Staff report

DATE: November 08, 2016

FILE: 5610-03

TO: Chair and directors
Comox Valley water committee

FROM: Debra Oakman, CPA, CMA
Chief Administrative Officer

RE: Comox Valley water system - water treatment procurement recommendation

Purpose

To provide a summary of the procurement options analysis and interviews with other jurisdictions, and recommend a project delivery method for design and construction of a water treatment system for the Comox Valley water system (CVWS).

Policy analysis

In November 2007, Vancouver Island Health Authority introduced a new drinking water treatment policy aimed at ensuring consistent minimum standards for all surface water supply systems on Vancouver Island. The policy termed the "4321 policy" requires surface water supply systems to maintain the following treatment specifications:

- 4-log (99.99 per cent) removal/inactivation of viruses;
- 3-log (99.9 per cent) removal/inactivation of Giardia cysts and cryptosporidium oocysts;
- Two treatment processes, usually filtration and disinfection; and
- 1 NTU turbidity (maximum) in finished water.

The Comox Valley Regional Districts (CVRDs) permit to operate for the CVWS, updated July 16, 2015 requires the construction and commissioning of a water filtration plant and all works necessary to meet the BC Drinking Water treatment objective (microbiological) for surface water supplies in BC by September 30, 2019.

At their September 13, 2016 meeting the Comox Valley water committee passed the following motion:

THAT the Comox Valley Regional District proceed with property acquisition, permits and approvals, detailed design, and grant funding applications for the deep water lake intake and direct filtration treatment as recommended by Opus DaytonKnight in their Water Treatment Options Study – Project Definition Report dated August 12, 2016 immediately to progress the project and maximize opportunities for grant funding.

Executive summary

In the CVWS treatment project definition report presented to the water committee in September 2016, Opus DaytonKnight proposed a contracting strategy for procurement of the project. They suggested that the project could either be delivered as one project, or 'de-bundled' for procurement of the major components of work using three separate processes, which could be delivered as a combination of design-bid-build and design-build contracts for the Comox Lake (marine portion) and raw water pump station; water treatment plant (WTP); and conveyance pipelines and tie-in to the existing bulk water distribution system.

Given the size of the project and the many factors to be considered prior to selecting a project delivery model, staff initiated a procurement options analysis with Deloitte. This process included a market sounding to ascertain market interest and obtain feedback from engineering and construction firms to help guide development of the process; and a multiple criteria analysis (MCA) of three potential models: design-bid-build (DBB), design-build (DB), and design-build-finance (DBf).

The report from Deloitte attached as appendix A summarizes the procurement options analysis, which concludes that the project would best be delivered as a single DB contract because this model is likely to deliver lower capital costs, and has a significantly higher likelihood of being completed on time. Deloitte also concludes that delivery as a single contract will allow the interface risk between contractors to be transferred to a competent third party with the experience and capacity to best mitigate it.

Given that the CVRD does not have much experience with the DB model Deloitte also recommended that the CVRD consult with jurisdictions that have delivered water projects using this model prior to making a final decision on procurement. Past experience of staff and input from consultants indicated that DB projects are more complex and have the potential to deliver a lower quality and/or a less operable final product.

CVRD staff undertook research to identify jurisdictions with experience delivering water or wastewater projects via DB using industry contacts and DB associations. Initially the focus was on finding greenfield water projects but it quickly became clear that not many of these have been completed recently. Most jurisdictions already have water treatment in place, and those DB water projects undertaken in western Canada have largely been upgrades to existing plants. Looking farther afield, most DB water projects in the United States have been delivered via public private partnership with inclusion of long term operation of the infrastructure, a very different model than the one being considered for delivery of the water treatment project.

There are, however, a number of BC jurisdictions with DB experience and staff set up visits with several of these, including Chilliwack, Metro Vancouver, and Squamish. Staff with each of these jurisdictions were very helpful and the projects they highlighted crossed the full spectrum of DB experience, from completely performance based to fully prescriptive, and successes to failures. Key takeaways from the interviews include the importance of highly skilled advisors, a well written specification, and the merits of using a performance period where the bid team is responsible for operation and maintenance of the facility during the first year or complete turn of the seasons.

Each of the face to face interviews complemented the other and together provided the information needed to form a recommendation. Staff are confident that the CVRD can ensure long term operability of the WTP by engaging a highly skilled team of advisors, optimizing the level of detail of the project specification for each of the major project components, and incorporating a performance period. In addition, delivering the water treatment project as a DB will allow the project team to achieve a higher state of project 'readiness' for grant funding sooner than following a DBB process would, and the DB model is likely to deliver reduced capital costs and a shorter time to completion.

If the recommendation to deliver the water treatment project as a DB is approved, the CVRD will release a RFP for owner's engineer immediately. Working from the project definition report, the owner's engineer team will develop an indicative design and support the CVRD project manager in achieving the permits, approvals, and other investigatory work required before starting the two phase procurement process. In parallel with the above, the owner's engineer will work closely with CVRD project and operational staff to develop a detailed specification and procurement documents.

The CVRD will also release a request for proposal (RFP) for communications support over the duration of the project, with the first deliverable being a project communications plan. The owner's engineer will provide support for the communications team implementation of the communications plan

Recommendation from the chief administrative officer:
THAT the Comox Valley water system treatment project be delivered following a design build project delivery method, with further consideration given to construction financing and a performance period to ensure a high quality, operable facility.

Respectfully:

D. Oakman

Debra Oakman, CPA, CMA
Chief Administrative Officer

Background/current situation
In order to better understand the full range of water treatment options available for the CVWS, at their February 3, 2015 meeting the Comox Valley water committee passed a motion recommending that the CVRD engage an expert in the analysis and design of municipal water treatment systems to analyze the Comox Lake source water quality in order to recommend the final treatment option for the CVWS. At their September 29, 2015 meeting the Comox Valley water committee approved a motion to award the Comox Lake water treatment options study to Opus.

That study is now complete, with the results communicated to the water committee by Opus in September 2016. In addition to providing a recommended technical solution for delivering water treatment to the system Opus also provided a high level recommendation regarding procurement of the project.

Referring to it as the contract strategy, Opus proposed to 'de-bundle' the major components of work into three separate processes, which could be delivered as a combination of design-bid-build and design-build contracts:

- Contract A - Lake Intake (Marine Portion) and Raw Water PS
- Contract B – Water Treatment Plant
- Contract C – Conveyance Pipelines and Tie-In

Design-bid-build (DBB)
This is the traditional and still the most widely used project delivery model in North America. With the help of engineering consultants the CVRD would develop detailed design specifications for construction of the water treatment system components. These specifications would be tendered separately or bundled together and the lowest qualified bidder(s) would be awarded a construction contract. The contractor(s) would be responsible for building the system per the specifications, the CVRD and to a certain extent the consulting engineer would be responsible for costs accruing from errors or inefficiencies in the design. The contractor(s) would receive monthly progress payments minus a holdback (usually 10 per cent) released upon successful commissioning of the system. Financing would be through the Municipal Finance Authority (MFA).

Design-build (DB) or design-build-finance (DBf)
Under this project delivery model, the CVRD would still engage engineering consultants but they would develop a performance based specification rather than detailed design. The CVRD would then go out with a request for quotation (RFQ) and RFP process to select a bid team comprised of design engineer and construction firm. The CVRD would enter into a DB agreement with the bid team, a single entity responsible for both design and construction of the water treatment system. Combining design and construction into a single contract focuses responsibility for all construction risks to a single private sector entity. Rather than including detailed specifications developed by the owner's engineer, the DB contract contains performance based specifications and the DB contractor must decide how best to meet them. This can result in cost savings and schedule reduction due to combining two procurement processes into one and an increase in the potential and motivation for innovation by the private sector. Under a DB payment is made at specific design and construction milestones and under a DBf payment is not made until successful commissioning of the system ('little' f for construction financing, rather than 'big' F which represents financing over the life of an operations agreement – not being considered here). After commissioning, financing of the project would be through the MFA.

