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Valley Line LRT – Stage 1

Value for Money Report
City of Edmonton

April 07, 2016

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1 Introduction

KPMG LLP ("KPMG") was retained by the City of Edmonton ("City") to act as its financial and process advisor throughout the procurement process for the Valley Line LRT – Stage 1 P3 Project ("Project"). This light rail transit Project will include 11 at grade neighbourhood stops and one above-grade station between Mill Woods Town Centre and 102 Street and will be delivered by the City under a public-private partnership ("P3") model.

KPMG provided process and financial advisory support throughout the project procurement process including updating the Value for Money ("VFM") assessment at various phases of the procurement process.

A VFM assessment is the comparison between the total project costs lifecycle costs (construction and operations) assuming delivery of the project as a traditional project (the public sector comparator or "PSC") and assuming delivery of the project as a P3 project. VFM assessments utilize assumptions about the future macro and local economy, probabilistic risk assessment, financial modelling and sensitivity analysis to perform this comparison and to develop an understanding of the potential range of VFM that the project may generate. The difference between the public sector comparator and the P3 project assessment is referred to as the value for money. If the costs for the P3 project are assessed to likely be lower than the public sector comparator, the P3 project is said to likely be able to deliver positive value for money.

Financial close was achieved for the Project on February 11, 2016. This VFM assessment follows the financial close for the Project. The VFM assessment describes the various aspects of the project including the delivery options that were considered, the competitive selection process that was undertaken and the key terms of the Project Agreement, in addition to providing the final VFM assessment.

The information contained herein is based on the Project Agreement signed between the City and TransEd Partners General Partnership. In instances where KPMG was not directly involved in the process, the data has been attributed to the appropriate party that has provided the information.

Based on the analysis and the underlying assumptions as described herein, it is estimated that the City may achieve value for money of $727 million in net present value terms, by pursuing the project under the DBFVOM P3 model rather than the DB model, representing a value for money savings of 25%.

For ease of reference a glossary of key terms used in the report can be found in Appendix A.

Disclaimer

This report has been prepared for the sole purpose of assisting the City with analyzing the potential Value for Money associated with the Valley Line LRT – Stage 1 P3 Project.

The information included in this report is meant for the exclusive use of the City. KPMG will not assume any responsibility or liability for losses incurred by the City, its management, its directors or any other parties as a result of the circulation, publication, reproduction or use of this report contrary to the provisions of this paragraph.

KPMG disclaims any responsibility or liability for any reliance that any person other than the City may place on this report.

In preparing this report, KPMG relied upon information and material provided by the City and other parties. KPMG has not audited nor independently verified any of the information contained herein. None of KPMG, member firms of KPMG, nor any of their respective directors, officers, partners, employees, agents or representatives make any representations or warranties as to the accuracy, reasonableness or completeness of this information, nor shall any of them have any liability for any representations, expressed or implied contained herein, or for any omissions from the report or from any other written or oral communications transmitted in connection with the report. The comments, calculations and conclusions noted or referred to herein are based on information that has been made available to KPMG by the City and other parties.

The VFM assessment is based on estimations and forecasts about future conditions of the Project that are subject to change. The estimations and forecasts may change based on changes in underlying macroeconomic factors and other events at a later date. As such, actual results may vary from those presented in this report.

2 Project Overview

2.1 Project Background

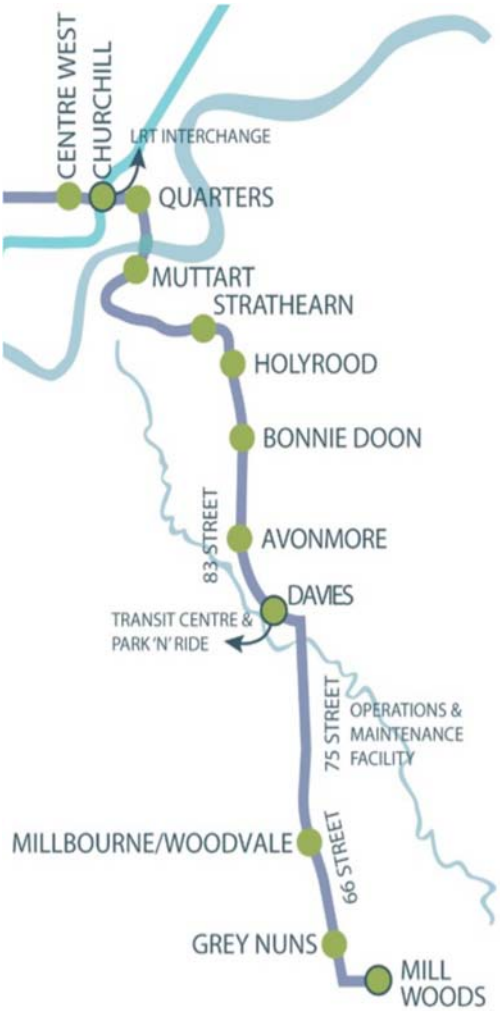
The City has determined the Project scope, which is comprised of a light rail transit alignment of approximately 13 kilometres extending from Mill Woods Town Centre to 102 Street with a total of 11 stops and one above-grade station. An urban-style approach will be applied to this system, which will run primarily at grade and operate in a dedicated guideway adjacent to traffic. The operation of the light rail transit system is based on line of sight with light rail vehicles generally having traffic signal priority through intersections. To accommodate a balanced transit network and to acknowledge potential traffic congestion issues, the City will designate some intersections as partial priority intersections.

Train service will be provided at five minutes headways during weekday peak periods and in 10 minute or 15 minute intervals during off-peak weekday hours or weekends. The speed of the light rail vehicles will be limited to roadway traffic speeds in narrow right-of-ways and pedestrian- oriented areas to promote safety. The City has pursued the Project such that this urban style low-floor light rail transit system will place an emphasis on:

- aesthetics and fit within the surrounding area;
- integration with transit, pedestrian and cyclist connections; and
- operations that fit safely with reduced right-of-way and fewer barriers, gates and bells.

