



Project Report:

Evergreen Line Rapid Transit Project

March 2013

partnerships
British Columbia

Purpose of this Report

The purpose of this report is to provide key information to the public about the Evergreen Line Rapid Transit Project (Evergreen Line or the Project). This report describes the need for the Project and how it will be delivered. The report also explains how different procurement delivery methods were analyzed, and how project benefits and innovations are expected to be achieved. A summary of the key aspects of the project agreement is also provided.

In all of its procurement processes, the Province of B.C. is committed to a high standard of disclosure as part of its accountability for the delivery of public projects. Ministries, Crown Corporations and other government agencies are publicly accountable for projects through regular budgeting, auditing and reporting processes.

The Evergreen Line Rapid Transit Project Board, which includes representatives from the Ministry of Transportation and Infrastructure, TransLink, and Partnerships BC, is accountable for the contents of this report.

Defined Terms and Abbreviations

Capitalized terms are defined in the glossary at the end of this report.

Abbreviations are defined in the table below:

ALRT	Advanced Light Rapid Transit
BCRTC	BC Rapid Transit Company
CPTED	Crime Prevention Through Environmental Design
DB	Design Build
DBB	Design Bid Build
DBF	Design Build Finance
LRT	Light Rail Transit
MOTI	Ministry of Transportation and Infrastructure
NPC	Net Present Cost
PPP	Public Private Partnership
RFP	Request for Proposals
RFQ	Request for Qualifications
VFM	Value for Money

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1 Executive Summary

The Evergreen Line is an 11-kilometre extension to the existing SkyTrain system in Metro Vancouver, seamlessly integrating with the Millennium Line at Lougheed Town Centre Station. It will provide a fast, frequent and convenient rapid transit service to Port Moody and Coquitlam and will integrate with regional bus and West Coast Express networks. The Evergreen Line is an integral part of the Provincial Transit Plan and the broader regional planning objectives of Metro Vancouver, which include connecting regional centres with rapid transit to achieve sustainable growth.

The Evergreen Line will take a significant step towards achieving the Province's Transit Plan, bringing many benefits to Metro Vancouver and the Northeast sector, including:

- stimulating community growth and development;
- creating compact, liveable communities and shorter commutes;
- providing direct connection, without transfer, onto the Millennium Line;
- frequent service (every three minutes during peak periods and service almost 20 hours a day);
- increased transportation choice and better connections between regional centres in Metro Vancouver;
- generating an estimated 8,000 direct and indirect jobs during construction; and
- removing an anticipated 40,000 cars from the road by 2021.

SkyTrain technology was chosen for the Evergreen Line because it is estimated to have two and a half times more ridership than a Light Rail Transit (LRT) system; it will provide a direct connection without transfer onto the Millennium Line; and is almost twice as fast as LRT.

The total Project budget is \$1.431 billion, which includes the base project scope (\$1.403 billion) and provision for Lincoln Station (\$28 million). Funding for the Project includes contributions of \$417 million from the Government of Canada, \$400 million from TransLink and \$586 million from the Province of British Columbia. In addition, the City of Coquitlam assembled a unique funding arrangement with a private partner and the federal

crown corporation PPP Canada to enable the Lincoln Station to be constructed for opening day. The Province is responsible for the design and construction of the Project and, following completion, TransLink will operate the new line as part of the SkyTrain network.

The Project will be completed in several parts. The Province has assembled the property required for the route and conducted various advance works to prepare the site for major construction. The Province and TransLink have together entered into a fixed-price contract with Bombardier for the supply of 28 new SkyTrain vehicles, and TransLink will supply fare collection equipment and faregates for the stations. The majority of the infrastructure – including guideway, tunnel, stations and systems – will be delivered by a single private partner.

The procurement decision to use a Design Build Finance (DBF) partnership delivery model for the Evergreen Line infrastructure was based on a thorough analysis of procurement options. A Design Build Finance Operate Maintain (DBFO) model (similar to the model used for the Canada Line) was examined but deemed not appropriate for the Project because of the need for full operational integration with the existing SkyTrain system. A Design Build Finance Maintain (DBFM) model was rejected on the grounds that there would be greater economies of scale if the Evergreen Line was maintained as part of the larger SkyTrain system.

A DBF model was chosen because it better met the procurement objectives, providing better risk transfer related to scope and schedule, as well as opportunities for innovation particularly through construction methodology.

In December 2012, the Province entered into a performance-based, fixed price project agreement with the private partner (EGRT Construction) to design, build and finance the guideway, tunnel and stations; install the automatic train control and other systems; and test and commission the Evergreen Line. The term of the contract is approximately 3.5 years, and the fixed price of the contract is \$889 million.

During construction, EGRT Construction will receive partial progress payments to reflect a proportion of the work actually completed. EGRT Construction will fund the remaining portion and will be repaid when the Evergreen Line is declared substantially complete and meets a range of performance requirements. The project agreement includes a range of performance measures – for example traffic management and environmental protection requirements – which can result in a deduction to payments to EGRT Construction if those measures are not met.

The Project is expected to achieve significant value for taxpayer dollars. In financial terms, the value for money is estimated at \$134 million (net present cost) when compared to the Design Build (DB) comparator.

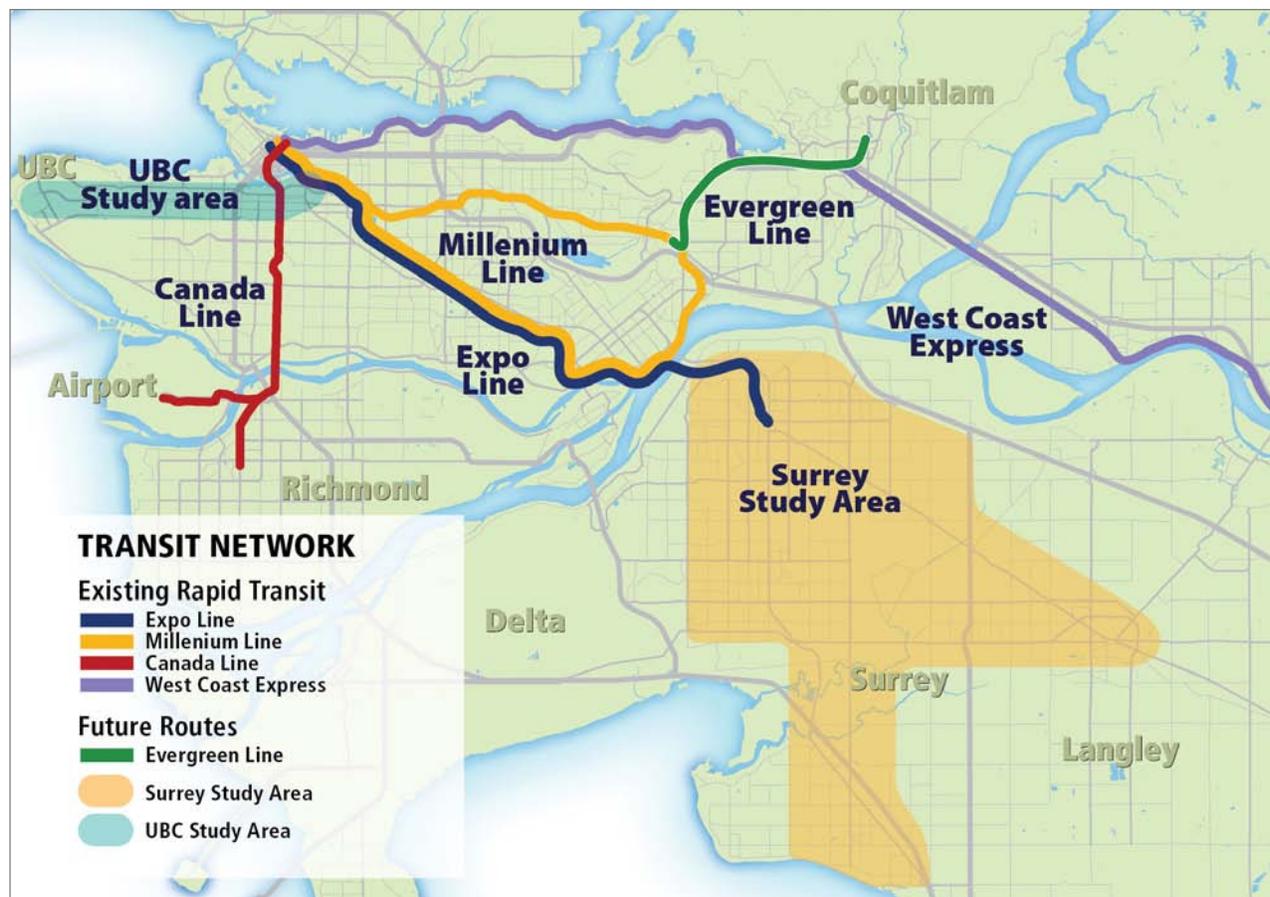
The significant factors in achieving this value for money include:

- The use of a single-bore tunnel, as opposed to the twin-bore tunnels envisaged in the reference concept. This approach is expected to result in a shorter time to bore the tunnel, significantly reducing schedule risk and potentially allowing the work to finish ahead of the required schedule;
- EGRT Construction has accepted the risk of geotechnical conditions in the tunnel within its fixed price – the DB comparator assumed that the Province would share this risk and retain significant contingency to cover it; and
- EGRT Construction has included efficient private financing including a mechanism that matches private finance to the month-by-month credit requirements of the Project.

2 Project Background and Goals

Metro Vancouver's Northeast sector – including the municipalities of Coquitlam, Port Moody, Port Coquitlam, Anmore and Belcarra – has experienced rapid population growth and continues to be one of the fastest growing areas in Metro Vancouver. The most recent estimates indicate that the population in the Northeast sector will grow by approximately 66% (to 376,000) by 2031, which would represent the second highest growth rate in Metro Vancouver. This current and anticipated population growth is adding pressure to the regional transportation network as traffic volumes build and congestion increases. The Evergreen Line will be one of a series of regional transit and transportation improvements that will address these challenges by increasing transportation choice and supporting growth management and environmental sustainability objectives. The Evergreen Line is also an integral part of the Provincial Transit Plan (www.th.gov.bc.ca/Transit_Plan/) and the broader regional planning objectives of Metro Vancouver, which include connecting regional centres with rapid transit to achieve sustainable growth.

FIGURE 1 – EVERGREEN LINE REGIONAL INTEGRATION



Planning for the Evergreen Line has been ongoing for more than 10 years. Early in the planning process, the line was conceived as an extension of the SkyTrain system, using advanced light rapid transit (ALRT) technology. In 2004, following a review of technology alternatives and in light of the funding envelope of \$800 million for the project, TransLink decided to move forward with a Light Rail Transit (LRT) solution.

In 2008, work was undertaken by the Province and TransLink to review the choice of technology and route for the Evergreen Line (<http://www.evergreenline.gov.bc.ca/about.htm>), in light of increasing urgency with respect to providing viable transportation alternatives and maximizing ridership capacity.

Project objectives, which were established to guide the review, are set out in Table 1.

TABLE 1 EVERGREEN LINE RAPID TRANSIT PROJECT OBJECTIVES

PRIMARY OBJECTIVES	DESCRIPTION
Increase Transportation Choice	<ul style="list-style-type: none"> • Increase transportation choice • Support a reduction in auto use by providing an alternative to the single occupancy vehicle • Increase the people-moving capacity in the Northeast sector • Integrate travel modes and provide connectivity to the wider transit network • Ensure speed and reliability of the system
Support Growth Management	<ul style="list-style-type: none"> • Support municipal growth management targets established by the region's Livable Region Strategic Plan • Contribute to community building by stimulating future concentrated and mixed use development • Support existing development • Provide support for a positive business environment
Support Environmental Sustainability Initiatives	<ul style="list-style-type: none"> • Support provincial climate action goals by reducing regional car trips • Meet regional and local environmental objectives to preserve green space • Encourage pedestrian traffic along the corridor

The 2008 review involved an in-depth analysis of the LRT and ALRT technology options to determine which could best meet the Project objectives. Key features of each technology are summarized below:

- LRT is a driver operated system along a separate right-of-way with grade-level crossings at road intersections. The implementation of LRT would be new in Metro Vancouver, and would require dedicated operations and maintenance facilities; and
- ALRT is automated and driverless and runs on a completely separate guideway that will integrate with the existing Millennium Line. It would be operated from the existing SkyTrain operations and maintenance facility in Burnaby. Additional vehicle storage capacity would be required to accommodate the additional SkyTrain vehicles.

Analysis included the development of ridership forecasts, capital and operating cost estimates, benefit-cost analysis, and a review of the development potential for different corridors. The review built upon the extensive body of analysis that had taken place over the previous decade, and included input from experts with extensive expertise in the development of rapid transit systems around the world.

The review recommended the ALRT option as the technology choice that would bring the most benefits, including:

- two and a half times the ridership of LRT (70,000 per day by 2021), better meeting the ridership goals of the Provincial Transit Plan;
- improved service as a result of the direct connection, without transfer, onto the Millennium Line and greater frequency of service;
- the ability to move people almost twice as fast as LRT - from Coquitlam City Centre to Lougheed Town Centre in 15 minutes compared to 24 minutes by LRT and from Coquitlam City Centre to Vancouver in 40 minutes;
- overall better value, including lower operating costs (\$10 million annually compared to \$15 million annually for LRT) and a 40% higher benefit cost ratio than LRT (a comparison of project benefits such as travel time savings and safety benefits, to the estimated project capital cost of \$1.4 billion for SkyTrain versus \$1.25 billion for LRT).

The business case identified two potential routes, a Northwest route through Port Moody, and a Southeast route along Lougheed Highway. After the release of the business case, mayors and councils in the Northeast sector were invited to provide their feedback on the choice of route during a 45-day period. Municipal councils in Port Moody, Port Coquitlam, Burnaby, New Westminster and Belcarra voiced their unanimous support for the Northwest route.

In the spring of 2008, the Province announced that ALRT technology would be used for the Evergreen Line, consistent with the technology used for the Expo and Millennium Line components of the existing SkyTrain system. The Province assumed responsibility for the design and construction of the Project, with TransLink having responsibility for the ongoing operation and maintenance of the Evergreen Line as a fully interoperable extension of the existing SkyTrain system.

3 Project Scope

The Evergreen Line will be an 11-kilometre long extension to the existing SkyTrain system in Metro Vancouver. It will connect to the Millennium Line at Lougheed Town Centre Station in Burnaby¹, allowing passengers to travel to Vancouver without changing trains or platforms.

The scope of the Project includes:

- the design and construction of the guideway and an approximately two-kilometre bored tunnel;
- an expansion of the existing Lougheed Town Centre Station;
- six new stations;
- provision for two potential future stations; and
- a vehicle storage facility.

Twenty-eight new SkyTrain vehicles will be procured to accommodate the Evergreen Line service, transit integration facilities will be provided, and fare collection and faregate equipment will be installed at stations as part of the overall Project scope.

The Evergreen Line alignment is illustrated in Figure 1. It includes a combination of elevated and at-grade guideway and tunnel and will encompass the following three areas:

- (a) Lougheed/Burquitlam: the line will run north from Lougheed Town Centre Station on an elevated guideway along the centre of North Road. Burquitlam Station will be on the east side of Clarke Road near Burquitlam Plaza. Leaving Burquitlam Station, the line will cross to the west side of Clarke Road, before entering a tunnel towards Port Moody.
- (b) Port Moody: the line will emerge from the tunnel just east of Barnet Highway. It will travel at ground level along the south side of the Canadian Pacific Rail (CPR) tracks to Moody Centre, located at the Port Moody transit exchange site. Continuing east, the line will cross the CPR tracks just before Inlet Centre Station, located north of Barnet Highway.
- (c) Coquitlam: the line will continue along the north side of the CPR tracks towards Coquitlam Central Station, located at the Coquitlam transit exchange site. Turning north, the line will run on an elevated guideway along the west side of Pinetree Way, stop at Lincoln Station near the Coquitlam Centre Mall, then cross to the east side near Northern Avenue, before ending at Lafarge Lake-Douglas Station, north of Guilford Way.

