Baffinland Iron Mines LP
Mary River Expansion Stage 3

Definitive Study Report

Section 21 – Execution Plan

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Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**	**Approved By**
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21. Project Management

The project will be executed by a small Owner Team supported by an EPCM contractor. The contractual relationships are shown in Table 21-1.

The EPCM contractor is responsible for project delivery from receipt of Run of Mine ore (ROM) at the primary crusher pad at Mary River Mine to lump ore discharge onto ships at Milne and fine ore reclaim at the port at Milne (a detailed RACI matrix defining EPCM responsibilities is contained in the PEP – Part A (Appendix A21-1)). Baffinland Iron Mines (BIM) is responsible to provide, but not limited to the following;

- provision of funds for project execution and timely payment of approved invoices so as to maintain the project schedule
- provision of approvals in a timely fashion to enable effective discharge of EPCM duties and responsibilities
- maintaining current operations including sustaining capital works and capital works not defined within this report
- ensuring the current operation is capable and proven to export 5Mtpa of DSO iron ore annually
- mine development including commissioning and ramp up of new mine equipment
- maintaining and extending existing contracts for supply of explosives, fuel, air transport services for personnel, materials and equipment necessary to support the construction program.
- provision of all licences, permits and approvals relative to construction and operations work, including liaising with regulatory bodies and the community
- community relations and management of Inuit Impact and Benefits Agreements (IIBA)
- provision of all marine services and contracts related to export of iron ore, import of fuel and sustaining capital works.

All contracts for provision of materials, equipment, construction services and other things necessary to the construction of the Project will be let by BIM with BIM as the Owner contracting party and the EPCM contractor appointed to act as agent for BIM in the management and execution of contracts within the EPCM contractor's scope.

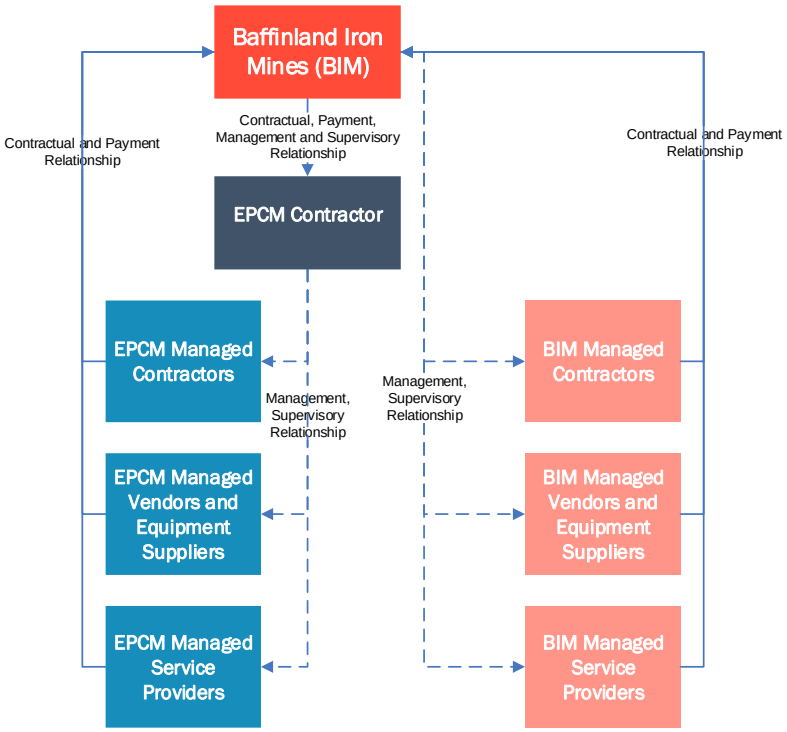

Table 21-1: Project Management Structure

21.1 Execution Strategy

21.1.1 Project delivery Strategies

Six objectives drive the execution plan for the implementation phase of the project. The project delivery objectives are:

1. to cause no harm to people, equipment and environment.
2. to deliver the Project, within scope, schedule and cost baselines defined in the FS Study Report and PEP.
3. to start functional testing of train unloading, crushing screening, stockpiling reclaim systems and one ship loader with ore before the end of the 2019 shipping window and completion of ship loader performance test at 12mtpa rate in the 2020 shipping season to enable ramp up to an ore production and shipping rate of 12mtpa in 2020.
4. to minimize and delay capital expenditure as much as possible.
5. to minimize interruptions to existing operations so that BIM can maintain planned production rates throughout the construction phase.
6. to maximize opportunities for early revenue generation, ahead of schedule without increasing project cost.

The driving delivery strategies for the project are detailed within PEP Part A contained in Appendix A21-1. The driving delivery strategies for the project are developed in the following.

1. **Project Delivery Objective #1:** No harm to people, equipment and environment

1.1 Minimize site hours in order to reduce risk potential for injury to the operations or construction workforce. This will be done by deploying a comprehensive modularization, pre-assembly, pre-cast program, and where applicable, commissioning the modules off-site. Non-critical site resources will be retained in the Hatch home office.

1.2 Contractor's will be held responsible for compliance with project H&S and environmental requirements.

1.3 No construction work on fish bearing streams will be permitted in the breeding season. This will be done by including the requirements in the contract documents and project schedules, and verification of compliance during construction.

2. **Project Delivery Objective #2**: Delivery of the Project, within scope, schedule and cost baselines defined in the FS Study Report and PEP.

2.1. Engagement of an EPCM contractor by 1 May 2017 released to deliver the full Project scope defined in the PEP.

2.2. Completion of enabling early Works before the start of the 2017 sea lift. The early works program relies heavily on the free issue of equipment and beds by BIM Operations and this aspect will influence the success of the early works program.

2.3. Require major construction contractors to adopt an offsite focus to construction work to reduce indirect costs by implementing:

2.4. Shipping complete ship loads from a single supplier/contractor directly to Milne and avoiding trans-shipment at the Consolidation Hub. As a corollary, only North American sourced materials and equipment outside the scope of CM001, will be shipped to Milne via the consolidation hub.

