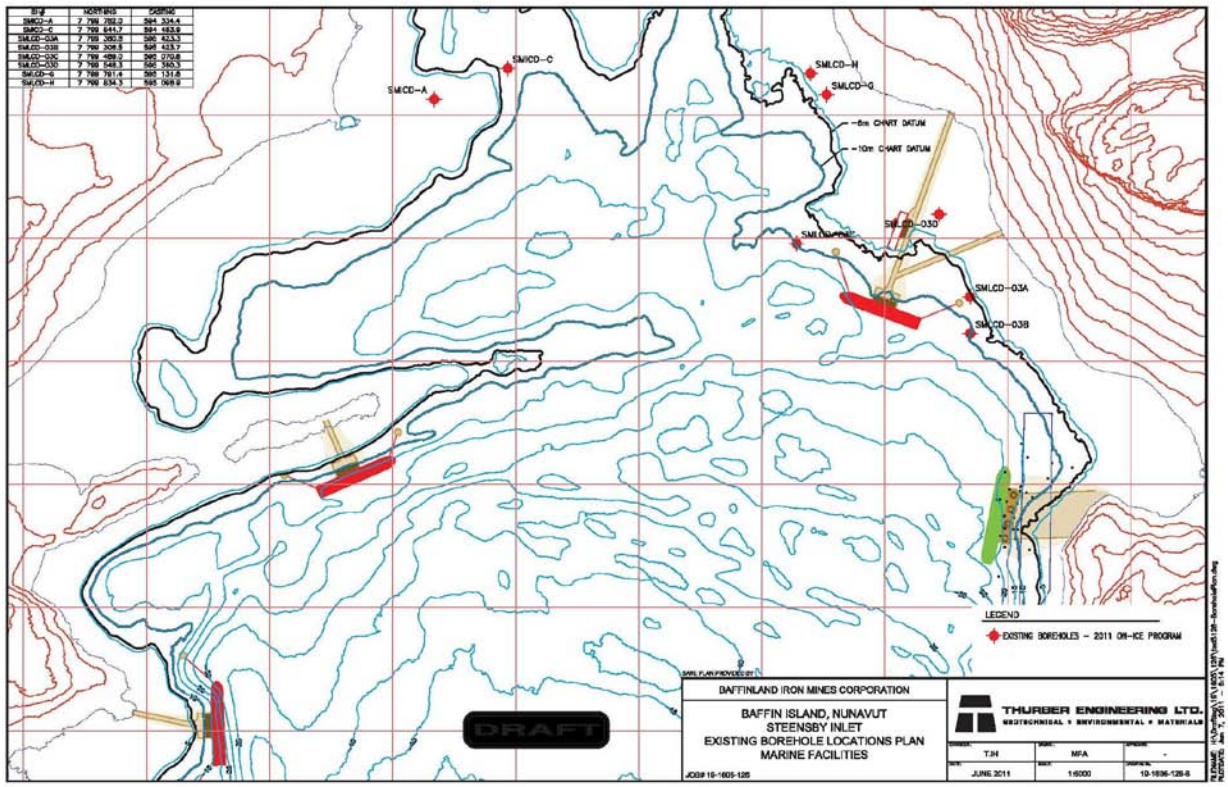


Figure 3: Location of probes (also see Appendix C).

All gravity options were closed out and drawings and cost estimates varying between $21 and $29 million can be found in Appendix D.

2.4 Construction Dock Alternatives – Floating Dock

Following the rejection of gravity based dock structures, Hatch preceded with completing a layout and cost estimate for a floating dock option.

The advantage of a floating dock is:

a) The approach and abutment can be constructed to allow for the anticipated settlement in the rockfill.

b) The dock height is always a consistent height off the water surface

The disadvantage is the floating dock

a) Requires a bridge from shore to the dock and the bridge will be at varying slopes depending on the tide.

b) Trucks that receive product off the ships must turn around on a restricted area

c) The barge must be secure in a horizontal position by braces and anchors

d) The barge and bridge must be removed and installed each fall and spring.

The proposed rockfill approach and floating dock location(s) and concept are as follows in Figure 4, Figure 5 and Figure 6 and are also attached in Appendix E.

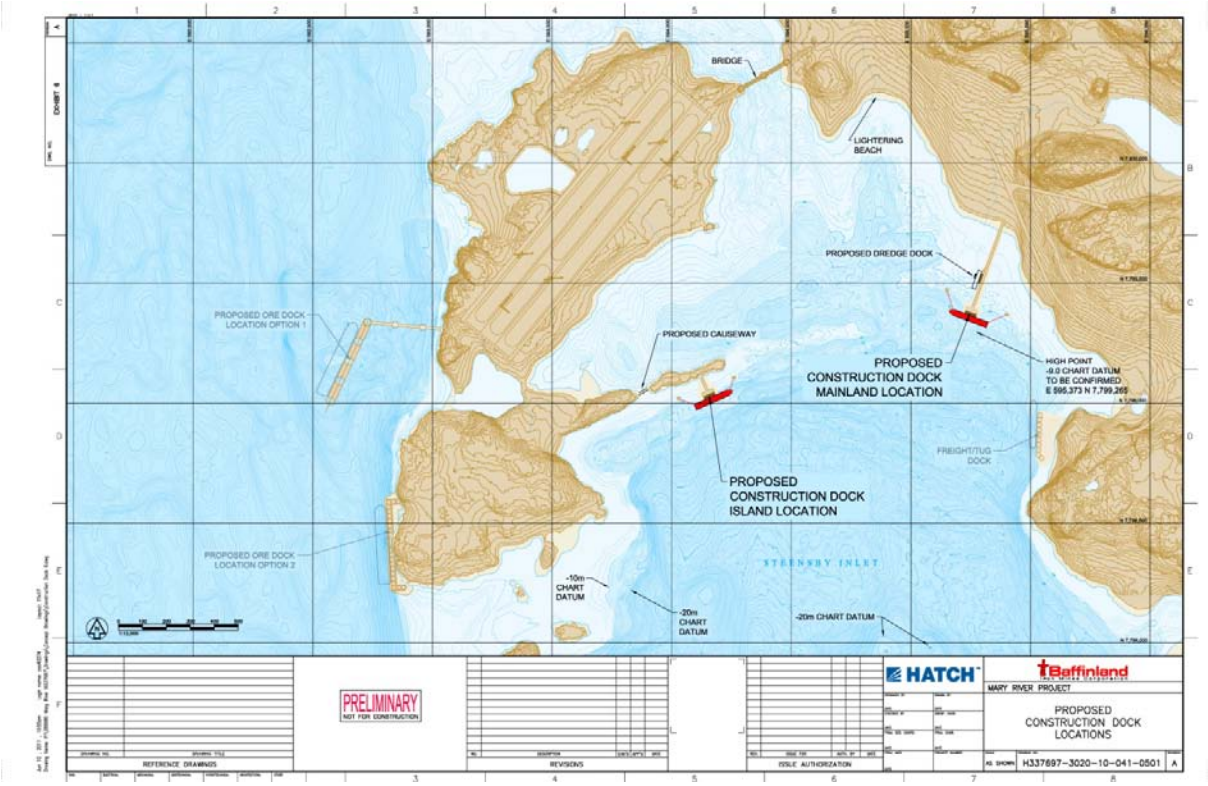


Figure 4: Proposed Construction Dock Locations.

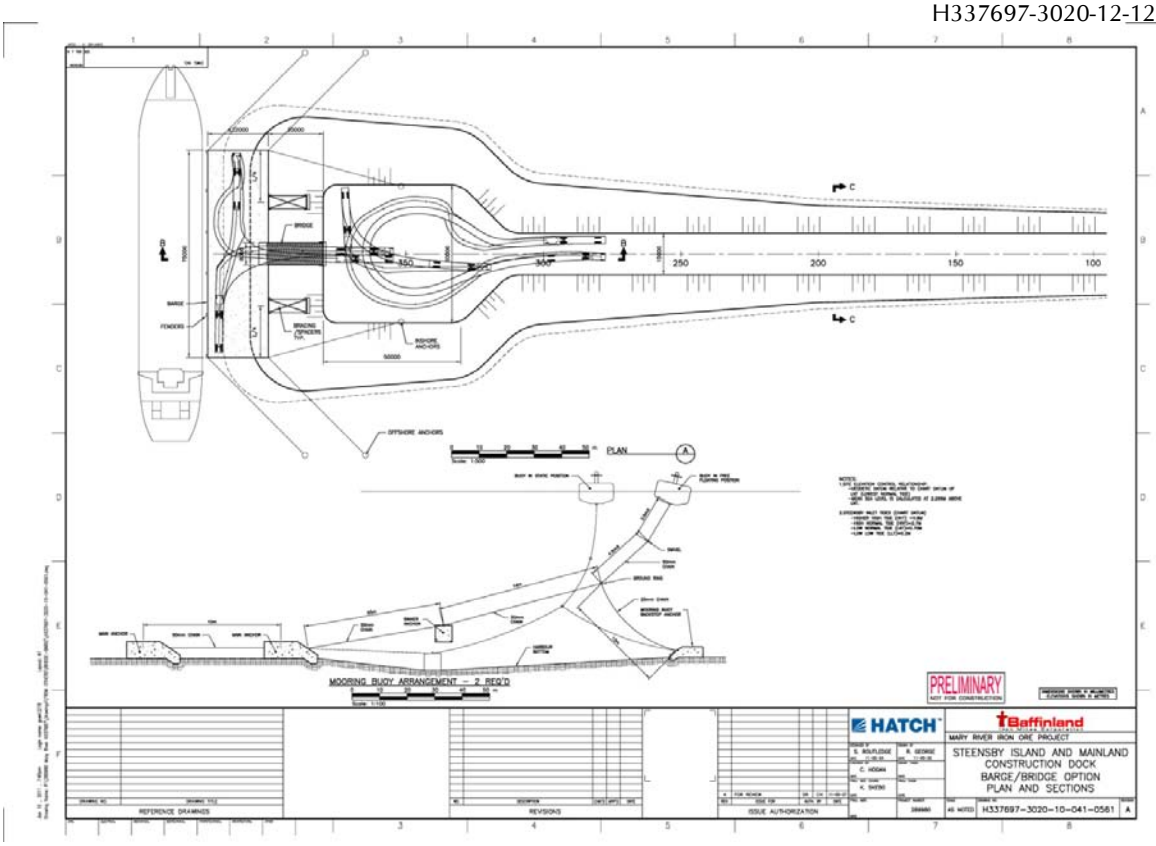


Figure 5: Steensby Island and Mainland Construction Dock Barge / Bridge Option Plan and Sections.

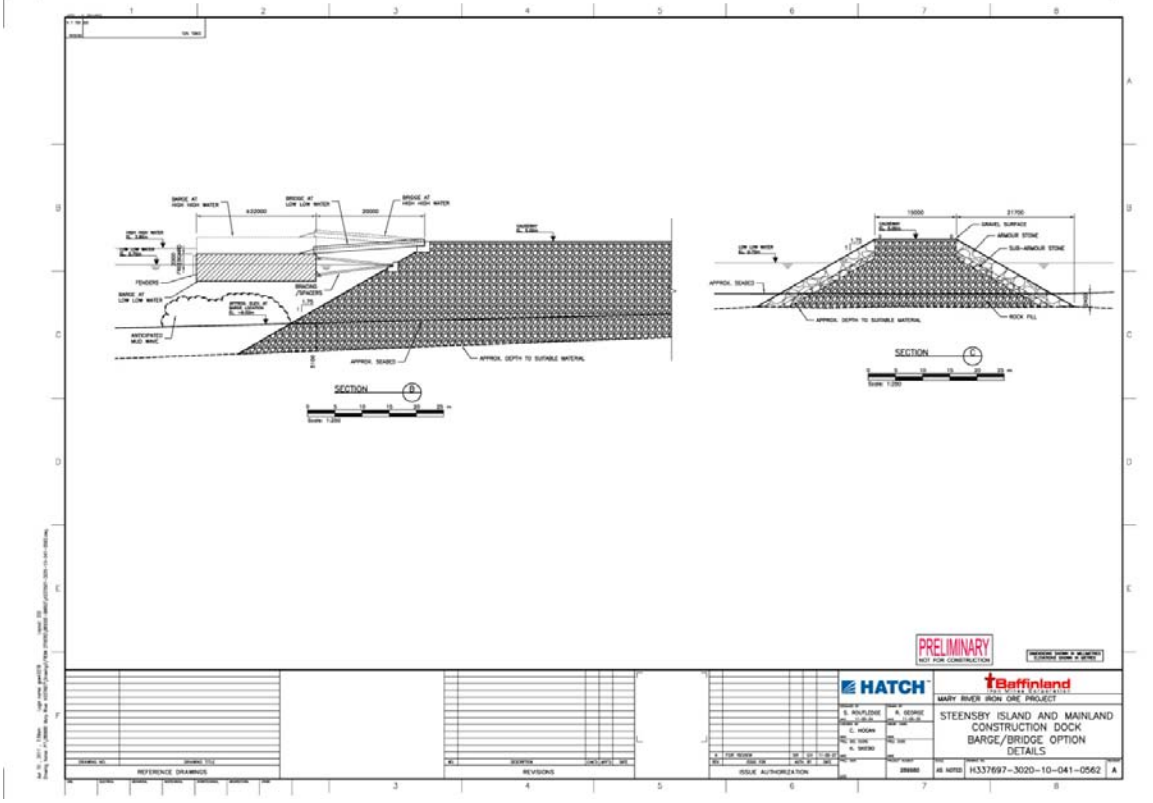


Figure 6: Steensby Island and Mainland Construction Dock Bridge / Barge Option Details.

3. Technical Considerations

The constructability of a floating dock off a rockfill causeway is a standard form of construction.

The issue of confirming geotechnical issues is addressed in Section 5.

4. Operational Considerations

Consideration has been given for operational aspects of the options in the following categories.

4.1 Safety / Environmental

The harbour will be very busy with the construction of the ore and freight docks and the construction traffic and activities may impact of the effectiveness and safety of multipurpose vessels if they are completing lightering operations instead of being docked at a wharf.

The safety and environmental risks should be reduced by transferring goods from a vessel to trucks on a dock versus transferring from ship to barge and then barge to shore.

4.2 Labour

N / A

4.3 Time

N / A

4.4 Product quality

N / A

4.5 Costs

A construction dock will reduce eliminates the double handling of many materials and thus reduces the operational time and costs to unload vessels.

4.6 Risks

The construction of a floating dock;

- reduces the risk of losing time during the unloading / loading operations
- reduces risks of incidents / accidents on the beach

5. Constructability Considerations for a Floating Dock Option

The constructability of a rockfill approach on unsuitable material will have issues in that the unsuitable material will either have to be displaced or compressed.

The spring geotechnical program was not sufficiently able to gather enough information to determine the expected displacement and or settlement issues that may arise with the construction of the approach. Additional geotechnical investigation is required to determine how to mitigate or identify geotechnical risks.

The anchorage and bracing system must be robust enough to ensure the dock and bridge are stable for operations during winds and wave conditions.

6. Project Impacts

6.1 Capital Costs

Estimated capital costs for a rockfill approach and floating construction dock is $25.35 million (Includes 25% contingency and excluding taxes).

A breakdown of costs is in Appendix F.

6.2 Schedule

Construction Dock – Four year life expectancy

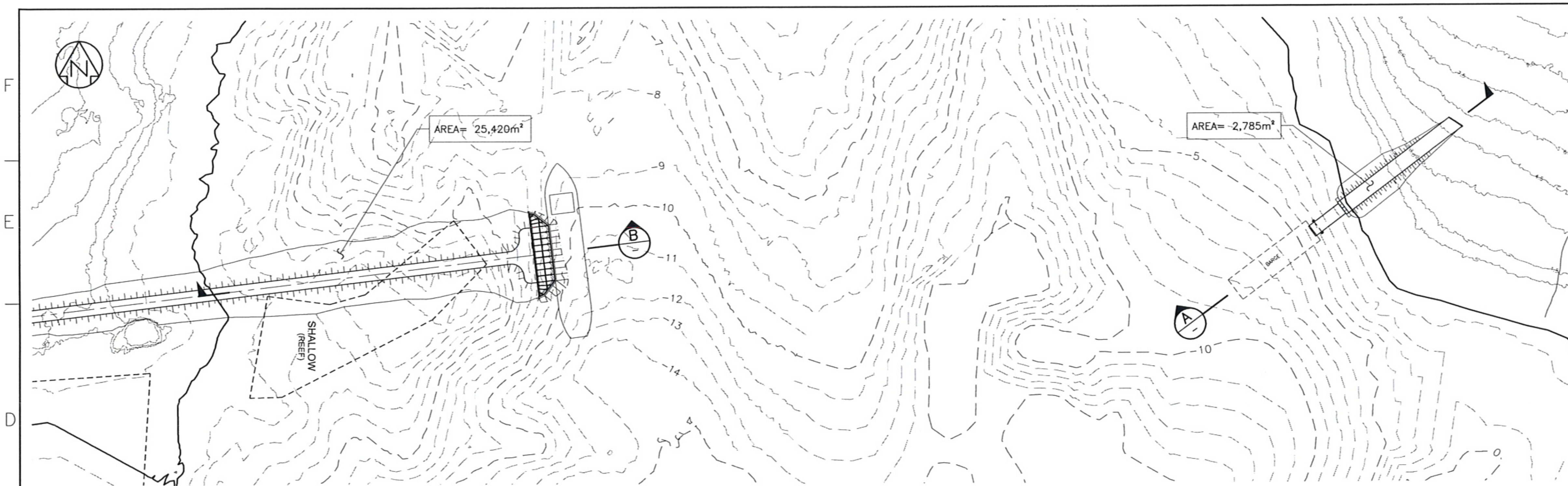
A high level construction dock schedule is as follows (year to be determined);

- June 1 to July 15 - Process rockfill /clear stone / sub armour and armour rock
- July 1 - Commence filling causeway through breaking ice
- August 1 to August 31 - Finish all surfaces and Armour
- August 1 - Deliver dock barge / bridge / anchors / spacers etc
- August 1 to August 15 - Install abutment
- September 1 - Dock available for vessels

6.3 Conclusions and Recommendations

Hatch's recommendation is to proceed with the design of a floating barge dock that permits the docking of 8 metre draft vessels at both the mainland and island locations proposed in Section 2.4, Figure 4.