The City has determined that the low floor light rail transit stop infrastructure will be simple in scale and focused on fit and integration with the neighbourhood. As this extension does not directly interline with the existing Edmonton light rail transit system, transfers between systems will be possible through close walking connections from the new stops to the existing stations, such as Churchill stop, which will be the main interchange location between the two systems.

The adjacent map illustrates the proposed Project alignment and stops.



2.2 Strategic Context

The City's Strategic Vision ("The Way Ahead"), identifies strategic goals that support the concept of expanding its public transit system, including light rail transit. These include:

1. Improving Edmonton's Liveability;
2. Transforming Edmonton's Urban Form;
3. Shifting Edmonton's Transportation Modes; and
4. Preserving and Sustaining Edmonton's Environment.

Aligning with these strategic goals, four policy plans were developed by the City in support of expanding the City's light rail transit system. A brief overview of how four of these strategies impact this Project and public transit development in general is provided below:

1. *The Way We Move* seeks to enhance the use of public transit and active modes of transportation in order to maximize Edmonton's overall transportation system efficiency and provide transportation alternatives to single-occupant vehicles.
2. *The Way We Grow* defines the City's strategic growth and development plan and a component of the plan defines how Edmonton's transportation network, including the light rail transit system, will support areas of increased population density and employment.
3. *The Way We Live* defines the City's people plan and how to bring people together to create a civil, socially sustainable and caring society where people have opportunities to thrive and realize their potential in a safe and attractive city.
4. *The Way We Green* seeks to preserve Edmonton's environment and natural resources and minimize the City's ecological footprint through a sustainable transportation network.

2.3 Project Goals

Consistent with the City's strategic context for its transit system, the City's goals for the Valley Line LRT – Stage 1 P3 Project include the following:

1. Achieve cost certainty for the City and provide VFM to the City's residents;
2. Achieve schedule certainty with regard to Project delivery (design, construction and service commencement) and achieve high level of quality on the delivered Project;
3. Allow for / facilitate incremental expansion of the light rail transit network in the future; and
4. Consider the costs of the Project over its entire lifecycle.

3 Project Delivery Options

3.1 Background

The City undertook a business case in 2012 to assess the feasibility of procuring the Project through alternative delivery models. The City assessed the Project against a set of criteria that determined that the Project appeared to be viable as a P3 and further, if delivered by way of a P3 model, had the potential to generate greater value compared to other potential delivery models.

The Design-Build (DB) model was deemed by the City to be the public sector comparator, being the most likely traditional model that the City would use to deliver the Project as an alternative to a P3. The DB model would envisage a DB contractor taking full responsibility for the design and construction of the infrastructure while the City would retain the responsibility for the supply of the vehicles and the operations and maintenance of the project over the long term.

As part of the business case that the City developed in 2012, three P3 delivery models were analyzed to determine the model that would best meets the City's objectives for the Project:

- Design-Build-Finance-Vehicle Supply-Operate-Maintain (DBFVOM);
- Design-Build-Finance-Vehicle Supply-Maintain (DBFVM); and
- Design-Build-Finance-Vehicle Supply-Operate (DBFVO).

Under each of these P3 delivery models, it was assumed that the Preferred Proponent would be responsible for supplying the light rail vehicles.

From the 2012 analysis undertaken by the City, each of the three P3 delivery models were assessed from a qualitative perspective, which demonstrated that a DBFVOM model was the most appropriate P3 model for the Project. A VFM assessment was then performed to compare the DBFVOM model to the DB model. The City's assessment concluded that the DBFVOM model generates greater potential value for the City compared to the DB delivery model.

The VFM assessment presented in this report confirms the initial business case results. This VFM assessment compares the risk-adjusted costs of the two procurement options: DB and DBFVOM. For more details on the VFM assessment, refer to Chapter 6.

3.2 Procurement Options

As mentioned, the VFM assessment compares the DB approach to the DBFVOM approach. The two options are described in the following sections.

3.2.1 Design-Build Model

The Design-Build (DB) model was considered by the City to be the most likely delivery model that it would pursue for the project if it was not pursued as a P3.

The DB model integrates the design and construction roles with a single private sector counter-party. The design firm and the contractor work together to develop a design that meets the required performance parameters. This model has the potential to compress the construction period schedule to the extent that the design and construction phases of the Project can proceed concurrently.

Early contractor involvement enables construction engineering considerations to be incorporated into the design phase. This can enhance the constructability of the design and enable more efficient implementation. This can also reduce the time and costs required to solve design errors and result in fewer potential change orders.

Under this model, the City would hire a single private sector partner (the "Design-Builder") for the design and construction of the Project. The City would enter into a separate contract with a light rail vehicle supplier. Operations, maintenance and financing of the Project would remain the sole responsibility of the City.

During the construction period, the City would make monthly progress payments to the contractor based on the value of work completed. With this method of payment, the Design-Builder does not have to arrange significant amounts of private financing. Performance security would be limited to performance bonding and typical construction warranties.

3.2.2 Design-Build-Finance-Vehicle Supply-Operate-Maintain Model

DBFVOM is a P3 procurement model in which a private partner ("Project Co") comprising a consortium of companies (architect/engineer, construction contractor, light rail vehicle supplier, maintenance provider, operator and lender/equity provider) would be selected to design, construct, finance, operate and maintain the Project, as well as supply the light rail vehicles, as part of a long-term contract to meet pre-defined performance specifications.

The term of the agreement with Project Co would include both the construction period and the longer operating and maintenance term. Pursuing a DBFVOM procurement typically involves a two-stage competitive selection process (e.g., Request for Qualifications and Request for Proposals).

In contrast with the DB model, the DBFVOM model uses financial incentives to facilitate on-time and on-budget project delivery, as well as to help ensure quality operations, maintenance and rehabilitation services. The risks for changes to design, construction costs and schedule, operating costs, and maintenance and rehabilitation costs would be transferred to Project Co.

During construction, the City would hold financial leverage over Project Co's performance since the release of payments are contingent upon specific construction completion

requirements set out in the agreement. This type of performance oversight works to incentivize Project Co to complete construction on time and according to the requirements of the agreement. During the operations and maintenance term, the City would hold financial leverage over Project Co's performance since the payments are performance-based and deductions would be made where Project Co breaches its operations, maintenance and life cycle obligations in the agreement.