2.5. EPCM site based contractor turnover to be minimized to create an effective, contiguous team effort without loss in coordination/productivity.

2.6. Completion and operationalizing of construction camps to ramp up for earthworks contractors' personnel (CC002/CC003) to full occupancy by October 2017.

2.7. To allow contract award in the time-frame required to support the project schedule, our packaging strategy must allow for early issue of functional specifications to support design/build basis bids by the OEM's.

2.8. The packaging strategy must also maximize the allocation and receipt of firm bid pricing for critical and long lead project components so as to accommodate the D-B approach and quick turnaround to contract award. To do this we need to ensure the scope definition supports firm pricing, and the validity period supports the planned commitment dates.

2.9. Contract formation and award is to be expedited for critical packages, recognizing the level of engineering definition and shipping requirements. Where required for receipt of critical vendor information, 2 stage orders may be required.

2.10. To execute the project within the budget allocation for EPCM services, a lean and minimalist EPCM approach is required. This impacts the division of responsibility between all contractors.

3. Project Delivery Objective #3: To start functional testing of train unloading, crushing screening, stockpiling reclaim systems and one ship loader with ore before the end of the 2019 shipping window and completion of ship loader performance test at 12mtpa rate in the 2020 shipping season to enable ramp up to an ore production and shipping rate of 12mtpa in 2020.

3.1 Engage vertically integrated design build contractors to undertake delivery of core Project elements complete with a performance warranty (Ore Dock and Ore Processing/BMH plant)

3.2 Engage two earthworks contractors to spread risk and maintain focus on the requisite port/mine elements,

3.3 Validating the integrity of Design Build supplied equipment/systems through:

3.4 Bolster Operations knowledge of the new process equipment to enable efficient ramp up.

4. Project Delivery Objective #4: Minimize and delay capital expenditure as much as possible.

4.1 Contract on basis of minimal upfront payments, and 45 day payment cycle from approval of payment certificate to cash flow.

4.2 Delay orders of mining / rail equipment to “late as possible” to meet required ramp up. We will advance the schedule development of these packages to enable detailed planning activities and identification of required-on-site (ROS) dates of all mining and rail equipment. The planning of the procurement and fabrication activities will integrate with the appropriate sealift to ensure just-in-time delivery for shipping.

4.3 Opportunities to transfer capital to operating or lease charges will be investigated for rail operations and maintenance, including rolling stock and maintenance workshop.

5. Project Delivery Objective #5: Minimize interruptions to existing operations so that BIM can maintain planned production rates throughout the construction phase.

5.1 Project travel/accommodation burden must not over-extend Operations systems, and comprehensive integrated planning with Operations upon receipt of contractors’ resource loading and rotational schedules will be required.

5.2 The EPCM will ensure strict implementation of “Readiness Review Process” to ensure an efficient and safe execution of the tie-in/ shutdown work by the contractors engaged in the work.

5.3 Strong Leadership from the part of the EPCM Site Management, and the planning, preparation and execution of the works.

6. Project Delivery Objective #6: Maximize opportunities for early revenue generation

6.1 Rail to be expedited (where possible without cost implication) to decrease opex cost by transferring ore transport on trucks to rail. To achieve this, we will have to negotiate an expedited rail and rail unloader schedule and include in the contracts, and consider constructing bridges in parallel instead of in sequence

6.2 Crushing/Screening/Stacking to be expedited (where possible without cost implication) to increase revenue earned from increased stockpile size at the port. To achieve this, we will have to negotiate best secondary crushing / screening completion date and include in the contract, and schedule the changeover of the 1st primary crusher to align with timing of <100m requirement for secondary crushing / screening commissioning at the port.

21.1.2 EPCM Functional Execution Plans

The following outlines key elements of the EPCM's functional execution plans .

21.1.2.1 Health and Safety Management (refer to Appendix A21-2)

- Individual Contractors are responsible for the management and administration of Health and Safety relevant to their scope and will adhere to the project Functional Guide for Contractor Safety Management (refer to Appendix A21-2).
- The Hatch site health and safety team is required to monitor, assess and report on the level of compliance with the project HS Plan and procedures. Additionally, the Hatch H&S team will provide guidance on safety trending, target risk management opportunities, provide advice on project training needs and status, and provide the oversight to assure that minimum H&S criteria are being met or exceeded.

21.1.2.2 Environment Sustainability and Community Interface Management (Refer to Appendix A21-3)

- Protection of the environment and demonstration of compliance with permits and regulations will be undertaken by contractors engaged for construction work. The EPCM will collect collate and transmit contractor documentation to BIM to meet BIM reporting requirements. BIM will provide functions to collect environmental data, audit contractor compliance and perform all reporting works to BIM and third parties.
- Inuit Engagement in the project. The role of the EPCM in this instance is only geared towards inclusion of the Inuit engagement requirements and opportunities in the contracts and ensuring the contractors provide regular reporting to BIM in this regard.
- BIM takes responsibility for all aspects of community interface management on the project and the EPCM has made no allowance for deliverables for sustainability and community interface management or reporting.

21.1.2.3 Quality Management (ref Appendix A21-4)

- Quality management for EPCM related work will take the form of audits to assess compliance with EPCM procedures and workflows. Quality control for EPCM delivered services will be delivered through use of standard EPCM procedures for services provided by the EPCM.
- The quality function, as it relates to auditing and verifying contractor and vendor compliance to their Quality Plans and Inspection and Test Plans, will be undertaken by Package Coordinators and Site Construction Supervisors. Responsibility for providing quality control plans and discharging all work relative to those plans vests with the contractors and vendors, including sub-contractors and sub vendors engaged by those contractors.

