

Position paper on contracting delivery models



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Purpose

The purpose of this paper is to provide a brief outline of a narrow range of delivery models commonly used in the delivery of complex infrastructure projects including:

- Engineering, Procure and Construct (**EPC**)
- novated EPC
- Engineering and Procurement and Construction Management (**EPCM**)
- Project Management Contractor (**PCM**)
- Early Contractor Involvement (**ECI**)
- Front End Engineering Design (**FEED**).

Choosing an appropriate delivery model is not an exact science. There is no formula into which an individual project's peculiarities and Owner's unique requirements can be 'plugged in' to produce the only correct answer. Ultimately, the choice of the delivery model is a risk management exercise in itself, involving a balancing of various factors including:

- the degree of complexity of the engineering of the project and how much control the Owner wants to retain or be involved in overall design
- time constraints on project delivery – for example, whether it should be executed over a normal, sequential schedule, or a fast-track schedule
- the experience and capability of the Owner, including the Owner's degree of knowledge of design and construction and the extent and nature of the Owner's resources (including the skills and expertise of the Owner's team)
- the experience and capability of the designers and construction Contractors to be engaged to deliver the project
- the size of the project (in terms of the dollar value and physical complexity)
- requirements of equity and debt Financiers.

Ancillary documents

The following documents are useful to Owners when considering the appropriate delivery model and determining their appetite for risk alongside balancing the various factors described above:

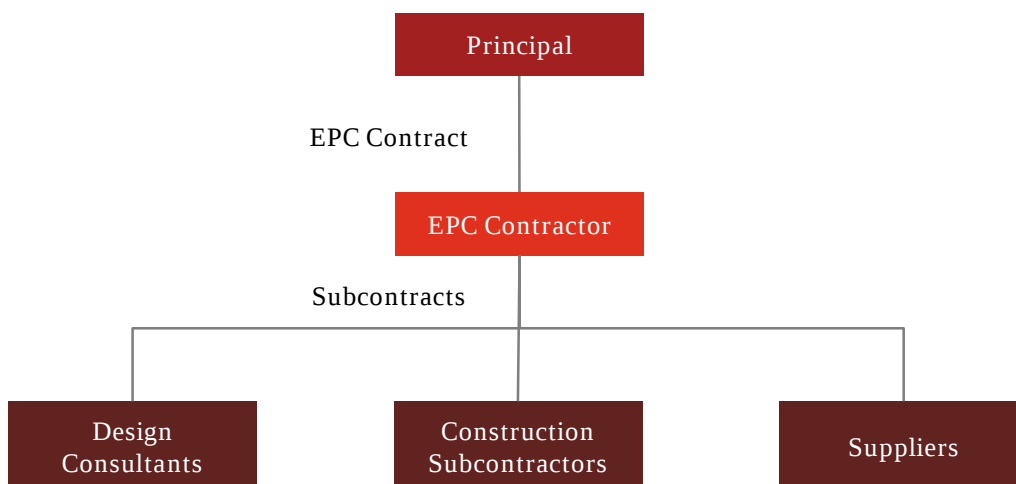
- a contracting and procurement plan (**Appendix 1**)
- a risk register and action plan (**Appendix 2**).

A contracting and procurement plan analyses and recommends a chosen project delivery model and contracting and procurement approach for committing and managing the project in order to provide a best value, best risk outcome for the project, through least capital and operational expenditure and taking into account the Lenders' bankability requirements in respect of time and cost certainty and quality and volume of output. This plan typically provides for a "base case scenario" for formulating the detailed contracting and procurement procedures for the execution phase of a project.

A risk register records details of all the risks identified for the project. Risks associated with activities and strategies are identified then graded in terms of likelihood of occurring and seriousness of impact. Risk registers typically contain the following information:

- a description of each risk and its potential consequences (operational and strategic)
- factors that may impact upon the likelihood and consequence of the risk
- an assessed risk grade – Low, Medium, High or Extreme and whether this risk grade is acceptable
- actions and controls that currently exist to mitigate risks
- early warning factors and upward reporting thresholds.

The process of identifying and analysing risks should be a part of tactical decision making and be dealt with in the initial planning of the project.



EPC

Under an EPC structure, the Principal enters into a contract with the EPC Contractor, which will then enter into various subcontracts with its sub-Contractors for performance of discrete portions of work and carry out all aspects of the design, construction and commissioning of the project.

The perceived **advantages** of the EPC structure for an Owner include:

- the degree of complexity of the engineering of the project and how much control the Owner wants to retain or be involved in over design
- time constraints on project delivery – for example, whether it should be executed over a normal, sequential schedule, or a fast-track schedule
- the experience and capability of the Owner, including the Owner's degree of knowledge of design and construction and the extent and nature of the Owner's resources (including the skills and expertise of the Owner's team)
- the experience and capability of the designers and construction Contractors to be engaged to deliver the project
- the size of the project (in terms of the dollar value and physical complexity)
- requirements of equity and debt Financiers
- single point responsibility – the Contractor is responsible whether a fault is due to design or construction
- costs – this form of delivery structure can be more economical as the design can take into account constructability issues (such as access, construction problems and particular methods of working employed by the Contractor) which can result in substantial savings
- time – it can allow fast track construction due to phased construction
- there is one overall contract for the Owner to manage, with design and construction warranted by a single contracting
- the Owner obtains the significant extra-legal promise (not usually obtainable in either of the alternative delivery structures) of a warranty of fitness for purpose from the Contractor
- guarantee or wrap – the EPC structure more easily facilitates a corporate 'wrap' or guarantee of the design and construction of the whole project increasing the bankability of the project
- the EPC structure, or a combination of EPC structures for a project, tend to be the better 'bankable' form of delivery models because of the 'perceived' fixed time and fixed price nature of the contracts.

The perceived **disadvantages** of the EPC delivery structure include:

- the checks and balances that are usually present when design and construction are separate do not usually exist, as the design and construction are being performed through one entity
- under-design – this is not frequently detectable by the Owner's "design checking" team, and may result in latent recurrent operational or maintenance problems and costs in the completed project
- the difficulty of making any genuine assessment or comparison of prices submitted by tenderers where designs differ ("comparing apples and oranges")
- it can be an expensive option if the EPC Contractor seeks to extract an excessive "price premium" for the acceptance of design risk, particularly where the Owner has controlled the earlier design process

- if the Owner finds that it must direct significant variations (usually where it has not fully or properly expressed its requirements in the functional performance brief), the EPC Contractor will usually be able to extract a significant price premium for carrying them out
- an Owner must generally rely solely on one organisation for recovery of compensation if something goes wrong with the project. There may be few organisations that will be able to provide adequate financial guarantees to ensure that there is substance behind the contracting party in the event of a claim for the total failure of the project.

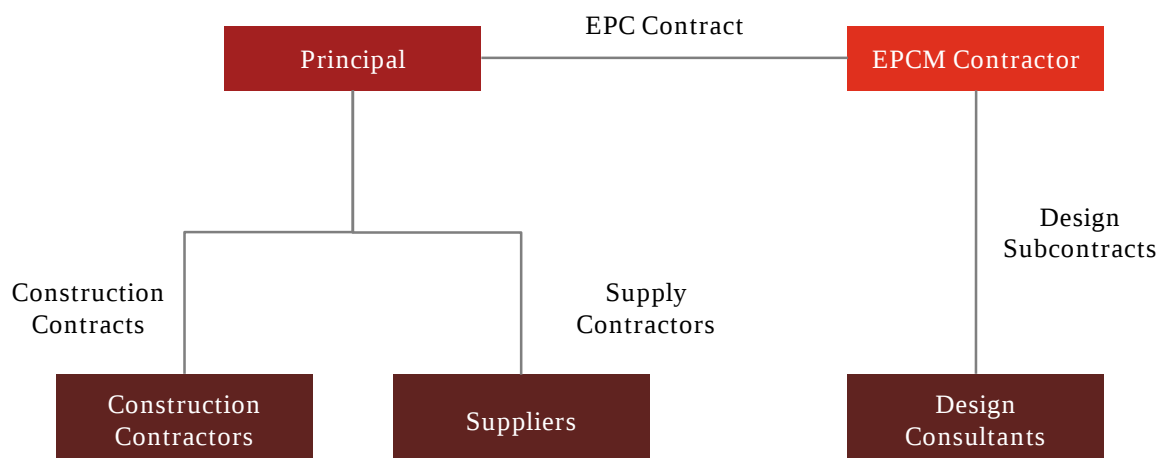
Novated EPC

There are hybrids of the EPC structure. For example, under a novated EPC approach, the Owner engages design consultants (under contracts obliging them to agree to being novated at the Owner's direction to a construction Contractor) to carry out the design to an appropriate stage (generally speaking, a stage that is sufficiently advanced for the Owner to feel comfortable that it will receive the type and standard of facility it is seeking, but not so advanced that the benefits of an experienced construction Contractor's buildability and other time-saving practical input will be lost), and then the Owner engages a Contractor who agrees to accept the novation of, and responsibility for the work of, the design consultants who enter into new (novated) contractual arrangements with the Contractor.