Procurement options analysis
Given the size of the project and the many factors to be considered prior to selecting a project delivery model, staff initiated a procurement options analysis with Deloitte. This process included a market sounding to ascertain market interest and obtain feedback from engineering and construction firms to help guide development of the process; and a MCA of three potential models: DBB, DB, and DBf. The study process included two workshops with CVRD staff, including a full day MCA workshop where the three models were compared on a range of technical, cost, schedule, and other criteria, and a sensitivity analysis was completed to ensure that the outcome was not reliant on scoring for any one or two criteria alone.

The report from Deloitte attached as appendix A summarizes the procurement options analysis, which concludes that the project would best be delivered as a single DB contract because this model is likely to deliver lower capital costs, and has a significantly higher likelihood of being completed on time. Deloitte also concludes that delivery as a single contract will allow the interface risk between contractors to be transferred to a competent third party with the experience and capacity to best mitigate it.

Given that the CVRD does not have much experience with the DB model Deloitte also recommended that the CVRD consult with jurisdictions that have delivered water projects using this model prior to making a final decision on procurement.

Interviews with other jurisdictions
As explained above, the DB model is recognized for its ability to deliver projects on time and budget at reduced risk to the public sector. However, past experience of staff and input from consultants indicated two potential concerns with the model:

- Complexity: DB procurement is more complex, requires highly paid experts in the field, and could at least initially tax internal resources given that we have not developed internal expertise with the model
- Operability/quality: how to ensure long term operability/quality of the water treatment plant when so much of the design is left to the DB team who are focused on reducing cost through innovation and efficiencies?

CVRD staff undertook research to identify jurisdictions with experience delivering water or wastewater projects via DB using industry contacts and DB associations. Initially the focus was on finding greenfield water projects but it quickly became clear that not many of these existed. Most jurisdictions already have water treatment in place, and those DB water projects undertaken in western Canada have largely been upgrades to existing plants. Looking farther afield, most DB water projects in the United States have been delivered via public private partnership with inclusion of long term operation of the infrastructure, significantly increasing complexity and essentially eliminating the risk of the facility being built with low operability.

There are, however, a number of BC jurisdictions with DB experience and staff set up visits with several of these, including Chilliwack, Metro Vancouver, and Squamish.

City of Chilliwack
Three senior engineering staff from Chilliwack took the time to meet with CVRD staff and provided a wealth of information and template documents developed since they began delivering projects via DB in the mid-nineties. Chilliwack had been experiencing significant cost overruns on projects, a lack of innovation in the designs being developed, and regular disputes between the owner, contractor, and consultant triangle inherent to the DBB model. Chilliwack has employed DB as their preferred project delivery model since then because it encourages a team approach, allows for a greater level of innovation with the contractor and designer working together, and provides 'single source responsibility' – i.e. resolves the dispute 'triangle' mentioned above. Since 1995 Chilliwack has delivered approximately 89 projects via DB worth just under $158 M.

Metro Vancouver
Metro Vancouver's project manager for the Lions Gate Secondary wastewater treatment plant project met with CVRD staff and provided a detailed overview of the history and current status of the $700 M project. Construction of the facility is being procured by DBf. Metro Vancouver has chosen to include construction financing for the project to provide additional assurance that the project will be completed on time and to the specified levels of performance.

Squamish
The City of Squamish has not undertaken many DB procurement processes. The most significant one was completed several years ago and the current project manager offered to meet with us to go over some of the lessons learned from that project. Their experience highlighted that a DB process cannot be managed like a traditional DBB; a highly skilled owner's engineer must be engaged from start to finish to write and ensure compliance with a good project specification.

The highlighted projects crossed the full spectrum of DB experience, from completely performance based to fully prescriptive and in between. Key takeaways from the interviews include:

- A key success factor for DB processes is having highly skilled technical, legal, and (for large projects especially) financial advisors
- A good specification, with the optimal level of detail, is crucial to the success of the project.
- Capital cost savings from the DB model are maximized with a light/non-prescriptive performance specification that allows for maximum innovation
- A more prescriptive specification will reduce innovation and potential cost savings but will not compromise the other benefits of a DB: risk transfer, cost and schedule certainty
- The DB model is optimized by addition of a 'performance period' immediately after commissioning, where the bid team is responsible for operation and maintenance of the facility during the first year or complete turn of the seasons.
- A performance period provides additional incentive for the bid team to deliver an 'operable' facility; transfers the somewhat difficult and onerous first year of operation to another entity; and can incorporate training requirements that will ensure CVRD staff are ready to take over the facility

Each of the face to face interviews complemented the other and together provided the information needed to form a recommendation.

- The CVRD can ensure long term operability of the WTP by working with an owner's engineer to develop a detailed specification for this component of the project
- Incorporating a performance period will further ensure long term operability of the WTP
- The specification for the other major project components can be a lot less prescriptive because the same concerns for operability to not apply, thereby increasing the innovation potential
- Delivering the water treatment project as a DB will allow the project team to achieve a higher state of project 'readiness' for grant funding sooner than following a DBB process would
- The DB model is likely to deliver reduced capital costs and a shorter time to completion

If the recommendation to deliver the water treatment project as a DB is approved, the CVRD will release a RFP for owner's engineer immediately. Working from the project definition report, the owner's engineer team will develop an indicative design and support the CVRD project manager in achieving the permits, approvals, and other investigatory work required before starting the two phase procurement process. In parallel with the above, the owner's engineer will work closely with CVRD project and operational staff to develop a detailed specification and procurement documents.

The CVRD will also release a RFP for communications support over the duration of the project, with the first deliverable being a project communications plan. The owner's engineer will provide support for the communications team implementation of the communications plan

Options
The committee has the following options to consider:

1. Proceed with procurement of the Comox Valley water system treatment project using a design-build project delivery method
2. Proceed with procurement of the Comox Valley water system treatment project using a design-bid-build project delivery method

While not the traditional project delivery model locally, the design build process has a demonstrated ability to deliver capital costs savings and higher cost and schedule certainty. Potential challenges with the model, including a higher level of complexity and potential for reductions in final output quality can be fully mitigated by engaging highly skilled advisors and developing a project specification with a level of detail appropriate to the project component. Additionally, the DB model will allow the project to achieve an optimal state of project readiness for grant funding applications faster than a DBB procurement would. For these reasons, only option 1 is recommended.

Financial factors
Implementation of water treatment for the CVWS is an expensive project which will have a significant impact on water rates for property owners within all service areas served by the system. Depending on the level of grant funding achieved for the project, required borrowing ranges from nothing for the 75 per cent grant funding scenario, to over $70 M if the project is not successful in attracting grants.

Delivery of the project via DB has the potential to reduce capital costs by approximately 15 per cent. Capital cost savings of this magnitude would significantly reduce the financial impact of the project to property owners in the CVWS.

Legal factors
None.

Regional growth strategy implications
The regional growth strategy contains several goals and objectives applicable to the operation and upgrade of the CVWS. This includes reducing energy consumption and greenhouse gas emissions. These targets will be incorporated into any future infrastructure upgrades required to meet the Island Health 4321 drinking water policy.

Intergovernmental factors
The CVWS is governed by the Comox Valley water committee whose membership includes representatives from the City of Courtenay, the Town of Comox and the CVRD Electoral Areas 'A', 'B' and 'C'.

Interdepartmental involvement
The engineering services branch is leading this work.

Citizen/public relations
The project team will continue to engage with the local community during this next phase of the project, with a focus on regular, consistent, and transparent contact with the public regardless of the level of activity. In early November, the CVRD will release a RFP to engage a communications consultant to guide communications with the public over the duration of this important project. A communications plan outlining goals, strategies and methodology will be brought forward in early 2017.

Prepared by:	Concurrence:
K. LaRose	*M. Rutten*
Kris La Rose, P.Eng. Senior Manager of Water/Wastewater Services	Marc Rutten, P.Eng. General Manager of Engineering Services Branch

Attachment: Appendix A – Draft report dated September 19, 2016 "Comox Valley Regional District Water Treatment Project – Procurement Options Assessment"

Deloitte.

