



U.S. Department
of Transportation

**Federal Transit
Administration**

Foreign Public Private Partnership (PPP) Case Study Analysis Report

Canada Line, London Underground, TransMilenio, and
Southern Cross Station

FINAL

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The information presented in this report was obtained through research and interviews that reflect indicative information at points in time including before, during, and after each respective project completion.



Executive Summary

Background

Governments outside of the United States (U.S.) have used Public Private Partnerships (PPPs) to successfully develop, deliver, finance, operate and maintain existing and new transit systems for almost two decades--resulting in many billions of dollars of investment in transit infrastructure and services.

In the U.S., the Federal Transit Administration (FTA) launched a PPP Pilot Program (Penta-P), to evaluate whether transit PPP's can reduce and optimally allocate risks associated with new construction, redevelopment, or operations compared to conventional procurements. Penta-P projects would also provide a means to evaluate whether PPPs can accelerate project delivery, improve reliability of cost and benefit projections, and enhance project performance and efficiency.

The Department of Transportation's (DOT), Office of the Secretary of Transportation (OST) has provided additional support to FTA's Penta-P by funding additional studies and analysis, including this study on foreign transit PPP case studies. The purpose of this report is to summarize the lessons learned and insights gained from the review of four international transit PPP case studies.

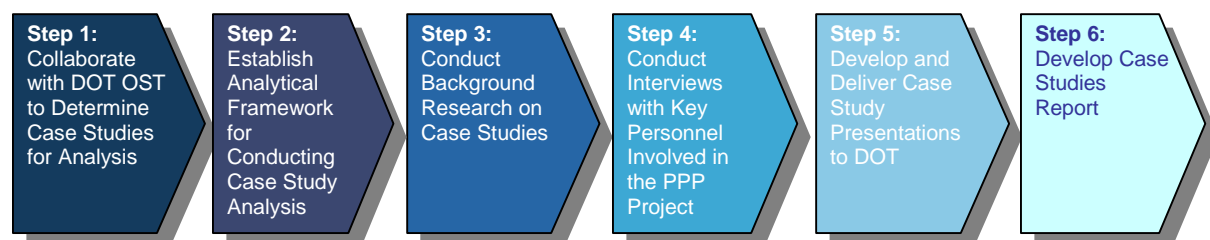
Objectives

The primary objectives of the foreign PPP case studies project as summarized in the statement of work are to:

- **Task 1:** Identify, in consultation with DOT OST and FTA selected models of existing and new transit system PPP outside of the U.S.;
- **Task 2:** Develop a report on each selected PPP including a description of the following: governance structure, partnership structure, description of the project, significant issues encountered, and key success factors; and
- **Task 3:** Prepare a written final report that summarizes lessons learned from the PPP transit projects and their potential application for FTA.

Approach

The Foreign PPP Case Studies project was conducted using a six step approach as illustrated in **ES Figure 1**.



ES Figure 1: Approach for Foreign PPP Case Studies Project

Case Study Summaries

FTA and DOT OST evaluated various foreign PPP projects for research and analysis. Based on discussions, 4 case studies were selected. **ES Figure 2** highlights the case studies selected and the key attributes of interest to FTA and DOT OST.

Case Study	Key Attributes
Canada Line	<ul style="list-style-type: none"> ▪ New Light Rail Project ▪ Use of PSC and VFM Analysis
London Underground	<ul style="list-style-type: none"> ▪ Existing Infrastructure Project (Heavy Rail) ▪ State of Good Repair
TransMilenio BRT	<ul style="list-style-type: none"> ▪ Bus Rapid Transit Project ▪ Ridership Risk Transfer
Southern Cross Station	<ul style="list-style-type: none"> ▪ Transit-Oriented Development Project ▪ Refurbishment of Existing Asset

ES Figure 2: Foreign Case Studies and Key Attributes of PPP Project

Canada Line

Canada Line is a \$1.47B (2003 USD, net present value) 19-km automated light rail system connecting downtown Vancouver with the Vancouver International Airport and the neighboring city of Richmond. It was awarded as a Design-Build-Finance-Operate PPP for a 35-year concession period in 2005 to InTransitBC, one of three bidders. Award was made based on InTransitBC's "least cost of availability payment" bid after having met stringent system design, construction, and operations requirements, and commercial and legal experience qualifications.

With rail service now in operation (as of August 2009), InTransitBC will be paid an as yet undisclosed annual availability payment with 70% of payment based on vehicle availability and performance against service schedules; 20% on quality of service in the form of passenger accessibility, comfort, convenience, and station upkeep; and 10% on meeting ridership thresholds. Ridership is estimated to be 100,000 passengers per weekday in the developed Vancouver-Richmond corridor in the first year of operations.

The Canada Line PPP was initiated and developed by the Provincial government of British Columbia through extensive project planning and financial modeling in the form of a Public Sector Comparator (PSC) and Value for Money (VFM) analysis. The Province's objective was to alleviate congestion and improve transit options between the region's job center and the International Airport and accommodate the expected population growth. Currently, Canada Line has been delivered on budget and ahead of schedule in time for the 2010 Winter Olympic Games.

London Underground

The London Underground project, is a \$98B (2003 USD) PPP providing operations, maintenance, and upgrade of existing infrastructure of the London Underground system over a 30-year period. The system was divided into three (BCV, JNP, SSL; see Section 7.1.2) manageable rail line groupings and awarded as a PPP on a Finance-Operate-Maintain basis in 2002 and 2003 to two consortia, Metronet (awarded two of the three concessions) and Tube Lines. Under the PPP design, the public sector is responsible for the operation of trains and train drivers and station management and personnel. The private consortia are responsible for

the modernization and upgrades of the system infrastructure including railways, signaling systems, and stations. Metronet and Tube Lines were selected based on lowest availability and operations and maintenance payments after meeting: technical performance, system organization and management, legal and commercial expertise requirements.

Due to the size and complexity of the 254-mile heavy rail system with 3.4M average weekday riders and difficulty in projecting system costs for 30 years, the bidding time horizon was reduced from the full 30 years to the first of four 7.5-year periods. The private sector is paid \$1.6B (2003 USD) per year on average roughly split three ways by rail line grouping, for system operations and maintenance based on train service and infrastructure availability, capability in the form of efficient passenger movement through the system, and system facility and station ambience.

The London Underground PPP was originated and largely driven by former Prime Minister Tony Blair and the governing Labour Party with the intended goal of ensuring a consistent funding stream for capital upgrades and operations and maintenance of the system. The PPP has been successful in achieving a consistent long-term funding stream, but has run into difficulty with one of its private sector partners, Metronet, which recently fell into bankruptcy due to cost overruns and poor internal oversight. As a result, the government has had to resume control of operations of Metronet's former rail line groupings.

TransMilenio

TransMilenio (Phases I & II) is a \$995M (2005 USD) 82-km bus rapid transit system in Bogotá, Colombia with an average weekday ridership of 1.5M passengers. It was designed as a PPP where the public sector provides the infrastructure, planning and design, management and contracting for public transport services, and oversight and control. The private sector was engaged through multiple concession agreements to provide feeder and trunk bus operations, as well as fare collections. Concessions were awarded on a Finance-Operate-Maintain basis for a 10-year period based on eight criteria with the two most important being least price per kilometer and previous operating experience in Bogotá. Other criteria included environmental performance, bus fleet manufacturer, and bid team composition.

The procurement process incentivized older disorganized and inefficient bus companies and operators to restructure and form partnerships in order to bid. While the public sector maintained responsibility for system planning and oversight, design, and infrastructure investment and construction, the private sector owned, maintained, and operated the buses and fare collection. The trunk and feeder operators assumed 100% of the ridership risk and were paid a share of the fare revenue based on availability, ridership, and quality of service.

TransMilenio was initiated by former Bogotá Mayor Enrique Peñalosa and achieved its Phase I and Phase II intended goals of providing affordable, timely, clean, and efficient mass transit for city residents, and a self-sustaining service requiring no public subsidy. The Mayor's decision to pursue a PPP was based on comprehensive project planning and analysis of the older privately operated piecemeal bus system.

Southern Cross Station

Southern Cross Station is a \$321.8M (2002 USD) regional and commuter rail hub redevelopment PPP in Melbourne, Australia. The contract was awarded in 2002 to Civic Nexus, whose proposal the State of Victoria deemed best station design at lowest build cost, with

lowest availability payment for ongoing operations and maintenance. In addition, Civic Nexus' proposed valuation of commercial development rights to real estate surrounding the station met State requirements. The State awarded Civic Nexus a PPP involving the reconstruction and redevelopment of the station, development rights to the 60 acres surrounding area real estate, a 30-year contract to operate and maintain the station, and an average annual payment from the public sector of \$17M for the operations and maintenance of the station (2002 USD).

The project was 100% financed by the private sector through Civic Nexus, a special purpose vehicle (SPV) led by ABN Amro, and was sponsored by the Australian State of Victoria through its \$1.1B (2002 USD) "Linking Victoria" program to improve transportation infrastructure throughout the state, which included road, rail, and water transport. The State's decision to pursue a PPP was based on extensive project planning and business case analysis. The PPP achieved the State's intended goal of delivering an iconic central transit station and spurred rapid residential and commercial tax revenue generating development of the formerly blighted neighborhood near the station and Melbourne's central business district.

