Steensby Ore Dock Trade-off Study

Major Impacts and Considerations

Trade-off Study

Rev. 0

July 14, 2011

2011-07-14	0	Final	V. Lake	R. MacCrimmon	J. Casson	
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY
HATCH						CLIENT

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Appendix

1. Executive Summary

1.1 Overview

Baffinland Iron Mines Corporation (BIMC) is currently assessing the feasibility of constructing and operating the Port, Rail, Infrastructure and mine site for the Mary River Project. Hatch has been retained to assist in the Port components of the project.

The following figure shows the overall project site plan for the Mary River project:

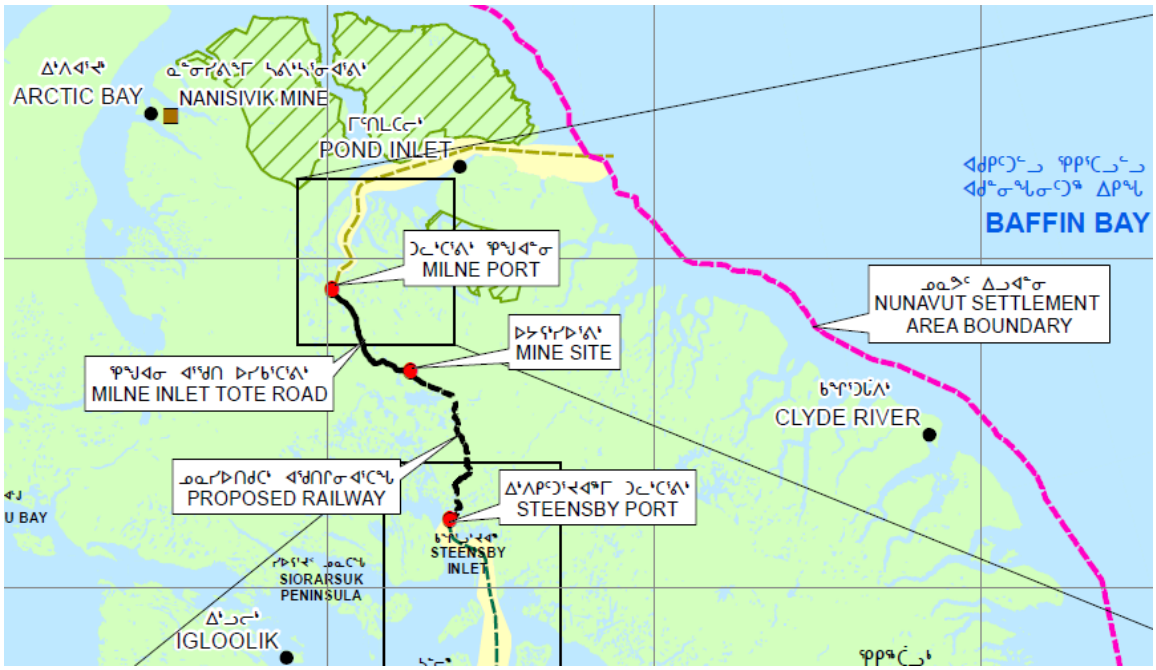


Figure 1: Site Plan, as show in the Environmental Impact Statement by Knight Piésold

This trade-off study provides a summary of the impacts on constructing an Iron Ore dock on Steensby Island for the Mary River Project. Aspects that will be covered in this study include technical, constructability, operational, environmental, schedule and cost considerations.

The dock will be required to accommodate shipping of 18 million tonnes per annum of iron ore. It will accommodate not only the shiploader(s) and vehicular traffic but also ore conveyor(s) moving ore from the railcar dumper to the stockpiles and other essential services. This dock will be completed in 2015.

In general, the objectives of this dock are to:

- Provide safe berthing facilities for 190,000 DWT ore carrier with adequate water depth and moorings (water depth of 23.0 m);
- Provide shiploading facilities for loading the ore carriers;
- Provide shore access for conveyors, maintenance vehicles and operations personnel;
- Provide mooring capabilities for ice breaking vessels and tugs (to be confirmed);
- Provide robust foundations that will resist the ice and other environmental forces, including impact from these large ships.

It should be noted that no bunkering, fresh water or fuelling will be provided to the ore carriers.

1.2 Motivation for Hatch Trade-off Study

In the spring of 2011 Hatch / Thurber completed a limited on-ice geotechnical program completing several probes. The results of this investigation found an unexpected layer of unsuitable material at the project site measuring several metres in thickness. Limited geophysical investigations were performed at the south dock location only.

A combination of cost considerations and unexpected poor foundation conditions at the Northern location (AMEC/Sandwell) has prompted the study to revisit both the North and South locations (Aker Kvaerner) and re-evaluate them as options.

This study will compare several options and rank these options based on technical, constructability, environmental, scheduling and cost criteria, in order to identify the most effective location and solution for the ore dock.

1.3 Options Assessed

The base case for the Northern site for this study can be found in the Technical Decision Memorandum entitled "Marine Structures at Steensby" (TDM-159952-0000-000-019) completed by Sandwell and AMEC in 2008.

This option (referred to as location L4), seen in Figure 2 and Figure 3, called for open /discrete caissons offshore (refer to drawings numbered A1-159952-8400-190-S003 and S004 in Appendix A).

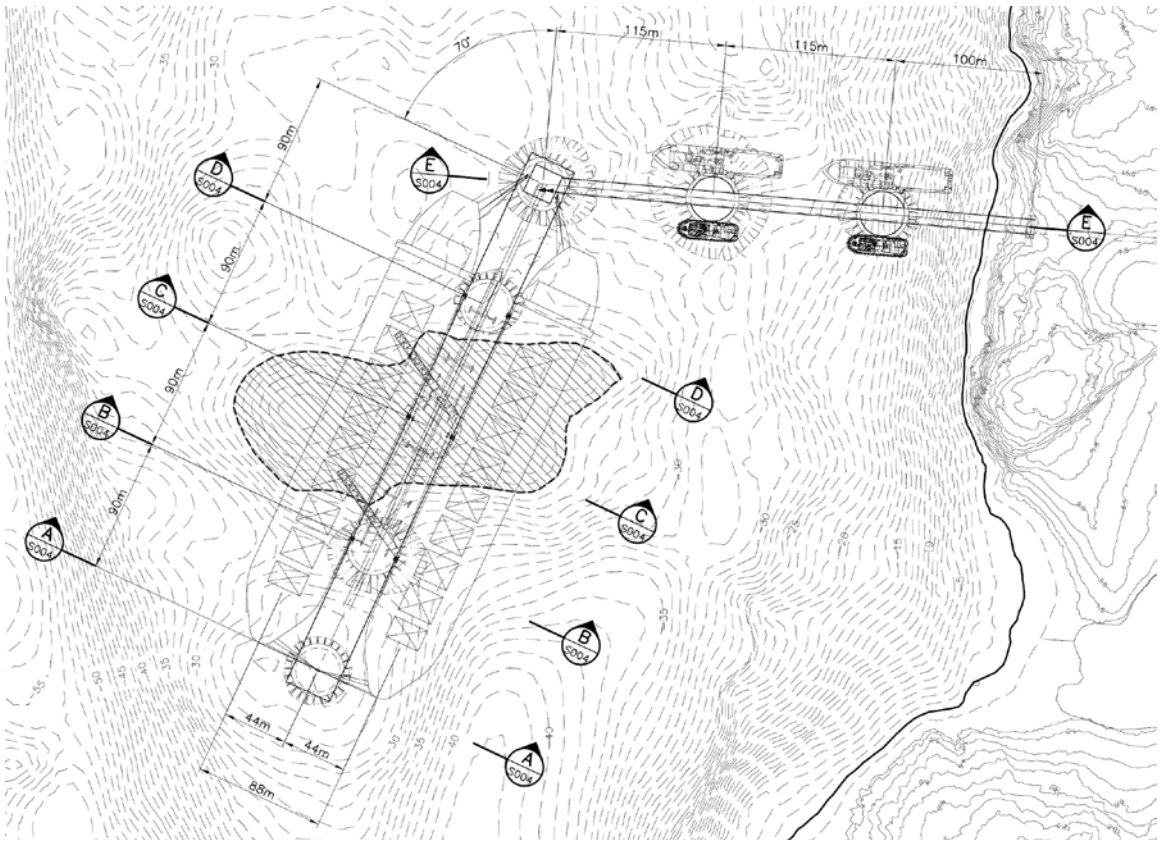


Figure 3: Plan, Sandwell/AMEC option for Steensby Ore Dock (see Appendix A)

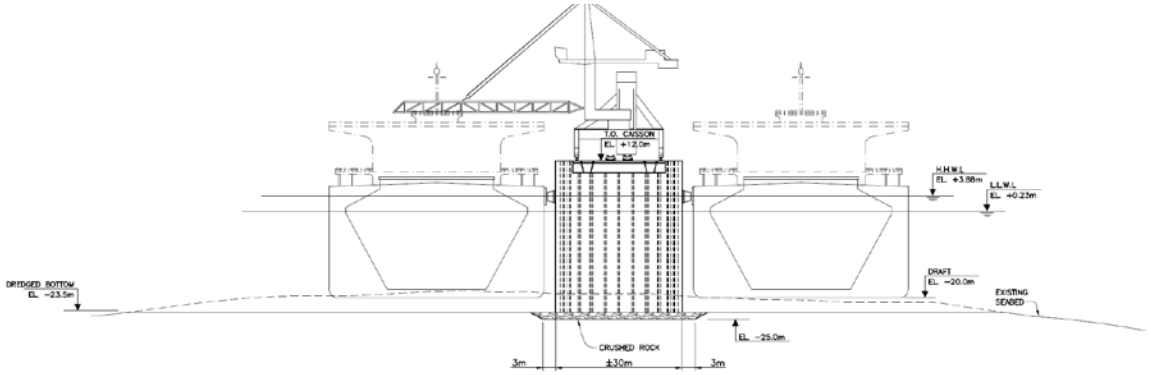


Figure 2: Elevation, Sandwell/AMEC Case for Steensby Ore Dock (see Appendix A)

The location for the Southern site can be found in the document entitled "Definitive Feasibility Study Value Engineering Reports, Mary River Iron Ore Project" completed by Aker Kvaerner in 2008.

The ore dock options that will be discussed herein include the following:

- North Site
  - Option 1: Concrete caissons;
  - Option 2: Concrete filled steel columns on concrete caisson foundations;
  - Option 3: Continuous steel caisson.
- South Site
  - Option 4: Concrete caissons;
  - Option 5: Concrete filled steel columns on concrete caisson foundations;
  - Option 6: Continuous steel caisson.

All options will provide an operating elevation of 12.0 m above chart datum (CD). The overall dock length will be 390 m and will support the shiploader, conveyors and vehicle traffic. Fenders, quick release hooks and bollards will be provided at intervals along the dock to facilitate berthing and mooring.

In addition, the North site requires an approach trestle. In general, the approach trestle provides an access road for vehicles and personnel and also a passage for the ore conveyors.

The total length of the approach trestle is 330 m. The following options to be discussed herein include:

- Approach 1: Concrete caissons;
- Approach 2: Concrete filled steel columns on concrete caisson foundations;
- Approach 3: Combination causeway and bridge.

2. Options to be Evaluated

2.1 North Site

2.1.1 Option 1

This option consists of five (5) concrete caissons; it remains unchanged from the original Sandwell / AMEC concept. Ice was assumed to be pushed between the caissons for clearing. Caissons were assumed to be supported on rock.

The following is a basic description of the proposed ore dock which will be referred to as the Option 1 in this study:

- Deep water on both sides of dock could provide two (2) berths;
- Five (5) concrete caissons – 30.0 m diameter and 37.0 m in height (to be filled with crushed rock and hematite) spaced at 90 m;
- Dredging required;
- Rock mattress foundations for caissons;
- Dock superstructure consists of 76 m clear span bridges composed of cast-in-place concrete supports, steel girders and precast concrete deck panels.

Figure 4 and Figure 5 illustrate the plan and elevation for Option 1 (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0021 to 0024).

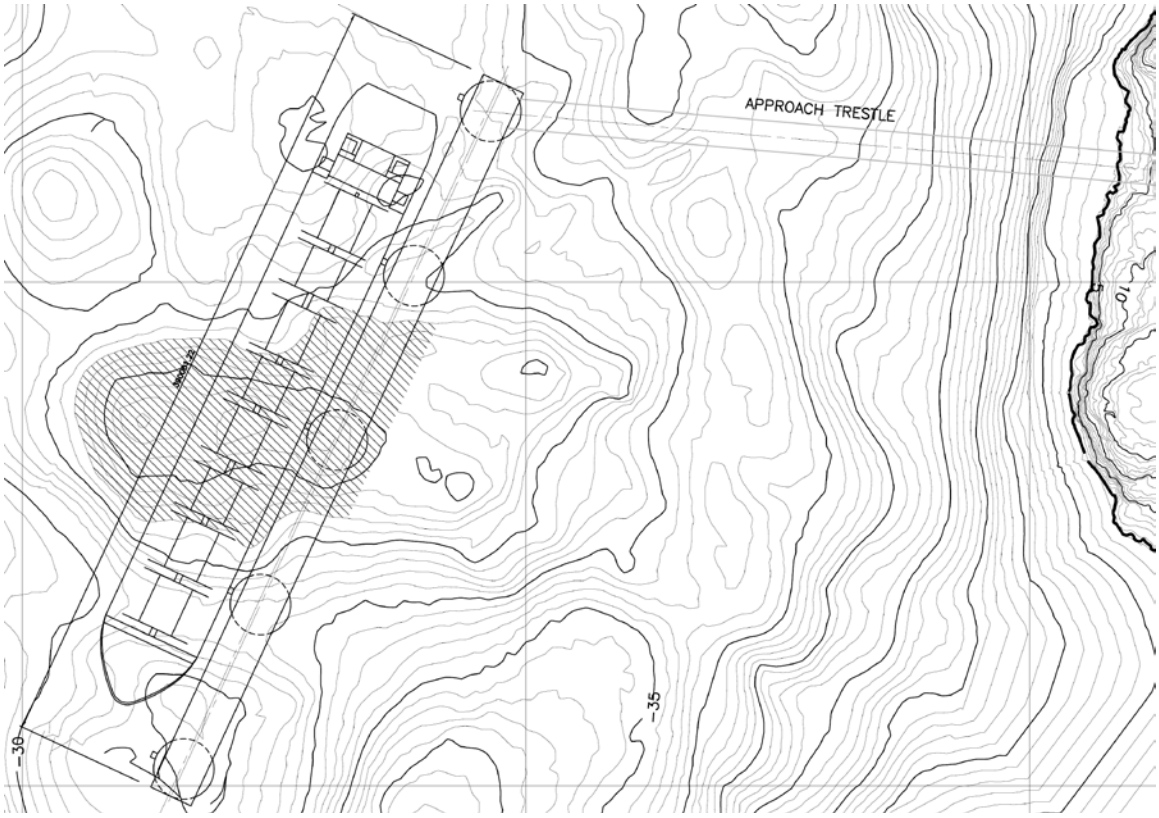


Figure 4: Plan, Option 1 for Steensby Ore Dock (see Appendix A)

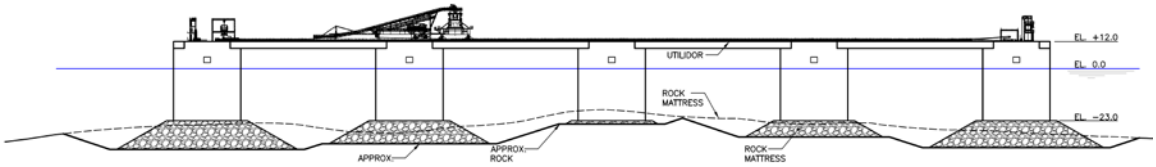


Figure 5: Elevation, Option 1 for Steensby Ore Dock (see Appendix A)

2.1.2 Option 2

Option 2 consists of a structural steel deck supported by eight (8) concrete filled steel columns which are in turn supported on eight (8) sunken concrete caissons.

The following is a basic description of the proposed solution which will be referred to as Option 2 in this study:

- Eight (8) – 23.0 m square sunken caissons (to be filled with rock or hematite) to be used as foundation for the steel columns, spaced at 54 m;
- Eight (8) – 10.0 m diameter x 26.0 m high concrete filled steel piers;

- Dredging required;
- Rock mattress for foundations for caissons;
- Dock superstructure will consist of steel box girder piers, steel deck beams and pre-cast concrete deck panels.

Figure 6 and Figure 7 illustrate the plan and elevation for Option 2 (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0001 to 0003).

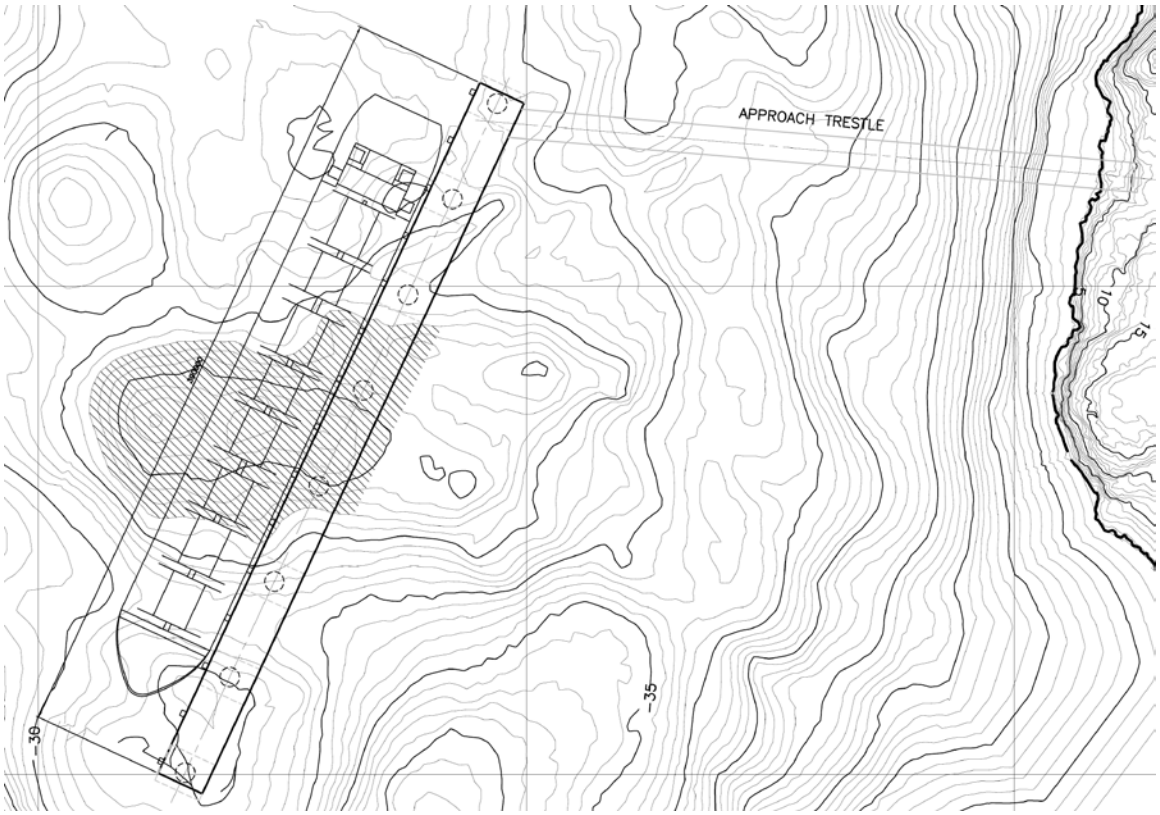


Figure 6: Plan, Option 2 for Steensby Island Bridge (see Appendix A)

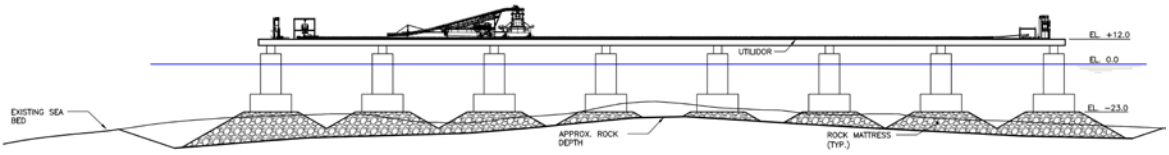


Figure 7: Elevation, Option 2 for Steensby Island Bridge (see Appendix A)

2.1.3 Option 3

Option 3 consists of a continuous steel caisson (to be designed by a naval architect).

The following is a basic description of the proposed dock which will be referred to as Option 3 in this study:

- One (1) – 390 m long by 25.0 m wide by 25.0 m high steel caisson (to be rock filled);
- Rock mattress for caisson foundation and scour protection to be provided;
- Dredging required.

Figure 8 and Figure 9 illustrate the plan and elevation for Option 3 (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0031 and 0033).

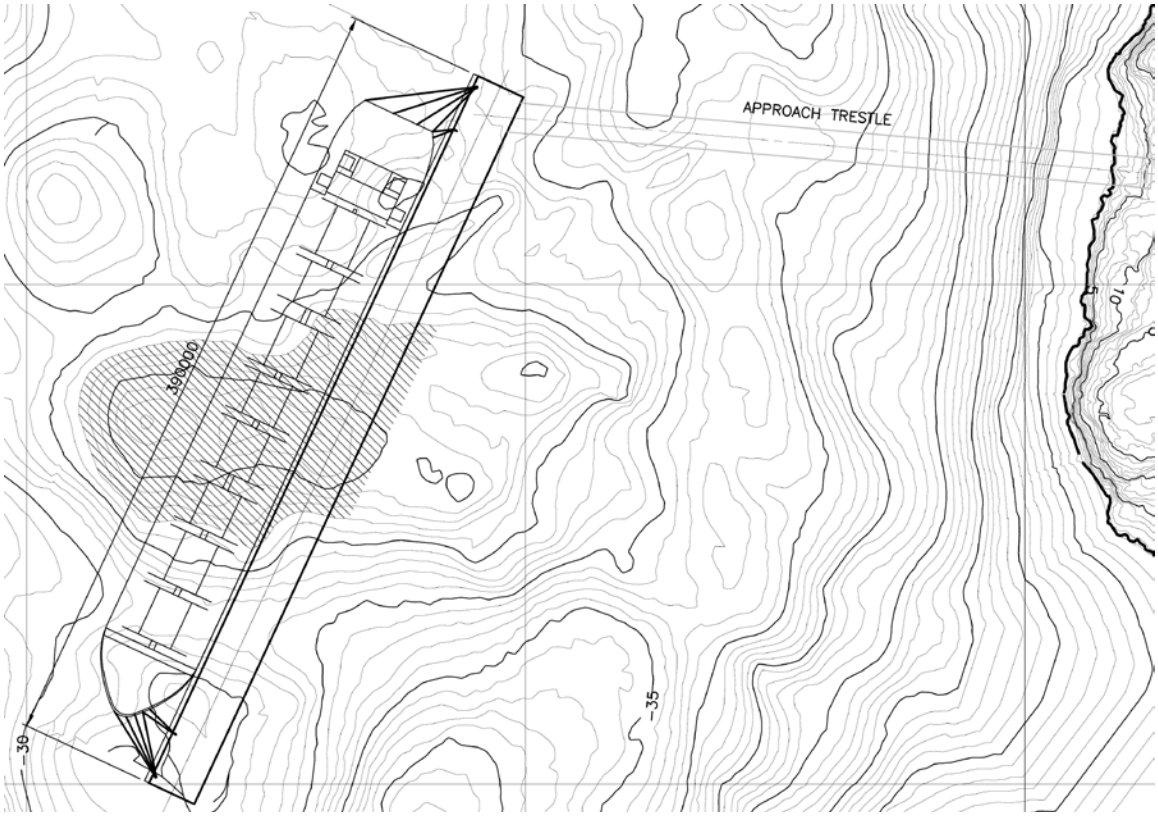


Figure 8: Plan, Option 3 for Steensby Island Ore Dock (see Appendix A)

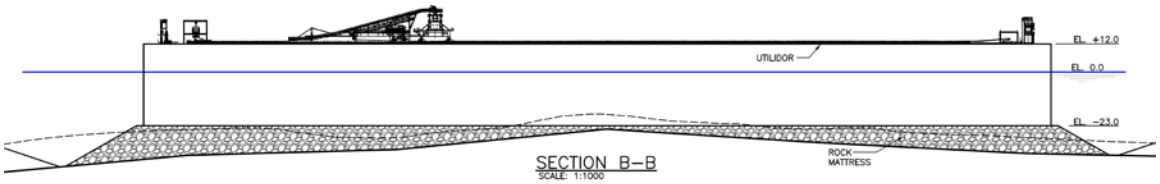


Figure 9: Elevation, Option 3 for Steensby Island Ore Dock (see Appendix A)

2.2 South Site

2.2.1 Option 4

Option 4 is located at the Aker Kvaerner location. The basic description of the dock remains the same as Option 1.

Figure 10 and Figure 11 illustrate the plan and elevation for Option 4 (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0041 to 0044).

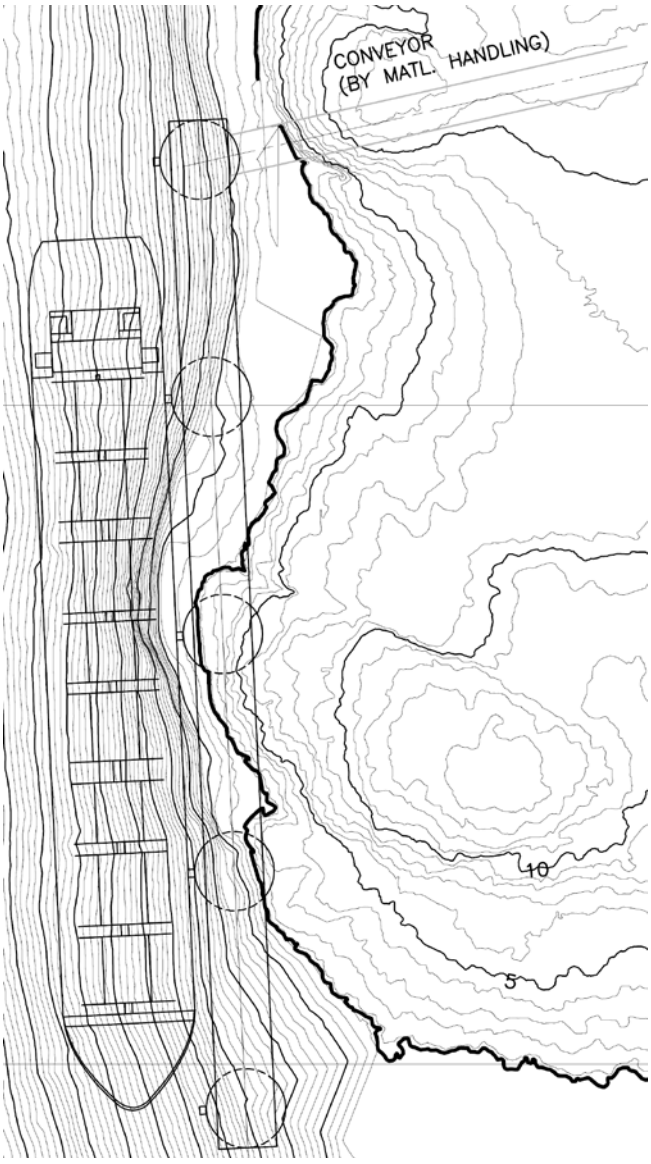


Figure 10: Plan, Option 4 for Steensby Island Ore Dock (see Appendix A)

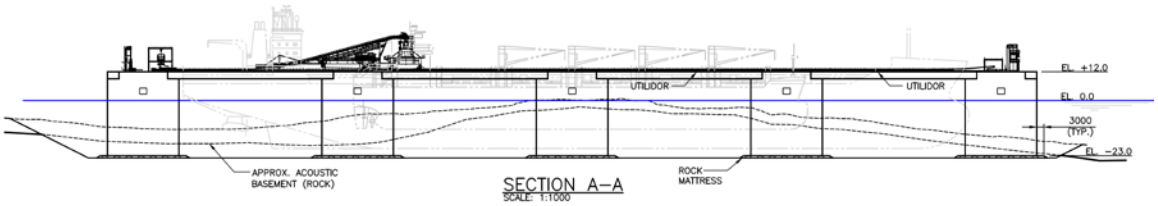


Figure 11: Elevation, Option 4 for Steensby Island Ore Dock (see Appendix A)

2.2.2 Option 5

The basic description of Option 5 remains the same as Option 2.