Comox Valley Regional District

Water Treatment Project – Procurement Options Assessment

September 19 2016 [DRAFT FOR REVIEW]

Comox Valley Regional District
Water Treatment Project – Procurement Options Assessment

Contents

Figures

Tables

Appendices

1. Introduction

1.1 Purpose

Deloitte was engaged by the Comox Valley Regional District (CVRD) to conduct a procurement options assessment for the planned water treatment project (the “Project”), including the consideration of project bundling/un-bundling. The methodology entailed a strategic assessment based on a multi-criteria analysis supplemented by the findings of a market sounding exercise. This report briefly outlines the analysis conducted and findings reached.

1.2 Limitations

This report was prepared for the exclusive use of the Comox Valley Regional District, and is not to be reproduced or used without written permission of Deloitte with the exception of its use with regard to the procurement process for the Project. No third party is entitled to rely, in any manner or for any purpose, on this report. Deloitte’s services may include advice or recommendations, but all decisions in connection with the implementation of such advice and recommendations shall be the responsibility of, and be made by, the Comox Valley Regional District.

This report relies on certain information provided by third parties, and Deloitte has not performed an independent review of this information. This report does not constitute an audit conducted in accordance with generally accepted auditing standards, an examination or compilation of, or the performance of agreed upon procedures with respect to prospective financial information, an examination of, or any other form of assurance with respect to internal controls, or other attestation or review services in accordance with standards or rules established by the CPA or other regulatory body.

2. Background

2.1 Project overview

CVRD has been has been ordered by its health regulator (Vancouver Island Health Authority / VIHA) to upgrade its water system (source: Comox Lake) to provide filtration (currently the treatment system includes disinfection only) on the Comox Valley water system. Consequently, CVRD has recently completed a Project Definition Report[1] (PDR) for the necessary improvements which entail:

- Lake intake and raw water pump station (PS);
- Water treatment plant (WTP); and
- Approximately 7.5 km of steel watermain.

The total estimated construction cost is $85.29M, with additional indirect cost of $20.51M for a total of $106M, excluding any financing costs that may be necessary. This is presumably one of the largest capital projects ever undertaken by CVRD.

Table 1 - Cost Estimate (from Project Definition Report)

Item Description	Project Definition Report ($ Million)
Raw Water	
Intake and Marine Pipeline	$4.94
Pump Station	$4.68
Water Treatment	
Site Works	$1.80
Building (Operations and Chemical)	$10.51
Raw Water Intake	$0.03
Pre-Treatment/Coagulation	$0.63
Flocculation	$0.79
Filtration	$7.81
Backwash System	$1.24
Primary Disinfection	$1.57
Residual Disinfection	$1.55
Clearwell	$4.77
Pipelines	
Raw Water Pipeline	$5.53
Treated Water Pipeline	$11.93
Tie-In	$0.70
Sewer	$2.44
Subtotal - All Direct Cost	*$60.92*
Contractor Indirect Cost (10%)	$6.09
Contingency (30%)	$18.28
Subtotal - Construction Cost	**$85.29**
Indirect Costs	
Land Cost - PS	$0.40
Land Cost - WTP	$0.50
Environmental Assessment & Water License	$0.20
BC Hydro Service Extension	$1.50
CVRD Indirect Costs (4%)	$3.41
Engineering and CM (15%)	$12.79
Escalation to mid-point (2%)	$1.71
Subtotal - Indirect Cost	**$20.51**
Total Project Cost	**$105.80**

[1] Water Treatment Options Study – Project Definition Report, August 12, 2016 – OPUS DaytonKnight Consultants Ltd.

VIHA has requested that water filtration be operational by September 2019. Key tasks needed to facilitate implementation of water filtration include:

- Securing land and rights-of-way for the PS, WTP and pipelines;
- Completing an Environmental Assessment;
- Securing funding for construction;
- Completing an indicative design and updated cost estimate[2];
- Securing financing for construction, if needed;
- Designing the infrastructure;
- Constructing the infrastructure;
- Commissioning the infrastructure; and
- Operating and maintaining the infrastructure into the future.

The PDR proposed procurement of construction through three separate tenders (an "un-bundled" approach) of the following components:

Table 2 - Construction Packages (Un-Bundled)

Bundle	Components	Estimated Construction Cost (millions)
A	Lake intake and raw water pump station	$ 13.5
B	WTP	$ 43.1
C	Conveyance pipelines (raw, treated, and sewer)	$ 28.9
	TOTAL	**$ 85.5**

This design of the Project would be done as a whole (i.e. not un-bundled).

2.2 Procurement options

The CVRD does not have the in-house resources to design or construct the Project, and will therefore be purchasing design services and construction services. This is typical of most municipal governments. The way in which these services are procured from the market is referred to as a procurement option or "delivery model".

There are a number of delivery models used to procure major infrastructure projects. The typical approach for municipal water and wastewater projects is the Design-Bid-Build (DBB) delivery model. There are many alternative approaches, which differ from DBB in the way that the services of designers, constructors, and (sometimes) operators are combined, and in the way that the parties interact with the project owner (i.e., CVRD). Each alternative offers its own advantages, and has its own drawbacks – as does DBB.

2.3 Initial workshop

An "initial workshop" was conducted by Deloitte on August 17th 2016 to collect background information on the project, orient the CVRD's project team to various delivery models, and discuss and document CVRD's project objectives and constraints. The CVRD participants were as follows:

- Marc Rutten, General Manager of Engineering Services Branch
- Kris La Rose, Senior Manager of Water and Wastewater Services
- Mike Herschmiller, CVRD Manager of Water Services
- Zoe Berkey, Engineering Analyst

[2] The technical need for an indicative design depends in part on the procurement model used for the Project, but it may necessary in any case to develop a more detailed cost estimate for purposes of making grant applications and other project planning

- Zoe Norcross-Nu'u, Engineering Analyst

The session was conducted by Chris Baisley and Mark Wainwright of Deloitte. The workshop agenda is included in Appendix A.

Key outcomes of the workshop included:

- Confirmation that the procurement options assessment should include DBB, Design-Build (DB), and Design-Build-Finance (DBF), with other options screened out from consideration;
- Documentation of project objectives and constraints (see next section); and
- Discussion of potential market sounding participants.

The Project objectives and constraints were collected at the initial workshop as the basis for the criteria against which various delivery models are compared (described in Section 3).

2.4 Procurement options carried forward for consideration

As decided at the initial workshop, the following delivery models (described very briefly) were carried forward for assessment:

- **Traditional Design-Bid-Build (DBB)**
    - Design engineer procured to complete engineering investigations and develop detailed design;
    - Construction contractor procured by tender, selected on a lowest-cost basis; and
    - Construction contractor paid on progress basis during construction and commissioning.

- **Fixed-Price Design-Build (DB)**
    - Owners engineer procured to complete engineering investigations and develop DB performance specification;
    - Integrated DB team procured by RFQ / RFP process:
        - Winning proposal selected largely on a lowest-cost basis (taking long-term costs into account); and
        - DB contractor paid on progress during construction with a moderate level of holdback until commissioning is complete.

- **Fixed-Price Design-Build-Finance (DBF)**
    a. Owners engineer procured to develop DB performance specification;
    b. Integrated DBF team procured by RFQ / RFP process;
        i. Winning proposal selected largely on a lowest-cost basis; and
        ii. DBF contractor not paid until commissioning is complete (and therefore the DBF contractor must provide short-term construction financing).

Appendix B contains further information on these delivery models. Models screened out included progressive design-build, construction management, construction management at risk (due to unclear risk allocation and low level of cost competition in these models), design-build-operate-maintain, and design-build-finance-operate-maintain (due to the outsourcing of operations in these models, which CVRD does not intend to do).