In the DBFVOM model, there is potential for increased quality as the nature of the long-term relationship creates an added incentive to use high-quality materials and make efficient design choices to improve cost effectiveness during the operations and maintenance term. Furthermore, the requirement to supply the light rail vehicles allows for integrated design considerations early in the construction period.

Under the DBFVOM model, Project Co is required to finance a portion of the construction costs through a combination of debt and equity. The repayment of this financing is achieved through payments from the public sector over the 30 year operations and maintenance period. These payments are contingent upon performance obligations and meeting contractual requirements. The risk of Project Co not achieving the required rate of return drives efficiencies and responsiveness and helps ensure projects are on-time and on-budget.

At the end of the operations and maintenance term, Project Co must transfer control of the assets back to the City under agreed-upon terms and conditions, known as handback requirements. The handback requirements would explicitly outline the expected condition in which the assets must be returned to the City and a stipulated life-expectancy beyond the agreement period.

4 Competitive Selection Process

4.1 Project Timeline

The City's detailed assessment of the Project's suitability as a P3 was undertaken during the business case stage.

Table 4-1 provides an overview of the distinct procurement phases and key dates for the Project.

Table 4-1: Project Timeline

Action	Timeline
Business Case Due Diligence Period	April 2011 - April 2012
Request for Qualifications Issuance	April 23, 2014
Request for Qualifications Response Deadline	June 17, 2014
Notification of Request for Qualifications Shortlist	August 6, 2015
Request for Proposals Issuance	September 10, 2014
Proponent Information Meeting	September, 22 2014
FINAL Draft Project Agreement Issuance	July 10, 2015
Submission of Financial Proposals	October 20, 2015
Notification of the Preferred Proponent	November 25, 2015
Commercial Close	February 8, 2016
Financial Close	February 11, 2016
Construction Period	Mid-February 2015 – Mid-December 2020 (4.8 years)
Operations Start	December 2020
Operating Period	December 2020 – December 2050 (30 years)

4.2 Business Case Due Diligence Period

Prior to the commencement of the procurement process, business case assessments and VFM assessments were undertaken by the City to assess the suitability of the P3 approach and to inform the City's decision-making process. As indicated previously, the business case assessments undertaken by the City in 2011-2012 determined that the Project had the potential to deliver value for money if it were to be procured as a P3.

The City determined that updates to the VFM assessment would be performed during the procurement process and a final VFM assessment would be prepared after financial close of the Project had been achieved.

This VFM assessment report is issued following financial close of the Project.

4.3 Procurement Process

The City used a procurement process involving a two-staged approach comprised of a Request for Qualifications followed by a Request for Proposals. A well-structured procurement process is important to driving competition so as to help promote value for money for the City. As such, the key procurement objectives for the Project included ensuring that the procurement process was competitive, fair, transparent, and encouraged innovation.

4.3.1 Request for Qualifications

The Request for Qualifications was the first of two stages of the procurement process. The purpose of the Request for Qualifications was to market the Project to a wide audience to encourage participation and competition, present an overview of the proposed scope and structure of the opportunity to interested parties, and evaluate the technical and financial capabilities of respondents. All responses were evaluated by the City against a set of pre-established evaluation criteria and guidelines in an effort to shortlist the most qualified teams for the Request for Proposals stage.

Shortlisting prior to the issuance of the Request for Proposals is considered necessary to allow each remaining Proponent a reasonable chance of success in the procurement in return for a level of investment from the Proponents that is necessary to participate fully in the Request for Proposals. It also ensures there is sufficient competition to generate the best value for the City.

Five teams submitted responses during the Request for Qualifications phase. The City's evaluation resulted in three shortlisted Proponents being qualified and approved to participate in the Request for Proposals process, as summarized in Table 4-2.

Table 4-2: Shortlisted Proponent Teams

Proponent Team	Equity Provider	Design and Construction Team	Operations and Maintenance Team
TransEd Partners	Fengate Capital Management Ltd.; EllisDon Capital Inc.; Bechtel Development Co.; Bombardier Transportation Canada Inc.	Bechtel Canada Co.; EllisDon Civil; Bombardier Transportation Canada Inc.; Arup Canada; IBI Group; Bombardier Transportation Canada Inc.	Bombardier Transportation Canada, Inc.; EllisDon Facility Services, Inc.; Bechtel Canada Company

Proponent Team	Equity Provider	Design and Construction Team	Operations and Maintenance Team
Moving YEG	Meridiam Valley line LRT ULC; ACS Infrastructure Canada Inc.; Aecon Concessions; HOCHTIEF PPP Solutions North America; Keolis S.A.	Aecon Infrastructure Management Inc.; Dragados Canada Inc.; Flatiron Construction Canada Ltd; MMM Group Ltd.; Stantec Consulting Ltd.	Keolis Canada Inc.
River City Transit	SNC-Lavalin Capital Inc.; Kiewit Canada Development Corp.	SNC Lavalin Constructors (Pacific) Inc.; Kiewit Management Co.	SNC-Lavalin Operation & Maintenance Inc.; SNC-Lavalin Operations & Maintenance Inc.; Alstom Transport Canada Inc.

4.3.2 Request for Proposals

The Request for Proposals process was the final stage of the procurement process. The purpose of the Request for Proposals stage was:

- To enable the shortlisted Proponents to develop and present their technical and financial proposals to meet the Project objectives;
- To allow the shortlisted Proponents to review and comment on the draft Project Agreement that will be signed by the Preferred Proponent; and
- To select the Preferred Proponent.

During the Request for Proposals open period, Proponents were invited to review and comment on drafts of the Project Agreement that was ultimately finalized prior to the final technical and financial submission for each Proponent; this Project Agreement was then signed by the Preferred Proponent at commercial close. As part of this process, the City held a series of confidential collaborative meetings with each of the shortlisted Proponents. At the collaborative meetings, Proponents were given an opportunity to discuss their preliminary designs for the Project with the City, as well as provide comments on specific commercial items related to the Project Agreement, including risk allocation, financial matters and other technical matters.