Figure 12 and Figure 13 illustrate the plan and elevation for Option 5 (refer to Appendix Afor complete drawings numbered H337697-3220-10-042-0051 to 0053).

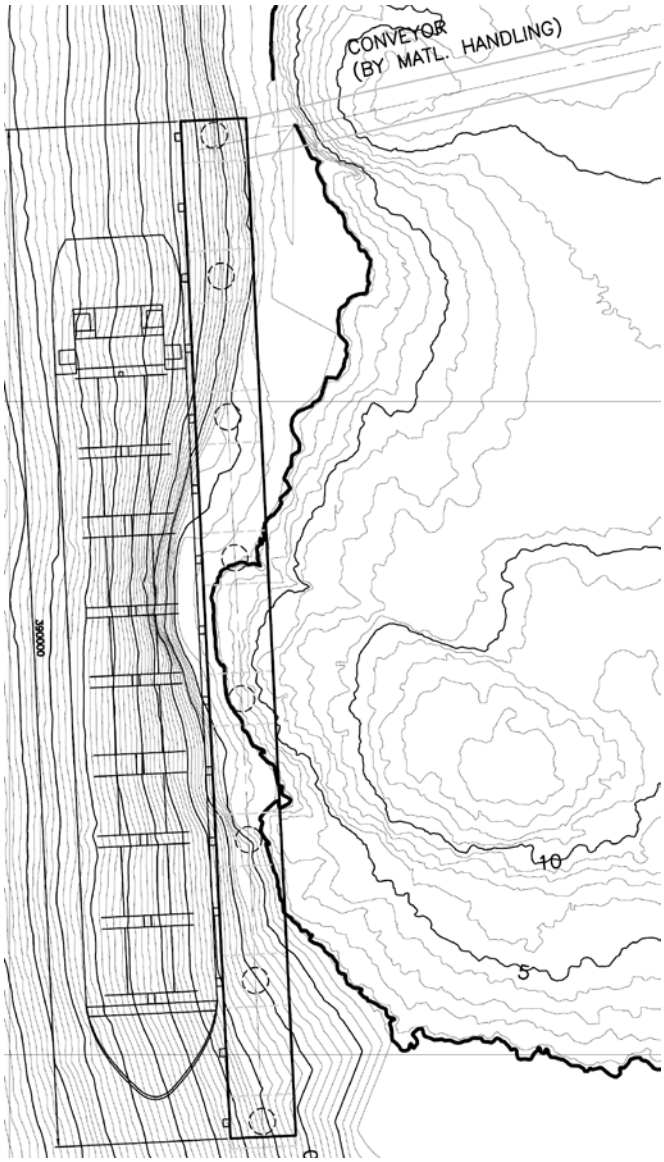


Figure 12: Plan, Option 5 for Steensby Island Ore Dock (see Appendix A)

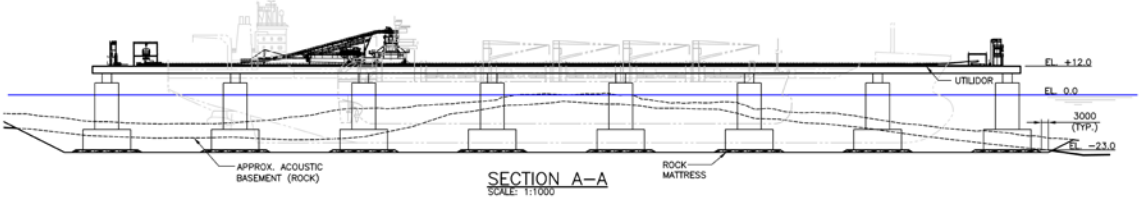


Figure 13: Elevation, Option 5 for Steensby Island Ore Dock (see Appendix A)

2.2.1 Option 6

The basic description of Option 6 remains the same as Option 3.

Figure 14 and Figure 15 illustrate the plan and elevation for Option 6 (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0061 and 0062).

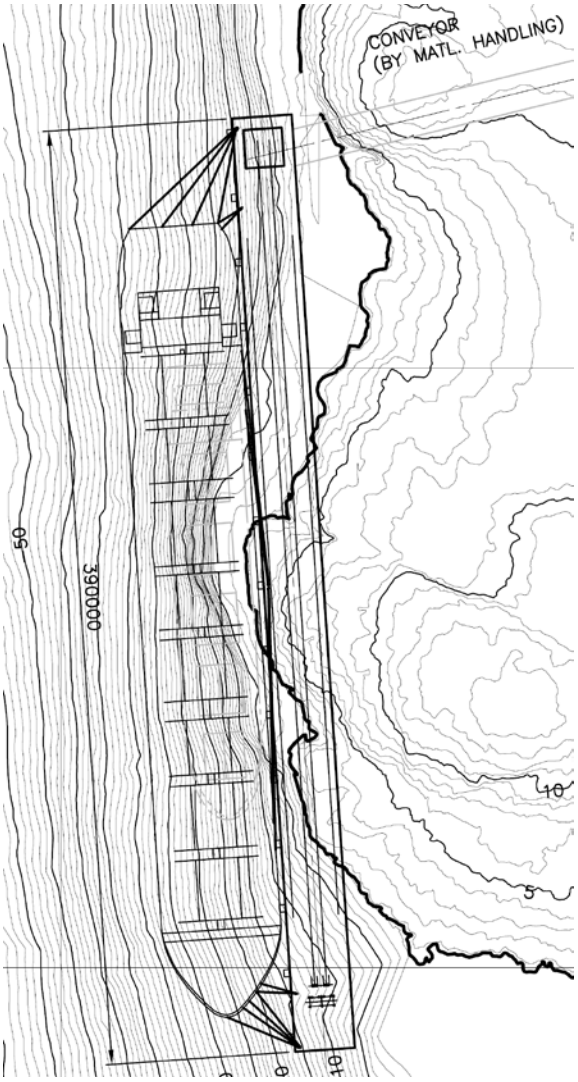


Figure 14: Plan, Option 6 for Steensby Island Ore Dock (see Appendix A)

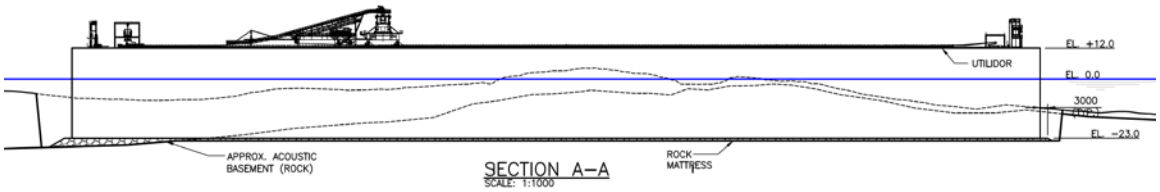


Figure 15: Elevation, Option 6 for Steensby Island Ore Dock (see Appendix A)

2.3 Approach Trestle

2.3.1 Approach 1

The first option for the approach trestle to the ore dock consists of two (2) concrete caissons; it remains unchanged from the original Sandwell/AMEC concept. It is assumed that this trestle will be paired with Option 1 at the North location.

The following is a basic description of the proposed approach trestle which will be referred to as the Approach 1 in this study:

- Two (2) concrete caissons – 30.0 m diameter and 37.0 m in height (to be filled with crushed rock and hematite), spaced at 115.0 m;
- Caissons were assumed to be supported on rock;
- Superstructure consists of cast-in-place concrete foundations, steel girders and precast concrete deck panels.

Figure 16 and Figure 17 illustrate this approach trestle (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0071 and 0072).

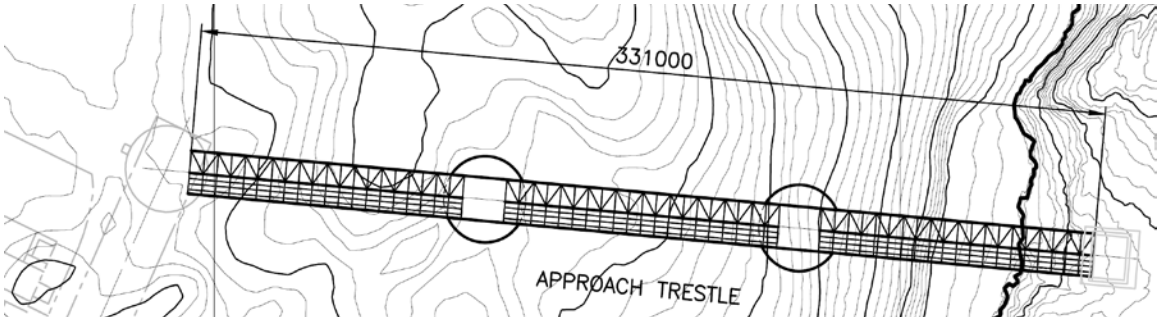


Figure 16: Plan, Approach 1 for Steensby Island Ore Trestle (see Appendix A)

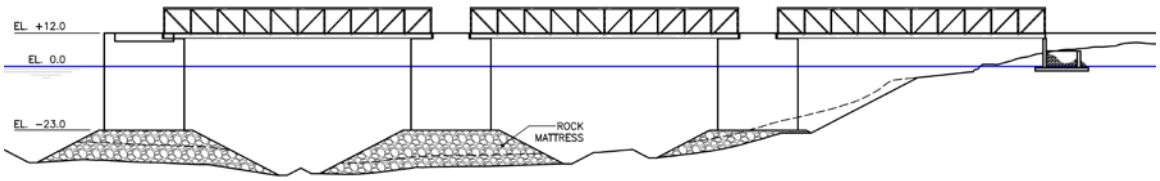


Figure 17: Elevation, Approach 1 for Steensby Island Ore Trestle (see Appendix A)

2.3.2 Approach 2

The second option for the approach trestle to the ore dock consists of a structural steel deck supported by two (2) concrete filled steel columns which are in turn supported on two (2) sunken concrete caissons. It is assumed that this trestle will be paired with Option 2 at the North location.

The following is a basic description of the proposed approach trestle which will be referred to as the Approach 2 in this study:

- Two (2) – 23.0 m square sunken caissons (to be filled with rock or hematite) to be used as foundation for the steel columns;
- Caissons were assumed to be supported on rock;
- Rock mattress for foundations for caissons;
- Dock superstructure will consist of steel box girder piers, steel deck beams and pre-cast concrete panels.

Figure 18 and Figure 19 illustrate this approach trestle (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0081 and 0082).

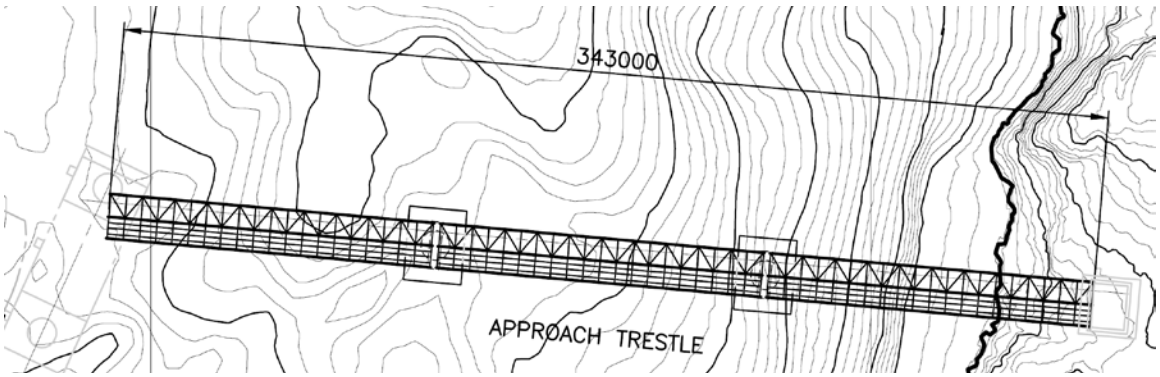


Figure 18: Plan, Approach 2 for Steensby Island Ore Trestle (see Appendix A)

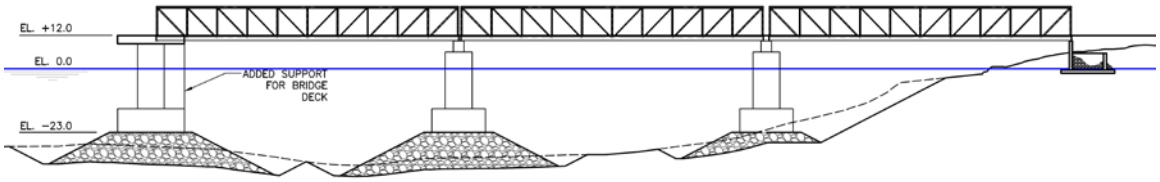


Figure 19: Plan, Approach 2 for Steensby Island Ore Trestle (see Appendix A)

2.3.3 Approach 3

The third option for the approach trestle to the ore dock consists of a single rock fill causeway supporting a steel truss bridge span. It is assumed that this causeway will be paired with Option 3 at the North location.

Figure 20 and Figure 21 illustrate this approach (refer to Appendix A for complete drawings numbered H337697-3220-10-042-0091 and 0092).

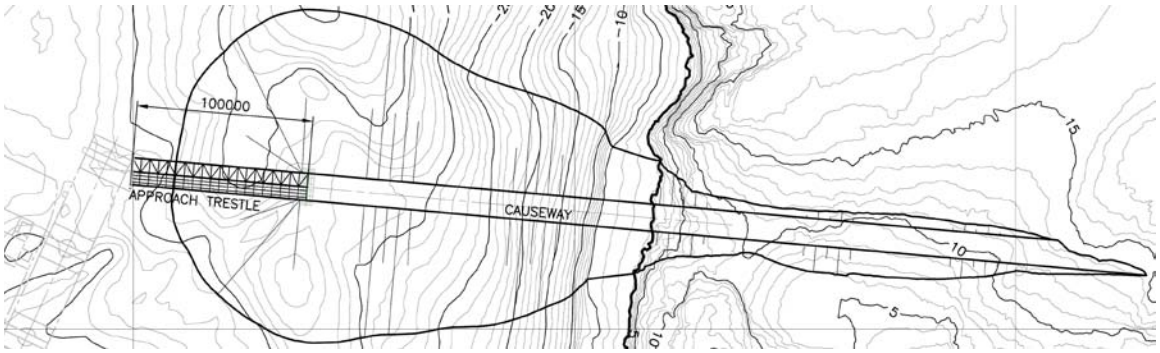


Figure 20: Plan, Approach 3 for Steensby Island Ore Trestle (see Appendix A)

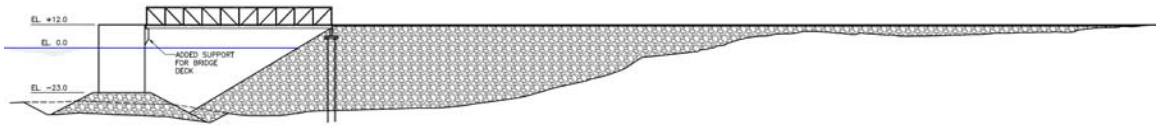


Figure 21: Plan, Approach 3 for Steensby Island Ore Trestle (see Appendix A)

3. Evaluation Criteria

3.1 Technical

From a technical point of view, all options succeed in meeting the objectives of the facility as described in Section 1.1.

At the North site, a lack of geophysical investigation and few reliable boreholes and probes has resulted in the rock surface being poorly defined. This in turn has made the Options 1 through 3 less feasible solutions. The soil conditions discovered at the North site are very poor. There is more than 10 m of soft material that must be removed (a volume estimated at approximately 400,000 m^3) in order to provide suitable foundations for the proposed structures.

Off-ice geotechnical investigations were undertaken in 2011, but results were largely unsuccessful, therefore engineering properties of the soft material are not well defined. Further investigation is planned for summer 2011 and it is expected to yield better information. In the meantime, estimating has been based on assumptions and the best information available.

A review of the South site geophysical and geotechnical investigations has forced a relocation of the dock closer to land. This should allow the dock to be founded on bedrock. Rock excavation is expected to be approximately 275,000 m^3. Further geotechnical investigations to be conducted in the summer of 2011 will be needed to complete the geotechnical report.

In summary, the following points outline the technical evaluation of the options:

- Option 1 and 2: Site conditions threaten feasibility, large amount of dredging;
- Option 3: Site conditions threaten feasibility, large amount of dredging, expert to be consulted regarding steel caisson design;
- Option 4 and 5: Expert to be consulted regarding the extensive rock excavation required;
- Option 6: Expert to be consulted regarding the extensive rock excavation required and design of steel caisson.

3.2 Constructability

Construction in arctic conditions requires significant planning. Onsite activities are challenging due to the short summer and open water season, cold and dark winters and site accessibility. All options must address these issues.

In general, the proposed caissons can be prefabricated and transported to the site. This will drastically reduce the amount of on-site effort required.

Options 3 and 6, which involve the construction of a continuous steel caisson, will require the input from an outside expert.

The constructability of the Options 1 through 3 will be dependent on the existence of soft material that appears to be present at the Northern site. Preliminary geotechnical investigations indicate that up to 10 m of unstable overburden material will have to be removed.

The previous geotechnical program was not completed and therefore did not gather sufficient information to determine the expected displacement and / or settlement that may arise with the construction of any of the options. Additional geotechnical investigation will be required to determine how to mitigate or identify geotechnical risks. There is a geotechnical investigation planned for the summer 2011 in order to verify assumptions.

It should be noted that the construction of Options 4 through 6 can be executed from land but also require extensive rock excavation.

In summary, the following points outline the constructability evaluation of the options:

- Option 1 and 2: Additional geotechnical investigation required;
- Option 3: Additional geotechnical investigation required, expert to be consulted regarding steel caisson;
- Option 4 and 5: Extensive rock excavation to be evaluated by an expert;
- Option 6: Experts to be consulted regarding steel caisson and rock excavation required.

3.3 Operational

Although there are some differences in the designs and locations with respect to operation of the dock, notably ice management, they are not significant issues for purposes of this trade-off study.

3.4 Environmental / Archaeological

The Environmental Impact Statement [EIS] prepared by Knight Piésold in December 2010 considered the EIS Option 1 (referred to in the EIS as "Ore Dock – Location 4") for the Ore Dock on Steensby Island. In general, they had no negative comments on the proposed structure. Figure 22 below shows the four locations considered. There was concern that "Ore Dock – Location 1" would interfere with more archaeological sites than Location 4. However, Location 1 provides easy access to deep water without the construction of a trestle.

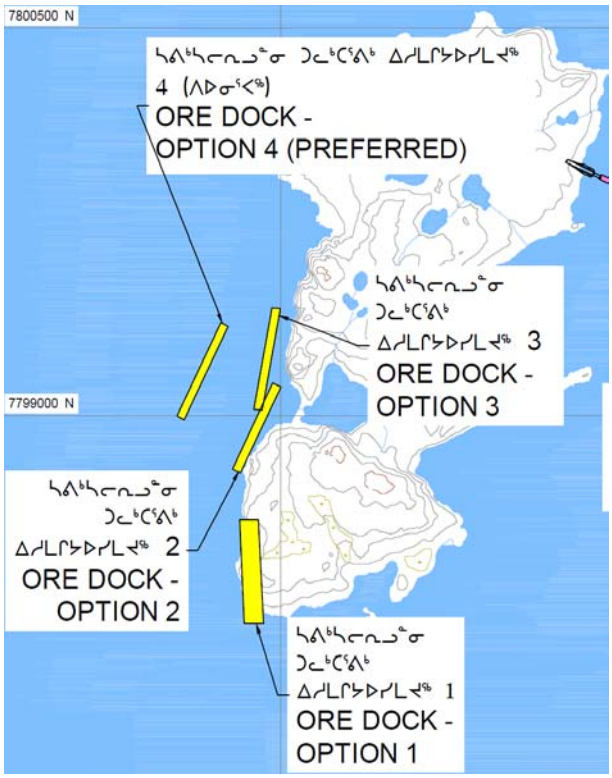


Figure 22: Ore Dock locations, as show in the Environmental Impact Statement by Knight Piésold

Herein Option 1 (or EIS Ore Dock - Option 4) was preferred in the EIS for the following reasons:

- Superior ice management;
- Ease of providing second berth;
- Least underwater blasting and dredging (no disposal required);
- Moorage for tugs and support vessels could be provided along the trestle;
- Minimal on site construction.

As mentioned above, Option 1 (or EIS Ore Dock - Option 4) required the least amount of underwater blasting and dredging (Option 2 is expected to be similar). However, mitigation techniques were recommended in the EIS in order to cause the least amount of disturbance to the surrounding environment. Option 3 occupies a larger overall footprint, but would still require the same mitigation techniques.

If Options 4 through 6 were to be considered, the environmental implications may have to be revisited.

In summary, the following points outline the environmental evaluation of the options:

- Option 1: Considered in the existing EIS, blasting shall follow blasting plan to be developed by the contractor and filed with the Department of Fisheries and Oceans;
- Option 2: Similar to case assumed in EIS;
- Option 3: Larger overall footprint, but similar requirements as Option 1 will be required;
- Options 4 through 6: Environmental and archaeological mitigation required, perhaps the need to revisit the evaluation of the requirements.

3.5 Schedule

At this point in time, it is difficult to estimate the duration of the schedule. The original Sandwell / AMEC schedule estimated it as 2 years in duration.

It is fairly obvious that use of prefabricated sections sunk in place is the logical concept for construction as it limits onsite activities.

3.6 Cost

Estimated comparative capital costs associated with each of the options for the Steensby Island Ore Dock can be seen in Table 1. A breakdown of the costs can be found in Appendix B. All options include a 30% contingency and exclude taxes. It should be noted that there is a modest increased cost (less than $4 million) of the materials handling systems (conveyors) if the Southern site is chosen.

Table 1: Costs of Options for Complete Ore Dock

Option	Cost Dock	Cost Approach	Cost Conveyors (additional)	Total Cost	Variation
1	$298,000,000	$93,000,000	-	$391,000,000	-
2	$278,000,000	$76,000,000	-	$354,000,000	-9%
3	$308,000,000	$98,000,000	-	$406,000,000	+4%
4	$328,000,000	-	$4,000,000	$332,000,000	-15%
5	$286,000,000	-	$4,000,000	$290,000,000	-26%
6	$290,000,000	-	$4,000,000	$294,000,000	-25%

For simplification purposes, approach trestles have been paired with the docks of similar construction method.

There is a decreased capital cost implication from the selection of the Southern site. The extent of this cost savings is in the range of 15 to 26%. Cost estimates can be found in Appendix B.

3.7 Summary

Table 2 provides a summary of the criteria evaluated in Section 3. Where possible, each option has been given a ranking (1 through 6), where 1 is the least preferred option and 6 is the most preferred. It follows that at this point the Southern location is preferred over the North. However, no conclusion can be made as to the option preferred due to lack of complete information.

Additionally, consideration of ranking for other items such as ice management and berthing are outside the scope of this Trade-off Study.

Table 2: Ranking of Options

Option	**1**	**2**	**3**	**4**	**5**	**6**
Description	Concrete Caissons	Steel Columns	Steel Caisson	Concrete Caissons	Steel Columns	Steel Caisson
Technical	3	5	6	3	5	6
Constructability	1	3	5	2	4	6
Environmental	1	1	1	3	3	3
Schedule	3	2	4	3	2	4
Cost	2	3	1	4	6	5
Overall	**1**	**2**	**4**	**3**	**5**	**6**
						Preferred

4. Value Engineering

It should be noted that at the South location, there are two possibilities for cost reductions as follows:

- Possibility of quarrying part of the rock excavation, this would also permit an early start;
- Possibility of reducing amount of rock excavation and cost of structure by using a rock "shelf" combined with the structure.

Further investigation into these options will be part of the next phase of activities.

5. Conclusions and Recommendations

The findings of this study indicate that further geotechnical investigations are necessary to advance the study to the confidence level needed to advance to FEL3. Experts should be consulted to confirm the following:

- Dredging and rock excavation methods, costs and scheduling;
- Slope protection requirements;
- Expected displacement of soft materials.

The summer 2011 geotechnical program should be closely monitored to ensure that the results yield the information required to complete the study.

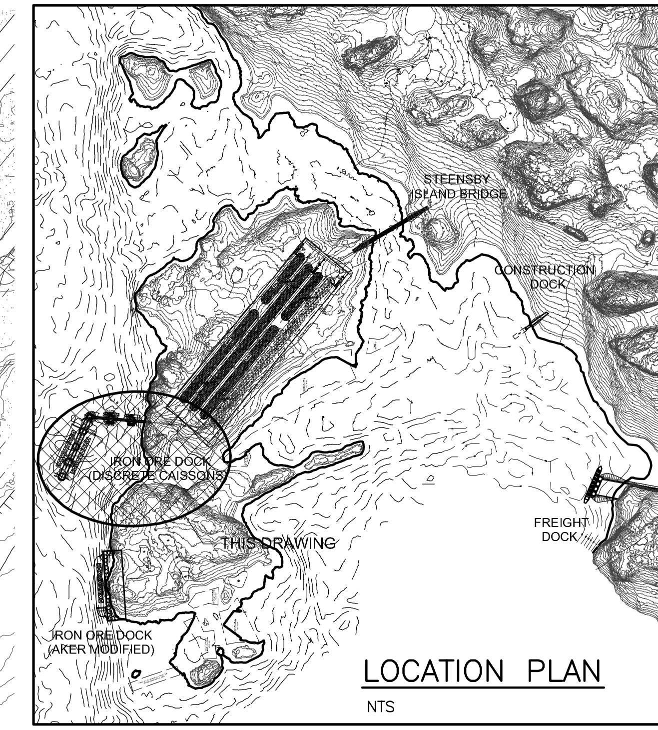
At this point, the continuous steel caisson option is preferred, but in general, the three options being considered at the two sites have their pros and cons.