2.5 Market sounding

A market sounding exercise was conducted by Deloitte to ascertain, primarily, if there is likely to be sufficient market interest in each of the delivery models under consideration. At the same time, the opportunity was used to solicit other project-related feedback that could assist CVRD in implementation of the Project.

Seven construction contractors and four consulting engineering firms were interviewed. The key findings are as follows:

- Based on the interviews conducted, it is apparent that the Project would attract strong market interest from qualified designers and builders if delivered as a DBB, DB, or DBF.
- For DB or DBF, bundling as a single project will attract the most interest. However, a WTP-only DB or DBF would also be of interest to the market.
- For DBB, the project should attract strong interest whether bundled or de-bundled.

The market sounding confirmed that CVRD can assess the merits of the models with a high degree of confidence that the market will respond to whichever model the CVRD ultimate decides to implement.

3. Multi-criteria assessment

3.1 Introduction

A multiple-criteria analysis (MCA) approach is used to consider the relative merits of each of the delivery models under consideration, and is the primary decision-making instrument covered by this report. This section outlines the development, conduct, and results of the MCA.

3.2 Workshop participants

The MCA was conducted by means of a workshop assessment presented by Deloitte. The CVRD participants were as follows:

- Marc Rutten, General Manager of Engineering Services Branch
- Kris La Rose, Senior Manager of Water and Wastewater Services
- Beth Dunlop, CVRD Chief Financial Officer
- Mike Herschmiller, CVRD Manager of Water Services
- Scott Hainsworth, Manager of Operating and Capital Procurement
- Zoe Berkey, Engineering Analyst
- Zoe Norcross-Nu'u, Engineering Analyst

The session was conducted by Chris Baisley and Mark Wainwright of Deloitte. The workshop agenda is included in Appendix C.

3.3 Assessment criteria

The MCA criteria used were initially developed by Deloitte based on the CVRD Project objectives and constraints collected in the initial workshop. At the commencement of the MCA workshop, the criteria table was validated and changes made before the assessment commenced so that the category weightings represent the relative importance of each category to CVRD, and that within each category each criterion's weighting reflects the relative importance to CVRD. An additional criterion was also added at that time.

Table 3 - Delivery Model Assessment (MCA) Criteria

Category	Category Weighting	Criterion	Criterion weighting within category
Technical	25%	Ability to meet required drinking water quality standards	High
		Minimize chemical addition for filtration	Med
		Ease of achieving necessary regulatory approvals	High
		Ensure ease of operations of the completed project	High
CVRD Resources	5%	Minimize demand on current CVRD resources - design of project	Low
		Minimize demand on current CVRD resources - construction of project	Low
		Contributes to building WTP operating expertise within CVRD	Med

Category	Category Weighting	Criterion	Criterion weighting within category
Schedule	10%	Fewest winters with unfiltered water	High
		Ensure on time completion (i.e. to the TBD schedule)	Low
		Earliest readiness for grant application (i.e. tender or RFP ready)	Low
Cost	40%	Minimize capital cost	High
		Maximize capital cost certainty	Medium
		Optimize lifecycle cost	High
		Minimize transaction (i.e. consultant) costs	Low
Innovation	10%	Maximize innovation - WTP	High
		Maximize innovation – pump station and intake	Med
		Maximize innovation – conveyance	Med
		Maximize innovation – architecture	Low
Risk	10%	Minimize retained design risk	Low
		Minimize retained construction risk	Medium
Total	**100%**		

In assessing the delivery models, for the DB and DBF models it was assumed that the performance specification would allow for at least two different filtration technologies, and that the financial evaluation would take long term operating costs into account. For the DB model it was assumed that a holdback on all progress payments would be applied, and released upon successful commissioning (when the performance of the project is demonstrated to meet the specifications).

The assessment was done on the assumption that the project is procured as a single bundle.

3.4 Assessment conduct

The MCA was conducted by first establishing that all participants were fully versed in the DBB, DB, and DBF models and project-specific questions and about the applicability and pros/cons of the models were thoroughly discussed. This was done by means of a half-day interactive workshop.

Then, for each criterion, a group-consensus score was established for each delivery model on the four-point scale presented below.

Table 4 - MCA Scoring System

Score	Meaning
1	Fails to meet requirements and/or produces undesirable outcomes for CVRD
2	Minimally meets requirements and/or produces neither negative or positive outcomes for CVRD
3	Adequately meets requirements and/or produces positive outcomes for CVRD
4	Exceeds requirements and/or produces exceptional outcomes for CVRD

3.5 Assessment results

The table below presents the workshop consensus scoring.

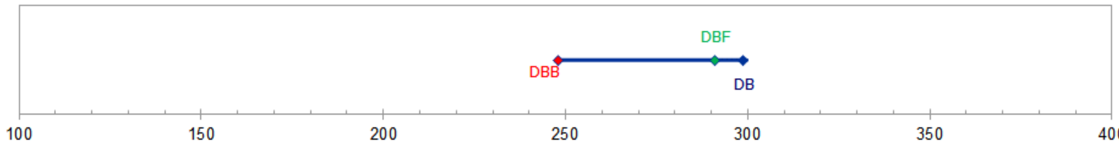
Table 5 - MCA Results

Category / Weighting	Criterion	Criterion Relative Weight Within Category	DBB	DB	DBF
Technical	Ability to meet required drinking water quality standards	High	3	3	3
	Minimize chemical addition for filtration	Med	2	3	3
	Ease of achieving necessary regulatory approvals	High	3	2	2
	Ensure ease of operations	High	4	2	2
25.0%					
CVRD resources	Minimize demand on current CVRD resources - design phase (performance spec / contract phase for DB/F)	Low	2	3	2
	Minimize demand on current CVRD resources - construction	Low	2	3	3
	Contributes to building WTP operating expertise within CVRD	Med	3	3	3
5.0%					
Schedule	Fewest winters with unfiltered water	High	2	3	3
	Ensure on time completion (i.e. to the TBD schedule)	Low	2	3	4
	Earliest readiness for grant application (i.e. tender or RFP ready)	Low	2	3	3
10.0%					
Cost	Minimize capital cost	High	2	4	3
	Maximize capital cost certainty	Med	2	4	4
	Optimize lifecycle cost	High	3	2	2
	Minimize transaction (i.e. consultant) costs	Low	2	4	3
40.0%					
Innovation	Maximize innovation - WTP	High	2	3	3
	Maximize innovation – pump station and intake	Med	3	4	4
	Maximize innovation – conveyance	Med	2	3	3
	Maximize innovation – architecture	Low	2	3	3
10.0%					
Risk	Minimize retained design risk	Low	2	3	4
	Minimize retained construction risk	Med	2	3	4
10.0%					

Appendix B contains the summary justification underlying each score shown above.

The scoring results in total scores for each delivery model as shown below (the lowest possible score is 100, the highest possible score is 400).