Case Study Comparisons

This report compares and contrasts the 4 case studies along the following dimensions:

- **Procurement** - presents why each project was selected as a PPP, the structure and duration of the procurement process and any key issues during procurement;
- **Governance Structure** - presents the public sector structure and enabling environment for the project and a description of private sector entities;
- **Partnerships/Risks** - presents the transfer of risk between the public and private sector including: construction risk, financing risk, and operations and maintenance risk ; and
- **Financing** - presents the financial profile of each PPP, the extent of private sector financing, and the flow of funds between the public and private sector.

Lessons learned have been compiled around these dimensions for the 4 case studies.

Procurement Characteristics

All 4 case studies employed an open bid competition that included evaluation criteria based on specific project requirements. Canada Line, London Underground, and Southern Cross followed a procurement timeline of Request for Express Interest (RFEI) or Pre-Qualifications followed by Request for Proposal (RFP) and concluded with a negotiation for Best and Final Offer (BAFO). TransMilenio simply issued an RFP. In general, procurement followed a consistent process that involved performance specifications and a high degree of structured and fair interaction with all potential bidders. **ES Figure 3** summarizes key procurement characteristics of the respective projects including:

- **RFP to Contract Award Time** - number of months from the issuance of the Request for Proposal (RFP) to Contract Award;
- **Length of Concession** - length of concession agreement;
- **Value of PPP Project** - total cost of the project including public and private sector financing;
- **Number of Contracts** - number of contracts awarded as part of the PPP project;
- **Cost of Procurement** - independent estimate of the cost of procurement phase; and

- **Use of Public Sector Comparator (PSC) / Value for Money (VFM) Analysis** - use of public sector comparator and value for money analysis.
- **Basis of Award** - major criteria used for award selection.

Procurement Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
RFP to Contract Award Time	28 months	39-43 months	7 months	9 months
Length of Concession	35 years	30 years; Re-evaluation after every 7.5 years	Approximately 10 years	30 years
Value of PPP Project	\$1.47B (2003 USD)	\$98B (2003 USD) over 30 years; \$24.6B (2003 USD) over 7.5 years	\$995M (2005 USD)	\$321.8M (2002 USD)
Number of Contracts ¹	1	3 (one per line grouping)	10 (Phase I) 10 (Phase II)	1
Cost of Procurement	\$24.8M (2003 USD) ²	\$717.4M (2003 USD) ³	\$5.3M (2005 USD) ⁴	\$2.3M (2002 USD) ⁵
Use of PSC/VFM Analysis	Yes	Yes	No*	Yes
Basis of Award	Least cost of availability payment paired with meeting stringent system design, construction, and operations requirements	Lowest availability and operations and maintenance payments paired with technical performance and system organization requirements	Lowest price per km and proven previous experience operating bus lines in Bogotá	Best design at least cost and lowest availability payment for operations and maintenance with consideration for valuation of surrounding real estate

ES Figure 3: Procurement Comparison

*private consultant conducted comprehensive project plan study instead of PSC for TransMilenio to determine if:

- the system would be manageable and affordable to private operators and;
- the routes and frequency of service could be configured in such a way to have the system pay for itself through ridership revenue, requiring no public subsidy.

Project plan concluded that a system such as TransMilenio could successfully be conducted by private operators if the routes and service frequency was configured properly and if the public sector covered the costs of building the busway infrastructure.

¹ Redacted versions of contracts, with the exception of TransMilenio, are publicly available on the respective websites:

Canada Line - www.canadaline.ca

London Underground - www.tfl.gov.uk (Transport for London)

Southern Cross - www.partnerships.vic.gov.au (via Partnerships Victoria)

² Canada Line (2006)

³ National Audit Office, UK (2004)

⁴ includes costs for Phase I project planning and procurement; Institute for Transportation & Development Policy (2006)

⁵ Victorian Department of Transport (2002)

Governance Structure

In all four case studies a dedicated public sector entity was formed for the express purpose to lead and oversee the PPP project. In all four case studies the public sector entity interacted with a primary private sector entity, the SPV. Political leadership was instrumental in the development of the PPPs in three of the four case studies; a public sector expert was on hand to provide guidance in the implementation of the projects. In the U.S., it remains to be seen whether a PPP can and should be led by a newly created dedicated public sector entity or through an existing public sector entity. FTA will need to consider the particular public sector entities involved and determine who might be best suited to assume this role. **ES Figure 4** summarizes key features of the governance structure for the respective PPP projects including:

- **Lead Public Partner** - public sector entity responsible for oversight of the PPP project;
- **Special Purpose Vehicle (SPV) or Private Partner(s)** - private sector point of contact that serves as the liaison with the lead public partner;
- **Public Sector Assistance** - key government legislation or guidance supporting the use of PPPs;
- **Public Champion** - public leadership initiating or advocating the project as a PPP; and
- **Use of Independent Auditor** - use of an independent auditor to ensure fairness and help resolve disputes.

Governance Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
Lead Public Partner	Canada Line Rapid Transit Co. (CLCO)	London Underground Limited	TransMilenio Company	Southern Cross Station Authority (SCSA)
Special Purpose Vehicle (SPV) or Private Partner(s)	InTransitBC	Tube Line Holdings; Metronet	Trust Fund Operator, Multiple bus companies	Civic Nexus
Public Sector Assistance	Partnerships BC	Private Finance Initiatives (PFI); Partnerships UK	None	Partnerships Victoria
Public Champion	Province of British Columbia	Former Prime Minister Tony Blair and Labour Party	Former Mayor Enrique Peñalosa	State of Victoria
Use of Independent Auditor	Yes	Yes	No	No

ES Figure 4: Governance Structure Comparison

Partnership Structure

The partnership structures of the 4 PPP projects were quite different based on the size and scope of the project. Many details of the risk transfer related to the partnership are embedded in the concession agreements for the projects. FTA may consider the existing PPP contracting frameworks used in countries such as the Australia, Canada, and the UK in order to identify best practices of transferring risks and including them in concession agreements. **ES Figure 5** summarizes key partnership characteristics of the respective PPP projects including:

- **Construction Risk** - encompasses risks related to cost, performance, schedule, environmental (land), and utilities;
- **Financing Risk** - encompasses risks related to additional financing costs due to schedule slippage, interest rate risks, variation in Consumer Price Index (CPI), and exchange rate risks; and
- **Maintenance and Operations Risk** - encompasses risk related to maintenance levels, defective components, and service level and quality.

Partnership Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
Construction Risk	Primarily transferred to private sector	Not Applicable	Borne by the public sector who was responsible for infrastructure build	Primarily transferred to private sector
Financing Risk	Primarily transferred to private sector	Shared between public and private sector; 95% loan guarantee provided by public sector	Financing for bus fleet transferred to private sector	Financing entirely by private sector; public sector contributed development rights to surrounding station real estate
Maintenance and Operations (M&O) Risk	Primarily transferred to the private sector	Shared between public and private sector; Latent defect risk retained by public sector	M&O for bus fleet transferred to the private sector; M&O for infrastructure retained by public sector	Primarily transferred to the private sector

ES Figure 5: Partnership Structure Comparison

Financing

The project financing profiles for the 4 PPP projects varied based on the size and scope of the project. FTA can compare and contrast its existing funding models with the ones listed below. Financing factors that FTA may want to consider include project affordability, market desirability, and level of committed public funding. **ES Figure 6** summarizes key financial measures of the respective PPP projects including:

- **Value of PPP Project** - total cost of the project including public and private sector financing;
- **Initial Share of Private Sector Funding** - percentage of private sector financing to total cost of the project; this initial funding is repaid to the private sector over the life of the concession agreement;
- **Debt to Equity Ratio of Private Funding** - ratio of debt to equity financing by the private sector;
- **Annual Payment to Private Sector During Concession Agreement** - maximum value of payments to the private sector per year; and
- **Use of Loan Guarantees** - use of loan guarantees by the public sector to alleviate outstanding concerns of private sector lenders.

Financial Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
Value of PPP Project	\$1.47B (2003 USD)	\$24.62B (2003 USD) 7.5 yrs.	\$995M (2005 USD)	\$321.8M (2002 USD)
Initial Share of Private Sector Funding	35%	26%	21%	100%
Debt to Equity Ratio of Private Funding	85:15	91:9	80:20	86:14
Annual Payment to Private Sector During Concession Agreement(s)	Not Publicly Disclosed	\$1.6B	No set amount; Dependent on farebox revenue	\$17.0M
Use of Loan Guarantees	No	Yes	No	No

ES Figure 6: Financing Comparison

Lessons Learned

Procurement Characteristics

FTA agencies or regional offices may consider the following lessons learned related to procurement when pursuing a potential transit PPP project in the future. **ES Figure 7** contains the procurement lessons learned and a description or explanation of each lesson.

