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[1] *Appendix attached with addendum*

1. Floating Barge Accommodation Facility Functional Requirements

1.1 General

1.1.1 Where possible all accommodation facilities to be installed on the floating barge shall be based on The Contractor's standard modular unit size and layout while also in accordance with all of the following requirements:

1.2 Dormitory / Bedrooms

1.2.1 Single occupancy bedrooms with private en-suite bathrooms. Fixtures and fittings for each bedroom as per the following list:

- Single bed
- Two lockable closets
- Desk with lockable drawers
- Task chair
- Wall mounted hooks
- Reading Chair
- Window (for external units) c/w insect screen
- Black-out blinds (for external units)
- 26" Wall / closet mounted flatscreen TV
- Clock radio alarm

1.2.2 Private en-suite bathrooms shall be provided within each bedroom, complete with toilet, sink, shower, cabinet / shelving unit, mirror and ceiling exhaust fan.

1.3 Kitchen / Dining Facility

1.3.1 The kitchen / dining facility shall be sized to seat and cater for 50% of the accommodation capacity. The kitchen shall be supplied to meet all relevant local and national food preparation health and safety legislation and shall consist of the following facilities:

- Cold and dry food storage suitable for a minimum of four week's groceries
- Fully equipped food preparation and cooking areas complete with (but not limited to) cookers, microwaves, fridges and freezers
- Serving lines and lunch pick-up area
- Seating / tables
- Disposal area for waste and dirty dishes

- Dishwashing and cleaning facilities
- Waste management area
- Loading dock with double doors.

1.4 Laundry / Housekeeping Facilities

1.4.1 An industrial laundry / housekeeping facility shall be provided consisting of one washer and one dryer per 25 people. Suitable thermal ventilation equipment shall be provided within designated laundry area.

1.4.2 Storage for all non-personal linen and bedding shall also be provided.

1.5 [2]Communications

1.5.1 The contractor shall design, supply and install all cabling and equipment necessary to distribute data and voice communications throughout the barge.

1.5.2 **Satellite Communications**

1.5.2.1 The contractor shall design, supply and install the complete satellite communications system for communications "with the outside world" with the appropriate hardware to support the required bandwidth for 300 people. A wireless point-to-point (PTP) connection with the land based IT Infrastructure (supplied by Others) may be installed, to interface with the land-based IT Infrastructure. The barge, however, should not be reliant on data bandwidth available through land-based satellite dishes.

1.5.3 **Telephone System**

1.5.3.1 The contractor shall design, supply and install the complete telephone system including one phone in each room. Common areas shall be provided with telephone outlets as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

1.5.4 **Data Network**

1.5.4.1 The contractor shall design, supply and install all Passive cabling, patch panels, wall/desk mounted panels and racking equipment within the barge, including one data point in each room.

1.5.4.2 The contractor shall design, supply and install all Active equipment (Switches, routers and uninterruptible power supplies).

1.5.4.3 Common areas shall be provided with data outlets as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

1.5.5 **Television**

1.5.5.1 [3]The contractor shall design, supply and install a complete Satellite TV system including one TV in each room. As a minimum, the system shall provide access to all stations normally available in Canada (satellite service - number of channels TBD).

[2] *General overall additions and modifications to communications requirements (section 1.5)*
[3] *General overall additions and modifications to communications requirements (section 1.5)*

1.5.5.2 Common areas shall be provided with TV's as required. Exact number of outlets and location shall be reviewed during the detailed design stage.

1.5.5.3 The owner will negotiate the provision of all services with the respective facility/service providers and make all applications and pay all and or any fees including all 'First up" and or single payment/annual and initial maintenance fees. All subsequent operating/recurring expenses will be borne by the Operator of the barge.

1.6 First Aid

1.6.1 An on-site First Aid clinic within the facility shall be supplied for the treatment of minor personal injuries. The facility shall meet all codes and requirements of the Nunavut Mine Health and Safety Act.

1.6.2 The first aid facility shall be suitably located to allow for external double door access for ambulance drop-off of patients.

1.6.3 The facility shall consist of the following:

- Waiting areas
- 1 Treatment Room complete with:
  - Treatment bed / stretcher
  - Treatment chair
  - Waste receptacle
  - Wall mounted lockable storage cabinet
  - Wash sink and cabinet
- 1 Nurses Office complete with:
  - Desk
  - Task chair
  - Lockable filing cabinets
  - Shelving
  - Communications provisions (see section 1.5)
- Lockable storage room.

