APPENDIX M – Procurement Assessment

Johnson Street Bridge Project

Procurement Assessment Report

July 14, 2011

MMM Group Limited
1045 Howe Street, Suite 700
Vancouver, BC V6Z 2A9

MMM GROUP

Johnson Street Bridge

Procurement Risk Assessment Report

Prepared by:	Joost Meyboom, P.Eng.	J. Meyboom
Reviewed by:	Jim Fowler, P.Eng.	Jim Fowler
Approved by:	Bill Larkin, P.Eng.	
	Mike Lai, P.Eng.	

Project No.	50-10751-100-000	Rev: 0

MMM GROUP

Johnson Street Bridge

Procurement Risk Assessment Report

Prepared by:	Joost Meyboom, P.Eng.	J. Meyboom
Reviewed by:	Jim Fowler, P.Eng.	
Approved by:	Bill Larkin, P.Eng.	
	Mike Lai, P.Eng.	

Project No.	50-10751-100-000	Rev: 0

STANDARD LIMITATIONS

This report was prepared by MMM Group Limited (MMM) for the account of (the Client). The disclosure of any information contained in this report is the sole responsibility of the client, City of Victoria. The material in this report reflects MMM's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. MMM accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

1.0 BACKGROUND

In January 2011, the City undertook a risk assessment workshop for the Johnson Street Bridge Project. The workshop led to the development of a Project Charter that identified a number of key Project risks as well as corresponding mitigation measures. Two key risks that were identified:

- Not delivering a bridge that is substantially similar to the renderings presented to Council and the public.
- Escalation of construction prices and in particular escalation of the price of steel.

Three mitigating strategies to manage these two risks are:

- The City's design team completely defines those elements of the project that characterize the iconic nature of the proposed bridge.
- Develop a Design-Build procurement model for project elements that do not affect the look of the bridge to capitalize on design-build efficiencies.
- Establish a procurement model that will provide an aggressive schedule.

The City undertook a second risk assessment workshop in May 2011 to update the Project's risk registry, in particular with regard to the above noted risks. The second risk workshop was followed up with a market sounding survey of bridge building contractors to ask them their thoughts on the most effective and efficient procurement method for the project. The results of the second risk workshop and the market sounding were presented to the City in a draft report dated May 31, 2011 and the report recommended investigating two methods a Design-Build and a Design-Bid-Build procurement methods. The draft report is included as ***Appendix A-1.***

We note that most moveable bridges in North America are delivered using a Design-Bid-Build approach. Similarly, Design-Bid-Build is used almost exclusively for iconic structures.

This report undertakes the following:

- Identify the elements of the project where the City should maintain full design control and other elements where Design-Build innovation could be applied,
- Compare the cost and schedule implications between Design-Bid-Build and Design-Build.
- Recommend a procurement model.

2.0 POTENTIAL SCOPE FOR DEISING-BUILD

2.1 Key Design Elements

The key design elements of the project include:

- The bridge will have three spans,
- Overall proportions and dimensions of the replacement bridge are substantially similar to those endorsed by Council in November 2009,
- the approach spans and bascule span are of the same architectural family
- The lighting scheme on the bridge is integrated with the bridge architecture,
- The trusses are characterized by their tapering configuration in elevation and the faceted truss members,
- The above water shape and treatment of the substructures,
- Marine fenders,
- In the future the public's ability to walk through the wheel when the bridge is not operating,
- The reliability of the electrical/mechanical system,
- The bridge will be a lifeline structure,
- The functional requirements with regard to vehicles, pedestrians, cyclists and mobility impaired people will be as presented to Council and the public over the past 2 years,
- Connectivity of the bridge to the onshore elements of the project,
- Multi-use path bridge over the west approach road,
- Multi-use trail head at the northeast project limit, and
- Elimination of the "S" curve on the west approach,

2.2 City's Design Team Scope

Based on the above, elements that require design control by the City's design team to ensure public expectations are met with regard to the bridge architecture include:

- The bridge superstructure,
- The above water portions of the bridge substructures,
- Landscape master plan and overall integration of the new bridge in the landscape.