Lesson Learned	Description/Explanation
The size and scope of concession agreements need to be reasonable	Public sector officials need to be mindful of the size and scope of a PPP project. If the project is too large or complex, the private sector may charge such a significant premium for the work, that is does not provide VFM. Excessively large, complex projects may limit the number of competitors that bid for the work. However, a PPP project should be large enough to justify the initial procurement costs which are higher for a PPP project. Typical ranges for PPP projects may span from \$100M to \$3-4B.
A structured PPP procurement process is beneficial	Following a standard procurement process including: (1) Request for Expressed Interest (RFEI) or Pre-Qualification; (2) Request for Proposal (RFP); and (3) Best and Final Offer (BAFO) helps encourage competition in the private sector and builds confidence that the public sector is taking the necessary steps to receive the best value for money. FTA may have to consider how a PPP procurement process maps to the New Starts planning process to determine the best way to move forward.
Open dialogue with vendors during procurement is beneficial	An open exchange on technical requirements between the public and private sector allows the private sector to craft innovative solutions that may more efficiently meet the requirements of the public sector. The dialogue should be structured within a defined procurement process and should be fair to all participants.
External consultants are often necessary to help structure PPP projects	External consultants help craft the PPP project to efficiently transfer risk to the private sector and ensure the public sector receives the best VFM. Their expertise on previous projects often cannot be replicated by the public sector. Support from external consultants helps achieve an optimal risk transfer to the private sector. PPPs are primarily legal and financial projects; it is often beneficial to have the appropriate legal and financial expertise upfront.
A small pool of PPP expertise in the public sector may be beneficial	While the use of external consultants as advisors to the public sector is common, familiarity and expertise within the public sector on PPPs is important to identify and confirm selection of appropriate projects, to review and validate information provided by external consultants and to provide regular insight to policy makers on program successes and challenges.

Lesson Learned	Description/Explanation
Bidder reimbursement may be required for large, complex PPP projects	For large and complex PPP projects, it may be necessary to entice private sector bidders by guaranteeing a fixed dollar amount or percentage of reimbursement for their PPP bid cost.
Develop PSC early in the project	Early development of a Public Sector Comparator (PSC) helps determine the feasibility of moving forward with the PPP. It helps identify whether the cost of pursuing a PPP procurement is worthwhile.
It may be beneficial to conduct Value for Money (VFM) analysis at least two points in time	First, VFM analysis may occur prior to receiving bids (shadow bid) to help determine the feasibility of pursuing the procurement as a PPP. Second, VFM analysis may be conducted after bids have been received to confirm whether VFM can be achieved through the private sector.
Minimize the number of concession agreements	One of the benefits of a PPP structure is that the Special Purpose Vehicle (SPV) is typically the single private sector entity that interfaces with the public sector. This allows the public sector to manage project delivery, commitment, risk, and communications with only one point of contact rather than with multiple parties. It should be noted that in transit projects, it is not uncommon for rail cars to be provided under a separate agreement.
For BRT, combining trunk and feeder concessions may help balance the ridership risk	For Bus Rapid Transit (BRT), it may be beneficial to combine trunk and feeder concession agreements. This allows for risks such as ridership and schedule risk to be spread throughout the system and also reduce administration cost.
For TOD, public sector must take due care in estimating value of commercial development rights	When considering transit-oriented development (TOD), it is important that the public sector accurately value commercial development rights. The public sector may want to solicit multiple estimates to ensure it is properly evaluating the potential benefits that development rights may present to the winning bidder and to the PPP.

ES Figure 7: Procurement Structure Lessons Learned

Governance Structure

FTA agencies or regional offices may consider the following lessons learned related to governance structures when pursuing a potential transit PPP project in the future. **ES Figure 8** contains the governance lessons learned and a description or explanation of each lesson.

Lesson Learned	Description/Explanation
Strong political leadership helps champion PPP projects	A strong political champion is often required to help move a PPP project forward. Typically, a strong political leader helps promote the use of a PPP and responds to public critiques. Such a champion can be at the national, state or local level, but must have sufficient authority to mobilize resources and support for a project.
Forming a public sector governing entity for the express purposes of implementing a project can be beneficial	The public sector governing entity serves as the chief advocate for the project and coordinates with the various public sector stakeholders. The governing entity can be focused solely on the successful delivery of the project. FTA may consider whether an existing transit authority could fill the role as public sector governing entity or whether a separate entity would be beneficial.
For BRT operations, it may be beneficial for the governing authority to have some jurisdiction over bus routes of the entire system	In order to gain the efficiencies of a new BRT system, it may be necessary for old bus routes to be phased out as the new ones are phased in. Keeping route maintenance separate from the governing authority makes it difficult to achieve all of the efficiencies expected of a new system. It may be beneficial for the project governing entity to have some jurisdiction over bus routes of the entire system.

Lesson Learned	Description/Explanation
Some flexibility may be required for construction during existing operations	The public sector needs to examine the flexibility in construction schedules during existing operations for both expected and unexpected changes. Reasonable modifications to the construction schedule will allow the concessionaire to work with existing operators to ensure construction remains on-track while providing limited service disruption to existing operations. It may be unrealistic to establish a daily construction schedule at the beginning of the project; there must be some flexibility allowed.
Peer Reviewers independently assess if projects are on-track	Conducting "peer reviews" to determine operational readiness is helpful. Peer reviewers may consist of existing transit operators from various metropolitan areas around the world.
A PPP may result in improved oversight of the system and public spending	Public sector employees often may place more scrutiny over contractor's work than they would if the public sector was completing the operations and maintenance. This is largely driven by the desire of the public sector to maintain a good public image and to ensure that a PPP is providing value to the taxpayers.

ES Figure 8: Governance Structure Lessons Learned

Partnership Structure

FTA agencies or regional offices may consider the following lessons learned related to partnership and risk allocation when pursuing a potential transit PPP project in the future. **ES Figure 9** contains the partnership and risk allocation lessons learned and a description or explanation of each lesson.

Lesson Learned	Description/Explanation
It is difficult to transfer considerable ridership and/or farebox risk in a transit rail project	Inherently, transit rail projects are not profitable. They are intended to alleviate congestion, improve liveability, and provide other societal benefits. In Canada Line, a small portion of the ridership risk was transferred to the private sector which may be a good model to follow for future transit rail projects. However, significant ridership and/or farebox risk transfer to the private sector is difficult to achieve since transit rail is not intended to be profitable.
Operations and maintenance risks may be transferred almost exclusively to the private sector	A key benefit of a PPP is that the public sector mandates service levels for the private sector entity. This helps adequately maintain the capital asset and meet the expectations of system users. Transfer of operations and maintenance risks also allows the public sector to plan and budget a steady stream of funding for the project rather than absorb potentially costly maintenance items during the concession period.
Financing for transit rail projects is likely to be a mix of public and private funds	Given the significant capital cost associated with transit rail projects, public sector monies will most likely be required during the initial financing. It may be most beneficial to obtain as much private sector funding as possible, but public funds; sometimes as much as 80% are required in a PPP agreement.
Public sector must appropriately account for contamination risk	When dealing with a facility modification or upgrade (brownfield project), the public sector must be careful in thoroughly considering risks related to contamination whether it be environmental or other. The private sector may seek significant returns to assume this risk. In some cases, it may be beneficial for the public sector to assume these risks as part of the concession agreement.

ES Figure 9: Partnership Structure Lessons Learned

Financing

FTA agencies and regional offices may consider the following lessons learned related to financing when pursuing a potential transit PPP project in the future. **ES Figure 10** contains the financing lessons learned and a description or explanation of each lesson.

Lesson Learned	Description/Explanation
Public sector loan guarantees may negatively impact PPP projects	Public sector loan guarantees may undercut the due diligence by lenders which are a key element of a successful PPP project. If lenders are assured a large percentage of their investment, they may be less inclined to take the necessary steps to perform due diligence before and during the contract period.
Public sector should have a contingency plan in the event of PPP failure	The public sector should maintain a contingency plan in the event the concessionaire goes out of business or becomes insolvent. In the case of London Underground, when one of the SPVs went bankrupt, the public sector had to scramble to determine the next steps and eventually had to assume the responsibilities of that concessionaire. It is important that the public sector consider and evaluate such situations and risks in order to mitigate the impact of such failures.
Public sector should have a means to recoup/retain monies associated with performance penalties	Developing specific performance penalties helps encourage the concessionaire to deliver a high quality product or service. However, the public sector should develop a means to recoup or retain the penalties associated with unsatisfactory performance results.
Public sector may consider the use of development rights to nearby government-owned real estate (if applicable)	The inclusion of development rights to nearby government-owned real estate can be leveraged to bolster overall affordability and desirability of a PPP project. It can be applied in lieu of or in conjunction with existing public sector project funding contributions.

ES Figure 10: Financing Lessons Learned

Conclusion

Public private partnerships (PPP's) in transportation have shown a great measure of promise in countries around the world in recent years as a complementary and alternative method of procurement. In countries such as Australia, Canada, Colombia, and the United Kingdom, PPP's have served to encourage private investment and participation to reliably finance, construct, and manage large complicated transit projects. Case studies in the countries above demonstrate that although PPP's can improve the delivery of a particular project, there are a number of intermediate steps, ranging from project planning and scoping to financial modelling to contracting and risk allocation, necessary to achieve this objective.