- The solutions are technically sound, as long as proper assumptions can be made – additional geotechnical investigations should provide sound results;
- Caissons can be prefabricated off site and installed in order to reduce on-site time;
- The EIS identified that the Southern site may interfere with more archaeological sites, - this should be revisited;
- Scheduling will be confirmed after consulting with experts (as noted above);
- There is a substantial cost saving in choosing the Southern site over the Northern site.

Appendix A:

Drawings

DETAIL 2
1:2000
A1-159952-8400-190-0005



LOCATION PLAN
NTS

LEGEND:

DREDGED AREA (POSSIBLY DRILLED AND BLASTED)

100 0 100m
SCALE = 1:2000

speed and precision worldwide
Sandwell
SANDWELL PROJECT No: 143075

REV	DDMMMYY	REVISION	DR	CHK	APP	APP	APP	APP
A	14-10-08	SQUAD CHECK REVIEW	JOF	MM				

ISS	DDMMMYY	APP	ISSUED FOR

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.
PROJECT PHASE
AREA

PROJECT NO. | ACTIVITY NO. | BY | DDMMMYY
DSN
DRN
CHK
APP
SCALE 1:2000 | PACKAGE CODE

Baffinland Iron Mines Corporation

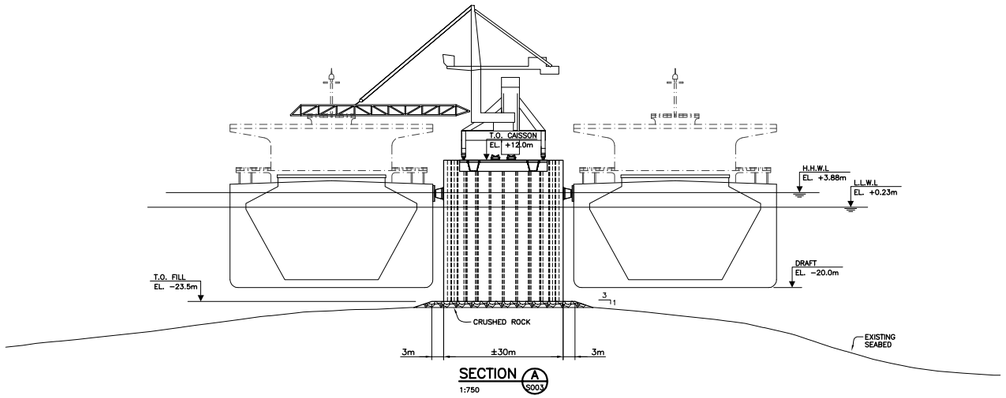
amec

SUBJECT
MARY RIVER PROJECT
IRON ORE DOCK (DISCRETE CAISSONS)
PLAN

CLIENT DWG. NO.
DRAWING NO. A1-159952-8400-190-S003
REV. A

CAD FILE: A1-159952-8400-190-S003.DWG

SAVED: 17-Nov-08 11:41 AM PLOTTED: 19-Nov-08 8:51 AM USER: MAGED EL-MESTKAWY



SECTION A (S003)
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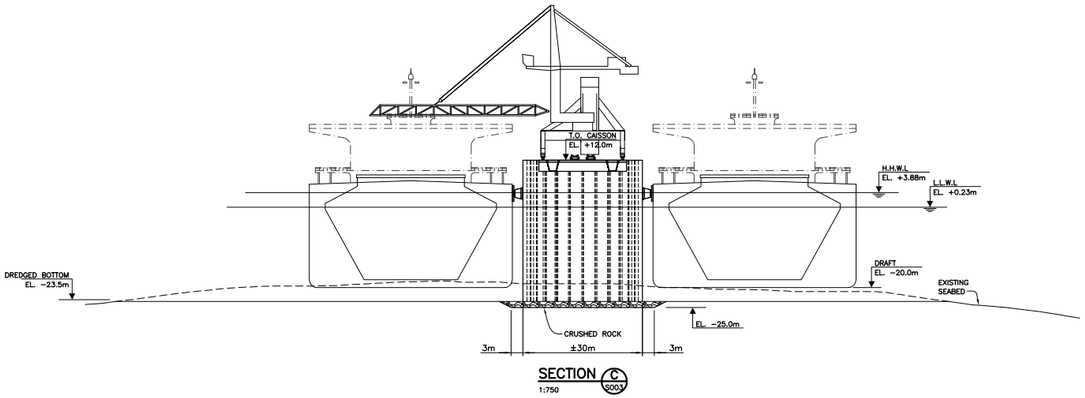
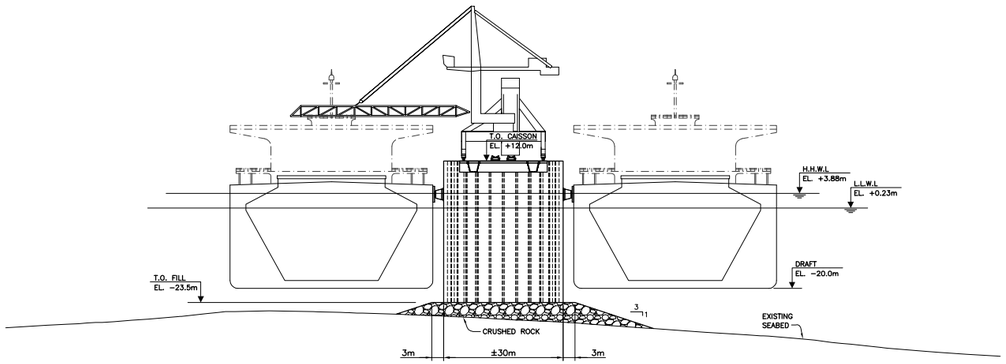
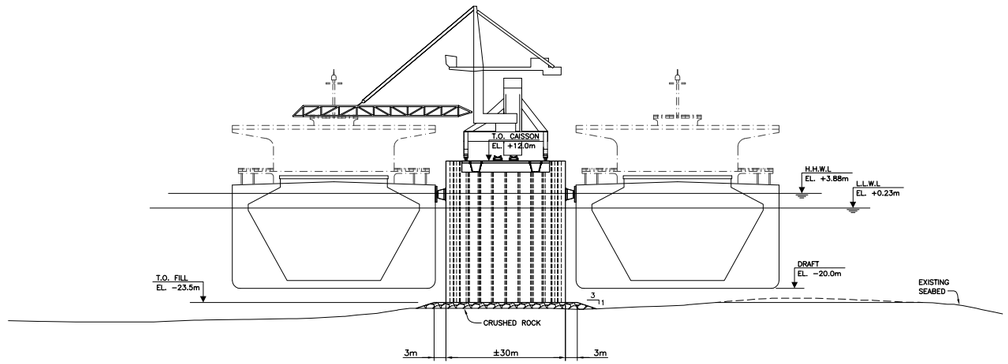


SECTION C (S003)
1:750



SECTION B (S003)
1:750



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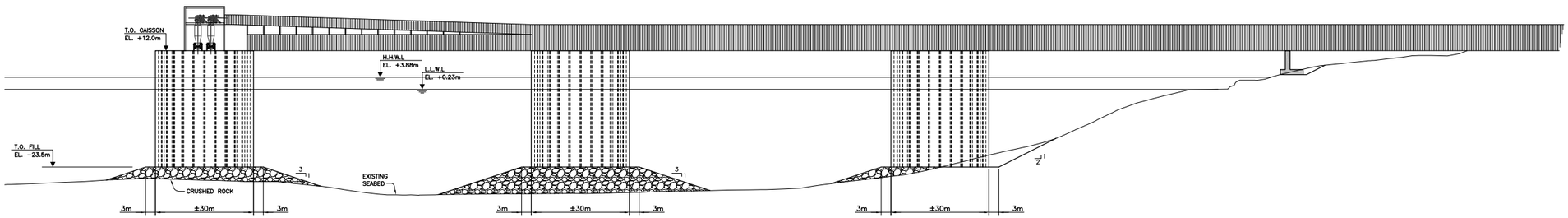
1:750



SECTION E (S003)
1:750

SCALE = 1:750

SANDWELL PROJECT No: 143075

REV	DDMMMYY	REVISION	DR	CHK	APP	APP	APP	APP
ISS	DDMMMYY	APP	ISSUED FOR					

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

AREA

PROJECT NO. | ACTIVITY NO. | SCALE: AS SHOWN | PACKAGE CODE

	BY	DDMMMYY
DSN		
DRN		
CHK		
APP		

Baffinland Iron Mines Corporation

amec

SUBJECT

MARY RIVER PROJECT
IRON ORE DOCK (DISCRETE CAISSONS)
SECTIONS

CLIENT DWG. NO.

DRAWING NO. A1-159952-8400-190-S004 | REV. A

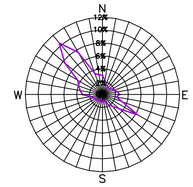
CAD FILE: A1-159952-8400-190-S004.DWG

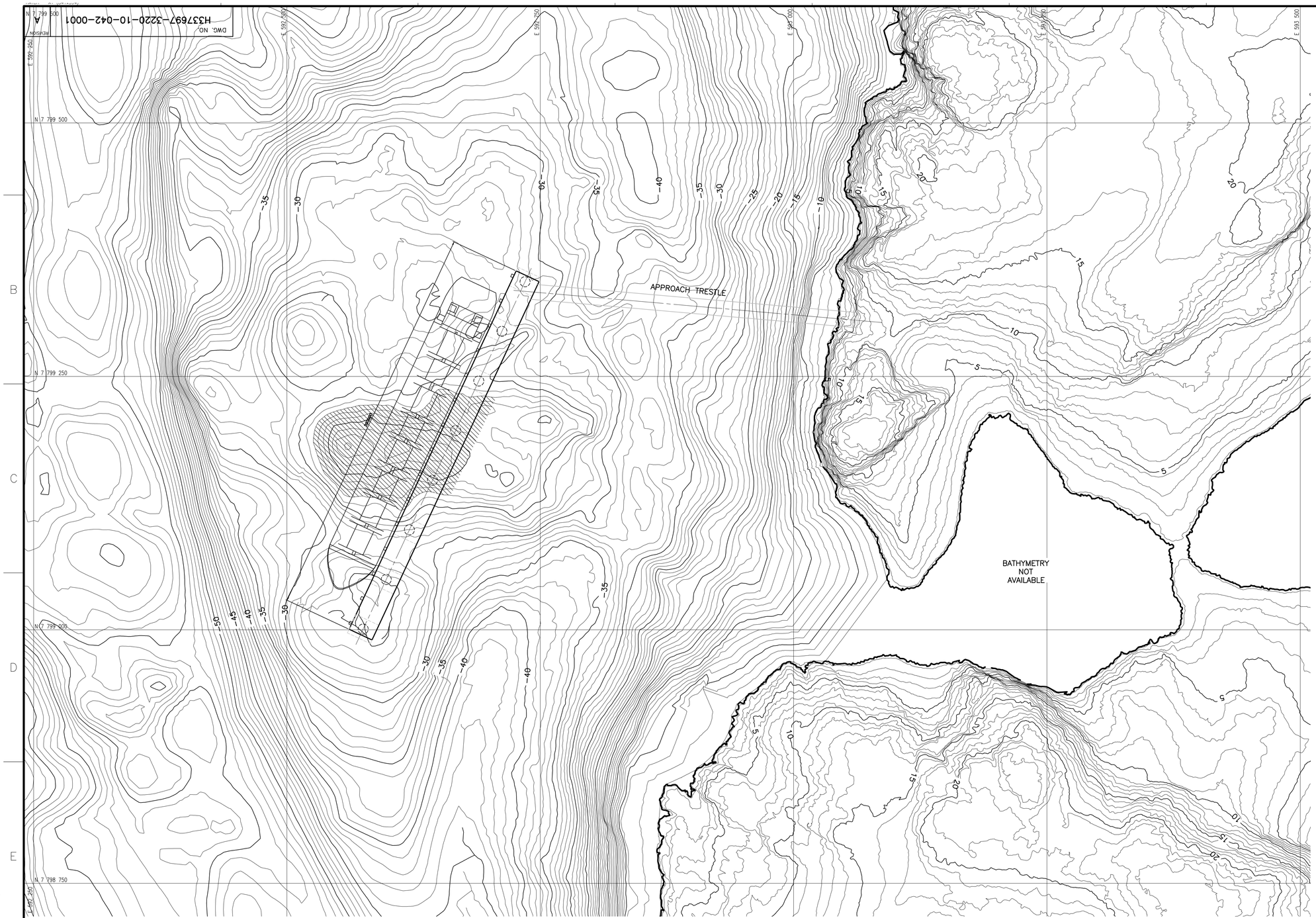
SAVED: 12-Nov-08 9:38 AM | PLOTTED: 19-Nov-08 8:52 AM | USER: MAGED EL-MESTKAWY

DWG. NO. H337697-3220-10-042-0001 REVISION A

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions





NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

GENERAL ARRANGEMENT
SCALE: 1:2000

KEY PLAN
SCALE: 1:25000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY P. MICHALKO DATE	DRAWN BY S. GRAHAM DATE 05/02/2011
CHECKED BY R. MacCRIMMON DATE	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. DATE	PROJECT NUMBER

Baffinland Iron Mines Corporation

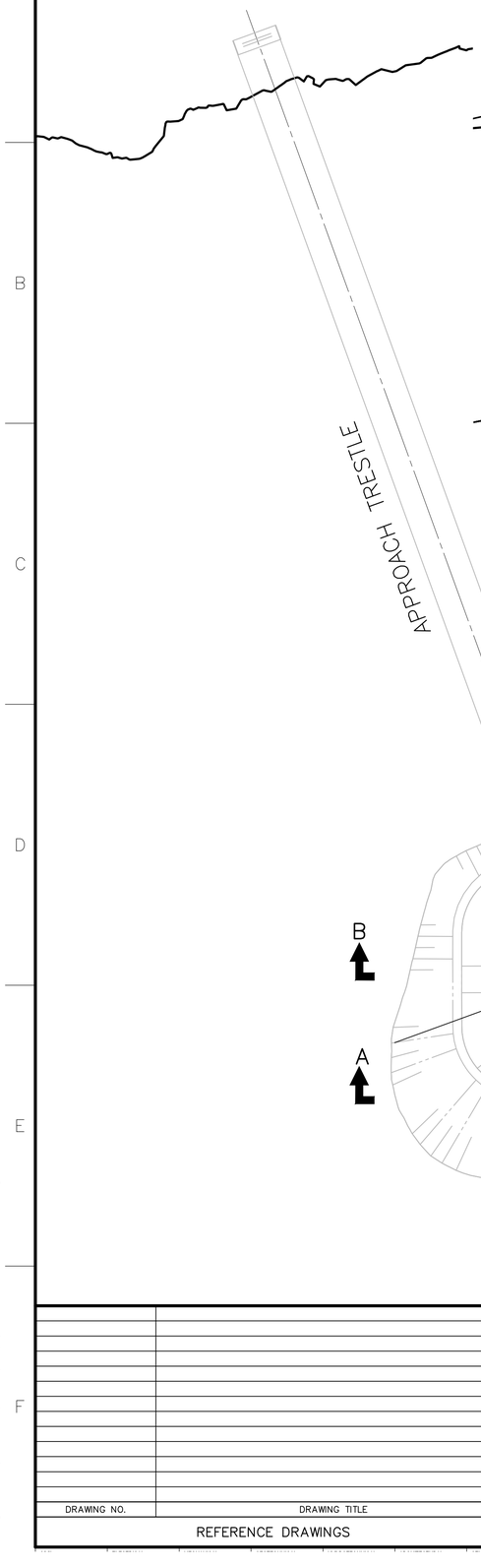
MARY RIVER IRON ORE PROJECT

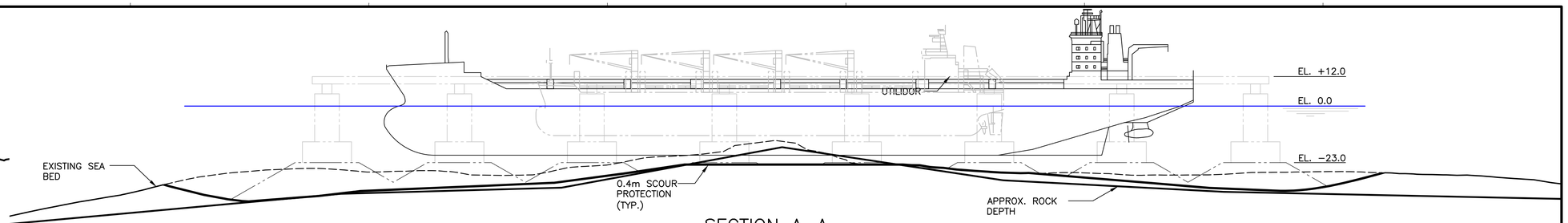
STEENSBY PORT IRON ORE DOCK PLAN OPTION 2.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0001	A

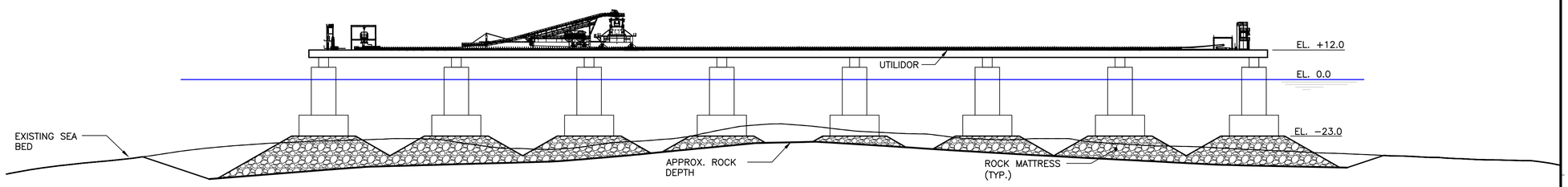
Jun 24 , 2011 , 8:51am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0001.dwg

DWG. NO. H337697-3220-10-042-0002
REVISION A
N 7 799 000

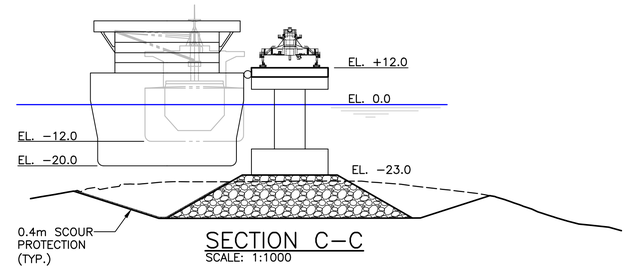




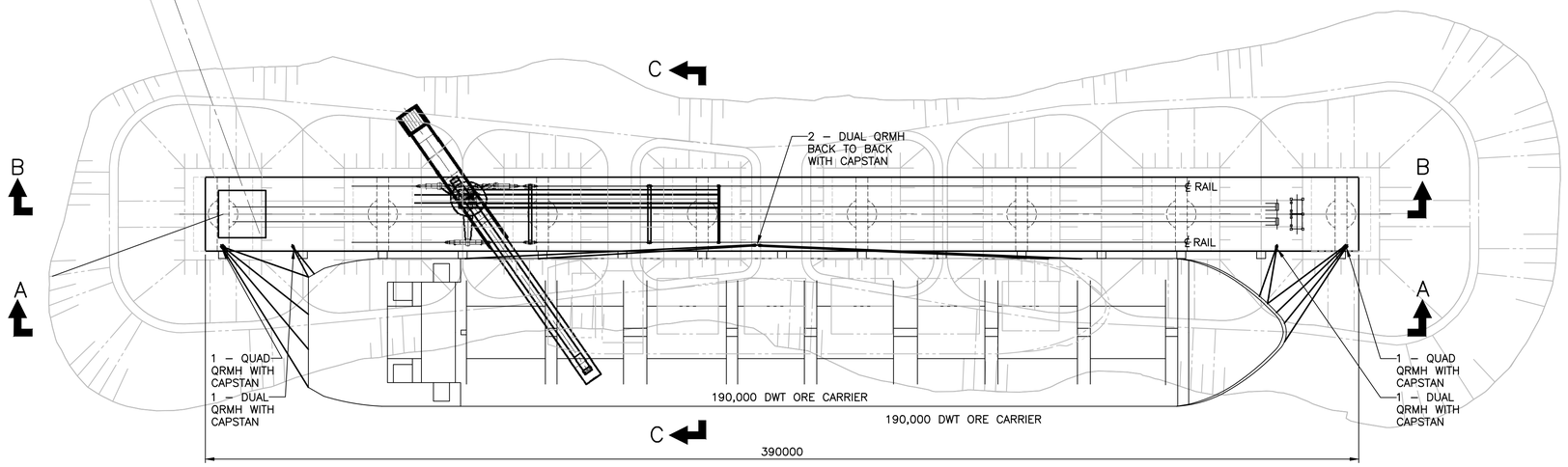
SECTION A–A
SCALE: 1:1000



SECTION B–B
SCALE: 1:1000



SECTION C–C
SCALE: 1:1000



PLAN
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

PRELIMINARY
CONCEPT ONLY
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 R. MacCRIMMON	DRAWN BY S. GRAHAM
DATE	DATE 05/2/2011
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

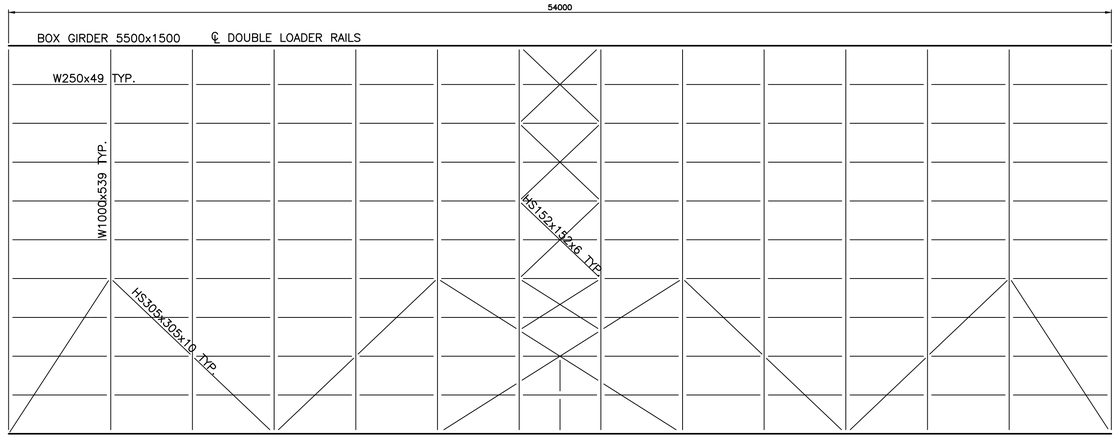
STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS OPTION 2.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697–3220–10–042–0002	A

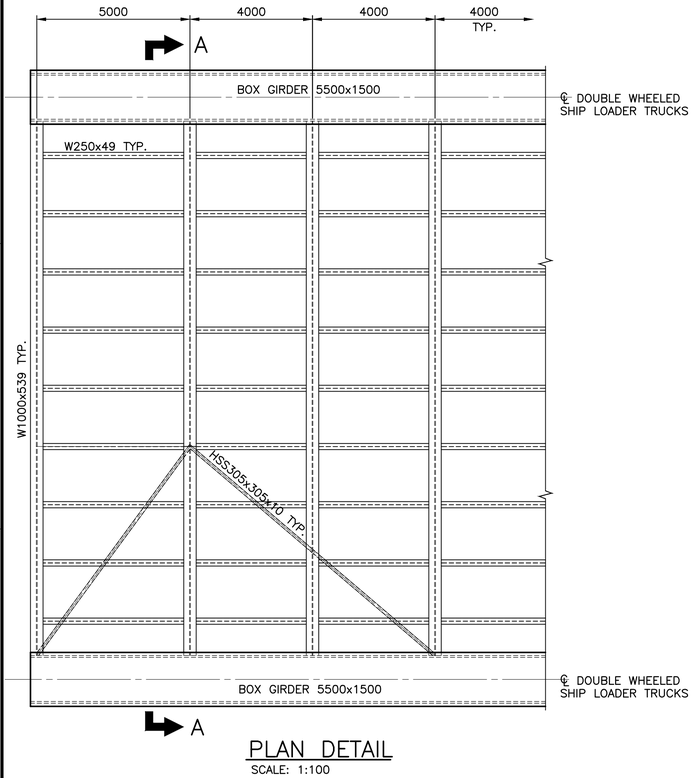
Jun 24, 2011 - 8:58am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0002.dwg

DWG. NO. H337697-3220-10-042-0003 | REVISION A

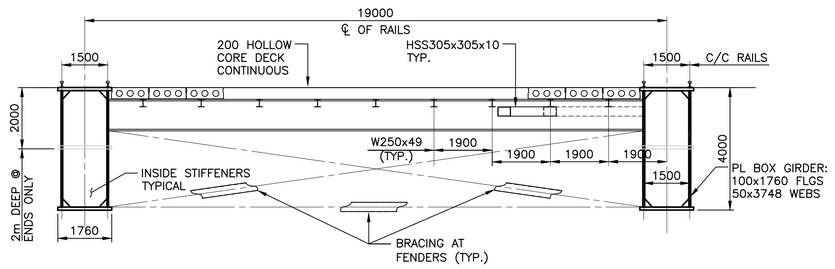
DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES



DECK PLAN
SCALE: 1:150



PLAN DETAIL
SCALE: 1:100



SECTION A–A
SCALE: 1:100

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

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

DESIGNED BY: P. MICHALKO	DRAWN BY: S. GRAHAM, DATE 05/30/2011
CHECKED BY: R. MacCRIMMON	DISCIP. ENGR.
PROJ. DES. COORD.	PROJ. ENGR.
PROJ. MGR.	PROJECT NUMBER

STEENSBY PORT IRON ORE DOCK DECK PLAN, SECTION & DETAILS OPTION 2 .