Request for Proposal submissions were divided into two stages. The technical submission covered all works associated with the design, construction, operations, maintenance and renewal of the Project, while the financial submissions identified the Proponents' financial offer and provided details on how the financing plan would be executed, including sources and uses of funds, mitigation strategies and other supporting documentation.

The City received compliant technical and financial proposals from all three Proponents. The City selected TransEd Partners as the Preferred Proponent. It was determined by the City that TransEd Partners had submitted a compliant and complete technical submission that was aligned with the requirements of the Project Agreement. The City further determined that the proposal provided by TransEd Partners offered the lowest total costs on a net present value basis to the City over the full term of the Project Agreement.

4.4 Fairness Monitor

A Fairness Monitor, GGC Consultants Inc., was engaged to monitor the competitive selection process and offer an assessment of the procurement procedures and an opinion on whether or not the competitive selection process was carried out in a fair and reasonable manner. The Fairness Monitor was provided access to all documents, meetings, and information related to the evaluation processes throughout the Request for Qualifications and Request for Proposals stages.

The Fairness Monitor issued letters at various stages in the project procurement process attesting that the process was undertaken in a fair manner and that no fairness issues were known to exist at the date of the letters.

The Fairness Monitor letters were issued on August 6th 2014 following the conclusion of the Request for Qualifications stage and again on November 25th 2015 following the conclusion of the Request for Proposals stage.

The Final Fairness Monitor Letter was issued on March 15th 2016 attesting to the commercial and financial close phase.

In all instances the Fairness Monitor has confirmed that the Request for Qualifications, Request for Proposals and the Financial and Commercial Close processes were open, unbiased, transparent, consistent in approach and fair.

5 Project Agreement Overview

Table 5-1: Quick Facts

QUICK FACTS	
Project Co (Private Sector Counter-party)	TransEd Partners General Partnership
Project Owner	City of Edmonton
Construction Completion Target	December 2020
Term of the Project Agreement	4.8 yr construction; 30 yr O&M

5.1 Profile of the Preferred Proponent

TransEd Partners was selected as the Preferred Proponent. TransEd Partners is a consortium consisting of the following parties:

- *Equity Investors:* *Fengate Capital Management Ltd.* (60%), *EllisDon Capital Inc.* (20%), *Bechtel Development Co.* (10%), and *Bombardier Transportation Inc.* (10%) will each provide equity in the Project. The amount of equity that each firm will provide is identified in parentheses.

- Lenders: The *Bank of Nova Scotia, Royal Bank of Canada and Sumitomo Mitsui Banking Corporation* will provide the senior debt capital for the Project.

- Design and Construction Responsibility: *Bechtel Canada Co., EllisDon Civil, Bombardier Transportation Canada Inc., Arup Canada, IBI Group, and Bombardier Transportation Inc.* will be responsible for the design and construction of the Project.

- Operations and Maintenance Responsibility: *Bombardier Transportation Canada Inc., EllisDon Facility Services Inc., and Bechtel Canada Company* will have primary responsibility for the operations and maintenance of the Project, while TransDev North America Inc. will perform work as a subcontractor.

At commercial and financial close, the equity investors of TransEd Partners established a new legal general partnership entity known as TransEd Partners General Partnership, a special purpose entity for the Project, which for the purposes of the Project Agreement is Project Co, the private sector counter-party. TransEd Partnerships General Partnership has executed agreements with the parties listed above for delivering its obligations under the Project Agreement.

5.2 Key Terms of the Project Agreement

The Project Agreement between the City and Project Co involves a 4.8-year construction period (February 2016 to December 2020) and a 30-year operating period. A summary of the responsibilities of Project Co, the City, and the Independent Certifier under the terms of the Project Agreement is provided below.

5.2.1 Summary Independent Certifier Responsibilities

An independent third party will be selected through a competitive tendering process to provide independent oversight and monitoring of construction progress. The Independent Certifier will be responsible for various activities during the construction period including:

- Certification of monthly Construction Period Payments calculated based on the Independent Certifier's determination of the percentage of completion of construction based on a value in the ground measurement methodology; and
- The Independent Certifier certifies the Project is ready for service commencement.

5.2.2 Summary Project Co Responsibilities

Project Co will be responsible for various activities throughout the term of the Project Agreement, including:

- Financing a portion of the design and construction costs to be repaid by the City over the operating period of the agreement;
- Completing the design, construction, testing and commissioning of the full system of the Project and commencing service in December 2020;
- Supplying the light rail vehicles required to provide the full service in December 2020;
- Providing maintenance and major rehabilitation services as specified in the Project Agreement over the 30-year operating period;
- Developing and implementing a detailed asset management and renewal program to ensure the Project's system components and assets meet the performance requirements for the full duration of the agreement term; and
- Meeting the detailed Handback Requirements, as specified by the Project Agreement, at the end of the Project Agreement term in 2050 when Project Co will transfer the operations of the light rail transit system back to the City.

5.2.3 Summary City Responsibilities

The City, as the owner of the Project and its assets, continues to have a number of responsibilities as the Project Owner during the term of the Project Agreement, including:

- Making Construction Period Payments and Operating Period Payments in a timely manner and applying payment deductions from the aforementioned payments as required due to various performance breaches or poor performance;

- Monitoring the performance of Project Co and enforcing the contract throughout the Project Agreement term;
- Instructing Project Co to operate the system to provide various passenger capacity levels;
- Operating and maintaining the fare collection system and establishing and controlling all fare policies, such as the fare rates charged to customers;
- Providing security staff that will patrol the City's entire light rail transit system, including policing and fare enforcement;
- Installing ticket vending machines;
- Coordinating with other modes of transit provided by Edmonton Transit System (e.g. bus interfaces), and developing the schedule for the light rail transit service;
- Providing shelters, signage and other passenger facilities including the Mill Woods transit centre (Project Co is responsible for the Davies Station transit facility);
- Undertaking all marketing and advertising at light rail transit stations, bus stops, and in / on the light rail vehicles;
- Permitting of any and all potential retail activities at stops/station; and
- Undertaking any expansion of the light rail transit system in the future (e.g., a future West line expansion), including the related operating expenses of the expansion.

