COAA
Construction Owners
Association of Alberta

DEVELOPING A CONTRACTING STRATEGY

A Best Practice of the
Construction Owners Association of Alberta

March 2018

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BEST PRACTICE – DEVELOPING A CONTRACTING STRATEGY

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BEST PRACTICE – DEVELOPING A CONTRACTING STRATEGY

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1.0 INTRODUCTION

Within the industry, there are a myriad of approaches to developing Project contracting strategies, and in many organizations, no documented/rigorous process exists. This perception of the COAA Contracting Committee members was validated in the Contracting Strategy Best Practice Workshop held at the COAA Best Practices Conference in May 2012.

The COAA Contracting Committee recognizes that early development and implementation of a fit for purpose Contracting Strategy is a critical deliverable to facilitate successful Project outcomes.

1.1 A Guide for Owners and Contractors

This Best Practice has been prepared as a guideline for Owners and Contractors (re: their sub Contractors) to facilitate the development of Contracting Strategy for industrial Projects in Alberta. Its purpose is to ensure that Project Owners have comprehensively considered Project specifics (goals/objectives, work environment, scopes of work, Project and contract risk allocation), weighed the pros and cons in consultation with all of the key Parties and clearly articulated the appropriate Contracting Strategy for the Project.

A standardized approach (i.e. the participants, considerations and steps taken to develop Project contracts strategies will enable this). However, by definition, this will result in numerous different solutions, as most or all Projects are unique with their own specific objectives, considerations, location, Contractor market, risks, etc.

It should be noted that there are numerous references and practices already developed and available on this topic. This Best Practice is meant to distill the common themes, summarized into a relatively short guideline. If Project stakeholders desire more in-depth research in order to develop their Project Contracting Strategy, a listing of many, but not all, reference resources is included in Appendix G. The practices are generic in nature and must be adjusted for Project-specific requirements.

1.2 Acknowledgements

Recognition is owed to all industry stakeholders who take an interest in making our industry more efficient; particularly those who have supported the creation of this Best Practice and those who will champion its use.

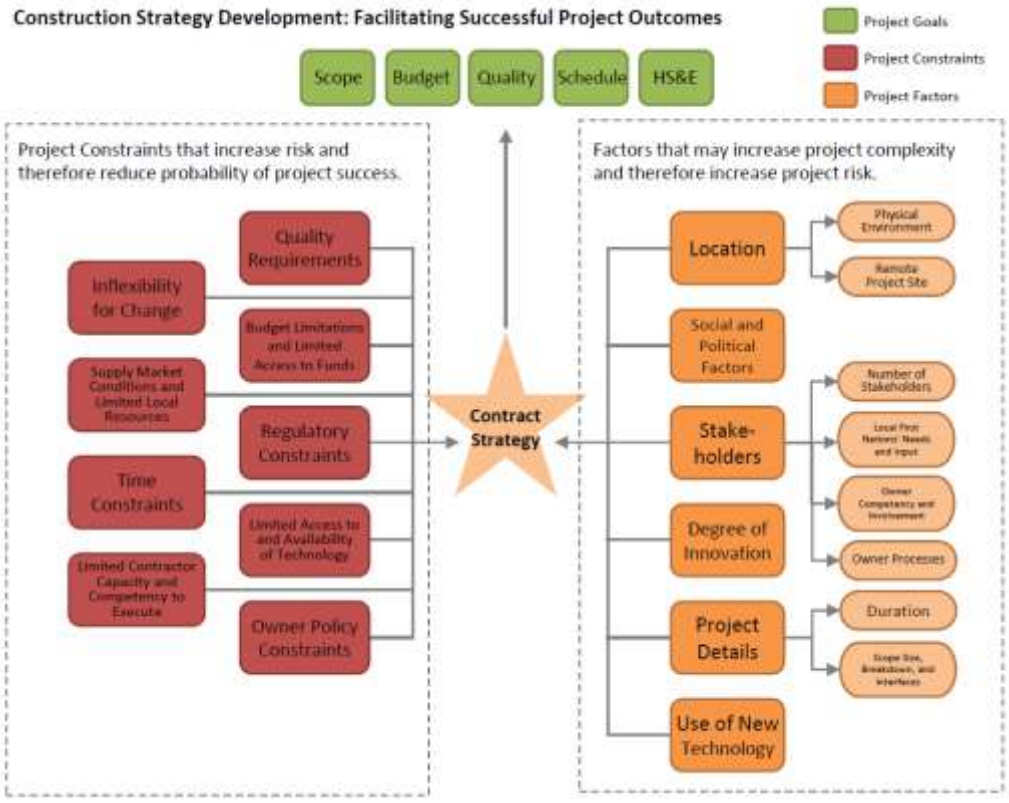
The COAA membership and board of directors, through to the working committee members, who worked collaboratively on this best practice, should be commended for contributing their valuable time and experience for the mutual benefit of the industry.

1.3 Business Case

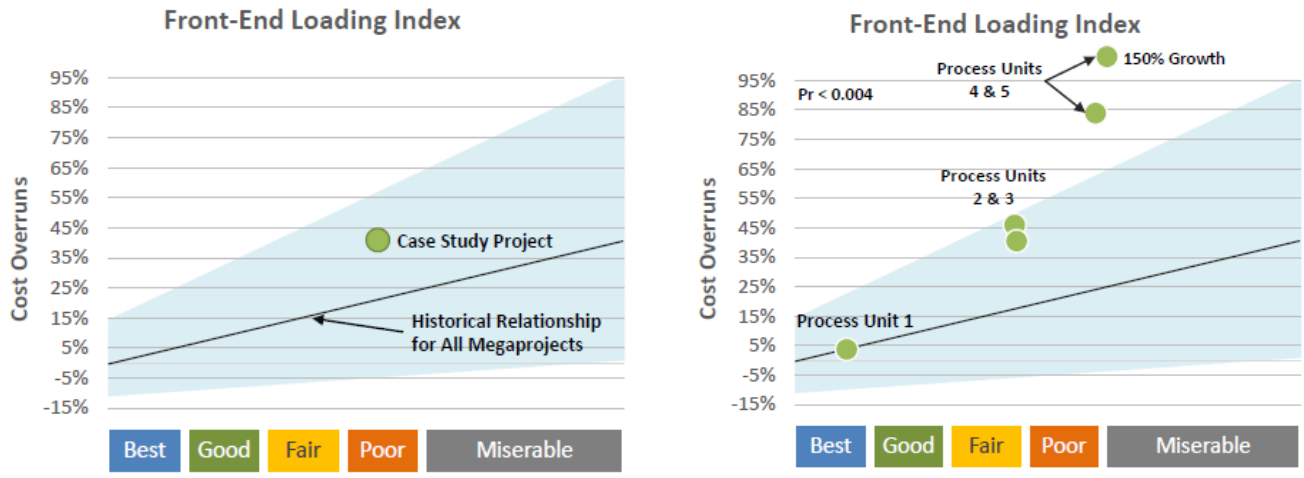
Project management practices as espoused by various industry sources (CII, PMI PM BOK, IPA Consultants, many Owner company internal Project management stage gated Project processes) state that in addition to completing a comprehensive, detailed scope of work in the front-end loading phase of a Project, similar rigor and comprehensive attention and approach by the Project team is needed on execution strategies.

In layman's terms, we don't just need to know and detail things like equipment counts and specifications, bulk materials MTO's, construction DFL hours and CWP's, cost estimates and schedules. For increasing our probability of Project success, we also need to be clear on key Project constraints (e.g. local/ regional contracting capability, capacity, and Project commitments; current supply / demand, other work in the region, schedule constraints), responsibility splits, assignments of various scopes of work to all Project participants (Owner, Contractors, suppliers), be aware of and address scope of work interfaces, allocation of risk to the Party best able to manage the risk, and have an appropriate compensation model for the scope of work and risk assigned to a Contractor. Another key consideration is the risk acceptance/avoidance of the Owner.

Research has shown that when execution strategy component of front end loading of a Project is poorly done, probability of Project failure (cost growth, schedule slip) is higher. In particular, we rely on research done by Ed Merrow of Independent Project Analysis, (Presentation: "Attack the Real Issues", May 2015) represented in the two tables below:



Cost Growth Varied by Process Unit



FEL drives mega Project Cost Predictability

As such we advocate earlier development of the Contracting Strategy at FEL2 and FEL3 phases. (FEL 2 is the planning phase in which the preliminary design, schedule and budget are completed. In the FEL3 phase, the preliminary 3D model, the Project execution plan and the definitive estimate are completed.)

Figure 4.3 The project management process as recommended by IPA (adopted from IPA Burroughs, 2007)).

This COAA Best Practice will provide those in Project development, planning and execution with an approach, key principles and a tool box to assist cross-functional Project teams develop optimal Contracting Strategy/strategies for their specific Project(s). The scope of the Best Practice development is described in Appendix A.

1.4 Continuous Improvement

The value in any Best Practice is:

- it is actually used and implemented by industry
- industry feedback advises, that in fact, using the Best Practice helped Projects arrive at better contracting strategies and resulted in improved Project outcomes, and;
- Suggestions and recommendations for improvement are received and acted on, with the Best Practice being updated and re-issued to industry.

To ensure implementation of this continuous improvement process, and to measure the value that industry derives from the use of the Best Practice, the subcommittee requests the following:

For companies that use this Best Practice once it is formally issued, upon completion of the development of Project Contracting Strategy using the best practice, and on completion of those Projects, COAA requests feedback be provided to the e-mail below on your assessment; whether the Best Practice added value to your Project and/or any recommendations for improvement.

admin@coaa.ab.ca

Include in the subject line: *Suggestions for Contracting Strategy Improvements*

Feedback will be collected, tabulated and key themes and findings reported back to a subsequent COAA Best Practices Conference. Following that update, the Best Practice will be revised and re-issued for use, addressing the feedback and recommendations received from industry.

2.0 DEVELOPING A CONTRACTING STRATEGY

2.1 Contracting Strategy Objectives

The overall objective of implementing an appropriate Contracting Strategy for a Project is to increase probability of Project success. The objectives of the Contracting Strategy Best Practice include:

- Contract strategy or strategies developed and implemented are aligned to and supportive of Owner's business and Project objectives
- Key considerations of Project scope, risk, work location conditions are addressed
- The appropriate Project stakeholders are involved in the development, understand and support the Project contract strategy
- Clear and appropriate allocation of Project and contract risk to Contractors and Owners
- Minimize/avoid contract claims and/or disputes
- Clear definition of Project scope roles/responsibilities, communication channels and decision making (this supported by well written, comprehensive contracts and scopes of work aligned to the contract strategy)

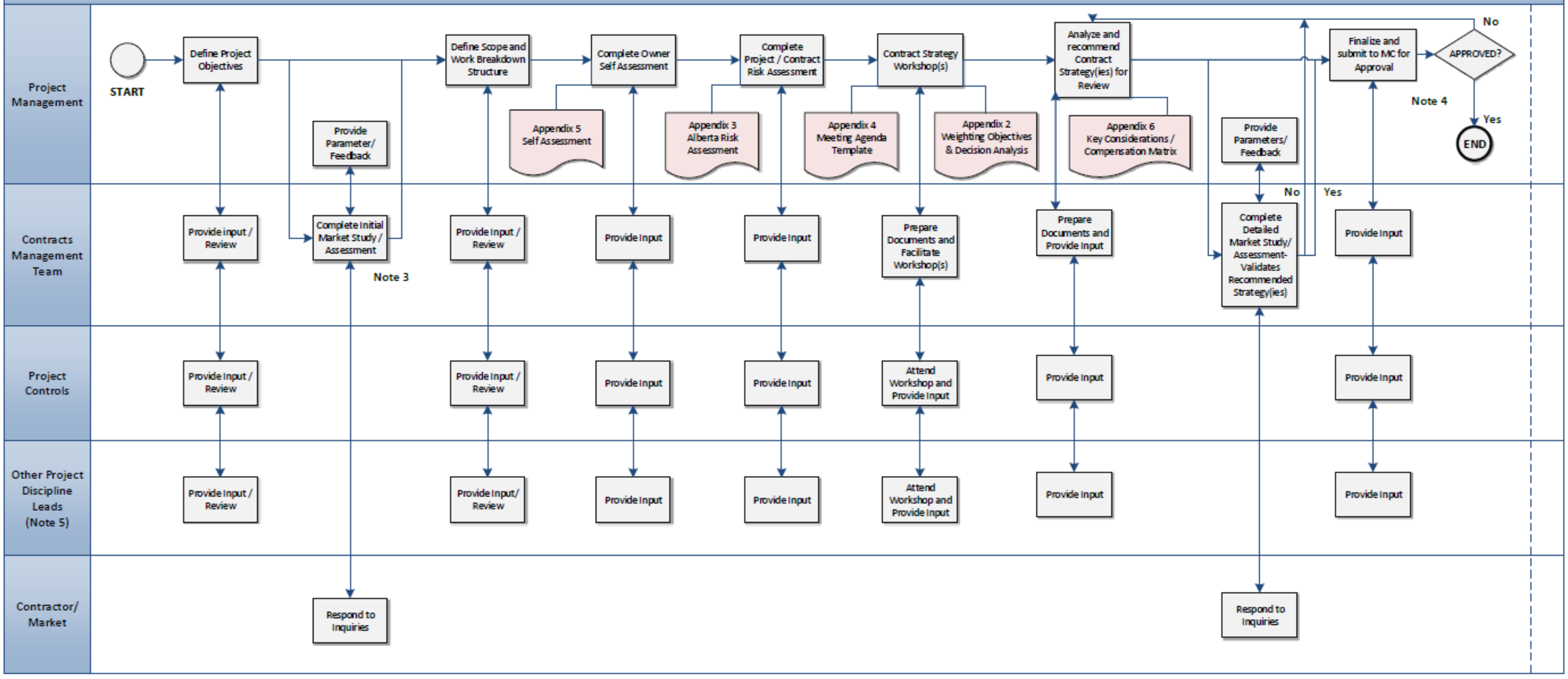
The Contracting Strategy is, by definition, the top-level plan for delivering a major capital asset within an uncertain environment. Deviations from "the plan" are to be expected: the strategy should contemplate both potential changes which can be managed and mitigated, and the potential for unknown changes which cannot be managed and simply require adaptation. The strategy should be framed such that changes are recognized promptly with a responsive planning process immediately assessing "manage" or "adapt" options. Staying "on strategy" will expedite the recovery from "off plan".