Appendix A



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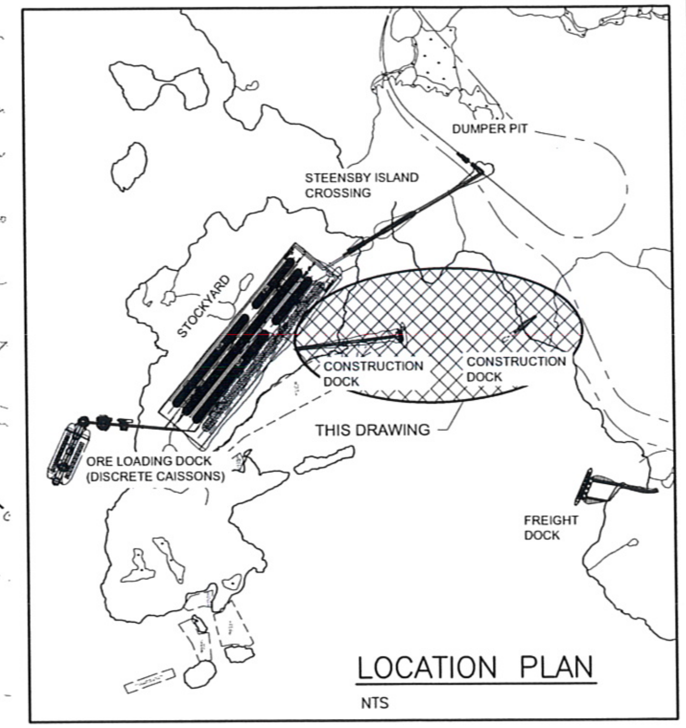

LOCATION PLAN
NTS

SECTION A
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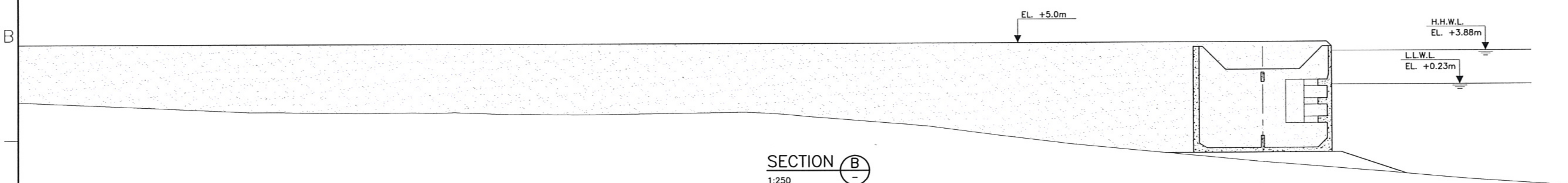

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EIS SUBMISSION 2008/11/21

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	REFERENCES	

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PROJECT PHASE
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DSN / DRN / CHK / APP
SCALE: AS SHOWN | PACKAGE CODE

Baffinland Iron Mines Corporation
AREA
SUBJECT: MARY RIVER PROJECT CONSTRUCTION DOCK

amec
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DRAWING NO. A1-159952-8410-190-S007
REV. A

CAD FILE: A1-159952-8410-190-S007.DWG

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Appendix B

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MAINLAND DREDGING DOCK OPTION 1 (SEE TABLE 4)

MAINLAND DREDGING DOCK OPTIONS 2 & 3 (SEE TABLE 4)

ISLAND CONSTRUCTION DOCK OPTION 1 (SEE TABLE 2)

MAINLAND CONSTRUCTION DOCK OPTIONS 1 & 2 (SEE TABLE 3)

MAINLAND CONSTRUCTION DOCK OPTION 3 (SEE TABLE 3)

-10m CHART DATUM

-9.0 CHART DATUM TO BE CONFIRMED DREDGING MAY BE REQUIRED

ANCHOR BUOY (TYPICAL)

ISLAND CONSTRUCTION DOCK OPTION 2 (SEE TABLE 2)

MAINLAND FREIGHT DOCK (SEE TABLE 5)

ISLAND CONSTRUCTION DOCK OPTION 3 (SEE TABLE 2)

-10m CHART DATUM

STEENSBY INLET

TABLE 3 - Steensby Mainland Construction Dock

Shipping Company	Transport Degagnes	Nunavut Shipping	Fednav	Woodward
Flag	Canadian	Canadian	Cypriot	Canadian
Typical Sealift Vessel - Name	MV Sedna Desgagnes	MV Umiavut	Federal Pioneer	MT Tuvaq
Class	Ice Class 1A	Ice Class 1A	Ice Class E3	
Type	Multipurpose	Multipurpose	Multipurpose	Tanker
Cranes	2 - 180mt	2 - 50mt	2- 57mt	
LOA (metres)	139	113	143	165
Beam (metres)	21.00	18.90	23.1	22
Draft	8.00	8.00	8.7	9.8
Deadweight MT	12612	9587	17451	15954
Estimated Max Cargo Weight	9611	7670	13960	12760

TABLE 4 - Steensby Dredging Dock

Shipping Company	Contractor	Contractor
Flag	Canadian	Canadian
Typical Sealift Vessel - Name	varies	varies
Class	Scow	Tug
Type		Prop / Rudder
Cranes	On Shore	Not Applicable
LOA (metres)	100	12
Beam (metres)	12.00	5.00
Draft	3.00	4.00
Deadweight MT	not applicable	not applicable
Estimated Max Cargo Weight MT	1000	not applicable

TABLE 2 - Steensby Island Construction Dock

Shipping Company	Transport Degagnes	Nunavut Shipping	Fednav
Flag	Canadian	Canadian	Cypriot
Typical Sealift Vessel - Name	MV Sedna Desgagnes	MV Umiavut	Federal Pioneer
Class	Ice Class 1A	Ice Class 1A	Ice Class E3
Type	Multipurpose	Multipurpose	Multipurpose
Cranes	2 - 180mt	2 - 50mt	2- 57mt
LOA (metres)	139	113	143
Beam (metres)	21.00	18.90	23.1
Draft	8.00	8.00	8.7
Deadweight MT	12612	9587	17451
Estimated Max Cargo Weight	9611	7670	13960

TABLE 5 - Steensby Freight Dock

Shipping Company	Irving Oil	General Cargo	General - Ro Ro
Flag	Canadian	Varies	Canadian
Typical Sealift Vessel - Name	MV Acadian	varies	MV Sanderling
Class		varies	
Type	Tanker	Multipurpose	ro-ro / Multipurpose
Cranes		varies	none
LOA (metres)	176	181	192
Beam (metres)	27.40	26.40	27
Draft	11.20	10.90	8.4
Deadweight MT	37515	30000	unknown
Estimated Max Cargo Weight	30000	24000	

N

0 100 200 300 400 500

1:5000

Appendix C

BH#	NORTHING	EASTING
SMICD–A	7 799 782.0	594 334.4
SMICD–C	7 799 844.7	594 483.9
SMLCD–03A	7 799 380.8	595 423.3
SMLCD–03B	7 799 306.5	595 423.7
SMLCD–03C	7 799 489.0	595 070.8
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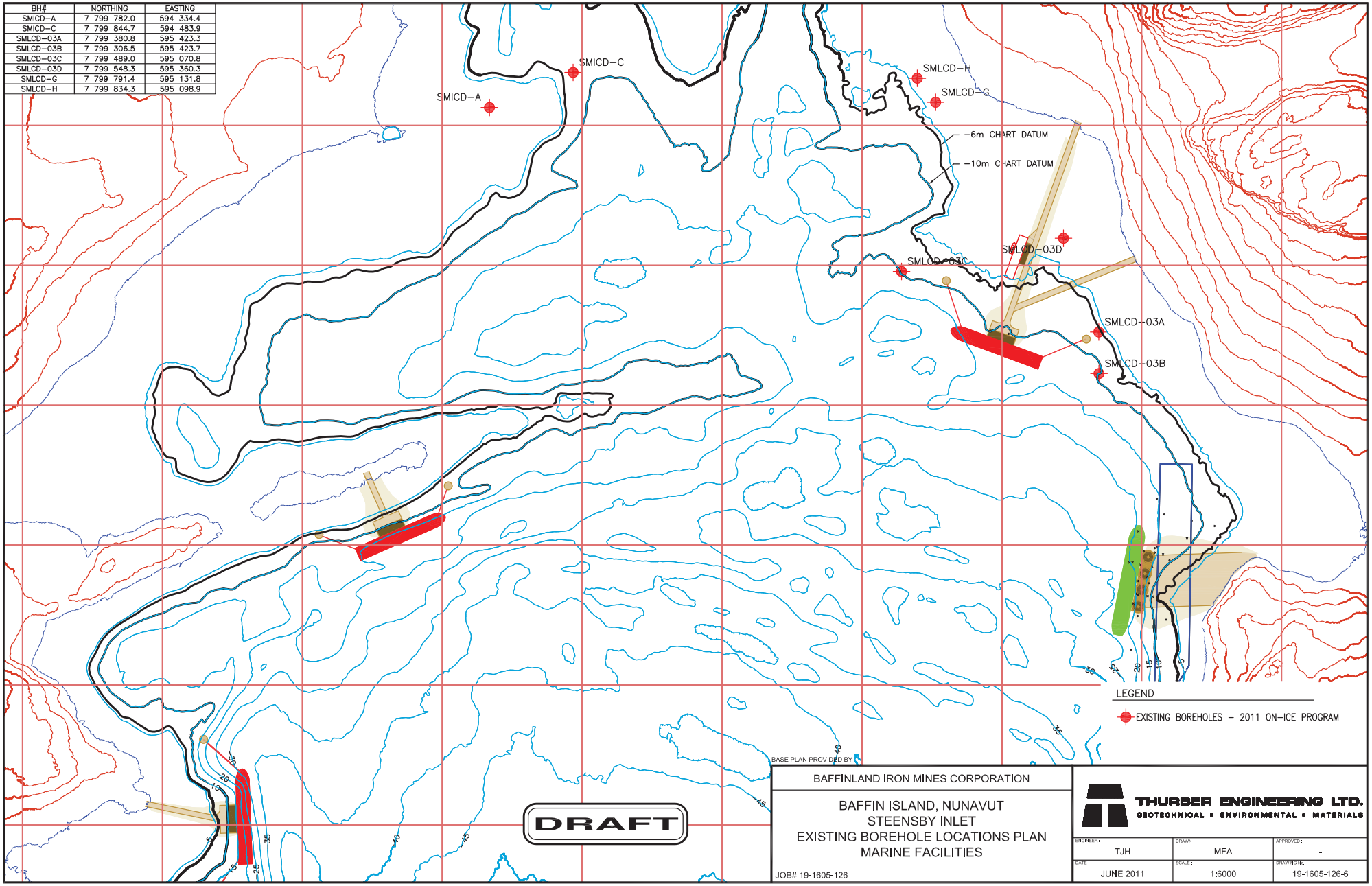
SMLCD–G	7 799 791.4	595 131.8
SMLCD–H	7 799 834.3	595 098.9



BAFFINLAND IRON MINES CORPORATION

BAFFIN ISLAND, NUNAVUT
STEENSBY INLET
EXISTING BOREHOLE LOCATIONS PLAN
MARINE FACILITIES

JOB# 19-1605-126

THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

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Appendix D

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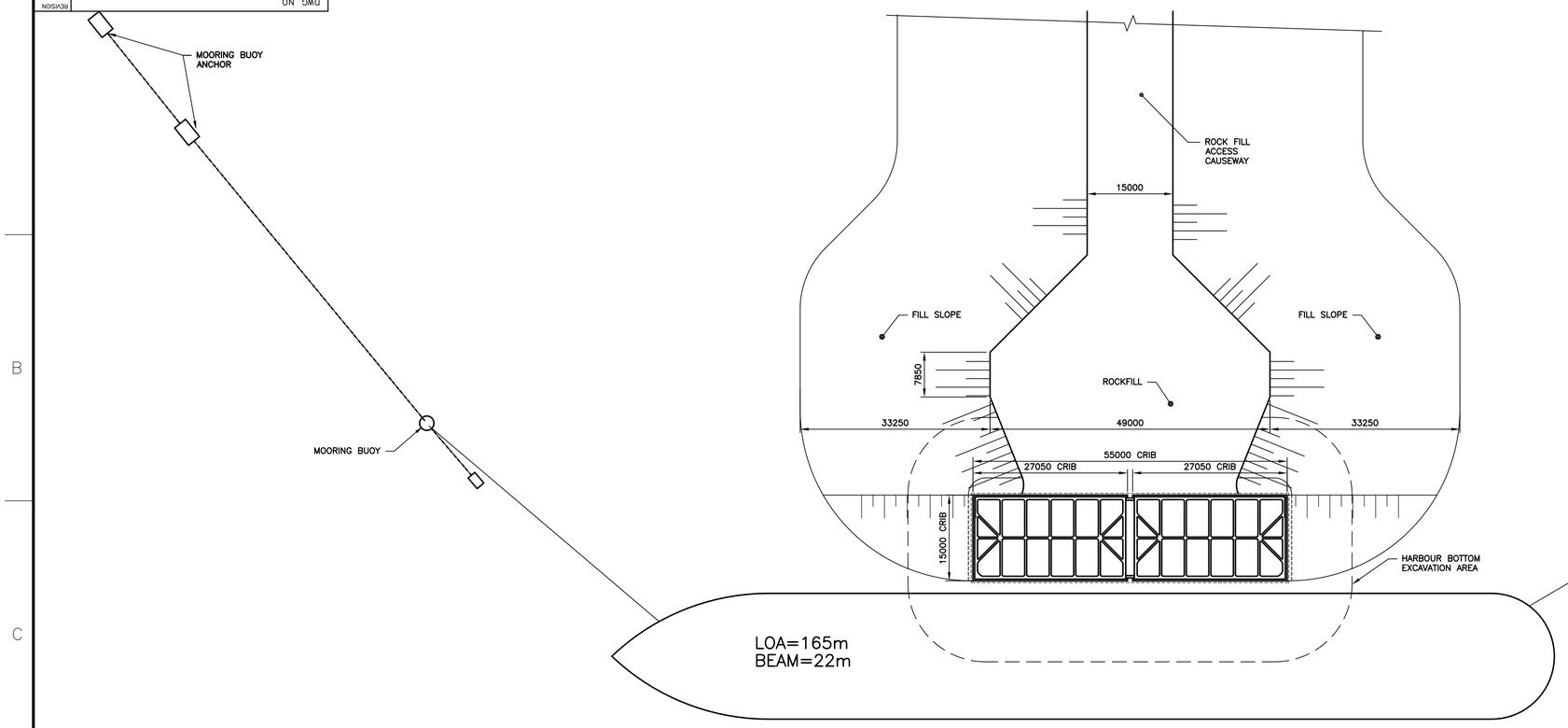

PLAN

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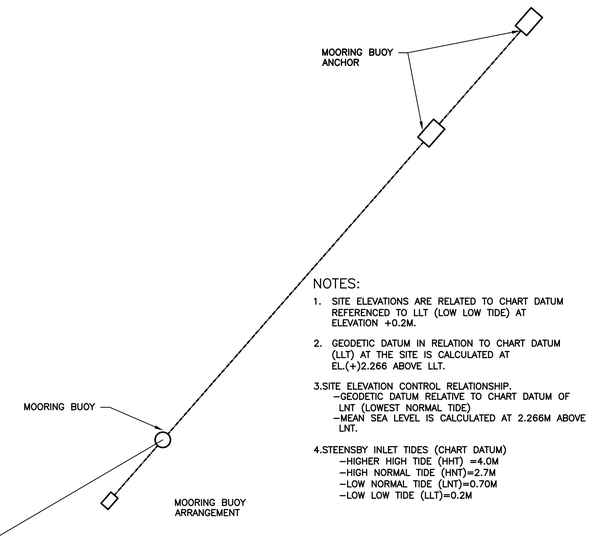