¹ The Millennium Line was built in 2000 with a platform and track connections to accommodate a future extension to Coquitlam.

The alignment also includes provision for two potential future stations at West Port Moody and Falcon Avenue and provision for a potential future extension to Port Coquitlam.

FIGURE 2 – EVERGREEN LINE ALIGNMENT



LINCOLN STATION

The Evergreen Line was originally planned to have six stations on opening day, but a unique funding partnership between the City of Coquitlam, the owners of the Coquitlam Centre Mall and PPP Canada will deliver a seventh station – Lincoln Station – at Pinetree Way and Lincoln Avenue. Lincoln Station is supported by the recent implementation of a new density funding mechanism approved by Coquitlam City Council, which is aligned with the planning goals outlined in the City of Coquitlam’s Official Community Plan for the City Centre to become a sustainable, high-density, urban core. Located in the heart of a growing commercial and residential area, the new station will service Coquitlam Centre Mall and more than a dozen existing and planned residential and retail developments located within a short walk of the station.

The inclusion of the new Lincoln Station during the construction of the Evergreen Line is expected to cost approximately \$28 million. The estimated cost premium of building the station after the



Figure 2: Artist Rendering of Lincoln Station

Evergreen Line opens is an additional 30% creating a strong financial benefit to proceeding sooner. In addition, the construction of the Lincoln Station as part of the current scope eliminates future disruption to transit riders and reduces risk associated with design and construction.

PPP Canada approved the City of Coquitlam’s application for funding for the Lincoln Station project and will provide 25% (up to \$7 million) of funding towards the design, construction and financing of Lincoln Station. Costs associated with the Lincoln Station will be tracked during construction and the final contribution by PPP Canada will be determined at substantial completion on the basis of actual costs.

4 Project Benefits and Key Features

4.1 Speed, Convenience and Safety for Users

As an extension of the SkyTrain system, the Evergreen Line uses Advanced Light Rapid Transit (ALRT) technology, which is automated, driverless and runs along a separate, dedicated guideway. The Evergreen Line will have a maximum operating speed of 80 kilometres per hour, will run every three minutes during peak periods (with capacity to run trains less than two minutes apart), and will operate about 20 hours per day.

Transit passengers will be able to travel from Coquitlam City Centre to Lougheed Town Centre in 15 minutes, making it faster and easier for area residents to commute around the region. The direct connection between Evergreen Line and the Millennium Line will allow passengers better access to other parts of Metro Vancouver.

The Evergreen Line is fully separated from street level traffic, making it a very safe form of public transportation. The system will include a number of passenger access and safety technologies, including platform and guideway intrusion and emergency stop systems. Stations will be designed in accordance with Crime Prevention Through Environmental Design (CPTED) guidelines, which are intended to reduce opportunities for crime by ensuring that people in the station can easily see one another and be seen through unimpeded sightlines and security cameras.

4.2 Reduced Congestion

Metro Vancouver and the Northeast sector continue to experience significant population and economic growth that, combined with changing regional travel patterns, places considerable strain on the regional transportation network. Without public transportation system improvements, the trend towards increased congestion is expected to continue and will result in the Northeast sector road network reaching capacity shortly after 2021.

The Evergreen Line will improve the movement of people, increase transportation choice and provide better connections between regional

centres in Metro Vancouver, while also supporting environmental sustainability objectives. The Evergreen Line is expected to influence the travel patterns of current transit users while also attracting new riders to the transit system. Analysis undertaken as part of the business case estimates that the new system will draw 50,000 riders daily in its first year of operation and 70,000 daily riders by 2021, resulting in an estimated 40,000 reduction in car trips by 2021.

4.3 Stimulating Development

The impact of rapid transit on development has been demonstrated by the implementation of existing rapid transit lines (Millennium Line and the Canada Line), which have shaped development in Metro Vancouver. Official Community Plans in both Port Moody and Coquitlam anticipate the Evergreen Line, and new construction close to planned station locations is already occurring. Coquitlam has prepared for the Evergreen Line by introducing a new bonus density bylaw to stimulate development around rapid transit stations. This has led to in excess of 12 highrise towers within Coquitlam under construction or in the development process as well as a number of commercial and low-rise residential structures accommodating several thousand units. The City of Port Moody is in the process of updating their Official Community Plan to increase density in Port Moody, particularly around Evergreen Station locations. Currently, there are three new developments being constructed adjacent to Moody Centre Station and Inlet Centre Station.

Significant future residential and commercial development is expected as a direct result of the Evergreen Line and projects already underway in Coquitlam and Port Moody include mixed use residential towers with retail and/or office space. Major destination shopping venues such as Lougheed Mall and Coquitlam Centre Mall (as well as other malls and shops adjacent to those regional centres) will benefit from increased accessibility. Access to office space locations along the corridor, for both local residents and for commuters throughout Metro Vancouver will be improved.

4.4 Employment Impacts

During construction, the Evergreen Line is forecast to create 8,000 direct and indirect jobs in B.C.'s lower mainland. Operation of the Evergreen Line will generate employment for systems operators and supervisors as well as light vehicle maintenance technicians and supervisors.

As well as the direct and indirect jobs associated with the Evergreen Line itself, The Ministry of Jobs, Tourism and Skills Training has estimated that the residential and commercial construction resulting from the Project will generate more than 7,000 additional person years of employment in the region.

5 Project Delivery Options

The Evergreen Line Project includes various elements and will be delivered in several parts:

- **Property.** The Province is responsible for assembling the property required for the route
- **Environmental Approvals.** The Province is responsible for obtaining the Environmental Assessment Certificate for the Project.
- **Advance Works.** The Province has undertaken a number of advance works with respect to utility relocations, the widening of North Road, the demolition of buildings and the re-location of rail tracks in Port Moody in preparation for major construction.
- **SkyTrain Vehicles.** Following a Request for Expressions of Interest in 2010, it was determined that the vehicles would be supplied by Bombardier. In November 2012 a fixed-price contract was signed between Bombardier, the Province and TransLink for the supply of 28 new vehicles. The contract value is \$90.7 million.
- **Civil Infrastructure.** This includes the guideway, tunnel, stations and systems, as well as testing and commissioning. The optimal procurement method for the civil infrastructure for the Evergreen Line was determined as a result of an extensive procurement options analysis, which was undertaken by the Province and Partnerships BC. The methodology used, and the results, are explained in detail in the remainder of this section.

5.1 Methodology (Civil Infrastructure)

The evaluation of procurement options is mainly concerned with identifying the method of delivering the project that will result in the greatest value for money on both a financial (quantitative) and qualitative basis. In financial terms, value for money is established by calculating the estimated cost of a project, based on a particular partnership procurement method, and comparing it to the estimated cost if the project were procured using another method.

The evaluation of procurement options involves two main steps. The first step identifies key procurement objectives, and provides a qualitative assessment of a wide range of available procurement options including both traditional and partnership methods. The assessment of these procurement options is intended to identify the two procurement methods most appropriate to the project which then form the basis of comparison.