5.3 Quality and Performance Monitoring

A key element of the Project Agreement is the quality and performance monitoring of Project Co throughout the agreement term. The Project Agreement establishes a number of mechanisms to monitor Project Co's performance during the Project Agreement terms that will help to ensure that the City is receiving value throughout the term. These quality and performance monitoring mechanisms have been highlighted below.

5.3.1 Design and Construction Period

It is expected that the following activities will occur during the design and construction period to better ensure that Project Co is meeting its contractual requirements and that payment is made based on progress and quality of work:

- The Independent Certifier will review and monitor design and construction progress, as well as reviewing invoices and costs of proposed design changes;
- A Construction Period Joint Committee will oversee the design and construction of the Project. The committee, comprising representatives from the City and Project

Co, will meet at least once a month to discuss matters relating to the Project and to review the reports prepared by the Independent Certifier; and

- Construction Period Payments made during the design and construction period are contingent upon Project Co's completion progress. This progress is verified by the Independent Certifier.

5.3.2 Maintenance and Rehabilitation Period

It is expected that the following activities will occur during the maintenance and rehabilitation period to ensure that Project Co is meeting its contractual performance requirements:

- An Operating Period Joint Committee will be established to provide oversight and direction on matters related to the operating period, including operations, maintenance and rehabilitation. The Operating Period Joint Committee meets at least once every 3 months throughout the Project Agreement term and includes representatives from the City and Project Co;
- The Committee reviews and monitors Project Co's performance throughout the Project Agreements' 30-year term;
- Payment deductions will be applied where performance does not meet contractual specifications and requirements;
- The City will perform inspections and testing to check reports and ensure the requirements continue to be met; and
- Project Co's lenders will also review performance during the maintenance period to protect their investment.

5.3.3 Performance-Based Payment

Payments to Project Co are performance-based, which means they can be reduced in the event that Project Co does not meet the performance standards of the Project Agreement. This mechanism better ensures that the City does not pay for goods and services that are not of the appropriate quality and incentivizes Project Co to meet the performance standards and requirements.

5.3.4 Handback Requirements

Project Co and the City will be required to adhere to the following requirements leading up to the end of the Project Agreement term:

- Project Co is required to meet specific and detailed Handback Requirements at the end of the Project Agreement term. The purpose of these requirements is to ensure that the Project has been well-maintained over the 30-year operating period;

- In 2043 and again in 2048 (seven years and two years prior to expiry of the Project Agreement), the City and Project Co will perform a detailed condition assessment of the Project's system components and assets to ensure that they are in the condition anticipated to meet the Handback Requirements specified in the Project Agreement. If the asset conditions are found to be below that anticipated, the City will hold back payments in reserve until Project Co makes the necessary repairs and corrections of potential identified deficiencies; and

- After the Project Agreement expires, the City will assume responsibility for operating, maintaining and rehabilitating the light rail transit system.

5.4 Payment Adjustments

The Project Agreement provides for adjustments to the payments to Project Co to reflect specific circumstances related to the following:

- If there is a discriminatory change in law (specific to the Project rather than a general change in law), the payments may be adjusted to leave Project Co in a no better or worse position than if that change in law had not occurred;

- The payment in a given month may be reduced if Project Co does not meet the performance requirements set out in the Project Agreement. Deductions will vary depending on the incidents' severity and duration and will be applied on a monthly basis;

- The Service Payments and Major Rehabilitation Payments to be paid over the 30 year operating term are linked to an index in the Project Agreement. The index is composed of a basket of appropriate verifiable price indices, with monthly adjustments to the payments being applied in accordance with a set formula and weightings of the selected indices. Through the index the City offers a degree of protection to Project Co for inflation related pricing risks over the long-term 30 year period. To the degree that the index does not fully reflect the change in actual pricing, Project Co will assume this risk (known as differential inflation risk).

5.5 Risk Allocation Summary

As noted above, the Project Agreement allocates risks and responsibilities between the City and Project Co. This risk allocation was pursued by the City on the basis that the risks should be held and managed by the party that is in the best position to do so. Some risks are assigned to Project Co, some risks are assigned to the City, and some risks are shared between the parties.

The Project Agreement captures the detailed risk allocation over the construction period and 30-year operating period through its various commercial provisions.

Table 5-2 summarizes the key risk allocation between the City and Project Co under the Project Agreement.

Table 5-2: Summary of Risk Allocation for Project Agreement

RISKS AND RESPONSIBILITIES	Retained by City	Transferred to Project Co	Shared
Design & Construction			
Design		✓	
Construction of Infrastructure		✓	
Light Rail Vehicle Supply		✓	
Land acquisition	✓		
Utility relocation • Before Financial Close • After Financial Close	✓	 ✓	
Gerry Wright Operations and Maintenance Facility • Infrastructure and equipment • Activities surrounding the pipeline crossing the site		 ✓ ✓	
Supply and installation of ticket vending machines ("TVM"): • Specification of supplier and supply of TVM • Installation of TVM • Base Construction and conduit installation	 ✓ ✓	 ✓	
Bus Infrastructure (excluding Davies Transit Centre) • Shelters, signage and other passenger facilities • Civil infrastructure (Lay-bys, pads for shelters)	 ✓	 ✓	
Environmental and other permits and approvals		✓	
Contamination: • Disclosed • Undisclosed	 ✓	 ✓	
Geotechnical Site Conditions: • General Corridor • Tunnel • NSRV • Slope Stability		 ✓ ✓ ✓ ✓	
Stakeholder communications		✓	
Testing & commissioning		✓	
Operations, Maintenance & Lifecycle			
Light rail transit civil infrastructure Light rail transit signals/systems		✓ ✓	
Roadway signals/systems			✓