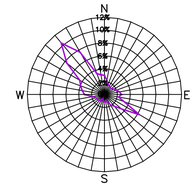
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0003	A

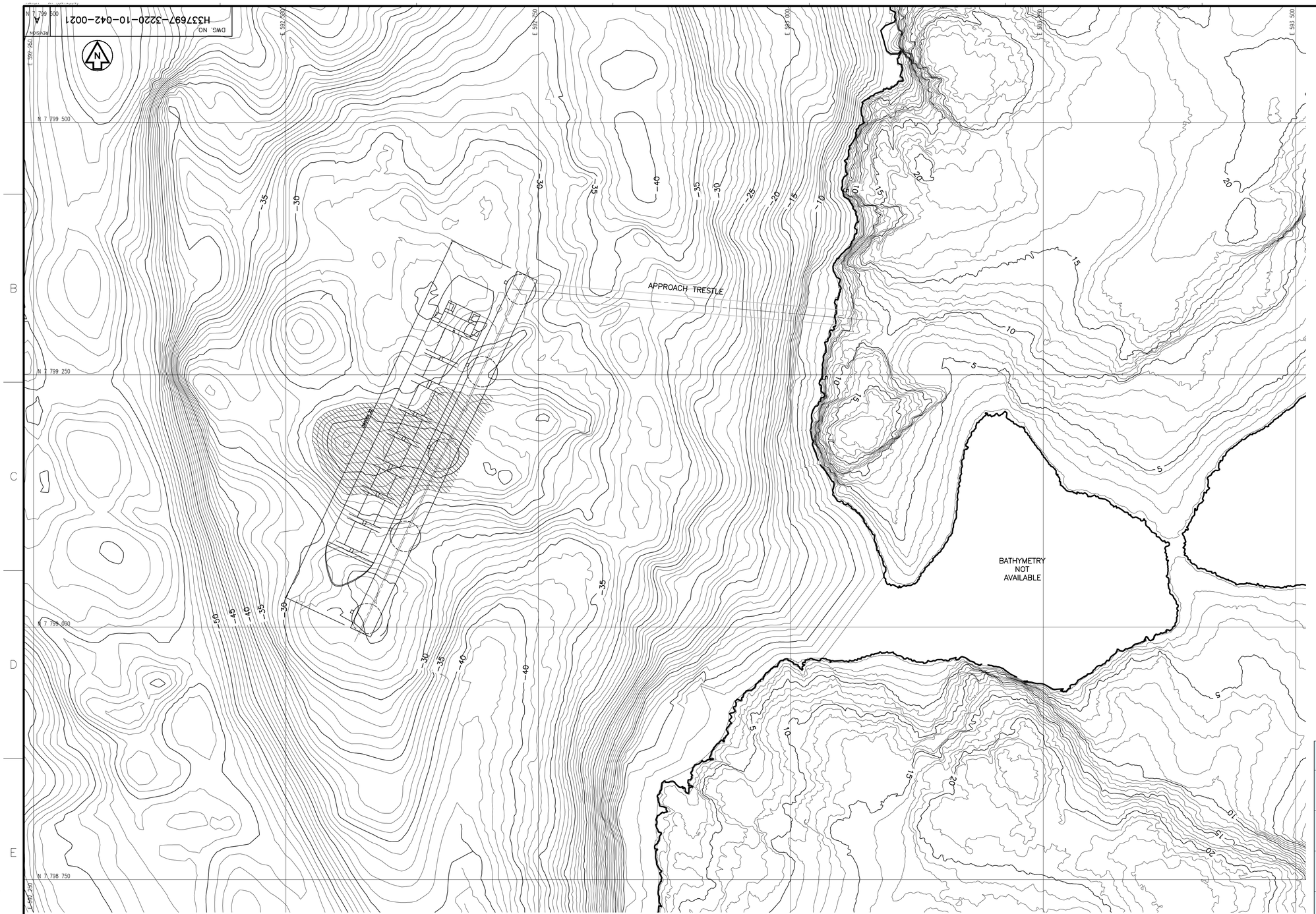
Jul 04 , 2011 , 8:36am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0003.dwg

DWG. NO. H337697-3220-10-042-0021 REVISION A

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions





NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

KEY PLAN
SCALE: 1:25000

GENERAL ARRANGEMENT
SCALE: 1:2000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY P. MICHALKO	DRAWN BY S. GRAHAM
DATE	DATE 05/03/2011
CHECKED BY R. MacCRIMMON	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

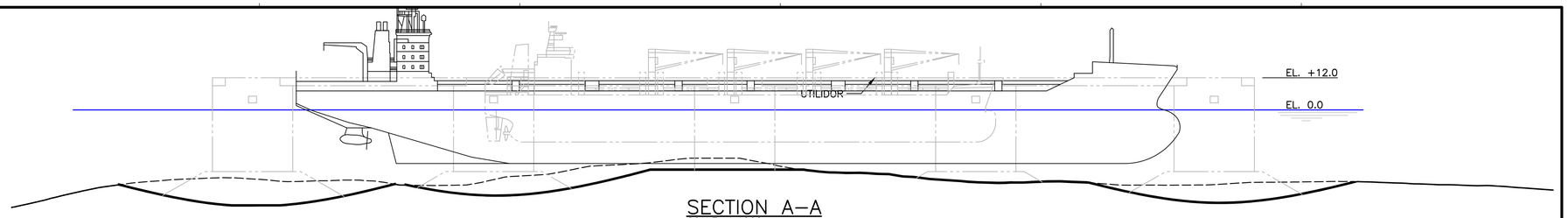
MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK PLAN OPTION 1.

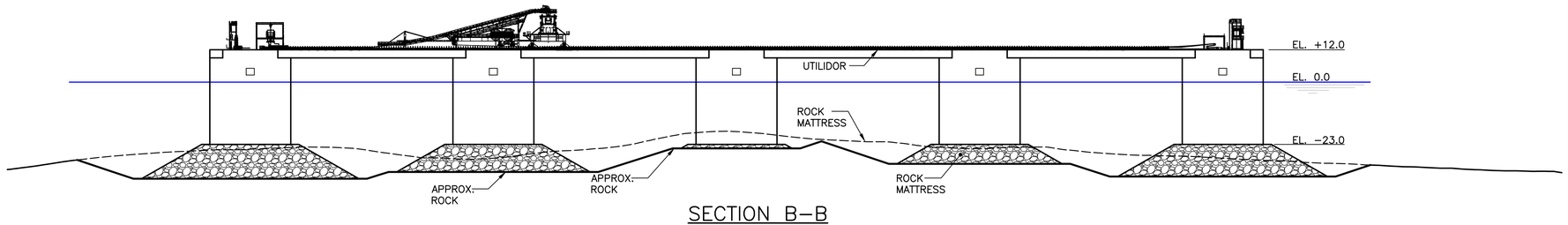
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0021	A

Jun 24 , 2011 - 8:59am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0021.dwg

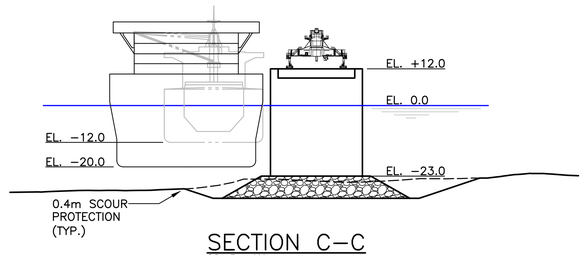
DWG. NO. H337697-3220-10-042-0022
REVISION A



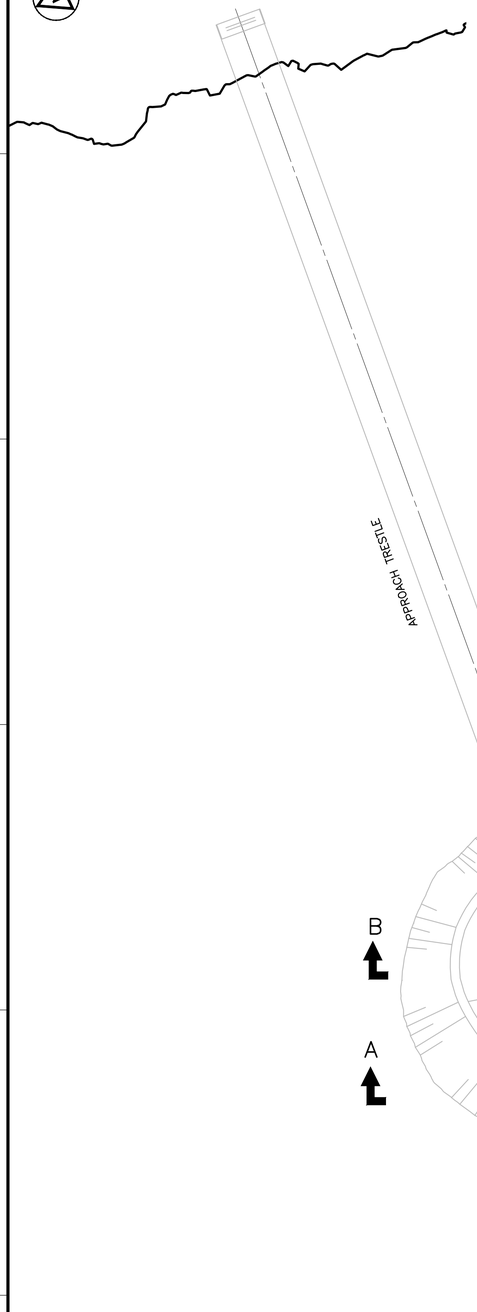
SECTION A–A
SCALE: 1:1000

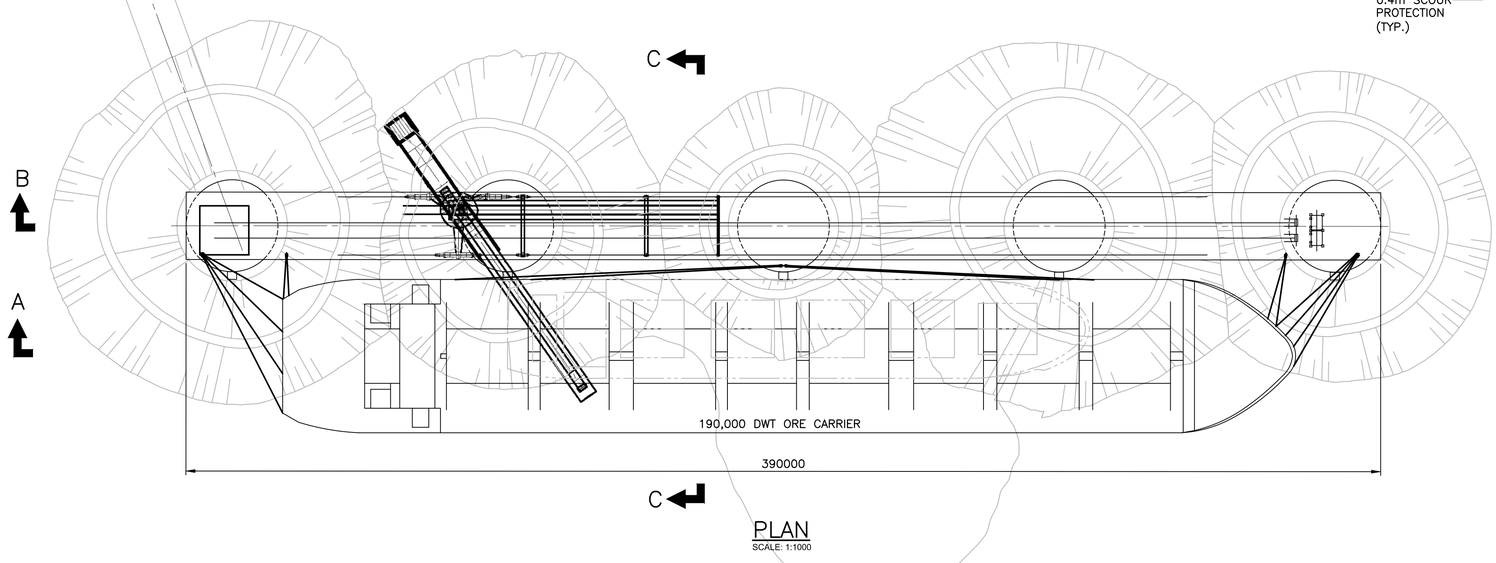


SECTION B–B
SCALE: 1:1000



SECTION C–C
SCALE: 1:1000





PLAN
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

PRELIMINARY
CONCEPT ONLY
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: R. MacCRIMMON	DRAWN BY: S. GRAHAM
DATE	DATE: 05/2/2011
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

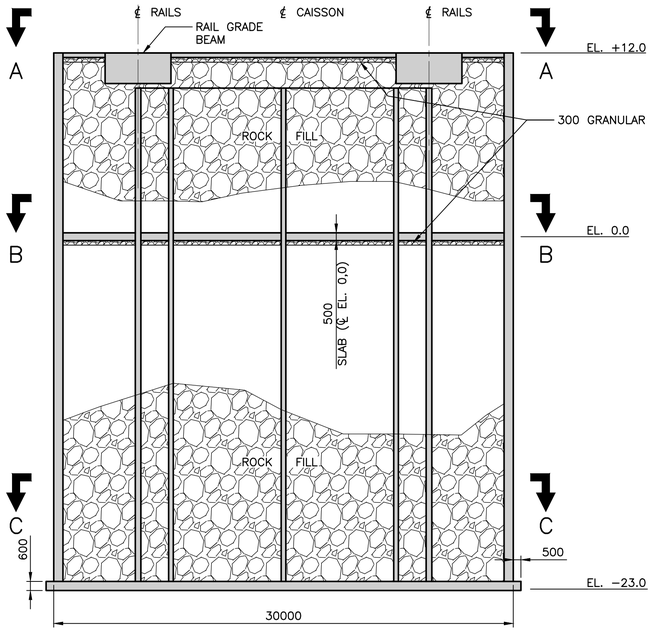
Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

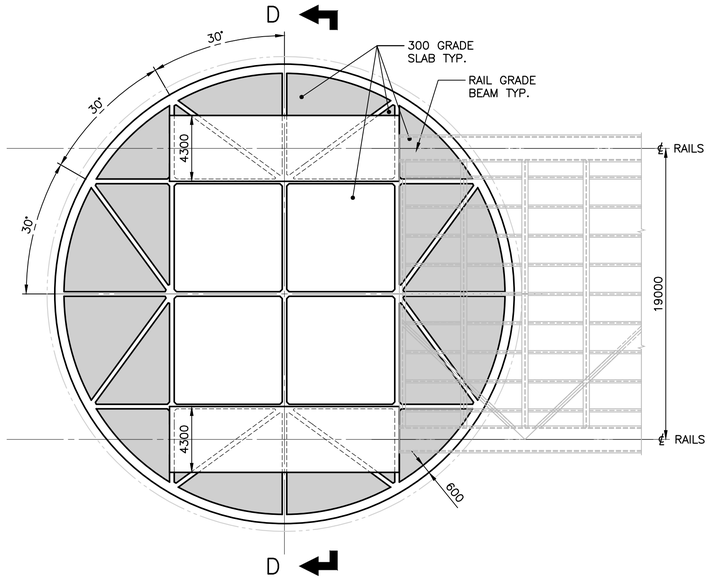
STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS OPTION 1.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0022	A

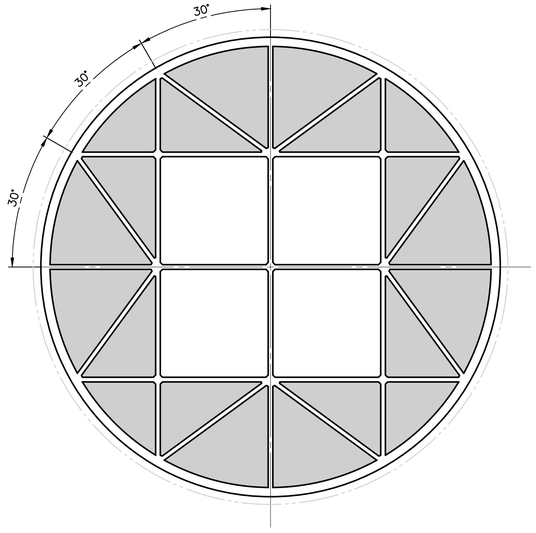
Jun 24, 2011 - 8:59am Login name: grat57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0022.dwg



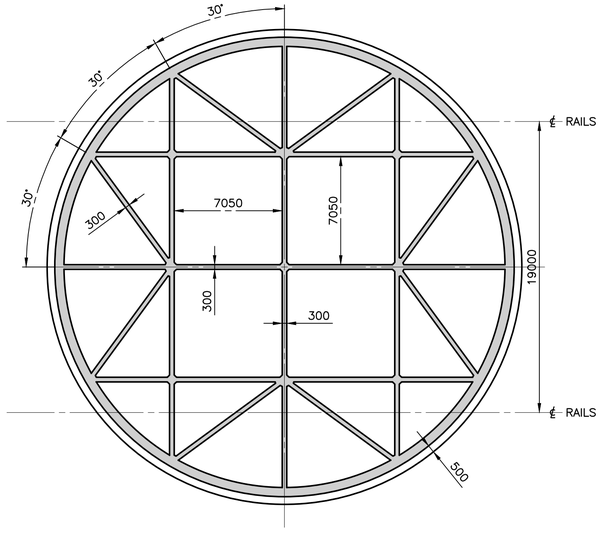
ELEVATION D–D
SCALE: 1:200



PLAN A–A
SCALE: 1:200



PLAN B–B
SCALE: 1:200



PLAN C–C
SCALE: 1:200

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 4 8 12 16 20m
Scale: 1:200

PRELIMINARY
CONCEPT ONLY
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: R. MacCRIMMON	DRAWN BY: S. GRAHAM
DATE	DATE: 05/10/2011
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

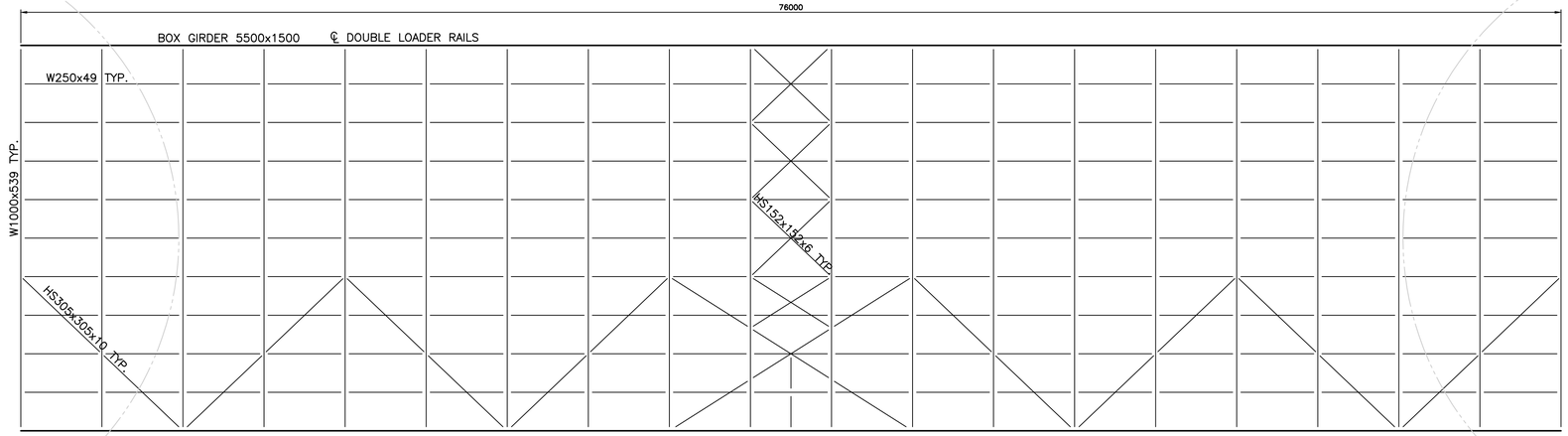
MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK CAISSON PLAN SECTIONS & DETAILS OPTION 1.

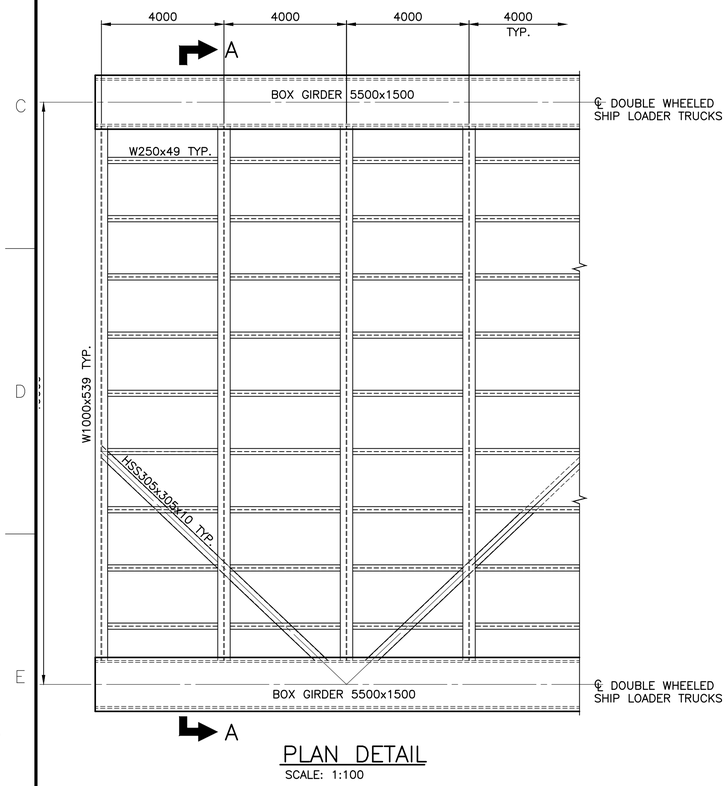
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0023	A

DWG. NO. H337697-3220-10-042-0024 | REVISION A

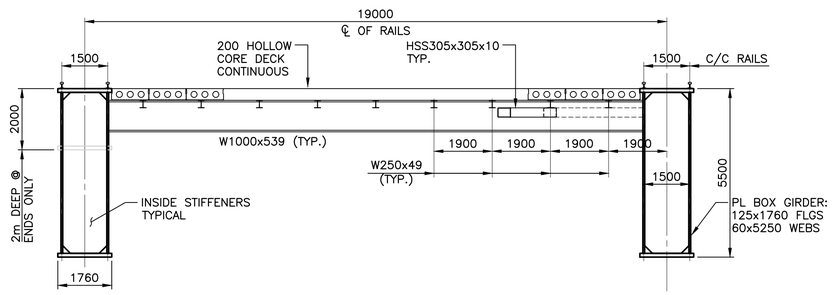
DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES



DECK PLAN
SCALE: 1:150



PLAN DETAIL
SCALE: 1:100



SECTION A–A
SCALE: 1:100

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

PRELIMINARY
CONCEPT ONLY
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
P. MICHALKO	S. GRAHAM
DATE	DATE 05/30/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

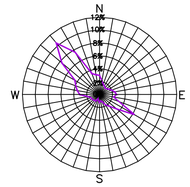
STEENSBY PORT
IRON ORE DOCK DECK
PLAN, SECTION & DETAILS
OPTION 1 .

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0024	A

DWG. NO. H337697-3220-10-042-0031 A
REVISION

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions



N 7 799 500
N 7 799 250
N 7 799 000
N 7 798 750
E 592 750
E 593 000
E 593 250
E 593 500

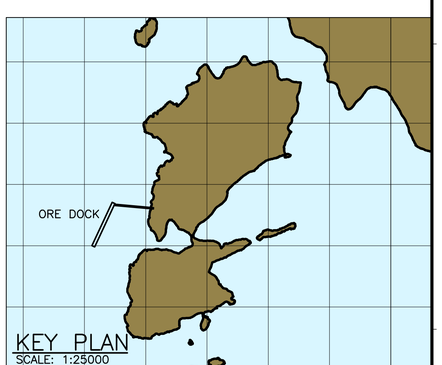
APPROACH TRESTLE

BATHYMETRY NOT AVAILABLE

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000



KEY PLAN
SCALE: 1:25000

GENERAL ARRANGEMENT
SCALE: 1:2000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

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REVISIONS				

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DESIGNED BY	DRAWN BY
P. MICHALKO	S. GRAHAM
DATE	DATE 05/03/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

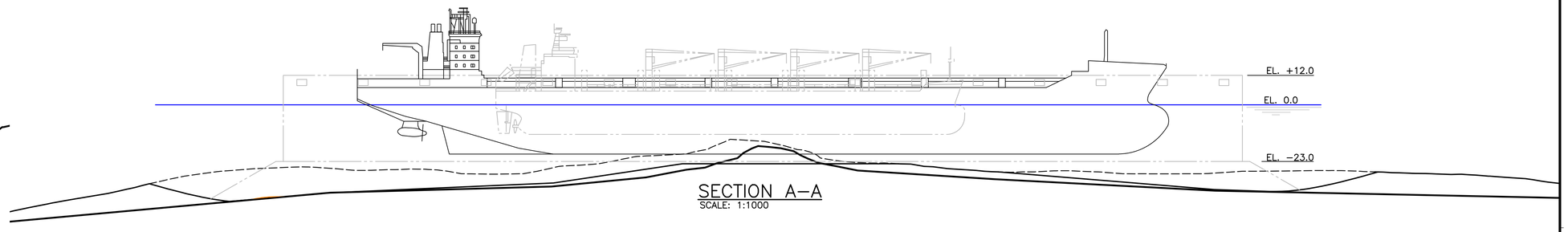
MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK PLAN OPTION 3.