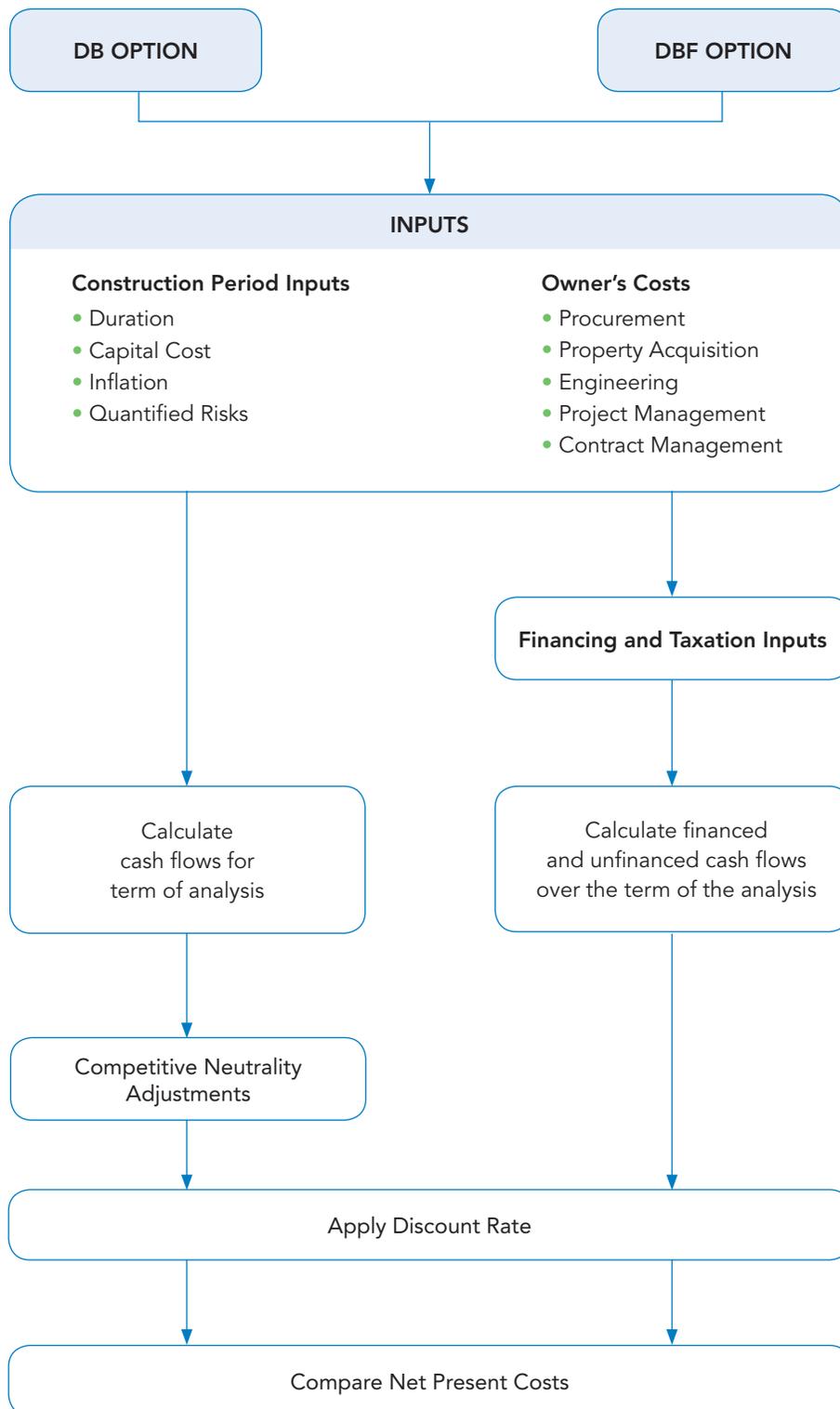
The second step in the assessment involves a more detailed, quantitative analysis that compares the two methods. A comprehensive risk analysis is conducted and financial models representing the two procurement methods are developed and compared. Both procurement methods take into account detailed financial inputs that reflect key project components during the construction period, as well as associated public sector costs under each option.

To ensure that a complete comparison is being made, the analysis also considers inputs that address financing and taxation issues along with adjustments to ensure competitive neutrality that include items such as how each model accounts for insurance costs. Without these adjustments, the traditional procurement method may be understated in some areas and consequently would not reflect the true cost to government. A discount rate is applied to the projected future cash flows to facilitate an accurate comparison of the two approaches in present day dollars. Discounting allows procurement methods with different cash flow impacts to be compared on a like-for-like basis. Comparing competing options in this way provides an objective means of determining the approach that provides the best value in terms of cost.

The results of this quantitative comparison between the two procurement methods, together with the qualitative criteria, are used to determine the method that is expected to provide the best potential value for money.

The following graphic illustrates the financial modeling approach used to compare two different procurement models.

DETERMINING THE NPC OF ALTERNATIVE PROCUREMENT APPROACHES - SUMMARY



5.2 Project Procurement Objectives

For the Evergreen Line civil infrastructure, procurement options were considered in the context of the following procurement and Project objectives.

- (1) **Facilitate System Integration and Interoperability:** Ensure the ability to deliver a seamless integration and interoperability of the Evergreen Line with the existing Sky Train system.
- (2) **Operation Integration:** Ensure seamless delivery systems operations and maintenance throughout the operating period.
- (3) **Accommodate System Expansion:** Ensure there are no constraints to the future expansion of services, or future procurements.
- (4) **Maximize Competition:** Ensure an attractive and marketable transaction and ensure a fair and transparent procurement process.
- (5) **Allocation and Management of Risks:** Allocate risk to the party that is best able to manage the risk and find the optimal risk balance for the project.
- (6) **Schedule and Cost Certainty:** Achieve timely delivery and efficient project sequencing.
- (7) **Overall Value for Money:** Deliver the best quality project for the best price.

5.3 Procurement Options Analyzed

5.3.1 Preliminary Procurement Assessment

Prior to completing a procurement options analysis, the project team considered a number of options to determine which traditional and partnership models would form the basis for more extensive quantitative and qualitative analysis.

The preliminary assessment of partnership options concluded that:

- The use of a Design-Build-Finance-Operate-Maintain (DBFOM) model (similar to the model used for the Canada Line) was not deemed appropriate for the Project. This reflects that the Evergreen Line will be integrated into an existing automated driverless system (the Canada Line is a stand-alone system and is operated and maintained separately). The Evergreen Line will be operated seamlessly with the SkyTrain system.
- The use of a Design-Build-Finance-Maintain (DBFM) model (similar to the model used on the Docklands Light Rail system in the United Kingdom, which also involves extensions to an existing system) was also rejected. A DBFM approach was expected to have higher annual maintenance costs when compared to the economies of scale that would be generated by TransLink by maintaining the Evergreen Line as part of the SkyTrain system (TransLink has one of the lowest rapid transit operating costs around the world, and has considerable experience and expertise in operating and maintain SkyTrain, relative to a new concessionaire).

The preliminary analysis did, however, suggest that the partnership options offered benefits relating to scope and schedule risk, and the project team determined that a DBF model should be advanced as the preferred partnership model for further study.

The project team undertook a similar preliminary analysis to determine the preferred traditional model to be used as a comparator to the PPP model. Design Build (DB), Design Bid Build (DBB) models, and a combination of DB and DBB approaches (as was used on the Millennium Line) were considered. The preliminary assessment of traditional models concluded that:

- In the case of both the DBB and DB/DBB combination approaches, these multiple contract model approaches would not likely be the best option to manage Evergreen Line risk in a public procurement scenario. ALRT is a complex and integrated system, with exceptionally stringent technical requirements. The implementation of multiple contracts brings risk at the interface between contracts, and it is difficult to avoid at least elements of this risk falling to the Province.
- Internal analysis and market sounding indicated that project risk could be better managed under a DB. In this scenario a single contractor or consortium of contractors would have greater flexibility in managing construction interfaces and is required to assume the full risk for managing those interfaces while delivering a fully functional system, which provides the Province with greater cost and schedule certainty than under a multiple contract scenario.

Following this preliminary analysis, the DBF and DB models were taken forward for more detailed analysis.

5.3.2 Detailed Analysis

The detailed procurement analysis assumed the following models:

Design Build (DB): Under a DB model, the Province would engage engineers and architects to develop a concept design for the project. The Province would then conduct a competition to select a design build team to undertake the detailed design and construction of the Project, based primarily upon the output specifications prepared by the Province's compliance team. The successful team would enter into a fixed price contract with payments being made by the government at specific progress milestones.

In this model, design and construction risk is transferred to the design builder, while the Province retains life cycle maintenance risks. The DB contract would include a general two-year warranty, with five- or ten-year warranties for specific elements. The benefits of a DB procurement model include the enhanced risk transfer and innovation that comes from integrated design and construction.

Design Build Finance (DBF): A DBF model is similar to a DB option, with the addition of private financing of a portion (or all) of the capital requirements during construction. The private finance is typically repaid on completion, with the potential for partial hold back during an availability demonstration period post substantial completion. In addition the contract would include a two year general warranty and five or 10 year warranties for specific items.