The perceived **advantages** of the novated EPC approach for the Owner include:

- the close relationship between the Owner and the design consultants at the early stages of design retains for the Owner the opportunity to monitor and provide direct input into the design process
- a closer relationship between the Contractor and the design consultants in the later stages of the design process so that the design can take account of constructability issues and methods of working of the Contractor
- the Owner retains the benefits of an EPC delivery model (including obtaining a warranty for fitness for purpose from and single point of responsibility in the Contractor, and a higher degree of certainty in the design process compared to the standard EPC structure).

The novated EPC delivery structure's perceived main disadvantage is that it can be the most expensive delivery structure, as there will usually be a degree of overlap and repetition, as it is incumbent on a prudent Contractor to review the designer's design in order to be comfortable with taking over responsibility for it.



EPCM

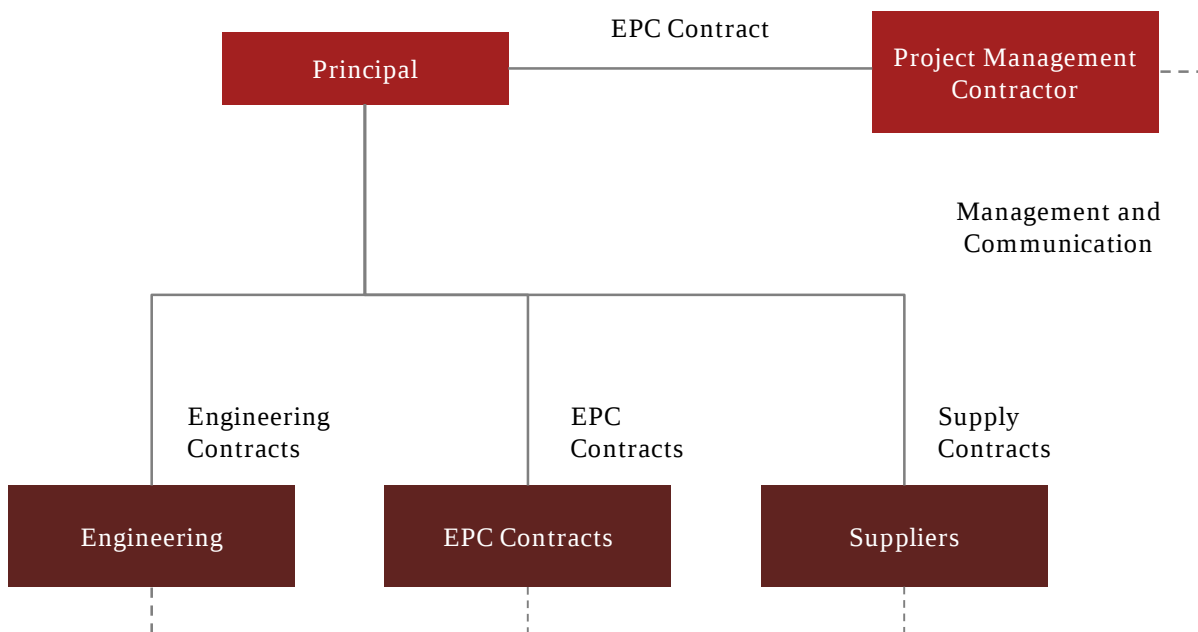
Under an EPCM structure, the Owner engages an EPCM Contractor to carry out the engineering design, and to manage the procurement and construction of the project. The Owner enters into direct contracts with suppliers and construction Contractors for the project. EPCM structures may be used in the delivery of large projects where an Owner is keen to take a “hands on” approach throughout the project, often with an expectation that getting things right will take ‘fine tuning’ to design.

The perceived **advantages** of the EPCM delivery structure include:

- time – it allows fast track construction due to phased design and construction. Project delivery can be competitive in overall design-construction time as compared with an EPC approach
- the Owner retains better control over design development (than in an EPC approach) while at the same time, the design can take into account constructability issues (such as access, construction problems and particular methods of working employed by the Contractor) by using the construction management skills of the EPCM Contractor.

The perceived **disadvantages** of the EPCM structure include:

- there is usually no firm project cost established until construction is well underway
- neither the EPCM Contractor nor the construction Contractors warrant that the project, when completed, will achieve all of the operational requirements of the project (that is, no warranty of fitness for purpose)
- there is the risk that the overall quality and performance of the project may be subordinated to the EPCM Contractor's desire to maximise cost and time performance-based incentives incorporated into its remuneration. For example, because of the inability to fix project costs, various techniques are adopted such as awarding a larger portion of the project early in the project or setting targets for each portion of the project work and then trying to maintain the targets. The techniques used to minimise cost overruns can sometimes compromise the quality of the project. In addition, the opportunity for the EPCM Contractor to cover up its own design deficiencies by the way it manages or procures construction packages is greater
- the successful integration of design and construction functions and avoidance of changes/modifications to the design are largely left to the EPCM Contractor. The Owner may not be aware of potential conflicts of interest or weaknesses in the EPCM Contractor structure that may interfere with economical and timely project completion.



PCM

Under a PCM structure, the Owner engages a Contractor to project/contract manage, or a project manager to contract/project manage to assist the Owner in the management aspects of the project delivery process. The Owner enters into direct contracts (supervised on its behalf by the PCM) with design Contractors, construction Contractors and suppliers.

Under the PCM structure the manager/Contractor is nominated as the Owner's agent to manage the direct contracts with designers, Contractors and suppliers.

The perceived **advantages** of the PCM structure for an Owner include:

- the construction management skills of the PCM can be utilised without the inherent conflict of interest of it also being the designer. The PCM can play an active role in evaluating design tendered by design Contractors, so as to effect value engineering to reduce costs and to make suggestions as to how to improve the performance outcome of the design
- individual project components are performed by the most expert specialists in those fields, so that each risk is spread to those best equipped to take it and is thus minimised for the overall project
- there can be independent evaluation of cost, schedule and construction performance (including evaluation for changes/modifications in design) by the PCM as it is not the designer or Contractor
- full time, objective co-ordination between the design and construction Contractors (both horizontally, between different designers or between different construction Contractors, and vertically, between designers and construction Contractors) is available by dedicated resources
- if the management function is well executed, project delivery can be competitive in overall design-construction time as compared with the EPC and EPCM structures.

The perceived **disadvantages** from an Owner's perspective include:

- in using a phased construction approach, the Owner begins the project before the total project price is established. The issue is whether the possibility of early completion is a sufficient trade-off for this cost risk
- the Owner has certain responsibilities and obligations under the construction contracts that must be met in a timely manner – for example, delays in the design development or supply of Principal-supplied materials and equipment can have serious time and cost consequences for the Owner. The Owner heavily relies upon the PCM to manage the Owner's performance of these responsibilities and obligations
- similar to an EPCM delivery structure, it would be difficult to procure a warranty for fitness for purpose for the Project from either of the PCM, the design Contractors or the construction Contractors as the PCM is not performing either design or construction and neither the engineering designers or the construction Contractors are solely responsible for both the design and construction of the project
- the success of project implementation to a great extent stands or falls on the planning, estimating and project management skills and resources of the PCM
- the PCM does not usually give a guarantee either in terms of overall price or the quality of the work (this contrasts with the corporate 'wrap' or guarantee of the design and construction of the whole project given under an EPC structure).

ECI

ECI is a relational procurement method which involves Contractors in the preliminary design process and, when used correctly, is an efficient means of designing and planning infrastructure projects in a less adversarial structure. ECI is similar to a design and build contract model, the key difference being that ECI seeks to obtain the benefit of the Contractor's specialist knowledge early in the project planning and design process, as opposed to novating a design to the Contractor which has been developed by the Owner.

This procurement method comprises a two stage process:

- **Stage 1:** the Contractor proceeds with the design development; works with the Owner on identifying, mitigating and apportioning engineering and constructability issues and risks; prepares a preliminary design; and submits a detailed design for pricing for stage 2 (which proceeds at the discretion of the Owner)
- **Stage 2:** construction commences, usually pursuant to a design and construct model, with key construction risks and issues already identified and defined in stage 1, allowing for a guaranteed contract price for the project. Stage 2 typically includes KPI incentivisation procedures or other ways of sharing risks and rewards to continue the collaborative and cooperative themes of the ECI procurement method.