RISKS AND RESPONSIBILITIES	Retained by City	Transferred to Project Co	Shared
Light Rail Vehicles		✓	
Roadways and Drainage components: • Within or below the extent of the Trackway • Outside of the Trackway	 ✓	 ✓	
Landscaping			✓
Snow removal: • Trackway • Roadways and sidewalks • Constrained areas • OMF • Davies Transit Centre and Davies Park'n'Ride • Stops and Station • All other areas	 ✓	 ✓ ✓ ✓ ✓ ✓ ✓	
Station / Stops maintenance		✓	
Fare setting and collection	✓		
Energy: • Consumption • Pricing/Inflation	 ✓	 ✓	
Activities surrounding the pipeline at the Operations and Maintenance Facility		✓	
Davies Park'n'Ride and Transit Centre maintenance		✓	
Mill Woods Transit Centre maintenance	✓		
Marketing the light rail transit service	✓		
Developing the service timetable			✓
Bus Infrastructure (other than at Davies Transit Centre)	✓		
Advertising	✓		
Retail activities at stops	✓		
Policing and fare enforcement	✓		
Safety of System		✓	
Damage to Project			✓
Communications with the public concerning general transit information			✓
Complaint Management			✓
City transport policy	✓		
Ridership Volumes / System Capacity and Service Levels	✓		
User satisfaction		✓	
Project Financing & Other			
Financing			✓
Inflation: • During construction period • During operating period	 ✓	 ✓	

RISKS AND RESPONSIBILITIES	Retained by City	Transferred to Project Co	Shared
• Differential inflation during operating period		✓	
Change in Law			✓
Force Majeure			✓

6 Value for Money Assessment

As indicated previously, VFM assessments compare total project costs of the public sector comparator with that of the P3 project and the difference is referred to as value for money. If the P3 project costs are assessed to likely be lower than the public sector comparator costs, the P3 project is said to likely be able to deliver positive value for money.

VFM assessments utilize assumptions about the future macro and local economy, probabilistic risk assessment, financial modelling and sensitivity analysis to perform this comparison and to develop an understanding of the potential range of VFM that the project may generate.

For this VFM assessment, the public sector comparator is represented by the DB model and the P3 project is represented by a DBFVOM model. Total project costs are compared on a risk-adjusted and net present value ("NPV") basis.

To arrive at risk adjusted costs, it is standard practice to develop a risk matrix and to quantify risks through a risk workshop (this process is described in Section 6.2).

The VFM assessment presented in this chapter has been performed after financial close for the Project. The following sections provide details on the project costs and the results of this VFM assessment.

6.1 Project Cost Estimates

Prior to the receipt of the Proponent financial submissions as part of the procurement process, the City, together with its cost consultant and owner's engineering team, estimated the various project costs that would likely be incurred over the full project term (construction period and 30 year operations and maintenance period).

Estimates were developed for the likely project cost expectations if the Project was procured as a DB and as a DBFVOM.

It is noted that after the receipt of the Proponent's financial submission, Construction Period Payments and Operating Period Payments from the Preferred Proponent's financial offer are used as the basis of the DBFVOM costs.

When considering the project costs under the DB model, the City considered its experience in building light rail transit systems, procuring light rail transit vehicles and operating and maintaining the Edmonton Transit System.

When considering the project costs under the DBFVOM model, the City again considered its experience in building light rail transit systems and procuring light rail vehicles, and operating the Edmonton Transit System operations. In addition, the City supplemented the estimation process with case studies involving private sector light rail transit operation and maintenance.

The estimation of project costs takes into consideration the activities and responsibilities of the City and the expected counter-party under the two models.

The cost estimates were then risk-adjusted, as discussed in Section 6.2.

The broad project cost payment categories are:

- *Construction Period Payments:* Construction Period Payments include Progress Payments (DB and DBFVOM models) and a Service Commencement Payment (DBFVOM model only):
    - *Progress Payments:* Under the DBFVOM model the City would make Progress Payments to Project Co totalling 50% of the project's capital costs. Under the DB model the City would make progress payments equal to 100% of the project's capital cost.
    - *Service Commencement Payment:* Under the DBFVOM model, the City would make a payment to Project Co that is equal to 16.7% of the project's capital costs upon certification of the system for service commencement. Service Commencement is linked to the successful commissioning of the light rail transit system and the ability to start operations. Under the DB model, a separate Service Commencement Payment would not be necessary as the Design-Builder would have received full 100% monthly payments for work completed.
- *Operating Period Payments:* Once Service Commencement is achieved, the City would make monthly Operating Period Payments. These payments are intended to cover the remaining capital costs owed to Project Co (in the case of a DBFVOM model only), operating costs (both models), maintenance costs and major rehabilitation costs (both models).
    - *Capital Payment:* As the City would have paid Project Co 66.7% of the project capital costs prior to service commencement, Project Co would need to finance the remaining 33.3% of the project capital costs. As such, under the DBFVOM model, during the operating period, the City would make fixed (unindexed) monthly payments to Project Co to cover the costs associated with the long-term financing of the outstanding capital costs (debt repayment and equity return).
    - *Service Payment:* During the operating period, under the DBFVOM model the City would make monthly payments to Project Co, based on the operating service level as specified in the Project Agreement for any given period of time. The Service Payment can be adjusted for special events and small permanent changes to service levels with associated pricing being clearly stipulated in the Project Agreement. Under the DB model, Edmonton Transit System would undertake the operations of the Project through its operating budget as established by City Council in the ordinary course of the annual operating budget process.
    - *Major Rehabilitation Payments:* During the operating period, under the DBFVOM model the City would make monthly payments to Project Co to compensate Project

Co for major rehabilitation costs expected to be incurred, including major rehabilitation for the light rail transit system and light rail vehicles. Under the DB model, the City would allocate major rehabilitation capital budget in accordance with its capital budget setting process and in accordance with its identification by Edmonton Transit System of the Project rehabilitation needs during the term.

- *City Construction Period Costs:* The City would be required to undertake a number of construction-related activities including project management and oversight under each of the DB and DBFVOM models.

- *City Operating Period Costs:* The City would be required to undertake a number of operations-related activities including fare collection and enforcement as well as project management and oversight under each of the DB and DBFVOM models.