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1.0 Introduction

1.1 Document Purpose

This document provides an overview of FTA's approach to the Foreign PPP Case Studies Analysis project and presents a summary of the case studies including key lessons learned that are applicable to the United States (U.S.) DOT and FTA.

1.2 Report Structure

The remainder of this document is organized as follows:

- Section 2.0 - Background
- Section 3.0 - Project Objectives
- Section 4.0 - Approach to Case Study Analysis
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 - Section 7.4 - Analysis of Financing
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 - Section 7.6 - Analysis of Success Factors
- Section 8.0 - Conclusion

2.0 Background

Governments outside of the U.S. have used Public Private Partnerships (PPPs) to successfully develop, deliver, finance, operate and maintain existing and new transit systems for almost two decades--resulting in many billions of dollars of investment in transit infrastructure and services.

Section 3011(c) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorizes the U.S. Secretary of Transportation to establish and implement a pilot program to demonstrate the advantages and disadvantages of public private partnerships (PPPs) for new fixed guideway capital projects (the Pilot Program).

Transit agencies increasingly have turned to PPP project delivery approaches to procure new or expanded transit services. In the U.S., the Federal Transit Administration (FTA) launched a PPP Pilot Program (Penta-P), to evaluate whether transit PPP's can reduce and optimally allocate risks associated with new construction, redevelopment, or operations compared to conventional procurements. Penta-P projects would also provide a means to evaluate whether PPPs can

accelerate project delivery, improve reliability of cost and benefit projections, and enhance project performance and efficiency.

3.0 Project Objectives

The primary objectives of the Foreign PPP Case Studies project are to:

- **Task 1:** Identify, in consultation with DOT OST selected models of existing and new transit system PPP outside of the U.S.;
- **Task 2:** Develop a report on each selected model to include:
 - Overall governance structure (by level of government) for implementing the project, including funding contributions and approval processes;
 - Partnership structure (roles of different public and private participants and the contractual framework governing their relationships);
 - Description of the projects illustrating each model;
 - Significant issues that emerged during or after the partnership was formed, and how and if they were resolved;
 - Success factors or attributes of these projects that made them successful or inhibited success; and
- **Task 3:** Prepare a written final report that summarizes lessons learned from the PPP transit projects and their potential application for FTA.

4.0 Approach to Case Study Analysis

The Foreign PPP Case Studies project was conducted using a six step approach (**Figure 1**).

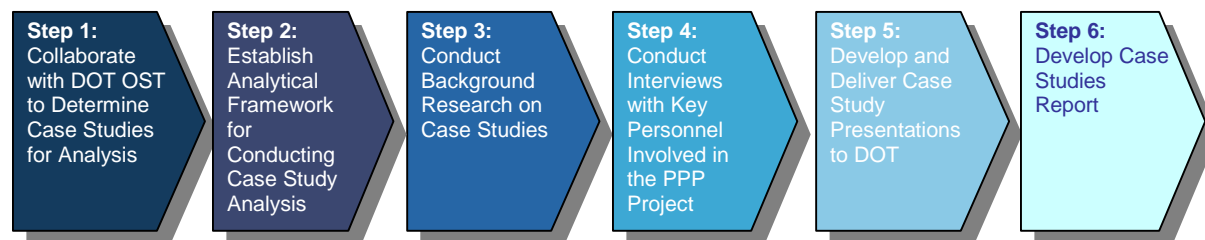


Figure 1: Approach for Foreign PPP Case Studies Project

Step 1: Collaborate with DOT OST to Determine Case Studies for Analysis. FTA met with DOT OST on several occasions to discuss desired attributes of the case studies under review. Based on this collaboration, 4 case studies were selected for this study.

Step 2: Establish Analytical Framework for Conducting Case Study Analysis. An analytical framework was developed for analyzing each case study. The analytical framework contains attributes that DOT OST and FTA sought to learn more about and is intended to provide a consistent structure between the case studies and allow for easy comparison between the PPP projects. The analytical framework consisted of the following components:

- Project Summary and Objectives;
- Project Timeline (including Procurement);
- Governance Structure;
- Partnership Structure;
- Financing;

- Key Challenges;
- Key Success Factors; and
- Applications and Challenges in the U.S.

Step 3: Conduct Background Research on Case Studies. Once DOT OST confirmed the case studies for review and provided concurrence on the analytical framework for conducting the case studies, external research began. Concession agreements, formal government reports, previous case studies of the PPP projects, and other external research were gathered to gain a strong understanding of the projects. The materials were analyzed and organized according to the analytical framework.

Step 4: Conduct Interviews with Key Personnel Involved in the PPP Project. Based on background research, key personnel for each project were identified. Key personnel included: project sponsors, public sector advisors, and private partners with hands-on experience with the PPP projects. Interviews helped close gaps from the background research and supplemented FTA's understanding of the case study.

Step 5: Develop and Deliver Case Study Presentations to DOT. Based on data collected from the background research and interviews with key project personnel, 90-minute presentations were developed for each case study. The presentations were organized by the analytical framework and presented to DOT and FTA employees.

Step 6: Develop Case Studies Report. This final report was developed which compares and contrasts key elements of the case studies in accordance with the analytical framework. The final report summarizes lessons learned from the PPP transit projects and their potential application for transit PPPs in the U.S.

5.0 Introduction to PPPs and PSC

5.1 *Public Private Partnerships*

Public Private Partnerships (PPPs) are a collaborative contractual arrangement between public sector and private sector entities to design, plan, finance, construct and/or operate projects. Unlike conventional methods of contracting or procurement in which discrete functions are divided and procured through separate solicitations, PPPs comprise a single private entity, typically a consortium of private companies, that are responsible and financially liable for performing all or a significant number of functions in connection with a project. PPPs allow for project risks to be transferred to the party best equipped to handle them whether that be the private or public sector. In transferring responsibility and risk for multiple project elements to the private partner, the private partner receives the opportunity to earn a financial return commensurate with the risks it has assumed.

PPPs are employed in much of the world and heavily in countries such as the United Kingdom, Canada, and Australia. PPPs are relevant to various industries including: transportation, water, power, health care, housing, and defense.

Structured in multiple forms, PPPs vary according to the scope of responsibility and degree of risk assumed by the private partner with respect to the project. In each case, the private partner assumes financial risk in some form - for example, through an equity investment, liability for indebtedness, a fixed priced contract or a combination thereof.

Figure 2 below illustrates a spectrum of delivery options and PPP models with different risk profiles. It ranges from Design Bid Build (DBB), a traditional procurement and not a PPP, to Design Build Finance Operate Maintain (DBFOM), where there is significant transfer of risk and ownership to the private partner.



Figure 2: Spectrum of Delivery Models for Capital Projects

DBB is the traditional form of project procurement delivery in which the design and construction of the facility are awarded separately to private sector engineering and design firms. Under a DBB delivery approach, the project sponsor, not the construction contractor, is responsible for the financing, operation, and maintenance of the facility and assumes the risk that the drawings and design specifications are complete and free from error. As you move up the spectrum to Design Build Operate Maintain (DBOM) and Design Build Finance Operate (DBFO), there is greater transfer of risk and control to the private partner related to Design, Construction, Financing, Maintenance, and Operations. A Design Build Finance Operate Maintain (DBFOM) has substantial risk transfer to the private partner and complete ownership by the private partner.

The following sections highlight the key differences between a traditional procurement method, DBB, to that of Public Private Partnerships (PPPs) which come in various forms as illustrated in **Figure 2** above.

DBB Structure:

The typical DBB structure has separate agreements between multiple private parties and the public sector, where the public sector holds most of the risk. A simplified DBB Structure is illustrated in **Figure 3**.