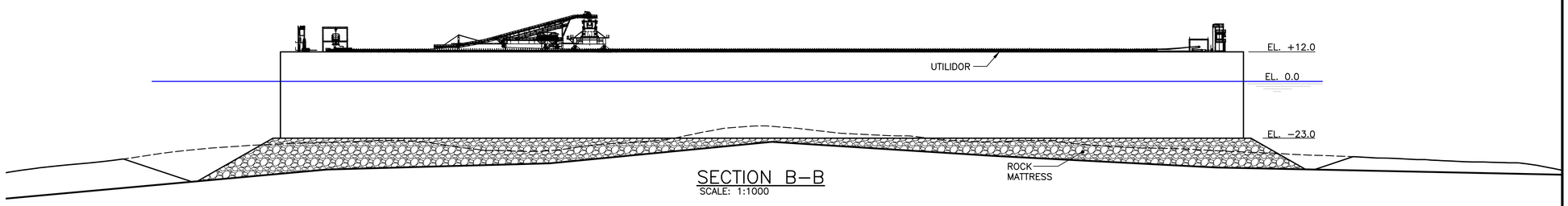
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0031	A

Jun 24 , 2011 - 9:01am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0031.dwg

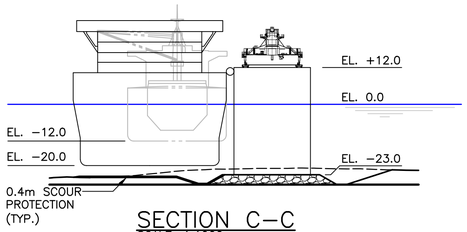
DWG. NO. H337697-3220-10-042-0032
REVISION A



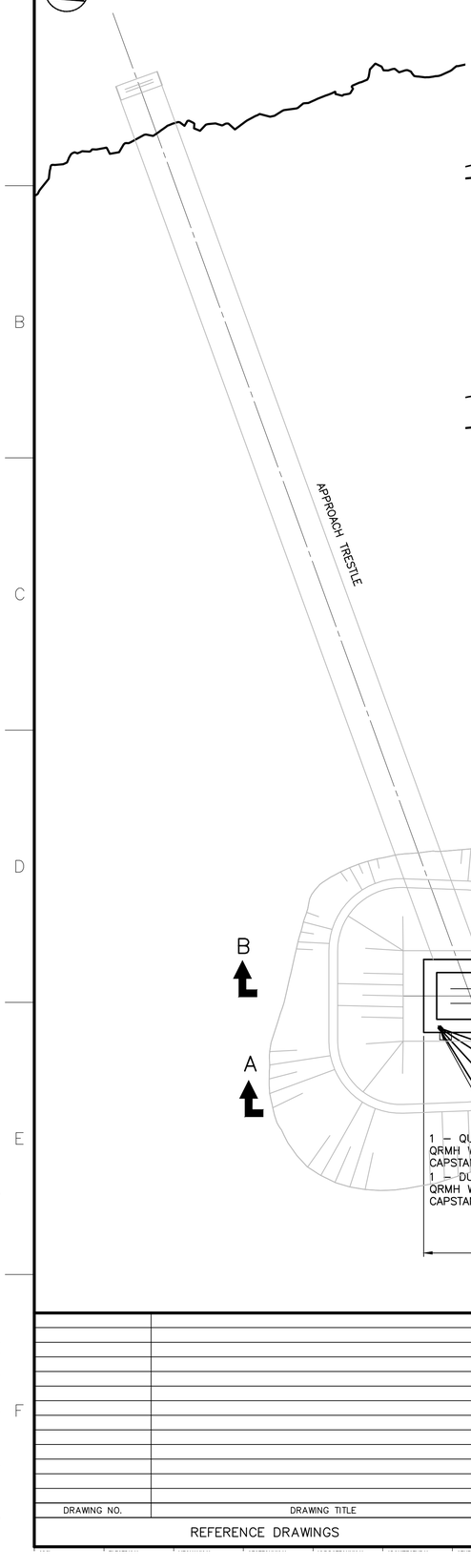
SECTION A–A
SCALE: 1:1000

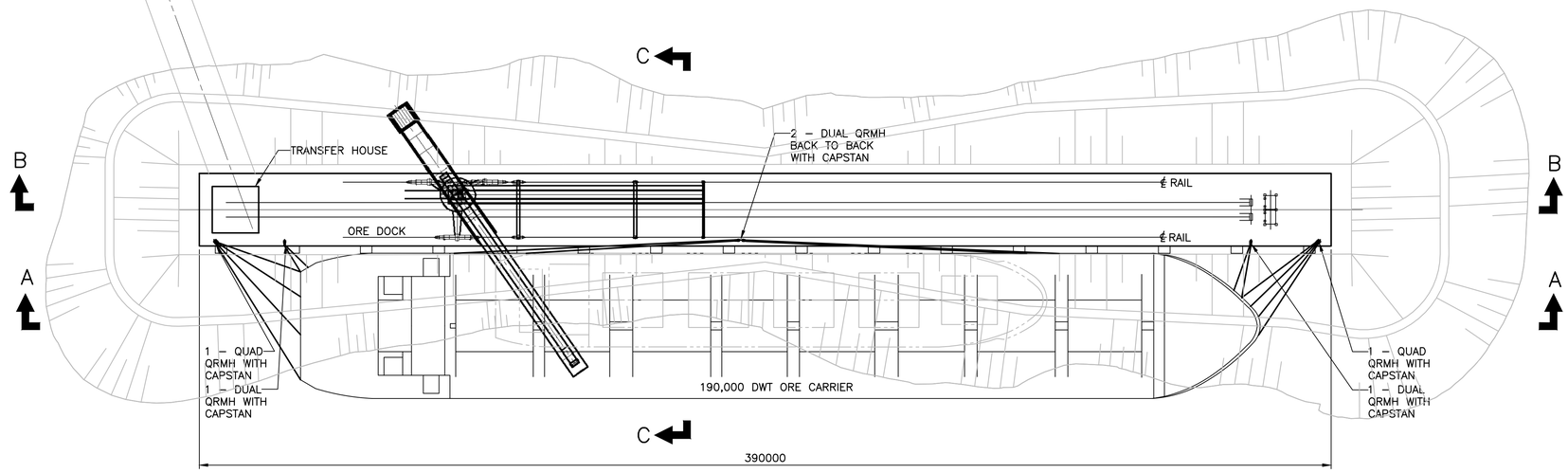


SECTION B–B
SCALE: 1:1000



SECTION C–C
SCALE: 1:1000





ARRANGEMENT 3 PLAN
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

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

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R. MacCRIMMON	S. GRAHAM
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CHECKED BY	DISCIP. ENGR.
P. MICHALKO	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

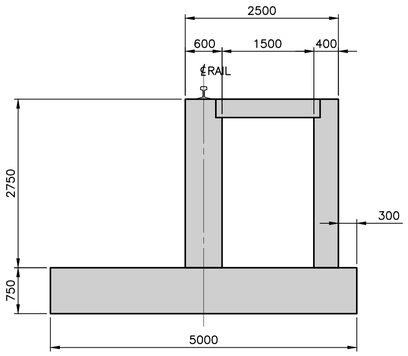
MARY RIVER IRON ORE PROJECT

STEENSBY PORT
IRON ORE DOCK
PLAN & SECTIONS
OPTION 3.

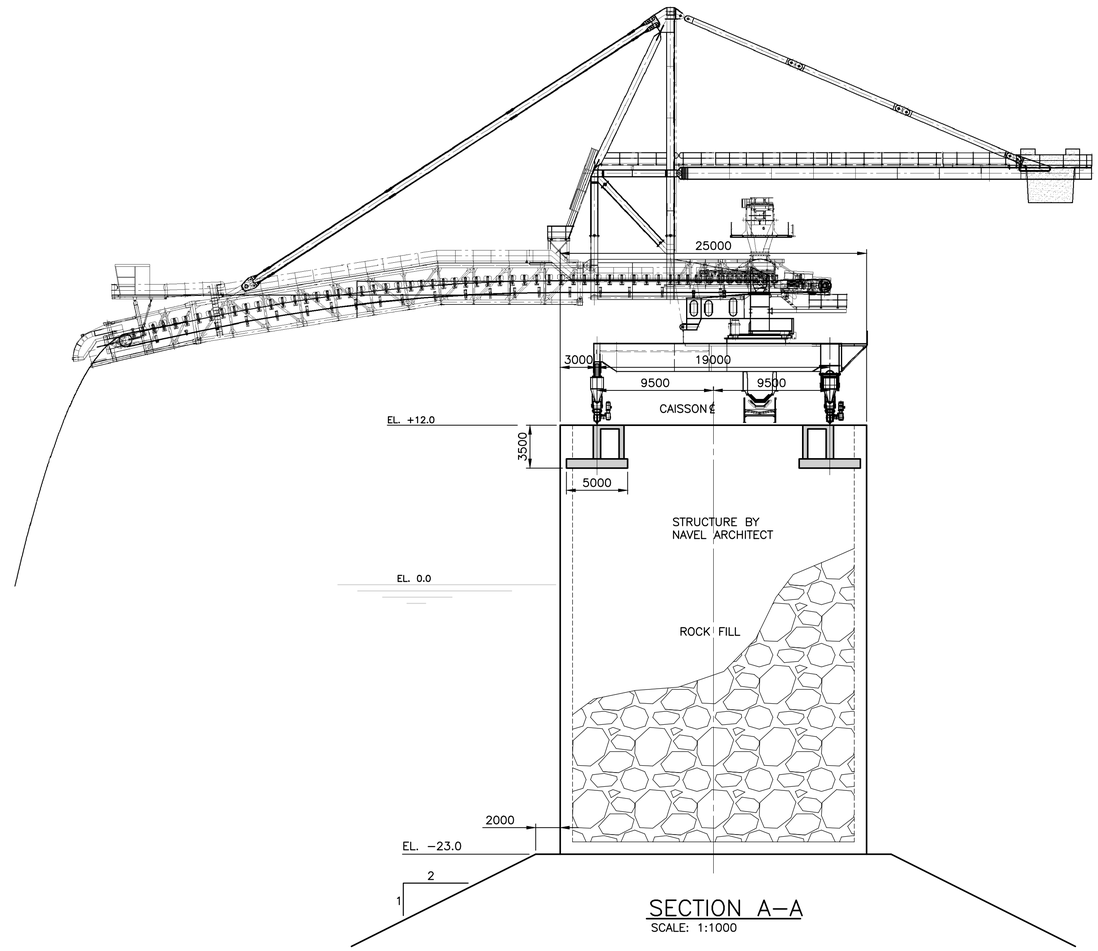
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0032	A

Jun 24, 2011 - 9:02am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0032.dwg

DWG. NO. H337697-3220-10-042-0033 | REVISION A



UTILIDOR DETAIL
SCALE: 1:50



SECTION A–A
SCALE: 1:1000

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DO NOT USE FOR CONSTRUCTION

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

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

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R. MacCRIMMON	S. GRAHAM
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DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

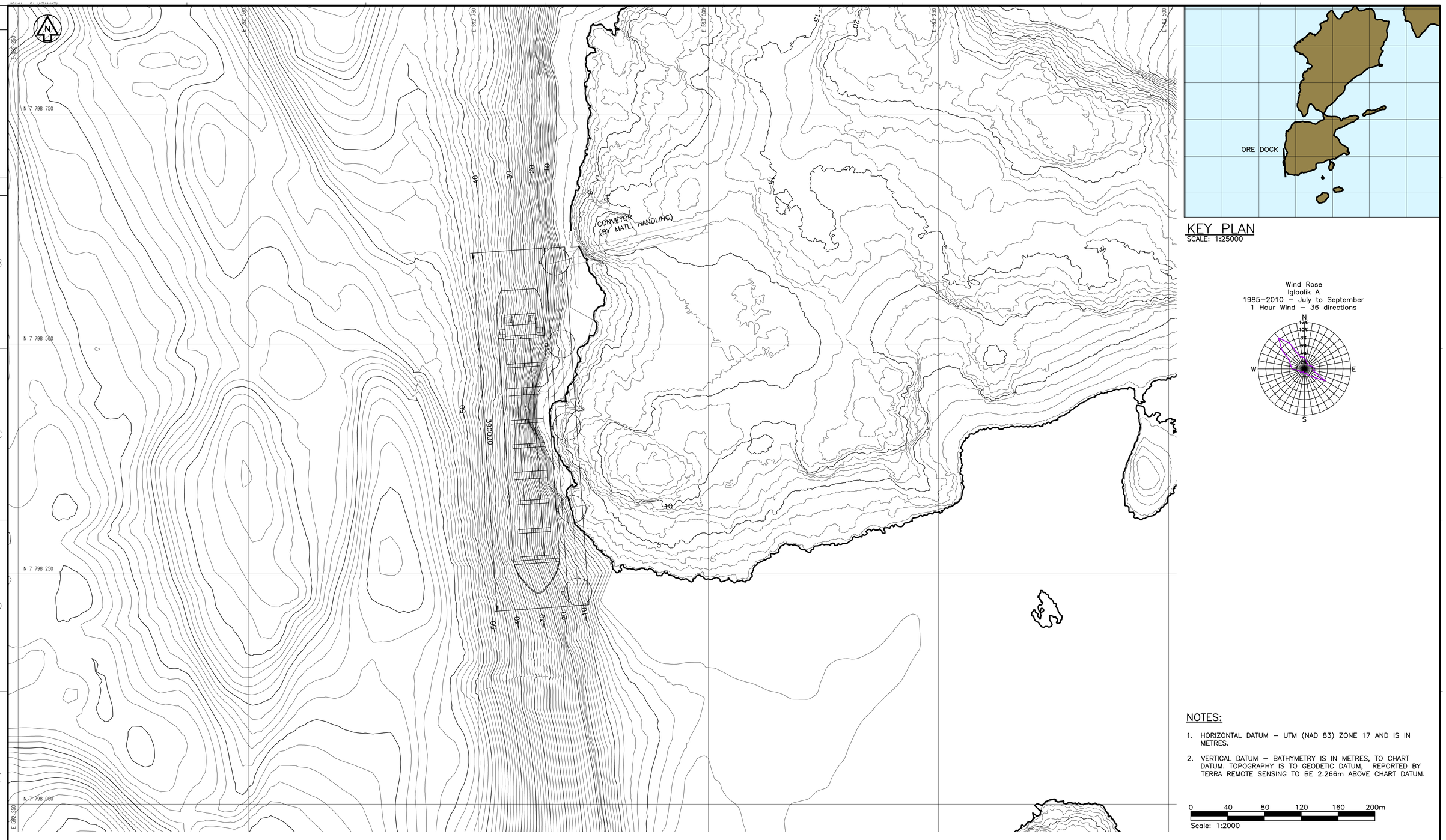
STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS ARRANGEMENT 3 (CONTINUOUS).

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0033	A

May 16 , 2011 - 9:43am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0033.dwg

DWG. NO. H337697-3220-10-042-0041

REVISION A



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions

GENERAL ARRANGEMENT
SCALE: 1:2000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
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DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

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P. MICHALKO	S. GRAHAM
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R. MacCRIMMON	
DATE	DATE
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PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

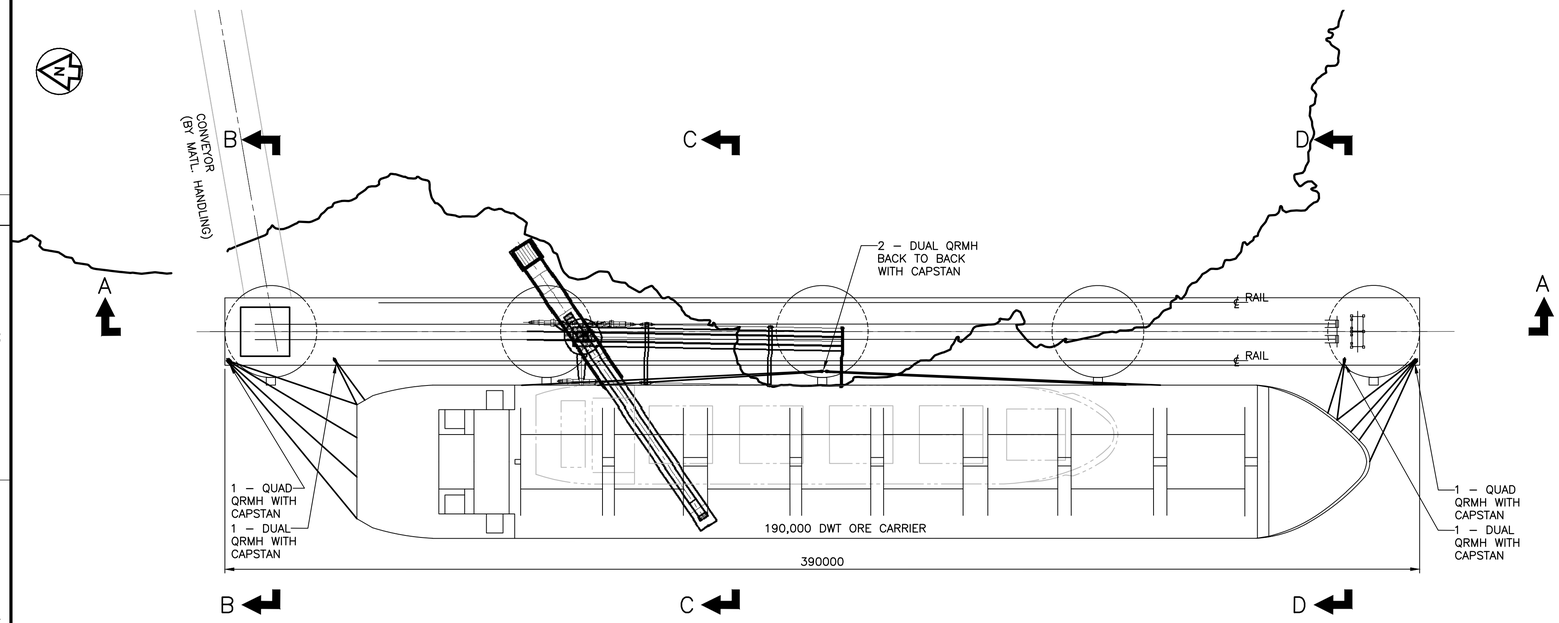
STEENSBY PORT IRON ORE DOCK GENERAL ARRANGEMENT OPTION 4.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0041	A

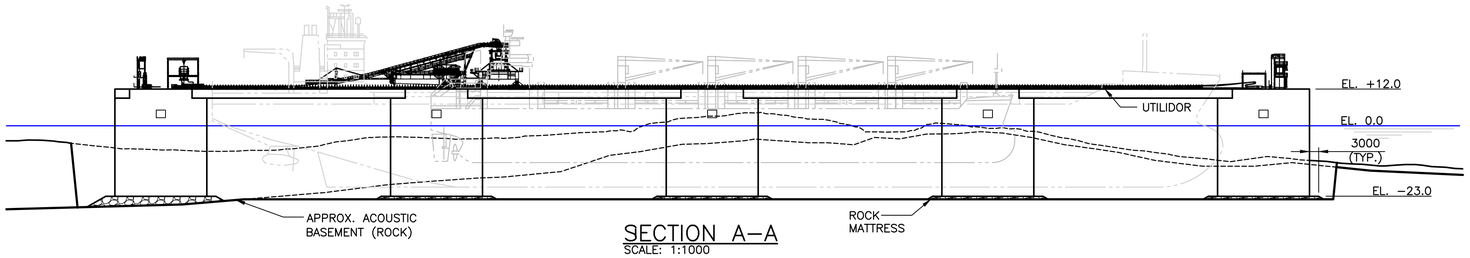
Jul 07 , 2011 - 9:28am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0041.dwg

REVISION A

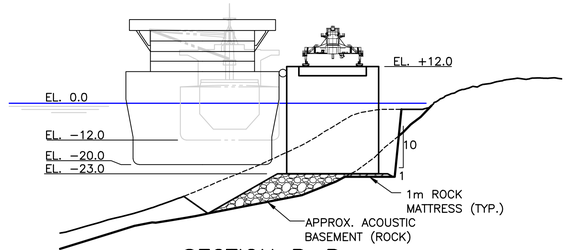
DWG. NO. H337697-3220-10-042-0042



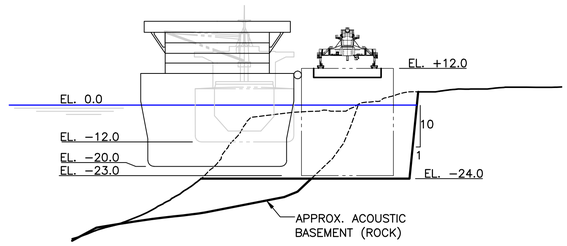
PLAN
SCALE: 1:1000



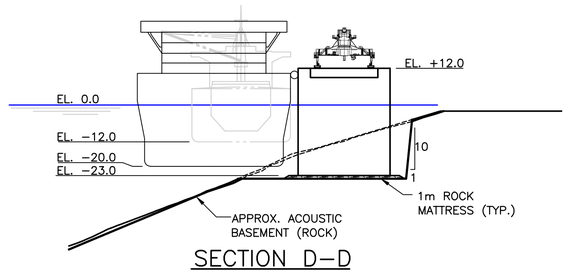
SECTION A–A
SCALE: 1:1000



SECTION B–B
SCALE: 1:1000



SECTION C–C
SCALE: 1:1000



SECTION D–D
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
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DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

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A	ISSUED FOR REVIEW		07/07/2011

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R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS OPTION 4.

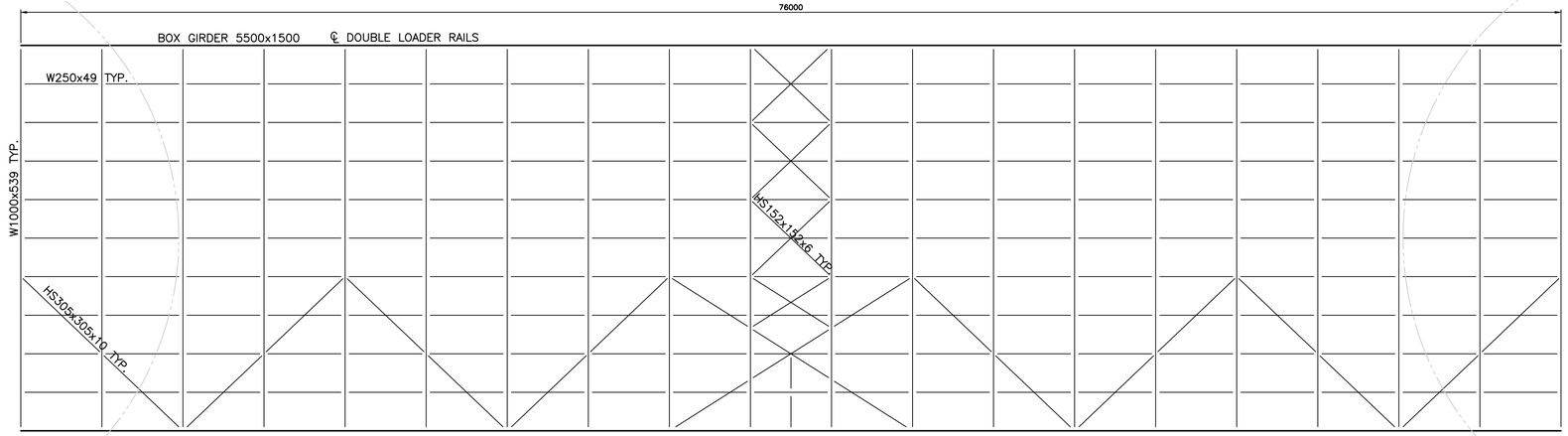
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0042	A

E 592 250

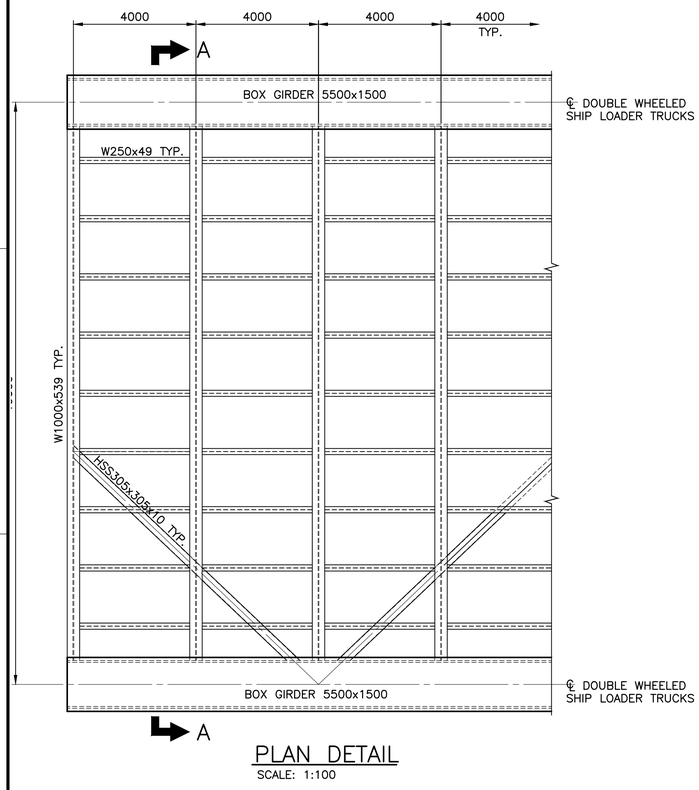
Jul 07 , 2011 - 9:27am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\CA\H337697-3220-10-042-0042.dwg

DWG. NO. H337697-3220-10-042-0043 REVISION A

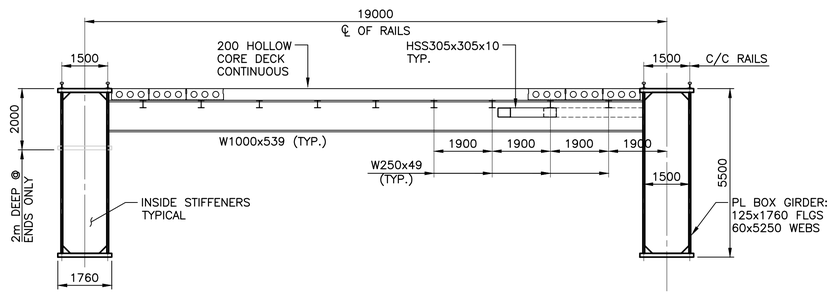
DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES



DECK PLAN
SCALE: 1:150



PLAN DETAIL
SCALE: 1:100



SECTION A–A
SCALE: 1:100

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 3 6 9 12 15 m
0 2 4 6 8 10 m
Scale: 1:150
Scale: 1:100

PRELIMINARY
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DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

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R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

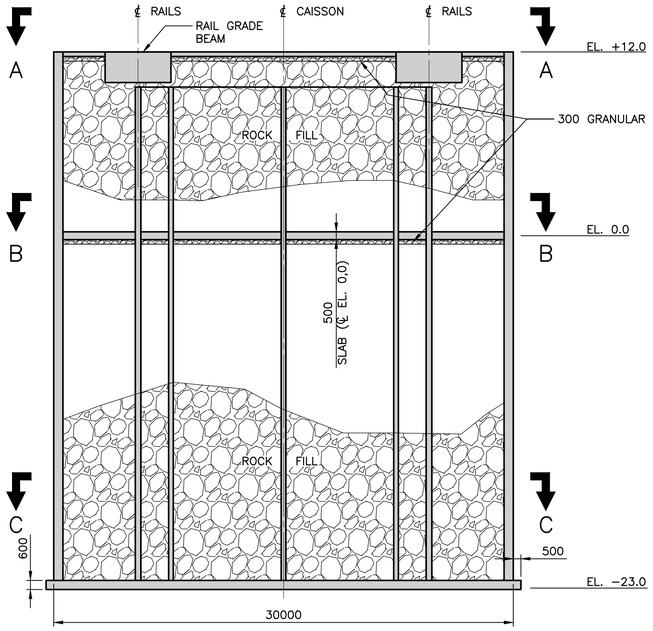
MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK DECK PLAN, SECTION & DETAIL OPTION 4.