21.1.2.4 Risk management (ref Appendix A21-5)

- The major contracts for equipment and material supply (CM001, CG001, CC002, CC003 and TR001) are being delivered on lump sum and variants of design build contracts; as such risk mitigation through construction will vest with the contractor. The EPCM will be responsible for management of cost and schedule risk as defines in the Project Controls Plan (Ref Appendix A21-10).
- EPCM risk management work will focus upon:
  - Qualitative Risk Analysis – Regular risk register updates to ensure the risk treatment plans are up to date and effective, identification of new project risks and closure of risks that have been mitigated or are no longer applicable.
  - Quantitative Risk Analysis (QRA) – Twice yearly updates of the capital cost risk profile developed during the Feasibility Study to update uncertainty factors related to work packages prices, quantities and duration, etc.
  - Technical risk management – consisting of Construction and Commissioning Safety workshops to identify and minimize hazards related to the construction and commissioning activities, procedures and sequence.
  - In addition, the engineering team will attend Hazard and Operability Studies (HAZOPs) lead by the major the contractor groups.

21.1.2.5 Engineering (refer to Appendix A21-6)

- In support of the project strategies, engineering will be implemented as a lean EPCM approach where:
  - Engineering design will primarily be executed by major vendors and design-build contractors with the EPCM team developing design for earthworks and wrap-around systems only.
  - The EPCM engineering team will be responsible to:
    - Finalize and issue IFC drawings for the rail earthworks.

- Develop Mine Site and Port Site final layout, earthworks detailed design and earthworks IFC drawings.
- Finalize configuration of and develop detailed design of the Mine Site and Port Site power distribution systems.
- Develop detailed design for the water / effluent pipeline modifications at the Mine Site and Port Site.
- Complete detailed design for pre-cast elements outside the scope of major contracts and which will be included in package PC001.
- Finalize configuration of and develop detailed design of the Mine Site and Port Site communications / IT systems.
- Develop scopes of work and technical specifications for packages not issued for final bid during the Feasibility / Stage 3 Study.

- Mississauga will be the principal project implementation office where package leads will be based, however, Johannesburg will be the principal engineering design office where all detailed design included in the EPCM scope is carried out. Engineering design developed in Johannesburg will be supported by subject matter experts from Canada as required and, in particular, will be reviewed by a Nunavut registered Professional Engineer based in Canada who will ultimately stamp the drawing prior to release for construction.
- Engineering design carried out by vendors and contractors will be carried out in their preferred location. Generally smaller vendors and contractors are based in Canada, however, design by larger contractors, particularly CM001, will likely be carried out in multiple locations including Canada, Europe and potentially USA / Australia.
- The engineering execution plan is predicated upon completion of engineering design as defined in the table below;

Package	Define Functional Requirements	Process Design (Size / Rate / Capacity)	Basic Design	Detail Design	Design Verification	Functional Compliance Review
CC001 – Early Earthworks	EPCM	EPCM	EPCM	EPCM	EPCM	EPCM
CC002 – Earthworks North	EPCM	EPCM	EPCM	EPCM	EPCM	EPCM
CC003 – Earthworks South	EPCM	EPCM	EPCM	EPCM	EPCM	EPCM
CM001 – BMH and Processing	EPCM	Contractor	Contractor	Contractor	Contractor	EPCM
CG001 – Ore Dock	EPCM	n/a	Contractor	Contractor	Contractor	EPCM
TM001 – Fuel Storage	EPCM	EPCM	EPCM	Contractor	Contractor	EPCM
TR001 – Rail System	EPCM	EPCM	Contractor	Contractor	Contractor	EPCM
TX001 – Construction Camp	EPCM	EPCM	Contractor	Contractor	Contractor	EPCM
TX002 – Permanent Camp	EPCM	EPCM	Contractor	Contractor	Contractor	EPCM
TX003 – Workshops	EPCM	EPCM	Contractor	Contractor	Contractor	EPCM
PA001 – Mine Site Camp						
PC001 – Pre-Cast Concrete	EPCM	n/a	EPCM	Vendor	Vendor	EPCM
PE001 – E-Houses	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PE002 – Power Generation	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PM007 – Jaw Crusher Upgrade	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PM100 – Mobile Eq't – HME	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PM200 – Mobile Eq't – Other	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PM201 – EPCM Vehicles	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PR001 – Locomotives	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
PR002 – Ore Wagons	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
BE001 – Power Cable	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
ZX006 – Coms & Data Services	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
ZR001 – Rail Operations	EPCM	EPCM	Vendor	Vendor	Vendor	EPCM
CX001 – (Wrap-around MEIP)	EPCM	EPCM	EPCM	EPCM	EPCM	EPCM
CX001 – (Reclaim Conveyor)	EPCM	EPCM	EPCM	Contractor	Contractor	EPCM
CX001 – (Rail Unload Tunnel)	EPCM	EPCM	EPCM	Contractor	Contractor	EPCM
CX001 – (Tote Road Comms)	EPCM	Contractor	Contractor	Contractor	Contractor	EPCM

Table 21-2: Design Responsibilities

- EPCM will be responsible for review vendor and contractor design documents for functional compliance with issued specifications.
  - Functional specifications developed during the Stage 3 study will be updated for award of vendor purchase orders and design-build contracts with limited technical development by the EPCM engineering team.

- Design carried out by vendors and contractors will be subject to review to confirm compliance with project functional requirements.

21.1.2.6 Procurement and Contracting (refer to Appendix A21-7)

The EPCM will be responsible for completing the bidding process, contract award and administration of the packages noted in the Package List shown below.