There is an inseparable relationship between the bridge superstructure and its electrical/mechanical system and as such the two need to be designed together by the City's design team.

2.3 Potential Design Scope for Design-Builder

Of the above elements, the design of several could safely be passed on to a Design-Builder using performance-based specifications and a 30% complete reference concept. These elements are:

- Seismic requirements with regard to lifeline performance,
- Below water bridge elements such as footings and foundations,
- Fendering,
- Approach roads and paths,
- Roadway illumination,
- Traffic signals,
- Drainage,
- Removals and decommissioning of existing facilities.

With regard to seismic design, there is a strong interdependency between the bridge foundations, substructure and superstructure with regard to the load paths and strategies used to dissipate seismic loads. This is similarly true for ship impact loads.

Notwithstanding this interdependency, foundation and substructure design could be transferred to a Design-Build team by specifying seismic and ship impact loads assumed in the design of the superstructure by the City's design team or by having the Design-Build design developed concurrently with the completion of the superstructure design. This has the potential to slow the project down in order to select a D-B contractor and team.

3.0 DESIGN-BUILD OPTIONS

Two options for Design-Build are:

- City design team provides a 100% complete superstructure and electrical/mechanical design together with performance specifications for the design-build scope.
- City design team completes the superstructure and electrical/mechanical design in collaboration with the three shortlisted Design-Build teams.

The second option could lead to a number of issues and complications with regard to fairness during the Design-Build procurement process.

4.0 COST IMPLICATIONS OF DESIGN-BUILD

The potential Design-Build scope noted above corresponds to a construction cost of about $20 M, excluding engineering, contingencies and escalation. Given that there is limited scope for innovation in the design-build elements, this estimated cost could possibly be reduced by between 3% to 5% because of inherent efficiencies with design-build innovation. This corresponds to a cost reduction of between $600,000 and $1,000,000.

Given that the proposed Design-Build model is a complex undertaking, a budget of between $400,000 and $800,000 can be anticipated for the City's management of the procurement process and the ongoing management of the Design-Build elements of the contract, exclusive of engineering time required for design compliance reviews. In addition a stipend budget in the order of $150,000 per contractor will be required for the unsuccessful bidders.

As such, the opportunity for cost savings with Design-Build appears to be limited.

5.0 SCHEDULE

Important schedule considerations are:

- Regardless of the procurement method selected, a Project Definition Report is required to clearly establish the project scope and associated costs to a level corresponding to a 10% contingency. This draft report is scheduled to be delivered to the City in late October.
- The construction schedule is relatively the same regardless of whether Design-Build or Design-Bid-Build is used as the procurement model and a 2.25 year construction schedule is estimated to achieve opening of the new bridge by no later than March 2016.
- Design of the steel superstructure is the critical path through Detailed Design and requires 10 months after completion of the Project Definition Report.
- A 6 month proposal period would be required for a Design-Build tender process.

Based on the above key durations, the following table compares the schedules of a Design-Build and a Design-Bid-Build delivery model. Design-Build (1) and Design-Build (2) refer to the options noted above in ***Section 3.0***.

Activity	Design-Build (1)		Design-Build (2)		Design-Bid-Build	
	Start	Finish	Start	Finish	Start	Finish
Project Definition Report	April 2011	November 2011	April 2011	November 2011	April 2011	November 2011
Detailed Design of Superstructure1	November 2011	September 2012	November 2011	September 2012	November 2011	September 2012
Detailed Design of other elements	April 2013	July 2013	January 2013	April 2013	November 2011	September 2012
Request for Qualifications	July 2012	September 2012	March 2012	May 2012	July 2012	September 2012
Request for Proposals	October 2012	February 2013	June 2012	November 2012	N/A	N/A
Tender	N/A	N/A	N/A	N/A	October 2012	November 2012
Award	March 2013		December 2012		December 2012	
Construction2	April 2013	July 2015	January 2013	March 2015	January 2013	March 2015

Notes:

1. Assumes that detailed design of the superstructure will commence immediately after submission of the Project Definition Report and before sign-off of this report by the City.