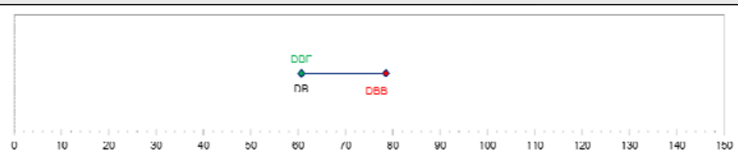
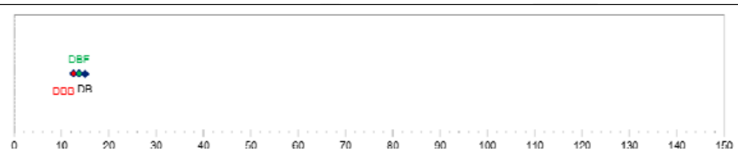
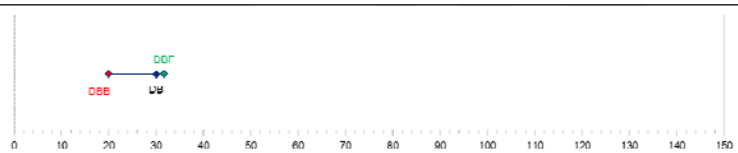
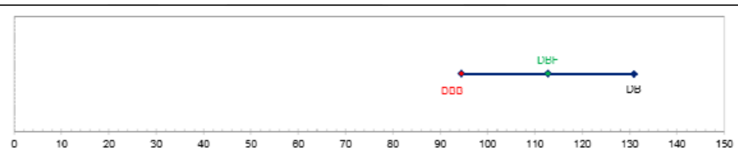
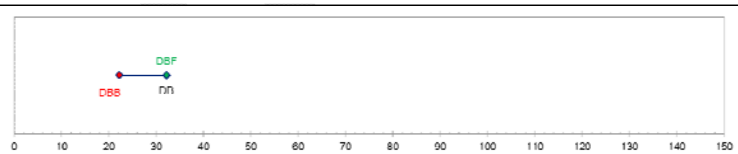
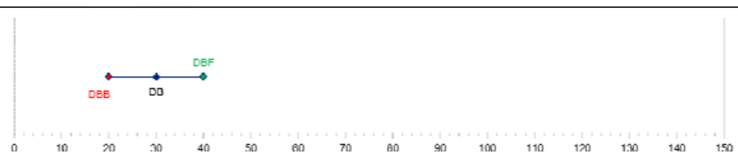
Figure 1 - Delivery Model MCA Scores



The results indicate that DB is the model that best satisfies the delivery model assessment criteria, followed by DBF, with DBB scoring the lowest. It is also observed that DB and DBF are closely clustered.

The table below presents the scoring results for each category separately.

Table 6 - Delivery Model Scores For Each Category

Category (max pts)	**Delivery Model Scores Within Category**	**Best Model / Key Reason**[3]
Technical (100 pts max)		**DBB** - Most control over design to ensure ease of operations
CVRD Resources (20 pts max)		No appreciable difference in overall demand on CVRD resources.
Schedule (40 pts max)		**DBF** - Highest incentive for on-time construction due to full holdback
Cost (160 pts max)		**DB** - Competition for integrated design and construction, and lowest transaction costs
Innovation (40 pts max)		**DB/DBF** - Competition for integrated design and construction
Risk (40 pts max)		**DBF** - Highest security over risk transfer due to full holdback

[3] Based on identification of the criteria that most influence the scoring, and justifications documented during the MCA workshop

The DB and DBF models (which are very similar) score better than DBB in all categories but Technical. As can be seen in Table 5, the two criterion driving the lower score in this category for DB and DBF are:

- Ease of achieving necessary regulatory approvals; and
- Ensure ease of operations.

These are areas where attention should be given to mitigate the potential downsides of DB/DBF, should either of these models be implemented. Mitigants discussed in the workshop included early consultation with regulators to ensure they are aware of the use and timing implications of the DB/DBF model, and ensuring attention is given to operability and maintenance considerations in the performance specification.

3.6 MCA sensitivity analysis

Sensitivity analysis of the MCA results (details provided in Appendix E) was undertaken to determine if the overall finding is sensitive to changes in category weightings and/or in-category criteria weightings. The tests were:

- Swapping the relative importance of the Technical and Financial categories;
- Reducing the in-category importance of minimizing capital cost and optimizing lifecycle cost from "high" to "low";
- Giving "minimize chemical addition for filtration" the same score for DBB as for DB and DBF[4];
- Removing the two criterion that were scored equally across all models[5].

The scoring outcome (i.e. DB scoring the highest) did not change with any of these tests.

A "what-if" test was done to determine the Technical weighting that would be necessary for DBB to score as the highest outcome, holding the relative distribution of the other categories constant. A 57% weighting was needed. This indicates that only if the majority of importance is put on the Technical category would DBB score higher than the other models. Such a weighting is significantly different than that articulated by CVRD in the MCA workshop.

Overall it is concluded that the scoring outcome (i.e. DB scoring the highest) holds across reasonable scenario changes in the input weightings, and that the DB is the delivery model that best meets CVRDs evaluation criteria, and therefore its objectives, for the Project.

3.7 De-bundling assessment

As part of the MCA workshop, a discussion of the pros and cons of de-bundling the Project in relation to the delivery models was conducted. This took into account, in part, the market sounding feedback.

Three potential de-bundled scenarios arrived at were:

1. De-bundled DB;
2. De-bundled DBB; and
3. Combination of DBB for Intake and Pump Station, DB for WTP, DBB for Conveyance.

A key Project feature that influences this assessment is that the WTP component sits in the middle of a linear system. In order to functionally test and commission the WTP, raw water is needed (thus the upstream components – intake, pump station, raw water conveyance need to be complete) and a way to

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[4] thus giving DBB the same advantage as DB/DBF have regarding more leeway in selection of filtration process

[5] this would not be expected to change the outcome

discharge treated water is needed (thus the downstream conveyance needs to be complete). There is "interface risk" between these components therefore in both design, and construction.

Consideration was given to the likelihood that the conveyance portions of the project have the potential to be completed well ahead of the other components, but there was less certainty that the intake and pump station could confidently be completed significantly in advance of the WTP.

3.7.1 De-bundled DB

The de-bundled DB scenario was dismissed because it would create interface risk between 3 different DB contractors, with CVRD in the middle as the counterparty to each DB contract. In particular there is the concern that the WTP DB contractor could be held up from completing commissioning, with CVRD subject to claims and losing some of the risk-transfer benefits around proving out WTP performance prior to making full payment.

It was also noted that total contingency costs in DB prices would likely be higher across three contracts rather than one, and that parallel procurement of 3 DBs would be onerous and overly costly. Market sounding indicated little interest in standalone DBs for the intake and pump station or conveyance components.

3.7.2 De-bundled DBB

The de-bundled DBB scenario was dismissed because it was felt that the projects would individually still be of the size that a general contractor for each would be required, eliminating any potential cost advantage of contracting directly with specialist subcontractors. More importantly, this approach would entail interface risk between the construction contractors, although with perhaps lower financial implications for CVRD than in the de-bundled DB scenario.

De-bundling further into more than three pieces, in an attempt to engage specialist subcontractors directly, was dismissed because it would create additional interface risk and project management costs for CVRD, essentially turning the project into a Construction Management approach.

3.7.3 Combination of DBB / DB / DBB

This scenario was rejected because it would "sandwich" a DB for the WTP between two DBBs. The interface risk in this approach is similar to the de-bundled DB, although perhaps higher risk because the DBB contracts would have less certainty of on-time completion, making coordination planning more uncertain.

Only if CVRD had absolute certainty that it could have the intake and pump station, and all conveyance (with perhaps the exception of the sewer line) ready well in advance of the time at which the WTP DB contractor would start functional testing, could this scenario be entertained. Otherwise a fixed-price date-certain DB contract for the WTP would not be achievable.

3.7.4 Benefit of bundling

The examination of de-bundling exposes the primary benefit of bundling the project into a single procurement (be it DBB, DB, or DBF). This is that interface risk between project components can be transferred from CVRD to a competent party with the capacity to best mitigate it – that being the general contractor in a DBB, or the DB contractor in a DB.

Furthermore, it was recognized that all de-bundled scenarios would face incremental CVRD effort and cost to coordinate and administrate contracts (either direct, or consultant costs), compared to a fully bundled approach.

Given the above and that the market sounding indicated strong interest and no lack of capacity in the market to take on the project as a single bundle, a single bundled approach was strongly favoured at the conclusion of the workshop discussion.

4. Conclusions and recommendations

4.1 Conclusions of the MCA workshop

Following are the key conclusions drawn through the MCA.

1. Design-Build is the delivery model that best meets CVRD's objectives for the Project.
2. The Project should be procured as a single bundle (a single tender in the case of DBB, a single RFP in the case of DB or DBF).

4.2 Recommendations

Following are overall recommendations by Deloitte based on our execution of the work program and the understanding of the project we developed therein.