The DBF option includes greater security around the risk transfer related to cost and schedule, in particular, through performance incentives up to and including project commissioning as a result of the at-risk private finance. Additional benefits of this approach include: the addition of lender due diligence; limiting scope change; and enhanced enforceability. Satisfactory performance is incentivized as the private partner would receive no payment, or reduced payments as a result of work that was incomplete or below a specified standard.

Both the DB and the DBF delivery models are two-stage procurements, involving a Request for Qualifications (RFQ) through which respondent teams submit qualifications for evaluation. Shortlisted teams are then invited to participate in a Request for Proposals (RFP). Following the RFP stage, the preferred proponent is eligible to enter into a contract with the Province to design, build and finance the Project.

5.4 Results of the Procurement Options Analysis

Based on the procurement options analyzed, the DBF method was determined to be the preferred procurement option, expected to best meet the Province's procurement objectives and overall project objectives.

5.5 Achieving Value for Money

Value for money is a term that captures both the quantitative and qualitative benefits that are expected to be achieved by the decision to deliver the project using the partnership method. Quantitative value for money is achieved through the lower project cost resulting from a particular procurement method. Qualitative value is achieved when a particular procurement method is best able to support the broader objectives of a project.

6 Competitive Selection Process

A two-stage competitive selection process was undertaken for the Project². During the RFQ stage, respondents were asked to present their qualifications for the Project. Seven teams responded to the RFQ. A shortlist of three teams was selected and invited to participate in the RFP stage process. The proponent teams invited to compete are described below.

PROPONENT	TEAM MEMBERS
EL Partners	Vinci Construction Grands Projects, Vinci Concessions, BA Blacktop Ltd., Bombardier Transportation Canada Inc., Ausenco Engineering Canada Inc., HNTB Canada Inc., GENIVAR Inc., Merrick Architecture, Borowski Sakumoto Fligg Ltd., Exp Services Inc., and McElhanney Engineering Services Ltd.
Kiewit/Flatiron Evergreen Line	Peter Kiewit Infrastructure Co., Flatiron Constructors Canada Ltd., HOCHTIEF Aktiengesellschaft, Kiewit Infrastructure Co., Parsons Canada Ltd., Hatch Mott MacDonald Ltd., and Stantec Consulting Ltd.
SNC-Lavalin Inc.	SNC-Lavalin Inc., Graham Building Services (a JV), International Bridge Technologies Inc., Jacobs Associates Canada Corporation, PCL Constructors West Coast Inc., Rizzani de Eccher S.p.A., S.E.L.I. Societa Esecuzione Lavori Idraulici S.p.A., SNC-Lavalin Constructors (Pacific) Inc., SNC-Lavalin Constructors (Western) Inc., and MMM Group Ltd.

During the RFP stage, workshops and topic meetings were offered so that each team had the opportunity to discuss issues or concerns related to commercial, legal, design and construction matters. The RFP included a number of specific features reflecting the unique requirements of the Evergreen Line Project including:

- processes to allow proponents to propose modifications to the tunnel alignment and to the land provided for the project. These processes were included to facilitate innovation that would meet the requirements of the RFP;
- two risk scope levels, relating to the risk of differing geotechnical site conditions in the tunnel. Proponents could elect to accept the risk of such differing site conditions, or to share the risk with the Province. If a proponent elected to share this risk, under the RFP, the Province would attribute an additional cost of \$30 million to the proponent's price proposal for evaluation purposes; and
- a unique process relating to the provision of the automatic train control. To enable the Evergreen Line to be fully interoperable with the existing SkyTrain system, it must use the proprietary Thales SELTRAC automatic train control system. The private partner is responsible for the delivery of the automatic train control as part of the scope of the DBF contract, and to allow, this the RFP included a form of ATC supply contract and a process through which each of the proponents could undertake confidential discussions with Thales.

² The RFQ and RFP procurement documents are publicly available at www.partnershipsbc.ca

The timeline of the competitive selection process is outlined in the table below.

PROCUREMENT STAGE	TIMING	OUTCOME
Request for Qualifications	July 2010	The project was marketed locally, provincially, nationally, and internationally. Submissions from seven respondents were evaluated and a shortlist of three teams was announced on November 9, 2011: <ul style="list-style-type: none"> • EL Partners • Kiewit/Flatiron Evergreen Line • SNC-Lavalin Inc.
Request for Proposals	November 2011 to October 2012	The three shortlisted teams submitted proposals.
Selection of Preferred Proponent	October 2012	After evaluation of the proposals, SNC-Lavalin Inc. was selected as the preferred proponent.
Project Agreement Finalization	December 2012	The project agreement was signed by the Province, BCTFA and Evergreen Rapid Transit Holdings Inc. ("EGRT Construction", which was established by SNC-Lavalin Inc. to deliver the Project)

6.1 Evaluation of Proposals

The overall objective of the evaluation of technical submittals was to determine whether the proponent's proposal:

- substantially satisfied the requirements of the RFP and the definitive project agreement;
- demonstrated to the satisfaction of the Province that the proponent would be capable of performing the obligations and responsibilities of the private partner and delivering the Project in accordance with the project agreement; and
- demonstrated a good understanding of the Project and the work.

Proponents that submitted technical submittals meeting these requirements were invited to make a financial submittal. Financial submittals were then evaluated and ranked on the basis of whether the requirements of the RFP had been met, the selected risk level, and proposal price. The Province appointed an evaluation committee to evaluate the proposals based on the criteria set out in the RFP, and to recommend a preferred proponent.

It was determined that one technical submittal did not substantially satisfy the requirements of the RFP, and that proponent was not invited to submit a financial submittal.

Financial submittals were submitted by the two remaining proponents. The evaluation included a ranking process through which the lowest priced proposal was determined. The proponent that offered the proposal with the lowest price that met the requirements of the RFP was eligible to be selected as preferred proponent under the terms of the RFP. The evaluation committee made its recommendation to the Project Board (the governing body that provides guidance and oversight for the implementation of the project) in accordance with both its mandate and the provisions of the RFP. Based on that recommendation, SNC-Lavalin Inc. was identified as the preferred proponent for the Project.

6.2 Fairness Reviewer

A fairness reviewer, Jane Shackell, Q.C. of Miller Thomson LLP, was engaged to monitor throughout the implementation of the competitive selection process and offer an assessment as to whether or not the selection process was carried out in a fair and reasonable manner. The fairness reviewer was provided access to all documents, meetings and information related to the evaluation processes throughout both the RFQ and RFP stages. The fairness reviewer issued reports for both the RFQ and the RFP stage of the competitive process. In her report on the RFP stage, the fairness reviewer stated *“During the RFP process, I have observed that the project team has when necessary discussed and instructed itself appropriately on matters related to fairness. Periodically, I have been asked for, or have offered, comments on fairness issues. In each such case, the project team has carefully considered my advice and I have been satisfied with the resolution of the matter.”*

The fairness reviewer’s reports are publicly available at www.partnershipsbc.ca.

6.3 Competitive Selection Costs

The cost of the competitive selection process is factored into the value for money analysis. The total competitive selection cost for the project from approval of the business case to financial close is \$9.7 million including procurement, legal, evaluation and financial advisory services; in addition, the unsuccessful RFP proponent that met the eligibility requirements will receive a stipend of \$1.5 million. The decision to offer partial compensation is made on a case-by-case basis and can be used to: encourage competition; ensure the quality of proposals submitted; secure access to intellectual property; and mitigate costs incurred by proponents in developing their proposals. In the case of the Evergreen Line competitive selection process, the conditions to be eligible for a stipend were set out in the proponent agreement, released publicly with the RFQ.