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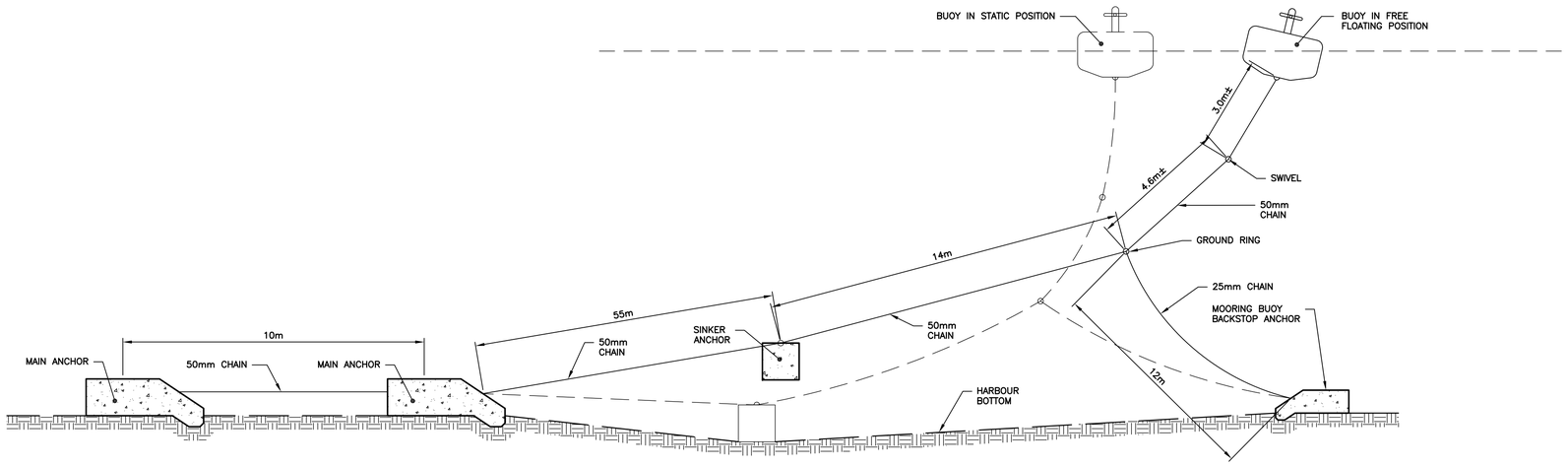
   - –LOW LOW TIDE (LLT)=0.2M

STEENSBY INLET



MOORING BUOY ARRANGEMENT – 2 REQ'D

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PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

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NO.	DESCRIPTION	CHK'D	APP'D	DATE
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CHECKED BY PJC DATE 11-05-13	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. DATE	PROJECT NUMBER

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK CONCRETE CAISSON OPTION SITE PLAN

SCALE	DRAWING NO.	REVISION
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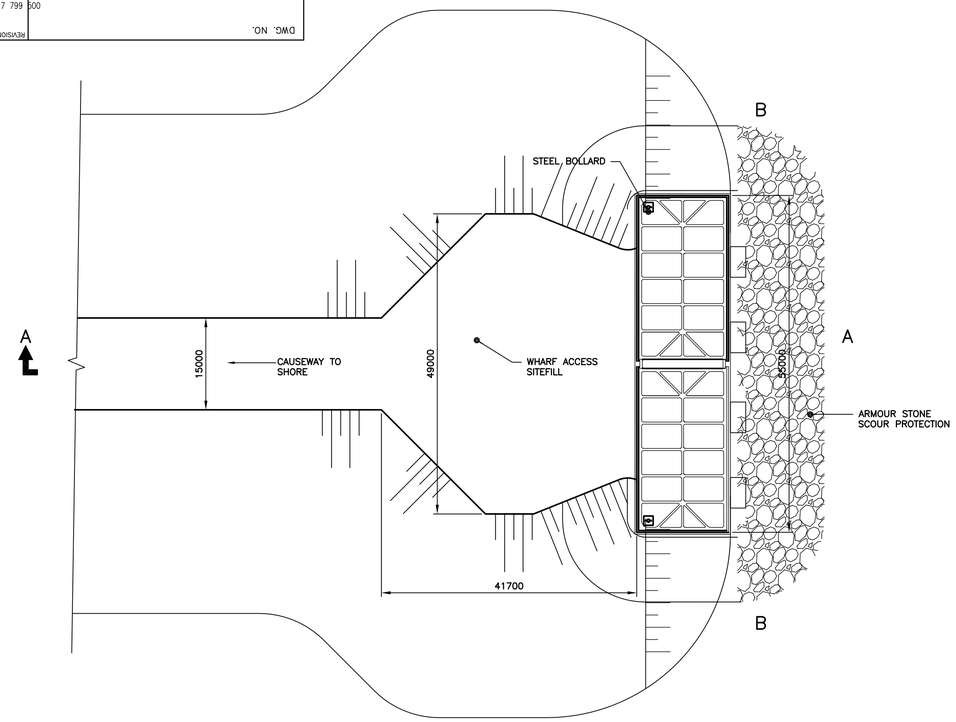

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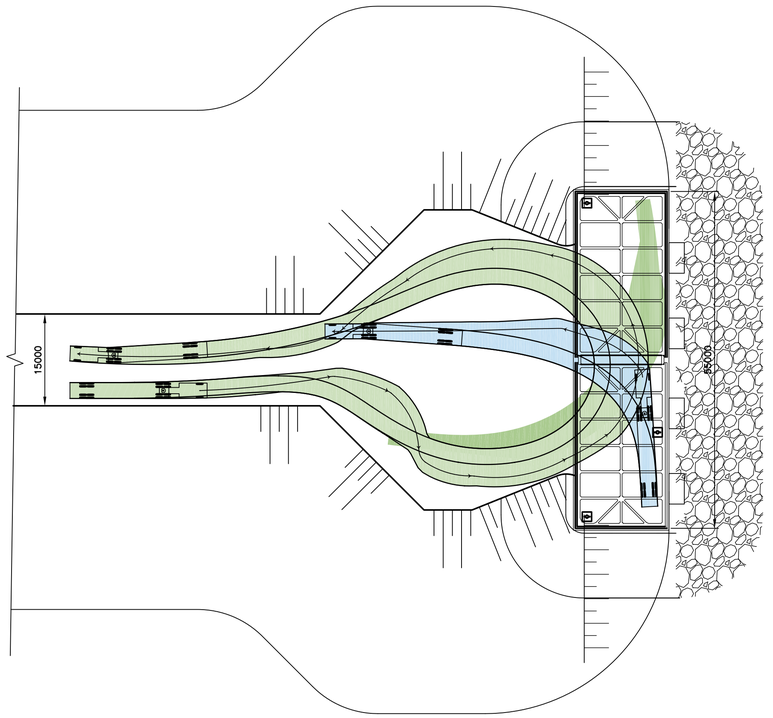

PROPOSED TRUCK TURNING–PLAN

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NOTES:

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2. GEODETIC DATUM IN RELATION TO CHART DATUM (LLT) AT THE SITE IS CALCULATED AT EL.(+)2.266 ABOVE LLT.
3. SITE ELEVATION CONTROL RELATIONSHIP.
   –GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
   –MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.
4. STEENSBY INLET TIDES (CHART DATUM)
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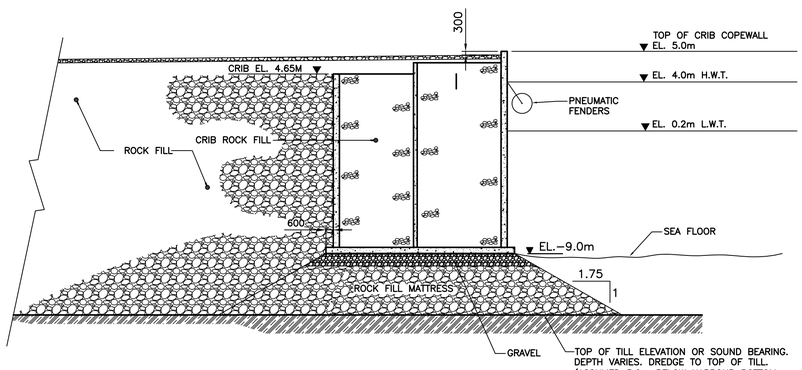

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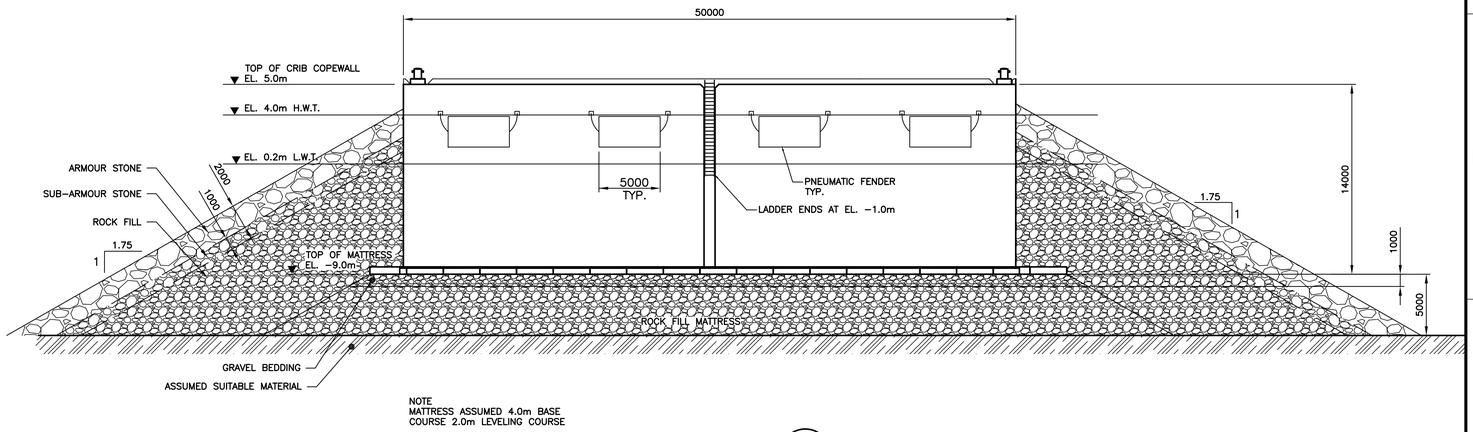

NOTE
MATTRESS ASSUMED 4.0m BASE COURSE 2.0m LEVELING COURSE

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DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

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ISSUE AUTHORIZATION

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DATE 11–05–13	DATE 11–05–13
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PJC	
DATE 11–05–13	DATE
PROJ. DES. COORD.	PROJ. ENGR.
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PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK CONCRETE CAISSON OPTION ELEVATION AND SECTIONS

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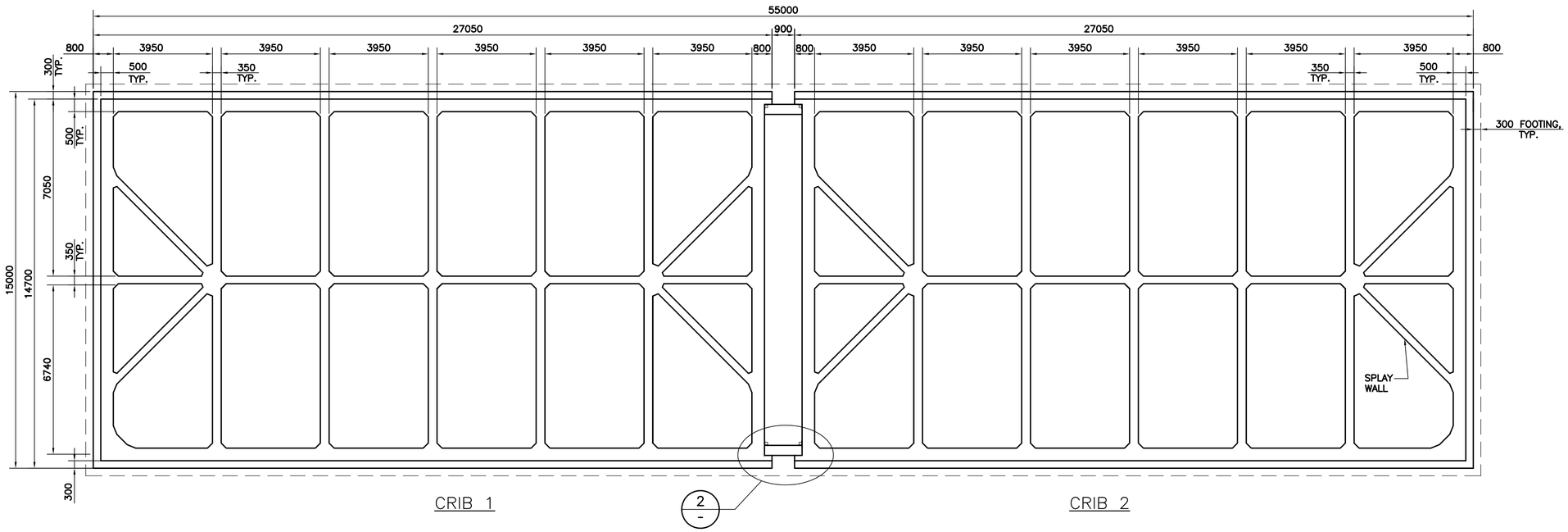

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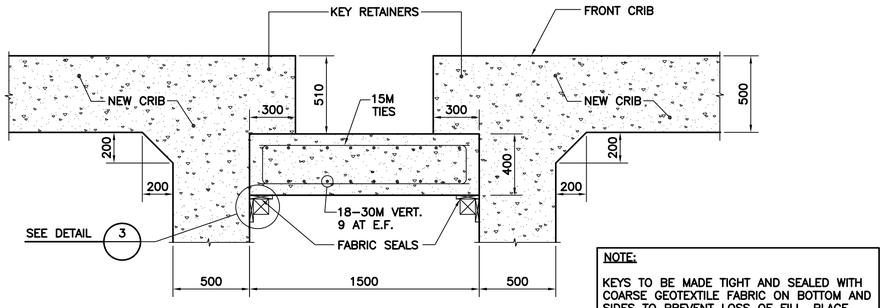
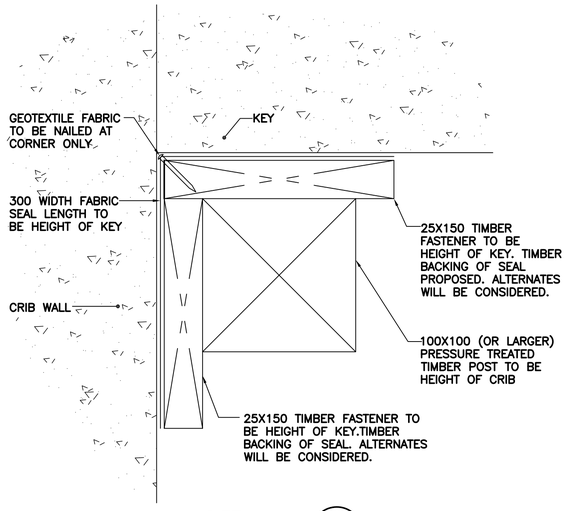


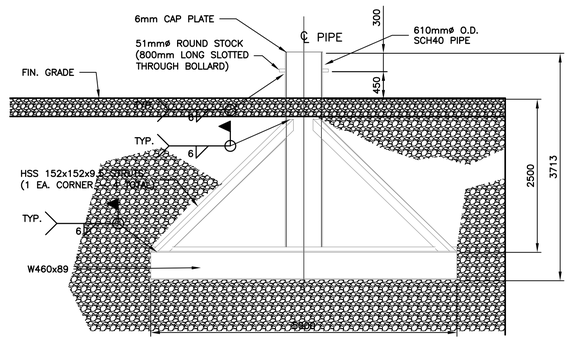
NOTE:

KEYS TO BE MADE TIGHT AND SEALED WITH COARSE GEOTEXTILE FABRIC ON BOTTOM AND SIDES TO PREVENT LOSS OF FILL. PLACE BAGS OF CEMENT AT BOTTOM TO SEAL GAP BETWEEN BOTTOM OF KEY AND MATTRESSES.