Feed

Similar to an ECI, a FEED contract governs the front-end engineering and design processes, typically referring to planning and design (with defined groups of activities or segments) in the early stage of a project, usually commencing after provisional project approval and will normally be completed prior to final project approvals. It is especially used for process plants.

The objective of the FEED contract is to further develop and document the front-end engineering and design processes so that the Owner can obtain final project approvals; required applications to authorities can be submitted; and the resulting documents can form a basis for the design and construct contract.

The perceived **advantages** of the ECI and FEED structures for an Owner include:

- enables risks to be identified, mitigated and/or properly allocated and priced in the initial stage, allowing for a number of initial risk uncertainties to be removed so that the parties can agree to a realistic risk adjusted price
- reduces the costs of tendering as only one design process is undertaken
- value for money can be achieved through early Contractor involvement in design and pricing
- all costs and documentation are transparent and the decision-making process allows for discussion and deeper understanding of project requirements
- optimising construction efficiencies and improving profitability by reducing operating costs and ensuring more efficient delivery
- the parties can work together as partners to create unique solutions for the project, building a transparent relationship where the risks of misunderstandings are reduced and a culture of blaming each other is avoided.

The perceived **disadvantages** of both ECI and FEED structures from an Owner's perspective include:

- it does not embrace risk sharing and is therefore unsuitable for projects where risk in the construction phase remains high
- it requires commitment from the top management of both the Owner and the Contractor for the entire project as transparency, an integrated team and openness of communication remain cornerstones of the ECI method.

Appendix 1 Sample contracting and procurement plan

1 Executive summary

This Plan has been prepared by the Owner and contains an overview of the recommended approach for committing and managing major works packages in order to provide a best value, least risk outcome for the Project, through least capital and operational expenditure and considering the Project's Financiers' requirements in respect of time and cost certainty.

The recommended project delivery model is an [**insert recommended contracting model and reasons for this recommendation**]

2 Introduction

2.1 Purpose

This Contracting and Procurement Plan (**Plan**) has been developed to describe the basis for the contracting and procurement plan going forward into the Implementation Phase of the Project.

This Plan has also been developed for the purposes of providing guidance and support to the Capital Cost Estimate for the Definitive Feasibility Study (**DFS**).

As such this Plan is based upon certain key principles and assumptions which are set out in Section 2 and Section 3 of this Plan.

This Plan is an integral part of the Project Execution Plan (**PEP**) and should be read in conjunction with the PEP.

This Plan provides for a "base case scenario" for formulating the contracting and procurement plan for the execution phase of the Project. This Plan will therefore be subject to modification particularly where key assumptions made during the DFS change going forward. Key assumptions this Plan relies upon include:

- the perceived corporate structure adopted for operating the Project (refer to the PEP)
- the perceived Project business and contracting risk profile to be adopted (refer to the PEP)
- perceived market conditions during the Implementation Phase as assessed at the time of preparing this Plan
- all land access, environmental, heritage and other regulatory approvals will be obtained in accordance with the Project schedule
- input from the Owner's Lenders (including Export Credit Agencies) will influence the forms of the contracts (including pricing) and the numbers of the contracts finally proposed for each work package
- the Project will proceed in accordance with the current Project schedule.

2.2 The project

[**insert description of project**]

2.3 Overview

This Contracting and Procurement Plan considers three phases of works to be implemented. These are:

- **Early Works:** Works to be undertaken with preliminary funding through equity raising prior to the scheduled Project finance approval date
- **Construction Implementation Phase:** Works undertaken after the Project finance approval date to construct the [facility] and all associated infrastructure
- **Ramp Up To Operations Phase:** Specified initial operations contracts to facilitate the commencement of commercial operation by the Owner.

The areas covered by this Plan are:

- Early Works Packages (prior to Project finance approval date)
- Site Construction and Installation Packages
- Plant and Equipment Procurement (including from offshore suppliers and manufacturers)
- Service Contracts
- Purchase Orders
- Owner's Initial Operations Phase Packages.

2.4 Contract procurement and management procedures

Contract management procedures will be based upon proven delivery and management systems from the selected Contractor, Owner and its other consultants. These procedures will be developed in conjunction with the Owner during the Project Implementation Phase and cover the following functions:

- Develop and utilise a suite of shortform model contracts, with purpose written general terms and conditions and associated contract documentation
- Pre-qualify suitable Contractors, suppliers and consultants for bid lists or sole source negotiation by exception
- Competitively tender and award contract packages, or where appropriate in limited circumstances sole source and negotiate contract packages
- Administer contracts after award including initial contract obligations, variations, claims management, warranty claims and contract close outs
- Proscribe internal signing authorities and authorisations to commit capital expenditure.

3 Key principles

This Plan has been developed on the basis of the following key underlying principles:

- Safety, value and cost efficiency are the key drivers for the Project
- Engineering and design is to be progressed to an advanced stage so that the scopes of works can be defined in sufficient detail to 1) enable Contractors to provide firm lump sum prices where possible, or, 2) if lump sum pricing is not achievable because the market dictates schedule of rates payment terms, enable the Owner to accurately assess and include overrun contingency in the Capital Cost Estimate for the DFS

- Wherever possible multidiscipline vertical packages will be awarded on a fixed time and cost basis. It is generally accepted that this will contribute to the best value, least risk outcome for the Project, the Owner and the Project's Financiers
- Whenever possible "best fit" construction companies, suppliers and manufacturers (including international companies and joint ventures) will be engaged to accord with the size and complexity of scope to be performed
- Individual package values will be assessed to ensure that as a single risk exposure to the Project that the financial risk is avoided or minimised to acceptable levels
- A proven and reliable set of project management and delivery systems will be utilised for Project delivery
- Quality standards will be established, communicated to Contractors, and managed to attain the required quality in all areas
- No "new" technology will be introduced and only proven, reliable equipment will be used
- This Plan takes into account the requirements of the Project Financiers, such as time and cost certainty, the transfer of design, interface and cost overrun risk to Contractors, insurers and end users and suppliers, and Contractors nominated by any Export Credit Agencies providing funding to the Project
- Detailed contracting plans will be separately completed for each of the work package summaries set out in the Contracts and Procurement Strategy Package Plan Matrix [not provided].

4 Key assumptions

4.1 [Insert contracting model chosen] Project Delivery Model]

The review process to determine the most appropriate delivery model for the Project has taken into account various factors, including:

- the degree of complexity of the engineering of the Project and the degree of control and level of input the Owner wishes to retain for the overall design
- fast-track schedule time constraints are not currently being imposed on project delivery
- the internal experience and capability of the Owner, including the Owner's degree of knowledge of design and construction and the extent and nature of the Owner's resources (including the skills and expertise of the Owner's team)
- the experience and capability of the designers and construction Contractors to be engaged to deliver the Project
- the availability of local and international Contractors
- the size of the Project (in terms of the dollar value and physical complexity)
- the requirements of equity and Lenders.

The expected "boom" in the number of energy, resources and infrastructure projects to be delivered across Australia and globally, increased pressure to fast-track delivery, limitations on Owners' resources, rising prices of commodities, materials and labour, has meant we are witnessing a re-defining of the way projects are being delivered. [Insert contracting model] contracting is just one of a number of alternative models becoming more wide spread.]

The key recommendation in this Plan is that the proposed contracting structure for the Project is [Insert contracting model] structure, whereby the [Insert details of contracting model].

It anticipated that the Contractor will be appointed by means of a competitive tender initiated through an expression of interest process. However, there are potential benefits in single-source negotiations with the existing DFS service provider, which should be analysed before the Owner commits expenditure to a full blown tender process for the appointment of the Contractor. These include:

- time and cost savings to the Owner through ongoing continuity of knowledge and resources retained by using the existing DFS services provider
- liabilities for pre-FEED and FEED performed by the existing DFS services provider could be wrapped in **[Insert contracting model]**
- time and cost savings to the Owner through existing DFS services provider needing less time to validate existing engineering and design
- time and tender costs savings in the event the Owner does not get a suitable level of engagement from third party Contractors during the tender process to create a truly competitive environment because the Contractors don't believe they can compete with the existing DFS services provider.