2.2 Work Process Flow Diagram

The swim lane work process flow diagram in Figure 1, on the following pages, provides a high-level description of the key activities, steps and Project personnel involved in generating a Project Contracting Strategy.

Develop Contracting Strategy (This process should be implemented in the FEED phase of the project life cycle – Refer Note 1)

Rev: 0c
Dated: 18 Mar 2013



Assumptions and/ or Pre-Requisites
(Also refer to Best Practice Guideline 4.3):

1. Project Team is in place.
2. Project Business Case and high level scope is defined.
3. PM is accountable for development of contract strategy, with input from SMEs (i.e. Contracts and other functions as required).
4. Activities forming part of contract strategy development process completed prior to Project sanction.

Notes

1. Note that if there are major changes in project objectives or conditions during project execution, it is strongly recommended to revisit, revalidate or modify the project contract strategy, using this process.
2. Template Documents shown are appendices of the Best Practice.
3. Reference : COAA Contractor Prequalification Best Practice
4. MC Definition – Management Committee, the senior company management with accountability / authority to fully sanction a project.
5. Refer to Legend tab for Listing

Business Process Legend

- Sequence Flow
- Process
- Activity
- Decision
- System
- Start
- End
- Document
- Jump

PROJECT SANCTION

Other Project Disciplines
Engineering
Health Safety Environment
Community Relations/ Social Sustainability
Construction Management
Labour Relations
Quality Management
Procurement
Materials Management
Logistics & Transportation, Customs
Operations, Commissioning and Start-up
Legal, Risk Managemente 4

2.3 Benefits of Implementing a Contracting Strategy Best Practice

- Streamlined process for bidding and/or negotiations (should happen if appropriate strategy, compensation model and allocation of risk is achieved)
- Higher probability of successful Project outcomes (cost, schedule compliance, reduced change, claims)
- Education of strategy alternatives and pros/cons, key criteria to be evaluated
- Early consideration and allocation of risk in development of Contracting Strategies
- Foster collaboration, stakeholder alignment, understanding and alignment of business and Project objectives and risk
- Minimize inefficiencies in the finalizing/risk allocation process
- Greater understanding of impacts of scope of work handoff and interface management with respect to Contracting Strategy selection
- Selection of appropriate compensation model for contracts
- Understanding of Owner ‘s capabilities (re: self performed responsibilities/scopes of work)

2.4 Contracting Strategy Defined

During the development of this Best Practice, as evidenced in COAA Best Practices 2013 workshop on Contracting Strategy Best Practice, there are many different perceptions and definitions of what a Contracting Strategy is and isn’t. For the purposes of this Best Practice, a “Contracting Strategy” is:

A Project deliverable, in the form of a document, typically produced by a multi-disciplinary team, which describes a set of planned contracting decisions and activities that are aligned with and support, Project:

- organizational goals
- Project objectives
- Project key success factors

In addition, to this alignment, an optimal Contracting Strategy should clearly define, at least, the following considerations:

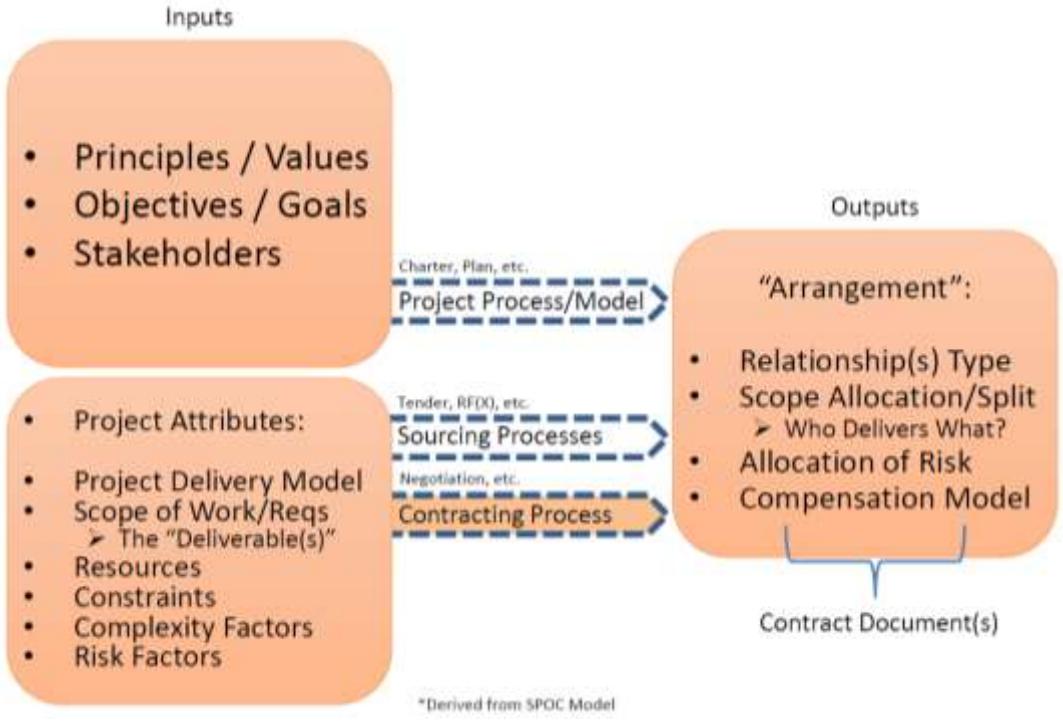
- models for Project delivery
- Project scopes of work and the key interfaces between them
- roles and responsibilities of the participating stakeholders

- risks and constraints (including schedule) associated with the Project and strategies to mitigate them
- compensation models to be utilized for various contracted scopes
- method(s) of sourcing the Contractors' services (COAA Contractor Pre-qual Best Practice)
- Owner organization's scope of work and responsibilities, and capability assessment, identified areas for improvement / focus

A "Contracting Strategy" is the synergistic sum of many components - e.g. Project delivery models, compensation models, sourcing strategies and standard form contracts – but the individual components are NOT contracting strategies. Therefore, for greater certainty:

- Formal tendering, multiple or sole source negotiations are examples of Sourcing strategies, not contracting strategies.
- Lump sum, unit rate, reimbursable, target price / guaranteed maximum price are examples of Compensation models, not contracting strategies.
- Design-Bid-Build, Design-Build, EPC and EPC(M), etc. are examples of Project Delivery models, not contracting strategies.

The notion is represented pictorially below by way of a basic, Input-Output Model:



2.5 Pre-Requisites for Success

Development of a Contracting Strategy cannot be successfully undertaken without first completing several key activities, including:

- understanding of clear, documented business and Project objectives
- well defined Project scope and execution strategy
- initial Project risk and opportunity identification / evaluation
- Owner Project team capability self- assessment
- up-to-date understanding of the Contractor market (supply / demand of supervision and direct labour)
- listing and description of key Project constraints (e.g. schedule, cost, quality, regulatory, community relations)
- capacity, capability, labor relations, supervision and labor availability
- multi-discipline team

The development of a Contracting Strategy is improved when all the appropriate functional disciplines assigned to the Project are involved and consulted, as it broadens to scope of issues, concerns, risks to be addressed in the Contracting Strategy.

2.6 Using This Best Practice

This Best Practice is developed as a narrative with a tool box of simple, easy to use documents and references for Project teams Developing a Contracting Strategy. The complete scope is represented in Figure 2 - Contracting Strategy Best Practice Document Tree.

Figure 2.

The first section of this guide provides an overview and a level of detail on key Project issues to be considered and addressed by the Project team when developing a Contracting Strategy. Many of these issues can help assist the team with the generation of criteria to evaluate various Contracting Strategy alternatives.

It is important to generate ALTERNTIVE contracting strategies and implement the evaluation process, and not jump to “the right answer”. The multi-discipline approach, coupled with the assessment of all the various criteria, should increase the probability of an optimal Contracting Strategy that meets the Project objectives and is aligned to the Project and worksite realities.

The second section of this guide provides an overview, definitions and a level of detail on the more common compensation models that can be used for industrial Project contracts. It provides key criteria to be considered for each contract scope, once a Contracting Strategy has been developed. It is proposed that in many instances, disagreements and claims on contracts could be reduced or eliminated by the selection of appropriate compensation model.

3.0 KEY CONSIDERATIONS

The purpose of this section of the Best Practice is to provide a summary of factors, risks and the key elements of certain contractual strategies that Owners and Contractors should consider in order to identify what Contracting Strategy may best suit their circumstances including:

- identification of the Key objectives and Constraints
- what are some of the key considerations / risks
- how the Project or scope is to be allocated
- which contractual framework suits the Project being proposed (and why)?
- which compensation framework suits the Project being proposed (and why)?

The list of key consideration factors, risks, and contractual types is not exhaustive. This document is intended to provide general guidance to Owner and Contractor Project personnel. There is no substitute or shortcut to a Party conducting an objective, thorough review of a Party's particular circumstances. Parties should assess for their specific Project the relevance and significance of the merits/shortcomings of the factors detailed in this document as part of the Party's overall Project planning process.

3.1 Definitions

Compensation Models: the method of calculating the price to be paid for the scope or Service to be provided which may be lump sum, unit rate, target price, reimbursable or some other compensation methodology.

Contractor: means a provider of services (i.e. fabrication/construction/others).

EPC: means Engineering, Procurement and Construction Services

EPC Contractor: means a Contractor providing Engineering, Procurement and construction materials and services to an Owner with respect to the Project.

E&P: means Engineering and Procurement services

EPCM: means Engineering, Procurement and Construction Management Services, where the Construction services are executed by a third Party but managed by the Party providing the Engineering, Procurement and Construction Management services.

EPCM Contractor: means a Contractor providing Engineering, Procurement and construction management services to an Owner with respect to the Project.

Owner: For the purpose of this guide, "Owner" includes an EPC subcontracting for EPC, an EPC acting as agent for Owner or the asset Owner directly.

Parties: Depending on the context in this guide, this term includes (i) the contracting Parties and (ii) the key stakeholders within an organization involved in the establishing a Contracting Strategy and in carrying out the Project planning process.

Project: The construction Project or a silo within the overall Project as the context dictates. The "Project" for the purpose of this section may be from the asset Owner's perspective or from a Contractor's perspective. Consequently, the "Project" objectives and constraints may differ for some Parties.

Services: means any of Engineering, Procurement or construction services or combinations of such services.

Sourcing Strategy: the formal tendering or proposal strategy or process which may include, multiple or sole source negotiations for the selection of the provider of particular scope or service.

Target Price Contract: the Owner and the Contractor agree at the outset on a fixed "target" price; the Contractor is reimbursed for progress on an actual cost basis, subject to the application at the end of the Project of a formula which provides for the Contractor to share in any savings below the target price or to contribute to any overrun above the target.