Package Number	Package Title	Contractual arrangement	Pricing Basis	Package Status at completion of the Stage 3 Definitive Study
CONSTRUCTION CONTRACTS				
CC001	Early Earthworks	FIDIC for Construction	Cost Reimbursable	Awarded in execution
CC002	Earthworks North	FIDIC for Construction	Unit Rate Schedules	Final contract negotiation to be completed
CC003	Earthworks South	FIDIC Design-Build	Unit Rate Schedules	Final contract negotiation to be completed
CG001	Ore Dock	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Bids received - rebid to align with CM001 scope required.
CM001	Bulk Materials Handling & Processing	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Awarded and in execution
CX001	Wrap Around MEIP	FIDIC for Construction	Unit Rate Schedules	Final design to be completed ahead of bidding
TM001	Fuel Storage	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Awarded and in execution
TR001	Rail System	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Re bidding required to overcome lack of bids in Study
TX001	Construction Accommodation Camp and Services	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Awarded in execution
TX002	Permanent Accommodation Camp	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Awarded in execution
TX003	Workshops	FIDIC Design-Build	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
SUPPLY CONTRACTS				
PA001	Mine Site Camp Supply	Purchase order	Lump sum	Awarded in execution
PC001	Pre-Cast Concrete	Purchase Order	Unit Rate Schedules	Awarded in execution
PE001	Power Distribution E-Houses	Purchase Order	Pricing Schedule: Milestone Payments	Awarded in execution
PE002	Power Generation	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
PM007	Jaw Crusher Upgrade	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
PM100	Mobile Equipment - Mine Production	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed

Package Number	Package Title	Contractual arrangement	Pricing Basis	Package Status at completion of the Stage 3 Definitive Study
PM200	Mobile Equipment - Other	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
PM201	EPCM Vehicles	Purchase Order	Pricing Schedule: Milestone Payments	
PR001	Locomotives	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
PR002	Ore Wagons	Purchase Order	Pricing Schedule: Milestone Payments	Final contract negotiation to be completed
BULK MATERIALS PURCHASE ORDERS				
BE001	Power Distribution Cable	Purchase Order	Pricing Schedule: Milestone Payments	Awarded in execution
SERVICE CONTRACTS				
ZG001	Site Survey	Service Level Agreement	Cost Reimbursable	
ZL001	Sea Lift - Standard Freight	Service Level Agreement	Unit Rate Schedules	Final contract negotiation to be completed
ZL004	Consolidation Hub	Service Level Agreement	Unit Rate Schedules	Final contract negotiation to be completed
ZX006	Communications and Data Services	Service Level Agreement	Unit Rate Schedules	Final contract negotiation to be completed
MATERIALS/SERVICES BY BIM				
TX007	Early Earthworks - Tormont Equipment Maintenance	Service Level Agreement	Unit Rate Schedules	Awarded in execution
TX008	Early Earthworks - Sandvik Equipment Maintenance	Service Level Agreement	Unit Rate Schedules	Awarded in execution
TX009	Early Earthworks - Explosives Supply	Service Level Agreement	Unit Rate Schedules	Awarded in execution
ZF001	Diesel Fuel Supply	Service Level Agreement	Unit Rate Schedules	
ZR001	Rail Operations	Service Level Agreement	Unit Rate Schedules	Bid received.
ZX004	Air Services - Passenger from Mirable to site	Service Level Agreement	Unit Rate Schedules	TBA
ZX005	Air Services - Freight	Service Level Agreement	Unit Rate Schedules	TBA
ZX009	Air Services - Passenger from regional aiports to Mirabel	Service Level Agreement	Unit Rate Schedules	TBA

Package Number	Package Title	Contractual arrangement	Pricing Basis	Package Status at completion of the Stage 3 Definitive Study
ZX010	Camp catering existing installations (early works)	Service Level Agreement	Unit Rate Schedules	TBA
Packages for Placed and Managed by BIM				
YH001	EPCM Services Early works			Awarded in Execution
YH002	EPCM Services Execution			Final contract negotiation to be completed
YH003	EPCM Site indirects costs			Final design to be completed ahead of bidding
YE999	Third Party Vendor and Pre-Assembly Yard QA-QC			
VX999	Vendor Representative Support planning package			Included in packages above
ZX991	First fills - planning package			Included in packages above
ZX992	Capital and commissioning Spares - planning package			Included in packages above
WE001	Owners costs			
WE002	Upgrade of Owner's systems			
WO001	Quarry Royalties			
XC999	Contingency			
XT999	GST credit planning package			

Table 21-3: Package List

- The contract formation, purchase order formation and resultant contract management shall be undertaken from the EPCM home office.
- All freight originating from North America will be consolidated at the at a project Canadian Consolidation Hub (CCH) before shipment to Milne; the exception being for explosives and the 800 man camp.
- For freight received at the CCH, the EPCM will receive pre-packaged (containerised) loads for shipment. The EPCM will receive such materials as loads and then re-issue to either the source or target contractor on site. The EPCM has no responsibility for the content of loads delivered to the CCH.

- For freight originating overseas (not North America and Canada) and where required specifically in the contract, contractors will freight goods, materials, equipment, pre-assemblies, modules, etc. directly to the port at Milne.
- Where specialty heavy lift vessels and offloading equipment is required, contract CM001 in particular, the contractor is responsible for all off load and site movement of goods and materials provided under the contract.
- For all other shipments arriving at Milne the seal lift contractor (ZL001) is accountable for material offload and transport to the high water mark at designated landing points at Milne. The EPCM contractor will register and issue all such loads to receiving contractors at Milne.
- Contractor CC002 will be accountable for:
  - receiving all shipments arriving from the CCH
  - moving the loads from the high water mark to either laydown areas at Milne or the Mine at Mary River for issue to receiving contractors.
- Once goods and materials have been transferred to contractors, the contractor will be responsible for all material management functions related to their site work.

21.1.2.7 Construction (refer to Appendix A21-8)

- The EPCM will coordinate the onsite infrastructure framework required for contractors to operate efficiently at site. Each contractor will be focussed on their contract, the work of the EPCM is to coordinate contractor activities and ensure efficient and safe completion of work.
- Construction oversight, that contractors are performing work in accordance with their contracts will be undertaken jointly by field supervisors, field engineers and package coordinators on site.
- The EPCM will be responsible for validating an ensuring the delivery of complete modules and pre-assemblies that have been pre-commissioned where appropriate: Specifically the EPCM will oversee and audit contractor plans to ensure contractor compliance with the contract and the project goals are met. Specifically the Construction team will provide oversight in respect to;
  - Extent of modularization/offsite fabrication and assembly including module configurations.
  - Procurement, contracting and fabrication strategies.
  - Vendors and fabrication/erection contractor pre-qualification criteria and availability.
  - Transportation, logistics and handling studies.
  - Coordination of vessel movements at Milne

- Sequencing, scheduling and execution planning for modules and pre-assemblies by contractors.
- Development of modular specifications and responsibility matrices.
- Crane requirements including pre-inspection, qualifications and reservation of appropriate equipment and resources.
- Determine module/assembly hook-up, pre-commissioning and commissioning requirements.