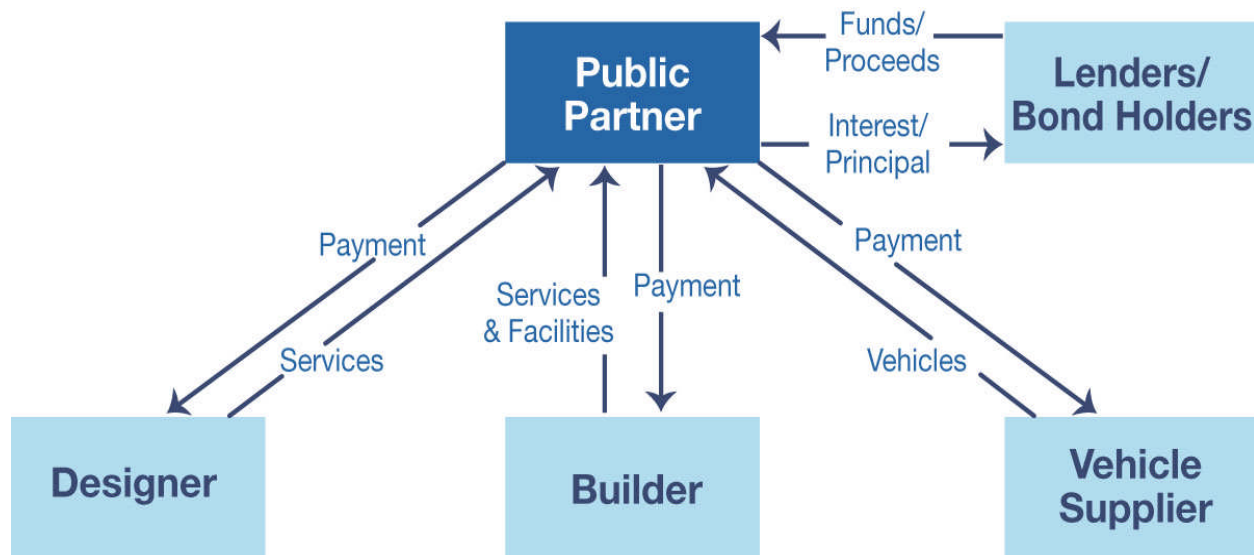


Figure 3: Simplified Structure for DBB

As illustrated, the public partner is responsible for interfacing with all private parties including: 1) Lenders/Bond Holders; 2) Designer; 3) Builder; and 4) Vehicle Supplier. Key elements of the DBB structure include:

- **Contracts:** The public partner typically engages in multiple contracts with the designer, general contractor/builder, and vehicle supplier.
- **Finance:** Public partner is responsible for financing.
- **Project Risks:** Most risks remain with the public partner including: design, construction, and financing.
- **Timing of Payments:** A DBB requires high up front capital costs to initiate the project. Funding after construction is for operations and maintenance only.
- **Performance Incentives:** Performance-based contracts may reward on-time/early delivery, but is not standard.
- **Maintenance/Operations:** Commonly performed by the public partner on a short term contract basis.

PPP Structure:

The typical PPP structure transfers risks and rewards to the private partner by providing commercial and financial incentives. The typical PPP structure allows the public partner to have a single point of responsibility and accountability. A simplified PPP Structure is illustrated in **Figure 4**.

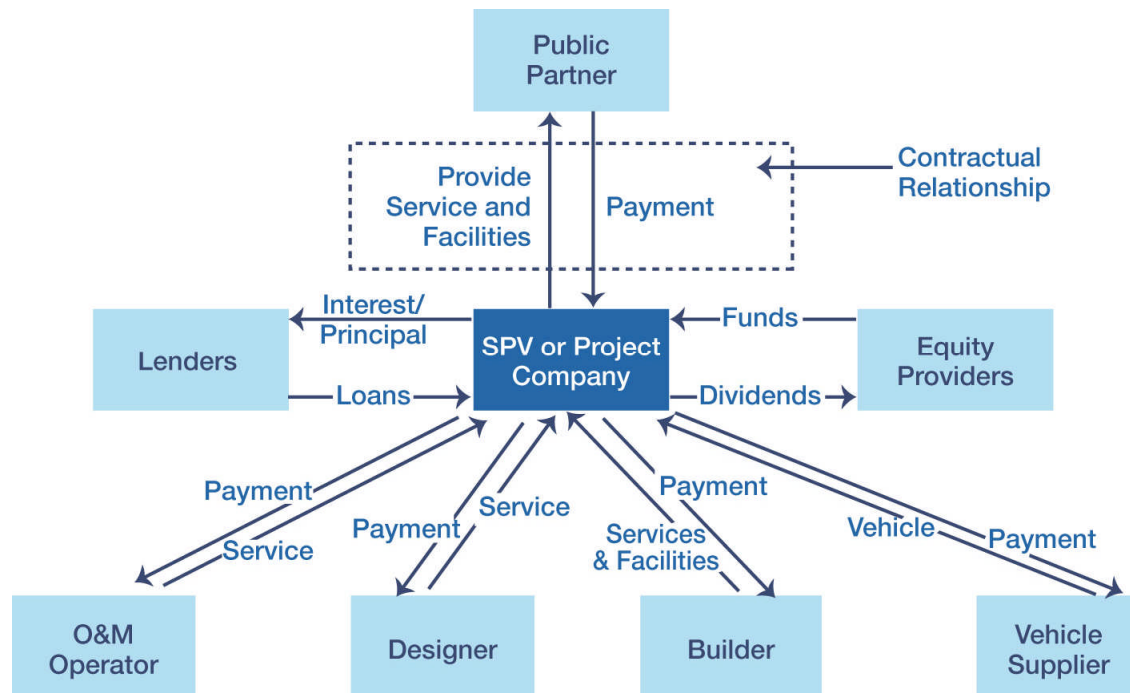


Figure 4: Simplified Structure for PPPs

As illustrated, the Special Purpose Vehicle (SPV) is the single point of contact/responsibility for the private partner. The public partner only interfaces with the SPV. The SPV interfaces with all private parties including: 1) Lenders; 2) Equity Providers; 3) O&M Operator; 4) Designer; 5) Builder; and 6) Vehicle Supplier. Key elements of the PPP structure include:

- **Contracts:** The Public Partner enters into one agreement with the private partner represented by the SPV. SPV lets contracts to designers, builders, service providers, and vehicle suppliers (sometimes let in a separate contract) for construction and provision of services.
- **Finance:** SPV raises equity and debt to finance the project. Some capital contribution may come from the public partner.
- **Project Risks:** Substantial risks are transferred from the public partner to the private partner including: design, construction, and financing.
- **Timing of Payments:** PPPs require lower up front capital costs than DBB, but require a steady and predictable payment stream over the life of the concession.
- **Performance Incentives:** Incentives for on-time/early delivery automatically are built into concession agreements through the use of milestone and availability payments to private partner.
- **Maintenance/Operations:** Typically included in PPP agreement.

Summary:

The key differences between traditional DBB projects and PPP projects are summarized in the **Figure 5** below.

Technical Area	Typical Characteristics	
	DBB	Transit PPP
Contracts	Multiple contracts to cover various aspects of project design, construction, vehicle supply, and operation	Single concession agreement between the public and private partner
Finance	Public partner assumes all costs and ownership	Upfront private partner investment typically required
Project Risks	Majority of risk is held by the public partner	Borne mostly by the private partner with some shared with the public partner
Timing of Payments	Public partner must secure full funding for project construction at outset and for ongoing operations and maintenance	Lower up front costs for the public partner, steady predictable stream of payments throughout the life of the concession
Performance Incentives	Possible incentives for on-time/early delivery for contracted vendor	Incentives for on-time/early delivery and performance over the life of the concession through the use of milestone and availability payments to the private partner
Maintenance / Operations	Commonly performed by the public partner on a short term contract basis	Typically included in PPP agreement

Figure 5: Comparison of DBB and PPP

5.2 Public Sector Comparator

When evaluating the merits of a potential PPP procurement, governments will often times employ the use of a public sector comparator (PSC) as a baseline measure to compare against future bids to assess value for money.

A PSC is a hypothetical risk-adjusted cost estimate for a project if it were to be financed, owned, and implemented by the public sector. It is used to compare costs to implement a project through the public sector with a conventional procurement to one with the private sector through a PPP and uses financial and statistical modeling techniques to estimate project cost. This comparison takes account of differences in project delivery and risks assumed by the public and private sectors. A PPP option for a project demonstrates value for money if it can deliver the project for a better risk adjusted cost than the public sector could. A PSC provides a measurement for decision-making and clarifies project requirements and risks. It is used as a key negotiating tool by the public sector and provides a decision-making audit trail with independent reviews for public transparency.

PSC History:

PSC, as it is known today, was largely developed in the United Kingdom and Australia during the late 1980s and early 1990s and grew out of the Private Finance Initiative, a formalized legal framework established by the British government in 1992. The framework mandated the use of a detailed PSC in consideration of potential PPP projects and followed the growing political interest in PPP's at the time. In Australia, the State of Victoria began to establish similar standards for the use of a PSC around the same time.

Basic Elements:

A PSC is typically comprised of a reference project, bid simulation, and a shadow bid. The reference project is a defined and priced project that would reasonably be undertaken by the public sector. A bid simulation can either be a hypothetically defined and priced bid or a concretely defined submission from an actual bid submission by the private sector. The comparison is then made between the reference project and bid simulation on a standardized basis. A hypothetically defined bid simulation can also be referred to as a shadow bid, an estimate of where the private sector bids are expected to be.

Timing of PSC:

A PSC is typically constructed before bids are received in order to avoid influence of ideas from private sector bids. It helps to define and anticipate what a private sector bid will need to deliver in order to improve value for money (VFM) compared to the PSC. A PSC can be employed when bids are first received as an initial test of potential VFM, prior to selection of a preferred bidder using revised bid information, and prior to closing the project as a pre-requisite for approval to execute the project. To maintain accuracy, the PSC must be kept up-to-date with the most recent and available data and revised to reflect any changes to project scope, schedule, cost, or any other aspects that may affect the pricing and bidding process.