PRECAST CONCRETE KEY BETWEEN CRIBS 2
SCALE 1:20



DETAIL 3
FABRIC SEALS
SCALE 1:2



BOLLARD DETAIL

0 1 2 3 4 5 m
Scale: 1:50

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY	DRAWN BY
GMC DATE 11-05-13	SL DATE 11-05-13
CHECKED BY PJC DATE 11-05-13	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. DATE	PROJECT NUMBER

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK CONCRETE CAISSON OPTION PLAN AND DETAILS

SCALE	DRAWING NO.	REVISION
1:250	H337697-3020-10-041-0523	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Steensby Inlet Construction Dock Options Analysis Cost Estimate

Project: Mary's River Iron Mine — **Option: Concrete Caisson**

Location: Steensby Inlet, Baffin Island

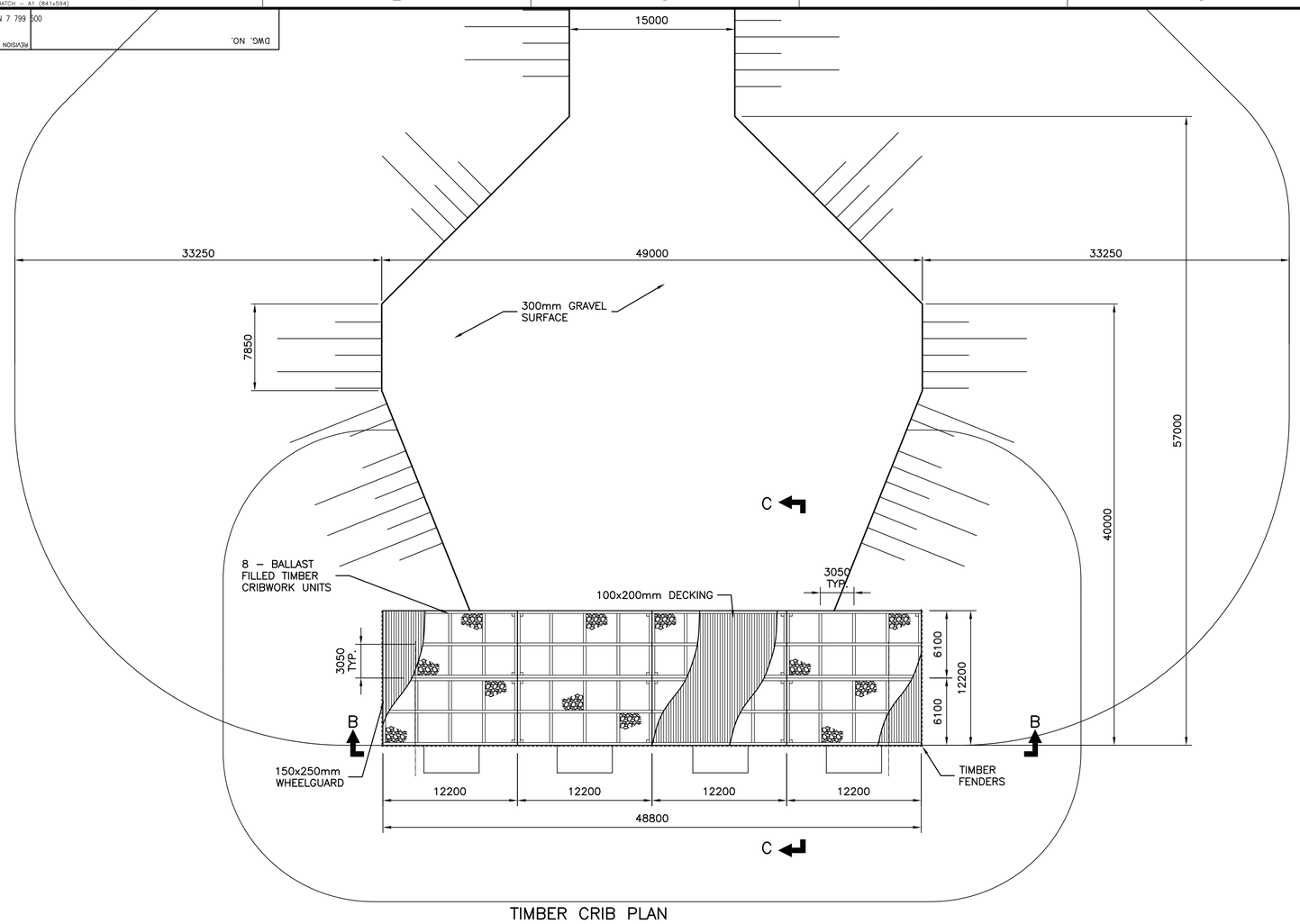
Designed for Crushing and Thermal Ice Loads

Owner: Arcelor Mittal

Consultant: Hatch

Element	Units	Elemental Cost		Elemental Amount	
		Quantity	Unit Rate	Sub-Total	Total
A Site Preparation					
Dredging and leveling of caisson area (assume 5m dredging)	Cu.m.	14600	$ 150.00	$ 2,190,000.00	
Placement of bedding gravel, 1m layer thickness	Cu.m.	830	$ 80.00	$ 66,400.00	
Supply and placement of 450m causeway armour stone	Cu.m.	34470	$ 85.00	$ 2,929,950.00	
Supply and placement of 450m causeway sub armour stone	Cu.m.	17235	$ 85.00	$ 1,464,975.00	
Supply and placement of 450m causeway rock fill	Cu.m.	83970	$ 75.00	$ 6,297,750.00	
Supply and placement of 450m causeway surface road structure gravel	Cu.m.	2025	$ 70.00	$ 141,750.00	
Supply and placement of turning area armour stone	Cu.m.	5425	$ 85.00	$ 461,125.00	
Supply and placement of turning area sub armour stone	Cu.m.	2712	$ 85.00	$ 230,520.00	
Supply and placement of turning area and mattress rock fill	Cu.m.	25493	$ 75.00	$ 1,911,975.00	
Supply and placement of turning area surface gravels	Cu.m.	725	$ 70.00	$ 50,750.00	
					$ 15,745,195.00
B Supply of Concrete Caissons					
Concrete supply	Cu.m.	2400	$ 300.00	$ 720,000.00	
Slipform work and concrete placement	Cu.m.	2400	$ 1,000.00	$ 2,400,000.00	
Supply and installation of reinforcing steel	MT	340	$ 2,000.00	$ 680,000.00	
Supply caisson rock fill, 50-300mm	Cu.m.	12600	$ 75.00	$ 945,000.00	
					$ 4,745,000.00
C Installation of Concrete Caissons					
Concrete caisson placement	Each	2	$ 150,000.00	$ 300,000.00	
Install concrete keys	LS	1	$ 350,000.00	$ 350,000.00	
Placement of caisson rock fill, 50 to 300mm	Cu.m.	12,600	$ 40.00	$ 504,000.00	
					$ 1,154,000.00
D Wharf Fixtures and Accessories					
Supply and install 2.5Dia. x 5.5m pneumatic fenders and chain	Each	4	$ 30,000.00	$ 120,000.00	
Supply and Install steel bollards	Each	2	$ 15,000.00	$ 30,000.00	
Supply and Install ladders	Each	4	$ 5,000.00	$ 20,000.00	
Supply and Install mooring buoys with chain and anchorage (winter storage onshore)	Each	2	$ 125,000.00	$ 250,000.00	
					$ 420,000.00
E General Equipment and Supplies					
Tug and caisson installation equipment (to be confirmed by Hatch)	Month	2	$ 200,000.00	$ 400,000.00	
Concrete caisson transport - low handling for 2 pieces (to be confirmed by Hatch)	MT	6100	$ 175.00	$ 1,067,500.00	
Shipping of equipment and supplies to site (to be confirmed by Hatch)	LS	1	$ 100,000.00	$ 100,000.00	
					$ 1,567,500.00
				NET CONSTRUCTION ESTIMATED COST	**$ 23,631,695.00**
F General Requirements					
Mobilization (to be confirmed by Hatch)	LS	1	$ 600,000.00	$ 600,000.00	
Site room and board (not considered)	Month	2	$ -	$ -	
General Conditions (to be confirmed by Hatch)	Month	2	$ 225,000.00	$ 450,000.00	
					$ 1,050,000.00
				CONSTRUCTION COST ESTIMATE SUB TOTAL (EXCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 24,681,695.00**
G Construction Contingency					
Construction contingency - 25%	%	25%	$ 6,170,423.75	$ 6,170,423.75	
					$ 6,170,423.75
				CONSTRUCTION COST ESTIMATE TOTAL (INCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 30,852,118.75**

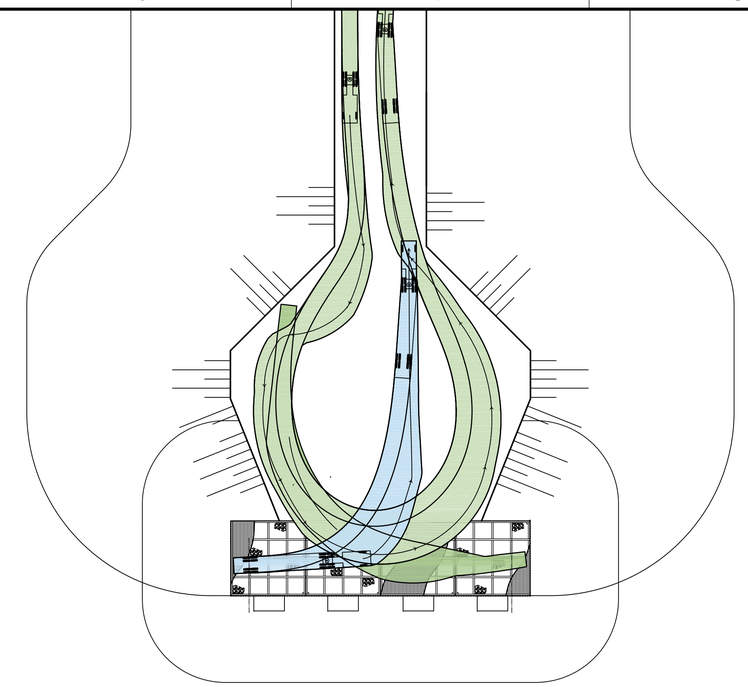
REVISION	DWG. NO.
N 7 799 500	



TIMBER CRIB PLAN

0 5 10 15 20 25 m

Scale: 1:250



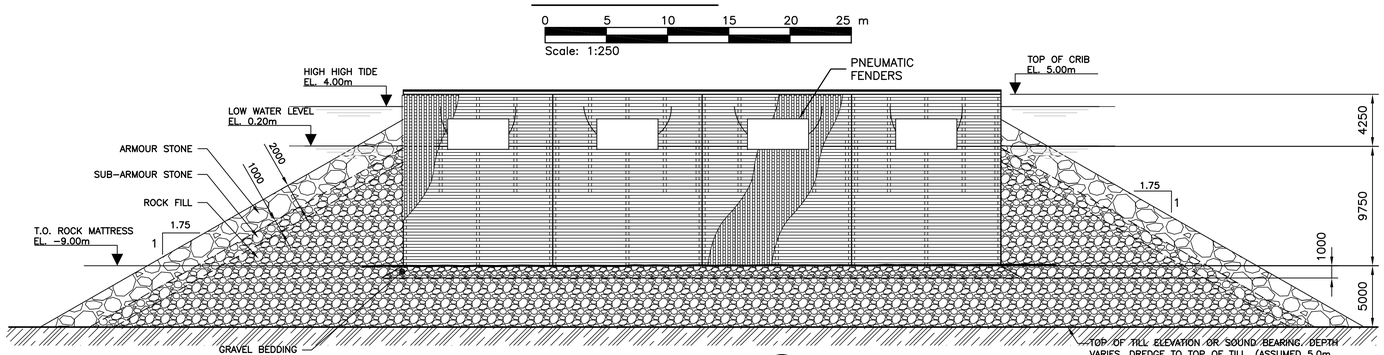
PROPOSED TRUCK TURNING–PLAN

0 10 20 30 40 50 m

Scale: 1:500

NOTES:

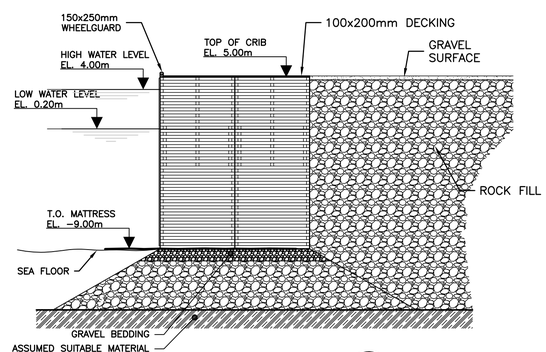
1. SITE ELEVATIONS ARE RELATED TO CHART DATUM REFERENCED TO LLT (LOW LOW TIDE) AT ELEVATION +0.2M.
2. GEODETIC DATUM IN RELATION TO CHART DATUM (LLT) AT THE SITE IS CALCULATED AT EL.(+)2.266 ABOVE LLT.
3. SITE ELEVATION CONTROL RELATIONSHIP.
   –GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
   –MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.
4. STEENSBY INLET TIDES (CHART DATUM)
   –HIGHER HIGH TIDE (HHT) =4.0M
   –HIGH NORMAL TIDE (HNT)=2.7M
   –LOW NORMAL TIDE (LNT)=0.70M
   –LOW LOW TIDE (LLT)=0.2M



TIMBER CRIB ELEVATION B

0 5 10 15 20 25 m

Scale: 1:250



TIMBER CRIB SECTION C

0 5 10 15 20 25 m

Scale: 1:250

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH

Baffinland Iron Mines Corporation

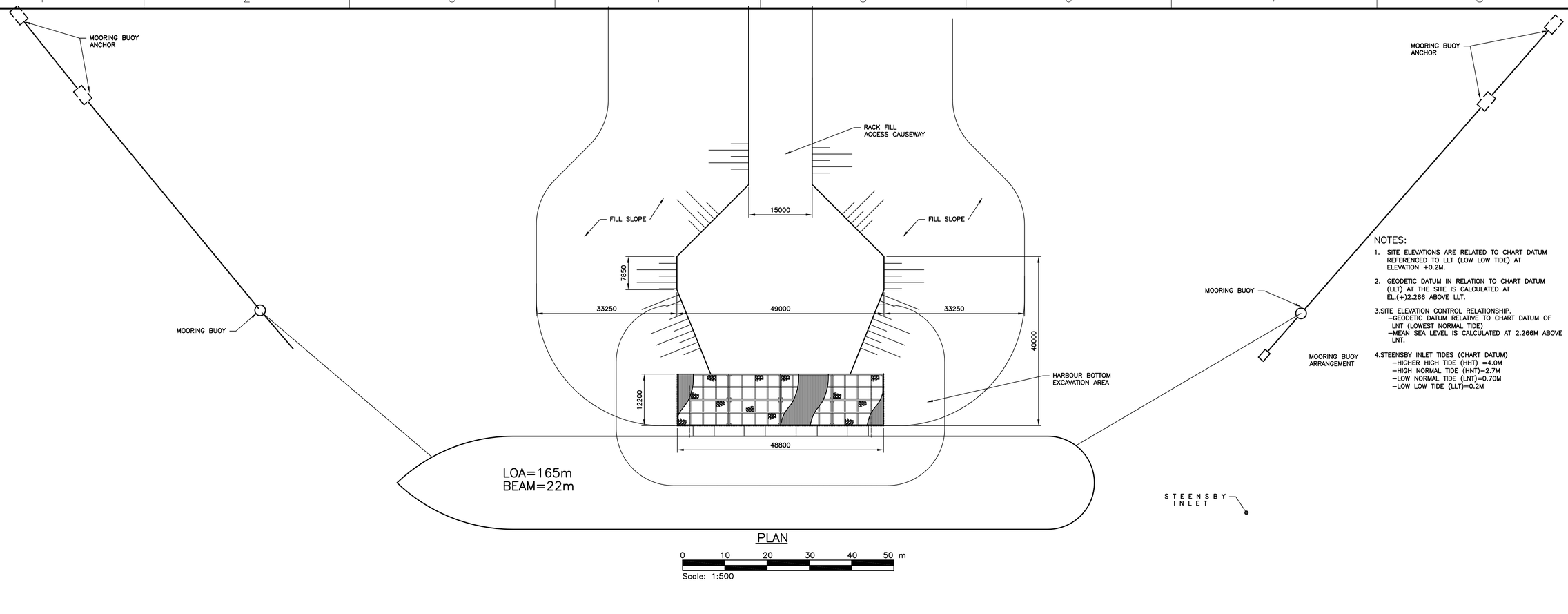
MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK
TIMBER CRIB OPTION
PLAN, SECTIONS AND DETAILS

DESIGNED BY	DRAWN BY
S. ROUTLEDGE	R. GEORGE
DATE 11–05–24	DATE 11–05–25
CHECKED BY	DISCIP. ENGR.
C. HOGAN	
PROJ. DES. COORD.	PROJ. ENGR.
K. SKEBO	
PROJ. MGR.	PROJECT NUMBER
	289980

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697–3020–10–041–0532	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER



PLAN

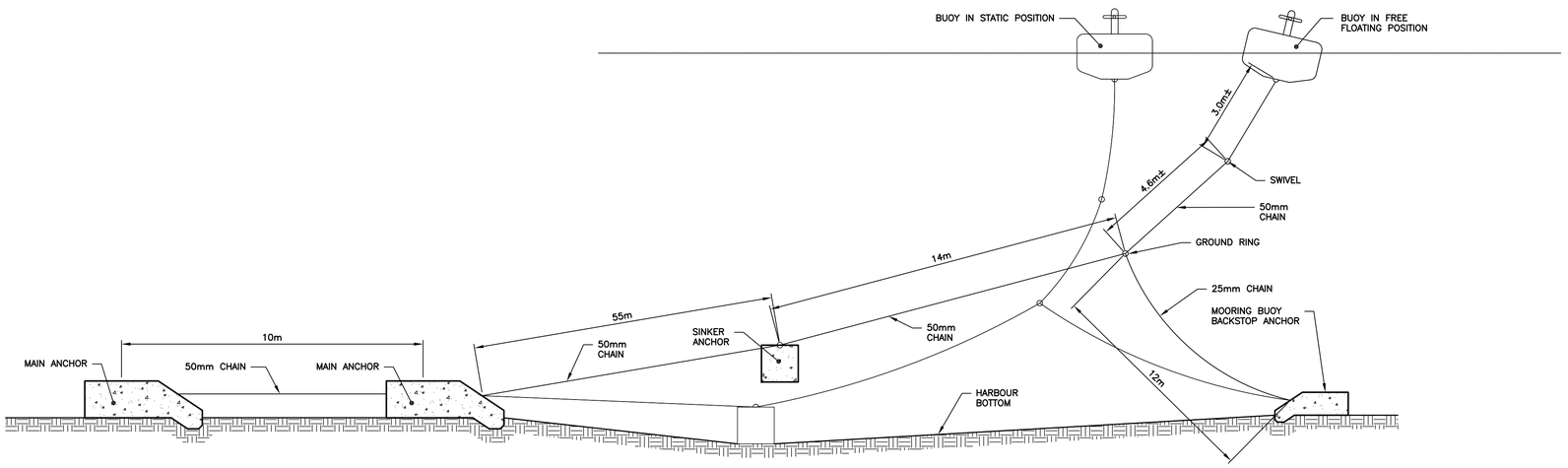
0 10 20 30 40 50 m

Scale: 1:500

MOORING BUOY ARRANGEMENT

NOTES:

1. SITE ELEVATIONS ARE RELATED TO CHART DATUM REFERENCED TO LLT (LOW LOW TIDE) AT ELEVATION +0.2M.
2. GEODETIC DATUM IN RELATION TO CHART DATUM (LLT) AT THE SITE IS CALCULATED AT EL.(+)2.266 ABOVE LLT.
3. SITE ELEVATION CONTROL RELATIONSHIP.
   - GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
   - MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.
4. STEENSBY INLET TIDES (CHART DATUM)
   - HIGHER HIGH TIDE (HHT) =4.0M
   - HIGH NORMAL TIDE (HNT)=2.7M
   - LOW NORMAL TIDE (LNT)=0.70M
   - LOW LOW TIDE (LLT)=0.2M



MOORING BUOY ARRANGEMENT – 2 REQ'D

0 10 20 30 40 50 m

Scale: 1:100

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
	REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
	REVISIONS			

REV.	ISSUE FOR	AUTH. BY	DATE
	ISSUE AUTHORIZATION		

HATCH™

DESIGNED BY: S. ROUTLEDGE, DATE 11-05-24	DRAWN BY: R. GEORGE, DATE 11-05-25
CHECKED BY: C. HOGAN, DATE	DISCIP. ENGR., DATE
PROJ. DES. COORD.: K. SKEBO, DATE	PROJ. ENGR., DATE
PROJ. MGR., DATE	PROJECT NUMBER: 289980

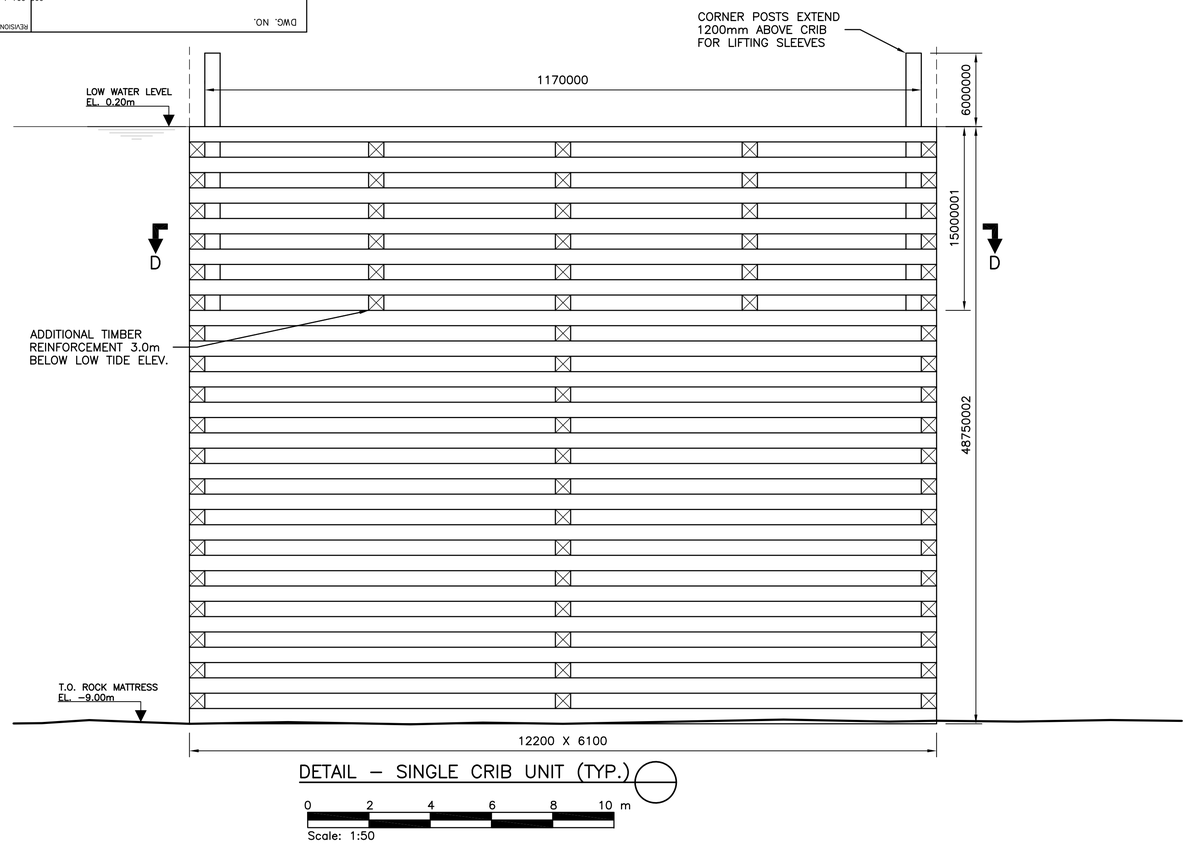
Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK TIMBER CRIB OPTION PLAN, SECTIONS AND DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0531	A

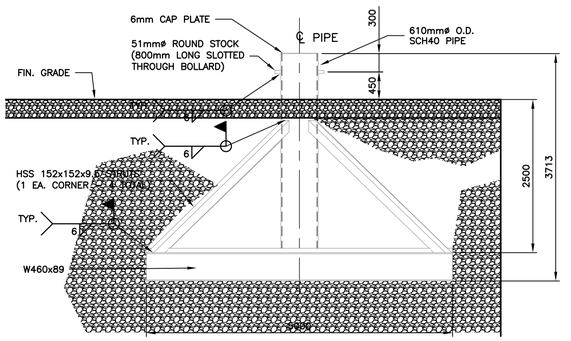
CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER



DETAIL – SINGLE CRIB UNIT (TYP.)

0 2 4 6 8 10 m

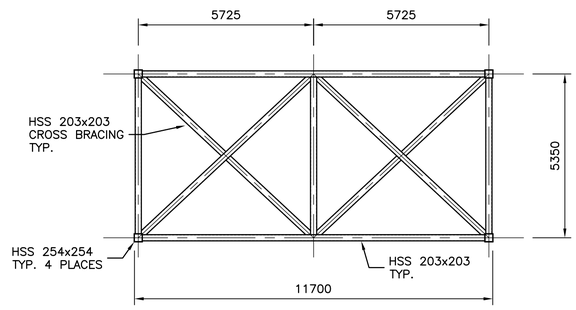
Scale: 1:50



BOLLARD DETAIL

0 1 2 3 4 5 m

Scale: 1:50



PLAN – HOIST FRAME (D)

0 2 4 6 8 10 m

Scale: 1:100

TIMBER NOTES:

1. ALL PRIMARY CRIB TIMBERS TO BE 250x250mm UNTREATED HEMLOCK No.1 GRADE OR BETTER AS PER NLGA GUIDELINES.
2. TIMBER CRIB DESIGNED TO WITHSTAND THERMAL ICE EXPANSION LOADS ONLY (0.2MPa OVER 2.0m ICE THICKNESS).

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND
CONSTRUCTION DOCK
TIMBER CRIB OPTION
DETAILS

DESIGNED BY: S. ROUTLEDGE, DATE 11-05-24	DRAWN BY: R. GEORGE, DATE 11-05-25		
CHECKED BY: C. HOGAN, DATE	DISCIP. ENGR., DATE		
PROJ. DES. COORD.: K. SKEBO, DATE	PROJ. ENGR., DATE		
PROJ. MGR., DATE	PROJECT NUMBER: 289980	SCALE: AS NOTED	DRAWING NO.: H337697-3020-10-041-0533
			REVISION: A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Steensby Inlet Construction Dock Options Analysis Cost Estimate

Project: Mary's River Iron Mine — **Option: Timber Crib**

Location: Steensby Inlet, Baffin Island — **Designed for Thermal ice load only.**

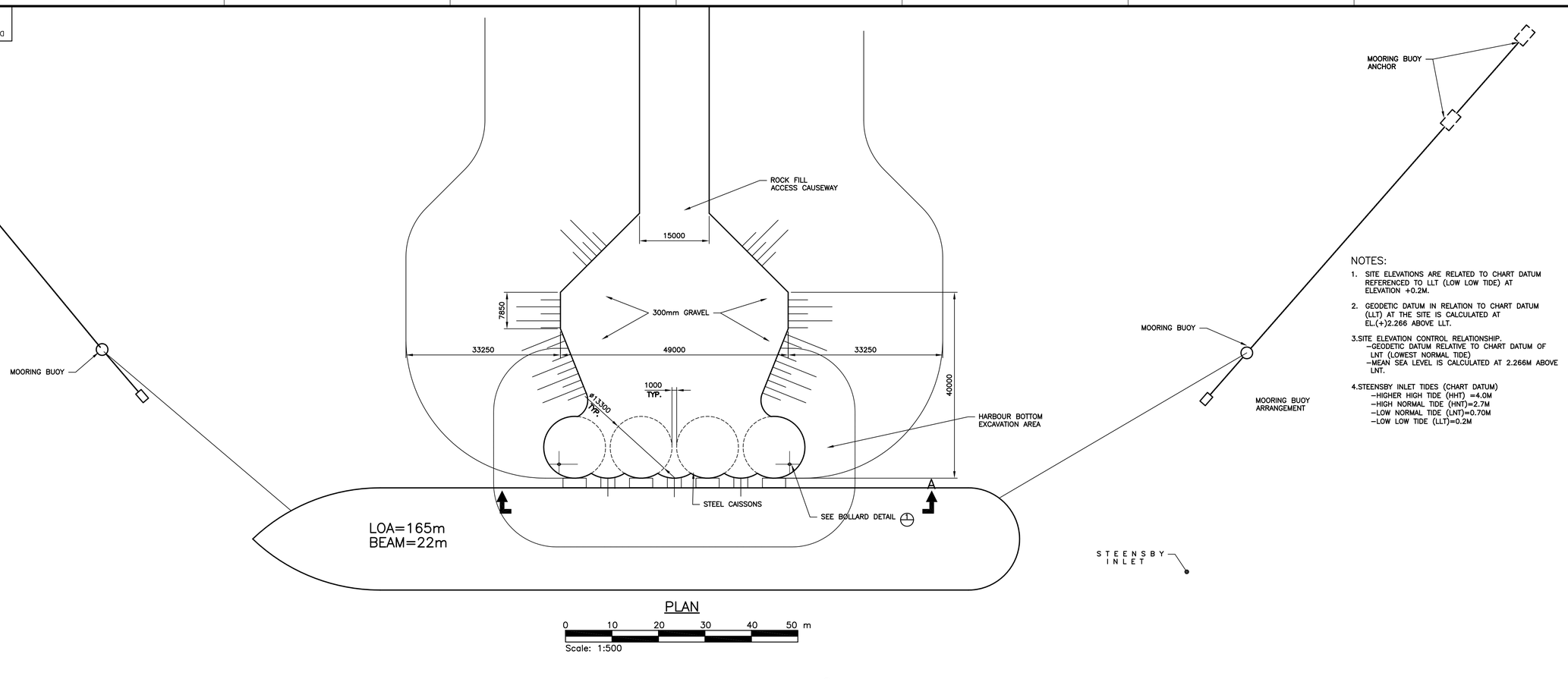
Owner: Arcelor Mittal — **Timber Not Suitable for Crushing Ice Loads.**

Consultant: Hatch

Element	Units	Elemental Cost		Elemental Amount	
		Quantity	Unit Rate	Sub-Total	Total
A Site Preparation					
Dredging and leveling of timber crib area (assume 5m dredging)	Cu.m.	11950	$ 150.00	$ 1,792,500.00	
Placement of bedding gravel, 1m layer thickness	Cu.m.	800	$ 80.00	$ 64,000.00	
Supply and placement of 450m causeway armour stone	Cu.m.	34470	$ 85.00	$ 2,929,950.00	
Supply and placement of 450m causeway sub armour stone	Cu.m.	17235	$ 85.00	$ 1,464,975.00	
Supply and placement of 450m causeway rock fill	Cu.m.	83970	$ 75.00	$ 6,297,750.00	
Supply and placement of 450m causeway surface road structure gravel	Cu.m.	2025	$ 70.00	$ 141,750.00	
Supply and placement of turning area armour stone	Cu.m.	5425	$ 85.00	$ 461,125.00	
Supply and placement of turning area sub armour stone	Cu.m.	2712	$ 85.00	$ 230,520.00	
Supply and placement of turning area and mattress rock fill	Cu.m.	22850	$ 75.00	$ 1,713,750.00	
Supply and placement of turning area surface gravels	Cu.m.	725	$ 70.00	$ 50,750.00	
					$ 15,147,070.00
B Supply of Timber Cribs					
250x250mm Timbers	Cu.m.	800	$ 500.00	$ 400,000.00	
150x250mm Wheel Guard	Cu.m.	3	$ 2,000.00	$ 6,000.00	
100x200mm Fenders	Cu.m.	2	$ 2,000.00	$ 4,000.00	
Supply rock fill ballast, min 300mm	Cu.m.	8000	$ 100.00	$ 800,000.00	
HSS254x254x6.4	lin.m.	3	$ 250.00	$ 750.00	
HSS203x203x6.4	lin.m.	68	$ 200.00	$ 13,600.00	
					$ 1,224,350.00
C Installation of Timber Cribs					
Timber crib placement	Each	8	$ 50,000.00	$ 400,000.00	
Placement of crib work above LLW	Each	8	$ 48,000.00	$ 384,000.00	
Placement of rock fill ballast	Cu.m.	8000	$ 40.00	$ 320,000.00	
					$ 1,104,000.00
D Wharf Fixtures and Outriggers					
Supply and install 2.5Dia. x 5.5m pneumatic fenders and chain	Each	4	$ 30,000.00	$ 120,000.00	
Supply and Install steel bollards	Each	2	$ 15,000.00	$ 30,000.00	
Supply and Install ladders	Each	4	$ 5,000.00	$ 20,000.00	
Supply and Install mooring buoys with chain and anchorage (winter storage onshore)	Each	2	$ 125,000.00	$ 250,000.00	
					$ 420,000.00
E General Equipment and Supplies					
Barge mounted crane rental with tug and scow (to be confirmed by Hatch)	Month	2	$ 400,000.00	$ 800,000.00	
Shipping of timber and steel - high handling cost (to be confirmed by Hatch)	MT	550	$ 500.00	$ 275,000.00	
Shipping of equipment and supplies to site (to be confirmed by Hatch)	LS	1	$ 100,000.00	$ 100,000.00	
					$ 1,175,000.00
NET CONSTRUCTION ESTIMATED COST					**$ 19,070,420.00**
F General Requirements					
Mobilization (to be confirmed by Hatch)	Each	1	$ 600,000.00	$ 600,000.00	
Site room and board (not considered)	Month	2	$ -	$ -	
General Conditions (to be confirmed by Hatch)	Month	2	$ 225,000.00	$ 450,000.00	
					$ 1,050,000.00
CONSTRUCTION COST ESTIMATE SUB TOTAL (EXCLUDING CONTINGENCIES; EXCLUDING RISK)					**$ 20,120,420.00**
G Construction Contingency					
Construction contingency - 25%	%	25%	$ 5,030,105.00	$ 5,030,105.00	
					$ 5,030,105.00
CONSTRUCTION COST ESTIMATE TOTAL (INCLUDING CONTINGENCIES; EXCLUDING RISK)					**$ 25,150,525.00**

HATCH – A1 (841x594)

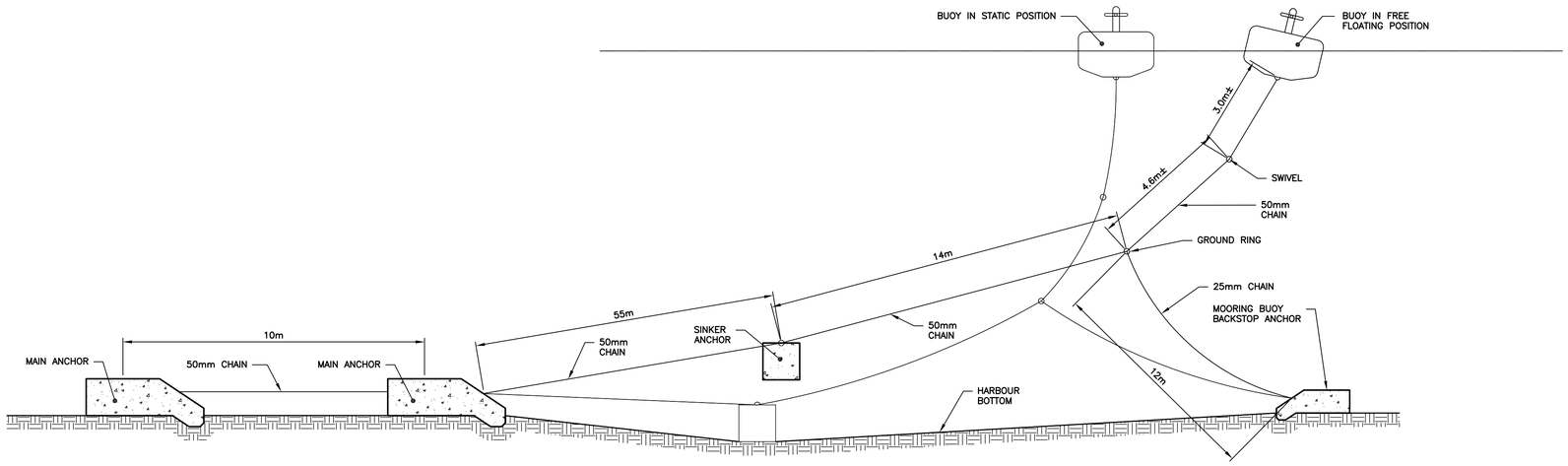
REVISION	DWG. NO.
N 7 799 300	



PLAN

0 10 20 30 40 50 m

Scale: 1:500



MOORING BUOY ARRANGEMENT – 2 REQ'D

0 10 20 30 40 50 m

Scale: 1:100

NOTES:

1. SITE ELEVATIONS ARE RELATED TO CHART DATUM REFERENCED TO LLT (LOW LOW TIDE) AT ELEVATION +0.2M.
2. GEODETIC DATUM IN RELATION TO CHART DATUM (LLT) AT THE SITE IS CALCULATED AT EL.(+)2.266 ABOVE LLT.
3. SITE ELEVATION CONTROL RELATIONSHIP.
   - –GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
   - –MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.
4. STEENSBY INLET TIDES (CHART DATUM)
   - –HIGHER HIGH TIDE (HHT) =4.0M
   - –HIGH NORMAL TIDE (HNT)=2.7M
   - –LOW NORMAL TIDE (LNT)=0.70M
   - –LOW LOW TIDE (LLT)=0.2M

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY C.R. DYCK	DRAWN BY E. GAWLIK
DATE	DATE
CHECKED BY L. FLOWERS	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD. K. SKEBO	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER 289980
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

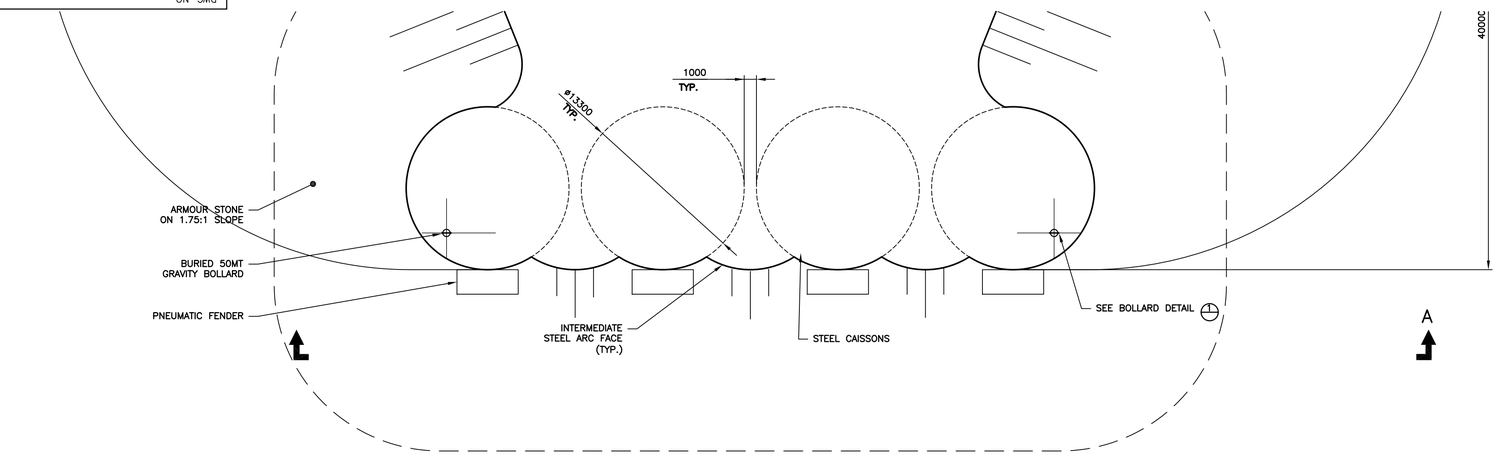
STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK –WELDED STEEL PLATE CAISSON OPTION PLAN, SECTIONS AND DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697–3020–10–041–0541	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Jun 16, 2011 - 3:45pm Login name: cook3274 Layout: SK01
Drawing Name: P:\289980 Mary River H337697\Drawings\Construction Dock\STEEL CAN OPTION\H337697-3020-10-041-0541-0542.dwg

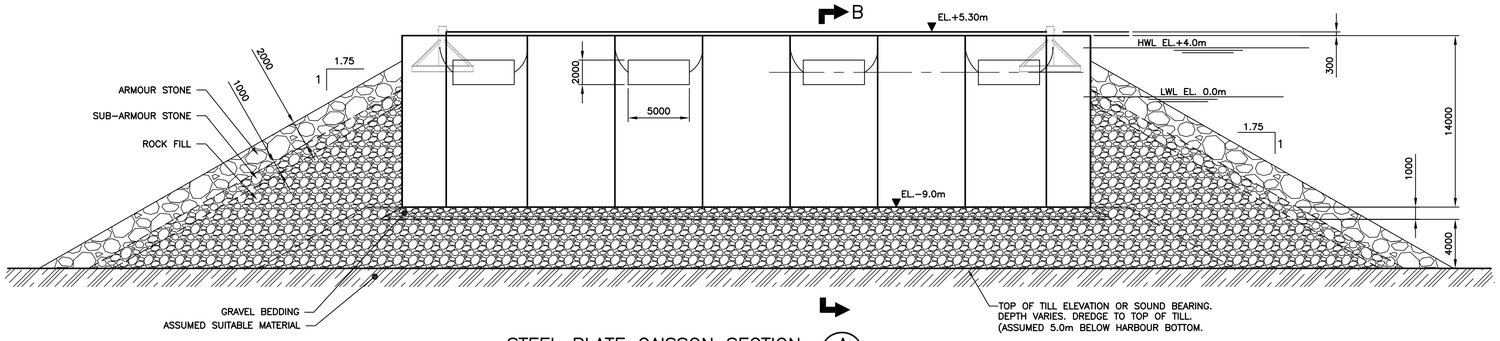
REVISION	DWG. NO.
N 7 799 300	



STEEL PLATE CAISSON PLAN

0 10 20 30 40 50 m

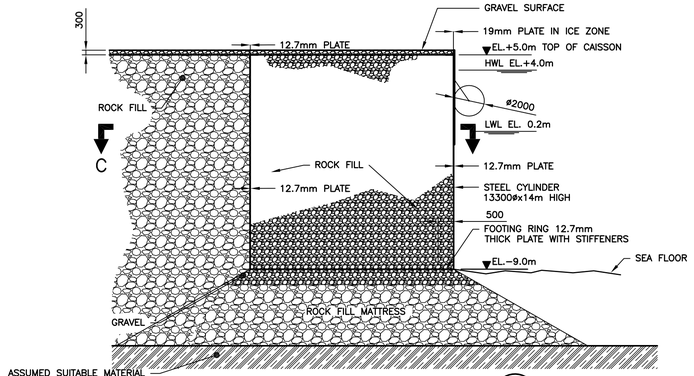
Scale: 1:500



STEEL PLATE CAISSON SECTION A

0 5 10 15 20 25 m

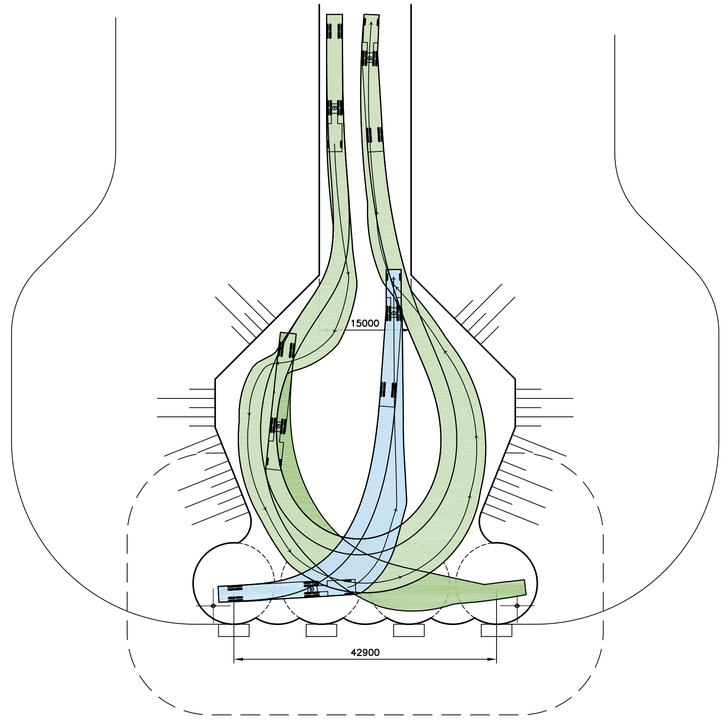
Scale: 1:250



STEEL PLATE CAISSON SECTION B

0 4 8 12 16 20 m

Scale: 1:200



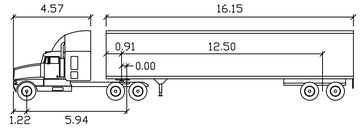
PROPOSED TRUCK TURNING – PLAN

0 10 20 30 40 50 m

Scale: 1:500

LOADING
ICE LOADING = 3.5 MN/m
SURCHARGE = 50 kPa

TRUCK



WB-62FL meters

Tractor Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 2.59	Steering Angle	: 28.4
Tractor Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.59		

TRUCK–DETAIL 2

N.T.S.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY: CR. DYCK	DRAWN BY: E. GAWLIK
CHECKED BY: L. FLOWERS	DISCIP. ENGR.
PROJ. DES. COORD.: K. SKEBO	PROJ. ENGR.
PROJ. MGR.	PROJECT NUMBER: 289980

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK – WELDED STEEL PLATE CAISSON OPTION DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0542	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Steensby Inlet Construction Dock Options Analysis Cost Estimate

Project: Mary's River Iron Mine — **Option: Welded Steel Caisson**

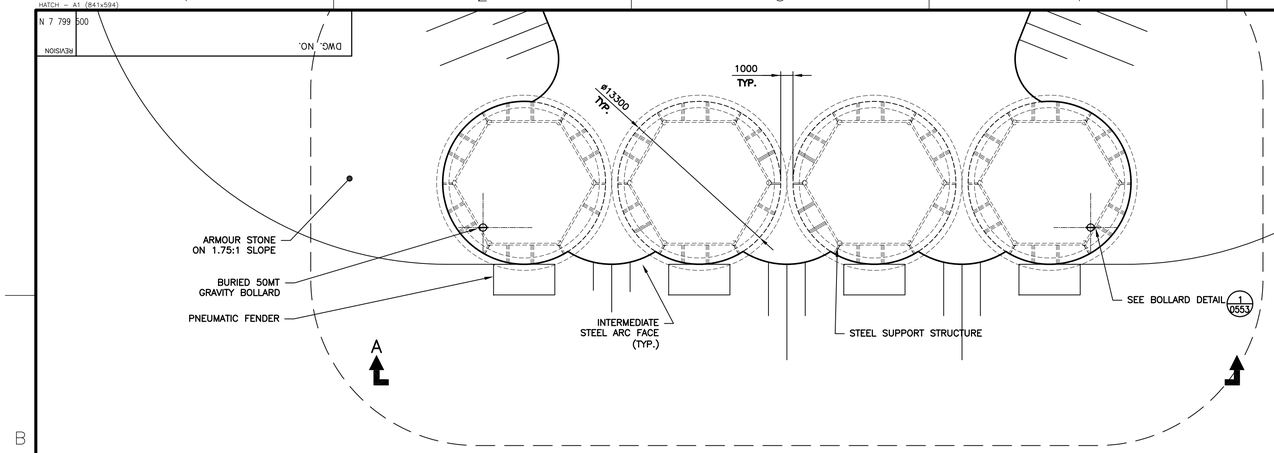
Location: Steensby Inlet, Baffin Island

Designed for Crushing and Thermal Ice Loads

Owner: Arcelor Mittal

Consultant: Hatch

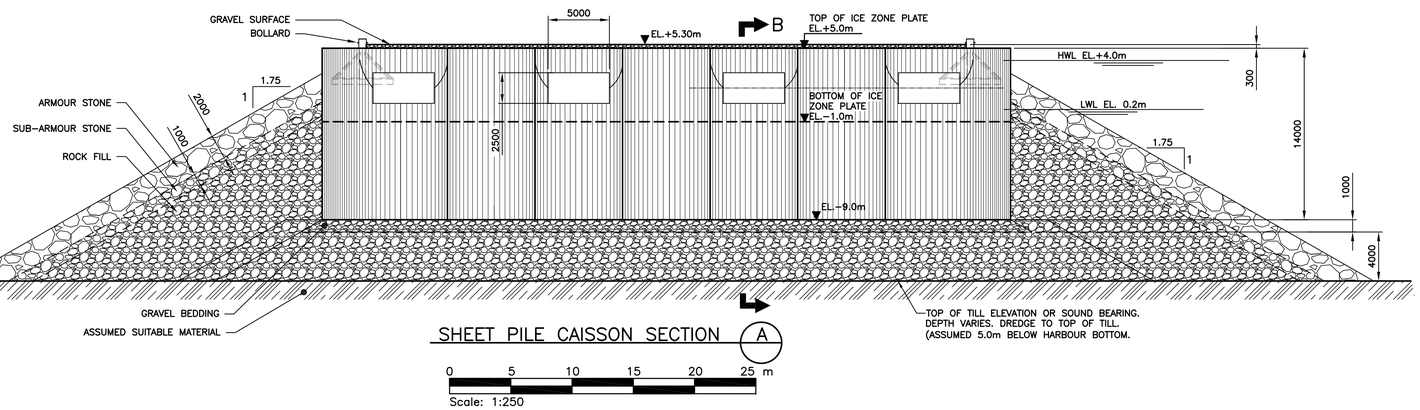
Element	Units	Elemental Cost: Quantity	Elemental Cost: Unit Rate	Elemental Amount: Sub-Total	Elemental Amount: Total
A Site Preparation					
Dredging and leveling of caisson area (assume 5m dredging)	Cu.m.	14600	$ 150.00	$ 2,190,000.00	
Placement of bedding gravel, 1m layer thickness	Cu.m.	830	$ 80.00	$ 66,400.00	
Supply and placement of 450m causeway armour stone	Cu.m.	34470	$ 85.00	$ 2,929,950.00	
Supply and placement of 450m causeway sub armour stone	Cu.m.	17235	$ 85.00	$ 1,464,975.00	
Supply and placement of 450m causeway rock fill	Cu.m.	83970	$ 75.00	$ 6,297,750.00	
Supply and placement of 450m causeway surface road structure gravel	Cu.m.	2025	$ 70.00	$ 141,750.00	
Supply and placement of turning area armour stone	Cu.m.	5425	$ 85.00	$ 461,125.00	
Supply and placement of turning area sub armour stone	Cu.m.	2712	$ 85.00	$ 230,520.00	
Supply and placement of turning area and mattress rock fill	Cu.m.	25493	$ 75.00	$ 1,911,975.00	
Supply and placement of turning area surface gravels	Cu.m.	725	$ 70.00	$ 50,750.00	
					$ 15,745,195.00
B Supply of Welded Steel Caissons					
Steel plate for caissons (4 caissons x 66.6MT + 3 intermediate arcs x 18.2MT)	MT	321	$ 2,000.00	$ 642,000.00	
Caisson and int. arc fabrication	MT	321	$ 2,750.00	$ 882,750.00	
Supply caisson rock fill, 50-300mm	Cu.m.	8550	$ 75.00	$ 641,250.00	
					$ 2,166,000.00
C Installation of Welded Steel Caissons					
Steel caisson lifting and placement	Each	4	$ 75,000.00	$ 300,000.00	
Intermediate connecting arc lifting and placement	Each	3	$ 20,000.00	$ 60,000.00	
Placement of caisson rock fill	Cu.m.	8550	$ 40.00	$ 342,000.00	
					$ 702,000.00
D Wharf Fixtures and Outriggers					
Supply and install 2.5Dia. x 5.5m pneumatic fenders and chain	Each	4	$ 30,000.00	$ 120,000.00	
Supply and Install steel bollards	Each	2	$ 15,000.00	$ 30,000.00	
Supply and Install ladders	Each	4	$ 5,000.00	$ 20,000.00	
Supply and Install mooring buoys with chain and anchorage (winter storage onshore)	Each	2	$ 125,000.00	$ 250,000.00	
					$ 420,000.00
E General Equipment and Supplies					
Barge mounted crane rental with tug and scow (to be confirmed by Hatch)	Month	2	$ 400,000.00	$ 800,000.00	
Shipping of steel caissons - low handling for 7 pieces (to be confirmed by Hatch)	MT	321	$ 400.00	$ 128,400.00	
Shipping of equipment and supplies to site (to be confirmed by Hatch)	LS	1	$ 100,000.00	$ 100,000.00	
					$ 1,028,400.00
				NET CONSTRUCTION ESTIMATED COST	**$ 20,061,595.00**
F General Requirements					
Mobilization (to be confirmed by Hatch)	Each	1	$ 600,000.00	$ 600,000.00	
Site room and board (not considered)	Month	2	$ -	$ -	
General Conditions (to be confirmed by Hatch)	Month	2	$ 225,000.00	$ 450,000.00	
					$ 1,050,000.00
				CONSTRUCTION COST ESTIMATE SUB TOTAL (EXCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 21,111,595.00**
G Construction Contingency					
Construction contingency - 25%	%	25%	$ 5,277,899.00	$ 5,277,899.00	
					$ 5,277,899.00
				CONSTRUCTION COST ESTIMATE TOTAL (INCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 26,389,494.00**