2. Not including decommissioning of the existing road bridge.

6.0 RECOMMENDED PROCUREMENT MODEL

A Design-Bid-Build procurement model is recommended. This recommendation is based on the following reasons:

- There are no significant cost advantages to using design-build given that there is limited scope for design-build innovation.
- There is no schedule advantage to using design-build.
- Most moveable bridges and all iconic bridges are delivered using Design-Bid-Build.
- City maintains control of design so project is closer to expectations of Council and Citizens.

The benefit of early fabrication industry input to the design will be captured by adding a senior steel fabrication expert to the City's design team. This is not currently in the design budget.

It is also recommended that a shortlist of qualified bidders be established before completion of the detailed design and that regular meetings are held between the shortlisted bidders and the City's design team to solicit contractor input as the designed is being finished

Introduction

The City's Project Charter identifies the need for a Design-Assist procurement method to help mitigate risks associated with construction cost escalation, in particular the cost of steel.

Design-Assist refers to a procurement process wherein detailed design is carried out with input from contractors. This early input helps achieve a practical design and enhances the constructability of the project. Although Design-Assist can be achieved in several different ways, five different Design-Assist approaches have been considered for the Johnson Street Bridge Project:

A. Early engagement of a steel fabricator to allow steel prices to be locked in based on a 30% complete design. Completion of the design by the City's design team in collaboration with the steel fabricator.
B. Engagement of a construction consultant to provide constructability reviews of the design prior to its completion,
C. A 3 stage Design-Bid-Build procurement where prequalified contractors are engaged by the City's design team before completion of the design.
D. Design-Build procurement where contractors and designers collaborate to complete the City's design team's 30% design,
E. Construction Management at Risk procurement based on a 30% complete design,

In order to move forward with the replacement of the Johnson Street Bridge, this report recommends a procurement model for the bridge replacement based on a review of the main project risks and a comparison of the relative merits of the above five different design-assist procurement methods. A market sounding was also undertaken to understand the bridge construction industry's appetite and experience with different procurement models.

1. Key Project Risks

In January 2011, the City undertook a risk assessment workshop for the Johnson Street Bridge Project. As part of the continued development of the project, the City undertook a second risk assessment of the project in May 2011. Two of the key project risks identified in these workshops were:

a) Escalation of construction prices and in particular escalation of the price of steel.
b) Not delivering a bridge that is substantially similar to the renderings presented to Council and the public.
c) Uniqueness of the design.

Factors affecting these risks are discussed below.

a) Escalation of Construction Prices

<u>Competing Projects</u>

Although the past three years have seen a reduction in prices for highway and bridge construction, there are a number of important projects anticipated in the next 5 to 10 years that could result in escalation of construction prices in the Lower Mainland and Vancouver Island. This escalation could result from both a labour shortage as well as an escalation in the cost of construction materials.

Potentially influential projects in this regard include:

- Ongoing development of the oil sands in Northern Alberta. An estimated $1.3 trillion of construction is anticipated in the next 20 years.
- Major hydroelectric development projects in British Columbia over the next 10 years,
- Re-building of areas in Japan that were devastated by the recent earthquake.
- Re-emergence of commercial development in major cities such as Calgary, Edmonton and Vancouver,
- Major transmission line projects in BC and Alberta.

An analysis by BTY, a cost consultant, is provided in **Appendix A** of the current construction by market in British Columbia. Annual escalation of construction costs of between 1% and 3% is identified in the BTY report for British Columbia between 2011 and 2014.

<u>Price of Steel</u>

The cost of steel was identified in the City's Project Charter as the major cost risk to the project. In addition to the cost of steel, availability of steel and shop time for steel fabrication was identified as risks to both the project budget and schedule. To help quantify these risks, the following information from the July 2010 cost estimate is important:

Item in Estimate	Estimated Quantity
Tonnage of fabricated steel in bascule span	2,000
Tonnage of steel in approach spans	770
Tonnage of steel in foundations	150
Tonnage of reinforcing steel	973
Total steel tonnage	4,050
Estimated price for steel supply ($2,000/t)	$8,100,000
Contingency (15%)	$1,220,000
Allowance in estimate for escalation in steel prices (10%)	$ 930,000

If steel prices were to increase by 10% over and above the 10% allowance included in the project cost estimate (total of 20% increase in steel prices), there would be a budget shortfall of $930,000 or about 1% of the Project budget.