The obvious risks in pursuing a single sourced negotiation process include:

- it does not create a competitive environment and the Owner may not receive the most competitive terms and price in the market for this major package
- the Owner may not be able to assess the best available resources, personnel and systems in the market
- the existing DFS services provider may push for a significant risk premium in its price to take design liability for the entire Project.

Recommendations will be made separately by the Owner's project team after a cost benefit analysis of the Owner pursuing single-source negotiations with the existing DFS service provider for the **[Insert contracting model]** has been completed.

4.2 Project timing

It is assumed that:

- detail design works funding (through equity raising) will be available to allow design to commence by the Owner
- early procurement activity funding (through equity raising) will be available to facilitate procurement of long lead time items by the Owner
- early works funding (through equity raising) will be available and early works on site may commence by the Owner
- project finance approval will be given by the Owner
- an estimated **[insert]** % of the total value of the works packages will be locked in/awarded (subject to financial close) prior to finance approval the Owner
- the EPCM Contractor will be appointed by the Owner to provide tendering and procurement services prior to finance approval
- site construction other than early works will commence.

4.3 General risk assumptions

It is assumed that:

- whenever possible contract packages will be constructed so as to reduce interfaces between construction Contractors, engineering disciplines and the Owner. This will reduce cost overruns and gaps in liability
- the Owner will transfer construction risks to Contractors where the cost of doing so is not prohibitive
- wherever possible, the engineering and scopes of work for construction packages will be sufficiently detailed to allow for firm lump sum pricing
- the Owner will minimise its direct procurement of plant, equipment and bulk materials. Items of plant, equipment and bulk materials will only be purchased by the Owner for issue to construction Contractors if such procurement is required to maintain the Project schedule, reduce sequencing interface (though stockpiling of critical long lead material) or would result in a substantial cost saving to the Project. Otherwise, to avoid unnecessary interface risk, Contractors will be responsible for their own procurement, inspection, expediting, transport and storage of necessary plant, equipment and materials
- common facilities, utilities and consumables will only be supplied by the Owner to Contractors where there is a clear cost and/or strategic benefit; otherwise Contractors shall be required to be “self-sufficient”
- local resources will be utilised whenever possible with Indigenous participation levels actively encouraged
- overseas procurement may be utilised if there are local resource constraints, such procurement is necessary to maintain the Project schedule, or it offers the opportunity to significantly reduce Project costs (eg through Export Credit Agency Funding or cheaper procurement)
- during the Project Implementation Phase the resources and oil and gas construction market in Australia will be very active, resulting in the Owner having to compete for key Contractors and skilled resources (note: many of the Owner’s competitors already have strategic relationships with major Contractors and suppliers. The Owner is also competing with project Owners who are able to fund their projects off-balance sheet and therefore are not restricted by the requirements of LenderLenders and commonly offer attractive schedule of rates or cost reimbursable terms to Contractors).

4.4 Engineering risk assumptions

It is assumed that:

- engineering design for the core infrastructure, including **[insert details]**, will be sufficiently advanced (approximately **[insert]**% complete) at the time of tendering major construction packages to allow for firm lump sum pricing
- the Owner will only detail design where necessary for non-core infrastructure construction packages (such as **[insert details]**), transferring detail design risks to Contractors via novated design and construct packages where the additional cost is considered acceptable and the Owner can provide sufficient detail in respect of its engineering and performance requirements
- preferred equipment suppliers will be specified to Contractors where proven suppliers and equipment specifications are required for particular works packages. These suppliers may have previously negotiated pricing agreements with the Owner
- sufficient geotechnical information will be available and design sufficiently advanced to enable Contractors to provide firm lump sum prices where possible, or, if lump sum pricing is not achievable because the market dictates schedule of rates payment terms, enable the Owner to accurately assess and include overrun contingency in the Capital Cost Estimate for the DFS
- wherever possible the Project will utilise proven and tested designs and pre-engineered products (eg non-process buildings) to reduce design costs and interfaces between design, supply and install components of certain works packages

- for plant and equipment proven designs will be selected and component suppliers specified only if it provides a practical commonality of spares holdings and minimises spares inventories.

4.5 Construction risk assumptions

It is assumed that:

- key contracting companies will be consulted for constructability reviews during the design phase to obtain best value in design, cost and/or schedule
- whenever possible process facilities contracts will be lump sum vertical multidiscipline packages, where scope will cover detailed earthworks, concrete foundations, structural, mechanical, piping, electrical and instrumentation
- construction Contractors will be responsible for establishment of their temporary facilities and services where that Contractor (including subContractors) has sole use of such facilities (excluding common facilities across the Project which will be provided by the Owner)
- construction camps will be provided and managed by the Owner, and construction Contractors will be charged a man day rate for the use of these facilities
- railway construction contracts will be lump sum vertical multidiscipline packages including, earthworks, drainage, bridges, track laying and some signalling backbone infrastructure
- earthworks for railway formation and bulk earthworks at the mine sites and port will be undertaken on a predominantly lump sum basis:
 - Site preparation works at the mines and the port that also involve large scale bulk earthworks will be contracted as single discipline, “horizontal” packages of work
 - At the mine sites the advantageous of including site preparation earthworks and drainage works in the scope of the railway Contractor or the mine pre-strip Contractor will be considered to enable economies of scale to be realised, due to the size of equipment fleets that will need to be mobilised to carry out this work
 - It may be advantageous to include the rail loop earthworks to a defined battery limit, in the port site preparation scope to better manage the mass balance of earthworks.
- major machine items such as stackers, reclaimers, ship loaders and train unloaders will be contracted on a design, supply, erect and commission basis using proven technology and suppliers
- non process buildings such as workshops, warehouses, offices and workforce accommodation will be tendered on a detailed design and erect basis with only floor plans, functional descriptions, level of fit out, nominated equipment and material and other Owner quality and performance requirements being provided to tenderers. This will maximise the use of standardised, pre-engineered buildings and will reduce indirect (design) costs and interface/gap in liability between designers and Contractors.

Railway rolling stock maintenance workshop and facilities design will be progressed by the Owner to an advanced stage before tendering due to their specialist nature and the need for the Owner to clearly articulate its functional and performance requirements.

5 Strategy

5.1 Objective

As outlined above, the objective is to obtain “best value, least risk” outcome for the Project within risk limits acceptable to the Owner and the Lenders. To achieve this objective the strategy is to:

- award consolidated fixed time and cost vertical multidiscipline contract packages wherever possible
- transfer risk to Contractors and insurers when value is represented
- leverage upon known Contractor expertise
- progress design and scopes of work to an advanced stage prior to going to tender, rather than a “fast track” procurement approach
- ensure appropriately resourced internal Owner project team and Contractor maintained for the duration of the Project.

5.2 Market conditions

The current market Owner remains very strong with a sustained high demand for Contractor resources, construction materials and key labour skills at all levels. Whilst the impact of the global economic down turn has tempered construction activity over the past 12 month period there is now significant risk of an upturn in activity. There are several major resource and oil and gas projects now committed, or likely to be committed within the Implementation Phase of this Project. Increased market activity brings with it the risk of price escalation in both labour and materials and exacerbates the skills shortage.

Since it is difficult to predict with any certainty market events and direction, the Project must be ready to adjust to a rapidly changing and ultimately competitive market environment. Contract packaging and the timing of packages to market will therefore need to retain some flexibility in order to respond to market forces. Ensuring some degree of flexibility in contract package refinement and contracting approach will assist the Project in responding positively to market forces.

This Project contains long lead time commodities such as the procurement of rail rolling stock, marine piling, stacker/reclaimers and heavy mining equipment where the schedule risk must be managed. The Project must also take into account long lead and specialist construction contract performance such as the marine dredging works.

Market conditions will also influence the final Project content in relation to Australian and foreign labour and/or overseas fabrication and component supply. Depending on the “tightness” of the labour market this may necessitate adjustments to the final package plan.

5.3 Project delivery systems and procedures

The project delivery systems and procedures used during the Project Implementation Phase will be provided primarily by the selected Contractor (refer to Section 4 – Proposed Project Delivery Model) and further developed in conjunction with the Owner and the Owner’s other consultants.

The systems, procedures and project execution documentation provided by the Contractor will be based on proven systems and specifically tailored to meet the requirements of this Project, including this Plan. As outlined above, as part of this process the Owner, in conjunction with the Contractor and the Owner’s legal advisors, will develop a suite of Owner Model Contracts.

The Owner will review and approve the project delivery systems and model contracts recommended by the Owner, the Contractor and the Owner’s legal advisors. This shall include reviewing to ensure the safety, legal, commercial, environmental, community, engineering, technical, logistical and operational needs of the Project and the Owner are met.

