



## **Committee of the Whole Report**

### **For the Meeting of August 10, 2017**

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**To:** Committee of the Whole **Date:** July 21, 2017  
**From:** Thomas Soulliere, Director of Parks, Recreation and Facilities  
**Subject:** Risk Management Approach: Crystal Pool and Wellness Centre Replacement Project

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### **RECOMMENDATION**

That Council

1. Approve the Risk Management Approach for the Crystal Pool and Wellness Centre Replacement Project;
2. Accept the key risks and mitigation strategies outlined for the project

### **EXECUTIVE SUMMARY**

Identifying, monitoring, minimizing, and mitigating risks with the greatest potential to impact budget and schedule are critical to positioning the Crystal Pool and Wellness Centre Replacement Project for success.

This report builds on the June 22, 2017 progress update to Council, which reviewed project planning, communications and engagement, funding opportunities and partnerships. The focus of this report is the risk management approach, which also aligns with the City's Project Management Framework and Project Management Institute's Project Management Body of Knowledge best practice of consistent reporting to key stakeholders regarding project risks.

The report is intended to provide Council with information on the extensive work completed to establish an industry-standard, ongoing risk management approach over the life of the project, as well as work undertaken to identify and assess key risks and the strategies to manage their impact. The Project Team has identified five key risk areas which must be managed, as well as response strategies for each, outlined in Attachment 1.

Council approval of the methodology to managing risk and specifically the five key risk areas identified, is an important action for this major project. This approach will help to ensure the Project Team, Council, stakeholders and citizens are aware of the expectations and processes associated with risk management.

## **PURPOSE**

The purpose of this report is to provide Council with a description of the risk management approach for Crystal Pool and Wellness Centre Replacement Project, as well as highlight the key risk areas identified to-date and responses for each.

## **BACKGROUND**

The Crystal Pool and Wellness Centre Replacement Project is a major infrastructure initiative to replace the current community aquatic and recreation facility. The new facility will be fully accessible and inclusive, meet environmental and operational standards, and serve the growing needs of citizens of all ages and abilities from across Greater Victoria for generations to come.

The Project Team is committed to an open, transparent and accountable approach to managing this project and will continue to engage Council and the public at regular intervals throughout the project. To date, several key updates and/or decisions have taken place:

- February 16, 2017 - Council approved the replacement at a cost of no more than \$69.4 million, including \$10 million from the Buildings and Infrastructure Reserve and the remainder through a combination of external borrowing and other funding opportunities. Council also directed staff to update the 2017-2021 Financial Plan, to include funding for the Crystal Pool Project, as well as to consult with citizens and stakeholders and develop a communication plan.
- June 15, 2017 - Council received a staff report on the "Lessons Learned from the Johnson Street Bridge Project", with advice relating to the Crystal Pool Project
- June 22, 2017 - Council received a Project Update report, with information on project planning, communications and engagement, funding opportunities and partnerships.

The material in this report is a continuation of that commitment.

## **ISSUES & ANALYSIS**

The Crystal Pool and Wellness Centre Replacement Project will have a distinct impact on Greater Victoria. By removing barriers and being more accessible, the new facility is expected to accommodate 35% more visits, allowing citizens of all ages and abilities to be active and social for decades to come.

Designing and building a facility to meet these operational goals is a challenge, however there are numerous aquatic, wellness and recreation facilities of similar size and scope built every year across North America. Like the Crystal Pool project, these facilities are created to be centres of active, inclusive communities.

The Project Team is drawing on these experiences and lessons learned, and considering proven mechanical, electrical, structural, and pool technologies, to set priorities and proactively manage and mitigate risks that have the greatest potential to impact successful project delivery.

### **Project Priorities**

Based on lessons learned from past City projects as well as peer-reviews across Canada, six priorities will define the success of the project:

- Delivering the project within budget
- Managing overall risk
- Achieving best value for money based on a total life cycle approach, considering capital and operating costs
- Achieving project scope that includes a 50-metre pool tank, dry floor recreation spaces and multi-purpose rooms
- Achieving a high-quality fitness and wellness facility that is barrier-free, inclusive, a place for community, and is efficient and sustainable
- Delivering the project on schedule

These priorities form the basis of the Project Plan and risk management approach.

### **Risk Management Approach**

Civic infrastructure planning requires fiscal prudence and clear, accountable risk identification and management over the entire life of the project.