Cost of Labour

A total of 165,259 man hours was estimated in July 2010 for on-site labour. This corresponds to about $9.5 million if a unit rate of $50/hour is used and the project estimate's 15% contingency is included. Based on these values, the project estimate's 10% allowance for escalation for on-site labour is $950,000.

If labour prices were to increase by 10% over and above the 10% allowance included in the project cost estimate (total of 20% increase in on-site labour prices), there would be a budget shortfall of $950,000 or about 1% of the project budget.

Availability of Steel and Fabricators

The project schedule allows the following durations with regard to steel supply, fabrication, delivery and erection:

Steel shop drawings, order and supply	–	5 months
Steel fabrication	–	11 months
Steel Delivery to Site	–	2 months
Steel Erection	–	2 months
Total Steel Schedule	–	20 months

Based on the above durations and a start of construction date of November 2012, opening of the new bridge is anticipated in February 2015, including consideration of fish windows. This gives just over a year of schedule float if a March 2016 completion date is required to comply with the City's Federal Funding Agreement.

The dates noted above are considered to be reasonable and not based on an aggressive approach to construction. For example during the recent boom period in BC, steel supply required a lead time in the order of 6 months while it currently requires in the order of 3 months.

b) Not delivering a bridge Substantially Similar to What has been presented to Council and the Public.

The key elements of the bridge and the project in general include:

- Overall proportions and dimensions of the replacement bridge are substantially similar to those endorsed by Council in November 2009,
- The approach spans and bascule span are of the same architectural family,
- The lighting scheme on the bridge is integrated with the bridge architecture,
- The trusses are characterized by their tapering configuration in elevation and the faceted truss members,
- The mass of the substructures will be architecturally "masked" to allow the superstructure to be accentuated,

- In the future the public's ability to walk through the wheel when the bridge is not operating,
- The reliability and durability of the electrical/mechanical system,
- The functional and connective requirements with regard to vehicles, pedestrians, cyclists and mobility impaired people will be as presented to Council and the public over the past 2 years,

Failing to provide the above elements would result in a project that is substantially different than what has been presented to the public.

c) Uniqueness of the Design

The bridge design is unique for a number of reasons. These include:

- Moveable bridges are not as common as fixed bridges, and
- The City requires an architecturally significant bridge and as such a non-conventional design is required.

2. Mitigating Strategies

As noted in this report's introduction, a Design-Assist based procurement model was identified as an important strategy to mitigate risks associated with construction costs. It is also valuable in dealing with the uniqueness of the design because it allows contractors to be involved in the design development and as such become familiar with the project before bidding. In general early contractor involvement through Design-Assist:

- Allows a design team to understand where their design could be adjusted to improve constructability,
- Gives contractors detailed insight into the design before having to price the work.

The integrity of the design is best protected by having the City design team complete the design for all the architecturally important and operational critical elements of the project. These elements of the project include the bridge superstructure, substructure dimensions, electrical/mechanical system, landscaping, lighting and overall integration of the project into the city fabric. This level of design control can be integrated with a Design-Assist procurement model.

The characteristics, advantages and disadvantages of the five Design-Assist models noted in the introduction are provided in the following:

Procurement Model Option	Description	Advantages	Disadvantages
A. Design-Assist with a Fabricator	A steel fabricator is selected using a 30% complete design and a target price is established. The steel fabricator works with the City's design team to develop shop drawings and expedite steel ordering, fabrication and steel	▪ Steel can be ordered early without having to wait for 100% design of all elements of the project. ▪ Inclusion of a steel fabricator during completion of detailed steel design will increase the efficiency of the design.	▪ City may lose considerable design control. ▪ Early ordering of steel is a risk if the project is cancelled. ▪ Interface between fabricator and General Contractor is difficult to specify and significantly