SHEET PILE CAISSON PLAN

0 5 10 15 20 25 m

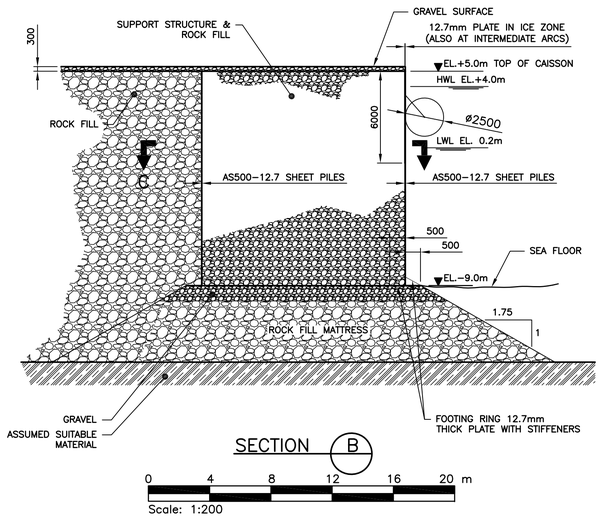
Scale: 1:250



SHEET PILE CAISSON SECTION A

0 5 10 15 20 25 m

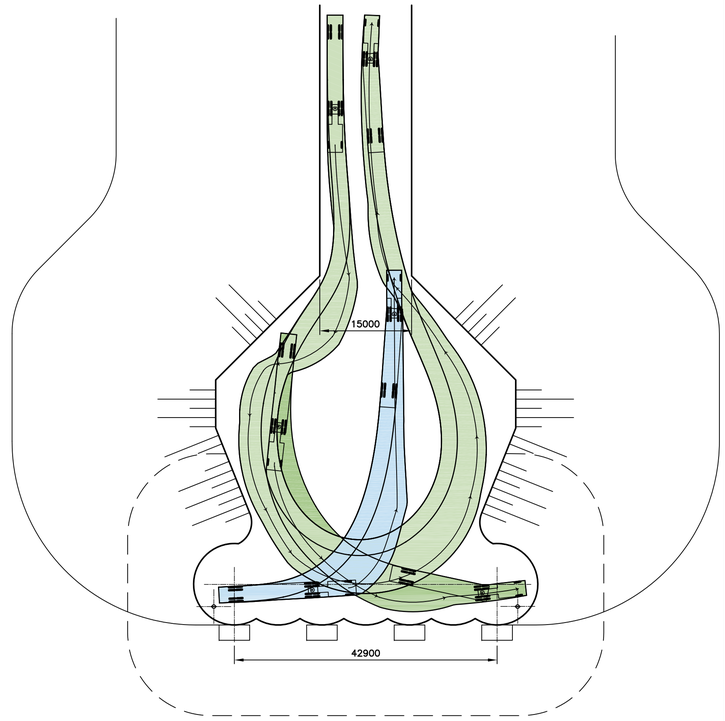
Scale: 1:250



SECTION B

0 4 8 12 16 20 m

Scale: 1:200

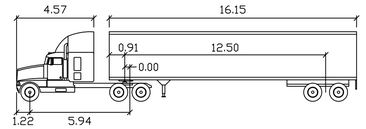


PROPOSED TRUCK TURNING PLAN

0 10 20 30 40 50 m

Scale: 1:500

TRUCK



WB-62FL meters

Tractor Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 2.59	Steering Angle	: 28.4
Tractor Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.59		

LOADING
ICE LOADING = 3.5 MN/m
SURCHARGE = 50 kPa
SUPPORT STRUCTURE PLATFORM = 4.8 kPa
NOTE:
LIFT FROM 6 POINTS AT TOP OF PIPE COLUMNS
LATERAL SUPPORT (TEMPORARY) REQUIRED FOR LIFT.

TRUCK-DETAIL 2

N.T.S.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

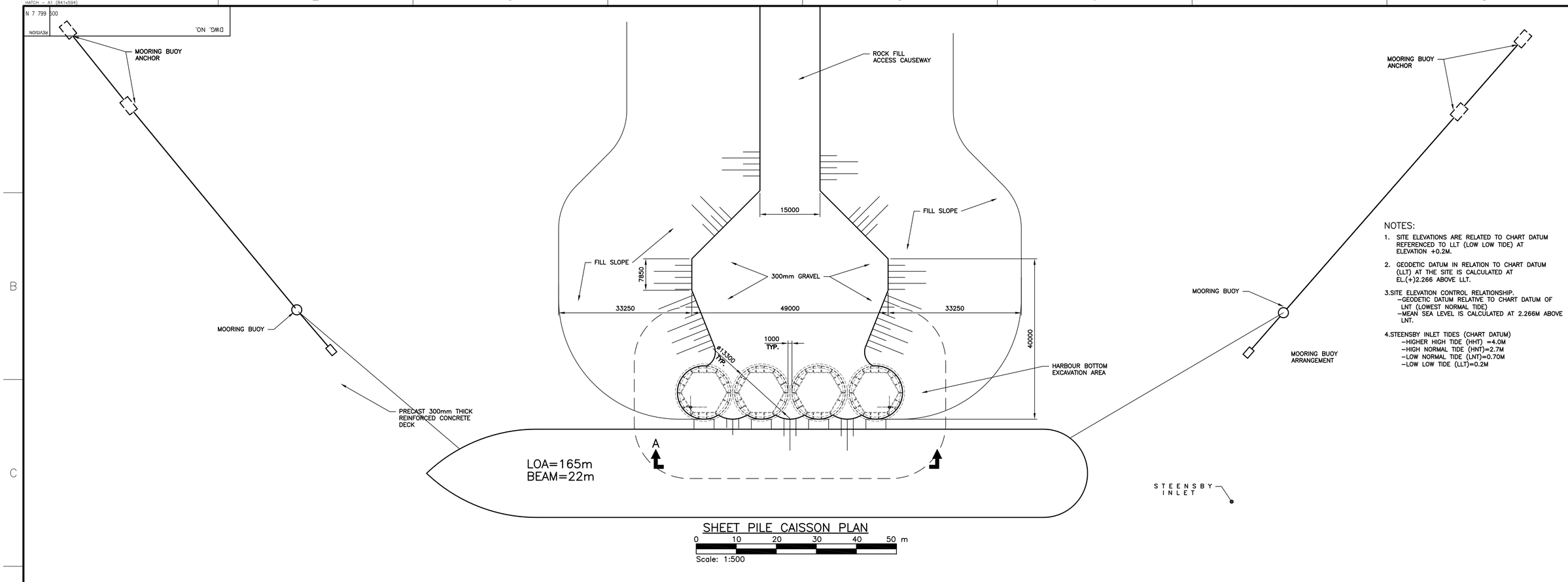
DESIGNED BY: CR. DYCK	DRAWN BY: E. GAWLIK
CHECKED BY: L. FLOWERS	DISCIP. ENGR.
PROJ. DES. COORD.: K. SKEBO	PROJ. ENGR.
PROJ. MGR.	PROJECT NUMBER: 289980

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK STEEL PILE CAISSON OPTION DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0552	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

REVISION	DWG. NO.
N 7 799 300	



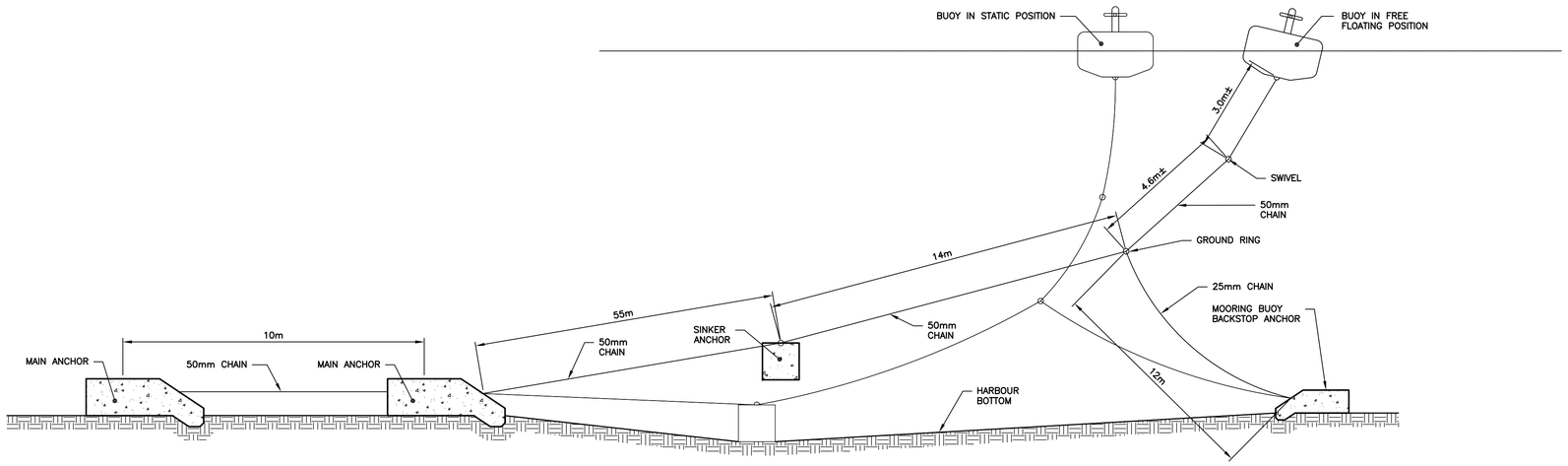
SHEET PILE CAISSON PLAN

0 10 20 30 40 50 m

Scale: 1:500

NOTES:

1. SITE ELEVATIONS ARE RELATED TO CHART DATUM REFERENCED TO LLT (LOW LOW TIDE) AT ELEVATION +0.2M.
2. GEODETIC DATUM IN RELATION TO CHART DATUM (LLT) AT THE SITE IS CALCULATED AT EL.(+)2.266 ABOVE LLT.
3. SITE ELEVATION CONTROL RELATIONSHIP.
   - GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
   - MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.
4. STEENSBY INLET TIDES (CHART DATUM)
   - HIGHER HIGH TIDE (HHT) =4.0M
   - HIGH NORMAL TIDE (HNT)=2.7M
   - LOW NORMAL TIDE (LNT)=0.70M
   - LOW LOW TIDE (LLT)=0.2M



MOORING BUOY ARRANGEMENT – 2 REQ'D

0 10 20 30 40 50 m

Scale: 1:100

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK
SHEET PILE CAISSON OPTION
PLAN, SECTIONS AND DETAILS

DESIGNED BY	DRAWN BY
C.R. DYCK	E. GAWLIK
DATE	DATE
CHECKED BY	DISCIP. ENGR.
L. FLOWERS	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
K. SKEBO	
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	289980

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0551	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Jun 10, 2011 - 11:20am Login name: gaw43278 Layout: A1
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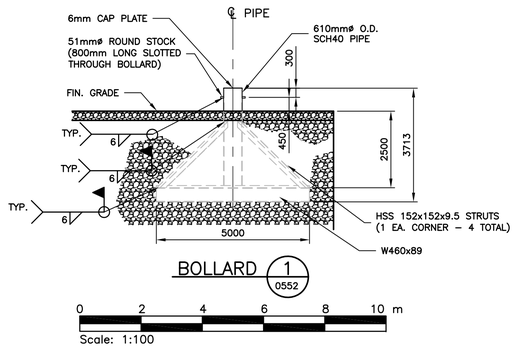
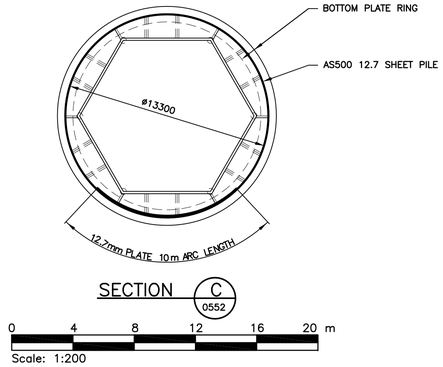


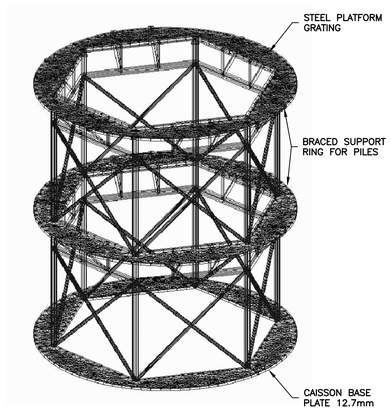
BOLLARD 1 / 0552

Scale: 1:100

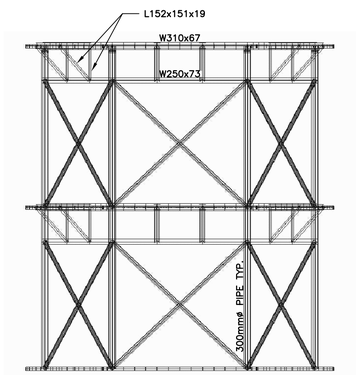


SECTION C / 0552

Scale: 1:200



SUPPORT STRUCTURE
ISOMETRIC VIEW
N.T.S.



SUPORT STRUCTURE
SIDE VIEW
N.T.S.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

DESIGNED BY: CR. DYCK	DRAWN BY: E. GAWLIK
CHECKED BY: L. FLOWERS	DISCIP. ENGR.
PROJ. DES. COORD.: K. SKEBO	PROJ. ENGR.
PROJ. MGR.	PROJECT NUMBER: 289980

STEENSBY ISLAND AND MAINLAND
CONSTRUCTION DOCK
STEEL PILE CAISSON OPTION
DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0553	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Jun 10, 2011 11:46am Login name: gaw43278 Layout: 0553
Drawing Name: P:\289980 Mary River H337697\Drawings\Steel Caisson Option\H337697-3020-10-041-0551-0552.dwg

Steensby Inlet Construction Dock Options Analysis Cost Estimate

Project: Mary's River Iron Mine — **Option: Welded Steel Caisson**

Location: Steensby Inlet, Baffin Island

Designed for Crushing and Thermal Ice Loads

Owner: Arcelor Mittal

Consultant: Hatch

Element	Units	Elemental Cost: Quantity	Elemental Cost: Unit Rate	Elemental Amount: Sub-Total	Elemental Amount: Total
A Site Preparation					
Dredging and leveling of caisson area (assume 5m dredging)	Cu.m.	14600	$ 150.00	$ 2,190,000.00	
Placement of bedding gravel, 1m layer thickness	Cu.m.	830	$ 80.00	$ 66,400.00	
Supply and placement of 450m causeway armour stone	Cu.m.	34470	$ 85.00	$ 2,929,950.00	
Supply and placement of 450m causeway sub armour stone	Cu.m.	17235	$ 85.00	$ 1,464,975.00	
Supply and placement of 450m causeway rock fill	Cu.m.	83970	$ 75.00	$ 6,297,750.00	
Supply and placement of 450m causeway surface road structure gravel	Cu.m.	2025	$ 70.00	$ 141,750.00	
Supply and placement of turning area armour stone	Cu.m.	5425	$ 85.00	$ 461,125.00	
Supply and placement of turning area sub armour stone	Cu.m.	2712	$ 85.00	$ 230,520.00	
Supply and placement of turning area and mattress rock fill	Cu.m.	25493	$ 75.00	$ 1,911,975.00	
Supply and placement of turning area surface gravels	Cu.m.	725	$ 70.00	$ 50,750.00	
					$ 15,745,195.00
B Supply of Welded Steel Caissons					
Steel plate for caissons (4 caissons x 66.6MT + 3 intermediate arcs x 18.2MT)	MT	321	$ 2,000.00	$ 642,000.00	
Caisson and int. arc fabrication	MT	321	$ 2,750.00	$ 882,750.00	
Supply caisson rock fill, 50-300mm	Cu.m.	8550	$ 75.00	$ 641,250.00	
					$ 2,166,000.00
C Installation of Welded Steel Caissons					
Steel caisson lifting and placement	Each	4	$ 75,000.00	$ 300,000.00	
Intermediate connecting arc lifting and placement	Each	3	$ 20,000.00	$ 60,000.00	
Placement of caisson rock fill	Cu.m.	8550	$ 40.00	$ 342,000.00	
					$ 702,000.00
D Wharf Fixtures and Outriggers					
Supply and install 2.5Dia. x 5.5m pneumatic fenders and chain	Each	4	$ 30,000.00	$ 120,000.00	
Supply and Install steel bollards	Each	2	$ 15,000.00	$ 30,000.00	
Supply and Install ladders	Each	4	$ 5,000.00	$ 20,000.00	
Supply and Install mooring buoys with chain and anchorage (winter storage onshore)	Each	2	$ 125,000.00	$ 250,000.00	
					$ 420,000.00
E General Equipment and Supplies					
Barge mounted crane rental with tug and scow (to be confirmed by Hatch)	Month	2	$ 400,000.00	$ 800,000.00	
Shipping of steel caissons - low handling for 7 pieces (to be confirmed by Hatch)	MT	321	$ 400.00	$ 128,400.00	
Shipping of equipment and supplies to site (to be confirmed by Hatch)	LS	1	$ 100,000.00	$ 100,000.00	
					$ 1,028,400.00
				NET CONSTRUCTION ESTIMATED COST	**$ 20,061,595.00**
F General Requirements					
Mobilization (to be confirmed by Hatch)	Each	1	$ 600,000.00	$ 600,000.00	
Site room and board (not considered)	Month	2	$ -	$ -	
General Conditions (to be confirmed by Hatch)	Month	2	$ 225,000.00	$ 450,000.00	
					$ 1,050,000.00
				CONSTRUCTION COST ESTIMATE SUB TOTAL (EXCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 21,111,595.00**
G Construction Contingency					
Construction contingency - 25%	%	25%	$ 5,277,899.00	$ 5,277,899.00	
					$ 5,277,899.00
				CONSTRUCTION COST ESTIMATE TOTAL (INCLUDING CONTINGENCIES; EXCLUDING RISK)	**$ 26,389,494.00**