In addition to the project cost categories noted above, the Project procurement process and Project Agreement incorporated an incentive regime designed to encourage various construction related behaviours. The components of the incentive regime were:

- Lane closure rental charges (designed to encourage proponents to keep traffic lanes open as much as possible);

- Transit Detour impact charges (designed to encourage proponents to avoid closing traffic lanes that result in transit detours or make detours onerous);

- Occupancy charges within the River Valley (designed to encourage proponents to spend the minimum amount of construction time necessary in the River Valley and to restore its landscaping as soon as practical);

- Tree removal or damage charges (designed to encourage proponents to avoid the removal of or damage to specified trees along the alignment); and

- Unit pricing for potential contaminated soil removal (designed to avoid risk premium pricing for contaminated soil removal by seeking a unit rate at proposal stage).

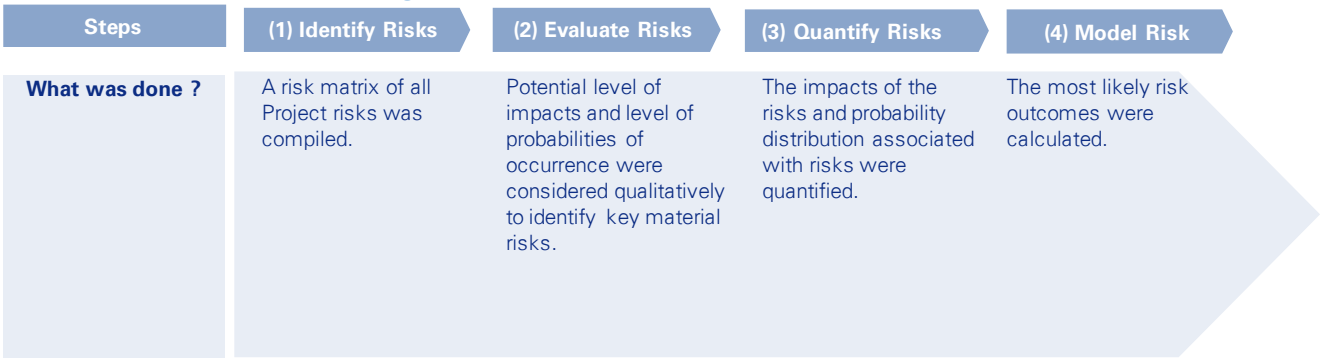
Proponents were required to consider the incentives regime and associated charges in formulating their technical approach to the Project. In formulating their approach, proponents would consider alternative approaches to minimize total project costs and incentive regime charges and incorporate the approach in their financial proposal.

For the PSC, the City developed an expectation of how the technical approach under the DB model would reflect the incentive regime and estimated the potential value of the incentive regime charges under the DB model.

6.2 Risk Quantification Process

A key component of VFM assessment is the quantification and range assessment of project risks. An overview of the risk assessment process applied to this Project is outlined in Figure 6-1.

Figure 6-1: Risk Assessment Process



Step 1 described in the above figure was undertaken and involved identifying and compiling a complete list of project risks. The risk register established by the City as part of the business case assessment it undertook in 2011-2012 was updated as the procurement process progressed. The project risks were actively monitored by the City and additional risk workshops were held with members of the City and their advisors.

Steps 2 and 3 involved evaluating and quantifying the impact of the risks for the DBFVOM and DB models. In particular, a consensus estimate of the following inputs was developed during risk workshop sessions:

- Cost Base – this refers to the cost portion of the project that the risk will affect.
- Probability – the overall probability that the risk would occur (between 0% and 100%);
- Most likely outcome – the most likely cost impact if the risk were to occur;
- Low Case – the estimated 'low case' cost impact that would occur for 1 in 20 events (i.e. 5th percentile); and
- High Case – the estimated 'high case' cost impact that would occur for 1 in 20 events (i.e. 95th percentile).

Risks were then quantified using the following formula:

Risk Cost = Cost Base * Probability of Risk Occurring * Impact of Risk

Step 4 of the risk assessment methodology was completed following the risk workshop. As part of this step, the inputs established in steps 2 and 3 were used to develop probability curves. The risk modelling software @Risk was used for this purpose. @Risk was used to conduct a Monte Carlo analysis of potential risk outcomes. The Monte Carlo simulation used the low, most likely and high cost impacts estimated in the risk workshop in a probability distribution (in this case a triangular distribution) to calculate the cost impact of each risk. The probability distribution allows for estimated total risks to be calculated at different confidence levels. For example, at 95th percentile, the estimated risk value will be

exceeded only 1 out of 20 times. At 50th percentile (expected value), the estimated risk value will be exceeded 1 out of 2 times. Risk averse organizations will typically use a higher confidence level compared to less risk averse organizations. For the main results in this VFM assessment, the risk quantification results associated with the expected values were considered in the total project cost quantifications. The Monte Carlo simulation establish a range of risk outcomes which were also subject to sensitivity analysis to establish the range of potential VFM assessment results.

The risk quantification process was reviewed and updated throughout the procurement process to ensure that the analysis reflected the final version of the Project Agreement.

6.3 Value for Money Results

For both the DB model and the DBFVOM model, the total risk-adjusted project costs are reported as net present values as at January 1, 2016. The conversion of the risk-adjusted project costs to net present values is undertaken by using a discount rate which is based on the City's long-term cost of existing debt as at the time of the assessment.

The net present values for the total risk-adjusted costs of the Project delivered using the DB and DBFVOM models are set out in the table below.

Table 6-1: Value for Money Assessment

NET PRESENT VALUE ($ millions)	DB	DBFVOM
Construction Period Payments[1]	1,446	848
Capital Payments	0	392
Sub-total	***1,446***	***1,240***
Service Payments[2]	689	434
Major Rehabilitation Payments[2]	232	153
Sub-total	***921***	***587***
Other City Construction Period Costs	479	442
Other City Operating Period Costs[2]	89	93
Sub-total[3]	***569***	***534***
Less Anticipated Revenues[2]	(190)	(190)
Total[3]	**2,746**	**2,172**
Cost Differential[4]	**574 million**	
Percentage Savings[4]	**21%**	
Sensitivity Range of Percentage Savings	**17% to 25%**	

[1] Construction Period Payments do not consider the estimated effects of the incentive regime charges (see also note 4).