PSC Modeling:

Modeling includes financial estimates that calculate the net present value (NPV) of all anticipated project costs for the PSC project, which is often referred to as the raw PSC. This can incorporate the use of a statistical model which utilizes Monte Carlo or another similar statistical modeling method to adjust the cost of the PSC project for risks. These adjustments are made by assigning costs to project risks by factoring the probability of each risk occurring in the future. This is balanced by a sensitivity analysis to verify the reasonability of the underlying risk assumptions. Ultimately, the model produces the NPV of the risk adjusted cost of procuring a project assuming that the public sector is providing the scheme and that the project is publicly financed. This is used as a baseline for determining whether or not future private sector bids provide value for money. **Figure 6** below illustrates a simple comparison of a PPP option with a PSC. On the left-hand side, the summation of the public sector base costs and the estimated value of the risk transfer are greater than the NPV of the PPP cost, therefore, the public sector is said to be achieving VFM. In the right-hand side, the summation of the public sector base costs and the estimated value of the risk transfer are less than the NPV of the PPP cost, therefore, the public sector is not achieving VFM and would most likely not utilize a PPP.

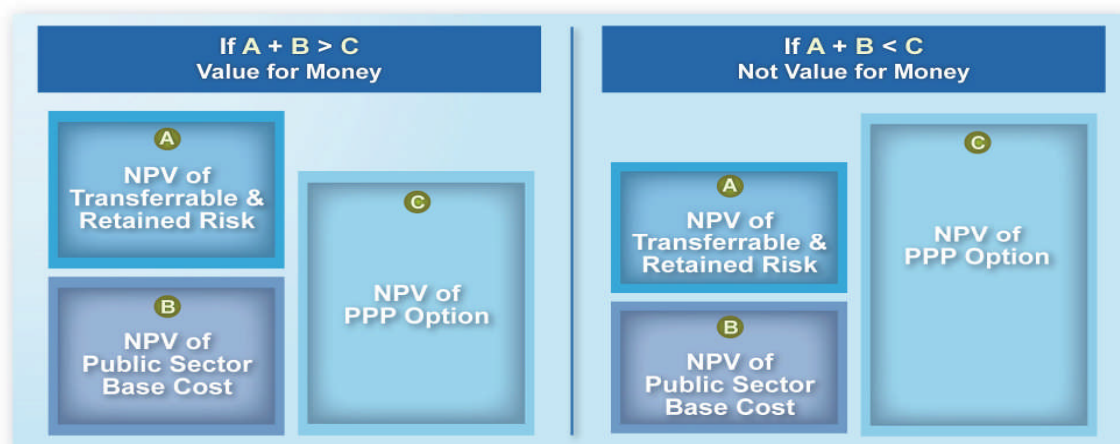


Figure 6: Value for Money Comparison

A number of factors are considered in the PSC model including:

- **Costs** - accurate estimates that capture all costs associated with a conventional public sector procurement delivery of the same volume, level of performance, service residual asset value including:
 - Capital Expenditures - construction, equipment;
 - Operating Expenditures - staff, personnel, utilities;
 - Lifecycle Costs - vehicle replacement;
- **Tax** - account for revenue that returns to the government in the form of taxes from the private sector PPP (e.g., property, payroll, capital transactions, sales);
- **Benefits** - measure and compare broad socio-economic benefits under a PSC vs. PPP;
- **Revenues** - generated revenue streams/sources, projections should be concluded by the public sector;
- **Residual Value** - account for residual value of assets at the end of the project term;
- **Inflation** - adjust real and nominal terms accordingly, general price index for relative pricing shifts, discount rate to ensure consistency with cash flows, account for relative deflation when comparing relative wages to general price index;
- **Interest Rates** - necessary in estimating cost of financing; and
- **Discount Rate/Depreciation** - assess PSC in NPV terms including:
 - Public sector should take into account "Social Time Preference Rate" (STPR), willingness for society to pay to have something now rather than in the future; and
 - Include allowances to account for unpredictable events or situations.

Risk Analysis:

The PSC model adjusts the baseline cost of the project for risk. For proper analysis and evaluation, it is important to maintain a detailed risk register and to assess the impact of these risks and probability they might occur. In addition, consideration should be made for the transfer and allocation of risks by the public or private sector (see Section 7.3 for examples) and for what period of time. The range of risks can be pooled from historic and current scenarios and data to determine risk value and can be used to reduce variations between PSC estimates and actual outcomes.

Issues and Challenges:

Although the PSC has been successfully applied on numerous projects around the world, it does not remain without criticism or debate. A main criticism of PSC's is that the analysis assumes that the public sector could and would actually implement the project when, in actuality, this may not be the case. The public sector may lack the necessary resources and expertise to attempt or complete the project diminishing the accuracy of any PSC.

Although PPP's of similar form have been adopted and adapted around world, this has not been the case for the PSC and VFM. There currently is no global standard with methodologies and points of view varying from country to country. Some differences include:

- Level of detail and information that should be used to develop a PSC
- Cost elements to include and exclude and their pricing and valuation
- Points-of-time PSC's should be constructed in relation to the PPP project formation
- Points-of-time and number of times PSC's should be used and analyzed

In addition, some critics have argued that a "true" PSC is unattainable due to the limitations of financial resources from the public sector to construct one and because the cost and revenue assumptions are not subject to any real market test. The analysis could be manipulated to produce only desired outcomes and risks may not be appropriately priced or accounted for leaving the PSC incomplete.

As FTA considers the potential for PPP's to deliver transportation projects, it is important to consider the different aspects of the PSC and VFM analysis in order to assess the practicality of pursuing a PPP.

6.0 Case Study Summaries

This section presents a high-level summary of each of the 4 PPP projects. The summary helps to establish a baseline of understanding for each project. (See Section 7.0 for an in-depth analysis of several key attributes of the projects including: procurement, governance, partnership/risk, financing, key challenges, and key success factors.)

FTA collaborated with DOT to evaluate various foreign PPP projects for research and analysis. Based on discussions, 4 case studies were selected. **Figure 7** highlights the case studies selected and the key attributes of interest to DOT and FTA.

Case Study	Key Attributes
Canada Line	<ul style="list-style-type: none"> ▪ New Light Rail Project ▪ Use of PSC and VFM Analysis
London Underground	<ul style="list-style-type: none"> ▪ Existing Infrastructure Project (Heavy Rail) ▪ State of Good Repair
TransMilenio BRT	<ul style="list-style-type: none"> ▪ Bus Rapid Transit Project ▪ Ridership Risk Transfer
Southern Cross Station	<ul style="list-style-type: none"> ▪ Transit-Oriented Development Project ▪ Refurbishment of Existing Asset

Figure 7: Foreign Case Studies and Key Attributes of PPP Project

6.1 Canada Line

Canada Line is a \$1.47B (2003 USD, net present value) 19-km automated light rail system connecting downtown Vancouver with the Vancouver International Airport and the neighboring city of Richmond. It was awarded as a Design-Build-Finance-Operate PPP for a 35-year concession period in 2005 to InTransitBC, one of three bidders. Award was made based on InTransitBC's "least cost of availability payment" bid after having met stringent system design, construction, and operations requirements, and commercial and legal experience qualifications.

With rail service now in operation (as of August 2009), InTransitBC will be paid an as yet undisclosed annual availability payment with 70% of payment based on vehicle availability and performance against service schedules; 20% on quality of service in the form of passenger accessibility, comfort, convenience, and station upkeep; and 10% on meeting ridership thresholds. Ridership is estimated to be 100,000 passengers per weekday in the developed Vancouver-Richmond corridor in the first year of operations.

The Canada Line PPP was initiated and developed by the Provincial government of British Columbia through extensive project planning and financial modeling in the form of a Public Sector Comparator (PSC) and Value for Money (VFM) analysis. The Province's objective was to alleviate congestion and improve transit options between the region's job center and the International Airport and accommodate the expected population growth. Currently, Canada Line has been delivered on budget and ahead of schedule in time for the 2010 Winter Olympic Games. **Figure 8** below summarizes the key attributes of the Canada Line Light Rail System PPP.