5.4 Contracting approach

The vertically integrated multidisciplinary packages include civil work, structural steel work, electrical, instrumentation, all services reticulation and where appropriate fit out and material procurement. Where appropriate some site preparation bulk earth works may be structured on the basis of suitably scoped horizontal packages to obtain economies of scale for such works.

The contracting approach seeks to provide the Owner with the benefit of “price and time certainty” at the time of contract award. It is anticipated that Contractors will build into their contract pricing an upfront “construction risk allowance” of between 5% and 10% of the contract price to provide “price and time certainty” in terms of a firm lump sum, or design and construct price. However, off setting this up front “fixed price and time certainty premium” it is anticipated that the Project will benefit from:

- a reduction in the Owner’s direct construction management and site supervision costs
- a reduction in contractual claims risk due to contract awards being made on advanced design, firm pricing and reduced the Owner-Contractor interfaces
- a built in profit incentive for Contractors to deliver contracts on or ahead of schedule where the Owner’s and the Contractors interests can be aligned through appropriate drafter KPI incentive regimes in the Model Form Contract
- securing limited recourse project financing
- being able to leverage off Contractors expertise to enhance value adding opportunities.

The contracting approach provides Contractors with a high degree of freedom, allowing Contractors to control the performance of construction works with minimal Owner intervention. Each construct only and design and construct works package will require the Contractor to assume full construction and schedule risks. Contractors must be able to reasonably price these risks and the Project must be able to assess if the cost to assume these risks are reasonable and practical. The Owner must also be confident that Contractors can manage the construction risk to deliver a quality product on time before awarding contracts. Packages will therefore only be committed on a lump sum or design and construct basis if cost and overall value can be clearly demonstrated. Individual package plans will be adjusted if necessary to provide a “best value, least risk” outcome in response to either changing market conditions or commercial and construction risk factors.

The contracting approach requires a substantial up front effort in the tender and contract negotiation period. Careful preparation of tender and contract documentation including scopes of work, defined battery limits between packages, technical standards and commercial terms is critical to maximising the benefits of this approach. It is therefore recommended that this preparation process be commenced and the Contractor appointed as soon as practically possible.

It must be recognised that the use of large, vertically integrated lump sum contracts limits the Owner’s ability to vary design, scope, or schedule following the award of contracts without incurring the risk of significant additional cost increase. This is also the case with respect to design and construct contracts.

Proposed tenderers for contract and procurement packages will be subject to a comprehensive prequalification process to verify their suitability prior to being invited to tender. Selected Contractors will therefore have demonstrated a clear understanding of project scope, schedule, and capability of delivering scopes of work safely, on time and within budget to the relevant quality requirements.

Wherever possible all contract and procurement packages will be competitively tendered in the market place. This will include where deemed advantageous the requesting tenders from overseas Contractors, fabricators and suppliers. In certain instances it may be necessary to negotiate contracts from a sole source provider. Where sole sourcing is required this will be undertaken on the basis of a formal negotiation plan.

The Contracting and Procurement Strategy Package Plan [not provided] will be used as the controlling document for the Project and will be revision controlled.

5.5 *Commissioning strategy*

Generally with the exception of bulk earthworks packages, all major contract packages will obligate Contractors to undertake precommissioning activities to effect specified “no-load testing” requirements. Manufacturers and equipment suppliers will also be required, where it is appropriate, to provide installation engineers to assist Contractors undertaking precommissioning activities. Contractors will allow for precommissioning work in their contract pricing sufficient to complete such activities and make ready for the Owner to fully commission the works.

Except the extent that it relates to an EPC or other supply and install works package where the Contractor or supplier is solely responsible for commissioning, upon successful completion of precommissioning activities, Contractors and equipment suppliers will be required to assist the Owner to fully commission the mines and port process plants, mining, marine and rail plant and equipment and all other systems ready for sustained production use by the Owner’s Operators. Such commissioning assistance will include achieving full “load commissioning” and completing performance testing requirements. Contractors and suppliers will provide commissioning assistance on an “as required basis” with costs being charged on a schedule of rates basis. Contracts will therefore include a schedule of rates for provision of such commissioning assistance to the Owner.

5.6 *Risk mitigation*

Project risks will be minimised and/or managed utilising measures which include:

- award of contracts on the basis of completed design (except for EPC and D&C packages as described above) and sufficient geotechnical information
- formal prequalification processes for tenderer assessment and selection
- use of Model Form Contracts and tender documents for all contract and procurement activities, including tailored general conditions of contract
- use of pre-prepared and approved Project technical standards
- extensive use of lump sum pricing to minimise risk of capital expenditure growth
- use where appropriate of contract mechanisms such as milestone payments, bonus incentives and/or liquidated damages to drive outcomes which are consistent with all the Owner’s time, cost, safety and quality/performance objectives for the Project
- use of comprehensive contract administration procedures
- use of both in house and third party expediting and inspection personnel to monitor conformance to specifications and schedule
- use of international design personnel where appropriate
- sourcing of materials, equipment and prefabricated modules from offshore when appropriate (including from Export Credit Agencies)
- requiring Contractors to manage their own productivity risks
- consideration of modularisation of plant and facility components so as to minimise the site based labour content.

Other risks that may affect the Project for which appropriate contingency will be required include:

- Government Work Place Legislation amendments and subsequent industrial relations issues in the resources industry

- increases in fuel prices and or foreign currency fluctuations which could cause cost increases in delivery of materials and services
- ability to access labour in the event of either labour or skills shortages.

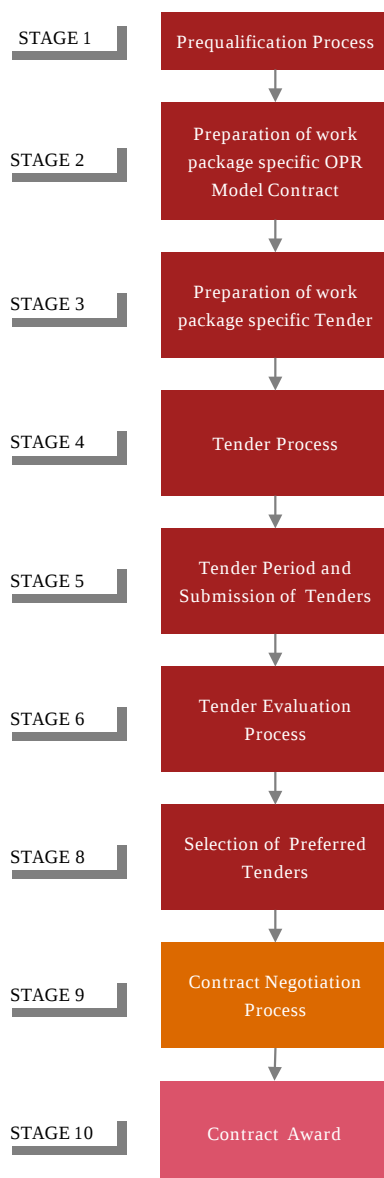
6 *Project scope included*

[insert scope of project]

7 *Tender process*

7.1 *Tender and award process*

In general, competitive tenders will be sought with local Contractors, suppliers and manufacturers to be given full, fair and reasonable opportunity where possible. Where sole sourcing is proposed by exception for items not listed in this Plan, a sole source justification will be required to be approved by the Owner prior to initiating negotiations, in accordance with authority levels to be established by the Project and approved by the Owner.



Note on diagram: There are various “toll gates” in the contracting process that will require the prior approval of the Owner before they can proceed to the following stage.

Prior to formal tenders being called, all proposed tenderers will be formally pre-qualified by the Project. The pre-qualification process will ensure that any organisation given the opportunity to submit a formal tender for the Project will be:

- capable of providing a substantive tender
- financially capable to undertake the proposed scope of work
- will have the resources and technical capability to perform the works.

The pre-qualification process will ensure that no tenderers are included on approved tender lists that are not capable of meeting the above criteria.

The tender selection process will address the following key areas:

- Health and Safety
- Technical Evaluation
- Contractor Capabilities
- Resources Capabilities Availability
- Schedule Requirements
- Pricing
- Financial Capacity
- Key Personnel
- Environmental Impacts
- Commitment to Indigenous employment opportunities
- Local (Australian) Content.

Compliance will be required with developed Project standards:

- Environmental
- Health and Safety
- Industrial Relations
- Cultural Heritage
- Community Relations
- Ethics and Governance.

Where deemed appropriate following initial tender evaluations, tenderers may be short-listed for further detail negotiations, or re-pricing.