Appendix E

HATCH – 11x17

REVISION A

DWG. NO. EXHIBIT 6

E 592,000 | E 592,500 | E 593,000 | E 593,500 | E 594,000 | E 594,500 | E 595,000 | E 595,500 | E 596,000

N 7,800,000 | N 7,799,500 | N 7,799,000 | N 7,798,500 | N 7,798,000

BRIDGE

LIGHTERING BEACH

PROPOSED DREDGE DOCK

HIGH POINT
-9.0 CHART DATUM
TO BE CONFIRMED
E 595,373 N 7,799,265

PROPOSED CONSTRUCTION DOCK MAINLAND LOCATION

PROPOSED CAUSEWAY

PROPOSED ORE DOCK LOCATION OPTION 1

PROPOSED ORE DOCK LOCATION OPTION 2

PROPOSED CONSTRUCTION DOCK ISLAND LOCATION

FREIGHT/TUG DOCK

STEENSBY INLET

-10m CHART DATUM

-20m CHART DATUM

-20m CHART DATUM

N

0 100 200 300 400 500

1:12,000

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH

Baffinland Iron Mines Corporation

MARY RIVER PROJECT

DESIGNED BY / DATE	DRAWN BY / DATE
CHECKED BY / DATE	DISCIP. ENGR. / DATE
PROJ. DES. COORD. / DATE	PROJ. ENGR. / DATE
PROJ. MGR. / DATE	PROJECT NUMBER

PROPOSED CONSTRUCTION DOCK LOCATIONS

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3020-10-041-0501	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

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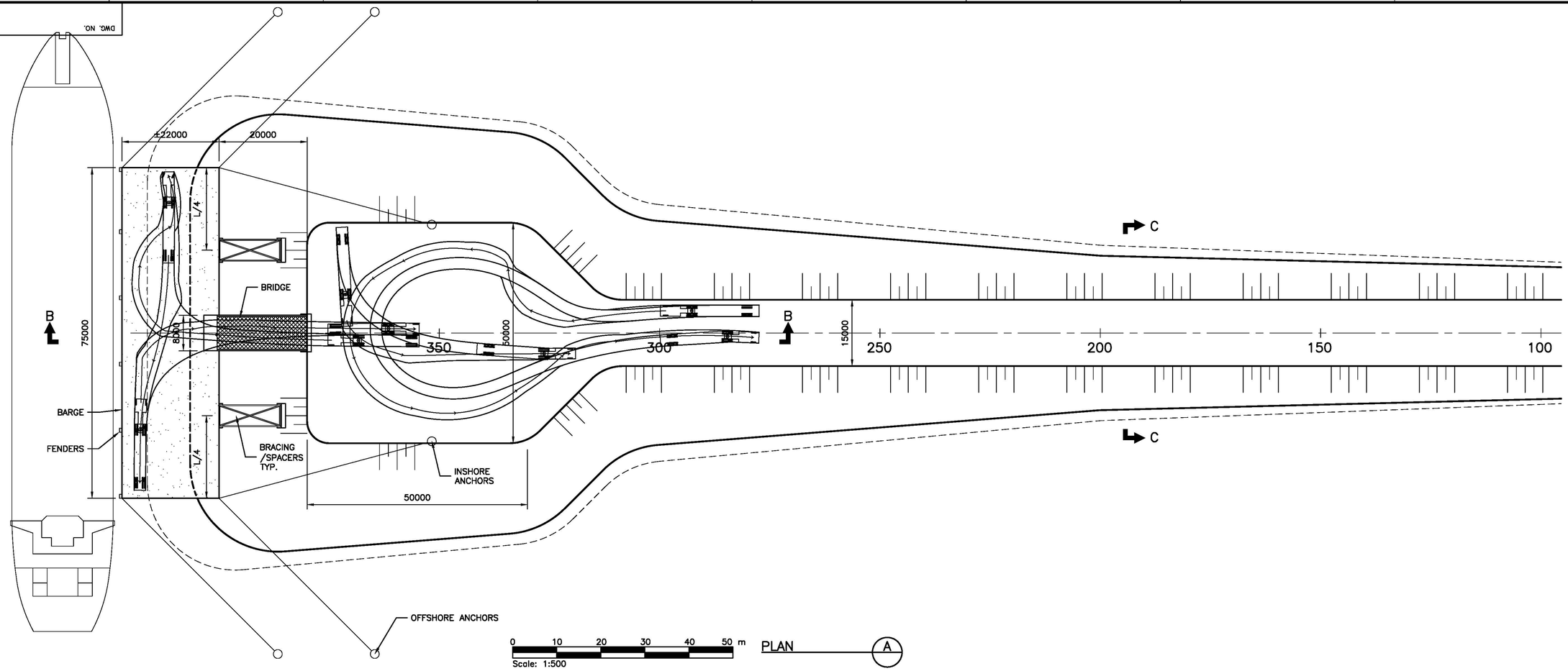
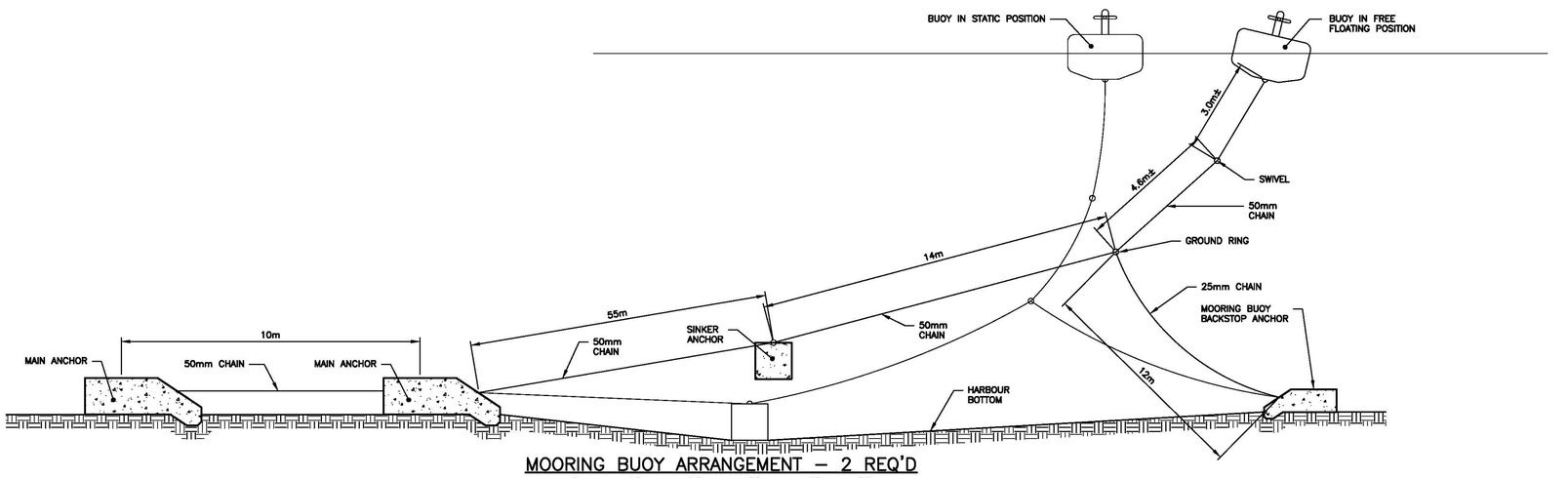
Drawing Name: P:\289980 Mary River H337697\Drawings\Concept Drawings\Construction Dock 6.dwg



0 10 20 30 40 50 m
Scale: 1:500

PLAN A



MOORING BUOY ARRANGEMENT – 2 REQ'D
0 10 20 30 40 50 m
Scale: 1:100

NOTES:
1.SITE ELEVATION CONTROL RELATIONSHIP.
–GEODETIC DATUM RELATIVE TO CHART DATUM OF LNT (LOWEST NORMAL TIDE)
–MEAN SEA LEVEL IS CALCULATED AT 2.266M ABOVE LNT.

2.STEENSBY INLET TIDES (CHART DATUM)
–HIGHER HIGH TIDE (HHT) =4.8M
–HIGH NORMAL TIDE (HNT)=2.7M
–LOW NORMAL TIDE (LNT)=0.70M
–LOW LOW TIDE (LLT)=0.2M

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY		DATE
A	FOR REVIEW	SR	CH	11-05-27
ISSUE AUTHORIZATION				

HATCH

DESIGNED BY: S. ROUTLEDGE, DATE: 11-05-24	DRAWN BY: R. GEORGE, DATE: 11-05-25
CHECKED BY: C. HOGAN, DATE:	DISCIP. ENGR., DATE:
PROJ. DES. COORD.: K. SKEBO, DATE:	PROJ. ENGR., DATE:
PROJ. MGR., DATE:	PROJECT NUMBER: 289980

Baffinland Iron Mines Corporation

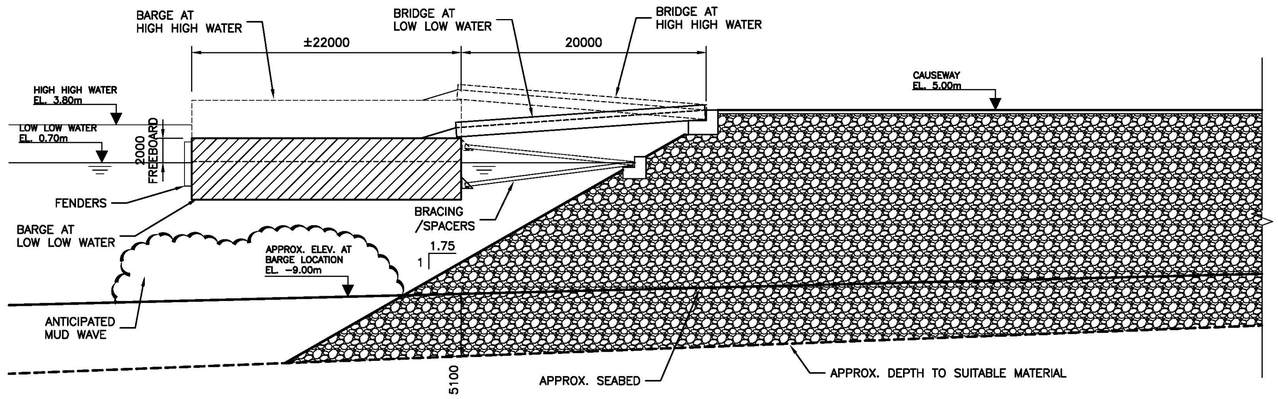
MARY RIVER IRON ORE PROJECT

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK BARGE/BRIDGE OPTION PLAN AND SECTIONS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0561	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

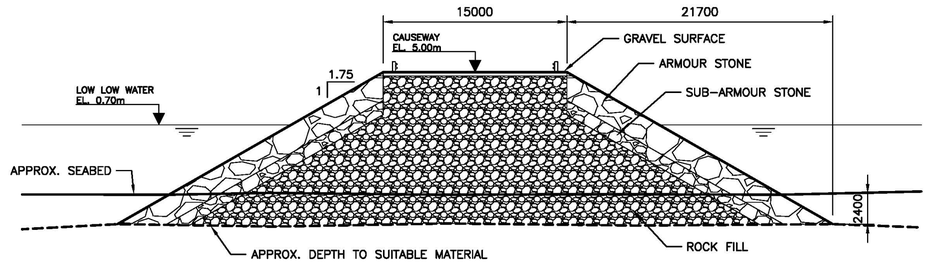
REVISION	DWG. NO.
N 7 799 500	



SECTION B

0 5 10 15 20 25 m

Scale: 1:250



SECTION C

0 5 10 15 20 25 m

Scale: 1:250

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY		DATE
A	FOR REVIEW	SR	CH	11-05-27
ISSUE AUTHORIZATION				

HATCH™

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

DESIGNED BY: S. ROUTLEDGE, DATE: 11-05-24	DRAWN BY: R. GEORGE, DATE: 11-05-25
CHECKED BY: C. HOGAN, DATE:	DISCIP. ENGR., DATE:
PROJ. DES. COORD.: K. SKEBO, DATE:	PROJ. ENGR., DATE:
PROJ. MGR., DATE:	PROJECT NUMBER: 289980

STEENSBY ISLAND AND MAINLAND CONSTRUCTION DOCK BARGE/BRIDGE OPTION DETAILS

SCALE	DRAWING NO.	REVISION
AS NOTED	H337697-3020-10-041-0562	A

CIVIL | ELECTRICAL | MECHANICAL | GEOTECHNICAL | HYDROTECHNICAL | ARCHITECTURAL | OTHER

Appendix F

Steensby Inlet Construction Dock Options Analysis Cost Estimate

Project: Mary's River Iron Mine **Option: Floating Barge**
Location: Steensby Inlet, Baffin Island **Barge and bridge to be taken out of service during iced months**
Owner: Arcelor Mittal
Consultant: Hatch

Element	Units	Elemental Cost Quantity	Elemental Cost Unit Rate	Elemental Amount Sub-Total	Elemental Amount Total
A Site Preparation					
Dredging of mud wave (assume 60m x 10m x 3m)	Cu.m.	1800	$ 150.00	$ 270,000.00	
Supply and placement of 450m causeway armour stone	Cu.m.	34470	$ 85.00	$ 2,929,950.00	
Supply and placement of 450m causeway sub armour stone	Cu.m.	17235	$ 85.00	$ 1,464,975.00	
Supply and placement of 450m causeway rock fill	Cu.m.	83970	$ 75.00	$ 6,297,750.00	
Supply and placement of 450m causeway surface road structure gravel	Cu.m.	2025	$ 70.00	$ 141,750.00	
Supply and placement of turning area armour stone	Cu.m.	5425	$ 85.00	$ 461,125.00	
Supply and placement of turning area sub armour stone	Cu.m.	2712	$ 85.00	$ 230,520.00	
Supply and placement of turning area and mattress rock fill	Cu.m.	25493	$ 75.00	$ 1,911,975.00	
Supply and placement of turning area surface gravels	Cu.m.	725	$ 70.00	$ 50,750.00	
					$ 13,758,795.00
B Supply of Floating Barge					
Bridge	Each	1	$ 600,000.00	$ 600,000.00	
Barge	Each	1	$ 2,000,000.00	$ 2,000,000.00	
Concrete abutments	Cu.m.	30	$ 2,500.00	$ 75,000.00	
Braces	Each	2	$ 100,000.00	$ 200,000.00	
Mooring anchors	Each	6	$ 75,000.00	$ 450,000.00	
					$ 3,325,000.00
C Installation of Floating Barge					
Concrete abutment placement	Each	4	$ 6,000.00	$ 24,000.00	
Bridge placement	Each	1	$ 50,000.00	$ 50,000.00	
Brace placement	Each	2	$ 15,000.00	$ 30,000.00	
Barge mooring	Each	6	$ 20,000.00	$ 120,000.00	
					$ 224,000.00
D Wharf Fixtures and Outriggers					
Supply and install 2.5Dia. x 5.5m pneumatic fenders and chain	Each	4	$ 30,000.00	$ 120,000.00	
Supply and Install steel bollards	Each	2	$ 15,000.00	$ 30,000.00	
Supply and Install ladders	Each	4	$ 5,000.00	$ 20,000.00	
Supply and Install mooring buoys with chain and anchorage (winter storage onshore)	Each	2	$ 125,000.00	$ 250,000.00	
					$ 420,000.00
E General Equipment and Supplies					
Tug and installation equipment (to be confirmed by Hatch)	Month	2	$ 400,000.00	$ 800,000.00	
Shipping of barge to site (to be confirmed by Hatch)	LS	1	$ 500,000.00	$ 500,000.00	
Shipping of steel to site - high handling cost (to be confirmed by Hatch)	MT	200	$ 500.00	$ 100,000.00	
Shipping of equipment and supplies to site (to be confirmed by Hatch)	LS	1	$ 100,000.00	$ 100,000.00	
					$ 1,500,000.00
NET CONSTRUCTION ESTIMATED COST					**$ 19,227,795.00**
F General Requirements					
Mobilization (to be confirmed by Hatch)	Each	1	$ 600,000.00	$ 600,000.00	
Site room and board (not considered)	Month	2	$ -	$ -	
General Conditions (to be confirmed by Hatch)	Month	2	$ 225,000.00	$ 450,000.00	
					$ 1,050,000.00
CONSTRUCTION COST ESTIMATE SUB TOTAL (EXCLUDING CONTINGENCIES; EXCLUDING RISK)					**$ 20,277,795.00**
G Construction Contingency					
Construction contingency - 25%	%	25%	$ 5,069,449.00	$ 5,069,449.00	
					$ 5,069,449.00
CONSTRUCTION COST ESTIMATE TOTAL (INCLUDING CONTINGENCIES; EXCLUDING RISK)					**$ 25,347,244.00**