The construction team will provide final releases for module shipment to site.

- Coordination of sealift contractor and CC002 will be undertaken to ensure a structured approach to receiving and issuing materials is delivered on site. There will be no EPCM managed warehouse; all materials shipped to site will be directly passed to end user contractors for their care custody and control.
- A third party quantity surveyor will be engaged to review and confirm installed quantities and quantities won (quarry work and ballast preparation) to confirm and validate contractor progress and charges presented on invoices.
- The construction management team will coordinate all site activities between contractors to ensure efficient delivery of construction works. In particular the management team will undertake overall coordination of manpower planning using plans prepared by contractors and coordinate people movements and accommodation needs. The site team will ensure personnel are mobilised to site after completion of all pre-requisite checks and pre-mobilisation activities. The site team will encourage the retention of non-skilled workers on site through manpower coordination activities and discussions with demobilising and mobilising contractors.
- The management team will manage the site services.

CC002 Earthworks South will be responsible for general site services at Mine consisting of the following:

- Sealift freight offload and delivery to laydowns.
- Raw water delivery to construction camp.
- Treated effluent pickup from STP and discharge.
- Project road and area snow removal and sanding.
- Garbage collection and delivery to incinerator and landfill.
- Bussing of passengers between the aerodrome and Milne Port construction camp.
- Minor carpentry and repairs to EPCM facilities.

- Raw water delivery to construction camp.
- Treated effluent pickup from STP and discharge.
- Project road and area snow removal and sanding.
- Garbage collection and delivery to incinerator and landfill.
- Minor carpentry and repairs to EPCM facilities.
- EPCM pickup maintenance.

TX001 Construction camp and services will be responsible for services related to the construction camps at both Milne Port and the Mine site as follows:

- Camp management, operation, maintenance and catering.
- Sewage treatment plant operation.
- Water treatment plant operation.
- Incinerator operation.

21.1.2.8 Commissioning (refer to Appendix A21-9)

The EPCM will be responsible for managing the commissioning program. The responsibilities for completion of each stage of commission is defined below;

Number	Package Name	Commissioning Stage				
		1	2	3	4	5
CM001	Ore Processing	C	C	C	C	BIM
PE001	Power Distribution E-Houses	C	E	E	BIM	BIM
PE002	Power Generation (not final)	C	E	E	BIM	BIM
PM007	Jaw Crusher Upgrade (not final)	C	C	C	C	BIM
PM100	Mobile Equipment - Mine	C	C	C	C	BIM
PR001	Locomotives	C	C	C	BIM Note 1	BIM Note 1
PR002	Wagons	C	C	C	BIM Note 1	BIM Note 1
TM001	Fuel Storage	C	E	E	BIM	BIM
TR001	Rail System (not final)	C	E	E	BIM	BIM
TX001	Construction Accommodation Camp and Services	C	C	C	C	BIM
TX002	Permanent Accommodation Camp	C	C	C	C	BIM

Number	Package Name	Commissioning Stage				
		1	2	3	4	5
CG001	Ore Dock	C	C	C	C	BIM

Note 1: BIM has plans to utilize a rail operator (ZR001) who will have Stage 4 commissioning responsibility as the operator. (and ongoing operations thereafter)

Table 21-4: Commissioning Responsibilities/

The stages of commissioning being defined are in the table below.

Function	Construction	Commissioning			
Project Phase	Execution			Start-up	Ramp-up
Stage	Stage 1: Construction Testing	Stage 2: Pre-Operational Equipment Testing	Stage 3: Pre-Operational Systems Testing	Stage 4: Process Commissioning	Stage 5: Ramp-Up
Activity	Equipment inspection and testing	Equipment inspection and testing	Systems testing	Process start up and testing	Ramp-up
Conditions	Not energized	Energized	Inert material (water, air)	Process materials	Process materials
Example Tasks	Wiring point to point Vessel leak checks Pressure pipe tests	Motor bump test Vibration checks Align conveyor	Interlock check Sequence check Pump flow check	Run systems with process materials Run the complete plant	Increase throughput to design rate and quality

Table 21-5: Commissioning Stages

- Where modules or pre-assembled components (CM001 elements, E houses, generators, locomotives etc) are procured, such items will be pre-commissioned to the a minimum commissioning Stage2, and where practical, particularly for CM001 modules, commissioned to Stage3, before shipping to site.
- To facilitate commissioning of critical equipment (CM001 and PR002) package engineers engaged at the start of the implementation phase will remain engaged with package management through design, fabrication, offsite pre-commissioning and on site commissioning to drive commissioning effort off site.

21.1.2.9 Project Controls (refer to Appendix A21-10)

- The project controls function will be managed and lead from the EPCM Home office. Field Coordinators will be engaged on site to capture schedule, cost and progress data from contractors. Processing of field collected data will be undertaken in the Home Office.