Specific emphasis during tender evaluations will be placed on Contractor safety records, systems and previous industry experience. In particular tenderers will be required to demonstrate a thorough understanding of safety

requirements for the Project. Short-listed tenderers will be required to submit further detail of their proposed management process for the safe implementation and management of the contract.

Tenderers will also be required to demonstrate their ability to meet key milestone dates applicable in the contract schedule.

A recommendation for award addressing all of the above with a capital appropriation request will be raised for approval and signing by the relevant Project personnel, in accordance with levels of authority to be established by the Project.

Prior to contract award, the recommended tenderer will attend site visits to become familiarised with specific site conditions, scope of work, safety requirements and potential interface issues.

Wherever possible all contracts will be awarded on the basis of a fully conformed contract document. Notices of Award or other forms of written commitment will only be used by exception where schedule demands on the Project critical path outweigh this Principal. No such commitment will be made unless it has been approved in accordance with the levels of authority to be established by the Project.

Following contract award, a kick-off meeting will be held to discuss key items and information requirements, including contract close out issues.

7.2 Confidentiality

Tenders will be submitted in sealed packages and be delivered to a locked tender box in a secure area by the nominated tender closing date.

Tenders will be opened in accordance with a formal procedure as part of the Contract Procedures which will be developed for the Project.

Unpriced copies of tenders will only be used by the lead engineers to evaluate technical aspects of the tender submissions.

7.3 Sole sourcing policy

Contracts or supply packages may be sole sourced by exception where:

- there is proven price competitiveness
- it is necessary or significantly advantageous to the Project schedule
- it provides for a commonality of spares throughout the Owner's operations
- commercial terms and conditions are advantageous
- for specialist works or where Contractors with proprietary equipment or technology are required
- Contractors or suppliers are suitably prequalified.

7.4 Customs duty and Australian participation

The Project contracts and procurement team shall assist in identifying and minimising any exposure to customs duties. The procurement process will ensure Australian participation is maximised in accordance with the Australian Industry Participation Plan. This will involve ensuring that full consideration is given to existing Australian capabilities to provide local personnel, suppliers, fabricators, and Contractors. Full, fair and reasonable opportunity will also be given to Australian capabilities to supply equipment, bulk materials, specialised materials and services to the Project. This commitment is to allow Australian participation to be maximised and for Australian talents, skills and economic regards to be advanced. Therefore:

- preference will be given to Australian suppliers, fabricators and Contractors where technical, schedule and commercial aspects are equal to or superior to off shore providers
- project design will be based on industry requirements which incorporate Australian standards and engineering practices so as to ensure maximum participation of Australian maintenance Contractors during the lifetime of the facilities
- Australian content opportunities will be identified in the Contracts and Procurement Plan developed for each package.

Appendix 2 Sample risk register and action plan

Risk matrix							
			Consequences				
			1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
Likelihood	5	Almost Certain:	M	H	H	VH	VH
	4	Likely:	M	M	H	H	VH
	3	Possible:	L	M	H	H	H
	2	Unlikely:	L	L	M	M	H
	1	Rare:	L	L	M	M	H

Consequences

		Consequence types						
		Financial (including impacts of delays)	Health and safety	Natural environment	Social/cultural Heritage	Community/ reputation/ media	Legal/govt.	Variance from Business performance objectives
Severity level	Catastrophic	>\$50M	Multiple fatalities, or significant irreversible effects	Very serious, long- term environmental impairment of ecosystem functions	Extreme social issues. Catastrophic damage to structures/items of cultural significance		Significant prosecution and fines Very serious litigation including class action	>30% variance from business objectives/KPI's
	Major	\$10M – \$50M	Single fatality and/or severe irreversible disability (>30%) to one or more persons	Significant harm with local effect	On-going serious social issues. Significant damage to structures/items of cultural significance	Serious public or media outcry (international coverage)	Major breach of regulation. Major litigation	10% – 30% variance from business objectives/KPI's
	Moderate	\$2M – \$10M	Serious injury/disabling injury	Serious medium term environmental effects		Significant adverse national media/public/ NGO attention	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible	5% – 10% variance from business objectives/KPI's
	Minor	\$50,000M – \$2M	Minor injury/medical treatment	Moderate, short- term effects but not affecting ecosystem functions	On-going social issues. Permanent damage to items of cultural significance	Attention from media and/or heightened concern by local community. Criticism by NGOs	Minor legal issues, non-compliances and breaches or regulations	2% – 5% variance from business objectives/KPI's
	Insignificant	<\$50,000	First aid/minor health impact	Minor effects on biological or physical environment	Minor medium-term social impacts on local population. Mostly repairable	Minor Adverse local public or media attention or complaints		<2% variance from business objectives/KPI's

Likelihood

	Description	Frequency	Probability
Almost certain	The event will occur on an annual basis	Once a year	>95%
Likely	The event has occurred several times in your career	Once every 1-5 years	60% – 95%
Possible	The event might occur once in your career	Once every 5 – 10 years	30% – 60%
Unlikely	The event does occur somewhere from time to time	Once every 10 – 30 years	5% – 30%
Rare	Heard of something like the event occurring elsewhere	Once every 30 years	<5%

Risk levels and actions

		Actions required
Risk levels	VH:	Very high risk – CEO/Board attention needed, action plans and management responsibility specified
	H:	High risk – senior executive management attention needed, action plans and management responsibility specified
	M:	Medium risk – manage by specific monitoring or response procedures, with management responsibility specified
	L:	Low risk – manage by routine procedures, unlikely to need specific application of resources

Risk Register & Action Plan – Marketing & Offtake Workstream

Number	Risk description (event and consequence)	Assessed category	Project phase	Existing controls	Risk severity before treatment			Rank	Risk treatment plan	Risk severity after treatment			Rank	Responsible person	Status of risk treatment plan
					Consequence		Likelihood			Consequence		Likelihood			
1	Significant changes in product quality demands (eg: less flake graphite demanded)														
2	Material default and termination of cornerstone/ foundation customer offtake agreement (eg take or pay obligations cannot be enforced)														
3															
4															
5															
6															
7															
8															
9															
10															

Risk Register & Action Plan – Geology, Mining, Processing and O&M Workstream

Number	Risk description (event and consequence)	Assessed category	Project phase	Existing controls	Risk severity before treatment		Risk treatment plan	Risk severity after treatment		Rank	Responsible person	Status of risk treatment plan
1	The operating and realisation expenditure cost estimates for the for each of mining, process, tailings and overhead activities have been categorised into labour, Contractors, stores, power, water, distribution, and overheads included in the DFS are excee											
2	Significant increase in costs of production, eg: concrete, steel, engineering costs, salaries, equipment prices, etc.											
2	Insufficient electrical and/or diesel power for mining and processing											
3	Insufficient water for mining and the processing plants											

Sample risk register and action plan

Item no.	Risk	Assessed	Project	Existing	Risk severity before treatment	Rank	Risk	Risk severity after treatment	Rank	Responsible	Status of
4	Lack of availability of competent personnel for plant operation and maintenance										
5	Unsuitable ground conditions for haulage and due to lack of maintenance and increasing traffic, thus generating dust, reduces visibility. Scarcity of water may hamper water spraying.										
6	Errors in the structural model, including the dip and dip direction of faults and discontinuity sets										
7	Errors in geotechnical model based on the RQD data from limited geotechnical logged boreholes, with the remaining parameters subject to many assumptions.										