1. The DB model is recommended on the basis that that this is the conclusion of the MCA workshop and we identified no compelling counterargument in our conduct of the work program or based on our experience on similar projects.
2. A single procurement is recommended to reduce project risk and respect CVRD's in-house resource capacity to manage large construction contracts.
3. CVRD should consult with some municipal owners of projects done with the DB model should it wish to gain additional comfort with design-build.
4. Given the Project's size and importance, appropriate project management resources and project management processes should be put in place – regardless of the delivery model used. Legal advice on the form of contract and specific conditions is also advisable, regardless of delivery model.

Appendix A – Initial Workshop Agenda

Deloitte.

Meeting Agenda

Project:	**Comox Valley Regional District** **Water Treatment Project**
Topic:	“Initial Workshop”
Date:	August 17, 2016
Location:	CVRD Boardroom

Item	Anticipated Duration (approx.)
1. Introductions	5 min
2. Workshop Objectives	5 min
3. Project Status	30 min
4. Project Objectives and Constraints	60 min
5. Project Risks	30 min
6. Flexibility with respect to PDR recommendations	10 min
7. Delivery models to consider	30 min
8. Market sounding approach	30 min
9. Other items	

Appendix B - Delivery Model Background

Delivery model background

Delivery models under consideration

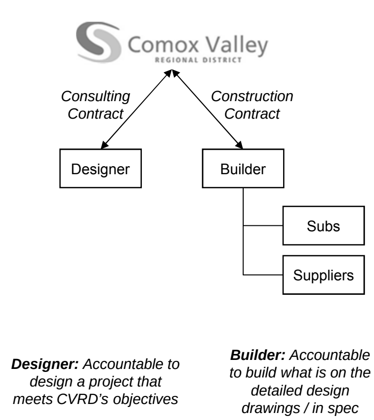
- Design Bid Build
- Fixed Price Design Build
- Fixed Price Design Build Finance

Delivery model overview

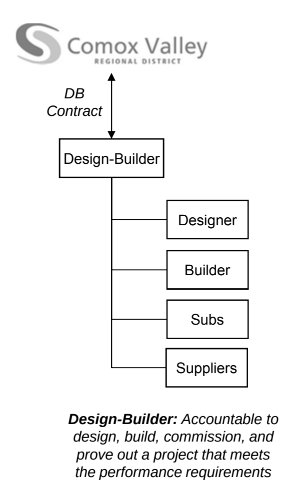
Project Responsibility	Traditional	Fixed Price DB / DBF
Planning	Municipality	Municipality
Design	Consultant selected on qualifications and fees	Qualified special-purpose DB contractor selected on bid design and price. Likely a consortium of firms
Construction	General contractor selected by tender (typically lowest price compliant)	
Construction financing	Not needed	Contractor / contractor's bank
Financing (long term)	Municipal Finance Authority	Municipal Finance Authority
Funding (who pays)	Municipality	Municipality
Design competition	No	Yes
Single-point accountability	No	Yes
Payment	Progress during construction	Progress during construction with holdback (DB), no payment until completion (DBF)

Contract structures

Design-Bid-Build



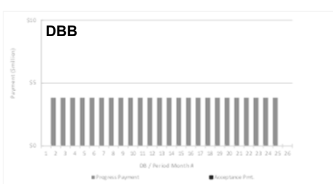
Design-Build



Form of specification / documentation that "goes to market"

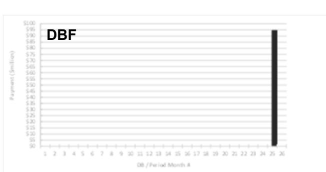
	Traditional	Fixed Price DB / DBF
Audience	Construction general contractors	Design-Build contractors
Form	Detailed drawings and equipment / material specification	Performance specification
Message	"Build precisely this, as on these drawings" (e.g. bldg. with these pipes, these filters, these controls, this wall finish, these windows...)	- "design and build something that delivers the required outcome" (e.g. volume and quality of treated water) - "Use / don't use these specific technologies, suppliers, materials"
Owner input	Through design reviews with Design Engineer	Through specification reviews with Owners Engineer, and compliance reviews of designs during RFP process
Contract	CCDC, MMCD with project-specific supplementary conditions	CCDC or a P3-based contract with project-specific performance specification and other conditions

Payment profiles



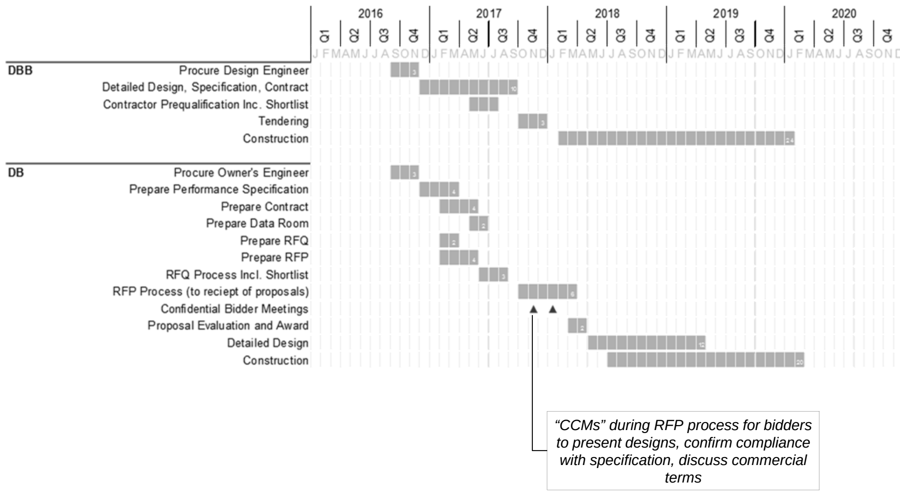
DBB: Contractor is paid for costs incurred as progress is made. No strong rationale for holdback because the Contractor's primary responsibility is to duplicate in the field what's on the drawings (to completion and without defect), rather than for project performance.

DB: Contractor is paid for costs incurred as progress is made, less a holdback. Holdback not released until acceptance, when project performance has been verified. This is rational because the DB contractor's responsibility is for design, construction, and prove-out. Holdback creates incentive for DB contractor to complete, and provides owner with liquid security (cash) that can be used to correct problems if contractor doesn't.

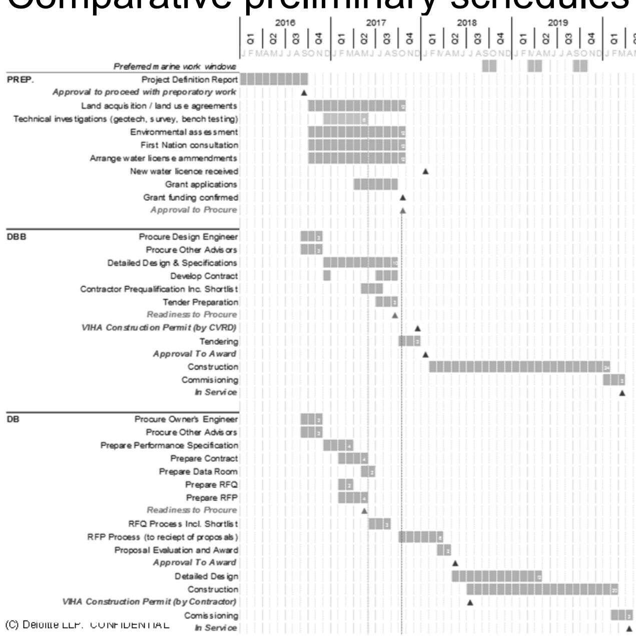


DBF: Contractor is not paid anything until acceptance, when project performance has been verified. This is rational because the DB contractor's responsibility is for design, construction, and prove-out. Large holdback creates need for 3rd-party financing which introduces lender due diligence and creates additional incentive for DB contractor to complete, and provides owner with liquid security (cash) that can be used to correct problems if contractor doesn't.