Works Contractor: As used in this guide, means the trades or construction Contractor(s) used for the construction component of the Project.

3.2 Knowledgeable Project Team

The Developing a Contracting Strategy Best Practice will provide a step-by-step guide of some key considerations that a Project team should evaluate prior to deciding on either an overall Project Contracting Strategy or a scope specific Contracting Strategy. The selection of appropriate and Contracting Strategy will require knowledge of:

- **Key Objectives**: Identifying and understanding the key objectives of, and constraints on, the Project
- **Complexity**: Considerations around the level of complexity of the Project (e.g. remoteness, technical innovation involved, contingencies presented by the marketplace, etc., all contribute to complexity)
- **Risks**: Identifying and understanding the risks (both typical and specific) that might impact upon or be encountered at each stage in the delivery of the Project, and how best to deal with those risks (refer to Appendix C – Alberta Risk Model)
- **Scope Split**: The split of the overall scope and the key interfaces that require to be managed refer to scope matrix in section x provided herein
- **Key Delivery Processes**: The key processes and activities that must be performed in delivering the Project

Note for Reference: a number of CONTRACT DELIVERY TYPES and COMPENSATION MODELS - and their alternatives have been included, in sections 5. and 6. herein, and in a summary table form in Attachment 1 Appendix B to assist the user in assessing the application on a particular Project or scope of Services.

3.3 Identifying Key Objectives and Constraints

The key objectives of each Project should be identified during the Project definition stage, as a precursor to any Contracting Strategy selection. Objectives of a Project must be identified and, in some cases, specified by a Project's stakeholders. The objectives can include or be drawn from any of the following:

- Scope (i.e. what is to be delivered) together with any required provision for flexibility - optional scope / staged performance / pre-investment for future phases for example
- Cost, including life-of –Project and transaction costs including
- Reliability of cost estimates or
- Lowest costs to achieve completion
- Time and Schedule, including an appropriate allowance for the necessary Sanction/Regulatory approval processes and the contract formation, negotiation and finalization period
- Quality of the Services, including "fitness for purpose" considerations
- Fundamentals - a Party's fundamental mandate, including the Project charter document(s), internal policies, industry customs/agreements, etc.
- Sociopolitical - sustainability and political considerations, including social, economic and environmental aspects including contribution to the advancement of government priorities / local businesses community, political, regulatory or stakeholder needs and expectations
- Standardization versus Innovation – is innovation, encouraged over prescriptive, specifications
- Comparative Ranking - A conscious decision to strive for 'better than business as usual' outcomes which may be through the use of various types of performance incentives or to be aligned with certain peers
- Pre-Construction Service Needs (i.e. the importance of value Engineering, constructability advice and cost estimates at the pre-construction phase
- Design Process Interaction (i.e. required degree of Owner control over the detail design)

- Flexibility requirements (the ability change Project requirements or specifications to adapt to market conditions, permit requirements, unknown site conditions, changes in technology…)
- Constraints are aspects of the Project that limit, restrict or otherwise impact upon the Project objectives in some manner. Some constraints are generic i.e. workforce availability and market conditions however generally constraints are typically unique to Each Project (or scope/silo) and may include:
    - time constraints
    - budget constraints
    - physical constraints
    - Technology availability
    - availability of resources, including labour resources
    - skills, capability and capacity of the Project participants (including the Owner team) to deliver the planned Project outcomes
    - market or industrial conditions
    - policy (internal, political, local, extra-territorial), other) requirements
    - Remoteness of the Project - Including constraints imposed by remoteness of a relevant aspect of the Project

The Constraints may not all be immediately obvious and the multi-disciple Project risk analysis (which should be undertaken as highlighted in Appendix C of the Best Practice) will assist in identifying additional constraints and further highlighting the areas where some of the key constraints can or cannot be managed and mitigated and/or are in conflict to achieving the Key Objectives.

3.4 Level of Complexity

The level of complexity of a Project must be considered when selecting an appropriate Contracting Strategy. The complexity of a Project is determined by a combination of factors, including:

- size of the Project
- duration of the Project
- scope of the Project
- number of stakeholders involved/interfaces
- level of technology to be incorporated in the Project

- degree of innovation required by the Owner
- market conditions
- Project collaboration tools across functions (i.e. Project controls/work face planning)

While contractually complex contracting strategies with many varying contract structures and interfaces may sometimes be required for some complex Projects, the Parties must take into consideration that the additional resources needed to administer a complex strategy are likely to be wasted if a simple Contracting Strategy can achieve the same outcomes. The inappropriate selection of a complex Contracting Strategy can also lead to unsatisfactory Project outcomes in terms of cost and schedule, as Contractors may make allowances in their pricing and risk allowances for additional administration costs, slow decision making and the possibility of contractual disputes which might otherwise not have arisen. Further, there is the risk that a complex Contracting Strategy may discourage a broad collection of otherwise qualified Contractors from participating in a bidding process and may potentially remove competition all together.

3.5 Identifying and Understanding Project Risks

A team lead Project risk analysis is a critical step in not only ensuring that the key members of the Project team have as full and detailed understanding of the Project risks but also how the elements of risk within each team members domain may affect (or could be mitigated by) other areas of the Project. The exercise itself can also be a worthwhile tool for team building and identifying constraints and reiterating the common objectives that will provide the guidance for the decisions to be taken in addressing these areas of risk.

The Risk Assessment Table (see Appendix C for a template and list of commonly encountered risk which should be assessed for applicability to the Project in question) can be used by the Project team to categorize the risks. The effects of the perceived risks will usually fall into the following general categories:

- scope definition / changes
- schedule Impact
- commercial consequences
- interface and prioritization clashes
- technology limitations

All of which may affect the schedule, cost and performance outcomes.

These categories should be carefully considered when selecting a contractual strategy as the ability to mitigate the commercial, performance and schedule effects of such risk, should they arise, may vary significantly depending in the contract type and its flexibility to accommodate the

effects of certain events.

Upon a proper review of the relevant risks and opportunities, a number of contracting strategies and compensation models may be blended or adapted to suit Parties' particular needs and as part of the overall matrix which will embody the Contracting Strategy for the Project.

3.6 How the Scope(s) Will Be Split

The outcomes of the initial steps will allow the Project team to consider the various factors to be addressed when reviewing how certain Services should be allocated. Schedule may dictate certain issues:

- technology choice
- market availability
- Owner competence

The multi-discipline Developing a Contracting Strategy Workshop detailed in Appendix D will provide the forum for the facilitation of open dialogue necessary to ensure that appropriate functional disciplines are involved and consulted and thus a wider scope of issues which are pertinent to the Contracting Strategy decisions are captured and addressed. This forum also facilitates the alignment of the team with respect to communication and reinforcement of the key objectives (which should have been agreed and weighted as per Appendix F) and awareness of team members of areas of risk which are not necessarily within their domain, but which could be mitigated by their actions.

By Parties considering the whole Project and its stages as a matrix, the team should be able to visualize all the key elements of the Project as it progresses and most importantly the interfaces between stages (Engineering to Procurement to Construction) and between work packages or silo's. Generally, as more Parties become involved in carrying out services, greater commercial and schedule risk will fall to the Owner, unless that particular interface is specifically addressed in the Contract.

See table on the following page for a graphic representation. Note that different Contractors are denoted by different colours. Generally, the more Contractors, the more interface risk between the Contractors which must be considered both vertically and horizontally – the Owners must recognize and be willing to manage the complexity presented by the interfaces.

Not all interfaces are as important or impactful on Projects: the vertical interfaces (i.e. the lines between the vertical silos) can be easier to define and typically have limited information flow across them. Those between stages (i.e., Engineering to Procurement to construction) within a Project area or sub-Project generally involve significant flows of information or materials, or transfers of responsibility, making them much more critical to Project success and more difficult to manage. The Contracting Strategy should recognize these differences.

Illustration of Work Allocation Driving Project Contracting Strategy
Note: Contract scope allocation shown is for illustrative purposes, not a recommendation on Contracting Strategy

		Process/ WBS Area 1	Process/ WBS Area 2	Process/ WBS Area 3	Process/ WBS Area 4	Utilities	Infrastructure
FEED	Project Management	Owner PMT					
	Engineering	Lump Sum Turnkey Contractor					
	Procurement						
	Licensors						N/A
EXECUTION							
	Engineering						
	Procurement						
	Engineering Specialty - Automation		Automation Contractor				N/A
	Engineering Specialty - EHT		EHT Contractor				N/A
	Engineering Specialty - HV Elec		HV Electrical Contractor				N/A
	Architect/Engineer						
	Construction Management		Owner CMT				
CONSTRUCTION SERVCIES	Scaffolding Supply/ Yard Mgt		Owner Contracted / Managed by Construction Contractors				
	Cranes < 200 T		Owner Contracted / Managed by Construction Contractors				
	Rentals		Owner Contracted / Managed by Construction Contractors				
	Site Services		Owner Construction Management Team (CMT)				
	Site Materials Management		Owner CMT				
CONSTRUCTION	Pipe Fabrication		Contractor 1	Contractor 2	Contractor 3	Contractor 4	N/A
	Module Assembly						N/A
	Site Installation & Construction						N/A
	Buildings - Pre-Fab						N/A
	Buildings - Site Install						
	Structural Steel Fabrication		Steel fabricator				N/A
	Insulation		Owner Contracted / Managed by Construction Contractors				N/A
	PreCommissioning / System Turnover						

4.0 PROJECT DELIVERY PROCESSES and CONTRACTING TYPES

Owners, engineers, and construction Contractors make the decisions, provide the services, and perform the work to deliver constructed Projects. The Project delivery process model describes how the participants are organized to interact, transforming the Owner's Project goals and objectives into a finished Project.

Whilst this document will endeavour to separate the consideration of choice of Project Delivery processes or contracting types (E&P, Construction Only, EPC, EPCM…) from compensation models (lump sum, unit rate…) in practice these are closely related and have overlapping risk and scope considerations.

Determining the appropriate contracting type requires consideration of market and Project conditions and the preferred allocation of risk based upon those conditions. Market and Project conditions may determine, by process of elimination, certain contracting types that are not viable for a given Project; e.g. Project complexity may determine a limited pool of appropriate Contractors, Project constraints such as fast track requirements may eliminate certain contract types, and market conditions may dictate favour certain contract types in common use.

Appendix B contains a number of comparison tables providing a Reference Guide for some commonly used delivery models, the relationship of the Parties, associated compensation strategies, potential performance risks and issues to consider in their use.

Generally, in the consideration of the adoption of a Contracting Strategy for a particular scope, there are a number of actions that a Party can take that typically contribute to value-for-money outcomes, including:

- optimizing risk allocation between the Parties - the common principle being that risk should be allocated to the Party best able to control the risk
- using performance specifications, where appropriate, to encourage maximum innovation
- ensuring the flexibility to secure scope changes at a reasonable cost
- using incentives to reward 'better than business as usual' outcomes
- setting an appropriate contract period / schedule realism (i.e. The schedule should allow a Party sufficient opportunity to recognize, investigate, price and implement innovation or other value or money outcomes)
- ensuring participants have the required skills and capabilities to deliver the planned Project outcomes
- adopting a Contracting Strategy appropriate to the complexity of the Project.

4.1 Engineering Only or Engineering and Procurement

The Owner engages engineers at an early stage to design the Project and prepare documentation and which fully describes the Services to be undertake and usually provide or assist in preparing the budget or sanction estimate. Some Engineering phases may include a Procurement function. The Procurement services may be undertaken by the engineer either;

In its own right i.e. procuring directly as the contracting entity from the vendor and assuming all the associated risk (schedule, quality and payment); or

As agent of the Owner i.e. the engineer procures on behalf of Owner. The Owner is the contracting entity and the payment is made directly from Owner to the Vendor but the management, expediting and other associated services are performed by engineer. The risk of performance, quality and cost remains with Owner except where the engineer exceeds the scope of the agency.

4.2 Construction Only

The Owner having engaged an engineer to design the Project and to prepare documentation (which fully describes the Services to be undertaken) awards the construction services to a construction Contractor. The (construction) Contractor then (i) procures the material and equipment as per the Owner engineer's documentation (or the material and equipment may be procured by Owner and "free-issued' to Contractor) and (ii) constructs the Project in strictly accordance with the Project Engineering / design documentation.

The Owner may contract one general Contractor for a given Project or enter multiple prime contracts; i.e. engage multiple trade Contractors directly (in effect acting as its own general Contractor). The Owner retains more control, but also more risk, in engaging multiple Contractors directly. Adopting this strategy requires careful examination if the Owner has the capacity and qualifications in-house to coordinate and manage the construction Project.