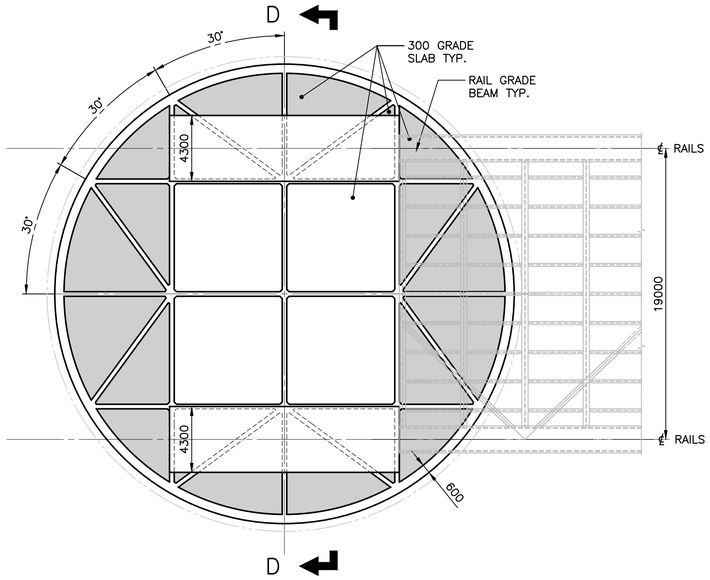
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0043	A

Jul 07 , 2011 - 9:26am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0043.dwg

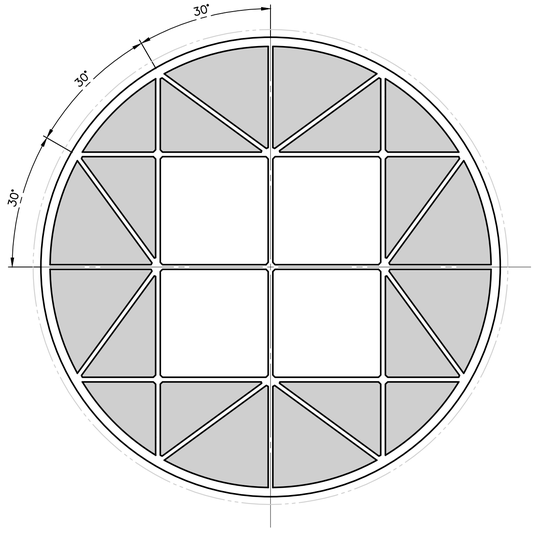
N 7 799 500



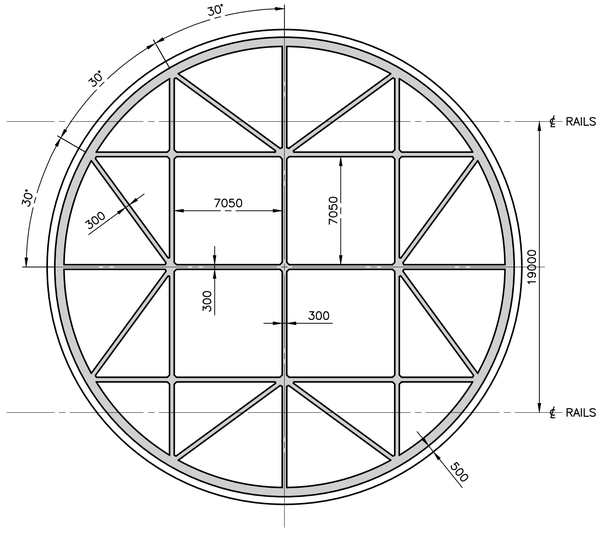
ELEVATION D–D
SCALE: 1:200



PLAN A–A
SCALE: 1:200



PLAN B–B
SCALE: 1:200



PLAN C–C
SCALE: 1:200

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 4 8 12 16 20m
Scale: 1:200

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

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NO.	DESCRIPTION	CHK'D	APP'D	DATE
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PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. DATE	PROJECT NUMBER

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

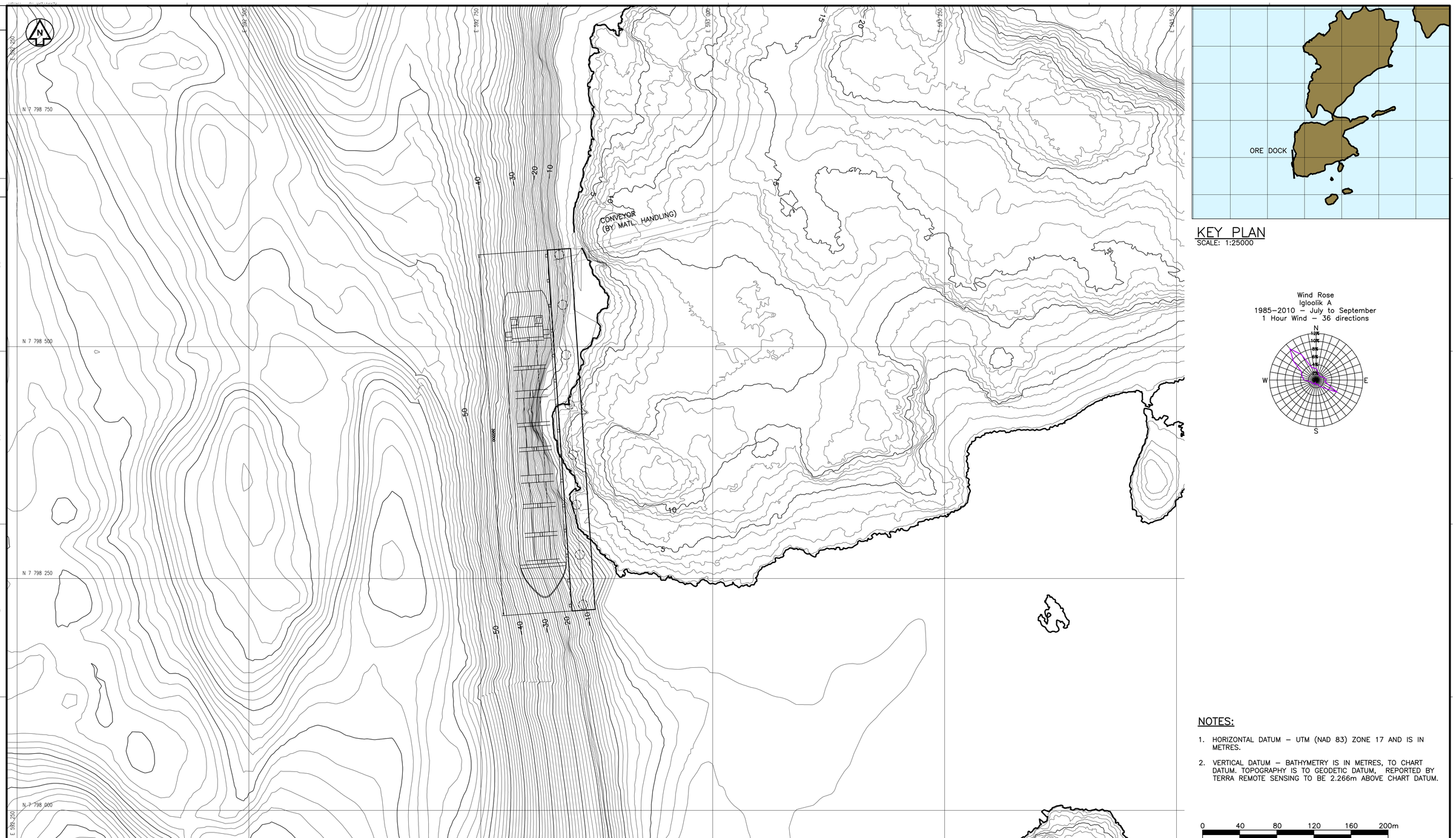
STEENSBY PORT IRON ORE DOCK CAISSON PLAN SECTIONS & DETAILS OPTION 4.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697–3220–10–042–0044	A

DWG. NO. H337697–3220–10–042–0044
REVISION A

Jul 07 , 2011 , 9:26am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697–3220–10–042–0044.dwg

DWG. NO. H337697-3220-10-042-0051
REVISION A



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

GENERAL ARRANGEMENT
SCALE: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
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DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

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A	ISSUED FOR REVIEW		07/07/2011

ISSUE AUTHORIZATION

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R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

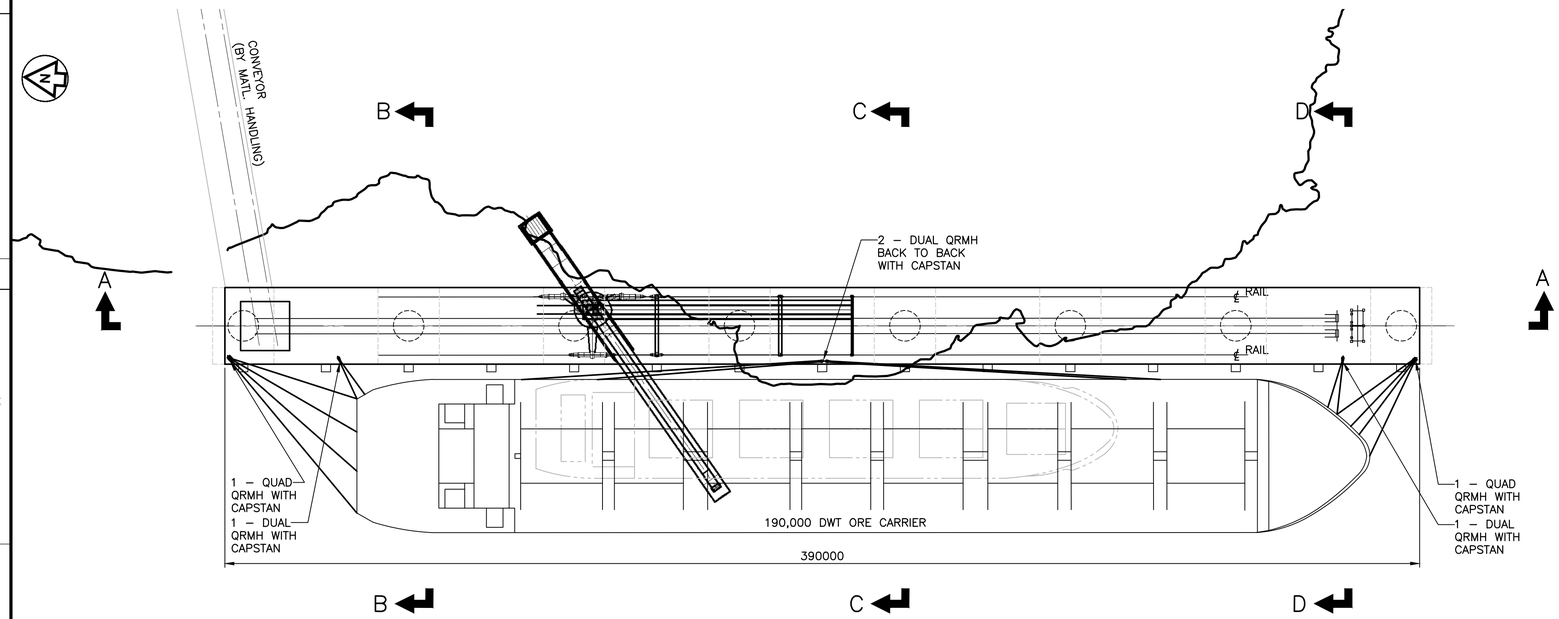
STEENSBY PORT IRON ORE DOCK GENERAL ARRANGEMENT OPTION 5.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0051	A

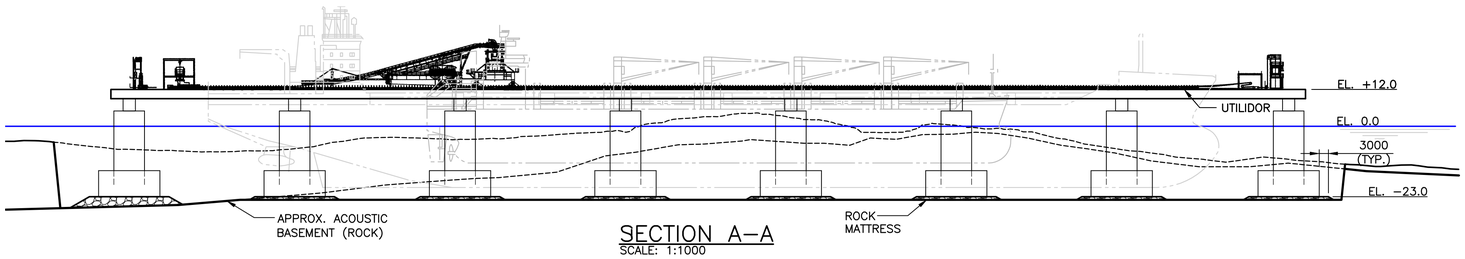
Jul 07 , 2011 , 9:25am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0051.dwg

REVISION A

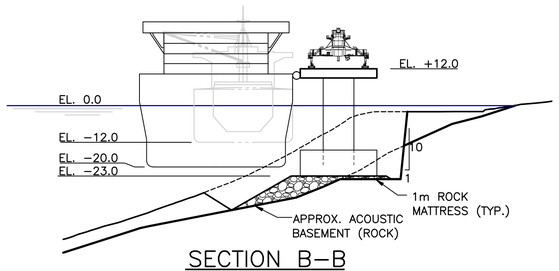
DWG. NO. H337697-3220-10-042-0052



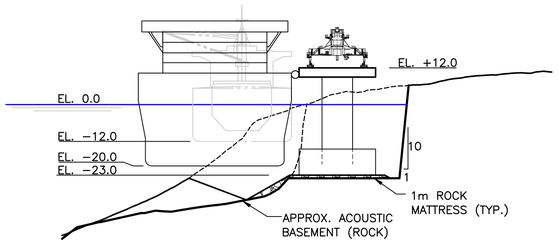
PLAN
SCALE: 1:1000



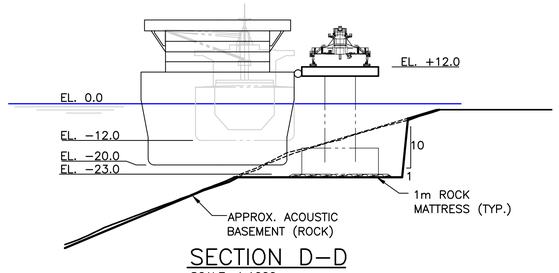
SECTION A–A
SCALE: 1:1000



SECTION B–B
SCALE: 1:1000



SECTION C–C
SCALE: 1:1000



SECTION D–D
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY P. MICHALKO	DRAWN BY S. GRAHAM
DATE	DATE 05/05/2011
CHECKED BY R. MacCRIMMON	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

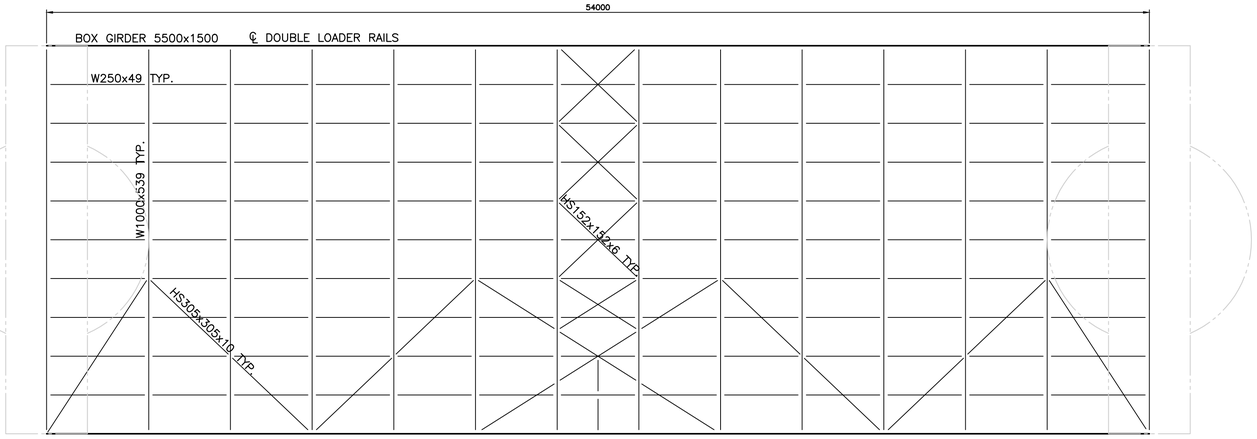
MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS OPTION 5.

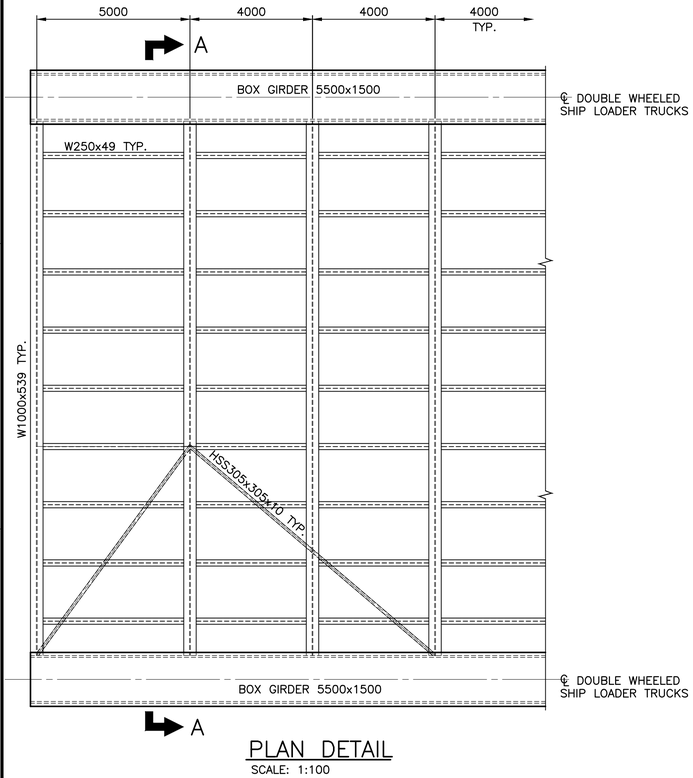
SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0052	A

E 592 250

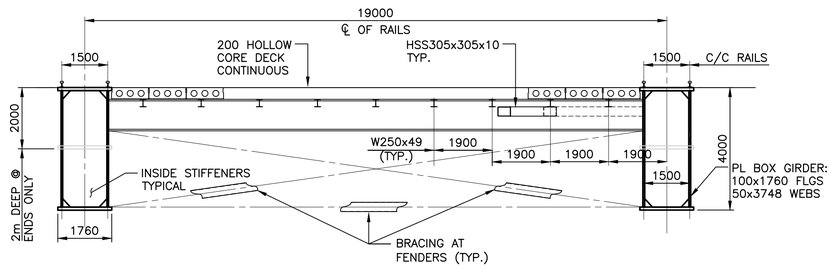
Jul 07 , 2011 , 9:35am Login name: groh57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0052.dwg



DECK PLAN
SCALE: 1:150



PLAN DETAIL
SCALE: 1:100



SECTION A–A
SCALE: 1:100

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 3 6 9 12 15 m
0 2 4 6 8 10 m
Scale: 1:150
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
A	ISSUED FOR REVIEW		07/07/2011
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DESIGNED BY	DRAWN BY
P. MICHALKO	S. GRAHAM
DATE	DATE 07/06/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

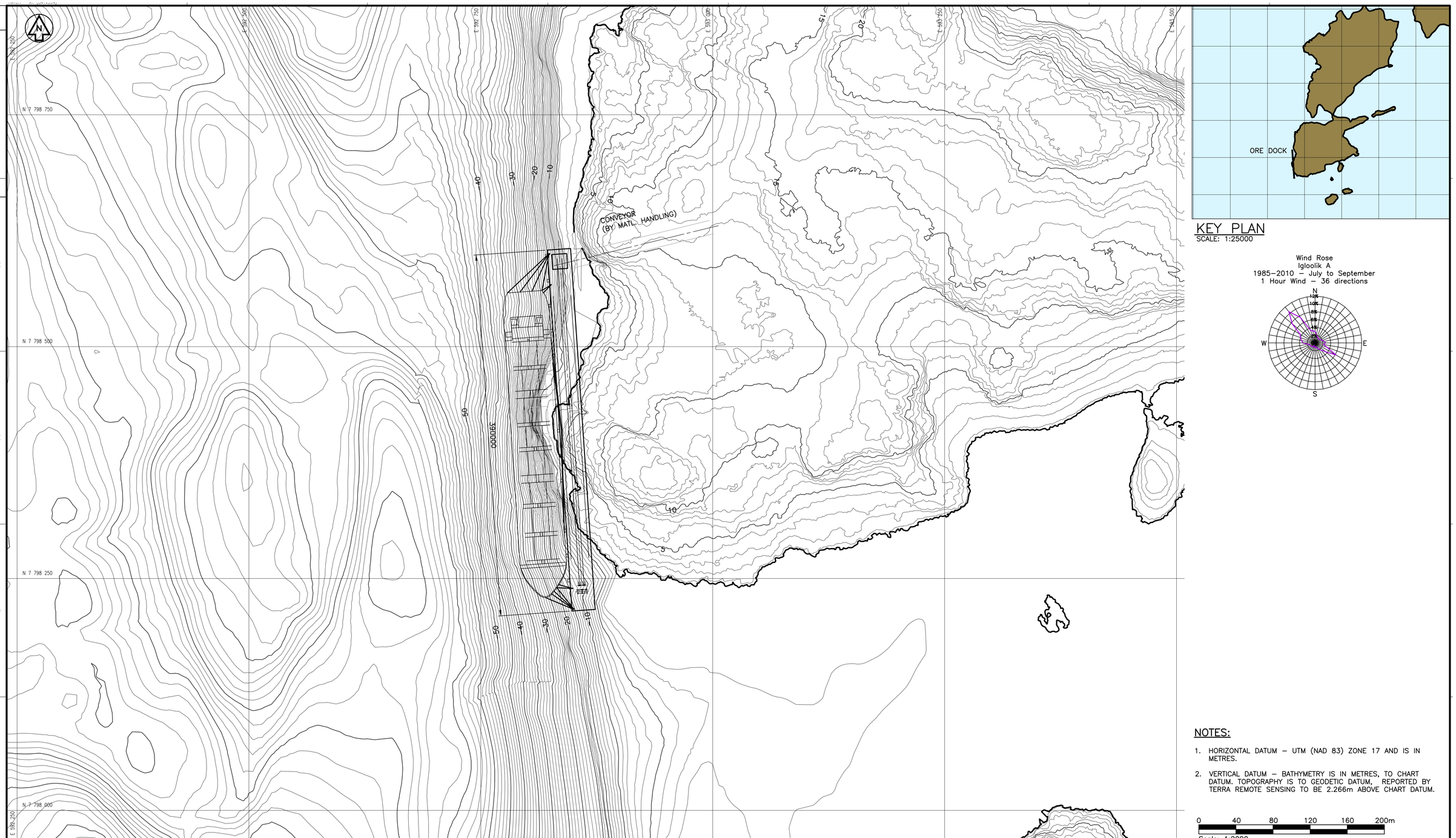
Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK DECK PLAN, SECTION & DETAILS OPTION 6.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0053	A

DWG. NO. H337697-3220-10-042-0061
REVISION A



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions

GENERAL ARRANGEMENT
SCALE: 1:2000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011
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P. MICHALKO	S. GRAHAM
DATE	DATE 05/05/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

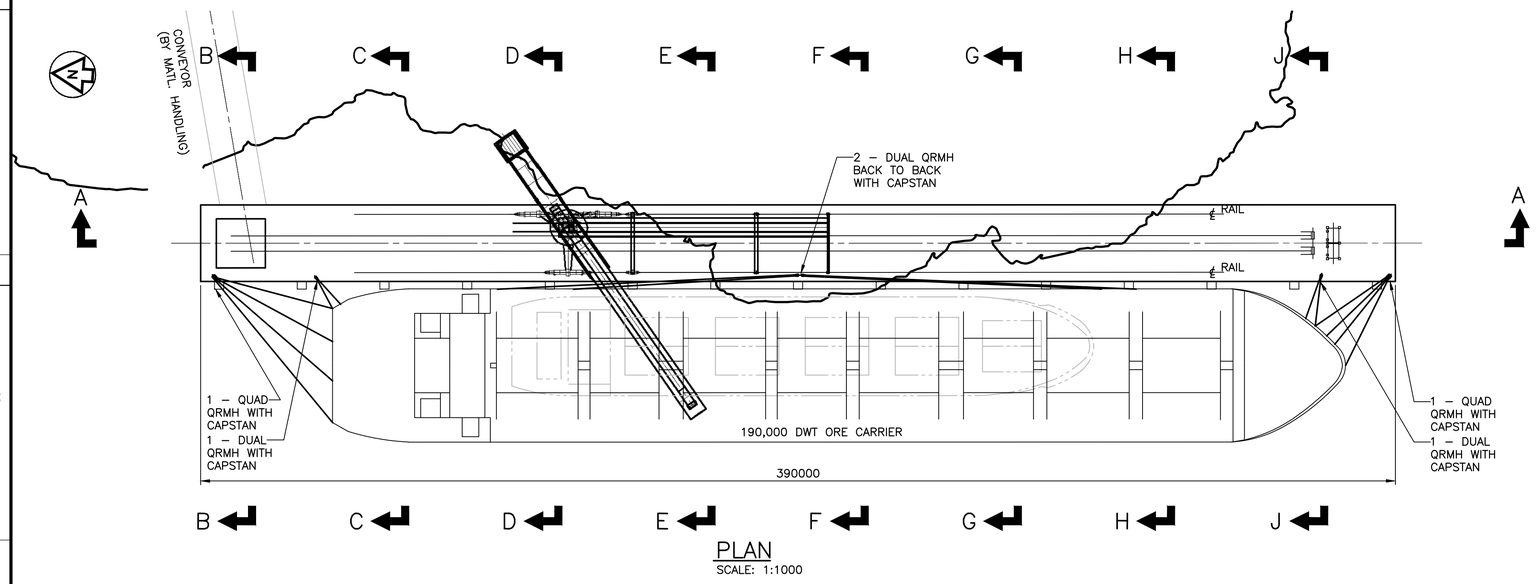
STEENSBY PORT IRON ORE DOCK GENERAL ARRANGEMENT OPTION 6.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0061	A

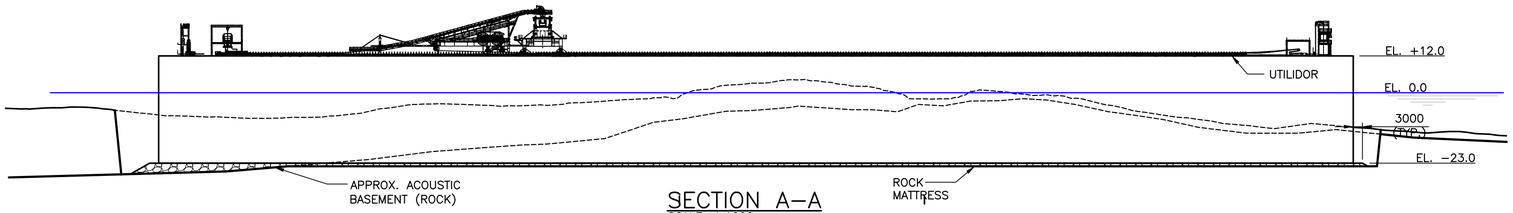
Jul 07 , 2011 , 9:33am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0061.dwg