The Project Team developed a risk management methodology at the outset of the project that is based on industry best practices; continuously identifying and reviewing key risks, assessing their impact and probability, evaluating each risk, and implementing the appropriate strategies to minimize or mitigate their impact.

As shown in the table below, there are a number of key elements to this approach, including Regular Risk Workshops, a Risk Management Committee (comprised of senior City staff, consultants and expert advisors), and regular reporting to Council. All of this information is documented in the Risk Management Plan for the project.

*Table 1: Risk Management Approach*

| Monthly                                              | Quarterly                        | Key Milestones                                              |
|------------------------------------------------------|----------------------------------|-------------------------------------------------------------|
| Report to the Project Team and Steering Committee    | Risk Management Committee Review | Formal Risk Review and Third Party Risk Register Review:    |
| Risk Register Update                                 | Council Update                   | 1. Upon receipt of Revised Cost (Class D) Cost Estimate     |
| Project Status Reports (risk, cost, schedule, scope) |                                  | 2. After Owner's Representative Project Manager is procured |
|                                                      |                                  | 3. After Design Consultant is procured                      |
|                                                      |                                  | 4. After Construction Manager is procured                   |
|                                                      |                                  | 5. At 50% and 100% Design                                   |
|                                                      |                                  | 6. When all tenders are awarded                             |

### *Risk Management Plan*

The Risk Management Plan defines how project risks with the greatest potential impact to budget, scope and schedule will be identified, monitored, controlled and mitigated throughout the project

life cycle. The plan also provides a framework for managing risk that is proactive and identifies the required resources, expertise and processes at the earliest possible stages.

Importantly, the Risk Management Plan is integrated into the Project Plan and meets the standards of the City's Project Management Framework and the Project Management Institute's Project Management Body of Knowledge.

The Risk Management Plan has five elements:

1. Risk Identification
2. Risk Analysis
3. Risk Response Planning
4. Risk Monitoring and Control
5. Risk Reporting

### *1. Risk Identification*

As the prudent first step in project planning, the Project Team identified a preliminary list of risks by:

- Conducting two Risk Management Workshops to identify all known risks
- Reviewing the risks and lessons learned from similar construction projects underway locally and across Canada, as well as the Johnson Street Bridge project, and
- Establishing a Risk Register that is a living document to be updated monthly over the life of the project and to ensure early risk identification and mitigation occurs at every step of the project.

During design and construction, the Project Manager is responsible for adding any newly-identified risks to the register.

### *2. Risk Analysis*

The Project Team has and will continue to engage external advisors in a review of the Risk Register and utilize the Risk Workshops to analyze all known risks and identify the priority risks.

The Project Team is responsible for ongoing risk analysis, including residual probability and cost/schedule impact, should a key risk transpire, as outlined in Table 1.

### *3. Risk Response Planning*

The City developed risk responses in four categories based on industry standard: avoid/exploit, transfer/share, mitigate/enhance, or accept, and assigned responsibility for each identified risk.

Through the Risk Workshops, the Project Team reviewed a range of planned responses for each risk. A clear, single point of contact has been assigned responsibility and accountability for response, and monitoring any residual risk.

To ensure input is continuously gathered, five formal Risk Management Workshops are planned at key project milestones.

As *Table 1* illustrates, risk reviews and response planning continues throughout the project.

#### *4. Risk Monitoring and Control*

As project planning progresses this summer and fall, the Project Team will monitor and reassess all the risks in the register at two key milestones; upon receipt of revised cost (Class D) estimate, and when the Owner's representative Project Manager is procured.

During design and construction, the single point of contact assigned responsibility for risk response will monitor the indicators that a specific risk may or may not be changing. For key risks, this individual will report monthly to the Project Team on the risk status. The Project Team will use this input to assess the probability and cost/time impact if the key risk events happen.

The Project Team is responsible for risk control, using industry best practice to continuously monitor and control the net impact of risks to the project schedule, cost, scope and quality.

#### *5. Risk Reporting*

Proactive reporting on risks continues throughout all phases of the project. The Project Manager will update the Steering Committee monthly through Project Status Reports, establishing an early warning mechanism of any emerging or present risks and enabling timely, appropriate risk responses; the City's Deputy Project Manager will report to the Steering Committee on the key risks and if any new risks arise that may impact the project; and, the Director of Parks, Recreation and Facilities will update Council quarterly.