1.7 Recreation / Exercise Facilities

1.7.1 An area(s) shall be provided suitable for providing, exercise and recreational functions. It shall include:

- Exercise room complete with cardio and weight training equipment; Size of facility should be suitable to support a minimum 10% of accommodation capacity.
- Recreation area complete with:

- Table games (i.e. pool; foosball; air hockey; table tennis; card tables and chairs or appropriate similar)
- Book cases

- Lounge / rest area complete with:
  - 32″ Flatscreen TV's and DVD players
  - Sofa's / seating
  - Coffee tables
- Commissary – see section 1.9 below.

1.8 Smoking

1.8.1 A separate heated facility fitted with air exchange units complete with fixtures and fittings as per lounge / rest area (see section 1.7.1) connected to the facility shall be supplied.

1.9 Shop (Commissary)

1.9.1 A commissary / shop facility shall be provided for the provisions of selling a range of personal items such as snacks, drinks and a limited assortment of food (including some refrigerated and frozen items) and hygiene items. The facility shall be supplied complete with all furniture, equipment and fixtures necessary for such activities. A store room for the shop shall also be included.

1.10 Arrivals

1.10.1 The accommodation facility shall be supplied with lobby style area adjacent to the main entrance to facilitate checking-in; waiting areas; and shift rotation baggage storage.

1.11 Janitorial

1.11.1 The accommodation facility shall be supplied with a janitorial room complete with all necessary fixtures and fittings to support standard janitorial equipment.

1.12 Offices

1.12.1 The accommodation facility shall be supplied with 2 offices. Each office to be complete with:

- Desk
- Task chair
- Lockable filing cabinets
- Shelving
- Communications provisions (see section 1.5)

1.13 Mud Rooms & Vestibules

1.13.1 All exits designated as 'common entrances and exits' shall be equipped with mudrooms and vestibules. These shall contain a work boot cleaning area and sufficient space for storage of all personal site safety equipment.

2. Site Specific and Marine Conditions

2.1 Site Conditions

2.1.1 For climatic data and site conditions please refer to H337697-0000-10-107-0001: Site Conditions Data Sheet.

2.1.2 Where conflict occurs between regulations, the most restrictive shall apply.

2.2 Marine Site Conditions

2.2.1 For all marine related conditions (i.e. sea ice and wave / tides and currents) please refer to H337697-0000-12-107-0001: Marine Site Conditions.

2.3 Bathymetry

2.3.1 For known bathymetric information please refer Appendix A:
H337697-PM701-SK001 - Steensby Inlet Bathymetric Survey

3. Utilities

3.1 General

3.1.1 All equipment to meet the requirements of vessel Class and national / international authorities for an accommodation barge in arctic waters.

3.1.1.1 Provide piping, valves, fittings, and associated equipment suitable for the working pressure to which they may be subjected in service and test to static pressure test 1.5 times working pressure for a minimum of 2 hours unless otherwise specified.

3.1.1.2 Provide all pumps or equipment with shut-off valves on suction and delivery side to isolate them for maintenance.

3.1.1.3 Vent all system high points, drain all system low points.

3.1.1.4 Design system layout to accommodate expansion or dynamic forces being transmitted by the piping systems to equipment connections or structural members.

3.1.1.5 Provide space for servicing, disassembly, and removal of equipment and components as recommended by manufacturer or as indicated.

3.1.1.6 Provide takedown joints to facilitate the removal of equipment and piping for maintenance and repair of the vessel.

3.2 Heating, Insulation and Ventilation

3.2.1 All bedrooms, work and common areas within the accommodation facility and all hull compartments and voids shall be thermally heated, insulation and ventilated to vessel Class requirements.

3.2.2 Refer to H337697-0000-45-122-0001: HVAC Design Criteria for all design assumptions.

3.3 Fire Protection

3.3.1 The accommodation facility and all necessary utility areas shall be supplied and installed complete with fire protection systems.

3.3.2 Fire extinguishers shall be installed throughout at all recommended minimum distances apart.

3.4 Potable Water Treatment, Sewage Treatment, Waste Incinerator

3.4.1 Potable water treatment shall comply with specification 46 07 13 – Equipment Specification – Potable Water Treatment Plants.

3.4.2 Sewage treatment shall comply with specification 46 07 53 – Equipment Specification – Sewage Treatment.

3.4.3 Waste incinerators shall comply with specification 11 82 19 – Equipment Specification – Waste Incinerators.

3.5 Power Generation

3.5.1 The Contractor shall provide electrical power generation and all necessary wiring throughout the facility. The equipment shall comply with all appropriate recognized marine electrical engineering standards, codes and Class regulations and shall also meet the following minimum design specifications:

3.5.2 **General**

3.5.2.1 Provide equipment designed to operate satisfactorily and withstand the effects of the transient conditions expected on a marine electrical system

3.5.2.2 Provide controls, indications, and other necessary devices to enable easy operation without a need of detailed electrical knowledge.