REVISION A

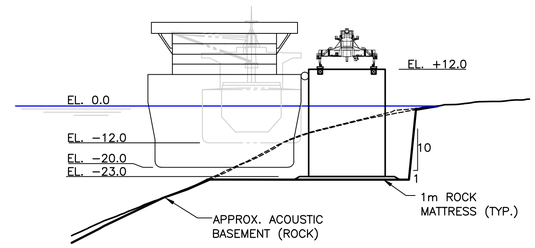
DWG. NO. H337697-3220-10-042-0062



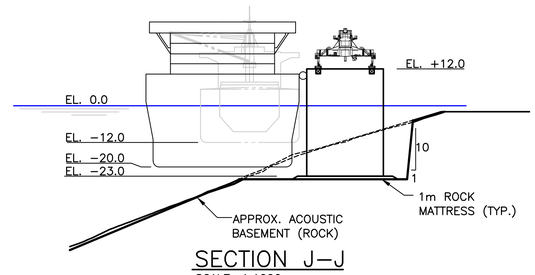
PLAN
SCALE: 1:1000



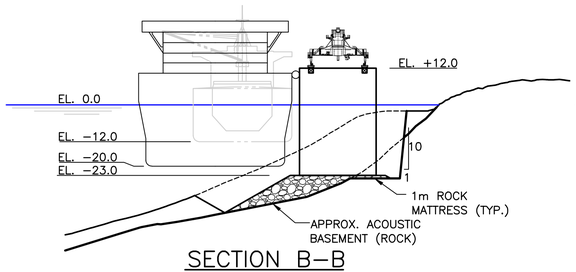
SECTION A–A
SCALE: 1:1000



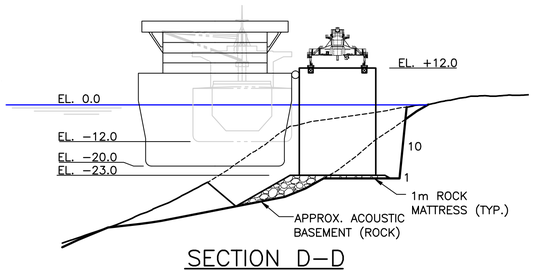
SECTION H–H
SCALE: 1:1000



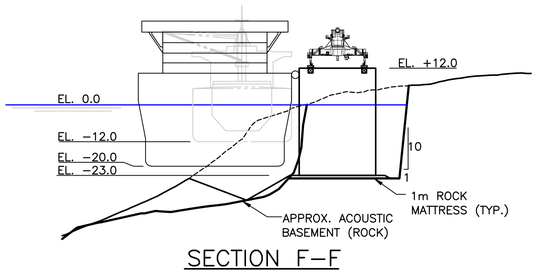
SECTION J–J
SCALE: 1:1000



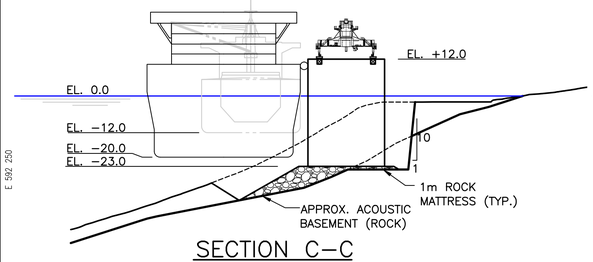
SECTION B–B
SCALE: 1:1000



SECTION D–D
SCALE: 1:1000



SECTION F–F
SCALE: 1:1000



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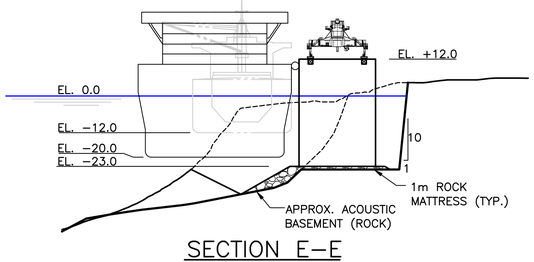
SCALE: 1:1000



SECTION E–E
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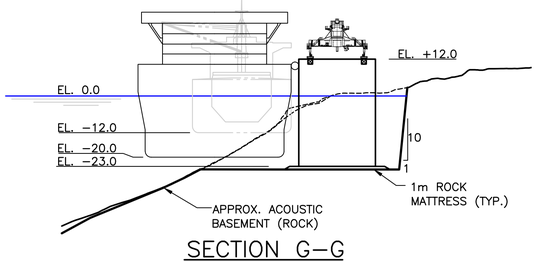


SECTION G–G
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

E 592 250

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY	DRAWN BY
P. MICHALKO	S. GRAHAM
DATE	DATE 07/05/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE DOCK PLAN & SECTIONS OPTION 6.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0062	A

Jul 07 , 2011 - 9:32am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\CA\H337697-3220-10-042-0062.dwg

REVISION A

DWG. NO. H337697-3220-10-042-0071

E 592 250 | E 592 500 | E 592 750 | E 593 000 | E 593 250 | E 593 500

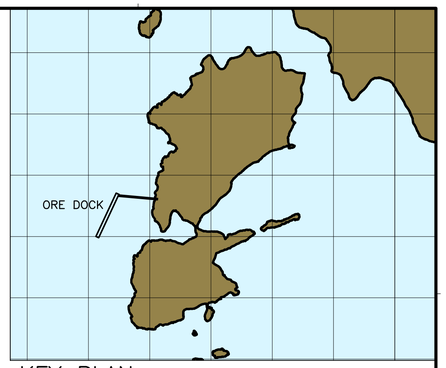
N 7 799 500 | N 7 799 250 | N 7 799 000 | N 7 798 750

331000

APPROACH TRESTLE

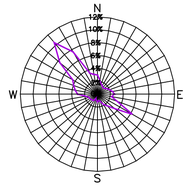
ORE DOCK

BATHYMETRY NOT AVAILABLE



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions



NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.
3. LOCATION PROVIDED BY AND CONCEPT DEVELOPED BY BAFFINLAND IRON MINE (BIM).

0 40 80 120 160 200m
Scale: 1:2000

GENERAL ARRANGEMENT
SCALE: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
A	07/07/2011		
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY P. MICHALKO DATE	DRAWN BY S. GRAHAM DATE 06/24/2011
CHECKED BY R. MacCRIMMON DATE	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. DATE	PROJECT NUMBER

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

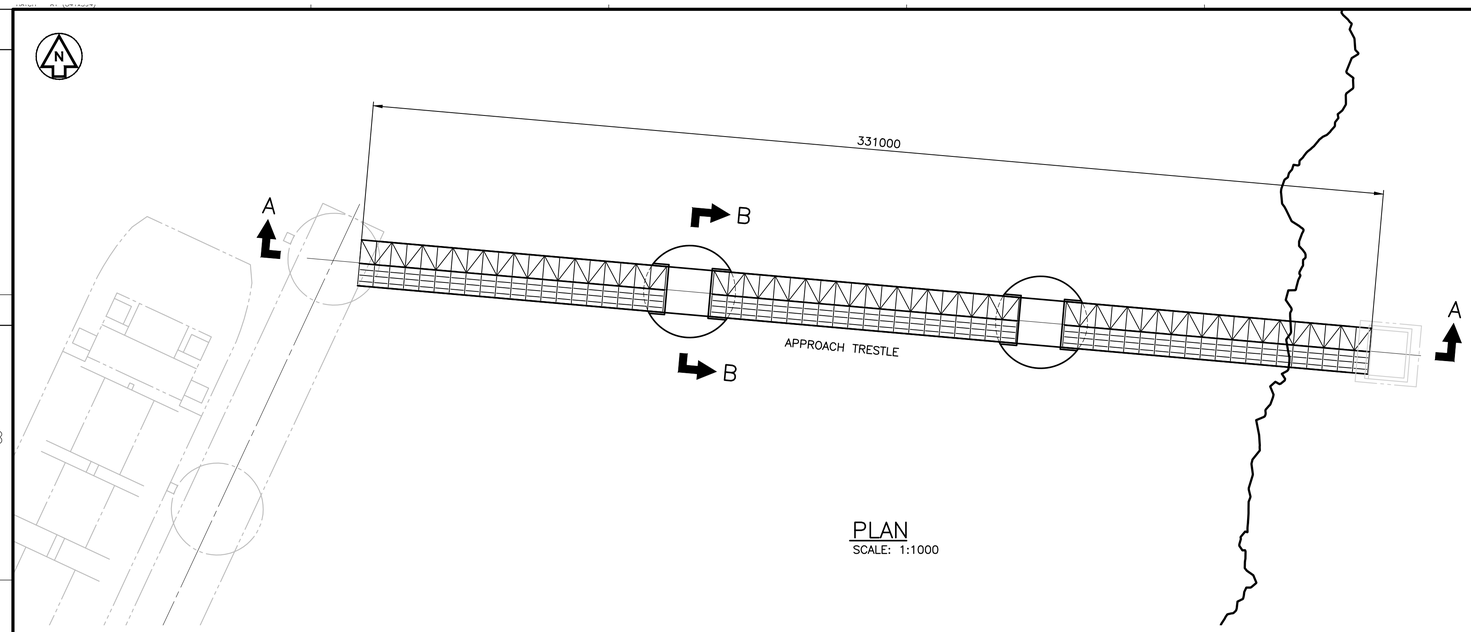
STEENSBY PORT IRON ORE TRESTLE GENERAL ARRANGEMENT OPTION 1.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0071	A

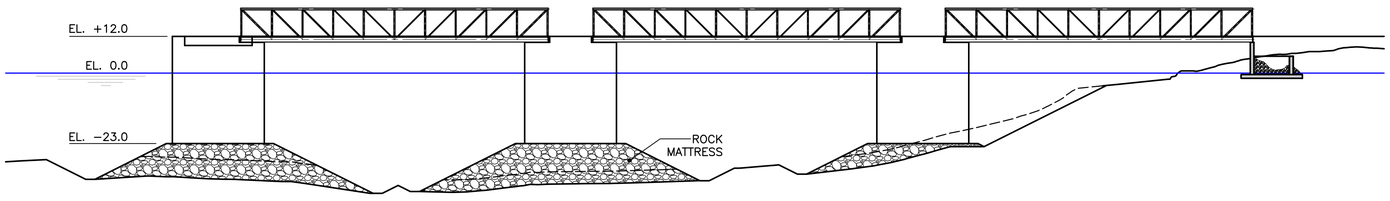
Jul 07 , 2011 , 9:32am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0071.dwg

REVISION A

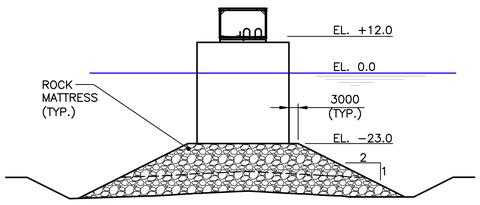
DWG. NO. H337697-3220-10-042-0072



PLAN
SCALE: 1:1000



SECTION A-A
SCALE: 1:1000



SECTION B-B
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
	REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
	REVISIONS			

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011
	ISSUE AUTHORIZATION		

HATCH™

DESIGNED BY P. MICHALKO DATE	DRAWN BY S. GRAHAM DATE 07/04/2011
CHECKED BY R. MacCRIMMON DATE	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 PORT IRON ORE TRESTLE OPTION 1 – PRECAST CAISSONS PLAN & SECTIONS.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0072	A

Jul 07 , 2011 , 9:31am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0072.dwg

REVISION A

DWG. NO. H337697-3220-10-042-0081

E 592 250 E 592 500 E 592 750 E 593 000 E 593 250 E 593 500

N 7 799 500

N 7 799 250

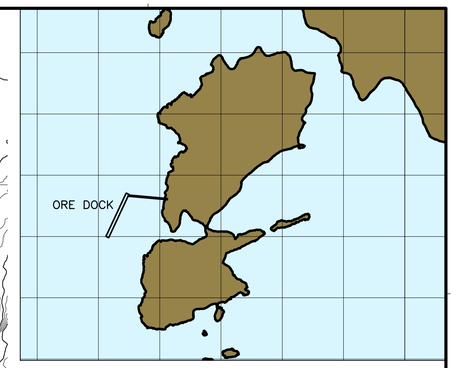
N 7 799 000

N 7 798 750

343000

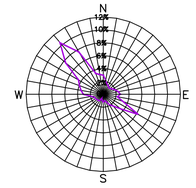
APPROACH TRESTLE

BATHYMETRY NOT AVAILABLE



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions



NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

GENERAL ARRANGEMENT
SCALE: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PRELIMINARY
CONCEPT ONLY
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NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
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CHECKED BY R. MacCRIMMON	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

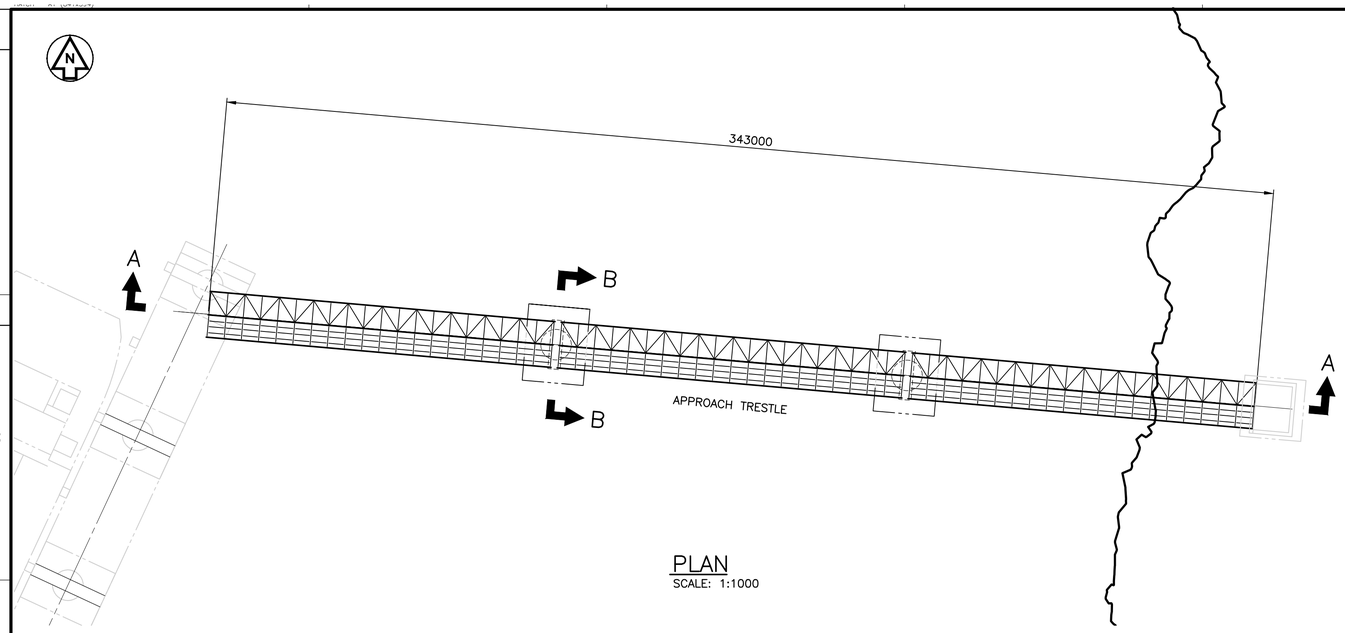
STEENSBY PORT IRON ORE TRESTLE GENERAL ARRANGEMENT OPTION 2.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0081	A

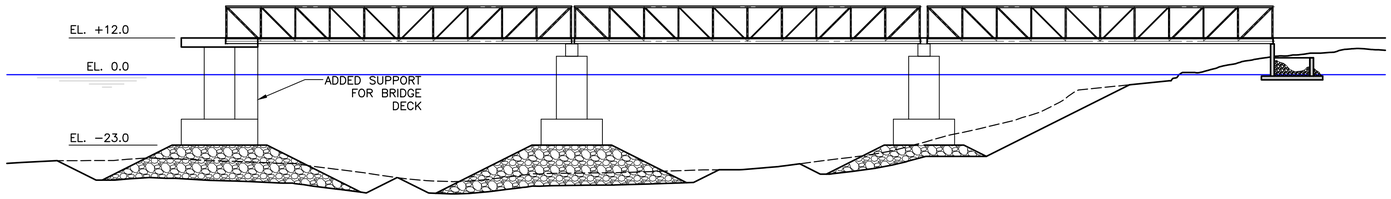
Jul 07 , 2011 , 9:30am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0081.dwg

REVISION A

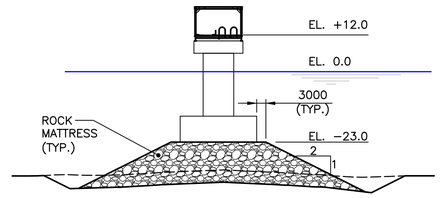
DWG. NO. H337697-3220-10-042-0082



PLAN
SCALE: 1:1000



SECTION A–A
SCALE: 1:1000



SECTION B–B
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
	REFERENCE DRAWINGS

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

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011
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DATE	DATE: 05/02/2011
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DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

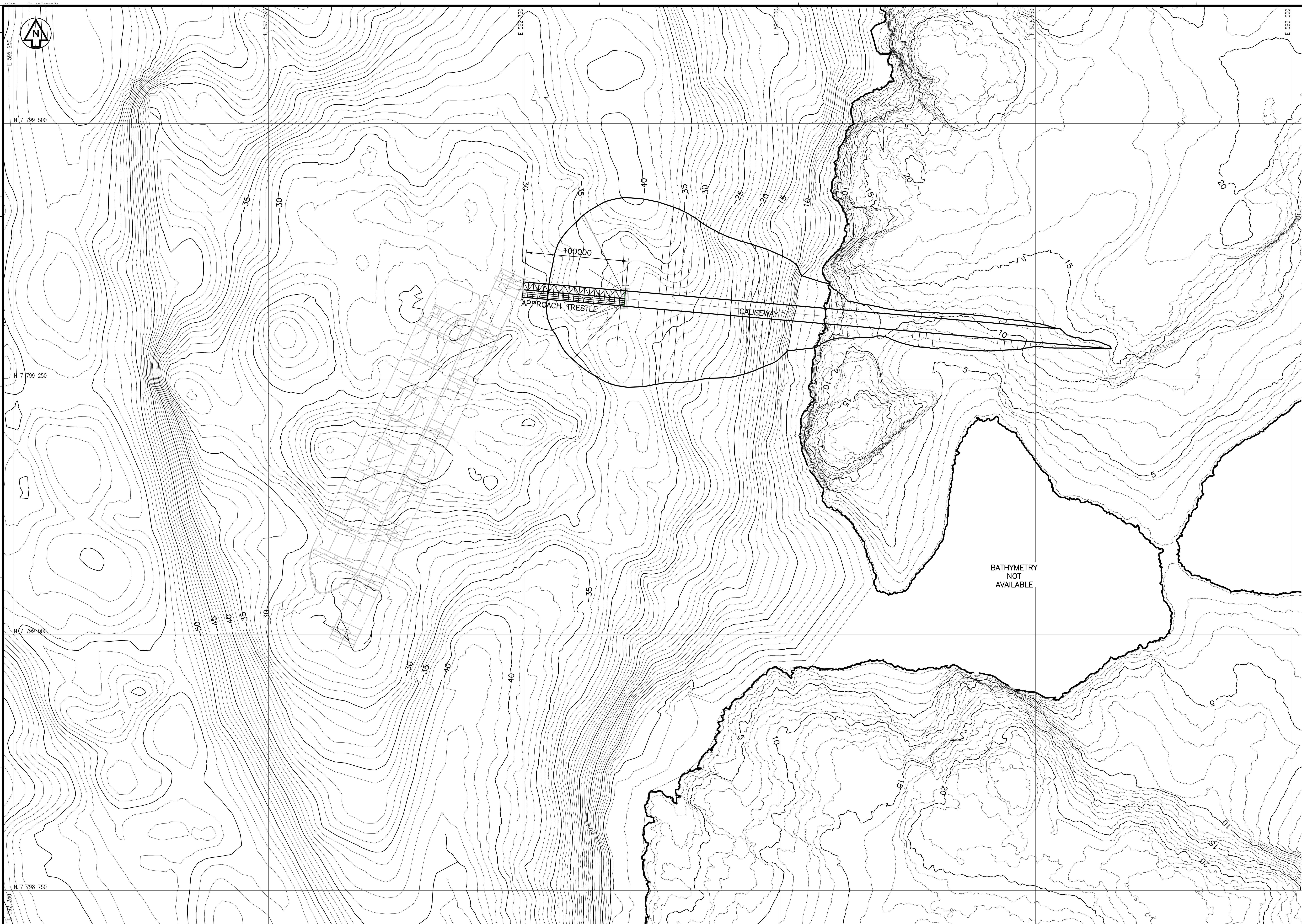
Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

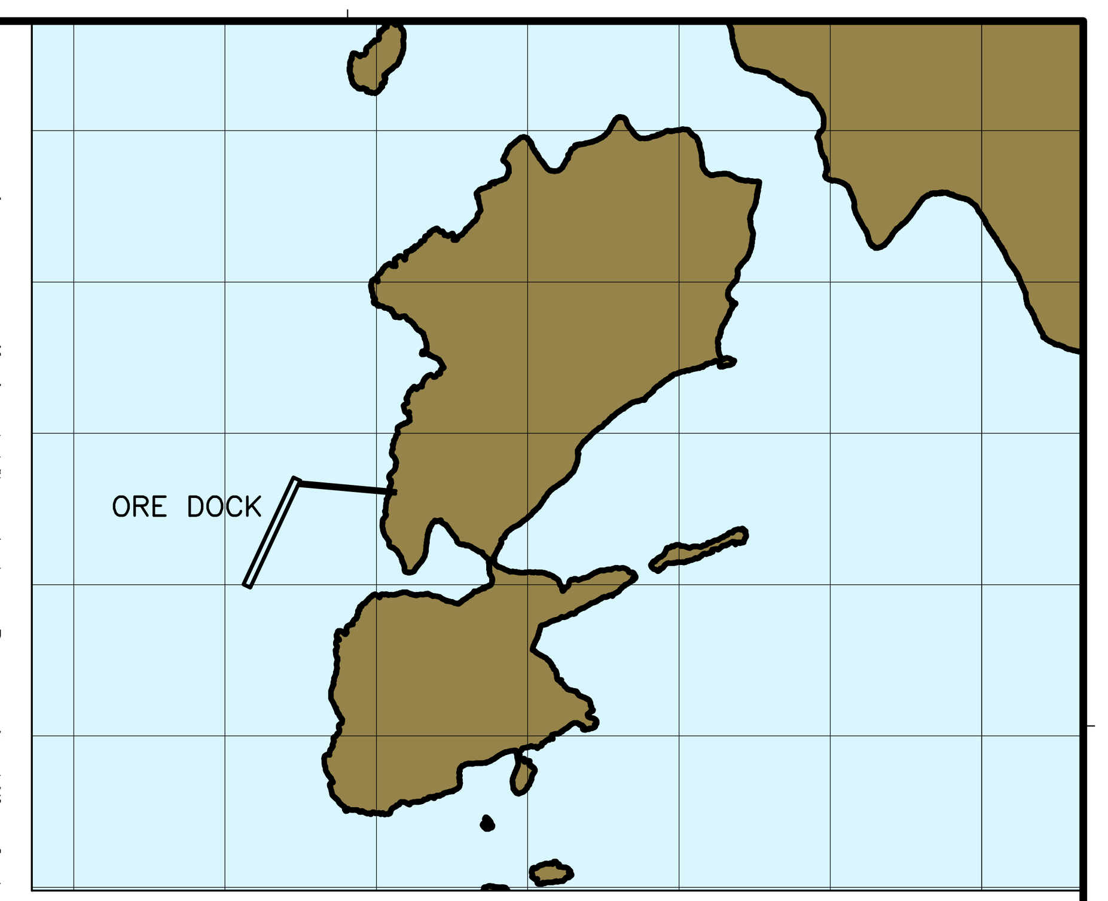
STEENSBY PORT IRON ORE TRESTLE PLAN & SECTIONS OPTION 2.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0082	A

Jul 07 , 2011 , 9:29am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0082.dwg



GENERAL ARRANGEMENT
SCALE: 1:2000



KEY PLAN
SCALE: 1:25000

Wind Rose
Igloolik A
1985–2010 – July to September
1 Hour Wind – 36 directions

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 40 80 120 160 200m
Scale: 1:2000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
A	ISSUED FOR REVIEW		07/07/2011
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY: P. MICHALKO
DRAWN BY: S. GRAHAM
DATE: 06/24/2011
CHECKED BY: R. MacCRIMMON
DISCIP. ENGR.
PROJ. DES. COORD.
PROJ. ENGR.
PROJ. MGR.
PROJECT NUMBER

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY PORT
IRON ORE TRESTLE
GENERAL ARRANGEMENT
OPTION 3.

SCALE: AS SHOWN
DRAWING NO.: H337697-3220-10-042-0091
REVISION: A

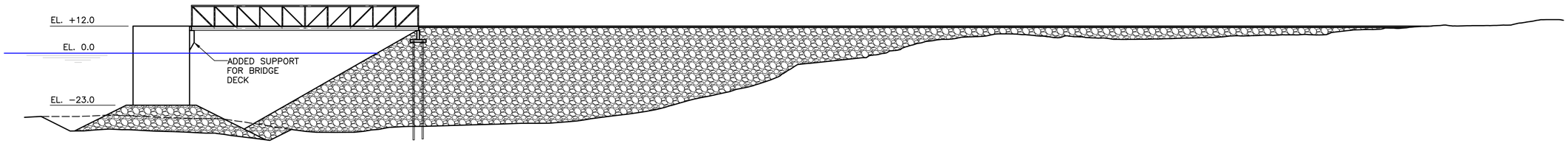
DWG. NO. H337697-3220-10-042-0091 REVISION A

Jul 07, 2011 , 9:29am Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0091.dwg

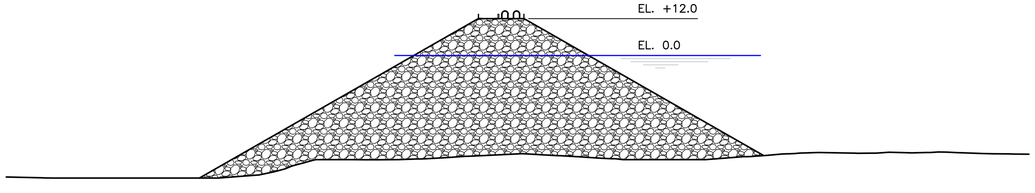
REVISION A

DWG. NO. H337697-3220-10-042-0092

PLAN
SCALE: 1:1000



SECTION A–A
SCALE: 1:1000



SECTION B–B
SCALE: 1:1000

NOTES:

1. HORIZONTAL DATUM – UTM (NAD 83) ZONE 17 AND IS IN METRES.
2. VERTICAL DATUM – BATHYMETRY IS IN METRES, TO CHART DATUM. TOPOGRAPHY IS TO GEODETIC DATUM, REPORTED BY TERRA REMOTE SENSING TO BE 2.266m ABOVE CHART DATUM.