### **Key Risks and Responses To-Date**

The Project Team has presently highlighted five key risk areas with the greatest potential impact on the project budget and schedule. These risk areas include:

- Market conditions, competition, labour availability, cost escalation
- Funding and spending requirements
- Site conditions
- Traffic, parking, community impact
- Operation of the existing facility

A detailed summary of each, along with the risk response strategy, and actions taken to-date are included in Attachment 1. It is important to note that this does not represent the full list of all risks identified in the Risk Register, but rather those deemed to be the most critical at this stage of the project. In addition, a summary of the risk evaluation of the project delivery model is provided in Attachment 2.

### **OPTIONS & IMPACTS**

#### **Council approve the Risk Management Approach, as well as key risks and responses for the Crystal Pool and Wellness Centre Replacement Project**

The risk management approach noted above is rooted in leading industry practice, experiences and lessons from other major projects, and City policies and practices. The methodology is intended to help guide this initiative to a successful outcome in a pro-active, transparent and accountable manner. Staff recommend Council approve this risk management approach.

### *Accessibility Considerations*

According to Recreation Integration Victoria, one in five residents is excluded from using the current facility due to its physical design. The new building will incorporate major physical and service enhancements to ensure the future building removes barriers to participation and is accessible for patrons of all ages, abilities and gender identification.

### *2015 – 2018 Strategic Plan*

The Crystal Pool and Fitness Centre Replacement Project align with Objective 7: Facilitate social inclusion and community wellness, seek opportunities for accessible sports and fitness by children and adults.

### *Impacts to Financial Plan*

Council has committed \$10 million from capital reserves toward the project cost of \$69.4 million. The remainder will be acquired through a combination of external borrowing, which requires electoral approval, and other external funding opportunities.

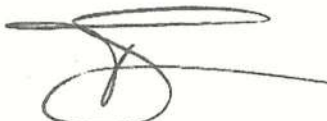
## **CONCLUSIONS**

As detailed in this report, the Project Team is committed to implementing industry and City standards to manage, minimize and mitigate risks, and delivering a high-quality facility within budget and schedule expectations. The methodology outlined is intended to provide a pro-active, transparent and accountable approach, which will position this major initiative for success.

Respectfully submitted,



Nav Sidhu  
Assistant Director  
Parks, Recreation and Facilities



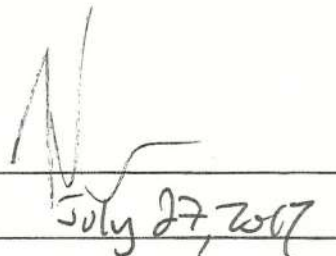
Thomas Soulliere  
Director  
Parks, Recreation and Facilities



Ralf Nielsen  
Principal and Director of Sustainability  
Colliers Project Leaders  
Crystal Pool Project Management Advisor

**Report accepted and recommended by the City Manager:**

**Date:**

  
July 27, 2017

**List of Attachments:**

Attachment 1: Summary of Key Risks and Responses (as of July 14, 2017)

Attachment 2: Summary of Risk Evaluation of Project Delivery Models

## Attachment 1

### Key Risks and Responses

#### ***Risk: Market Conditions, Competition, Labour Availability and Cost Escalation***

In the current, heated, local construction market, the availability of local skills and labour presents the greatest schedule and cost escalation risk for this project.

#### ***Response Strategy 1: Ongoing cost estimating***

- Retain an independent Quantity Surveyor (QS) to provide cost escalation estimates with the refined Cost (Class D) Cost Estimate in August 2017.
- Update the cost estimates and escalation figures at three key design milestones: 50%, 75% and pre-tender to monitor cost escalation, develop forecasts and refine escalation contingencies.
- Hold Project Team accountable (through contracts and plans) to deliverables that allow the timely development of cost estimates by the QS.

#### ***Response Strategy 2: Proceeding with Schematic Design in Fall 2017 to avoid future escalation costs***

- Proceeding with facility design in Fall 2017 creates project readiness in Spring 2018 and avoids higher costs later in the project.

#### ***Response Strategy 3: Using experience and qualifications based evaluation for critical procurements (Project Manager, Design Consultant, and Construction Manager)***

- Key consultants will be required to demonstrate:
  - local experience in designing and constructing pool and wellness projects of similar scope and budget, and
  - track record of working in heated construction markets.

#### ***Response Strategy 4: Using the Construction Management for Services and Construction delivery model***

- Construction Manager (CM) brings local knowledge of market conditions, constructability, trade and labour availability in very early to the design development stage.
- CM prepares trades procurement and labour supply plans for review by the City.
- The City will review and approve the plans to ensure minimal impact on cost, quality and schedule.
- Transfer of risk for cost, schedule and quality to the Construction Manager once the construction trades packages are awarded (excluding those outside their control).