4.3 Design and Construct / EPC / Turnkey / Design-Build

The Owner engages consultant engineers to prepare a detailed Project brief which defines the scope, quality and functionality requirements of the Project. The EPC Contractor then completes the design of the Project, procures the necessary material and equipment, prepares construction documentation, and constructs the Project. The Parties may decide to exclude the commissioning and start up activities, activities which are commonly included in an EPC Turnkey Project. This form of Contract implies the Owner has agreed to a lower level of control/influence with regards to Project execution insofar as the Owner wants to avoid cost/schedule impacts.

4.4 Managing Contractor / EPCM / Design and Construction Management

In an EPCM arrangement, the Owner selects an EPCM Contractor to manage the whole Project on its behalf. Generally, the EPCM Contractor performs Engineering, Procurement and construction management services i.e. the EPCM completes the design / Procurement phase and manages the construction phase of the Project. The actual construction work is performed by one or more "Works Contractors" under the direction of the EPCM Contractor.

The EPCM Contractor acts as agent of the Owner in construction management activities (and often for the Procurement activities). The EPCM model also recognizes that the Owner may also procure materials and equipment directly which will be incorporated into the services. Consequently, the services contracts are usually entered into between the EPCM Contractor (as agent for the Owner) and the Works Contractor. In this model, more execution risk is retained by the Owner relative to the EPC model. However, Owners can typically exercise more control over the EPCM Contractor and have more input into the Services being performed than is available in the EPC model. The EPCM model allows the Owner to be more involved in the Project execution, including the design process. Whilst the Owner and the EPCM Contractor may select the optimum strategy for the Project however, the Contracting Strategy for the Project, and the selection of Works Contractors, is ultimately the Owner’s responsibility. The Owner retains responsibility for the Works Contractors and the EPCM Contractor does not take responsibility for the Project estimates or final completion schedules.

4.5 Alliance and Collaboration

This relatively complicated Contracting Strategy provides for early Contractor involvement. This framework entails that an alliance (or collaborative team) is established among key Project participants, including the Owner and Contractor(s) is supported by inter-dependence and accountability agreed to by Parties. All Parties in the alliance (or collaborative team) are collectively responsible for all aspects of the delivery of the Project. The alliance (or collaborative team) is generally structured so that commercial risks and rewards are shared by the alliance (or collaborative team) Parties.

Documenting the allocation of Services and commercial risk and reward is complicated and time consuming. It is therefore often best suited to complex, high risk Projects where alternative strategies for risk allocation will be ineffective.

See Appendix B: Contract Types – Comparison

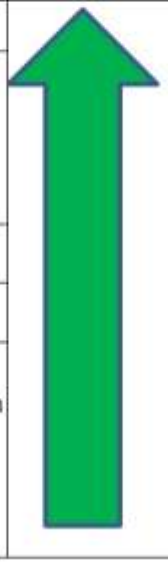
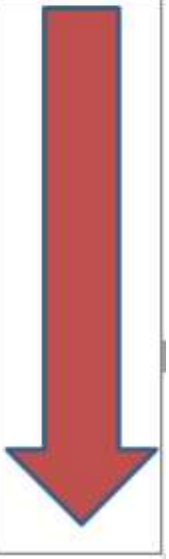
5.0 COMPENSATION MODELS

5.1 Compensation Models - Alternatives

Whilst the compensation strategy serves as a means of pricing the Services to be undertaken, it also structures the allocation of commercial risk to the various Parties involved. COAA believes that some compensation frameworks (i.e. “lump sum”) are not ideal in certain circumstances.

The choice of compensation model has fundamental implications for the allocation of Project risks and the determination of Project success. However, the allocation of risks, and the applicability of the comments that follow, may vary greatly among different contracts employing the same compensation model. That is, individual contracts may vary greatly while employing the same compensation model. Scope of Services definitions, payment provisions, change mechanisms, indemnity provisions, and many other contract provisions are also used to allocate risk, and have implications on Project success. Contracts may also contain blended features of more than one compensation model. As such, the following descriptions set out “typical” attributes of each compensation model. Tailoring contract terms and conditions to the Parties, the Project, and the market is as important as selecting the right contract type and compensation model; however, this is a separate topic beyond the scope of the present documents. Below is a summary of factors to consider in order to identify the commercial risk for an Owner / Contractor.

The following table summarizes the key issue of scope definition applicable to various compensation models, in very generalized terms.

The Relationship Between Scope Maturity and Cost Risk (Owner's perspective)			
		Scope 'Effort'	Cost Risk
Compensation Model	Scope Definition		
Lump Sum/Fixed Price	Fully defined (IFB/IFC)		
Unit Rate	Fully defined for each unit (including detailed pre-ambles by activity		
Reimbursable	Partially defined scope		
Target Price/Incentive	Partially defined scope		
Convertible (Reimbursable to Lump Sum)	Initially flexible scope with increasing definition upon conversion to lump sum		

5.2 Lump Sum or Fixed Price Contracts

Such Contracts require the Contractor to perform the contracted services and deliver services or materials for a pre-agreed price (a lump sum or fixed price). A lump sum Compensation model for construction is best suited to Projects where there is a high degree of certainty regarding the specific Project requirements and should be used where the scope of the Services is at an advance stage of definition and the changes that can be anticipated are minimal. The Owner may be required to take a hands-off approach with a lump sum contract so the ability for the Owner to provide the level of inspection and review of Contractor's activities that it desires should be clearly defined within the other sections of the contract (i.e. quality surveillance, vendor selection criteria, design approvals, audit). In a lump sum contract, the Owner has essentially assigned all the risk to the Contractor, who in turn can be expected to charge a risk premium in order to accept responsibility for unforeseen contingencies. Contractor bears the financial burden of underestimating the actual cost of construction and benefits from an overestimate that is accepted by an Owner. Beside the fixed lump sum price, other commitments are often made by the Contractor such as a specific schedule, the management reporting system or a quality control program.

Careful drafting and review of the scope of Services should be undertaken to ensure there is no contradiction or ambiguity in the obligations being undertaken for the fixed price or lump sum agreed to avoid disputes.

The use of lump sum contracts is prevalent in commercial and small to medium industrial Projects but is rare in major industrial Projects involving significant risk and complexity. Lump sum contracts are most conducive to competitive sourcing strategies when the Parties' have good scope definition, price predictability for Contractor's input costs and abundant availability of resources permitting the Owner to achieve savings through competition.

5.3 Unit Rate Contracts

Unit Rate Contracts allow for payment of the Services and materials on an quantitative basis. The cost elements within the compensation section are usually all-inclusive unit rates (i.e. Implicit estimates of costs to be incurred).

Unit Rate contracts provide a fixed price for a defined unit of Services (quantity), which may include labour, equipment, and/or material. The final contract value is determined by summing the actual quantities multiplied by the specified unit rates. Contractor accepts the productivity risk and risks of inflation. Reimbursement should be based strictly on actual quantities and no minimum price is guaranteed. For administration simplicity - the unit rates may, where possible, be "all-inclusive" rates and be valid for quantities both large and small, however this may not provide the most economical solution for the Owner as the risk factors the Contractors may want to include may inflate the unit rates, or the escalation of quantities may lead to disputes and claims.

An alternative is to have a large and varied suite of unit rates which accurately describe and reflect the Services to which they apply, and to have contract provisions to address significant escalation of quantities of Services.

Unit price contracts are generally restricted to Projects (or scopes of Services) where units of work can be readily identified and measured (i.e. piling, pipelines, bulk earthworks, concrete/foundations). Unit rate contracts require appropriate Owner surveillance (i.e. quantity measurement) and appropriate resources.

5.4 Reimbursable Contracts

Reimbursable contracts place more commercial risk on the Owner compared to lump sum contracts. This may achieve cost savings for the Owner, as the Contractor may be required to incorporate less risk premium into the contract price. On the other hand, there may be decreased cost certainty with reimbursable contracts. The Owner may incur cost inflation due to changes in market conditions, materials prices, labour costs and Contractor productivity among other factors. Cost-reimbursement types of contracts provide for payment of allowable incurred costs, to the extent prescribed in the contract. These contracts establish an estimate of total cost for the purpose of obligating funds and may also establish a ceiling that the Contractor may not exceed (except at its own risk) without the approval of the Owner. Cost-reimbursement contracts are suitable for use when uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of fixed-price or all-inclusive unit rate contract. Reimbursable contracts provide less incentive to cut costs and permit changes much more easily than lump sum contracts. Therefore, reimbursable contracts may be favoured where construction quality and design flexibility outweigh cost considerations. Market conditions and Project complexity may in fact dictate that lump sum contracting is not viable, and some variant of reimbursable and unit rate contracts must be used.

Cost reimbursement is a frequent subject of dispute, requiring careful contract drafting to ensure all anticipated costs are identified as reimbursable or not. But reimbursable contracts are less susceptible to disputes due to design change as the contract allows for automatic compensation for extra Services

A cost-reimbursement contract should be used only when:

- the Contractor’s accounting system is adequate for determining costs applicable to the contract; and
- Appropriate surveillance (and/or use of contract incentives) during performance will provide reasonable assurance that efficient methods and effective cost controls are used.

Reimbursable contracts are less suited to competitive tendering Sourcing Strategies.

Typical reimbursable compensation strategies are on a time and materials basis which provides for acquiring Services on the basis of direct labor hours at specified hourly rates that include wages, overhead, general and administrative expenses, and profit plus actual cost for materials or may be labour only with an agreed mark-up. In this compensation model the Contractor has little or no risk associated with salary, escalation, productivity, burden, ODC's and other labor associated cost (i.e. a labour multiplier). Contractor's fee is a unit rate or percentage charged on each hour worked by specified Contractor personnel multiplied by hours worked. The delineation between costs contained within the reimbursable unit rate and fee elements must be clearly defined. The Fee element can have multiple variants including a fixed fee, percentage, award fee, incentive fee, or any combination thereof charged on top of specific input costs incurred by the Contractor for carrying out the Services. One of the most commonly used forms is a Cost plus fixed fee contract which is a cost-reimbursement contract that provides for payment to the Contractor of a negotiated fee percentage that is fixed in value at the inception of the contract based on the Contractors job estimate.

The fixed fee value does not vary with actual cost (unless stipulated) but may be adjusted as a result of changes in the Services to be performed under the contract. This contract type permits contracting for efforts that might otherwise present too great a risk to Contractors for a unit price arrangement, but it provides to the Contractor only a minimum incentive to control costs. Under this type of contract, the Contractor will receive the actual direct job cost plus a fixed fee, and the Contractor will benefit from the opportunity to achieve a higher profit percentage if the work is completed ahead of schedule and with less manhours. The Owner still assumes the risks of direct job cost overrun while the Contractor will risk the erosion of its profits if the Project is dragged on beyond the expected time and at greater manhours than was originally estimated.

5.5 Progressive Lump Sum or Convertible Lump Sum

The overall aim of this strategy is a balanced approach to commercial risk such that Contractors are able to convert a reimbursable contract to a Lump Sum at a stage where there is a much deeper understanding of the Project and the associated costs and thus ultimately have greater cost predictability.

This type of compensation strategy originated in Middle East as a result of major EPC Contractors being unable or unwilling to contract on a Lump Sum basis due to: Increasingly complex Projects, Mega Projects with Capex investments of several billion dollars and Increasing and unpredictable global and regional commodity and labour costs. However, given the recent (2010 – 2015) reluctance of Alberta Contractors to work on a lump sum basis, this methodology has not been frequently utilized. The advantage of establishing a convertible contract at the outset is primarily the Owner's advantage; the Owner ensures that the Contractor is required to submit a price to complete the Services on a lump sum when the design is sufficiently advanced and establishes parameters for the performance delivery if the option to convert to lump sum is exercised.