Procurement Model Option	Description	Advantages	Disadvantages
	erection. The steel fabricator is assigned to a General Contractor after the balance of the project is tendered.		increases the potential for claims. ▪ If the cost of steel is volatile, steel suppliers may not be able to hold prices for more than a few weeks. Guaranteed pricing for a longer period of time would be obtained at a premium. ▪ Non-standard contract documents would be required. This will add “risk money” to bids. ▪ Loss of single point of accountability for construction.
B. Design Assist with a Constructability Consultant	City design team completes the design with constructability reviews carried out by a senior consultant with many years’ experience as a fabricator on contractor. Traditional Design-Bid-Build procurement	▪ City maintains full design control. ▪ Conventional contract documents that the industry is familiar and comfortable with. ▪ Review of design by an experienced contractor before tendering.	▪ Constructability Consultant will not be bidding the project. ▪ Fabrication and construction methods vary between contractors and consultant’s advice may not be applicable to all bidders.
C. 3 Stage Design-Bid-Build	Traditional tender based on 100% complete design and engagement of single General Contractor based on a low bid from a pre-qualified bidder. Prequalified bidders are engaged by the City’s Design Team immediately after shortlisting and in advance of tendering to get contractors’ input during detailed design.	▪ City maintains full design control. ▪ Conventional contract documents that the industry is familiar and comfortable with. ▪ Single point of accountability for construction. ▪ Input from various contractors before completion of the design.	▪ Longest schedule compared to other procurement models with regard to starting on-site works. ▪ Some loss of efficiencies inherent in a Contractor-led design effort.
D. Design-Build	Shortlisted Proponents submit a technical proposal showing how they will	▪ Efficiencies from a Contractor-led design team. ▪ Standard, industry-	▪ Loss of design control by the City. This would be mitigated by providing

Procurement Model Option	Description	Advantages	Disadvantages
	comply with the Project's technical and performance requirements. Based on a technical pass/fail, award to the lowest price.	recognized contract documents are available to reduce perception of risk by Proponents. ▪ Single point of accountability during construction. ▪ Reduced construction schedule.	prescriptive requirements (100% design) for elements where the City has made hard commitments and performance requirements where the City has committed to functional requirements (architectural, seismic performance, mechanical/electrical reliability for example).
E. Construction Management at Risk (Negotiated Contract)	A preferred Proponent is selected based on qualifications and before design is 100% completed. A target price is negotiated in partnership with the City and the Design Team as the design is completed.	▪ Efficiencies from Contractor/Design Team interaction are achievable during development of Target Price and completion of design. ▪ Single point of accountability during construction. ▪ Allows a clear understanding of the project risks and sharing of the project risks to optimize pricing. ▪ Potential for reduced construction schedule. ▪ Standard contract documents available from other jurisdictions such as Utah DoT.	▪ Could be perceived to lack transparency. ▪ Some contractors may only bid if there is no restriction on using their own forces. This could lead to non-competitive or lack of transparency in pricing.

3. Market Sounding

A number of Lower Mainland bridge construction firms were interviewed to discuss procurement strategies, steel prices and general escalation of construction costs. Contractors that expressed interest in the project and were available to be interviewed were:

- B.A. Blacktop (member of Vinci Group)
- Dragados Canada
- Flatiron Constructors

- Peter Kiewit & Sons
- Surespan Construction

Similar discussions were held with PCL.

In general there seems to be considerable interest in the project from contractors and based on this level of interest competitive bidding is anticipated.

A copy of the information sent to each contractor in advance of the interview is provided in Appendix B. In this package, Design-Assist was described to have the following characteristics:

- Ability to detect and resolve design problems and constructability issues, and address volatile steel costs and potential schedule/delivery issues.
- Design assist would be provided by the steel subcontractor.
- City would issue Request for Proposal for steel fabricator upon completion of preliminary design.
- Fabricator would assist with completing detailed design, detecting and resolving design problems and constructability issues prior to tendering.
- Outcomes include faster delivery or a higher level of certainty in delivery, to provide certainty to project timeline and cost.
- When the General Contractor is retained, the steel design assist and fabrication contract is to be assigned to the General Contractor as a nominated subcontractor for final assembly of the bridge.