See Attachment 2 for a risk evaluation of the project delivery models.

#### ***Response Strategy 5: Using contingency planning***

- Escalation Contingencies are included within the project budget.

### ***Risk: Funding and Spending Requirements***

***Federal and provincial negotiations on budget allocations for the social infrastructure component of the Investing in Canada Plan are expected in late 2017/early 2018. Resulting agreements may fast-track the project schedule to meet funding requirements.***

#### ***Response Strategy 1: Tracking and monitoring negotiations between the federal and provincial governments***

- Continue engaging with government representatives.
- Identify and track other government funding opportunities.
- Apply for applicable programs.

#### ***Response Strategy 2: Tracking spending requirements of funding programs***

- Track any conditions and spending requirements of federal funding programs.
- An alternate schedule can be implemented that requires the Construction Manager to issue work packages in sequence to enable substantial completion of the project by Fall 2020.

#### ***Response Strategy 3: Borrowing required funds from Municipal Finance Authority***

- Implement the plan to borrow the required funds from the Municipal Finance Authority pursuant on a referendum.
- 

#### ***Response Strategy 4: Ongoing Schedule and Cost Reviews that consider funding and spending requirements***

- Apply best practice in regular schedule and cost reviews that integrate funding and spending requirements alongside **market cost escalation** and other key risks.

### ***Risk: Site Conditions***

***Underground conditions are to be confirmed and the mature trees may pose potential design challenges and cost risks.***

#### ***Response Strategy 1: Conducting site due diligence and integrating findings into cost estimate***

- An Environmental Site Assessment (Level 2) and Geotechnical study recently completed to determine if any significant site conditions are present; results are being analyzed.

### ***Risk: Site Conditions***

*Underground conditions are to be confirmed and the mature trees may pose potential design challenges and cost risks.*

#### ***Response Strategy 2: Conducting Arborist study (tree survey)***

- An arborist studied the trees in Central Park and provided a recommendation on how to minimize the project's impact.
- Design Consultant is developing building orientations and set-backs to minimize impact.
- Engage the local neighborhood throughout the project.

#### ***Response Strategy 3: Using contingency planning***

- The Project Team included Design and Construction Contingencies within its budget.

### ***Risk: Traffic, Parking and Community Impact***

*The new facility is expected to increase visits by 35%, which will likely impact the community in terms of higher traffic and parking demand.*

#### ***Response Strategy 1: Analyzing transportation and parking requirements***

- A Transportation Demand Management Study is underway.
- Design Consultant and Project Team to develop options for managing transportation impacts.
- The Project Team interviewed Canadian peers on lessons learned to determine best practice to manage demand.

#### ***Response Strategy 2: Integrating all modes of transportation into design***

- Design integrates with all modes of transportation, including safe crossings, protected bike lanes, improved transit facilities as well as parking lot replacement.
- Engage local neighbourhood in planning, design and construction stages.
- Consult with BC Transit to accommodate the changing demand for transportation to and from the facility.

#### ***Response Strategy 3: Construction traffic management plan***

- Construction Manager required to develop and implement a traffic management plan for construction.
- The City will review and approve the plan to ensure the safety and minimal impact on the community.

***Risk: Operation of the Existing Facility***

Given the age and condition of the existing facility, the systems and components may fail before the new facility is completed and operation. This can impact the high-use of the facility today, and potentially disrupt, reduce or terminate the delivery of services and programs in future.

***Response Strategy 1: Risk management planning for the existing pool***

- A Risk Management Plan has been established to address the existing pool's critical systems should they fail.

***Response Strategy 2: Increasing inspections and maintenance***

- Increased frequency of inspections of the facility's systems to bi-monthly.
- Increased funding for maintenance.



Steering Committee  
Crystal Pool and Wellness Centre Replacement Project  
City of Victoria  
1 Centennial Square  
Victoria, BC, V8W 1P6

July 20, 2017

**RE: Crystal Pool and Wellness Centre Replacement Project: Project Delivery Model Risk Evaluation**

**Background**

Colliers Project Leaders has collaborated with over 80 municipalities across Canada to deliver more than 8,000 projects – from libraries, to pools, community centres and arenas. In addition, we've delivered in excess of \$1 billion in municipal infrastructure since 2012. Specific to Vancouver Island, Colliers Project Leaders has delivered more than 40 capital projects for clients such as BC Hydro, Camosun College, Public Services Procurement Canada, the District of Saanich and the University of Victoria.