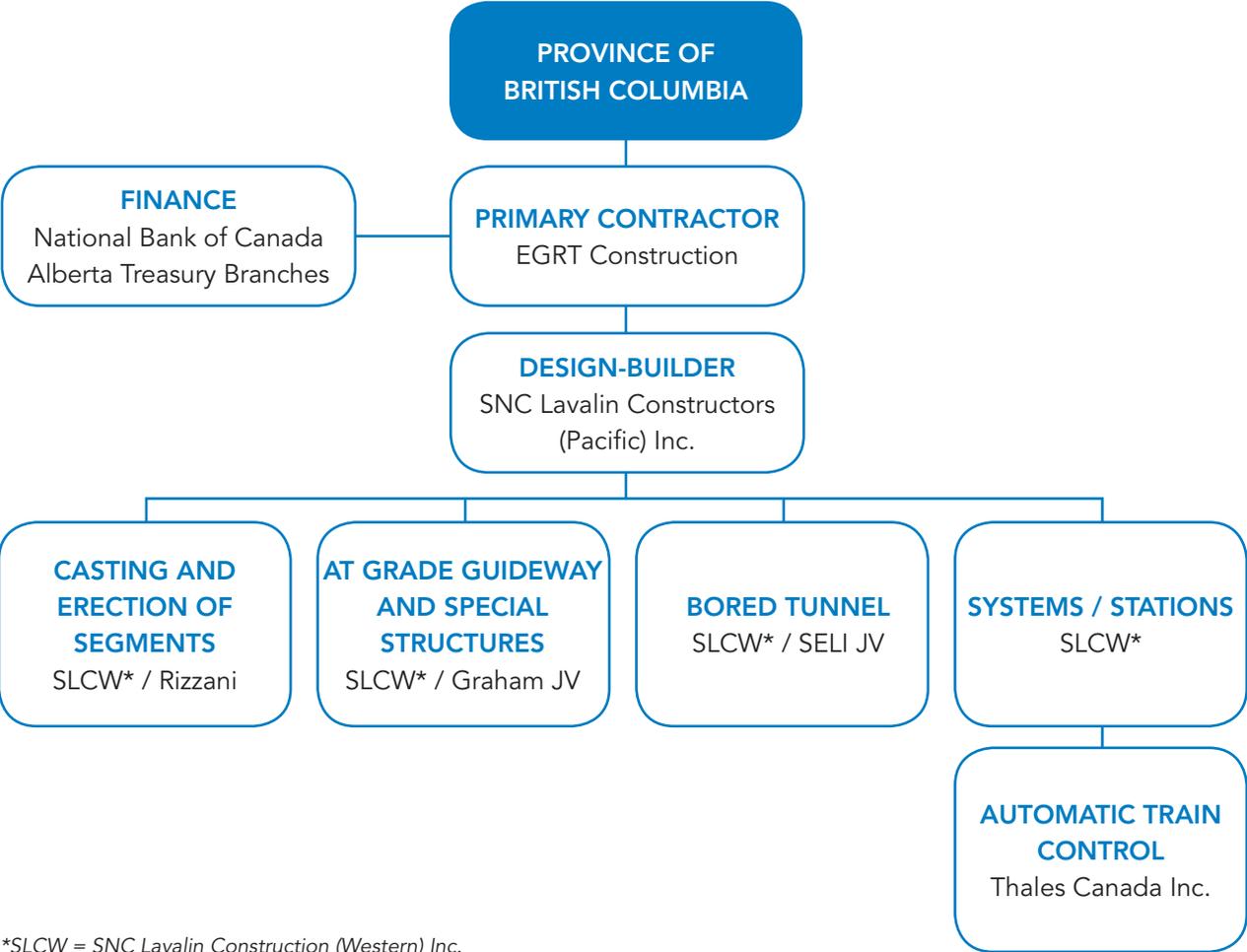
7 The Final Project Agreement

QUICK FACTS	
Private Partner	Evergreen Rapid Transit Holdings Inc. ("EGRT Construction")
Public partner	Province of British Columbia and the BC Transportation Financing Authority (BCTFA)
Facility owner	Province of British Columbia, BCTFA and TransLink (once complete, TransLink will own part of the line in recognition of its capital contribution to the Project)
Construction complete	2016
Term of the project agreement	3.5 years

7.1 Profile of the Private Sector Partner

The private partner for the Evergreen Line is Evergreen Rapid Transit Holdings Inc., doing business as EGRT Construction, which is owned by SNC-Lavalin Inc.. EGRT Construction will deliver the Project through a series of subcontracts, with key aspects of the project being delivered either by specialist providers or self-performed by SNC-Lavalin. The EGRT Construction structure is illustrated in Figure 3 below.

FIGURE 3: RELATIONSHIP BETWEEN THE PROVINCE AND EGRT CONSTRUCTION



*SLCW = SNC Lavalin Construction (Western) Inc.

7.2 Key Terms of the Project Agreement

Under the terms of the project agreement, EGRT Construction has an obligation to design, construct, test commission and partially finance the Project in accordance with the specifications set out in the agreement, and will receive payment for fulfilling these obligations. Key features of the project agreement include:

- The design and construction of the Evergreen Line for a fixed price of \$889 million excluding HST/GST and with the exception of costs associated with risks that are retained by the Province. The price includes the cost of PST following the re-introduction of PST in April 2013;
- EGRT Construction accepted the risk of differing site conditions in the tunnel, which is a key project risk, within the fixed price;
- The Province will make partial payments of \$582 million during construction based upon actual progress. These payments will be insufficient to meet the full cost of constructing the line. EGRT Construction will raise sufficient debt to fund the remaining construction costs. This will be paid by the Province once the Project has been built and met specified performance requirements, with \$307 million being paid at substantial completion.
- At substantial completion, \$40 million of this payment (or a letter of credit in this amount) will be retained for up to a year after construction is complete, pending proof that the Line will meet specified availability requirements under service conditions. In addition a further \$8.9 million will be retained as security for the general warranty period;
- As well as a general two-year work defect warranty, the project agreement includes additional specific component warranties (for example longer term warranties for station roofs) and a ten-year warranty for specific systems elements.

- A payment mechanism that includes financial penalties to EGRT Construction if it fails to meet performance requirements in the project agreement, such as requirements to effectively manage traffic during construction or meet environmental requirements;
- EGRT Construction must substantially complete the Project by July 29, 2016 or be subject to a financial penalty for every day of delay.

Once the project has reached substantial completion, it will be transferred to TransLink. TransLink is required to put the new line into revenue service within one month of the transfer. TransLink will then operate and maintain the Evergreen Line as part of the overall SkyTrain system.

7.3 Key Features of the Preferred Proponent' Proposal

The preferred proponent submitted a strong technical submittal that clearly demonstrated the consortium has the expertise and capacity to design and construct the Project. The technical submittal included a single-bore bored tunnel (as opposed to the twin-bored tunnel contemplated in the Province's reference concept for the Project). This innovation brings schedule benefits to the Project, significantly reduces the risk associated with achieving the required summer 2016 substantial completion date, and creates an opportunity for early completion.

The construction of the two-kilometre tunnel is one of the riskiest elements of the construction, partly due to the risk of unknown geological conditions being encountered during tunnelling (known as "differing site conditions" risk). The RFP included two risk scope levels for which the proponents could bid. Risk scope level one involved full transfer of all geotechnical risk in relation to the bored tunnel; risk scope level two involved a sharing mechanism if differing site conditions are encountered during tunnelling. The preferred proponent selected risk scope level one and has therefore accepted full geotechnical risk in relation to the bored tunnel, removing the Province's exposure to this risk.

The preferred proponent’s proposal contained \$255 million of private financing, including \$80 million underwritten by Alberta Treasury Branches and \$175 million provided by the National Bank of Canada. The debt pricing offered is significantly better than Provincial expectations at the business case stage, partly as a result of lower market pricing and partly because the preferred proponent incorporated a revolving credit facility that allows private financing to be drawn, repaid and redrawn throughout the construction period, matching the month-by-month credit requirements of the Project. As a result, significant savings in the interest during construction costs of the preferred proponent were achieved.

7.4 Risk Allocation Summary

The project agreement includes detailed risk allocation provisions. This approach transfers key risks to the private partner —such as construction, cost and schedule—and adds value through design and construction integration and private sector innovation.