Each interview was structured around the following questions:

Q1. Suitability of the Johnson Street Bridge Replacement Project to be delivered via Design-Bid-Build, Design-Assist, Design-Build?

Q2. Any issues with design-assist as proposed?

Q3. Any preference for a specific delivery method? Why?

Q4. Any feedback on steel supply issues in British Columbia – supply or pricing issues?

The following comments were made during the interviews:

Q1.

- In general, all contractors were in favour of Design-Build as the preferred method of delivery if a shortlisting process was developed to give traditional bridge builders without moveable bridge experience a chance of shortlisting. Most said that they would respond to a traditional Design-Bid-Build bid. There was, in general, considerable skepticism regarding the viability of a Design-Assist approach.

Q2.

- Design- Assist has a large risk of claims that could easily negate any savings in the price of steel. These claims would stem from the considerable complexity involved in managing the interface between the City selected steel fabricator and the General Contractor.

- A robust contract has a single point of accountability for the delivery of a project. The Design-Assist approach muddies the water with regard to accountability and this increases the project's risk profile.
- The technical and commercial integration of the designated fabricator and the General Contractor will be challenging and increases the project's risk profile with regard to disputes and quality.
- Engaging with a steel fabricator too early may diminish competitive pricing particularly given the uniqueness of the design. For example steel detailing will not be available with a 30% design and will be difficult to anticipate. Any details that the fabricator did not anticipate in establishing his Target Price will be the basis for claims and will not be priced competitively.
- Early engagement of a steel fabricator may not avoid the risk of escalating steel prices given that in volatile markets, many suppliers will not guarantee prices for more than 2 weeks.
- The cost of Design-Assist is likely higher than other procurement methods and the City's risk profile is increased.
- Erection of the bridge will need to be integrated with how steel is assembled in the fabricator's shop and transported to site. Given that the erection method will not be known until the General Contractor is selected, this will result in unanticipated costs for the fabricator and lead to extras. Alternatively the steel fabricator can be asked to include erection in his Target Price. This would result in the bulk of the project being awarded based on a 30% complete design. The City would be at risk for all changes that can be expected with this low level of design development.
- Interfaces between the electrical, mechanical and substructure elements of the construction and the fabricated steel will need to meet extremely tight tolerances and critical schedule dates. There is a risk that these interfaces will result in claims from either the steel fabricator or the General Contractor.
- Design-Assist has been proven to be effective where very tight deadlines need to be met but there is a corresponding premium to be paid. The BC Ministry of Transportation's Capilano Bridge Project was referenced in this regard.

Q3.

As noted above most Contractors preferred a Design-Build procurement. They were open to the following Design-Build approach:

- Technical pass/fail with award to the lowest price,
- 100% design by the City on architecturally important elements of the project,
- Design-Build for elements where performance is required and aesthetics are not critical - deep foundations for example.

One Contractor suggested a negotiated Target Price with an Alliance Contract. Negotiation with a qualified contractor would allow the transparent sharing and clear understanding of risks resulting in potentially lower prices than with a traditional Design-Bid-Build approach. An element of price competition is inherent in this process given that a contract is not signed until both parties agree on a Target Price. Contingencies are identified in a transparent manner and jointly managed by the Contractor and the City with a formula for sharing in any cost over and under runs.

One Contractor initially preferred the Design-Assist approach given that they lack experience with moveable bridges but have a strong fabrication group. They were, however, open to Design-Build if the Request for Qualifications allowed them to supplement their traditional bridge building experience with that of a "Moveable Bridge Coordinator".

Q4.