3.5.2.3 Emergency / back-up power provisions to be provided as necessary to meet all vessel class and regulatory requirements.

3.5.3 **Load**

3.5.3.1 The Contractor shall assume a load of **2kW/person.**

3.5.4 **Duty**

3.5.4.1 The equipment shall be designed for continuous service under the specified process and operating conditions.

3.5.4.2 The base load generator system shall be designed for continuous operation and to meet peak demand. The plant shall be designed for a minimum of "N+ 2" units in all locations, where N is the number of identical units operating to meet peak demand from the mine.

3.5.4.3 The above electrical demands must be met under the design maximum ambient temperature specified in the site conditions with N units in operation while not exceeding the maximum continuous rating of any engine.

3.5.5 **Exhaust System**

3.5.5.1 The exhaust system shall be provided complete with any off-gas treatment equipment necessary to comply with the emission standards listed in IFC Environmental, Health, and Safety Guidelines for Thermal Power Plants, Table 6A, on the basis of a Non-Degraded Airshed.

3.5.5.2 Fit generator set exhausts with high attenuation spark arresting hospital grade silencers to comply with noise regulations in section 3.5.9.

3.5.5.3 Refer to section 3.7 for further requirements.

3.5.6 **Emissions**

3.5.6.1 Emissions information shall be provided by the Contractor for their standard units as per the fuel system identified in Section 3.5.8. There shall be no post combustion NOx abatement.

3.5.7 **Cooling Systems**

3.5.7.1 The primary cooling system for the gensets at each power plant will consist of closed loop cooling systems circulating cooling fluid through the components to be cooled and rejecting heat to ambient air via independent dry cooling system (multi-unit fin fan coolers).

3.5.7.2 The cooling fluid shall be selected by The Contractor based on the ambient site conditions and the freeze points of the specific product specified.

3.5.7.3 The Contractor shall design engine cooling utilizing an appropriately sized closed loop system. The cooling system shall be designed with capacity to match the engine-generator 110% overload rating.

3.5.8 **Fuel System**

3.5.8.1 The engines shall be designed to operate on Ultra Low Sulphur arctic-grade diesel during normal operation.

3.5.8.2 The properties of locally available fuel oils are presented below in Table 3-1: Properties of Arctic Grade Diesel.

Table 3-1: Properties of Arctic Grade Diesel

	Unit	Typical
Fuel Type	ULS Arctic-Grade Diesel	
Cetane number no less than	-	≥ 40
Fraction Content:		
• 90% distilled at temperature of	°C	360
Kinematic Viscosity at 40 °C	Mm2/s (centistokes)	1.7 – 4.1
Flash Point	°C	≥ 40
Composition:		
Sulphur Content	ppm	< 15
Actual Resin Content	mg/100 cm3	≤ 30
Ash Content	%	≤ 0.01
Water and Sediment Content	vol %	0.05
Mechanical Particle Content	wt %	Absent
Acidity	mg KOH/100 cm3	≤ 5
Iodine Number	g of Iodine/100cm3	≤ 6
Coking Ability of 10% Residue		≤ 0.3
Filtration Factor		≤ 3
Density at 20 °C	kg/m3	820
Conductivity	pS/m	25
Carbon Residue	Ramsbottom % Mass	≤ 0.2
Copper Corrosion	D130 test method	No. 1
LHV	kj/kg	42,800

3.5.9 **Noise Control**

3.5.9.1 The maximum allowable sound level shall be 85 dBA (re 20 µPa) from specified equipment at 1m from accommodation facility envelope using stated test procedure.

3.5.9.2 All noise controls shall be industrial grade and allow for cleanability access for maintenance and operations, and adequate cooling. All impacts shall be cushioned to the extent possible. Enclosures are to be avoided whenever possible. If required, they shall be of heavy duty industrial design with adequate provision for cooling and maintenance access and shall not absorb water or contain combustible materials. Enclosure shall either be the manufacturer's standard proven enclosure or provided by a reputable supplier of acoustical enclosures.

3.6 Machinery Cooling

3.6.1 Provide central sea water cooled heat exchangers for auxiliary equipment as required.

3.7 Machinery Exhaust Systems

3.7.1.1 All exhaust piping within the Plant shall be suitably insulated.

3.7.1.2 Provide drain plugs at all low points in the exhaust piping system.

3.8 Instrumentation

3.8.1 All utility facilities shall be supplied with local PLC controllers and panel HMI as required, to effectively control the operation remotely. Instrumentation shall include a programmable general fault discrete output from the PLC available to activate an automatic dialer /or wireless alarm to alert the camp supervisor of potential issues. The common alarms may include (but not limited be to), incinerator general faults, sewage system general faults or loss of power. For further information refer to specification S25 00 50: Instrumentation Requirements for Packages Equipment.