- The EPCM will use its own cost control system in an un-customised roll out to manage progress and cost control for the project.
- Progress Measurement
  - EPCM Related work:
    - The EPCM will report progress for EPCM related Level of Effort work as Level of Effort activities where progress is based on actual hours relative to approved budget and expected forecast at completion.
    - Progress for EPCM engineering work will be based upon rule based rules of credit applied to the completion of Engineering Work Packages defined in the Engineering Functional Execution Plan contained in Appendix A21-6.
    - Cost performance will be assessed against approved budget using earned progress defined above.
  - Contractor and Vendor work
    - Contractors and vendors will be required to provide cost, schedule and performance reports in accordance with standards defined by the EPCM and as contained in their contracts.
    - The EPCM will verify field construction work by way of interactions with the field coordinators and input from the site based third party quantity surveyor.
  - Project Progress Measurement;
    - EPCM Services; measured as defined above and included in proportion to its cost contribution to the approved TIC.
    - Procurement: measured as above and included in proportion to its cost contribution to the approved TIC.
    - Contracts/Construction: measured as above and included in proportion to its contribution to the approved TIC.
    - Other; included in proportion to its contribution to the approved TIC.
    - EPCM standard procedures for progress measurement aggregation will be applied.
- Cost Controls will be applied in accordance with EPCM procedures and include for:
  - Capture of budgets, budget transfers and change approvals.
  - Capture of actual costs according to receipt of actual accruals and expenditure.
  - Cost trending to develop cost forecasts to enable mitigating strategies to be developed before cost is incurred.

- Project reporting will be included issue of a formal monthly report summarising the status of the project and providing forward projections for project performance and measures to be applied to vary the execution method to mitigate adverse trends. The expected formal reporting regime is shown in:

Report	Frequency
Project coding structure	Implemented and revised as required
Cost Baseline	6 to 8 weeks from FEL3 approval
Schedule baseline	6 to 8 weeks from FEL3 approval
Progress baseline	6 to 8 weeks from FEL3 approval
Package Cost Analysis Sheet (commitment control)	As required
Cost Forecast Report (includes contingency and Forex reporting)	Monthly
Trend and change report	Interim Period to be determined, issued monthly in the MPR
Level 1, 2 and 3 schedule updates	Monthly
4 week manhour report	Weekly
Engineering progress (no review of hours)	Bi-weekly
Engineering and EPCM hours update	Monthly
Overall consolidated progress	Monthly
Monthly project report	Monthly
Hatch invoices	Monthly
Third party payment certificates (Contractors and Suppliers managed by Hatch)	As required
Accruals on Hatch managed packages	Monthly

Table 21-6: Standard Reporting

21.1.2.10 Document Management (refer to Appendix A21-11)

- The EPCM will provide the primary document management system for the project and

- Store all and issue to contractors design deliverables created by the EPCM
- Receive document lists and track document submittals for all contractor and vendor packages.
- Store all documents created by the EPCM and contractors/vendors managed by the EPCM.

- The EPCM will require all vendors and contractors to submit document lists to be loaded into the document management system and against which project document numbers will be issued; contractors and vendors will be required to submit their documents according to their document list and numbered per EPCM issued document number.
- The document control function will be managed from the EPCM home office.

21.1.2.11 Project Systems Management (refer to Appendix A21-13)

In view of the lean EPCM approach, systems will only be deployed if core to a function on the project and where that function can setup and maintain that system:

- The standard engineering suite of tools will be used for Hatch generated design.
- The standard iPAS DM tool will be used for document management
- iPAS MP will be used to track materials at a container/module level, both in the home office and at site.
- iPAS PC will be used to manage contracts and project controls.
- iPAS EP/iPAS TF will be used to manage time reporting and engineering progress

Site IT systems and support costs have been minimized for the project and no allowance has been made for a Hatch IT site resource. Consequently, only those systems that can operate through a VPN connection, will be utilized at site.

21.1.2.12 PEP Part C - Control Baselines (refer to Appendix A21-14)

The PEP Part C contains the project baseline data against which project performance will be monitored, reported and as a basis to assess change. This section contains:

- The Project WBS structure which captures the Facilities Break Down Structure the FBS.
- Procurement Package Register
- Procurement Package Status Report – normalized for start of implementation
- Project Schedules
  - Milestones
  - Level 1, level 2 and level 3 project schedule
  - Critical path schedule level 1, level 2 and level 3

- Construction Manpower histograms
- EPCM Staffing manpower histogram
- Progress Curve baselines
- Cash flow Curve and Cash flow data, commitments and expenditure
- Facilities description

21.2 Systems and Procedures

The EPCM will deploy its standard suite of procedures, templates, forms and systems in discharge of its obligations. No provision has been made for customisation of any system, procedure, template or form during the execution phase.