This risk allocation is supported by the following provisions in the project agreement:

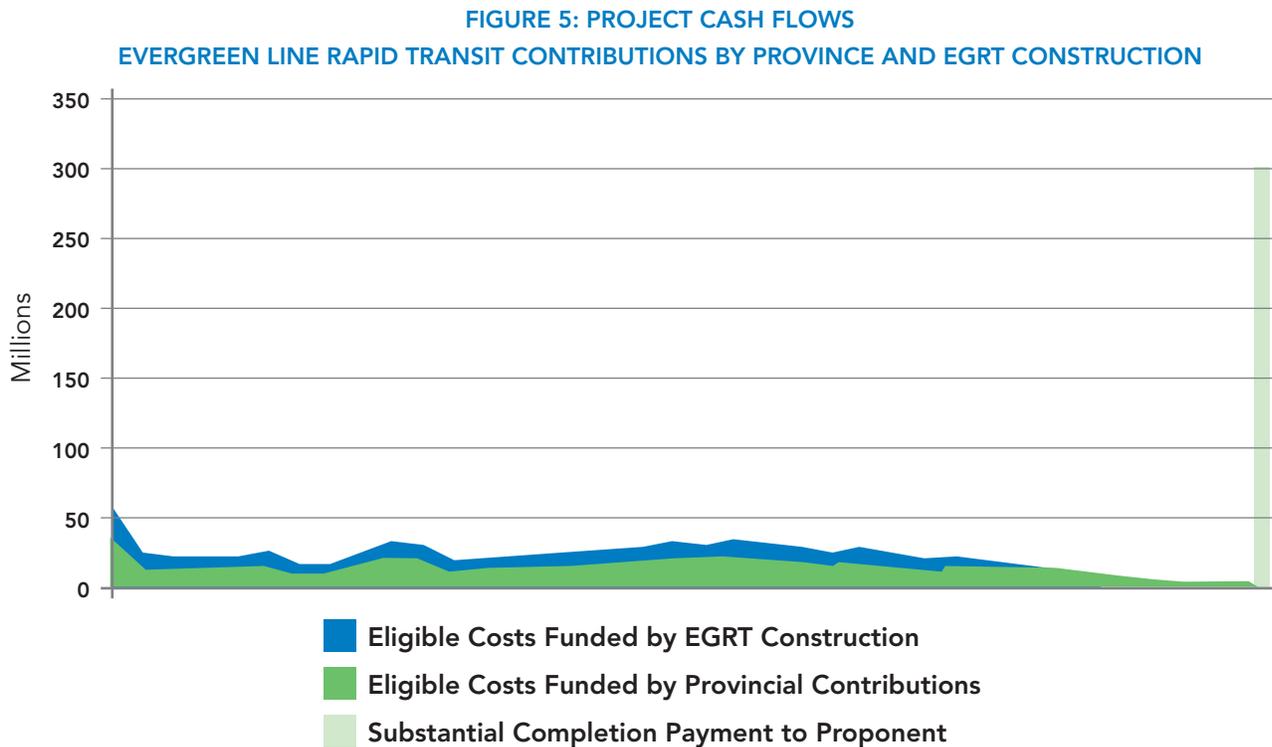
- EGRT Construction will receive a portion of the agreed contract price from the Province only after the Evergreen Line is completed and successfully operating, thus providing an incentive to complete the Project on time.
- Provisions are in place to reduce the payments to EGRT Construction if the Evergreen Line does not meet the performance standards in the project agreement.

RISK	TRANSFERRED TO EGRT CONSTRUCTION	RETAINED BY THE PROVINCE
Design	•	
Construction	•	
Functionality of design	•	
Ground conditions (general)	•	
Ground conditions (tunnel)	•	
Traffic management during construction	•	
Utilities – foreseen	•	
Utilities – unforeseen	•	•
Contamination – known (removal and disposal)	•	
Contamination – unknown		•
Systems installation and integration	•	
Testing and commissioning	•	
Proof of performance	•	
Private Financing	•	
Property acquisition		•
Province scope changes		•
Compensation Events		•
Force majeure/ relief events	•	•
Schedule	•	

7.5 Financial Summary

The project agreement between the Province and EGRT Construction includes a fixed price of \$889 million.

The graph below demonstrates the cash flows of the payments that are expected to be made to EGRT Construction under the project agreement. The graph is expressed in nominal dollars, and includes an inflation adjustment. Payment projections assume no penalties or deductions.



7.6 Quantitative Benefits

The estimated net present cost of the Project delivered using the DB procurement is \$1,330 million. The estimated net present cost of the Project delivered using the DBF approach and the preferred proponent’s proposal is \$1,196 million. A comparison of these numbers is provided below. In financial terms, the final Project is estimated to achieve value for taxpayers’ dollars of \$134 million or 10.1 per cent, when compared to the alternative procurement option.

The high value for money reflects the construction methodologies put forward by the preferred proponent including the use of a single bore tunnel rather than a twin bore tunnel, which is expected to allow for a shorter construction schedule. EGRT Construction has assumed differing site condition risk in the tunnel (the base case for the DB and during the procurement assumed that this risk would be shared with the Province). Finally, the preferred proponent brought forward excellent financing rates, which contributes to the value for money achieved.

TABLE 2: VALUE FOR MONEY TABLE (Net Present Costs in \$Millions discounted at 3.94% to April 1, 2010)

DB COMPARATOR		DBF PROPOSAL	
Capital Costs	} — \$	Completion Payment	\$ 244
Transferred Capital Risk & Contingency		Federal Funding During Construction	} — \$ 494
Bid Development Costs		Provincial Funding During Construction	
Total Costs	\$ 850	Total Payments to Private Partner	\$ 738
Competitive Neutrality Adjustment			
Federal Income Taxes	\$ -		
Provincial Income Taxes	\$ -		
Total Adjustment	\$ -		
Retained Owner's Costs (Capital)	\$ 376	Retained Owner's Costs (Capital)	\$ 376
Retained Owner's Risks	\$ 104	Retained Owner's Risks	\$ 82
Total Retained Costs	\$ 480	Total Retained Costs	\$ 458
Adjusted DB Comparator	\$ 1,330	Adjusted DBF Proposal	\$ 1,196

VFM

Adjusted DB Comparator minus Adjusted DBF Proposal **\$ 134**

The Retained Owner's Costs (Capital) include costs associated with project management, acquisition of property, and the purchase of 28 new SkyTrain vehicles. These elements of the Project are delivered outside of the DBF contract and the anticipated costs are considered to be the same for either procurement method.

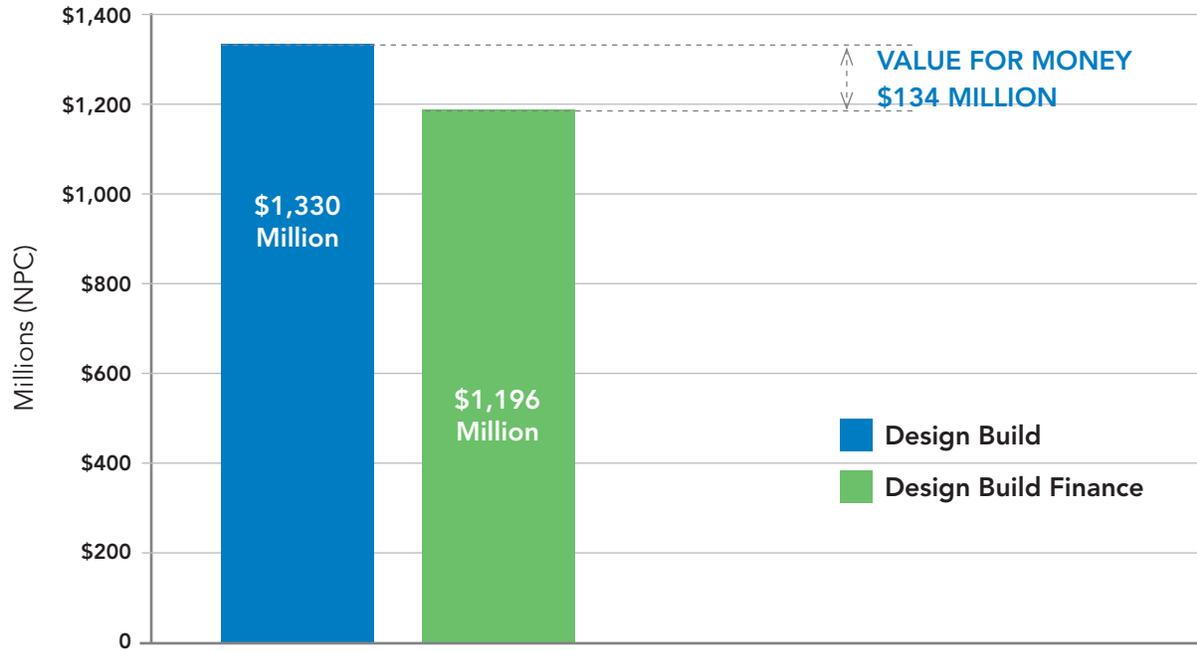
The significant value for money in this project is primarily due to the innovative proposal from EGRT Construction, which offered considerable cost savings compared to the DB comparator and was well below the affordability ceiling set out in the RFP. The value for money analysis was made following established methodology.³ The net present cost of the figures described above were developed using a discount rate⁴ of 3.94 per cent at April 2010, which represents the costs of capital over the life of the Project, taking into account factors such as inflation and interest rates.