Procurement process flow



Comparative preliminary schedules



Preliminary cost comparison

Procurement & Construction Phase Costs ($ 2016M)

DBB

Construction (incl. contingency)	$	85.29		PDR
Design & Tender	$	8.53	10% of construction	PDR
Engineering During Construction	$	4.26	5% of construction	PDR
TOTAL excluding financing	**$**	**98.08**		
Indirect Costs (excl. engineering)	$	7.72		PDR
TOTAL excluding financing	**$**	**105.80**		

DB/DBF

Construction (incl. contingency)	$	72.50	*15% savings over DBB, includes design costs*	*From SSP Biz Case*
Procurement		$1.70	*legal, technical, financial advisory*	*From SSP Biz Case*
Engineering During Construction	$	2.13	*half of DBB costs*	*From SSP Biz Case*
Honorarium	$	0.30	*$150k x 2*	
TOTAL excluding financing	$	76.63		
Indirect Costs	$	7.72		*PDR*
TOTAL excluding financing	**$**	**84.35**		

- DB tends to result in lower capital costs – methodology used for SSP results in 18.2% estimated savings, used 15% above
- Role of engineering consultant and level of effort is different for each model
- There is no legal advice included in DBB estimates (likely such advice needed)
- DB or DBF will likely require legal advice, could require financial/commercial advice – have included estimates from SSP which were for a DBFOM and therefore should be conservative (i.e., high)
- DB/DBF will have additional costs for financing (DBF $2.5M, DB $0.8M)
  (financing estimates very approx. based on current private financing estimates, DB assumes 25% holdback)

Pros and cons: DBB and DB

	DBB	DB
Pros	• Owner full control over design • Owner knows precisely what it will get before construction starts (100% design) • Lifecycle costs can be taken into account during design (but are not guaranteed) • Design engineer aligned with owner during construction re: quality • Familiarity of CVRD with procurement process	• Design competition among 3 proponents, owner gets 3 projects to choose from • Lower capital costs likely • Single-point accountability for final performance of project ("1 throat to choke") • Ability to hold liquid security over demonstration of final performance (holdback) • High cost certainty (when contract awarded) – no change orders (DB'er deals with internally) • High time certainty – DB'er has nobody but itself to blame, and "time is money" • Design engineer selected on basis of its design proposal (design competition)
Cons	• No single point of accountability for final performance • No ability to hold liquid security over final performance • Owner stuck in middle of designer and builder during construction • Low cost certainty (when tender awarded) – change orders • No builder input into design • Incentive for builder to seek change orders to increase contract size • Reliance on design engineer's preferences, no market input, only one design • Design engineer selected on qualifications only	• Owner has only 30-ish% design to understand what it will get before construction starts (that, and the performance specification which governs final design) • Focus of the DB team is to design, build, prove out performance, and exit. No incentive for long term lifecycle cost consideration unless RFP requires • Likely a simpler, more austere design • CVRD not familiar with procurement process • Requires a buy-in of owner to the DB approach: performance spec vs. prescriptive spec, no interference during construction, approval of design for compliance only (not for likes/dislikes), etc. *[only a "con" if this is difficult for owner to do]*

Incremental pros and cons of DBF over DB

	DBF
Pros	• Strongest risk transfer, secured with highest possible liquid security (cash in hand vs. dealing with surety companies etc.) • Lender and its technical advisor will review proposals before they're submitted, helps assure that proposal is buildable for the price • DB'er is accountable to both lender and owner for construction schedule • No payment administration for CVRD until project completion • Receipt of lender reports on construction progress during construction • Lender has step-in rights to complete construction should the DB'er default (bankruptcy, etc.) • Highest assurance of on-time completion • Possible cashflow advantages of not making capital payments until +/- 2 years later • Nature of transaction as commercial/financial brings additional scrutiny and diligence on both owner and bidder sides
Cons	• Higher level of involvement of legal and financial/commercial advisors in procurement • RFP process justifiably longer (say 2 months longer) • Procurement process is more complex (a commercial/legal stream, and a technical stream) • Higher costs for bidders – higher honorarium justifiable • Higher procurement costs for owner (more time, more advisory services needed) • Higher risk of insufficient market interest (although market sounding indicates not a concern)

Appendix C – MCA Workshop Agenda

Deloitte.

Meeting Agenda

Project:	**Comox Valley Regional District** **Water Treatment Plant Project**
Topic:	Multi-Criteria Analysis Workshop
Date:	September 14, 2016
Location:	3843 Livingstone Rd, Royston

Item	Anticipated Duration (approx.)	
1. Introductions	5 min	
2. Workshop Objectives	5 min	
3. Delivery Model Background (DBB, DB, DBF) a. Delivery model overview b. Contracting structures c. Form of specification d. Payment profiles e. Procurement process flow f. Schedules g. Cost comparison h. Pros and Cons	120 min	Establish common base of understanding prior to comparing delivery models (items 3–4)
4. Market Sounding Findings	60 min	

- LUNCH BREAK -

Item	Anticipated Duration (approx.)	
5. Review and Confirm Criteria and Weightings	30 min	Compare delivery models and arrive at preliminary conclusion (items 5–8)
6. Multi-Criteria Analysis	120 min	
7. Review and Validate Preliminary Results	60 min	
8. Next Steps	15 min	

Appendix D – MCA Assessment Rationales

Comox Valley Regional District
Water Treatment Project – Procurement Options Assessment

MCA Assessment Scoring Rationales

	DBB	DB	DBF
Category: Technical			
Ability to meet required drinking water quality standards	• All models will meet the standards	• All models will meet the standards	• All models will meet the standards
Minimize chemical addition for filtration	• Technology already decided (direct filtration), requires chemical addition	• Performance spec will be open to at least 1 technology that doesn't require chemical addition	• Same As DB
Ease of achieving necessary regulatory approvals	• Agencies are most familiar with DBB process w.r.t. timing of detailed designs	• Some agencies could be less familiar with DB process w.r.t timing of detailed design and design responsibility	• Same as DB
Ensure ease of operations	• CVRD has direct control of design • More opportunity to detect future operation problems during construction • CVRD can direct design changes during construction (change orders)	• Control of design is indirect, through performance specifications • Design changes during construction must be negotiated • May be less opportunity during construction to detect future operation problems	• Same as DB
Category: CVRD Resources			
Minimize demand on current CVRD resources – design phase (performance spec / contract phase for DB/F)	• Effort required to direct, review, approve detailed design, over a long time period	• Effort required to direct performance specification is higher level than DBB and, over a shorter time period	• Same as DB plus additional effort in legal and financial areas

	DBB	DB	DBF
Minimize demand on current CVRD resources - construction	• More interaction with contractor, design engineer • Change order management	• Less intervention during construction • No approval role • Relying on holdback rather than supervision to ensure project performance	• Similar to DB • Lenders provide additional due diligence and monitoring, reduces demand on CVRD
Contributes to building WTP operating expertise within CVRD	• Design engineer would provide • Should build training requirements into consulting contract	• Design engineer (within DB team) would provide • Should build training requirements into DB contract	• Same as DB
Category: Schedule			
Fewest winters with unfiltered water	• Builder has limited ability to accelerate construction due to role of design engineer and owner in approving changes and resolving issues • Design may limit rate of progress • No builder input to design	• More incentive (holdback) & ability to accelerate to achieve schedule – DB'er can adjust design / construction autonomously • Builder input taken into account during design, including schedule achievement • CVRD could set more aggressive in-service target – proposals will take into account	• Same as DB
Ensure on time completion (i.e. to the TBD schedule)	• Builder has limited ability to accelerate construction due to role of design engineer and owner in approving changes and resolving issues • Design may limit rate of progress • Change orders will give cause to extent completion date	• More incentive (holdback) & ability to accelerate construction to achieve schedule – DB'er can adjust design / construction autonomously • Builder input taken into account during design, including schedule achievement • Builder input taken into account during design	• Same as DB • Strongest completion incentive due to full holdback of payments