21.3 Organisation

21.3.1 Owner's Team

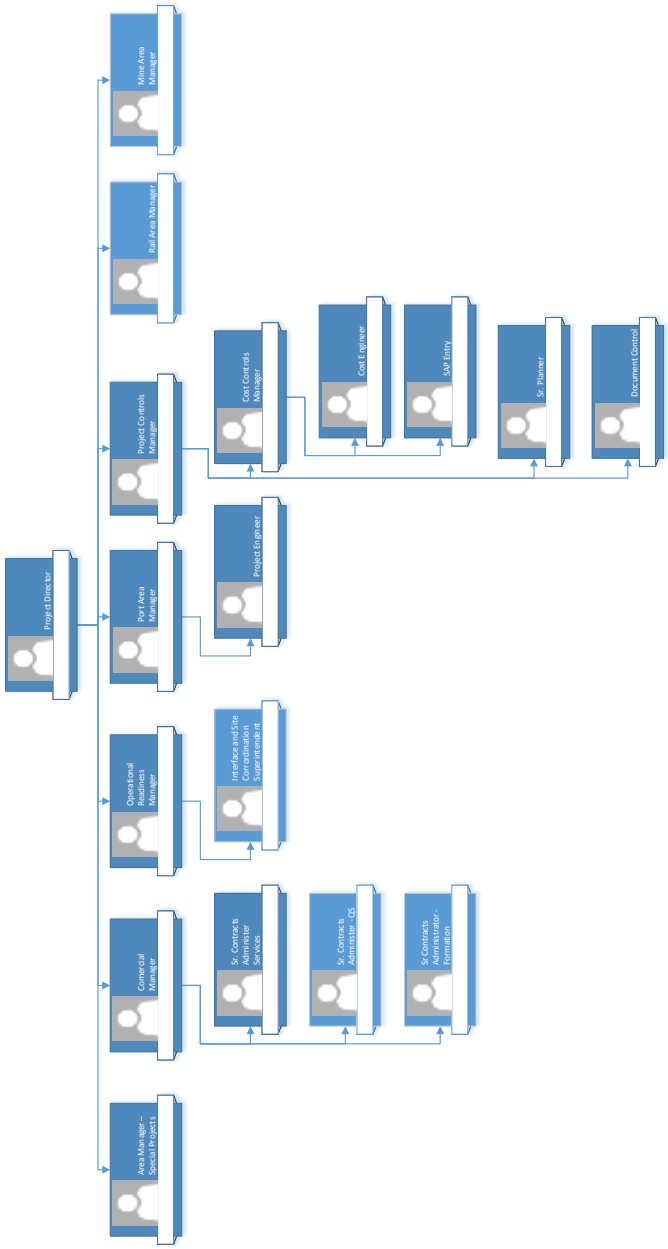

Figure 21-1:BIM Owner's Team Organisation

21.3.2 EPCM

The EPCM team structure recognizes;

- In 2017 to 2018 the team is focused upon:

- Completion of EPCM supplied engineering
- Award of all contracts and purchase orders
- Contract administration for awarded contracts
- Completion of Early Work to allow efficient ramp of 2017 construction work following the 2017 sealift
- Earthworks to progress site development at Milne Port, the mine site and Railway, in particular preparation of foundations for key elements of the CM001 package ready for delivery in 2018.
- Offsite fabrication and pre commissioning of modular and per-assembled plant and equipment
- Dock design and contractor mobilisation
- Delivery modular units for CM001

- In 2018 to 2019 the team is focused upon:
  - Completion of fabrication and shipping to site all plant and equipment required for construction completion.
  - Completing earthworks and rail line installation
  - Installation and commissioning of the bulk materials handling facilities.
  - Start up of the rail line and train unloader
  - Crushing, screening and lump stacking plant commissioning and ramp up.
  - Installation and commissioning of the shiploaders.
  - Performance testing of one shiploader onto a Panamax vessel.
  - Achieving mechanical completion for all plant and completion of dry commissioning for all plant.
- In 2020 BIM will manage any outstanding activities for the project, such as:
  - Performance testing associated with the lump reclaim and shiploading circuit supplied contractor CM001
  - Retrograde shipping in the 2020 sea lift of remaining contractor equipment and personnel.
  - Any outstanding financial close out on contracts and purchase orders (eg final payments, retention releases, release of bonds, etc)

The EPCM team structure has been aligned to the changes in work focus from year to year and also to the need to deport a lean management approach to the management of the site wherein major contractors are expected to self-manage against contracted schedules and cost projections.