Comments regarding the cost of steel and general outlook on construction costs were as follows:

- The price of steel is a relatively small percentage of the overall project cost.
- Steel prices are currently relatively stable and have recovered from the depressed prices experienced over the past 2 years
- Costs of between $5,000 and $10,000 per tonne for supply, fabricate and erect were quoted in the discussions. The current estimate is based on $9500/tonne for the bascule span and $7500/tonne for the approach spans. $2000/tonne was mentioned as the cost of steel supply.
- The Alberta economy may have only limited impact on the Lower Mainland.
- Steel is a global commodity and many were both doubtful if demand in Alberta's oil sands would have a large impact on the cost of steel.
- The price of steel was compared to the stock market and most did not want to speculate on escalation.

4. Analysis of Procurement Models

Based on the results of the market sounding described in Section 3, procurement Option A - Design-Assist with Early Fabricator Engagement is not recommended for the following reasons:

- This approach is not common in the transportation industry in Canada,
- It will require the development of sophisticated contract documents with which the City has no experience,
- It will result in a loss of design control for the City,
- It will introduce a number of contractual design interfaces that introduce additional risks.

Procurement Option E - Construction Management at Risk is also not recommended. This is primarily because this approach often involves a cost premium and because considerable, currently non-existent procurement processes would need to be implemented to ensure the transparency of this procurement model.

Procurement Option B – Design Assist with a Constructability Consultant is considered to be compatible with Option C and such could be implemented if Option C is found to be the preferred option.

A closer review of Option C – 3 Stage Design-Bid-Build and Option D – Design-Build is provided below to help develop a recommended procurement model.

Option C - 3 Stage Design-Bid-Build Procurement

This procurement model includes a prequalification, a design development and a traditional tender stage. Characteristics of these three stages are:

1. Prequalification Stage – A shortlist of 3 qualified bidders would be established based on the experience of the bidders' corporate and proposed key individuals experience as well as financial strength. Relevant experience would be focused on the construction of moveable bridges. A potentially longer list of prequalified steel fabricators would also be developed based on experience with the fabrication of significant architectural steel works and moveable structures. The three prequalified bidders would be

free to use any of the prequalified steel fabricators. A bid bond-type of mechanism may be required from the shortlisted bidders to ensure that the City receives 3 competitive bids.

2. Design Development Stage – The City's Design Team completes the detailed design of the project and establishes the technical requirements for the project in consultation with the shortlisted Proponents. This consultation would allow a level of design-assist to take place and would allow a contract document to be developed that optimizes the risk sharing between the City and the contractor. Interaction between the shortlisted bidders and the City's design team will also allow the bidders to thoroughly understand project scope and risks and optimize their tender prices. Interaction between the shortlisted bidders and the City's team could be achieved through separate meetings with the individual bidders and general information meetings. A fairness advisor may be required for this process.

3. Tender Stage – A traditional tender would be issued at the completion of the Design Development Stage. The tender documents would be based on CCDC2 with which the City is familiar.

This approach is based on conventional contract documents with which the City is familiar and allows optimization of risk sharing between the City and Contractor. This optimization should result in more competitive tender prices.

We also note that most moveable and iconic bridge projects in North America are delivered using a Design-Bid-Build procurement.

Option D - Design-Build Procurement

A hybrid Design-Build procurement model can be used to provide design-assist while allowing the City to retain design control over the architectural elements of the project. With a hybrid Design-Build procurement model, the City's design team would provide the City with 100% complete design for the bridge superstructure and the visible parts of the piers and abutments. Given the independency between the bridge's superstructure design and the electrical mechanical system, the City's design team would also provide 100% design for these elements. The remaining elements of the project could be designed by a Design-Builder based on performance-based specifications and a 30% complete reference concept. Design elements for the Design-Builder would include:

- Foundations,
- Below water bridge elements such as footings and foundations,
- Fendering,
- Approach roads and paths,
- Roadway illumination,
- Traffic signals,
- Drainage,
- Removals and decommissioning of existing facilities.

We note that there is a strong interdependency between a bridge's foundations, substructures and superstructure particularly for seismic design. Splitting superstructure and foundation design between two different design groups could lead to issues regarding overall responsibility for the design.