0 20 40 60 80 100m
Scale: 1:1000

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PRELIMINARY
CONCEPT ONLY
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
P. MICHALKO	S. GRAHAM
DATE	DATE 06/28/2011
CHECKED BY	DISCIP. ENGR.
R. MacCRIMMON	
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	PROJECT NUMBER
DATE	

Baffinland Iron Mines Corporation

MARY RIVER IRON ORE PROJECT

STEENSBY PORT IRON ORE TRESTLE & CAUSEWAY PLAN & SECTIONS OPTION 3.

SCALE	DRAWING NO.	REVISION
AS SHOWN	H337697-3220-10-042-0092	A

Jul 06 , 2011 - 2:46pm Login name: grah57916 Layout: A1
Drawing Name: P:\BAFFINLAND\337697\CAD\C\H337697-3220-10-042-0092.dwg

Appendix B:

Estimates

Ore Dock, North Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 1 - Sandwell/AMEC, 5 Caisson Arrangement**

Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Excavation, sediments (See below)					
for caissons	cu m			$ -	
					$ -
C Rock Fill					
under caissons	cu m	115996	$ 75.00	$ 8,699,700.00	
					$ 8,699,700.00
D Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	5250	500	$ 2,625,000.00	
curb walls	cu m	300	2000	$ 600,000.00	
					$ 3,225,000.00
E Caissons, 30 m diameter (five total)					
pre-cast concrete to float height	each	5.00	$ 13,600,000.00	$ 68,000,000.00	
cast-in-place concrete to top (NA)	cu m			$ -	
500 mm ice impact slab @ El. 0.0	cu m	1465.00	$ 2,000.00	$ 2,930,000.00	
200 mm top caisson slab	cu m	625.00	$ 2,000.00	$ 1,250,000.00	
box girder foundations on caisson	cu m	2500.00	$ 2,000.00	$ 5,000,000.00	
rail foundations on caissons	cu m	1125.00	$ 2,000.00	$ 2,250,000.00	
					$ 79,430,000.00
F Rock Fill					
in caissons	cu m	97350	$ 115.00	$ 11,195,250.00	
					$ 11,195,250.00
G Granular Fill					
under slabs	cu m	1750	$ 75.00	$ 131,250.00	
					$ 131,250.00
H Structural Steel Bridges (four total)					
supply & install box girders	tonnes	5128	$ 7,760.00	$ 39,793,280.00	
supply & install girders	tonnes	756	$ 7,760.00	$ 5,866,560.00	
supply & install deck beams, bracing	tonnes	360	$ 7,760.00	$ 2,793,600.00	
					$ 48,453,440.00
I Ship Unloader Rails					
supply rails, accessories (in separate estimate)	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
J Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
K Fenders					
supply	ea	24	$ 50,000.00	$ 1,200,000.00	
install	ea	24	$ 15,555.00	$ 373,320.00	
					$ 1,573,320.00
L Quick Release Bollards					
supply	ea	8	$ 20,000.00	$ 160,000.00	
install	ea	8	$ 10,000.00	$ 80,000.00	
					$ 240,000.00
M Capstans					
supply	ea	4	$ 50,000.00	$ 8,000.00	
install	ea	4	$ 10,000.00	$ 2,000.00	
					$ 10,000.00
N Ladders					
at caissons	ea	12	$ 2,000.00	$ 24,000.00	
					$ 24,000.00
O Rock Fill NA					
	cu m	0		$ -	
					$ -
P Granular Fill NA					
	cu m	0		$ -	
					$ -
Q Dredging					
adjacent to dock - soft material	cu m	400000	$ 150.00	$ 60,000,000.00	
adjacent to dock - rock	cu m	7000	$ 250.00	$ 1,750,000.00	
					$ 61,750,000.00
R Scour Protection					
	sq m	20000	$ 600.00	$ 12,000,000.00	
					$ 12,000,000.00
				SUB TOTAL	**$ 229,167,960.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 68,750,388.00	$ 68,750,388.00	
					$ 68,750,388.00
				OPTION 1 TOTAL	**$ 298,000,000.00**

NOTES

Ore Dock, North Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 2 - 8 Steel Pier Arrangement**

Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Excavation, sediments (See below)					
	cu m			$ -	
					$ -
C Rock Fill					
under caissons	cu m	152348	$ 75.00	$ 11,426,100.00	
					$ 11,426,100.00
D Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	6290	500	$ 3,145,000.00	
curb walls	cu m	300	2000	$ 600,000.00	
					$ 3,745,000.00
E Reinforced Concrete					
in piers	cu m	8300	$ 2,000.00	$ 16,600,000.00	
in pile caps	cu m	3200	$ 2,000.00	$ 6,400,000.00	
					$ 23,000,000.00
F Caissons, 23 m square (eight total)					
pre-cast concrete to float height	each	8	$ 3,250,000.00	$ 26,000,000.00	
cast-in-place concrete to top	cu m		$ 2,000.00	$ -	
					$ 26,000,000.00
G Piers, 10 m diameter x 26 m long,steel on caissons (eight total)					
double-walled stiffened plate, 10 mm thick assumed	tonnes	1500	$ 7,760.00	$ 11,640,000.00	
					$ 11,640,000.00
H Pile Caps, 4 m square steel box girder by 25 m long					
stiffened plate, 20 mm thick assumed	tonnes	660	$ 7,760.00	$ 5,121,600.00	
					$ 5,121,600.00
I Hematite Ore Fill					
in caissons	cu m	25075	$ 175.00	$ 4,388,125.00	
					$ 4,388,125.00
J Rock Fill					
in piers	cu m	9050	$ 115.00	$ 1,040,750.00	
on caissons	cu m	5060	$ 75.00	$ 379,500.00	
					$ 1,420,250.00
K Structural Steel Bridges (seven total)					
supply & install box girders	tonnes	3857	$ 7,760.00	$ 29,930,320.00	
supply & install girders	tonnes	763	$ 7,760.00	$ 5,920,880.00	
supply & install deck beams, bracing	tonnes	1617	$ 7,760.00	$ 12,547,920.00	
					$ 48,399,120.00
L Ship Unloader Rails					
supply rails, accessories	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
M Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
N Fenders					
supply	ea	29	$ 50,000.00	$ 1,450,000.00	
install	ea	29	$ 15,000.00	$ 435,000.00	
					$ 1,885,000.00
O Quick Release Bollards					
supply	ea	8	$ 20,000.00	$ 160,000.00	
install	ea	8	$ 10,000.00	$ 80,000.00	
					$ 240,000.00
P Capstans					
supply	ea	4	$ 50,000.00	$ 200,000.00	
install	ea	4	$ 10,000.00	$ 40,000.00	
					$ 240,000.00
Q Ladders					
at caissons	ea	18	$ 2,000.00	$ 36,000.00	
					$ 36,000.00
R Rock Fill NA					
	cu m	0		$ -	
					$ -
S Granular Fill NA					
	cu m	0		$ -	
					$ -
T Dredging					
adjacent to dock - soft material	cu m	400000	$ 150.00	$ 60,000,000.00	
adjacent to dock - rock	cu m	7000	$ 250.00	$ 1,750,000.00	
					$ 61,750,000.00
U Scour Protection					
	sq m	20000	$ 600.00	$ 12,000,000.00	
					$ 12,000,000.00
				SUB TOTAL	**$ 213,727,195.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 64,118,159.00	$ 64,118,159.00	
					$ 64,118,159.00
				OPTION 2 TOTAL	**$ 278,000,000.00**

NOTES

Ore Dock, North Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 3 - Continuous Steel Caisson**

Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Dredging (See below)					
	cu m			$ -	
					$ -
C Rock Fill					
under caisson	cu m	238860	$ 75.00	$ 17,914,500.00	
					$ 17,914,500.00
D Paving					
	sq m	8200	$ 120.00	$ 984,000.00	
					$ 984,000.00
E Reinforced Concrete					
conveyor foundations	cu m	460	$ 2,000.00	$ 920,000.00	
shiploader rail foundations	cu m	6200	$ 2,000.00	$ 12,400,000.00	
					$ 13,320,000.00
F Caissons, steel				$ -	
By Naval Architect	ls	1	$ 75,000,000.00	$ 100,000,000.00	
					$ 100,000,000.00
G Granular Fill					
at deck level	cu m	2500	$ 75.00	$ 187,500.00	
					$ 187,500.00
H Ship Uploader					
supply rails, accessories					
in separate estimate	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
I Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
J Fenders					
supply	ea	29	$ 50,000.00	$ 1,450,000.00	
install	ea	29	$ 15,000.00	$ 435,000.00	
					$ 1,885,000.00
K Quick Release Bollards					
supply	ea	8	$ 20,000.00	$ 160,000.00	
install	ea	8	$ 10,000.00	$ 80,000.00	
					$ 240,000.00
L Capstans					
supply	ea	4	$ 50,000.00	$ 200,000.00	
install	ea	4	$ 10,000.00	$ 40,000.00	
					$ 240,000.00
M Ladders					
at caissons	ea	18	$ 2,000.00	$ 36,000.00	
					$ 36,000.00
N Rock Fill in Caisson					
	cu m	340000	$ 75.00	$ 25,500,000.00	
					$ 25,500,000.00
O Granular Fill NA					
	cu m	0		$ -	
					$ -
P Dredging					
adjacent to dock	cu m	400000	$ 150.00	$ 60,000,000.00	
rock	cu m	7000	$ 250.00	$ 1,750,000.00	
					$ 61,750,000.00
Q Scour Protection					
	sq m	20000	$ 600.00	$ 12,000,000.00	
					$ 12,000,000.00
				SUB TOTAL	**$ 236,493,000.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 70,947,900.00	$ 70,947,900.00	
					$ 70,947,900.00
				OPTION 3 TOTAL	**$ 308,000,000.00**

NOTE

Ore Dock, South Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 1 - Sandwell/AMEC, 5 Caisson Arrangement**
Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Dredging Silt					
for caissons	cu m	138000	$ 150.00	$ 20,700,000.00	
					$ 20,700,000.00
C Excavation, rock					
for caissons	cu m	275000	$ 250.00	$ 68,750,000.00	
					$ 68,750,000.00
D Rock Fill					
under caissons	cu m	15000	$ 75.00	$ 1,125,000.00	
					$ 1,125,000.00
E Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	5250	$ 500.00	$ 2,625,000.00	
curb walls	cu m	300	$ 2,000.00	$ 600,000.00	
					$ 3,225,000.00
F Caissons, 30 m diameter (five total)					
pre-cast concrete to float height	ea	5	$ 13,600,000.00	$ 68,000,000.00	
cast-in-place concrete to top	cu m	0		$ -	
500 mm ice impact slab @ El. 0.0	cu m	1465	$ 2,000.00	$ 2,930,000.00	
200 mm top caisson slab	cu m	625	$ 2,000.00	$ 1,250,000.00	
box girder foundations on caisson	cu m	2500	$ 2,000.00	$ 5,000,000.00	
rail foundations on caissons	cu m	1125	$ 2,000.00	$ 2,250,000.00	
					$ 79,430,000.00
G Rock Fill					
in caissons	cu m	97350	$ 115.00	$ 11,195,250.00	
					$ 11,195,250.00
H Granular Fill					
under slabs	cu m	1750	$ 75.00	$ 131,250.00	
					$ 131,250.00
I Structural Steel Bridges (four total)					
supply & install box girders	tonnes	5128	$ 7,760.00	$ 39,793,280.00	
supply & install girders	tonnes	756	$ 7,760.00	$ 5,866,560.00	
supply & install deck beams, bracing	tonnes	360	$ 7,760.00	$ 2,793,600.00	
					$ 48,453,440.00
J Ship Unloader Rails					
supply rails, accessories	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
K Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
L Fenders					
supply	ea	24	$ 50,000.00	$ 1,200,000.00	
install	ea	24	$ 15,000.00	$ 360,000.00	
					$ 1,560,000.00
M Bollards					
supply	ea	8	$ 4,000.00	$ 32,000.00	
install	ea	8	$ 1,000.00	$ 8,000.00	
					$ 40,000.00
N Capstans					
supply	ea	4	$ 50,000.00	$ 8,000.00	
install	ea	4	$ 10,000.00	$ 2,000.00	
					$ 10,000.00
O Ladders					
at caissons	ea	12	$ 2,000.00	$ 24,000.00	
					$ 24,000.00
P Rock Fill					
	cu m	0		$ -	
					$ -
Q Granular Fill					
	cu m	0		$ -	
					$ -
R Dredging knoll	cu m	47000	$ 150.00	$ 7,050,000.00	
adjacent to dock	cu m	7000	$ 250.00	$ 1,750,000.00	
					$ 8,800,000.00
S Scour Protection					
	sq m	10000	$ 600.00	$ 6,000,000.00	
					$ 6,000,000.00
				SUB TOTAL	**$ 251,879,940.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 75,563,982.00	$ 75,563,982.00	
					$ 75,563,982.00
				OPTION 1 TOTAL	**$ 328,000,000.00**

NOTE

Ore Dock, South Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 2 - 8 Steel Pier Arrangement**
Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Dredging silt					
for caissons	cu m	138000	$ 150.00	$ 20,700,000.00	
					$ 20,700,000.00
C Excavation, rock					
for caissons	cu m	275000	$ 200.00	$ 55,000,000.00	
					$ 55,000,000.00
D Rock Fill					
under caissons	cu m	15000	$ 75.00	$ 1,125,000.00	
					$ 1,125,000.00
E Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	6290	$ 500.00	$ 3,145,000.00	
curb walls	cu m	300	$ 2,000.00	$ 600,000.00	
					$ 3,745,000.00
F Reinforced Concrete					
in piers	cu m	8300	$ 2,000.00	$ 16,600,000.00	
in pile caps	cu m	3200	$ 2,000.00	$ 6,400,000.00	
					$ 23,000,000.00
G Caissons, 23 m square (eight total)					
pre-cast concrete to float height	ea	8	$ 3,250,000.00	$ 26,000,000.00	
cast-in-place concrete to top NA	cu m	0	$ 2,000.00	$ -	
					$ 26,000,000.00
H Piers, 10 m diameter x 26 m long steel on caissons (eight total)					
double-walled stiffened plate, 10 mm thick assumed	tonnes	1500	$ 7,760.00	$ 11,640,000.00	
					$ 11,640,000.00
I Pile Caps, 4 m square steel box girder by 25 m long					
stiffened plate, 20 mm thick assumed	tonnes	660	$ 7,760.00	$ 5,121,600.00	
					$ 5,121,600.00
J Hematite Ore Fill					
in caissons	cu m	25075	$ 175.00	$ 4,388,125.00	
					$ 4,388,125.00
K Rock Fill					
in piers	cu m	9050	$ 115.00	$ 1,040,750.00	
on caissons	cu m	5060	$ 75.00	$ 379,500.00	
					$ 1,420,250.00
L Structural Steel Bridges (seven total)					
supply & install box girders	tonnes	3857	$ 7,760.00	$ 29,930,320.00	
supply & install girders	tonnes	763	$ 7,760.00	$ 5,920,880.00	
supply & install deck beams, bracing	tonnes	1617	$ 7,760.00	$ 12,547,920.00	
					$ 48,399,120.00
M Ship Unloader Rails					
supply rails, accessories	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
N Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
O Fenders					
supply	ea	29	$ 50,000.00	$ 1,450,000.00	
install	ea	29	$ 10,000.00	$ 290,000.00	
					$ 1,740,000.00
P Quick Release Bollards					
supply	ea	8	$ 20,000.00	$ 4,000.00	
install	ea	8	$ 10,000.00	$ 1,000.00	
					$ 5,000.00
Q Capstans					
supply	ea	4	$ 50,000.00	$ 8,000.00	
install	ea	4	$ 10,000.00	$ 2,000.00	
					$ 10,000.00
R Ladders					
at caissons	ea	18	$ 1,000.00	$ 18,000.00	
					$ 18,000.00
S Rock Fill NA					
	cu m	0		$ -	
					$ -
T Granular Fill NA					
	cu m	0		$ -	
					$ -
U Dredging					
knoll	cu m	47000	$ 150.00	$ 7,050,000.00	
rock	cu m	7000	$ 250.00	$ 1,750,000.00	
T Scour Protection					**$ 8,800,000.00**
	sq m	10000	$ 600.00	$ 6,000,000.00	
					$ 6,000,000.00
				SUB TOTAL	**$ 219,548,095.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 65,864,429.00	$ 65,864,429.00	
					$ 65,864,429.00
				OPTION 2 TOTAL	**$ 286,000,000.00**

NOTE

Ore Dock, South Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 3 - Continuous Steel Caisson**

Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, Demobilization					
	ls	1	$ 2,000,000.00	$ 2,000,000.00	
					$ 2,000,000.00
B Dredging Silt					
for caisson	cu m	138000	$ 150.00	$ 20,700,000.00	
					$ 20,700,000.00
C Excavation, rock					
for caisson	cu m	275000	$ 200.00	$ 55,000,000.00	
					$ 55,000,000.00
D Rock Fill					
under caisson	cu m	15000	$ 75.00	$ 1,125,000.00	
					$ 1,125,000.00
E Paving					
deck level	sq m	8200	$ 120.00	$ 984,000.00	
					$ 984,000.00
F Reinforced Concrete					
conveyor foundations	cu m	460	$ 2,000.00	$ 920,000.00	
shiploader rail foundations	cu m	6200	$ 2,000.00	$ 12,400,000.00	
					$ 13,320,000.00
G Caissons, steel					
by naval architect	ls	1	$ 75,000,000.00	$ 75,000,000.00	
					$ 75,000,000.00
H Granular Fill					
at deck level	cu m	2500	$ 75.00	$ 187,500.00	
					$ 187,500.00
I Ship Unloader Rails					
supply rails, accessories, in separate estimate	m	376	$ 600.00	$ 225,600.00	
install	m	376	$ 400.00	$ 150,400.00	
					$ 376,000.00
J Bull Rail					
	m	400	$ 150.00	$ 60,000.00	
					$ 60,000.00
K Fenders					
supply	ea	24	$ 50,000.00	$ 12,000.00	
install	ea	24	$ 15,000.00	$ 5,000.00	
					$ 17,000.00
L Quick Release Bollards					
supply	ea	8	$ 20,000.00	$ 4,000.00	
install	ea	8	$ 10,000.00	$ 1,000.00	
					$ 5,000.00
M Capstans					
supply	ea	4	$ 50,000.00	$ 8,000.00	
install	ea	4	$ 10,000.00	$ 2,000.00	
					$ 10,000.00
N Ladders					
at caissons	ea	18	$ 2,000.00	$ 36,000.00	
					$ 36,000.00
O Rock Fill					
Inside caissons	cu m	340000	$ 115.00	$ 39,100,000.00	
					$ 39,100,000.00
P Granular Fill					
	cu m	0		$ -	
					$ -
Q Dredging					
Knoll to the north, for ships	cu m	47000	$ 150.00	$ 7,050,000.00	
	cu m	7000	$ 250.00	$ 1,750,000.00	
R Scour Protection					**$ 8,800,000.00**
	sq m	10000	$ 600.00	$ 6,000,000.00	
					$ 6,000,000.00
				SUB TOTAL	**$ 222,720,500.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 66,816,150.00	$ 66,816,150.00	
					$ 66,816,150.00
				OPTION 3 TOTAL	**$ 290,000,000.00**

NOTE

Approach Trestle for Ore Dock, North Location, Baffinland Analysis Cost Estimate					
Project: Mary River				**Option: 1 - Sandwell/AMEC, 2 Caisson Arrangement**	
Location: Steensby Inlet, Baffin Island					
Owner: Baffinland Iron Mines Corporation					
Consultant: Hatch					
		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, demobilization					
	ls	1	$ 400,000.00	$ 400,000.00	
					$ 400,000.00
B Excavation, sediments					
for caissons	cu m	100000	$ 150.00	$ 15,000,000.00	
					$ 15,000,000.00
C Rock Fill					
under caissons	cu m	78842	$ 75.00	$ 5,913,150.00	
					$ 5,913,150.00
D Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	4500	$ 500.00	$ 2,250,000.00	
curb walls	cu m	238	$ 2,000.00	$ 476,000.00	
					$ 2,726,000.00
E Reinforced Concrete					
abutment	cu m	950	$ 2,000.00	$ 1,900,000.00	
					$ 1,900,000.00
F Caissons, 30 m diameter (two total)					
pre-cast concrete to float height	ea	2	$ 13,600,000.00	$ 27,200,000.00	
cast-in-place concrete to top	cu m	0		$ -	
500 mm ice impact slab @ El. 0.0	cu m	586	$ 2,000.00	$ 1,172,000.00	
200 mm top caisson slab	cu m	250	$ 2,000.00	$ 500,000.00	
box girder foundations on caisson	cu m	1000	$ 2,000.00	$ 2,000,000.00	
					$ 30,872,000.00
G Rock Fill					
in caissons	cu m	38940	$ 115.00	$ 4,478,100.00	
					$ 4,478,100.00
H Structural Steel Bridges (three total)					
supply & install deck and trusses	tonnes	1254	$ 7,760.00	$ 9,731,040.00	
					$ 9,731,040.00
I Ship Unloader Rails NA					
supply rails, accessories, in separate estimate	m	0		$ -	
install	m	0		$ -	
					$ -
J Bull Rails NA					
	m	0	$ 100.00	$ -	
					$ -
K Fenders NA					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
L Bollards NA					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
K Capstans NA					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
L Ladders					
at caissons	ea	4	$ 2,000.00	$ 8,000.00	
					$ 8,000.00
M Rock Fill					
	cu m	0		$ -	
					$ -
N Granular Fill					
	cu m	0		$ -	
					$ -
O Dredging					
	cu m	0		$ -	
					$ -
P Scour Protection					
	sq m	0		$ -	
					$ -
				SUB TOTAL	**$ 71,028,290.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 21,308,487.00	$ 21,308,487.00	
					$ 21,308,487.00
				OPTION 1 TOTAL	**$ 93,000,000.00**

NOTE

Approach Trestle for Ore Dock, North Location, Baffinland Analysis Cost Estimate

Project: Mary River — **Option: 2 - 2 Steel Pier Arrangement**
Location: Steensby Inlet, Baffin Island
Owner: Baffinland Iron Mines Corporation
Consultant: Hatch

		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, demobilization					
	ls	1	$ 400,000.00	$ 400,000.00	
					$ 400,000.00
B Excavation, sediments					
for caissons	cu m	100000	$ 150.00	$ 15,000,000.00	
					$ 15,000,000.00
C Rock Fill					
under caissons	cu m	78842	$ 75.00	$ 5,913,150.00	
					$ 5,913,150.00
D Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	4500	$ 500.00	$ 2,250,000.00	
curb walls	cu m	238	$ 2,000.00	$ 476,000.00	
					$ 2,726,000.00
E Reinforced Concrete					
in piers	cu m	2075	$ 2,000.00	$ 4,150,000.00	
in pile caps	cu m	800	$ 2,000.00	$ 1,600,000.00	
abutment	cu m	950	$ 2,000.00	$ 1,900,000.00	
					$ 7,650,000.00
F Caissons, 23 m square (two total)					
pre-cast concrete to float height	cu m	2	$ 3,250,000.00	$ 6,500,000.00	
cast-in-place concrete to top	cu m	0		$ -	
					$ 6,500,000.00
G Piers, 10 m diameter steel on caissons (two total)					
double-walled stiffened plate, 10 mm thick assumed	tonnes	375	$ 7,760.00	$ 2,910,000.00	
					$ 2,910,000.00
H Pile Caps, 4 m square steel box girder by 20 m long					
stiffened plate, 20 mm thick assumed	tonnes	165	$ 7,760.00	$ 1,280,400.00	
					$ 1,280,400.00
I Hematite Ore Fill					
in caissons	cu m	13000	$ 175.00	$ 2,275,000.00	
					$ 2,275,000.00
J Rock Fill					
in piers	cu m	2263	$ 115.00	$ 260,245.00	
on caissons	cu m	1265	$ 75.00	$ 94,875.00	
					$ 355,120.00
K Structural Steel Bridges (three total)					
supply & install deck and trusses	tonnes	1653	$ 7,760.00	$ 12,827,280.00	
					$ 12,827,280.00
L Ship Unloader Rails					
supply rails, accessories, in separate estimate	m	0		$ -	
install	m	0		$ -	
					$ -
M Bull Rail					
	m	0		$ -	
					$ -
N Fenders					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
O Bollards					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
P Capstans					
supply	ea	0		$ -	
install	ea	0		$ -	
					$ -
Q Ladders					
at caissons	ea	4	$ 2,000.00	$ 8,000.00	
					$ 8,000.00
R Rock Fill					
	cu m	0		$ -	
					$ -
S Granular Fill					
	cu m	0		$ -	
					$ -
T Dredging					
adjacent to dock	cu m	0		$ -	
					$ -
U Scour Protection					
	sq m	0		$ -	
					$ -
				SUB TOTAL	**$ 57,844,950.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 17,353,485.00	$ 17,353,485.00	
					$ 17,353,485.00
				OPTION 2 TOTAL	**$ 76,000,000.00**

NOTE

Approach Trestle for Ore Dock, North Location, Baffinland Analysis Cost Estimate					
Project: Mary River				**Option: 3 - Rock Fill Causeway Arrangement**	
Location: Steensby Inlet, Baffin Island					
Owner: Baffinland Iron Mines Corporation					
Consultant: Hatch					
		Elemental Cost		Elemental Amount	
Element	**Units**	**Quantity**	**Unit Rate**	**Sub-Total**	**Total**
A Mobilization, demobilization					
	ls	1	$ 400,000.00	$ 400,000.00	
					$ 400,000.00
B Rock Fill					
causeway 834,312 x 1.1 for settlement	cu m	900000	$ 75.00	$ 67,500,000.00	
					$ 67,500,000.00
C Pre-cast Concrete					
bridge deck panels, 200 thick	sq m	1500	$ 500.00	$ 750,000.00	
curb walls	cu m	238	$ 2,000.00	$ 476,000.00	
					$ 1,226,000.00
D Reinforced Concrete					
abutment	cu m	950	$ 2,000.00	$ 1,900,000.00	
conveyor foundations	cu m	272	$ 2,000.00	$ 544,000.00	
					$ 2,444,000.00
E Granular Fill					
on causeway	cu m	450	$ 75.00	$ 33,750.00	
					$ 33,750.00
F Structural Steel Bridges (one total)					
supply & install deck and trusses	tonnes	415	$ 7,760.00	$ 3,220,400.00	
					$ 3,220,400.00
				SUB TOTAL	**$ 74,824,150.00**
Construction Contingency					
Construction contingency - 30%	%	30%	$ 22,447,245.00	$ 22,447,245.00	
					$ 22,447,245.00
				OPTION 3 TOTAL	**$ 98,000,000.00**

NOTE