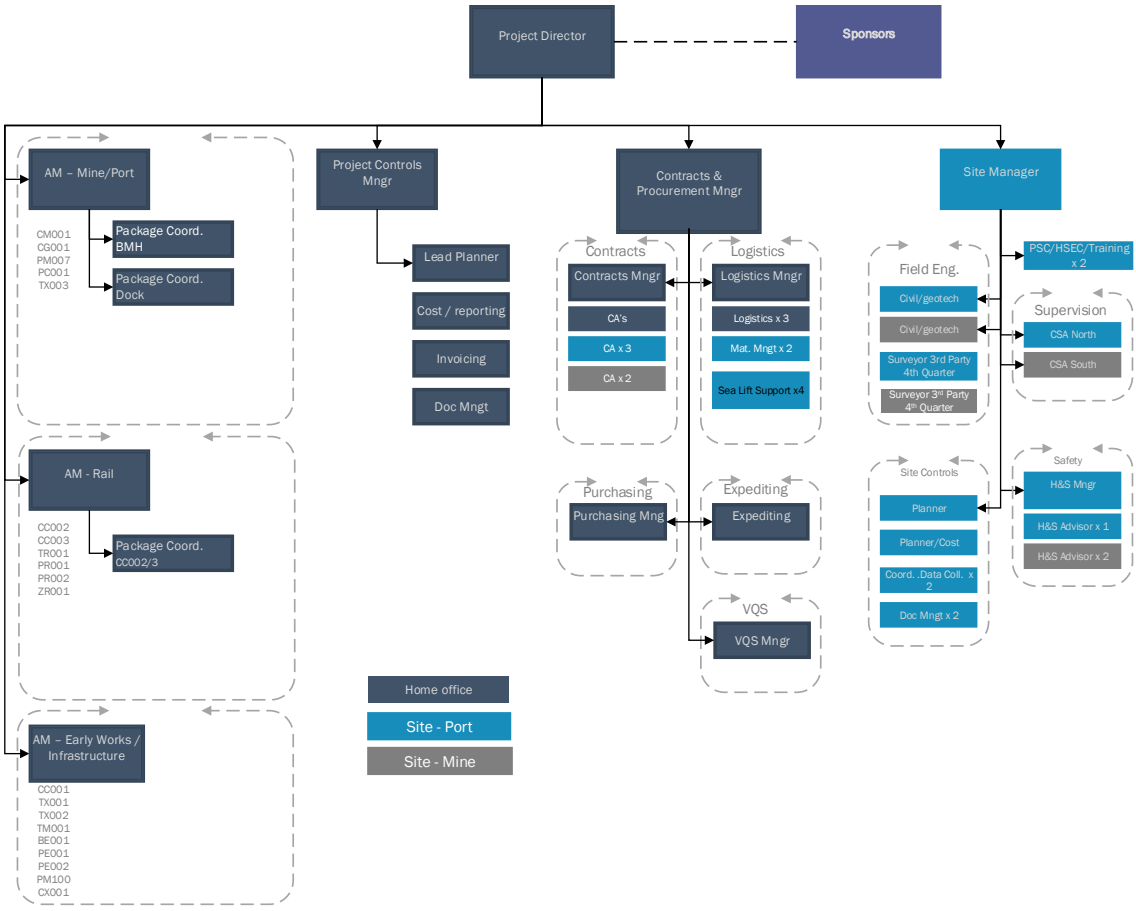

Table 21-7: EPCM Organisation 2017 - 2018

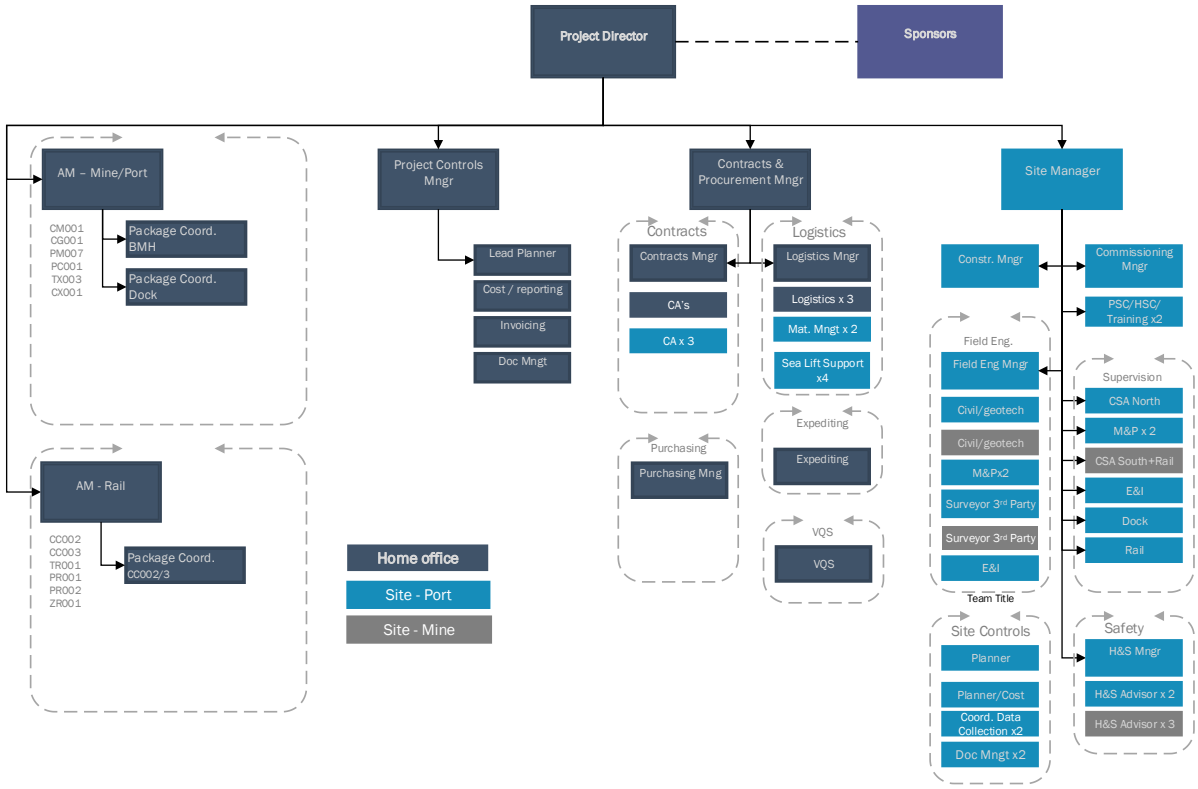

Table 21-8: **EPCM Organisation 2018 – 2019**

In all scenarios the EPCM will mobilize a small team to the Consolidation Hub at Velley Field in Quebec to prepare for and manage the sealifts for 2017, 2018 and 2019.

21.3.3 Roles and Responsibilities

Roles and responsibilities for the BIM Owner Team, the EPCM and Contractor/Vendor organisations have been developed and included within Appendix A21-1 PEP Part A.

21.3.4 Delegation of Authorities

21.3.4.1 Owner

The Owner delegations of authority have been developed and included within Appendix A21-1 PEP Part A.

21.3.4.2 EPCM

The EPCM delegations of authority have been developed and included within Appendix A21-1 PEP Part A.

21.3.5 Execution Offices

21.3.5.1 Home Offices

The BIM Owner's team will operate from the corporate offices of BIM located at 2265 Upper Middle Road, Oakville Ontario.

It is expected that the home office for the EPCM will be located close to the Home Office for the BIM Owner's Team.

21.3.5.2 Site Offices

BIM will provide serviced office accommodation for both the Owner and EPCM at both the port at Milne and also the mine at Mary River.

21.4 Reference Documents

Document Number	Title	Revision	Date	Appendix Number
H353004-00000-103-120-0001	PEP Part A – Definition and Execution Strategy	B	04/21/2017	A21 - 1
H353004-00000-110-120-0001	PEP Part B1 – Health and Safety Management	B	04/21/2017	A21 - 2
H353004-00000-120-120-0001	PEP Part B2 – Environment, Sustainability and Community Interface Management	B	04/21/2017	A21 - 3
H353004-00000-130-120-0001	PEP Part B3 – Quality Management	A	04/21/2017	A21 - 4
H353004-00000-140-120-0001	PEP Part B4 – Risk Management	B	04/21/2017	A21 - 5
H353004-00000-200-120-0001	PEP Part B5 – Engineering Management	A	04/21/2017	A21 - 6
H353004-00000-300-120-0001	PEP Part B6 – Procurement and Materials Management	B	04/21/2017	A21 - 7
H353004-00000-400-120-0001	PEP Part B7 – Construction Management	B	04/21/2017	A21 - 8
H353004-00000-500-120-0001	Pep Part B8 – Commissioning Management	B	04/21/2017	A21 - 9
H353004-00000-600-120-0001	PEP Part B9 Project Controls Management	B	04/21/2017	A21 - 10
H353004-00000-720-120-0001	PEP Part B10 – Document Management	B	04/21/2017	A21 - 11
H353004-00000-730-120-0001	PEP Part B11 – Project Systems Management	B	04/21/2017	A21 - 12
H353004-00000-103-120-0001	PEP Part B12 – Owner's Team Execution Plan	A	04/21/2017	A21 - 13
H353004-00000-103-120-0002	PEP Part C Control Baselines	B	04/21/2017	A21 - 14