4. Floating Barge Hull Specification

4.1 Introduction

4.1.1 This section of the specification relates directly to the requirements for the hull for which the accommodation will be based upon.

4.1.2 For the purposes of this specification, the floating barge hull shall be referred to as "the vessel" and the accommodation facility portion (topsides) shall be referred to as "the hotel".

4.1.3 The barge will be constructed of steel, suitable for cold environments, with an ice-belt in way of the barge waterline. The accommodations will be located above the deck, while power generating equipment, domestic systems (sewage, grey water) and tank storage for fuel, fresh water, sewage, grey water will be inside the hull.

4.1.4 A mooring system will be provided to ensure the barge remains moored in place for the intended timeframe. A spread mooring system will be provided, complete with anchor points, catenary anchoring system and mooring winches. Anchor points will be high-holding power drag embedment type anchors. Anchor supports are to be provided on the side of the barge to secure the anchors during transit.

4.1.5 Equivalent mooring systems may be suggested by the contractor if it will reduce the build or delivery time.

4.2 Classification

4.2.1 The vessel will be built and classed to a suitable barge standard (Lloyd's Register of Shipping or other approved RO by Transport Canada Marine Safety). Due to the remote location and cold weather environment the barge and all systems will be designed (but not classed) according to the requirements of for Arctic Ice Class 1A Super. The barge will also be suitably flagged and will meet all applicable Marine Safety requirements.

4.3 Typical Dimensions

4.3.1 For information purposes only, initial calculations predict the typical hull dimensions to be in the region of the following: (*Please note the contractor shall verify and suggest alternatives if applicable).*

- Length, overall = 118.6 metres
- Length, waterline = 115.4 metres
- Breadth, moulded = 27.0 metres
- Depth = 6.60 metres
- Draft = 3.5 metres
- Lightship (hull only) = 3,800 tonnes (approx.)
- Displacement, full load = 10,000 tonnes (approx.)

4.4 Typical Capacity

4.4.1 For information purposes only, initial calculations predict the typical capacities to be in the region of the following: (*Please note the contractor shall verify and suggest alternatives if applicable).*

- Fuel oil = 1,500 m3
- Fresh water = 900 m3
- Grey water (holding) = 450 m3
- Black water (holding) = 450 m3
- Ballast = 5,000 m3
- Lube oil, main engines = 5 m3
- Oily water = 5 m3
- Sludge = 5 m3

4.5 Service Conditions

4.5.1 **Functional Requirements**

4.5.1.1 The barge is a flush deck barge capable of supporting the accommodation facility and associated tankage and equipment.

4.5.1.2 The barge shall be equipped for service in the Canadian Arctic and shall be capable of remaining on station, fully moored, year round in the Arctic (near North Baffin Island) for a period of approximately 5 years.

B 4.5.1.3 [4]The whole facility shall be design under SOLAS Regulations as being an offshore vessel.

4.5.2 **Environmental Conditions**

4.5.2.1 Construct vessel to operate and remain on station in Arctic waters, incorporating features for safe and reliable operation 24 hours per day, year round in conditions which includes extreme weather and extreme cold.

4.5.2.2 Provide all shipboard systems for continuous operation in the environmental conditions as provided in the following Owner Supplied Specifications:

- H337697-0000-10-107-0001: Site Conditions Data Sheet.
- H337697-0000-12-107-0001: Marine Site Conditions.

4.5.2.3 Discharge overboard of oil, oily water, or untreated sewage waste is not permitted. Incorporate approved precautions in accordance with IMO MARPOL regulations and Transport Canada Marine Safety Requirements

B 4.5.3 **[5]Mooring Distance**

4.5.4 The contractor shall recommend a mooring distance to suit a 4 point mooring system based on the bathymetry identified in:

Appendix A:
H337697-PM701-SK001 - Steensby Inlet Bathymetric Survey

4.5.4.1

4.6 Construction

4.6.1 **Standards and Tolerances**

4.6.1.1 Observe construction tolerances as defined by Class for vessels of this type

4.6.2 **Workmanship**

4.6.2.1 Take care that the structural integrity of the hull structure is preserved. Refer any questions involving such integrity to Design Agent and Class Inspectors.

4.6.2.2 All plate edges and holes burned in the structure to be neatly and carefully executed. All cuts to be regular in outline without notches.