Some of the issues which can affect the overall success of this Compensation Model include a need for the following:

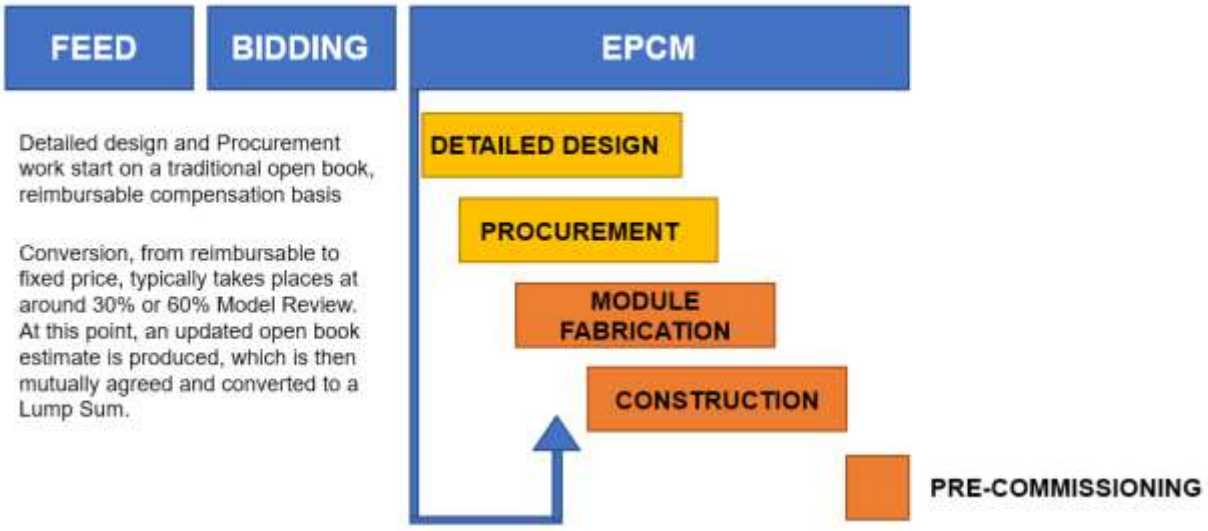
- Trust and openness between Owner and Contractor
- A balance of risk between Parties and a best for Project approach
- The Conversion needs to be mutually agreed based on an open book estimate

Ultimately the benefits that can be achieved by utilizing this Compensation model are for both the Owner and Contractor as it allows Contractor better understanding of the Project before submitting a fixed price for elements of the Services and for the Owner it can reduce the overall negotiation time for the Contract thus shorten overall Schedule.

Conversions can be staged as the Project develops or full converted in a single step at the appropriate stage of execution. Some pitfalls which can undermine its success include the requirement for good quality early Engineering documentations (FEED / EDS) to allow early transfer of Detailed Engineering / Procurement/ and Modular fabrication to lump sum. Clients FEED /EDS budget needs to be accurate or this can lead to delay and disagreement when converting the open book estimate into a mutually agreed lump sum.

Contract complexity: requires alternate contract terms addressing the parameters for a lump sum tender, the cost and performance responsibilities that would apply if the Owner exercises the option.

Whilst currently being investigated or proposed on a number of Alberta Project the readiness of the Alberta Construction Market to embrace this model and thus fully accept the Construction risk has not yet been fully tested on larger Projects.



In Alberta, the ability to convert the construction element of the Project to a lump sum is DIRECTLY DEPENDANT on the ability to efficiently maximise the level of modularization of the components thus minimise on site construction.

This compensation strategy increases the likelihood of construction Contractors being able to ACCURATELY estimate construction manhours and offer a corresponding lump sum or all-inclusive unit rate.

5.6 Contractor's Fee

Each of the compensation models listed herein refers to the Contractor's (EPC/EPCM/etc.) fee. This term has some ambiguity within the Alberta contracting community. Commonly the term implies the Contractor's profit (or profit margin); however, this definition is usually incomplete. Contractor's typically include their overhead costs (or SG/A) within their fee, thus obscuring what percentage of the fee is profit, and what percentage is the overhead. While the nomenclature may shift from Contractor to Contractor, it is a point worth clarifying and agreeing as it is an integral component of all compensation models.

The distinction is particularly important when using auditable compensation models like Cost Reimbursable, Convertible lump sum, and may prove beneficial during the tender stage on Unit Price or Lump Sum.

Definition of what is included in the 'overhead' component of the Fee ensures greater transparency around billable items and decreases the probability of dispute if and when an audit occurs.

Drawing this distinction allows profit to be discussed separately, and it can then become an

independent negotiated detail between Contractor and Owner. As referenced herein, risk allocation for given tasks may attract a different profit margin, which reinforces the need for clarity of scope during Contracting Strategy development.

5.7 Mixed Compensation Terms

Generally speaking, it is not recommended to combine compensation terms for an individual scope. The challenge with combining methodologies is the probability that an activity can be charged twice without the Owner (and potentially the Contractor) being explicitly aware, thus creating conditions for a dispute.

This is not to say that knowing, understanding, and potentially including reimbursable rates within a lump sum (for example) contract is inherently negative. This may allow for agreeable means between Owner and Contractor by which to price change to a given scope. However, trying to manage one activity (i.e. earthworks) with blended terms could lead to billing confusion, potential double charging, and potential decreases in productivity; all of which are inconsistent with an effective Contracting Strategy.

6.0 TOOLS FOR DEVELOPING A CONTRACTING STRATEGY

6.1 **Alberta Risk Assessment Model** (Appendix C)

This guide provides an overview and a level of detail on key Project considerations related to risk assessment of contract scopes and how they inter-relate. This tool will help in both the evaluation of Contracting Strategy alternatives, the division of responsibilities for various Project scopes of work amongst Contractors and Owner, and also in the selection process of the appropriate compensation model for a contract.

The topic of Project and contract risk assessment and allocation between Owner and Contractor is a large and complex one. In line with the approach of this best practice, this guide provides some key criteria to be considered, but does not intend to be a complete treatment of the subject.

6.2 **Developing a Contracting Strategy – Workshop Agenda Template** (Appendix D)

This template is a basis to assist Project teams plan and implement the Contracting Strategy development process. It "operationalizes" the work process flow diagram, and includes all the key steps, references to the various Best Practices tools, and lists the key Project disciplines to be involved.

This meeting agenda template is completely scalable and can used to develop a Project Contracting Strategy in one meeting for Projects with small scope, low dollar and complexity, or as a basis for multiple sessions, for complex, high risk, high capital value Projects.

6.3 **Owner Capability Self-Assessment** (Appendix E)

This guide is a tool to help with the often overlooked (and sometimes challenging) but critical assessment of the Owner's or Contractor's (for subcontracting) capability and capacity in various aspects of Project planning and execution.

This exercise is needed to help determine the appropriate scopes of work, Project responsibility the Owner decides to self-perform, and indeed areas of focus for improvement if there is a gap in areas that are to be self-performed.

Note to Draft: As of COAA Best Practices XXI, May 2013, this guide is very high level and refers only to high level self-assessment areas and refers to CII IR-111-3.

6.4 **Weighting Objectives an Decision Analysis** (Appendix F)

The Appendix outlines the initial step is to determine what the Project objectives are and illustrates the next and more difficult step in weighting these as to their priority. Typical objectives are Cost, Schedule, and Quality. Where a team may find itself in difficulty is in trying to find consensus on the weighting of these 3 key objectives and the inclusion and weighting of other key objectives in comparison. If everything is equal, all strategies could be adopted. Different Contracting Strategies affect objectives to a greater or lesser extent, so it's vital that there is a real discussion about what it is the Project team wants to focus on.

A Decision Analysis can be used to score the various Strategies against those Project Objectives. The Project team score, on a basis of 1-10, how well each of the contracting Strategies will best meet the objectives of the Project. This is done to solely see what Strategy best meets the company's objectives and Appendix F provides an illustrated example.

6.5 **Contracting Strategy Reference List** (Appendix G)

As highlighted in the guideline introduction, the concepts presented in this draft best practice are not new. There are many reference sources available, some in much greater detail resulting from much in-depth research available, and this Best Practice is meant to provide an overview, "point the way" for Project teams.

Appendix G lists the key references the Contracting Strategy Best Practices Sub-committee researched and sourced that informed the key concepts contained herein. This is by no means meant to be an exhaustive list of pertinent references on the topic, but a good starting point for Project teams to do further reading, learning etc.

APPENDIX A Best Practice Working Committee Mandate and Scope

The Best Practice is to be applicable to all capital Project planning for heavy industrial Projects in Alberta. It will address the following points as a minimum:

1. Open/ honest/ authentic communication early in the Project development phase to involve all stakeholders to obtain alignment
2. Contracting Strategy Best Practice will be applicable and useful for Owners, Engineers and Contractors
3. Address contracting relationships between Owner, Engineer and Construction Contractor, Contractor to SubContractor, etc.
4. Scalable to various size and complexity of Projects
5. Address the assessment and allocation of Project risk through optimum selection of Contracting Strategy and compensation models, including the need to address risk assessment and allocation to Parties
6. Selection considerations for the development of Contracting Strategy
7. Selection considerations for the compensation model appropriate for Contracting Strategy, scope of work and Project conditions
8. Include Owner capability self-assessment
9. Need to incorporate potential recycle of Contracting Strategy development based on supply market conditions and capacity, and/or change in conditions during Project execution
10. Link of Contracting Strategy to business and Project objectives
11. Need for early planning, avoid last minute rush negotiations
12. Contract strategy needs to look at life cycle of the Project
13. Impact of Owner management of scope of work / Contractor interfaces
14. Appropriate legal terms for the scope and work conditions
15. Aligned and supporting Project labor strategy
16. External Project constraints

The committee will not develop a set of detailed Contracting Strategy development algorithms / selection criteria.

APPENDIX B
Contract Types – Comparison Tables

Example 1 – EPC & Lump Sum – This form of contracting is not commonly done in Alberta on large industrial Projects unless for small silos within a Project with a well-defined scope. Key Drivers to choose this Contracting Strategy – well defined scope / price predictability for Contractor's input costs / Project is not schedule driven / availability of resources /low technical complexity / Owner comfort with and capability to handle a limited involvement in carrying out Services.

Roles	Risks allocated to the Owner	Risks allocated to the Contractor	Compensation and Variants	Performance summary
Owner engages engineer and prepares the Project brief, schematic design, developed design and contract documentation. Usually competitively tendered or where market conditions allow a negotiated firm price (usually where specific technology/ expertise involved). Contractor carries out the detailed Engineering, Procurement and construction either on its own or with Sub-Contractors JV partners Consortium partners Alliance Partners Relationship between Parties is potentially adversarial. With typically mentality is 'your gain is my loss'	That the basic design meets the Project brief. Owner should diligently ensure that the design can be built within the budget. Tenders should be called after EDS design is complete as without sufficient scope definition the Contractor (and their SubContractors) may include a prohibitive premium to the overall lump sum thus exceeding Owner budget. That the contract documentation reflects the design (unless design endorsement required) and that the contract documentation is complete, unambiguous, accurate and suitable for the purpose of the execution of the Project through E, P and C. The final cost to Owner is highly dependent upon the quality of the contract documentation prepared by the Owner and the impact of variations leading to additional cost / delayed completion.	Generally, the risk rests with the Contractor for cost and schedule overruns, quality issues requiring rework and availability of resources at the tendered cost for the duration and various stages of the work. Quality - Materials and workmanship are in accordance with the contract documentation. Schedule - Completion of the execution of the phases if the work will be within the allocated time. Cost - That the cost of execution will be within the adjusted contract sum. Interfaces - interface risk between the phases must be effectively managed without cost or schedule impact.	The accepted lump sum becomes the contract sum, subject to adjustment for variations to the contract documents and claims. A Contractor may be required to offer an "all-in" schedule of rates in lieu of a lump sum. Where the quantities are "known" this effectively becomes a Lump Sum. Convertible Lump Sum – is a compensation framework that initially makes available to Owner a reimbursable compensation contract until the Engineering is at a stage where the Contractor can reasonably ascertain its forecast cost to complete the Project and take the risk on future potential changes and thus offer a lump sum without including a prohibitively large risk factor.	This type of contract is predominantly used for Projects where there is a high degree of certainty about Project scope and requirements. Success is highly dependent upon the adequacy, completeness and accuracy of the contract documentation. Will normally deliver the lowest initial contract sum following tender call, but not necessarily the lowest final cost. Not well suited to fast tracking the Project. Not well suited when there is new technology or high technical risk unless Contractor is a specialist in the field. Not well suited where there is a lack of availability of resources or experience in managing such types of contract – from both an Owner and Contractor standpoint.

Tender process, cost and payments	Scope	Design/quality	Time	Generic contracts & Administration
Lump Sum competitive tendering can be an expensive process for Contractors to ensure all the risks have been adequately priced. Gaps in back to back lump sums for its sub-Contractors will require qualifications or risk premium to be added. The accepted lump sum becomes the contract sum, subject to adjustment for variations and claims. Contractor is paid on a regular basis for work completed, up to the value of the adjusted contract sum.	Scope is precisely specified in the contract documents. Scope can be varied, but not beyond the original intent of the contract documents. Any variations will normally give rise to a contract sum adjustment and extension of time through a change order.	Quality of materials and workmanship is fully specified in the contract documentation. Choice of SubContractor/ vendors rests with Contractor (usually with Owner approval) and quality/ performance based on Contractors pre-qualification system. Depending on thoroughness of design when work is tendered, the Contractor may have limited input into the design & 'constructability' of the Project. Warranty period of 12 months or more – Project dependant. May be extended to provide Commissioning /Operations start-up support.	Design and documentation must be completed before construction can commence, making it potentially the longest duration Procurement strategy available. Most delays will give rise to claims for extensions of time for the completion of construction.	Difficult to control time and cost outcomes where contract documentation is inadequate, or variations are needed. Claims are common. Owners usually provide their own in-house contracts. Contract administration is complex and may involve a large amount of change management.