Canada Line	
Attribute	Description
System Characteristics	<ul style="list-style-type: none"> ▪ Driverless Automated Light Rail System connecting downtown Vancouver with City of Richmond and Vancouver Airport ▪ 19 km system, including 9km of tunnels ▪ Includes 16 stations ▪ Encompasses 3 water crossings, 2 bridges ▪ Estimated 100,000 riders daily by 2010
PPP Notables	<ul style="list-style-type: none"> ▪ Scheduled for 3 months early delivery (August 2009) ▪ Independent auditor estimates PPP saved nearly \$80M
Project Value	\$1.47B (2003, USD)
Contractual Close	July 2005
Project Location	Vancouver, Canada
Type of PPP	Design Build Finance Operate (DBFO)
Concessionaire(s) / Contracts	SNC-Lavalin; 1 contract
Time from RFP to Contract Award	28 months
Length of Concession	35 years
Special Purpose Vehicle	InTransitBC consisting of: <ul style="list-style-type: none"> ▪ SNC-Lavalin ▪ Caisse de Depot et Placement du Quebec ▪ British Columbia Investment Management Co.
Key Public Sector Representative	Canada Line Rapid Transit Co. (CLCO)

Canada Line	
Attribute	Description
Funding Stakeholders	<ul style="list-style-type: none"> ▪ InTransitBC, 35% ▪ Canadian Federal Government, 22% ▪ TransLink (regional transit authority), 17% ▪ Vancouver International Airport, 13% ▪ Province of British Columbia, 12% ▪ City of Vancouver, 1%
% of Private Sector Funds	35%
Debt to Equity Financing of Private Sector Funds	85% debt; 15% equity
Payment Mechanism	<p>Annual Availability payments will be made during operations and based on the following specifications:</p> <ul style="list-style-type: none"> ▪ 70% of payment based on vehicle availability and adherence to the transit schedule ▪ 20% of payment based on quality of service - passenger accessibility, comfort and convenience, and maintenance and upkeep of vehicles and stations ▪ 10% of payment based on meeting ridership thresholds
Risk Transfer	<p>Key risk transferred during Design and Construction include:</p> <ul style="list-style-type: none"> ▪ Schedule ▪ Cost overruns ▪ Quality of construction work ▪ Systems Integration <p>Key risk transferred during Operations and Maintenance include:</p> <ul style="list-style-type: none"> ▪ Electrical and mechanical equipment defects ▪ Service level and quality ▪ Environmental <p>Key risk transferred during Financing include:</p> <ul style="list-style-type: none"> ▪ Interest Rate Risk ▪ Inflation ▪ Foreign Exchange Rate

Figure 8: Canada Line Summary

Source: Canada Line Rapid Transit Company

6.2 London Underground

The London Underground project, is a \$98B (2003 USD) PPP providing operations, maintenance, and upgrade of existing infrastructure of the London Underground system over a 30-year period. The system was divided into three (BCV, JNP, SSL) manageable rail line groupings and awarded as a PPP on a Finance-Operate-Maintain basis in 2002 and 2003 to two consortia, Metronet (awarded two of the three concessions) and Tube Lines. Under the PPP design, the public sector is responsible for the operation of trains and train drivers and station management and personnel. The private consortia are responsible for the modernization and upgrades of the system infrastructure including railways, signaling systems, and stations. Metronet and Tube Lines were selected based on lowest availability and operations and maintenance payments after meeting: technical performance, system organization and management, legal and commercial expertise requirements.

Due to the size and complexity of the 254-mile heavy rail system with 3.4M average weekday riders and difficulty in projecting system costs for 30 years, the bidding time horizon was reduced from the full 30 years to the first of four 7.5-year periods. The private sector is paid \$1.6B (2003 USD) per year on average roughly split three ways by rail line grouping, for system

operations and maintenance based on train service and infrastructure availability, capability in the form of efficient passenger movement through the system, and system facility and station ambience.

The London Underground PPP was originated and largely driven by former Prime Minister Tony Blair and the governing Labour Party with the intended goal of ensuring a consistent funding stream for capital upgrades and operations and maintenance of the system. The PPP has been successful in achieving a consistent long-term funding stream, but has run into difficulty with one of its private sector partners, Metronet, which recently fell into bankruptcy due to cost overruns and poor internal oversight. As a result, the government has had to resume control of operations of Metronet's former rail line groupings. **Figure 9** below summarizes the key attributes of the London Underground PPP.

London Underground	
Attribute	Description
System Characteristics	<ul style="list-style-type: none"> ▪ 11 subway lines on 254-mile heavy rail system with 270 stations ▪ One of the top 10 busiest subway in the world with 3.4M daily weekday riders ▪ Oldest underground rail system in the world, beginning service in 1863
PPP Notables	<ul style="list-style-type: none"> ▪ Largest PPP project of any kind in the world to date ▪ System divided into 3 similar manageable rail line groupings to facilitate PPP award ▪ Contract re-evaluation every 7.5 years to allow for flexibility in managing existing infrastructure
Project Value	<ul style="list-style-type: none"> ▪ \$24.62B (2003, USD) for first 7.5 years ▪ Nearly \$100B (2003, USD) for 30-year concession
Contractual Close	December 2002 (Tube Lines), April 2003 (Metronet)
Project Location	London, United Kingdom
Type of PPP	Finance Operate Maintain (FOM)
Concessionaire(s) / Contracts	<ul style="list-style-type: none"> ▪ Tube Lines awarded 1 agreement ▪ Metronet awarded 2 agreements
Time from RFP to Contract Award	<ul style="list-style-type: none"> ▪ 39 months for Tube Lines ▪ 43 months for Metronet (both agreements)
Length of Concession	30 years
Special Purpose Vehicle	<p>SPV 1: Tube Line Holdings consisting of:</p> <ul style="list-style-type: none"> ▪ Bechtel ▪ Jarvis ▪ Amey <p>SPV 2: Metronet (fell into bankruptcy in 2008) consisting of:</p> <ul style="list-style-type: none"> ▪ Balfour Beatty ▪ Atkins ▪ Bombardier ▪ Thames Water ▪ Seeboard
Key Public Sector Representative	London Underground Limited (LUL)
Funding Stakeholders	<ul style="list-style-type: none"> ▪ U.K. Dept. for Transport, 67% ▪ 7 Primary Lenders, 22% ▪ European Investment Bank, 7% ▪ Private Equity from SPVs, 3% ▪ Other Conditional Loans/Lines of Credit, 1% <p>TfL underpinned financing with coverage of up to 95% of total private sector financing, providing a significant loan guarantee to the lenders.</p>

London Underground	
Attribute	Description
% of Private Sector Funds	26%
Debt to Equity Financing of Private Sector Funds	91% debt; 9% equity
Payment Mechanism	<p>There is an Infrastructure Service Charge (ISC), an availability payment of \$1.6B per year which is divided between the 3 rail line grouping and 2 SPVs. Payments from London Underground to the SPVs during operations and maintenance were based on several factors:</p> <ul style="list-style-type: none"> ▪ Availability – measure of reliability of trains, signaling, and track and station based equipment ▪ Capability – measure of passenger’s journey time from entering the station to exiting at destination ▪ Ambience – measure of condition and cleanliness of trains and stations ▪ Maintenance and upkeep of facilities for customers and staff including clocks and restrooms ▪ Cyclical refurbishment and modernization of stations and trains.
Risk Transfer	<p>Key risk transferred to the private sector include:</p> <ul style="list-style-type: none"> ▪ Cost overruns ▪ Station Availability ▪ Train Operations and Maintenance ▪ Environmental <p>Key risk shared between private and public sector include:</p> <ul style="list-style-type: none"> ▪ Financing ▪ Service level and quality <p>Key risk retained by the public sector include:</p> <ul style="list-style-type: none"> ▪ Latent Defect

Figure 9: London Underground Summary

Source: Transport for London

6.3 TransMilenio BRT

TransMilenio (Phases I & II) is a \$995M (2005 USD) 82-km bus rapid transit system in Bogotá, Colombia with an average weekday ridership of 1.5M passengers. It was designed as a PPP where the public sector provides the infrastructure, planning and design, management and contracting for public transport services, and oversight and control. The private sector was engaged through multiple concession agreements to provide feeder and trunk bus operations, as well as fare collections. Concessions were awarded on a Finance-Operate-Maintain basis for a 10-year period based on eight criteria with the two most important being least price per kilometer and previous operating experience in Bogotá. Other criteria included environmental performance, bus fleet manufacturer, and bid team composition.

The procurement process incentivized older disorganized and inefficient bus companies and operators to restructure and form partnerships in order to bid. While the public sector maintained responsibility for system planning and oversight, design, and infrastructure investment and construction, the private sector owned, maintained, and operated the buses and fare collection. The trunk and feeder operators assumed 100% of the ridership risk and were paid a share of the fare revenue based on availability, ridership, and quality of service.

TransMilenio was initiated by former Bogotá Mayor Enrique Peñalosa and achieved its Phase I and Phase II intended goals of providing affordable, timely, clean, and efficient mass transit for

city residents, and a self-sustaining service requiring no public subsidy. The Mayor's decision to pursue a PPP was based on comprehensive project planning and analysis of the older privately operated piecemeal bus system. **Figure 10** below summarizes the key attributes of the TransMilenio BRT PPP.