[4] *Offshore vessel requirement added (4.5.1.3)*
[5] *Additional section (4.5.3) added regarding mooring distance*

4.6.2.3 Openings burnt in shell, deck, or other main strength members to be circular or have well rounded corners. Grind the edges of such cuts smooth and bullnosed.

4.6.2.4 Remove sharp or jagged edges of exposed structural work.

4.6.2.5 Remove all erection clips or bridges and grind any projections smooth. Removal of material from plate to be avoided, but if occurs fill with weld deposit. Grind such items flush and smooth where exposed to view inside or out.

4.6.2.6 Cut limber holes for drainage where necessary to permit total drainage to lowest point of compartment or tank. Limber holes to be 75 mm radius where possible, cut smooth on a radius.

4.7 Welding

4.7.1 General

4.7.1.1 All welding to be to Class standards as a minimum.

4.7.1.2 Submit details of welding, including preparations of plate edges, position and sequence for all hand welding of plate butts and seams as required by the class.

4.7.1.3 Properly prepare and fair up all plate edges before welding.

4.7.1.4 Where stress concentrations may arise at corners, edges, and terminals, continue the welding runs around the joint for a distance of at least 38 mm. Continuously weld all brackets all around. Continuously weld ends of stiffeners for a distance equal to twice the stiffener depth on both sides.

4.7.1.5 Completely seal all exposed faying steel surfaces by welding so that no water can gain access to cause corrosion. Do not perform any intermittent welding on the exterior or in interior wet spaces where finish is bare steel.

4.7.1.6 Leave the finished work clean and smooth with all projections and rough welds chipped flush and ground smooth. Make deck plate reinforcements by fitting insert plates only, do not use doublers. Chamfer the edges of insert plates on a four-to-one bevel down to the thickness of the surrounding plate, and make corners with a generous radius.

4.7.1.7 Ensure the surface of all parts to be welded is clean, dry, and free from rust, scale, and grease. All welds to be sound, uniform, and substantially free from slag inclusion and porosity. Take care to ensure thorough penetration and fusion; avoid undercutting. Before a sealing run is applied to a butt weld, expose the clean metal of the original root run.

4.7.1.8 Cut out and re-weld all welds not meeting these conditions.

4.7.1.9 Ensure sufficient class approved air holes/cut-outs for passage of air/fluids are provided at in longitudinal and transverse non-tight structures in deck and bottom.

4.7.2 Weld Schedule

4.7.2.1 Base dimensions of full fillet or intermittent welds on Class Rules. Forward a welding sequence and schedule as required by the Class. In general, weld patterns to be double continuous for all hull structures, bulwarks and deck fittings/structures.

4.7.2.2 Work out a satisfactory welding sequence to eliminate as far as practicable any "locked in" stresses or objectionable distortion in the structure.

4.7.3 **Testing and Inspection**

Carry out as determined by class rules.

4.7.4 **Welding Consumables**

4.7.4.1 All welding consumables to be:

- compatible with structural members
- type approved by Class

4.7.5 **Welder's Qualifications and Standards**

4.7.5.1 Ensure all welders employed in the construction of this vessel are certified in accordance with Classification Society standards

4.8 Materials

4.8.1 **Steel**

4.8.1.1 Use shipbuilding steel or structural steel, minimum Lloyd's Grade A (or as required by Class for environmental conditions stated in 103.2), wheelabrated and pre-weld primed.

4.8.1.2 All steel to be new material, free from lamination, deep rust, black oxide, or other obvious defects, and treated in accordance with the painting and protection requirements (section 4.15).

4.9 Castings and Forgings

4.9.1 Prove that any items of cast steel intended for attachment by welding have not more than 0.23 percent carbon and are free of slag inclusion, voids, etc.

4.10 Primary Hull Structure

4.10.1 Construct hull in accordance with Contract Guidance Drawings and in accordance with Class Rules for Steel Barges/Pontoons as a minimum standard.

4.10.2 Scantlings to be as shown on Drawings and are to be to Class rules as a minimum.

4.10.3 Hull structure to be designed and built to the ice class specified.

4.11 Hull

4.11.1 **Structure Fittings**

4.11.1.1 Fit 40 mm stainless steel docking plugs in heavy steel bossings in all main tanks. Provide two spanners for docking plugs.