Example 2. – Engineering - in Alberta, Engineering is usually done on a reimbursable basis to allow flexibility to the Owner for changes in design. The Contractor may be reimbursed at pre-agreed fixed unit rates or on an open book basis where the base costs (man hours) are fully auditable with overheads and profit levels being pre-agreed and often fixed. The engineer's scope may also include for Procurement services (often as Owner's agent).

Roles	Risks allocated to the Owner	Risks allocated to the Contractor	Variants	Performance summary
Owner engages engineers to prepare the Project brief, schematic design, developed design and contract documentation as the basis for letting future EPC work. This engineer carries out the Engineering design (usually with cost estimate). FEL1 – Feasibility / studies FEL 2 – Conceptual / DBM FEL3 – Basic Design / EDS Detailed Design - Relationship between Parties often is collaborative Requires trust and openness working towards the same goals and deadlines.	That the design meets the Project brief and that the contract documentation is complete, unambiguous, accurate and reflects the design allowing a smooth and successful continuation from Engineering into Procurement, fabrication, construction and commissioning. Owner is responsible for ensuring that the design can be built within the budget. All interface risk between design, Procurement and construction rests with the Owner, including; Quantity growth and its impact on Construction Engineering delay and its impact on construction sequencing and efficiency Overall Facility performance / efficiency	Little financial risk remains with the Contractor under a reimbursable contract. Sourcing suitable experienced resources can be an issue and can impact Contractor where schedule has been prioritized and a penalty is associated. Where Engineering is priced on fixed unit rates the risk of escalation in an overheated market rests with Contractor. Ownership of innovative designs invariably transfers to the Owner unless specifically captured in the Contract.	For well defined scopes Contractors may offer Engineering services on a lump sum basis. (confirm) Often Contractors are asked to undertake the Procurement services as an agent for Owner for long lead items that, if ordered, should maintain the overall schedule. When performing Procurement services as agent, Contractor will provide an evaluation of the vendors and make a recommendation – the decision, the underlying vendor contract and risk however rests with the Owner. Performance targets may be introduced to provide some incentive for the Contractor to meet key Owner / Project goals and provide the Owner some comfort of alignment.	Success depends on how well the Parties understand and are aligned in addressing the Project's objectives. Such understanding and alignment should minimize the development of multiple design solutions after initial design stages It can be difficult to control time and cost outcomes if there are many scope changes due to poor initial definition and lack of good quality resources. Reimbursable Engineering work is predominantly used for early phases of Projects where there is a fluctuating degree of certainty about Project requirements. There should be no excuse for a poorly defined detailed design scope where the earlier phases were executed on a reimbursable basis. However, this form is commonly used on detailed design that will undergo ongoing Project changes. Where Contractors act as agent for Procurement services (see Example #3) the added value is that of management only, there is usually no recourse for vendor non-performance (quality / delay / performance) unless, for example, the Contractor's recommendation of a particular vendor was evidence of sub-standard service.

Tender process, cost and payments	Scope	Design/quality	Time	Generic contracts & Administration
Tenders may be called at any stage of the design process. Competitive bid (or single sourced for specific technology). Tenders will be evaluated on price criteria / Estimated manhours / Key Personnel / Internal control systems /Technical experience / Expertise. Estimated price offered by tenderers based on cost plus basis / multiplier or average unit rates and their estimate of the manhours required. Contractor (engineer) is reimbursed for the manhours expended. Engineer's Final cost is dependent on the productivity/quality of the Engineer/Contractor personnel.	Scope is generally outlined in the contract documents with deliverables including; PFD's, Plot plans, Estimates, Specifications etc. Scope can be varied. Variations will normally give rise to an estimated contract sum adjustment and extension of time.	This promotes Engineering innovation, but initial quality can be compromised if reimbursement for rework and corrections during the design development. Warranty period of a minimum of x months (from Mechanical Completion or longer period from the delivery of Construction Work packages) (depending on nature of Project. Contractors often undertake unlimited rework (redesign) and may accept direct financial consequences of errors in their design work if it affects the construction (including ripe and tear) - but this liability is usually capped in both time and value.	Design and documentation should be completed before construction commences. If the Engineering and construction work package delivery by the Engineering Contractor is late, un-sequenced or incomplete then the potential financial effect on the construction performance can be incommensurable.	Contract administration is not overly complex. Claims are not common. Owners and Major Contractors usually have their own forms. FIDIC

Example 3. – Engineering and Procurement (and sometimes Fabrication - neither as Agent) on a Reimbursable or Lump Sum Basis

Roles	Risks allocated to the Owner	Risks allocated to the Contractor	Variants	Performance summary
Owner engages engineers/ consultants and prepares the Project brief, schematic design, developed design and contract documentation. Contractor carries out the Engineering design (usually after completion of DBM and/or EDS) and continues to commit to the Procurement of equipment and materials. Relationship between Parties will depend on the compensation method applied - usually collaborative at this stage. Requires trust and openness working towards the same goals/clear design/operational objectives.	That the design meets the Project brief and the associated contract documentation reflects the design and the schedule objectives. That the contract documentation is complete, unambiguous, accurate and suitable for the purpose of construction. Where a Lump Sum is accepted: Those changes are minimized / managed and that the quality conforms to expectations - this can be achieved by ensuring that reputable vendors (from Owner pre-approved vendor list) are utilized thus mitigating quality / performance issues. `Where a Reimbursable variant is used: Productivity and focus on end deliverable may be an issue where no penalty involved.	That the Engineering is in accordance with the contract documentation. The associated documents and equipment are delivered in a timely manner. That the procured or fabricated items conform to the contract in terms of quality and performance and are delivered on time and within the cost tendered. Residual risk remains if early commitments made for procured and fabricated items prior to a fully developed design and changes that cannot be directed to Owner (when on lump sum basis).	Assignment of early/long lead Procurement packages from Owner to Contractor for a mark-up / fee. Early involvement of the Owner Preferred Constructor can capture potential construction issues whilst still in design phase and prior to arriving on site. Interface issues between Contractor for E&P and Constructor for F+C can be managed through proactive interface management and ensuring the EP Contractor has significant incentive / key performance indicators (KPI's) manhours / schedule / quantities growth / average manhour cost / quality / safety / personnel turnover / timely & complete delivery of documentation and equipment. Compensation alternatives Lump sum Reimbursable with fixed fee Target Price Incentivized (KPI's) where profit risked	If Lump Sum Owner should include rights to allow review of the vendor choices made by the Contractor to ensure compatibility with Owner requirement. Lump sum would be used predominantly used for Projects where there is a high degree of certainty about Project requirements / equipment lists etc. Success is highly dependent upon the adequacy, completeness and accuracy of the contract documentation. Difficult to control time and cost outcomes where contract documentation is inadequate or variations are needed. Claims are common where Owner and Contractor goals are not aligned or where Owner does not have the experience to manage a lump sum contract. Will normally deliver the lowest initial contract sum following tender call, but not necessarily the lowest final cost. Risk of significant knock on cost during construction with limited recourse to E&P Contractor.

Tender process, cost and payments	Scope	Design/quality	Time	Generic contracts / Administration
Tenders called at any stage in design cycle. Price offered by tenderer may be based on cost plus basis / multiplier or average unit rates or lump sum. Competitive or can be single sourced for specific technology knowledge. Evaluated on Price Criteria /Estimated Manhours / Key Personnel / Internal Control Systems / Global Procurement strategy If Lump sum offered the accepted lump sum becomes the contract price, subject to adjustment for variations to the contract documents and claims. Final cost is highly dependent upon the quality of the contract documentation prepared by the Owner.	Scope is generally specified in the contract documents and usually relates to input/output expectations and a list of deliverables. Scope can be varied, but any variations will normally give rise to a contract sum adjustment and extension of time.	Quality of materials / workmanship should be fully specified in the contract documentation. Depending on the compensation method, Owner may have limited capacity to have input into the design or 'buildability' of the Project and is reliant on Contractor. Warranty period of usually 12-24 months (from delivery of Construction Work packages/ Equipment delivery). Contractors usually undertake unlimited rework (redesign) and may accept direct effect of errors in their design affecting the equipment / construction (including ripe and tear) if accepted this liability is often capped in value. Warranty offered for procured items/ modules may be limited to the flow through warranty received from vendors or capped.	The interface between the Contractor and the constructor can give rise to extensions of time for the resolution of constructability issues / timely delivery of equipment and construction work packages. Not well suited to fast tracking the Project. If Lump sum (or equipment packages assigned early Contractor) will endeavor to mitigate risk by having Engineering suitably complete before committing fully to vendors thus potentially extending the schedule. If Engineering / Procurement services are performed well though a suitable Procurement strategy, the timely delivery of work packages can greatly assist the productivity on site and the efficient sequencing of the construction work.	Contract administration can be complex where Lump sum is chosen and if there are numerous design changes after award. Less complex for reimbursable but schedule delay potential. FIDIC

Example 4 – Construction - Lump Sum/fixed price (incl. Owner free issued materials)

Roles	Risks Allocated to the Owner	Risks allocated to the Contractor	Variants	Performance summary
Owner has engaged engineers with whom it prepares detailed Project brief (to define scope, quality and functionality requirements) and may complete part of the design. Construction Contractor utilizes the design to develop the construction documentation, methodology and schedule and executes the construction. Relationship between Parties Potentially adversarial. 'Zero sum' mentality (i.e. 'your gain is my loss').	Owner is responsible for ensuring that the requirements of the Project brief can be met within the budget. That the Project brief adequately describes the Project requirements and that the contract documentation is complete and clear for construction. That any materials and equipment provided by Owner are delivered in a timely manner in meet the quality and quantity required for construction. Gaps potentially become Owner risks and they will likely trigger Change order procedures. Cost prior to tender -	That the construction meets the Project brief and that the materials (provided by Contractor) and workmanship are in accordance with the construction documentation. Owner may "free issue" long lead material and equipment to Contractor after award for a risk premium whereby Contractor absorbs any residual risk of costs, quality and delivery. That completion of construction will occur within the allocated time and that the cost of construction will be within the adjusted contract sum.	The Owner may complete the design, such that the Contractor is only required to document and construct the Project. The Owner's engineer/consultants may be nominated to the Contractor with the expectation that the Contractor would engage them directly for Engineering support throughout the construction phase. There may be some benefit in making the Contractor responsible for maintenance of the Project facility as an incentive for the Contractor to be proactive in achieving a low-maintenance outcome during the design and construction of the Project.	Predominantly used for Projects where there is a high degree of certainty about Project requirements. Quality outcomes are dependent upon the adequacy of the Project brief and how it is (or can be) interpreted; therefore, high quality is often difficult to control in a Lump Sum environment. Lump sum construction is preferable when cost outcomes outweigh the need for quality and schedule adherence. Claims are common, particularly concerning quality / timeliness of Owner (or Engineering deliverables) / material deliveries for Owner supplied items.

Tender process, cost and payments	Scope	Design/quality	Time	Administration Generic contracts
Design should be relatively advanced prior to starting a tender process. It is costly for construction tenderers to offer Lump Sum prices on a competitive basis. The make significant effort and accept risk to ensure the scope is fully covered in the price and remains competitive. The accepted Lump Sum becomes the contract sum, subject to adjustment for variations to the Project brief and claims. Final cost is dependent upon the adequacy of the Project brief (i.e. if the brief does not adequately define the requirements of the Project, it is likely there will be cost and schedule variation).	Project brief defines the scope of the Project, typically by specifying functional and performance requirements. Scope can be varied, but not beyond the original intent of the Project brief, and any variations will normally give rise to a contract sum adjustment and/or extension of time.	Project brief defines the quality of the Project, typically by specifying performance requirements. Contractor has significant ability to influence the design and 'buildability' of the Project. Warranty Period is typically 12 months depending on the Project.	Design and documentation should be well advanced (such that Constructor has been able to offer a fixed price). Procurement activities for long lead items should be well advanced. Few opportunities for extensions of time. (Note: variations to the Project brief will normally give rise to extensions of time).	CCDC (intended for non-industrial (i.e. Commercial or residential Projects). COAA Stipulated Price. Owner will appoint a Construction Manager (CM)to act honestly and fairly in administering the contract or self administer Owner often utilizes its Engineering firm to act as Owner's CM ensure compliance with the Project brief and will therefore often extend Engineering contracts to carry out CM work. Contract administration can become complex if brief is not of adequate quality. If Owner does not have appropriate resources for executing the CM work utilizing the Engineering agreement is often an alternative solution.