³ Partnerships BC's Discussion Paper: Methodology for Quantitative Procurement Options Analysis is publicly available at www.partnershipsbc.ca

⁴ The discount rate used for the calculation of value for money (VFM) is 3.94 per cent. The 3.94% discount rate is the project Internal Rate of Return (IRR) which was calculated using the private partner's financial model cash flows. This calculation was performed using Partnerships BC's project IRR calculation methodology.

To test the impact of a change in the discount rate on the quantitative VFM proposition of the DBF model versus the DB model, the modeling results were re-calculated assuming a discount rate 50 basis points higher and 50 basis points lower than the base discount rate. It should be noted that no change in the estimated value of risks was undertaken in conjunction with the change in discount rates used in the sensitivity analysis. A change in the discount rate, either higher or lower, would require a reassessment of the risks of the project. The results of the Sensitivity analysis of the discount rate showed that the NPC of the final project agreement would have been approximately \$134.5 million less than the PSC if the discount rate was 50 basis points lower, and about \$133.3 million less than the PSC if the discount rate was 50 basis points higher. The narrow range is due to the short length of the project agreement.

FIGURE 6: VALUE FOR MONEY - COST COMPARISONS



7.7 Accounting Treatment

B.C.'s Office of the Comptroller General, responsible for the overall quality and integrity of the government's financial management and control systems, has established accounting guidelines for partnership projects. Based on accounting guidelines, the capital cost, for accounting purposes, for the construction of the Evergreen Rapid Transit Line Project is expected to be \$1.431 billion. Following the completion of the Project, TransLink will operate the Project and in addition a portion of the Project's assets will be transferred to and owned by TransLink reflecting their capital contribution.

8 Project Agreement and Performance Monitoring

The project agreement with EGRT Construction includes specific provisions to ensure project delivery, performance and quality standards are met. Monitoring spans every phase of the Project, from financial close through design and construction to substantial completion, following which there will be a holdback of \$40 million for a period of up to one year pending proof of performance under operational conditions, and an additional \$8.9 million hold back to secure the two year warranty period.

8.1 Design and Construction Phase

The project agreement stipulates that both the Province and EGRT Construction must appoint design and construction representatives. The Province has also appointed an Independent Engineer to review and confirm construction activities, and certify payments in accordance with the project agreement. In addition, both the Province and EGRT Construction have jointly appointed an Independent Certifier who will monitor and report on construction progress and provide certification that the conditions for substantial completion have been achieved.

In addition to monitoring under the project agreement, the project team is developing a broader performance measurement framework to assess how well project objectives are being met. The framework will include specific performance measures linked to project goals and methods for collecting reliable and meaningful data, and how results will be reported.

8.2 Quality Management

The project agreement is designed to incent the private partner to ensure delivery, performance and high standards of quality. The private partner is required to implement a quality management system that complies with the requirements and principles of the ISO 9001:2008 Standard, as well as other specified standards. Contractual performance measures require the achievement of a range of quality related requirements. The Province's project team includes a Quality Manager and quality team that will conduct quality audits as construction progressed to provide assurance to the Province that quality requirements are being met.

Final payments will not be made until the Evergreen Line has been operating to the defined standard for 120 consecutive days.

8.3 Project Board

A Project Board was established in 2008 to provide guidance and oversight for the implementation of the Project, including the traditional capital components. Members of the Project Board include representatives from the Ministry of Transportation and Infrastructure, TransLink and Partnerships BC.

The Province has assembled an integrated project management team that will be responsible for implementing the Project through design, construction and implementation. The project team reports through the executive project director to the Project Board.

9 Glossary of Terms

Business Case: Document prepared in British Columbia by a project owner demonstrating the need and cost/benefit of a project, in addition to supporting a procurement method and providing an overview of the accounting impacts that a project may have.

Competitive Neutrality: A circumstance where competitive advantages that typically accrue to government as a result of public sector ownership are neutralized through a series of adjustments that permit a fairer comparison of non-public sector alternatives.

Discount Rate: A rate used to relate present and future dollars. Discount rates are expressed as a percentage and are used to reduce the value of future dollars in relation to present dollars. This equalizes varying streams of costs and benefits, so that different alternatives can be compared on a like-for-like basis.

Financial Close: The point in the procurement process where negotiations with a preferred proponent are finalized and a project agreement is executed, allowing construction to begin.

Independent Certifier: Independent, third-party certifier engaged jointly by the owner and the private partner to verify and certify whether substantial completion has been met.

Independent Engineer: Independent, third-party certifier engaged by the owner to verify and certify whether various conditions of the project agreement have been satisfied to allow progress payments to be made.

Net Present Cost (NPC): NPC refers to the value of periodic future cost outlays when they are expressed in current, or present day, dollars by discounting them using the discount rate.

Owner: Usually a provincial ministry, authority or agency that is undertaking a needs assessment and benefit analysis to determine if a project will satisfy service delivery requirements, and that will own the project and fund the annual service payments if a project proceeds as a PPP.

Preferred Proponent: A proponent selected from a shortlist of bidders to enter into negotiations with a project owner to reach financial close and deliver a project.

Project Agreement: The project agreement sets out the requirements for the delivery of an asset under a partnership project in terms of cost, schedule and performance that typically govern the performance-based payment to a private partner.

Province: The Province means the Province of British Columbia.

Public Private Partnership (PPP): Public private partnership whereby public sector infrastructure is procured using performance-based agreement with a private sector partner to deliver and maintain an infrastructure asset, including significant, upfront capital investment.

Request for Proposals (RFP): Document issued by an owner for qualified proponents to submit formal proposals to deliver a project.

Request for Qualifications (RFQ): Document issued by an owner inviting parties interested in participating in an RFP, to submit their qualifications for delivering a project.

Retained Risk: Risks associated with delivering a project that are not transferred to the private partner under a PPP, representing a cost to the project regardless of the procurement approach.

Traditional Procurement: Methods by which the public sector has traditionally procured projects in B.C, through design bid build (DBB) or design build (DB) contracts.

Transferred Risk: Risk associated with delivering a project that is typically borne by the public sector under traditional procurement that is transferred to the private sector under a PPP.

Value for Money (VFM): Also commonly referred to as value for taxpayer dollars, VFM describes the benefits to the public expected to be realized through a particular procurement method, and can be quantitative and/or qualitative in nature. Quantitative value for money is achieved through the lower cost of a project resulting from the procurement method, whereas qualitative value is achieved when a particular procurement method better supports the goals and objectives of a project without necessarily costing less.

Appendix A: Research and Data Resources

Research

Gateway Program - Improving Roads and Bridges for people, goods and transit throughout Greater Vancouver: Program Definition Report. January 31, 2006.

Liveable Region Strategic Plan Review: Population Growth Issues and Options – Workshop Backgrounder. Greater Vancouver Regional District, March 24, 2006.

GVRD Traffic Improvement Survey Public Opinion Update, Final Report, Ipsos Reid, April 17, 2006.

Regional Growth Strategy - Metro Vancouver 2040: Shaping Our Future Draft, November, 2009.

Ministry Data

Official Community Plans (OCPs) of the communities
Provincial Transit Plan (2008)