	DBB	DB	DBF
Earliest readiness for grant application (i.e. tender or RFP ready)	• Time to prepare detailed design and specification longer than needed for DB performance spec / contract	• Performance specification and contract can be ready earlier than DBB documents • Grant providers should not be adverse to a DB method – award grant based on having DB RFP ready • May need an indicative design strictly for purposes of having a cost estimate for grant application purposes.	• Same as DB
Category: Cost			
Minimize capital cost	• No design competition – only one design is priced • Owner more likely to initiate change orders • No builder input into design	• Design competition of 3 integrated DB teams with evaluation based largely on cost is expected to result in capital cost savings • Owner less likely to initiate change orders	• Same as DB • Additional costs of financing
Maximize capital cost certainty	• Full costs not known until construction complete • Contractor has incentive to seek change orders • CVRD is responsible for all change order costs • Can be partially mitigated by setting appropriate contingency allowance	• Fixed price contract • Affordability cap / scope ladder could be built in • Owner less likely to initiate change orders	• Same as DB

	DBB	DB	DBF
Optimize lifecycle cost	• CVRD can work with designer to optimize lifecycle cost (capital vs operating tradeoffs) – direct control	• Control of lifecycle cost consideration is indirect, through performance specifications and through RFP evaluation framework	• Same as DB
Minimize transaction (i.e. consultant) costs	• Transaction costs are primarily engineering design and construction services	• Owners engineer costs expected to be lower – performance spec rather than detailed design, and more limited construction services needed, some commercial advisory possibly needed	• Same as DB, but additional legal / commercial advisory costs
Category: Benefits of Innovation			
Maximize innovation - WTP	• No design competition • Filtration technology decided • No builder input to design	• Design competition of 3 integrated DB teams • Some filtration technology leeway to be permitted, some opportunity for innovation • Innovation through construction techniques • Market sounding – lots of potential for innovation	• Same as DB
Maximize innovation – pump station and intake	• No design competition	• Design competition of 3 integrated DB teams • Wide design leeway in performance specs, most opportunity for innovation • Innovation through construction techniques • Market sounding – lots of potential for innovation	• Same As DB

	DBB	DB	DBF
Maximize innovation – conveyance	• No design competition	• Design competition of 3 integrated DB teams • Wide design leeway in performance specs • Innovation through construction techniques	• Same As DB
Maximize innovation – architecture	• No design competition	• Design competition of 3 integrated DB teams • Performance spec must include architectural requirements	• Same As DB
Risk			
Minimize retained design risk	• Design risk almost fully retained by CVRD	• Risk transferred to DB'er • Risk transfer anchored with holdback – DB'er must prove out the performance of the project in accordance with the specifications to receive payment	• Additional due diligence by lenders over design • Holdback of full project costs until performance of the project in accordance with the specifications is proven
Minimize retained construction risk	• Considerable risk retained by CVRD	• Risk transferred to DB'er • Risk transfer anchored with holdback – DB'er must prove out the performance of the project in accordance with the specifications to receive payment	• Additional due diligence by lenders over constructability • Holdback of full project costs until performance of the project in accordance with the specifications is proven

Appendix E – MCA Sensitivity Analysis

Comox Valley Regional District
Water Treatment Project – Procurement Options Assessment

MCA Sensitivity Analysis

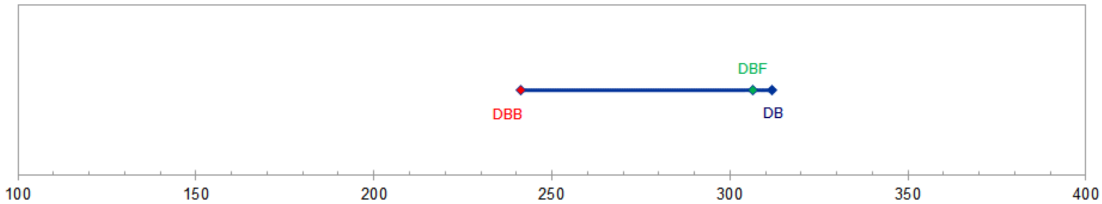
Test 1

The two criterion with the highest overall impact on the score, due to the category weightings and in-category relative weightings are:

- Minimize capital cost;
- Optimize lifecycle cost.

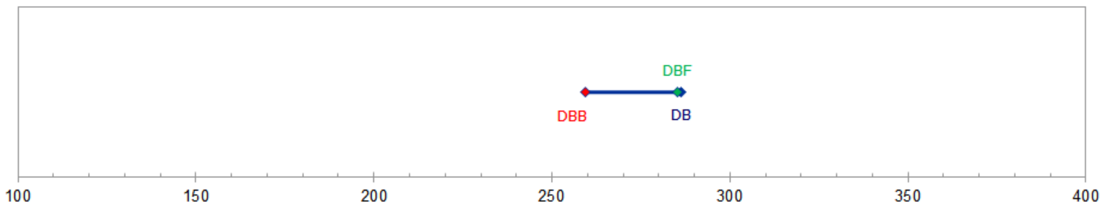
Setting the in-category relative weightings of these criteria from “High” to “Low” does not change the scoring outcome (i.e. DB preferred).

Table 1 - MCA Scores - Sensitivity Test 1



Test 2

The two categories with highest overall contribution to the score are Technical (25%) and Financial (40%). Swapping the weightings of these categories to emphasize Technical over Financial does not change the scoring outcome (i.e. DB preferred).

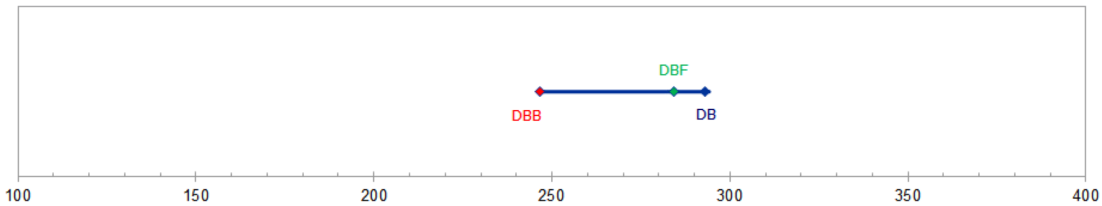


Test 3

Two criterion were scored identically and therefore do not distinguish between the delivery models:

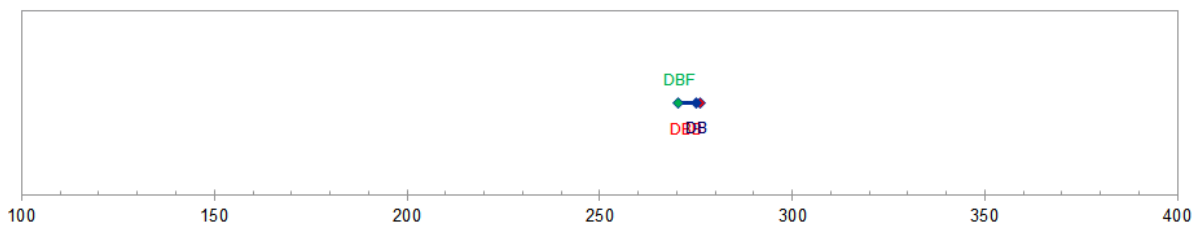
- Ability to meet drinking water quality standards; and
- Contributes to building WTP operating expertise within CVRD.

Removing these criteria from the analysis (which therefore amplifies the importance of the criteria that remain) does not change the scoring outcome (i.e. DB preferred).



What-If

A “what-if” test was done to determine the Technical weighting that would be necessary for DBB to score as the highest outcome, holding the relative distribution of the other categories constant. A 57% weighting was needed to “move” DBB to the point where it is just achieving a higher score.



The overall weightings to achieve this result are shown below.

Category	Original Weighting	Test Weighting
Technical	25%	57%
CVRD Resources	5%	2.9%
Schedule	10%	5.7%
Cost	40%	22.9%
Innovation	10%	5.7%
Risk	10%	5.7%
Total	**100%**	**100%**

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