Sample risk register and action plan

Item	Risk	Assessed	Project	Existing	Risk severity before treatment	Rank	Risk	Risk severity after treatment	Rank	Responsible	Status of
8	Hydrogeological model unavailable. Assumptions made of the location of the pre-mining water table and the drawdown, affecting slope stability										
9	Lack of security and theft of diesel and equipment storage areas are safety and security concerns, and may lead to production delays										
10	Lack of experienced mechanical fitters onsite to maintain mobile and fixed mining equipment and plant										

Risk Register & Action Plan – Marketing & Offtake Workstream

Number	Risk description (event and consequence)	Assessed category	project phase	Existing controls	Risk severity before treatment				Rank	Risk treatment plan	Risk severity after treatment				Rank	Responsible person	Status of risk treatment plan
					Consequence		Likelihood	Risk Level before treatment			Consequence		Likelihood	Risk level after treatment			
1	Significant changes in product quality demands (eg: less flake graphite demanded)																
2	Material default and termination of cornerstone/ foundation customer offtake agreement (eg take or pay obligations cannot be enforced)																
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Risk Register & Action Plan – Port Access, Transport and Logistics Workstream

Number	Risk description (event and consequence)	Assessed category	Project phase	Existing controls	Risk severity before treatment		Risk treatment plan	Risk severity after treatment		Rank	Responsible person	Status of risk treatment plan
1	Insufficient marine and landside infrastructure, stockpiling areas and/or operating capability at the port to meet the mine short and mid term capacity requirements											
2	Insufficient marine and landside infrastructure, stockpiling areas and/or operating capability at the port to meet the mine expansion capacity requirements											
3	Inadequate mine to port road and drainage infrastructure to meet initial and expansions capacity during all seasons											
4	Blockades at the port by workers/ dissatisfied local community											

Sample risk register and action plan

Item no	Risk	Assessed	Project	Existing	Risk severity before treatment	Rank Risk	Risk severity after treatment	Rank	Responsible	Status of
5	Default by Port Operator under Port Access Agreement (eg unable to provide capacity)									
6	Port Operator seeks to renegotiate terms of Port Access Agreement once substantial mine capital expenditure has been made									
7	Port Operators at inbound ports refuse to unload product due to movement of product during shipping									
8										
9										
10										

Risk Register & Action Plan – Land Tenure and Approvals Workstream

Number	Risk description (event and consequence)	Assessed category	Project phase	Existing controls	Risk severity before treatment		Rank	Risk treatment plan	Risk severity after treatment		Rank	Responsible person	Status of risk treatment plan
1	Expropriation of assets by Government once mine infrastructure has been completed – see also Government Stability Workstream												
2	Government seeks to renegotiate more favourable terms of Lease and/or Royalty Agreement once substantial mine capital expenditure has been made – see also Government Stability Workstream												
3	Key project permits and approvals on the project critical path are delayed resulting in significant overall project delays and [INSERT]not being able to meet commitments to off-takers												

Sample risk register and action plan

Item number	Risk	Assessed	Project	Existing	Risk severity before treatment	Rank Risk	Risk severity after treatment	Rank	Responsible	Status of
4	Breach of environmental approvals during construction or operations result in fines and critical path delays to the overall project programme and [INSERT] not being able to meet commitments to offtakers									
5										
6										
7										
8										
9										
10										

Risk Register & Action Plan – Government Stability Workstream

Number	Risk description (event and consequence)	Assessed category	Project phase	Existing controls	Risk severity before treatment				Rank	Risk treatment plan	Risk severity after treatment				Rank	Responsible person	Status of risk treatment plan
					Consequence		Likelihood	Risk level before treatment			Consequence		Likelihood	Risk level after treatment			
1	Change in Government results in withdarwal of tenure, mining licences and/or expopriation of assessts once mine infrastructure has been completed – see also Tenure and Approvals Workstream																
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Risk Register & Action Plan – Contracting, Procurement & Project Implementation Workstream

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment					Rank	Risk Treatment Plan	Risk Severity After Treatment					Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment			Consequence		Likelihood		Risk Level After Treatment		
1	The capital expenditure cost estimates for the mine and associated permanent and temporary infrastructure included in the DFS are exceeded by >30% resulting in [INSERT] needing to raise significant additional equity and debt and which in turn significantl	Financial and Schedule	Post Financial Close – Implementation	1 Project Scope (and all associated infrastructure) upon which DFS cost estimates will be based is currently being defined in parallel with further geology, geotechnical and processing studies 2 DFS Study Scope currently being prepared to include clear	4	Major	3	Possible	12	High	1 Final Project Scope (and all associated infrastructure) to be locked down before DFS cost estimates are finalised 2 Cost estimate sign offs and peer reviews to be completed in line with final approved DFS Study Scope 3 Confirmation to be provided	4	Major	2	Unlikely	8	Medium		
2	The Lenders' requirements in respect of time and cost certainty and transferring design and construction risk to Contractors, results in a sub-optimal project delivery model under current market conditions and unacceptable risk contingency included in the	Financial and Schedule	Pre-Financial Close – Study	1 Financial and legal advisors have been engaged to advise on Lender requirements 2 Contracting and Procurement Plan initiated that will identify how the Lender requirements will be met 3 Market sounding/informal discussions with Contractors on wha	4	Major	3	Possible	12	High	1 Complete the Contracting and Procurement Plan with input from financial advisors on Lender requirements and what is achievable in the current finance market 2 Works packages are currently to be structured (bundled) under an EPC Contract to minimise t	4	Major	2	Unlikely	6	Medium		
3	EPC Contractor does not ultimately demonstrate to [INSERT] or the Lenders during the DFS that it has the capacity or resources to deliver all of the Works Packages, leading to a re-examination of the DFS estimate and delays in achieving estimate deadlines	Financial and schedule	Pre-Financial Close – Study	1 Market sounding and selection of major Chinese Contractor with proven track record to participate in DFS study 2 Initial due diligence carried out on balance sheet and capability	4	Major	3	Possible	12	High	1 Further due diligence on EPC Contractor's capability and balance sheet (and that of it parent companies) to be carried as early as possible in the DFS 2 Ongoing senior management engagement with shortlisted EPC Contractor 3 Market sounding to be ca	4	Major	2	Unlikely	8	Medium		

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment						Rank	Risk Treatment Plan	Risk Severity After Treatment						Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment				Consequence		Likelihood		Risk Level After Treatment			
4	EPC Contractor will not accept full lump sum/fixed time and cost risk for all of the Works Packages resulting in [INSERT] not being able to get accurate or competitive prices for the DFS and/or prices include unacceptable risk contingency, leading to a	Financial and Schedule	Pre-Financial Close – Study	1 Contracting and Procurement Plan initiated that will identify the limited scope of work to be let on SOR basis 2 Market sounding/informal discussions with Contractors on what is achievable in the market 3 Existing consultants and internal advice	4	Major	4	Likely	16	High		1 Complete the Contracting and Procurement Plan 2 Ongoing senior management engagement with shortlisted EPC Contractor 3 Market sounding to be carried out to identify fall back position and alternative EPC Contractors 4 Seek ongoing advice from exis	4	Major	2	Unlikely	8	Medium			
5	EPC study Contractor and other Contractors not prepared to make investment in tendering, early works, etc. on an unapproved project or they refuse to accept commercial conditions associated with the tender validity period, resulting in [INSERT] not gettin	1	Pre-Financial Close – Study	1 Market sounding/informal discussions with Contractors on interest in the market 2 [INSERT] has identified and interested EPC Contractor who is participating in the DFS 3 Engineering and design is being progress to an advanced stage so that the	3	Moderate	3	Possible	9	High		1 [INSERT] senior management to continue engagement with EPC study Contractor and engage with other major Contractors and suppliers to build strategic relationships as early as possible 2 Utilise PCM Contractors strategic relationships with Contractor	4	Moderate	2	Unlikely	6	Medium			
6	Inability to prepare sufficiently scoped work packages for the DFS estimate resulting in unacceptable risk contingency being included in the DFS estimate and leading to a re-examination of the estimate to ensure project viability and delays I achieving e	Financial and schedule	Pre-Financial Close – Study	1 Time has been allocated to progress engineering and design to an advanced stage (rather than the fast tracked design and procurement model) so that the scopes of works can be defined in sufficient detail to enable Contractors to provide firm prices whe	3	Moderate	3	Possible	9	High		1 Continue to allow sufficient time (as opposed to fast-track delivery) to progress engineering and design to an advanced stage so that the scopes of works and [INSERT] requirements for the packages can be defined in sufficient detail to enable Contractor	3	Moderate	2	Unlikely	6	Medium			