Example 5 –The EPCM model – In an EPCM arrangement, the Owner, in order to involve an experienced player in large Projects, selects an EPCM Contractor who manages the whole Project on behalf of the Owner. The EPCM Contractor essentially ensures that the whole Project is completed as required and in time. An EPCM contract allows the Owner to be more involved in the design process. When an EPCM contract is entered into, the definition of the scope may be low though generally understood as the Engineering has not yet been performed; yet the Owner is committing to construction / low scope definition means that a Project can be kicked-off earlier than waiting for scope to be developed and defined. However, it also means that the Parties need to be prepared for scope refinement, development and growth.

Description	Risks allocated to the Owner	Risks allocated to the EPCM Contractor	Variants	Performance summary
The Owner initially engages engineer /consultants to prepare the Project brief, which includes budget estimate and estimated completion time. The EPCM Contractor works collaboratively with the Owner to revise the Project brief and refine the design to meet budget and time constraints. The EPCM Contractor then completes design and construction documentation, calls tenders for and lets subcontract trade packages (usually on behalf of the Owner) and manages construction. Relationship based (rather than adversarial); objectives are aligned to encourage win/win solutions. Parties must act in collaboratively to realize efficiencies in this model.	That the Project brief adequately describes the Project requirements. Trade Packages are contracted by EPCM Contractor as agent for Owner; Owner takes on commercial /legal risks in accordance with the form of trade contracts used. Issues between the Construction Contractor and the EPCM Contractor depending on how the responsibilities flow between them and the Owner; risk of gaps in responsibility and financial accountability. Risks incurred by the EPCM Contractor flow to Owner; EPCM Contractor acting as Owner's agent requires high degree of trust in addition to risk sharing mechanisms.	That the scope contained in the revised Project brief can be built within the offered, and within the time offered. That the design meets the revised Project brief and is suitable for its purpose. That the construction documentation meets the final design and is suitable for the purpose of construction. That materials and workmanship are in accordance with the construction documentation. That completion of construction occurs within the allocated time. Knock-on effects of design / CWP issues on construction and recourse to the EPCM Contractor are an issue which will need addressed.	The EPCM Contract is usually structured to provide for compensation on a cost- reimbursable, plus a fee, basis. However, may also include an incentive component (whether positive or negative), i.e. an under or overrun of the actual construction cost versus the estimated or targeted cost. In general, the intent of the payment terms is to motivate the EPCM Contractor to be rewarded for superior performance through fair risk and compensation provisions. As this strategy features a high degree of flexibility, contracts can be tailored to suit individual Project needs.	Used for major or complex Projects. Can be effective where there is some degree of uncertainty about Project requirements. Provides for early Contractor involvement. Incorporates many of the principles and benefits of alliance contracting on more typical commercial terms. The Owner needs to be realistic as to what involvement to have and what resources are available to provide effective and timely input to the design process. This requires enhanced communication between the Owner and the EPCM Contractor as opposed to other types of Project delivery methods. It may also require a more significant Owner team to be available and engaged, especially in regard of construction. .

Tender process, cost and payments	Scope	Design/quality	Time	Administration Generic contracts
The EPCM Contractor may be single sourced or selected on RFP basis. Competitive tenders for trade packages, to be overseen by EPCM Contractor on behalf of Owner, for construction. May be a 'Single-stage' option or a split option with the construction management "CM" as an option to be determined upon the performance of the earlier phases. Cost and payments may be structured in a variety of ways depending on the EPCM Contractor's appetite for risk.	During the early design stage, design/quality is defined in Project brief prepared by Owner; during the later stages, it is defined in revised Project brief prepared by EPCM Contractor collaboratively with the Owner and vendors.	The EPCM Contractor has significant ability to influence design and 'buildability' of the Project. . The warranty relative to EPCM services commences at the start of the services and concludes at a specified time frame following Construction completion. With regard to the actual construction work, the Owner relies on the warranty flowing from the Works Contractors.	The EPCM Contractor engaged at earliest stages of design. Design must be largely completed before final documentation and construction can commence. Note that variations to the Project brief may give rise to extensions of time.	Relatively complex to administer. EPCM Contractor's obligations are not as distinct as they would be under an EPC relationship. The Parties should expect Owner to exercise greater authority over EPCM's non-Engineering work. This complicates the contract administration.

Example 6. – EPC Alliance, Collaboration or Contractor Consortium – Contractor(s) carries out the detailed Engineering, Procurement and construction either on its own or with Sub-Contractors / JV partners / Consortium partners / Alliance Partners. The Alliance or Consortium is formed between key Project participants who are responsible for all aspects of the delivery of the Project. Consortium or Contractor Alliances can effectively address the risks of interface issues between the E&P Contractor and the Construction Contractor but needs a high level of trust between the two or more Contractors and a "hands off" Owner to truly achieve success. An alternative is that the Alliance includes the Owner and that full transparency between the Parties and a "best for Project" approach prevails.

Roles	Risks allocated to the Owner	Risks allocated to the Contractor	Variants	Performance summary
Owner initially engages engineer and prepares the Project brief, schematic design, developed design and contract documentation. Contractors specializing in various fields may "form" a consortium or JV as part of the Contractor Party to the Alliance. Relationship must be collaborative for the Alliance to be effective. There is a policy of 'no blame, no disputes' between the Alliance partners. However, the relationship between Parties can remain potentially adversarial but can be mitigated by the openness of an Alliance and/or a "Risk Pot" that is used to compensate for growth / unforeseen risk. The typical mentality is still to protect ones' own interests.	Cost overruns are borne by the Owner after the Alliance cap has been breached. That the design meets the Project brief and that the contract documentation reflects the design. That the contract documentation is complete, unambiguous, accurate and suitable for the purpose of the execution of the Project through E, P and C. The Owner's costs cannot be capped even if Project costs exceed expectations, but the overruns can be either borne by the Contractor or shared with the Contractor up to the Contractors agreed maximum cap.	That the materials and workmanship are in accordance with the contract documentation. That completion of the execution of the E, P and C phases will be within the allocated time and within the target price. That the cost of execution will be within the Target Price and structured so that commercial risk and reward is shared such that it is in the Alliance partners interests to work co-operatively.	Additional monetary incentives may be applied for performance relative to KPIs (Key Performance Indicators) determined by the alliance at the outset which can add/detract from overall profitability. Target price mechanisms vary considerably dependant on the Parties risk tolerance.	Predominantly used for mega Projects where no one Contractor has the skill or resources to execute the whole Project and where the Owner desires a seamless execution in terms of responsibility and team and where it is difficult to transfer risk appropriately between the Parties. Success is highly dependent upon the attitudes and abilities of the Alliance partners to manage the Project as a team and the clarity of the scope split and battery limits between Contractors. An alignment of common goals on a 'best for Project' basis is usually best served by an achievable incentive. Requires large team to manage the Alliance and interfaces, not well suited where there is a lack of resource availability or experience in managing Alliance contracts – from both an Owner & Contractor standpoint.

Tender process, cost and payments	Scope	Design/quality	Time	Generic contracts Administration
Tenders called from single Alliance consortia or via a competitive bid. Often short-listed Contractor alliances develop concept designs and target costs for the Project before a final selection is made. Often evaluated on non-price criteria through workshops and interviews. The process of establishing the Alliance can be costly in terms of time, effort and cost. Costs are often 100% reimbursable with Owner paying all direct costs of the Project or agreed unit rates (including Alliance partners' actual costs, profit and overheads), up to agreed target costs, after which the profit and overheads of all Alliance partners are also often used to cover costs on a pre-agreed basis. The Target Costs typically include substantial contingency or a "Risk Pot".	Scope is precisely specified in the contract documents. Scope can be varied, but usually is on the basis of a whole Project or a significantly sized silo to make the effort of entering such an agreement worthwhile.	Design/quality is defined in the Project brief; however, input is possible from the Owner, Contractor and a range of other experts, to give design and 'buildability' advice and balance quality against cost and time. KPIs (Key Performance Indicators) may be used to encourage excellent quality. Warranty period applies to trade contracts, for durations as deemed appropriate.	The process of establishing the alliance can be lengthy. Well suited to fast tracking the Project if an integrated schedule or where the Project is not fully defined or variations are needed if the "best for Project" mentality is adhered to. Owner delays will still give rise to extensions of time for the completion of construction but knock on effects Contractors in a Consortium should be absorbed between them. For true alliances there is usually a nonblame or recourse for delays.	Contract needs to be written specifically for the type of alliance chosen. Parties should appoint a steering committee to act honestly and fairly in administering the contract. Facilitator needed for workshops and cost consultants/ auditors needed to validate target costs. Contract administration is potentially very complex, specifically when overruns to the Target Price occur.

APPENDIX C Project Risk Register

TECOP = Technical/Operational, Economic, Commercial, Organizational, Political - Risk Classification System

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
(T)ECOP = Technical and Operational	Technology	Maturity and Uniqueness (e.g. exotic material) of tech, Level of Innovation: reliability of new tech. Intellectual Property License and Ownership e.g. level need for support from supplier of technology Ownership of documents - native & hard						
	Construction	Information Security and Cyber Security						
	Design Basis (as a phase)	Completeness of Design Basis Memorandum Quality of FEED (Front-end Engineering/Design) Future expansion philosophy See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Design Basis See also: Operations Risk Class as it may apply to Design Basis						
	Engineering (as a phase)	Timeliness of IFC Drawings Quality of Engineering deliverables Exposure to design changes Clear / concise Owner Specifications Standardization Modularization Plan Poor or failed handover to fabricators, constructor Ability to provide estimate of correct quality / sufficiency See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Engineering Phase See also: Operations Risk Class as it may apply to Engineering Phase						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
(T)ECOP = Technical and Operational	Fabrication (as a phase)	Quality of Fabrication deliverables Plan for components and bulks that arrive earlier than expected Heavy Lift requirements Potential for Congested Yard Strategy of material overages See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Fabrication Basis See also: Operational Risk Class as it may apply to Fabrication Phase						
	Construction (as a phase)	Quality of EWP: Engineering Work Package and CWP: Construction Work Package Sequential Delivery Constraints QA and inspection Drilling / Construction Interfaces Schedule delay mitigation						
	Pre-commissioning / Commissioning (as a phase)	See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Construction See also: Operational Risk Class as it may apply to the Construction Phase Lack of Handover procedure clarity Critical Tie-ins Lack of Operations input						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
(T)ECOP = Technical and Operational	Operations and Maintenance (as a phase)	See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Commissioning See also: Operational Risk Class as it may apply to the Commissioning Phase						
		Start up philosophy and schedule Shut down frequency						
		Availability and quality of site operators Lack of good Operator training						
		See also: Organizational>Project Management; Supply Chain; Capability Risk Classes as they may apply to Ops/Maintenance						
	Operational (applicable to all aspects of Project)	See also: Operational Risk Class as it may apply to Ops/Maintenance						
		Geology						
		Weather Conditions, Snow clearing Ground conditions						
		Power, Water, Pipeline and other Utility Availability						
		Road access /use agreements constraints Work site gate control						
		Fly in / Fly out strategy & availability Transportation Strategy, Route restrictions						
		Union issues						
		Heavy Lift requirements						
		Site Access facilities / Logistics/staging						
		On site storage conditions / availability						
		Potential for Congested Site						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
T(E)COP = Economic	Availability of Capital	Level of Investment (equity, debt)						
	Taxation	Complexity of royalty regime Exposure to the increases in royalty rates Market price of upstream products						
	Global Market for Output Price	Market Pricing of Commodities - (e.g. steel, concrete, etc.) exposure to fluctuation and escalation Foreign Exchange Rate fluctuation exposure						
	Global Input Prices	Transportation market conditions - and related cost exposure Permits, Customs Regulations						
	Export/Import	Strength of local manpower (expertise/capacity/availability) at Fabrication, Construction Contractors; Local Stakeholders						
	Local Market Conditions							