4.11.2 **Hull Tanks**

4.11.2.1 Construct integral tanks to Class requirements, and provide access manholes, complete with hand grips over each manhole (inside and out) and ladders as required for safe access

4.11.2.2 Provide at least two (2) manholes in each tank for access and ventilation during maintenance where practicable

4.11.2.3 Locate manholes at opposite sides or ends of tanks to maximum extent practical

4.11.2.4 Fit tanks with fill, vent, and sounding equipment as required by Class and TC-MS.

4.11.2.5 Provide tank coating suitable for the application and in accordance with section 4.15.

4.11.3 **Chain Lockers**

4.11.3.1 Chain lockers to be provided as required for mooring system.

4.11.3.2 Place structural reinforcements on outside of chain locker plating.

4.11.3.3 Fit heavy perforated galvanized plate at base of chain locker to permit drainage and prevent chain from contacting shell.

4.11.3.4 Provide access to chain lockers via quick-acting hatch in safe location.

4.11.3.5 Provide heavy "bitter end" lug to secure chain, with means of quickly slipping cable.

4.11.3.6 Cut climbing rungs in centre bulkhead.

4.11.3.7 Refer also to Anchoring System in section 4.20.

4.12 Watertight Doors

4.12.1 Provide watertight doors for access to below deck compartments as required in accordance with the following:

- class and Regulatory Authority approved
- steel construction with stainless steel hardware
- hinged, multi-dog type
- clear opening approx. 700 x 1,800
- manual, single handwheel operation; operable from both sides.

4.13 Fire Safety Systems

4.13.1 As per section 3.2, quip vessel with approved system for detection and extinguishing of shipboard fires, to Class and National Authority requirements

4.14 [6]Life Saving Equipment

B

4.14.1 Fully equip vessel with all lifesaving equipment necessary to fulfill Regulatory and operational requirements including SOLAS Regulations.

4.15 Painting and Protection

4.15.1 **System**

4.15.1.1 Painting and protection of the hull to be in accordance with Class regulations and suitable for extreme arctic conditions.

4.15.2 **Quality and Control**

[6] *Solas Regulations note added*

4.15.2.1 Paint manufacturer/distributor to furnish field service inspection and guidance at no additional cost to Owner's Representative.

4.15.3 **Application**

4.15.3.1 All paint system application guidelines to be strictly adhered to.

4.15.3.2 Do **not** paint the following:

- electrical or electronic control panels
- grease fittings
- handrails (internal)
- interior gratings
- machinery surfaces
- Monel metal fittings
- nameplates
- zinc anodes
- and, in general, all working parts.

4.16 Cathodic Protection

4.16.1 To be provided as per Class regulations.

4.17 Signs and markings

4.17.1 All interior and exterior signs, numbers, registry markings, name plates, warnings, directions and draft marks etc. to be clearly identified and fixed / painted to the structure to regulatory requirements.

4.18 Navigation Lights

4.18.1 Provide navigation lights to suit international Colregs.

4.19 Deck Machinery

4.19.1 Provide all deck machinery, equipment and fittings of rugged construction commensurate with the nature of vessel service, and the environmental conditions stipulated in section 4.5.2

4.20 Anchoring System

4.20.1 Fit mooring system on the barge suitable to enable the barge to remain on station year round for a minimum of 5 years.

4.20.2 Mooring system should be designed as a minimum to remain on station for the design environment (section 4.5.2) and Owners specifications.

4.20.3 Mooring system to be designed to meet all Class and regulatory requirements for a permanent mooring.

4.20.4 Mooring system to be designed to meet the Technical Requirements of the following:

- American Petroleum Institute (API) Specification 2P 2SK, Design and Analysis of Stationkeeping systems for Floating Structures
- MODU Code

4.20.5 As a minimum the mooring system will consist of a 4 point system, with each leg composed of steel wire rope and chain segments.

4.20.6 Anchor points to consist high holding power drag imbedment anchors or anchors suitable to suit bottom soil conditions (note final anchors to be verified based on final Owner supplied bottom soil condition report).

4.21 Towing Requirements

4.21.1 **Tow Bridle**

4.21.1.1 Barge to be outfitted with chain bridle suited for deep sea towing, attached to the barge in adherhance with all Class regulations

4.21.2 **Tow Bridle Recovery System**

4.21.2.1 Provide bridle recovery system suitable to allow stowage of towing bridle on main deck when not in use.

4.21.2.2 Provide wire rope of sufficient size and length, connected to flounder plate and to anchor winch to enable winch to pull towing bridle onto main deck when not in use.

4.21.3 **Emergency Tow Line**

4.21.3.1 To be fitted as per Class and regulatory requirements.

4.22 Bilge System

4.22.1 Provide a bilge system in accordance with Class and all regulatory requirements.

4.23 Ballast System

4.23.1 Provide a ballast system complete with all appropriate manifolds, sea chests and overboard discharges in accordance with Class and all regulatory requirements.