Through our provision of pre-construction Advisory Services to the Crystal Pool and Wellness Centre Replacement Project, we have worked with the Project Team and Steering Committee to develop the analysis of project schedules, risk identification and an assessment of the project delivery models.

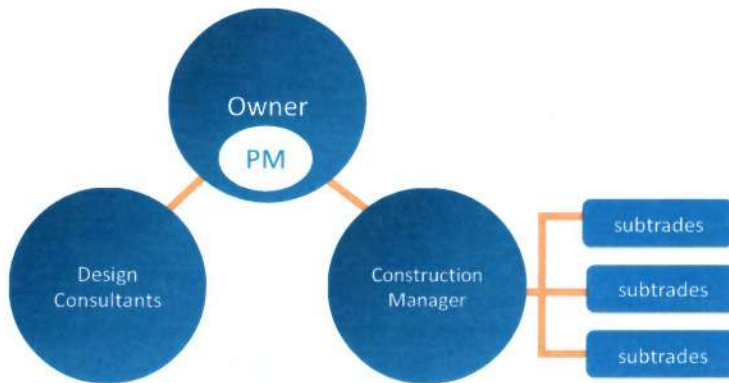
**Risk Evaluation of Project Delivery Models**

The selection of a project delivery model is considered a form of managing project risk. Each project delivery model presents risks and benefits to meeting a project's priorities and objectives. Collaboratively, the Project Team, Steering Committee and Colliers Project Leaders evaluated the risks and benefits of four industry standard design and construction procurement models:

1. Design-Bid-Build (DBB) – The City engages a design consultant to develop a detailed design. A tender is issued and General Contractors submit bids. The contractor with the lowest (qualified) bid is selected. Construction commences.
2. Construction Management for Services (CM as Agent) – The City engages a design consultant and a CM is retained at the same time to comment on constructability and cost. Once design is complete, the CM issues several tender packages and the City enters into contracts directly with the trades.
3. Construction Management for Services and Construction (CM at Risk) - The City engages a design consultant and a CM is retained at the same time similar to CM 'as Agent'. The CM tenders and enters into contracts directly with the trades. At a mutually agreeable point, the construction manager's contract is converted to a fixed price (at Risk) construction contract.
4. Design-Build (DB) – The City engages an owner's technical consultant to develop performance specifications and indicative design. A RFQ/RFP process is used to select a Design-Build contractor. The City enters into a fixed price contract to design and construct the project.

These options were evaluated through balanced multi-criteria assessment through a Delivery Model Workshop with the Project Team using Colliers Project Leaders' Delivery Methodology Assessment Tool. Evaluation criteria included the project priorities, risks, benefits, budget and

schedule requirements. Extensive best practice review, gathering of lessons learned and interviews with peers. A Risk Workshop further confirmed the outcomes of the assessment. Based on this work, the Project Team and Steering Committee determined a CM at Risk as the most beneficial and thus, the preferred delivery model (Figure 1).



*Figure 1 Construction Management for Services and Construction (CM at Risk) Delivery Model*

As part of the risk evaluation of the delivery model, a review of the retained risks and options analysis were conducted. The main points are as follows:

**a) Maintaining optimum control over the project**

The City of Victoria maintains optimum control over the project risks, cost, scope and quality through the CM at Risk model. The model allows the City to provide significant input and control over the design. The City, Design Consultant and CM work in collaboration during design to help assure a high quality, sustainable facility with optimum total cost of ownership. During design, the City's financial exposure is limited to the cost of the CM's Pre-Construction Services.

**b) Managing costs in a heated construction market**

In Vancouver Island's heated construction market, the CM at Risk delivery method gives the City the most flexibility to manage and mitigate market risks.

By engaging a builder early in the process, the City obtains realistic costing based on current market conditions and local trades. This will complement the advice obtained from the City's Quantity Surveyor. Once the CM's contract is converted to a fixed-price for construction, the City transfers the risks for cost and schedule.

The CM will consider the local market size, labour and skills availability to design the size and scope of trade packages to be attractive and stimulate competition within the Vancouver Island contracting industry.

**c) Integrating project management, design and construction**

Because the CM and Design Consultant can be retained at the same time, their expertise, together with the Project Manager and Quantity Surveyor, enables constructability, value engineering, market conditions and costing to be considered in an integrated manner across the Project Team.