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
TE(C)OP = Commercial	Access to Funding Insurance Profit Potential	Availability/Sanction Operational Funding from a Budget Liquidity/Cash flow for Project Financial Capability Lack of coverage, uninsurable risk, cost of self-insurance; COC & wrap up P & L sharing rules, in particular with JV's Marketing strategy definition / implementation Long-term commitment Project Economics / confidence Free-issued material/controls Material Take Off (MTO) growth and Ownership/responsibility Claims and management Liquidated Damages, Performance Guarantees						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
TEC(O)P = Organizational	Supply Chain Procurement	Procurement Strategy, impacted by Global Market situation, Local Market Situation Effectiveness of the Pre-qualification process, Quality of Vendors in the Agreed Master Vendor List Quality and Availability of Engineering, Fabricators, Contractors Local fabricator availability/capacity vs. preferred fabricators of Owners Local Content Requirements (First Nations Roles) EP Support/Reporting Assignment of long lead PO's / bulks						
	Logistics	Transportation control Transportation market situation, and limitation Transportation availability and limitations Transport strategy, including rail and pipeline Customs Clearance						
	Inventory/Warehouse	Spare Parts Philosophy Availability of Spare Parts and consumables Inventory / Warehouse Strategy						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
TEC(O)P = Organizational	Project Management	Too Numerous Scope interfaces Overall coordination and interface mgt., scope split clarity / clarity on role and responsibility Interfaces between multiple Engineering Contractors Interfaces between drilling / construction Interfaces Split of work, interfaces with JV/Business partner; Internal Alignment on Execution approach with JV/Business partner Multiple operating centers On site Communications protocol Lack of clarity and communication about objectives Change Management in response to exposure to design changes Lack of Documentation - Final and poor or failed handover to constructor, fabricators (proposed move from Engineering) Approvals, Authorization process / timing, in particular in the case of JV's						
	Capability/Availability (Internal/External)	Executive support/sponsorship Strength of Owner team: Quality/Availability/Expertise/Capability of Owner in-house resources Strength of Construction Management Team Retention of key personnel at Design and Engineering houses Strength of local manpower (expertise/capacity/availability) at Fabrication, Construction Contractors Availability and quality of site operators Rotational constraints						

Level 1 - TECOP Model	Level 2 - TECOP Model SubClass	Areas and Examples of TECOP Model Level 3 Risks	A – Estimated Impact of an Event	B – Probability or Likelihood of Event	Estimated (Value at Risk) = A x B	Proposed Action (e.g. Accept, Avoid, Mitigate, Transfer)	Risk Owner	Action Due date
TECO(P) = Political	Regulatory / Government Permitting	Local permitting requirements Permit to work / Hazop						
	HSE - Health	Camp conditions						
		Wet / dry Camp						
		Random testing protocol						
		Status of Medical Facilities						
	HSE - Safety	Exposure to illness / substance abuse						
		Clear Owner safety requirements / Level of buy-in						
		Comprehensive Contractor safety requirements						
		Alignment between HSE requirements and pre-qual expectations						
		Camp vs local accommodation						
		Safety of Transportation solution						
		Emergency Response Plan						
		Level of enforcement on access road						
		Use of a Random testing protocol						
	HSE - Environmental	Water management, specifically reduction in water usage						
		Stringent Environmental constraints						
		Difficulty/Challenges with waste Mgt and disposal						
		Pollution potential during Project execution						
		Pollution potential during operations						

	Stakeholder	Environmental and pollution reporting obligations "Social License" Environmental e.g. Greenhouse Gas Emissions Community Affairs Exposure to social disturbances Local Content Requirements (First Nations Roles) Local Stakeholder involvement						

APPENDIX D Workshop Agenda Template

Purpose / Instructions for Use

This template meeting agenda is to be used to guide the preparation and facilitation of Project Contracting Strategy workshop(s). It is a component of the tool box for COAA Best Practice on the Development of a Project's Contracting Strategy.

The typical agenda here is meant to be illustrative and not a complete, exhaustive list of all requirements to be addressed.

Contract Strategy Workshop Accountability: Project Manager / Director Contracting Strategy Workshop Facilitator: Project Manager of Contracts Contracting Strategy Workshop – Suggested core attendees from Project team

- Engineering
- Procurement
- Materials Management
- Logistics and Transportation
- Project Controls
- Quality Assurance
- Construction Management
- Labour Relations
- Health, Safety, Environment
- Local Community / Social Sustainability
- Commissioning and Start-up
- Operations and Maintenance

Prior to participating in this type of workshop session all attendees should have pre-read and be familiar with the Contracting Strategy Best Practices Work Process Flow Diagram (section 2.2), Contracting Strategy Key Considerations & Compensation Matrix/Selection Guide (Appendix B), and Contract Risk Review Matrix (Appendix C) documents of this Best Practice.

	Agenda Item	Agenda Item Detail	Led / facilitated by
1.	Safety Moment		Open
2.	Purpose / Objectives of Workshop	Set outcome targets for workshop to maintain focus.	Manager Contracts
3.	Project Basis – input into the Project Contracting Strategy development	Overview Project Scope Review WBS (Work Breakdown Structure) of Project Review Project and Business Objectives List any must have Business / Project Imperatives Review of Project labour strategy, union issues / First Nations environment	Project Manager/Director Labour Relations team members
4.	Review results of initial Contractor market assessment	- Contractor capabilities, capacities, willingness / interest in work, different compensation models etc.	Manager Contracts
5	Review results of Project team competency Self-assessment	- will identify any issues from Project team standpoint that can be self-performed, must be outsourced to a Contractor	Project Manager/Director
6	Develop Contracting Strategy selection criteria. Rank in importance (weighting). Also identify mandatory characteristics of Contracting Strategy selection criteria (e.g. Project scope represents less than 10 % of Contractor's capacity)	Aligned to Business / Project Objectives: e.g. if implementing a new proprietary technology / process in a Project and key objective is control / minimization of dissemination of data and information to Project participants, how well does strategy meet this requirement (could lead to minimum number of Contractors, insourcing certain activities to Project team etc.). Also, refer to COAA Contracting Strategy Best Practice Tool Box – Contracting Strategy Key Considerations & Compensation Matrix/Selection Guide Appendix B	

	Agenda Item	Agenda Item Detail	Led / facilitated by
7	Brainstorm, describe and document different contracting strategies	Different grouping of scopes (both cross Project areas/ WBS, across Project phased –DBM, DEFINE, Execute) Owner sourced / Contractor managed Project wide Contractors Also, refer to COAA Contracting Strategy Best Practice Tool Box – Contracting Strategy Map Template	Project Manager/Director Manager Contracts
8	Evaluate strategy alternatives	K-T Analysis. Ensure significant effort to obtain meaningful differentiation between alternatives	Project Manager/Director Manager Contracts
9	Agree and document recommended strategy(ies)	Identify recommended strategy(ies) and several contingency strategies; Identify strengths, weaknesses / Risks of recommended strategy(ies) Also, refer to COAA Contracting Strategy Best Practice Tool Box – Contracting Risk Criteria	Project Manager/Director
		Adjourn	
10	Meeting – Confirmation that Contractor Market can support the recommended strategy(ies)	Revisit recommended strategies, with more current, detailed Contractor market information. Confirm no show stoppers uncovered from more current Contractor market capability/capacity that do not support recommended Contracting Strategy(ies)	Project Manager/Director Manager Contracts

APPENDIX E Organization Capability Self-Assessment

Purpose

This tool is to be used by Project teams to assess their relative capability and readiness in key areas of planning and execution, in order to assist with the development of the appropriate Contracting Strategy for a Project. Specifically, this self-assessment will assist in determining which scopes of work and responsibilities should be self-performed and what scope should be contracted to a third Party.

This tool is not intended to give a definitive readiness score or answer, but to drive the right / pertinent questions for Owner companies to honestly reflect on their capability and capacity.

The detailed recommended Practice from the Construction Industry Institute is: IRR-111-3 Core Competency Tool Kit

Self Assessment Tool	
Assessment Level	**Process Descriptors**
1	Ad-Hoc – Incomplete - Undocumented
2	Documented – Improvement plans in place and being implemented
3	Documented - In place
4	Supporting IT Applications in place
5	Fully functional - Projects completed using the work processes and procedures

		Current Assessment	Level required for Selected Contracting Strategy	Action(s)
1	Organization - HR			
	Resource Planning			
	Project Organization			
	Project Roles & Responsibilities – Position Descriptions			
	Risk acceptance/avoidance profile			
	Project Management			
	Project Management			
	Cost Estimating			
	Cost Control/ Reporting			
	Planning/ Scheduling /Forecasting			
	Change Management			
	Construction Management			
	Construction Management			
	Progress and productivity measurement and reporting			
	Cost Control/ Reporting			
	Planning/ Scheduling /Forecasting			
	Change Management			
	CWP preparation			

		Current Assessment	Level required for Selected Contracting Strategy	Action(s)
	HSE			
	Safe Work rules/ regulations			
	Hazard assessment			
	Incident Investigation			
	HSE reporting			
	HSE work procedures (e.g. PPE, Working at Height, Confined space, excavations, safe lifts,			
	Contract Management			
	Contract Planning/ Reporting			
	Contract Formation			
	Post Award Administration			
	Contract Close out and Contractor evaluation			
	Contract Change Management			
	Materials Management			
	Quality Assurance			
	Information Technology			

APPENDIX F Weighting Objectives & Decision Analysis

The initial step is to determine what the Project objectives are, the next and more difficult step is to weight these as to priority. Typical objectives are Cost, Schedule, and Quality. Where a team may find itself in difficulty is in trying to find consensus on the weighting of these 3 key objectives and the inclusion and weighting of other key objectives in comparison. If everything is equal, all strategies could be adopted.

Different Contracting Strategies affect objectives to a greater or lesser extent, so it's vital that there is a real discussion about what it is the Project team wants to focus on.

A Decision Analysis can be used to score the various Strategies against those Project Objectives. The Project team score, on a basis of 1-10, how well each of the contracting Strategies will best meet the objectives of the Project. This is done to solely see what Strategy best meets the company's objectives.

ILLUSTRATIVE EXAMPLE

STRATEGY Selection Criteria		STRATEGY #1. EPC Entire Plant,		STRATEGY #2 EPC Silo 1 Separate EPC for Silo's 2 and 3		STRATEGY #3 EPC silo 1, EP silo's 2 and 3, Individual 3rd GC for silo 2 and Individual 3rd GC for silo 3		STRATEGY #4 EPC silo 1, Individually EP silo2 and 3 Owner is General Contractor for, Individual Discipline Contractors	
Key Objective	Weight	Score	w/ Score	Score	w/ Score	Score	w/ Score	Score	w/ Score
Lowest Cost.	100	5	500	6	600	8	800	6	600
Schedule	80		0		0		0		0
Quality	60								
Interface	20								
Self Performance	15								

STRATEGY Selection Criteria		STRATEGY #1. EPC Entire Plant,		STRATEGY #2 EPC Silo 1 Separate EPC for Silo's 2 and 3		STRATEGY #3 EPC silo 1, EP silo's 2 and 3, Individual 3rd GC for silo 2 and Individual 3rd GC for silo 3		STRATEGY #4 EPC silo 1, Individually EP silo2 and 3 Owner is General Contractor for, Individual Discipline Contractors	
Key Objective	Weight	Score	w/ Score	Score	w/ Score	Score	w/ Score	Score	w/ Score
Local aboriginal content									
Flexibility to change									
Total Score:									

APPENDIX G Reference List

This is a draft reference listing, of resources either reviewed in preparation of COAA Contracting Strategy Best Practice draft documents, referred to in the draft documents, or researched and found to be potentially applicable to the topic of developing contracting strategies.

It is by no means a complete, comprehensive list of the applicable references to the subject matter, only those that have been sourced by the sub committee during their work 2011- 2016.

Construction Industry Institute: Implementation Resource IR 111-3 Core Competency Tool Kit, Third Revision

Construction Industry Institute: Implementation Resource IR 165-2 Project Delivery and Contracting Strategy, Second Revision Oct 2003

EPC Contract Philosophy Document (2005) COAA Best Practices Contract

EPCM Contract Philosophy Document (2008) COAA Best Practices Contract

Identifying and Assessing Risk in Construction Contracts - An IMCA Discussion Document

IMCA General Contracting Principles

Independent Project Analysis (IPA): http://www.ipaglobal.com/

OWNERS' GUIDE TO ALTERNATE PROJECT DELIVERY SYSTEMS prepared for the 1st International Conference on Transportation Construction Management by Masucci, Maury, P.E. SVP - Hill International, Inc.

Procurement Strategy and Contract Selection - Second Edition Queensland Department of Public Works November 2008 (First published in January 2001 as Procurement Selection and Generic Contracts) ISBN 978-0-9804681-8-2 © The State of Queensland (Department of Public Works)

The Concept Research Program, NTNU, Department of Civil and Transport Engineering, ola.Laedre@ntnu.no

The Integrated Project Delivery Alliance www.ipda.ca