5. Spare Parts

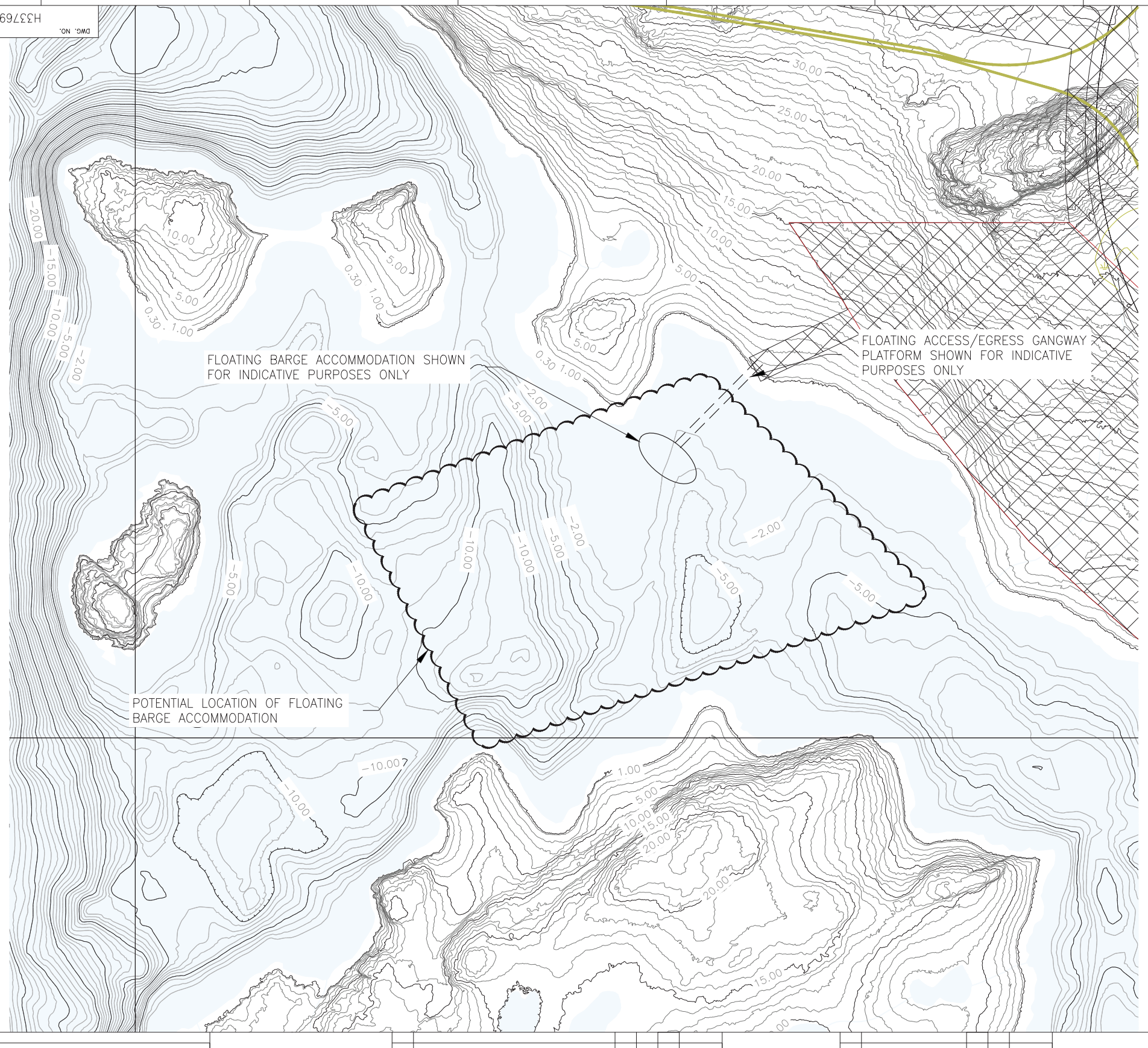
5.1 The Contractor shall supply lists of recommended spare parts for all facilities and utilities where appropriate.

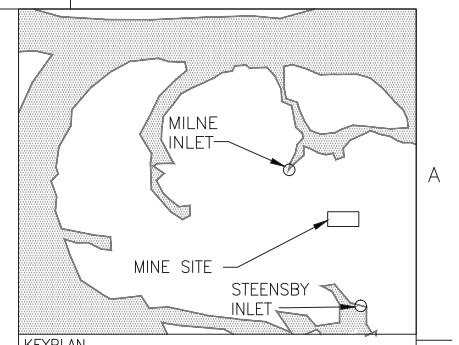
6. Quality Assurance

6.1 The Contractor shall prepare a quality assurance and inspection / test plan and submit for Owner's approval. No changes to the plan will be allowed during implementation without prior consent from the Owner. Refer to Section S01 43 00 – Quality Management for the requirements of this plan.