The design scope noted above for the Design-Builder corresponds to a construction cost of about $20 M (excluding engineering, contingencies and escalation). Whereas Design-Build can result in cost savings of 10% to 15% when there is considerable scope for innovation, we believe, that in the case of the Johnson Street Bridge, there is limited scope for innovation in the elements designed by the Design-Builder and only a 3% to 5% savings is likely on the elements designed by the Design-Builder. This corresponds to a construction cost reduction for the project of between $600,000 and $1,000,000.

Two options can be considered for a Design-Build procurement. These are:

i. The Design-Build Request for Proposal includes a 100% complete superstructure and electrical/mechanical design together with performance specifications for the balance of the project scope, or
ii. The City design team completes the superstructure and electrical/mechanical design in collaboration with the three shortlisted Design-Build teams during the Request for Proposal period.

Option ii has the advantage of providing an opportunity for better integration between the City's design team and Design-Builder's design efforts. Based on a schedule analysis Option ii also provides a more compressed schedule and as such would be preferable.

Given that the proposed Design-Build model represents a relatively complex procurement process, a budget of between $400,000 and $800,000 would be anticipated to manage this procurement process and to manage the ongoing Design-Build elements of the contract. A stipend in the order of $150,000 per unsuccessful Design-Build Proponent would be normal for a project of this size. This represents an additional, currently unbudgeted cost of between $700,000 and $1.1 million. As such the cost savings available from a Design-Build procurement may be limited.

Schedule Comparison

Important schedule considerations are:

- A Project Definition Report (PDR) is required for both procurement options to clearly establish the project scope and associated costs to a level corresponding to a 10% contingency. The draft PDR is scheduled to be delivered to the City in late October.

- The construction schedule is relatively the same for both procurement options. A 2.25 year construction schedule is estimated.

- Detailed design of the steel superstructure is the critical path through Detailed Design and requires 10 months after completion of the PDR.

- A 6 month proposal period would be required for a Design-Build procurement. This duration includes issuing of the RFP, proposal preparation by proponents, evaluation of proposals by the City and award.

Based on the above key durations, the following table compares the schedules Option C – 3 Stage Design-Bid-Build and Option D – Hybrid Design-Build.

Activity	Optin C - 3 Stage Design-Bid-Build		Option D – Hybrid Design-Build	
	Start	Finish	Start	Finish
Project Definition Report	April 2011	November 2011	April 2011	November 2011
Detailed Design of Superstructure[1]	November 2011	September 2012	November 2011	September 2012
Detailed Design of other elements	November 2011	September 2012	January 2013	April 2013
Request for Qualifications	January 2012	September 2012	January 2012	May 2012
Request for Proposals	N/A	N/A	June 2012	November 2012
Tender	October 2012	November 2012	N/A	N/A
Award	December 2012		December 2012	
Construction[2]	January 2013	March 2015	January 2013	March 2015

Notes:

1. Assumes that detailed design commences immediately after submission of the Project Definition Report and before sign-off of this report by the City.
2. Not including decommissioning of the existing road bridge.

Comparison of Option C and Option D

Based on the above discussion the following comparison can be made:

- Both options include design-assist,
- Both options are compatible with of total completion of March 16, 2016,
- Neither option has a schedule advantage,
- Neither option has a cost advantage,
- Both options provide the City with the required level of design control,
- Most moveable bridges are delivered using a Design-Bid-Build approach.
- Option C allows for the use of conventional contract documents with a relatively simple procurement process whereas Option D requires the development of a relatively complex procurement process.

5. Recommended Procurement Option

Option C – 3 Stage Design-Bid-Build is recommended. This recommendation is based on the following:

- Option C represents a procurement method that closely resembles a process with which the City is familiar and as such has a lower risk profile for the City.
- There is no significant cost or schedule advantage to Design-Build given that there is limited scope for innovation.
- Most moveable bridges and all iconic bridges are delivered using Design-Bid-Build.

- The City maintains design control to allow the project to comply with the expectations of Council and Citizens.
- The benefit of early fabrication industry input to the design will be captured by engagement of prequalified bidders during the completion of the detailed design. This benefit could be enhanced by engaging a senior constructability consultant to the design team. This is currently not in the project budget.