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment					Rank	Risk Treatment Plan	Risk Severity After Treatment					Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment			Consequence		Likelihood		Risk Level After Treatment		
7	Despite due diligence being carried out on the shortlisted EPC Contractor during the DFS, given the size of the Works Package the EPC Contractor does not ultimately have the capacity or resources to deliver all of the Works Packages on time, leading to de	Financial and Schedule	Post Financial Close – Construction	Refer to actions listed in risk 3 above.	4	Major	4	Likely	16	High	1 PCM to be engaged to supervise and closely monitor performance of EPC Contractor 2 Robust security package to be included in EPC Contract with parent company guarantee and appropriate amount of performance security in the form of enforceable on-demand	4	Major	2	Unlikely	8	Medium		
8	Not having fully documented EPC Contract scope of work and performance specification at the time of awarding the EPC Contract, leading to uncertainty and [INSERT] paying unacceptable Contractor claims.	Financial and schedule	Post Financial Close – Construction	1 Time has been allocated to progress engineering and design to an advanced stage (rather than the fast tracked design and procurement model) so that the scopes of works can be defined in sufficient detail to enable Contractors to provide firm prices when	3	Moderate	3	Possible	9	High	1 Allow sufficient time and don't go to the market until the tender packages are advanced and the scopes of works and contractual terms for the packages have been defined in sufficient detail to enable Contractors to provide firm prices where possible 2	3	Moderate	2	Unlikely	6	Medium		
9	[INSERT] may not be able to transfer all of the existing design prepared in the DFS and responsibility for timely delivery of all design going forward to the EPC Contract, leading to gaps in design liability and delays in delivering the design.	Financial and schedule	Post Financial Close – Construction	1 Gap analysis of design risk has been initiated; 2 Using proven technology where possible; 3 Shortlisted EPC Contractor has been engaged to prepare concept design for the DFS	3	Moderate	3	Possible	9	High	1 PCM model whereby the PCM Contractor/other engineering specialists will peer review critical design prepared by EPC Contractor 2 Starting point in EPC Contract is that EPC Contractor accepts responsibility for all design on a full turnkey basis; 3 E	3	Moderate	2	Unlikely	6	Medium		

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment					Rank	Risk Treatment Plan	Risk Severity After Treatment					Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment			Consequence		Likelihood		Risk Level After Treatment		
10	The interests of [INSERT] and the PCM Contractor are not sufficiently aligned to drive Project outcomes that are consistent with [INSERT] objectives in respect of cost, time, quality, safety etc.	Financial and Schedule	Post-Financial Close – Construction	1 Incentivised PCM contract model is being proposed; 2 [INSERT] existing consultant and internal advice is being sought on what is achievable on KPI incentive regimes on past projects and in the current market.	4	Major	3	Possible	12	High	1 Allow sufficient time so that [INSERT] requirements and objectives for the PCM contract can be defined in sufficient detail to enable [INSERT] and the PCM Contractor to agree a target man hour schedule and estimated target cost so the PCM Contractor can	3	Moderate	2	Unlikely	6	Medium		
11	Inefficiencies and difficulties arising from [INSERT] appointing multiple PCM Contractors, including having different management systems, agreeing on standard form contracts, quality of services, approach to KPIs etc.	Financial and schedule	Post-Financial Close – Construction	1 Single PCM contract model is being proposed.	2	Minor	4	Likely	8	Medium	1 Single PCM Contractor to be appointed 2 [INSERT] to engage internal resource to match PCM structure and systems	2	Minor	2	Unlikely	4	Low		
12	DFS estimate will include duplication of overheads and contingencies causing re-examination of estimate and delays in achieving a robust DFS estimate by the deadlines.	Schedule	Pre-Financial Close – Study	1 [INSERT] have engaged Internal and external technical, legal, commercial and insurance resources; 2 External peer reviews are being conducted; 3 Engineering and design is being progressed to an advanced stage so that the scopes of works and [INSERT] r	2	Minor	3	Possible	6	Medium	1 Further value engineering analysis to be completed 2 Estimate figures are not to be released until the value engineering process is complete 3 Allow sufficient time to complete value engineering process 4 External peer review to be completed 5	2	Minor	2	Unlikely	4	Low		
13	Industrial Relations implications and renegotiation of labour agreements has adverse impact on contracting and procurement.	Financial and schedule	Post-Financial Close – Construction	1 [INSERT] considering engaging external IR consultant with specific regional expertise.	2	Minor	3	Possible	6	Medium	1 IR Strategy document to be prepared 2 Establish project wide minimum IR requirements 3 Include status of Contractor's IR agreements and consider renegotiation cycles in the tender evaluation process; 4 IR risk to be assumed by Contractors under co	2	Minor	2	Unlikely	4	Low		

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment					Rank	Risk Treatment Plan	Risk Severity After Treatment					Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment			Consequence		Likelihood		Risk Level After Treatment		
14	Difficulty procuring suitably priced project wide insurance to meet Lenders requirements.	Financial	Post Financial Close – Construction	1 [INSERT] have engaged insurance broker to advise on insurance available in the market	2	Minor	2	Unlikely	4	Low	1 Insurance strategy to be prepared including an assessment of the benefits and risks of [INSERT] vs. Contractor procured insurance strategy; 2 Gap analysis on Contractor insurances to establish residual project insurance cover required.	2	Minor	1	Rare	3	Low		
15	Contractors are not prepared to tender because of the nature of the [INSERT] SPV set up for the project entering into the Works Packages, resulting in [INSERT] not getting a suitable level of engagement to create a truly competitive environment and leading	Financial and schedule	Pre-Financial Close – Study	1 Market sounding and selection of major Chinese Contractor with proven track record to participate in DFS study 2 Initial due diligence carried out on balance sheet and capability	4	Major	3	Possible	12	High	1 Ongoing senior management engagement with shortlisted EPC Contractor; 2 Explanation given to EPC Contractor regarding financing arrangements to provide further comfort it will get paid; 3 Consider advance payments for mobilisation and long lead procu	4	Major	2	Unlikely	12	Medium		
16	Single PCM Contractor is not able to provide adequate resources or suitably experienced personnel.	Financial and schedule	Post Financial Close – Construction	1 [INSERT] existing consultant and internal advice is being sought on what is available in the current market	4	Major	3	Possible	12	High	1 Market testing and sounding through EOI process; 2 Resources and key personnel will be key criteria in the EOI and tender evaluation processes; 3 LDs and/or KPI incentive payments for resourcing and key personnel to be incorporated into the PCM cont	4	Major	2	Unlikely	8	Medium		

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment						Rank	Risk Treatment Plan	Risk Severity After Treatment						Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment				Consequence		Likelihood		Risk Level After Treatment			
17	Delay and disruption caused by loss of continuity in progress, knowledge and resource if [INSERT] does not appoint the current lead and other study Contractors during the implementation phase.	Financial and Schedule	Post Financial Close – Construction	1 Market sounding and selection of team of DFS Contractors with proven track record to participate in DFS study; 2 Initial due diligence carried out on balance sheet and capability;	4	Major	3	Possible	12	High		1 Further due diligence on EPC Contractor's capability and balance sheet (and that of it parent companies) to be carried as early as possible in the DFS 2 Ongoing senior management engagement with shortlisted EPC Contractor; 3 Market sounding to be ca	4	Major	2	Unlikely	6	Medium			
18	[INSERT] is not able to source adequate resources or suitably experienced personnel.	Financial and schedule	Post Financial Close – Construction		4	Major	3	Possible	12	High		1 [INSERT] internal resourcing/ employment strategy to be prepared 2 Ongoing market testing of availability of key personnel; 3 Engage HR resource to prepare strategy and locate key personnel.	3	Major	2	Unlikely	6	Medium			
19	EPC Contractor unable to fund start up working capital on such a large scope of work, resulting in [INSERT] having to fund significant advance payments.	Financial	Post Financial Close – Construction	1 Financial and legal advisors have been engaged to advise on Lender requirements; 2 Market sounding/informal discussions with Contractors on what is expected in the market; 3 [INSERT] existing consultants and internal advice is being sought on what	3	Moderate	3	Possible	9	High		1 Complete the Contracting and Procurement Plan with input from financial advisors on Lender requirements and what is achievable in the current finance market (eg debt funding for the advance payment) 2 Ongoing engagement with shortlisted EPC Contract	3	Moderate	2	Unlikely	8	Medium			

Sample risk register and action plan

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment						Rank	Risk Treatment Plan	Risk Severity After Treatment						Rank	Responsible Person	Status
						Consequence		Likelihood		Risk Level Before Treatment				Consequence		Likelihood		Risk Level After Treatment			
20	Contractors do not finish on time causing [INSERT] to incur additional accommodation and overheads associated with [INSERT] workers accommodation camps.	Financial	Post Financial Close – Construction	1 [INSERT] existing consultants and internal team are analysis potential risk and cost implications.	4	Major	4	Likely	16	High		1 Prepare Accommodation Plan 2 Pass on costs to Contractors in construction contracts through LDs and indemnities; 3 Allow contingency in DFS estimate to fund additional costs until recovered from Contractors.	2	Minor	3	Possible	6	Medium			

Risk Register & Action Plan – Financing Workstream

Number	Risk Description (Event and Consequence)	Assessed Category	Project Phase	Existing Controls	Risk Severity Before Treatment				Rank	Risk Treatment Plan	Risk Severity After Treatment				Rank	Responsible Person	Status of Risk Treatment Plan
					Consequence	Likelihood		Risk Level Before Treatment			Consequence	Likelihood		Risk Level After Treatment			
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

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