Appendix A:
H337697-PM701-SK001 - Steensby Inlet Bathymetric Survey

DWG. NO. H337697-PX701-SK001





KEYPLAN

NOTES:

BATHYMETRY:

1.BETWEEN 2–12 SEPTEMBER 2007, TERRA REMOTE SENSING INC (TRSI) CONDUCTED A SIDE SCAN SONAR AND SINGLE BEAM BATHYMETRIC SURVEY IN THE AREA AROUND BAFFINLAND'S PROPOSED PORT SITE AT STEENSBY INLET.

THEN BETWEEN 5–13 SEPTEMBER, 2008, TRSI CONDUCTED SINGLE BEAM AND MULTIBEAM BATHYMETRIC SURVEY OPERATIONS IN THE SAME AREA, SOME OVERLAPPING WITH PREVIOUS DATA, SOME NOT, AND SOME IN NEW AREAS.

2.DIGITAL SINGLE BEAM BATHYMETRIC DATA WERE COLLECTED IN THE VERY SHALLOW NEAR SHORE AREAS AT TWICE PER SECOND USING A FURUNO MODEL FCV-582L ECHO SOUNDER AND A 200kHz AIRMAR 6° BEAM-WIDTH TRANSOM MOUNTED TRANSDUCER. POSITIONAL DATA WERE COLLECTED USING A CSI GPS, AND LOGGED ONCE PER SECOND TO TRSI'S RTC NAVIGATION PACKAGE.

3.MULTIBEAM BATHYMETRIC DATA WERE COLLECTED SOUTH AND WEST OF THE CAMP AREA USING AN ODOM ES3 WITH A POLE MOUNTED TRANSDUCER. POSITIONAL AND HEADING DATA WERE COLLECTED USING A CSI VS110 GPS SYSTEM, AND LOGGED TO A HYPACK SURVEY/NAVIGATION PACKAGE.

4.IMPORTANT NOTES RELATING TO THE TIDAL DATA USED IN REDUCING THE BATHYMETRIC DATA SHOWN HERE;

i. TIDE DATA WERE OBTAINED BY TRSI FROM A THIRD PARTY
ii. CHART DATUM FOR THIS AREA WAS DERIVED USING DATA FROM VARIOUS TIDE AND ADCP GAUGES INSTALLED IN THE STEENSBY INLET AREA IN 2007/2008, AND IS BASED ON 44 CONSTITUENTS.

iii. ACTUAL TIDES PROVIDED WERE REFERENCED TO CHART DATUM WHICH HAS BEEN CALCULATED TO BE 2.266M BELOW GEODETIC DATUM. SUPERSEDED – SEE NOTE RE. DATUMS.

5.TIDES ARE MAINLY SEMIDIURNAL AND HAVE PRONOUNCED FORTNIGHTLY CYCLE. THE MAXIMUM OBSERVED TIDAL RANGE WAS APPROXIMATELY 4 METRES DURING SPRING TIDES AND 1.5 TO 2 METRES DURING NEAP TIDES.

6.LONG TERM WATER LEVEL RECORDS INDICATE INTENSE AND ABRUPT VARIATIONS, SET-DOWNS UP TP -0.93 METRES AND SET-UPS UP TO +0.77 METRES IN THE RESIDUAL SEA LEVEL.

7.THE DATA SHOWN HERE ARE IN UTM ZONE 17, WGS84. BATHYMETRIC DATA IS REFERENCED TO CHART DATUM.

8.TERRA REMOTE SENSING ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE TIDE DATA USED IN REDUCING THE BATHYMETRIC DATA.

DATUMS:

1.TOPOGRAPHY IS BY TERRA POINT CANADA AND IS TO GEODETIC DATUM (CGVD 28).

2.BATHYMETRY IS TO CHART DATUM (LLWLT).

3.FROM AVAILABLE INFORMATION CHART DATUM HAS BEEN CALCULATED TO BE 2.940m BELOW GEODETIC DATUM.

SCALE 60 30 0 100 200 300 m

SCALE 1:3000

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

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

REV.	ISSUE FOR	AUTH. BY	DATE
ISSUE AUTHORIZATION			

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Baffinland Iron Mines Corporation

MARY RIVER PROJECT

STEENSBY INLET
BATHYMETRIC SURVEY

Sep 28 , 2011 , 2:04pm Login name: HUA09318 Layout: 7000-SKETCH 1
Drawing Name: C:\prj\projectwise\yhuang\H337697-PX701-SK001.dwg