[2] Operating Period costs and revenues are generated based on assumptions of ridership growth over the 30 year term and long inflation rate assumptions that are the same for both the DB and DBFVOM model assessments.

[3] Totals may not sum due to rounding.

[4] If the incentive regime charges were included in the analysis the differential would be $727 million or 25%.

Based on the analysis and the underlying assumptions as described herein, it is estimated that the City may achieve value for money of $574 million in net present value terms by pursuing the project under the DBFVOM model rather than the DB model.

A number of sensitivities of this result were undertaken, including:

- Adding and subtracting 0.5% to the discount rate;
- Adding and subtracting 1% to the long-term inflation assumptions;
- Adding and subtracting 10% to the DB Construction Period Payments (no change to the DBFVOM); and
- Adding and subtracting 10% to the DB Service Payments and Major Rehabilitation Payments (no change to the DBFVOM).

These sensitivities result in a range of VFM potential results as shown in the table below:

SENSITIVITIES	VFM RESULT
Base VFM	21%
Add 0.5% to the discount rate	23%
Subtract 0.5% from the discount rate	19%
Add 1% to the long-term inflation assumptions	22%
Subtract 1% from the long-term inflation assumptions	20%
Add 10% to the DB Construction Period Payments (no change to the DBFVOM)	25%
Subtract 10% from the DB Construction Period Payments (no change to the DBFVOM)	17%
Add 10% to the DB Service Payments and Major Rehabilitation Payments (no change to the DBFVOM)	23%
Subtract 10% from the DB Service Payments and Major Rehabilitation Payments (no change to the DBFVOM)	18%

These sensitivities generated a range of value for money assessment savings between 17% and 25%.

Appendix A – Glossary of Terms

Construction Period Payments: The mechanism used to financially compensate the contractor during the design and construction period. Construction Period Payments can include Progress Payments and a Service Commencement Payment.

Design-Build (DB): The approach where the City hires a contractor to both design and construct the Project. Once the Project is built, the City operates and maintains it. The City pays for the construction of the Project by making progress payments.

Design-Build-Finance-Vehicle Supply-Operate-Maintain (DBFVOM): A P3 procurement method where a consortium of private sector contractors are collectively contracted to design, construct, finance and maintain a capital asset for a defined period of time, including vehicle supply, as well as operate the transit service. The City makes payments to the private consortium throughout the defined Project term. The City continues to own the asset.

Discount Rate: The rate used to equalize varying cash flows under different procurement methods so that like-for-like cost comparisons can be made. The rate, expressed as a percentage, reduces the value of future dollars in relation to present dollars. The Discount Rate used for this project represents the City's long-term cost of outstanding debt as at the time of the assessment and was used to calculate the total cost of the Project over the Project Agreement term, in net present value terms.

Fairness Monitor: A consultant independent from the City and its other advisors and the bidding teams who provides monitoring and oversight of the competitive selection process (Request for Qualifications and Request for Proposals) to affirm that the process was fair and open to all parties.

Financial Close: The point in the procurement process where negotiations with the Preferred Proponent are finalized and a Project Agreement is executed, allowing construction to begin.

Handback Requirements: Refers to the specific requirements, as prescribed by the Project Agreement, for the physical condition(s) the Project's assets must be delivered in to the City by Project Co on the Project Agreement expiry date.

Independent Certifier: Independent, third-party certifier who verifies and certifies whether certain conditions of the Project Agreement are met before payments can be advanced.

Major Rehabilitation: The long-term requirements to replace and rehabilitate an asset to ensure that the asset continues to meet the same performance standard over the life of the operating period.

Net Present Value (NPV): The current value of a future sum of money. To assess long-term projects, NPV is commonly used to compare the value of money over time, adjusting for

interest rate changes and inflation. NPV is produced by applying a Discount Rate to a future stream of cash flows. The amount and timing of cash flows differ in the two models (DB and DBFVOM) for designing and constructing the Project and the calculation of NPV accounts for those differences.

Operating Period Payments: The mechanism used to financially compensate the private contractor over the operating period term of the agreement. The Operating Period Payment can be comprised of a Capital Payment, Service Level Payment and Major Rehabilitation Payment.

Preferred Proponent: TransEd Partners - the proponent selected from a shortlist of bidders to enter into negotiations with the City to reach Financial Close and deliver the Project.

Project: the Valley Line LRT – Stage 1 P3 Project.

Project Agreement: A legally binding document that sets out the requirements for the delivery of an asset under a P3 in terms of cost, schedule and life cycle performance, that typically governs the performance-based payments to Project Co.

Progress Payments: The payments made to Project Co by the City during the design and construction period. The total Progress Payments that will be made to Project Co will equal 50% of the Project's capital costs. These payments will be made on a monthly basis and will be based on the percentage of construction completion. Progress Payments must be formally certified by the Independent Certifier.

Project Co: TransEd Partners General Partnership - the consortium of companies selected as Preferred Proponent at the end of the Request for Proposals stage. Project Co will enter into the Project Agreement with the City.

Public-Private Partnership (P3): An alternative delivery model for developing public assets in a timely and cost-effective manner. P3s typically generate savings and value for taxpayers when the projects are complex and large in value (greater than $100 million).

Request for Proposals (RFP): The stage of procurement where the City issued a closed invitation to Shortlisted Proponents to submit formal proposals to deliver the Project.

Request for Qualifications (RFQ): The stage of procurement where the City issued an open invitation to private sector entities interested in submitting proposals for the Request for Proposals stage. The Request for Qualifications stage is used to qualify Proponents to move forward to the Request for Proposals stage.

Service Commencement: The stage in the design and construction period where Project Co has completed all technical specifications and requirements for the design and construction of the light rail transit system, as prescribed by the Project Agreement and the system being ready for operations. Service Commencement must be formally certified by the Independent Certifier for the light rail transit system to be able to begin service.

Service Commencement Payment: The payment that will be made to Project Co upon achieving Service Commencement. At Service Commencement, the City will make a payment to Project Co that is equal to 16.7% of the project's capital costs.

Value for Money (VFM) Assessment: Quantitative assessment that compares the costs of delivering a project under a DB model and a DBFVOM model on a net present value basis. The difference between these costs is the VFM