The Design Consultant, CM and Project Manager are then accountable for identifying significant market constraints as design progresses and developing appropriate mitigation responses. This

step is prudent in case of specialized components requiring significant lead times or “off-Island” suppliers.

The method applies an “open book” approach for bids from trade tenders, allowing the City to be involved in the quality screening of sub-contractors and thereby allowing further control of costs and quality.

#### **d) Identifying qualified and experienced contractors**

Unlike traditional construction tendering (lowest price), the procurement of the CM is based on qualifications and experience with projects of similar scope and budget. The evaluation should include a review of their financial health and capacity to undertake the project as well as project methodology and sustainability. The CM becomes an active member of the Project Team during the design and tendering stages (Pre-Construction stage); proactively contributing to costing, constructability, scheduling, planning, materials and systems selection, value engineering and other, related services include market advice and insight.

#### **Retained Risks (CM at Risk)**

Every project poses risk to the City. The residual risks with CM at Risk need to be managed by the City and the Project Manager. These have been identified as:

1. **No early confirmation of construction cost.** This is not typically established until the majority of trade packages are tendered for construction.  
**Recommended Risk Response:** Parallel tendering of trade packages (rather than staggered) can allow an earlier confirmation of the cost of construction. The benefit of this may outweigh the cost escalation incurred with staggered tendering.
2. **Construction Manager motivated to include contingencies in initial estimates.**  
**Recommended Risk Response:** The City should retain a Quantity Surveyor to provide a series of cost estimates at 50%, 75% and pre-tender. The requirement to provide “open book” disclosure of bids for trade packages to the City should be included in the CM's contract.
3. **Risk for the quality of the design, design errors and omissions are retained by the City.**  
**Recommended Risk Response:** The City should commit internal subject matter expertise and user resources to engage with the Design Consultant and support project coordination. It should also conduct a Bid Document Review prior to issuing tenders to identify errors and omissions in the construction drawings.
4. **Uncertainty around market capacity on the island for this method over the next two years.**  
**Recommended Risk Response:** Procure the CM based on experience, qualifications, financial health, methodology and sustainability. The City should require the CM, as part of their contract, to provide a labour supply plan and trade package procurement strategy for review and approval. The City should be involved in the selection of subcontractors for quality screening.

#### **Risk Analysis of other Models**

As described in the April 10<sup>th</sup>, 2017 Committee of the Whole report, the Project Team established a comprehensive risk management approach and outlined the project risks that have the greatest potential impact on project budget and schedule. Through the multi-criteria Delivery Model Assessment, industry best practice and lessons learned review; the other three industry standard design and construction procurement models were identified as not suitable to meet the project priorities.

The traditional **Design-Bid-Build** model is a longer, sequential process that poses significant escalation cost risk. The model is primarily used when achieving project scope is of primary importance, and when cost and schedule are secondary. Typically, the construction contractor has no involvement during the design and project planning phases, posing significant risk to integrating market conditions, trade cost insights and constructability early in the project. In

addition, the contract is typically awarded based on lowest price rather than experience and qualification.

The **Design-Build** model is not typically used in pool and wellness centre projects, particularly in the past 10 years. While this model provides cost certainty and an early transfer of cost and schedule risk, it requires early and significant staff commitment and user input in developing specifications that could impact operational, funding and other specific schedule and budget requirements. In this model, the focus is on initial costs rather than longer term quality or schedule. Even minor changes during construction pose a risk to not achieving the project scope. There is also risk associated with the contractor selecting lower cost and lower quality equipment that can result in higher operating costs and less than optimum total cost of ownership. These factors could impact the City's goals for a high-quality facility.

**CM as Agent** requires significant administrative resources to be applied during tendering and contract administration of the trade packages during construction. By entering into contracts directly with the trades, the City would retain the risks of being the constructor of the project. The City does not currently have the resources or expertise available to fulfill this role and assume these risks. This model would require the City to retain significant cost, schedule and quality risks during construction.

### **Conclusion**

In summary the **Construction Manager for Services and Construction (CM at Risk)** delivery method has been evaluated to present the least risk to the City against the other three (3) project delivery options assessed. It comes at an estimated cost of \$100,000 to \$150,000 (0.14 to 0.22% of the project value) for the CM's services prior to converting to a fixed price (at Risk) construction contract. This is insignificant in comparison to the cost of the potential risk in pursuing some of the other delivery methods.

Best regards,



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