TransMilenio BRT	
Attribute	Description
System Characteristics	<ul style="list-style-type: none"> • 82-km of trunk busways (41km in Phase I, 41km in Phase II) • Approximately 1.5M passengers/weekday • Average load of 40,000 passengers per hour per direction (pphpd) • Articulated buses with 160 passenger capacity • Central control center monitors system and buses and dispatches repair teams when necessary
PPP Notables	<ul style="list-style-type: none"> • Public sector responsible for planning, design, infrastructure investment, oversight and control • Private sector responsible for rolling stock, fare collection and bus operations/maintenance • Concessions awarded for trunk line operators, feeder system operators, and fare collection operator • Farebox revenue was placed in trust fund which managed the disbursements of funds to stakeholders
Project Value	\$995M (2005, USD) for Phases I and II combined
Contractual Close	April 2000 (Trunk), July 2000 (Feeder)
Project Location	Bogotá, Colombia
Type of PPP	Finance Operate Maintain (FOM)
Concessionaire(s) / Contracts	<ul style="list-style-type: none"> • 10 concessionaires and contracts in Phase I • 10 concessionaires and contracts in Phase II
Time from RFP to Contract Award	7 months
Length of Concession	10 years
Special Purpose Vehicle	Individual concession contracts were issued to multiple bus operators and fare collection operator. SPV was not utilized.
Key Public Sector Representative	TransMilenio Co.
Funding Stakeholders	<ul style="list-style-type: none"> ▪ National Government, 41% ▪ Local Fuel Surcharge, 29.5% ▪ Private Sector, 21% ▪ Local General Fund, 7% ▪ World Bank, 1.5%
% of Private Sector Funds	21%
Debt to Equity Financing of Private Sector Funds	80% debt; 20% equity

TransMilenio BRT	
Attribute	Description
Payment Mechanism	<p>Payments are made to 5 key stakeholders based on the total farebox revenue collected. The basis of payment and % cap on the payment for each stakeholder is listed below:</p> <ul style="list-style-type: none"> ▪ TransMilenio – based on % of total farebox revenue; fixed percentage of revenues, 3% in Phase I and 5% in Phase II ▪ Feeder Operators – based per passenger; capped at 20% of total farebox revenue ▪ Fare Collection Operator – based on tickets sold; capped at 11% of farebox revenue ▪ Trust Fund Company - based on percentage of total farebox revenue; fixed percentage of revenue, less than 1% ▪ Trunk Operators - based on a proportional amount of km driven; receives remainder of farebox revenue
Risk Transfer	<p>Key risk transferred to the private sector include:</p> <ul style="list-style-type: none"> ▪ Ridership ▪ Vehicle Supply/Availability of Buses ▪ Service level and quality ▪ Fleet Financing ▪ Fleet O&M <p>Key risk retained by the public sector include:</p> <ul style="list-style-type: none"> ▪ Infrastructure availability ▪ Infrastructure financing ▪ Infrastructure O&M

Figure 10: TransMilenio Summary

Source: TransMilenio S.A.

6.4 Southern Cross Station

Southern Cross Station is a \$321.8M (2002 USD) regional and commuter rail hub redevelopment PPP in Melbourne, Australia. The contract was awarded in 2002 to Civic Nexus, whose proposal the State of Victoria deemed best station design at lowest build cost, with lowest availability payment for ongoing operations and maintenance. In addition, Civic Nexus' proposed valuation of commercial development rights to real estate surrounding the station met State requirements. The State awarded Civic Nexus a PPP involving the reconstruction and redevelopment of the station, development rights to the 60 acres surrounding area real estate, a 30-year contract to operate and maintain the station, and an average annual payment from the public sector of \$17M for the operations and maintenance of the station (2002 USD).

The project was 100% financed by the private sector through Civic Nexus, a special purpose vehicle (SPV) led by ABN Amro, and was sponsored by the Australian State of Victoria through its \$1.1B (2002 USD) "Linking Victoria" program to improve transportation infrastructure throughout the state, which included road, rail, and water transport. The State's decision to pursue a PPP was based on extensive project planning and business case analysis. The PPP achieved the State's intended goal of delivering an iconic central transit station and spurred rapid residential and commercial tax revenue generating development of the formerly blighted neighborhood near the station and Melbourne's central business district. **Figure 11** below summarizes the key attributes of the Southern Cross Station PPP.

Southern Cross Station	
Attribute	Description
System Characteristics	<ul style="list-style-type: none"> Major commuter and regional rail transit hub for Melbourne and state of Victoria in Australia dating back to 1859 Peak capacity of 30,000 passengers per hour
PPP Notables	<ul style="list-style-type: none"> First joint-development project in Australia with all upfront financing provided by the private sector 60-acre project site including station and surrounding commercial development near the Melbourne central business district 30-year contract for station construction and modernization and operations and maintenance
Project Value	\$321.8M (2002, USD)
Contractual Close	July 2002
Project Location	Melbourne, Australia
Type of PPP	Design Build Finance Operate Maintain (DBFOM)
Concessionaire(s) / Contracts	Civic Nexus Pty. Ltd.; 1 contract
Time from RFP to Contract Award	9 months
Length of Concession	30 years
Special Purpose Vehicle	Civic Nexus consisting of: <ul style="list-style-type: none"> ABN Amro Leighton Contractors Grimshaw Partners + Daryl Jackson Honeywell Delaware North Winward Structures
Key Public Sector Representative	Southern Cross Station Authority (SCSA)
Funding Stakeholders	<ul style="list-style-type: none"> Bond financing through ABN Amro, 74% Equity from ABN Amro, 14% Value of rights to commercial real estate transferred to Civic Nexus, 12%
% of Private Sector Funds	100%
Debt to Equity Financing of Private Sector Funds	74% debt; 14% equity; 12% value of real estate
Payment Mechanism	Core Service Payments (CSP), also known as availability payments, are made quarterly during operations and maintenance based on station availability, operations, and maintenance; CSP comprise of 3 main components: <ul style="list-style-type: none"> Capital - reimbursement to private sector for cost of station redevelopment Operating - stations operations and management for the 30-year concession period Insurance - public sector covers cost of insuring station operations for 30-year concession period

Southern Cross Station	
Attribute	Description
Risk Transfer	<p>Key risk transferred to the private sector include:</p> <ul style="list-style-type: none"> • Design • Commissioning • Legislative/Political • Financial <p>Key risk shared between private and public sector include:</p> <ul style="list-style-type: none"> • Site • Schedule (Construction) • Force Majeure <p>Key risk retained by the public sector include:</p> <ul style="list-style-type: none"> • Scoping (Outputs)

Figure 11: Southern Cross Station Summary

Source: Southern Cross Station Authority

7.0 Case Study Comparisons and Lessons Learned

This section compares and contrasts the PPP projects based on key aspects of the agreed-upon analytical framework including:

- **Procurement** - presents why each project was selected as a PPP, the structure and duration of the procurement process and any key issues during procurement;
- **Governance Structure** - presents the public sector structure and enabling environment for the project and a description of private sector entities;
- **Partnerships/Risks** - presents the transfer of risk between the public and private sector including: construction risk, financing risk, and operations and maintenance risk ; and
- **Financing** - presents the financial profile of each PPP, the extent of private sector financing, and the flow of funds between the public and private sector.

A list of lessons learned that are applicable to FTA's Penta-P program and potential PPP arrangements in the future are provided in this section. In addition, key challenges and success factors of the PPP projects are compared and contrasted in this section.

7.1 Analysis of Procurement Phase

All 4 case studies employed an open bid competition that included evaluation criteria based on specific project requirements. Canada Line, London Underground, and Southern Cross followed a procurement timeline of Request for Express Interest (RFEI) or Pre-Qualifications followed by Request for Proposal (RFP) and concluded with a negotiation for Best and Final Offer (BAFO). TransMilenio simply issued an RFP. In general, procurement followed a consistent process that involved performance specifications and a high degree of structured and fair interaction with all potential bidders. **Figure 12** summarizes key procurement traits of the respective projects including:

- **RFP to Contract Award Time** - number of months from the issuance of the Request for Proposal (RFP) to Contract Award;
- **Length of Concession** - length of concession agreement;
- **Value of PPP Project** - total cost of the project including public and private sector financing;

- **Number of Contracts** - number of contracts awarded as part of the PPP project;
- **Cost of Procurement** - independent estimate of the cost of procurement phase; and
- **Use of Public Sector Comparator (PSC) / Value for Money (VFM) Analysis** - use of public sector comparator and value for money analysis.
- **Basis of Award** - major criteria used for award selection.

Procurement Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
RFP to Contract Award Time	28 months	39-43 months	7 months	9 months
Length of Concession	35 years	30 years; Re-evaluation after every 7.5 years	Approximately 10 years	30 years
Value of PPP Project	\$1.47B (2003 USD)	\$98B (2003 USD) over 30 years; \$24.6B (2003 USD) over 7.5 years	\$995M (2005 USD)	\$321.8M (2002 USD)
Number of Contracts ⁶	1	3 (one per line grouping)	10 (Phase I) 10 (Phase II)	1
Cost of Procurement	\$24.8M (2003 USD) ⁷	\$717.4M (2003 USD) ⁸	\$5.3M (2005 USD) ⁹	\$2.3M (2002 USD) ¹⁰
Use of PSC/VFM Analysis	Yes	Yes	No*	Yes
Basis of Award	Least cost of availability payment paired with meeting stringent system design, construction, and operations requirements	Lowest availability and operations and maintenance payments paired with technical performance and system organization requirements	Lowest price per km and proven previous experience operating bus lines in Bogotá	Best design at least cost and lowest availability payment for operations and maintenance with consideration for valuation of surrounding real estate

Figure 12: Procurement Comparison

*private consultant conducted comprehensive project plan study instead of PSC for TransMilenio to determine if:

- iii) the system would be manageable and affordable to private operators and;
- iv) the routes and frequency of service could be configured in such a way to have the system pay for itself through ridership revenue, requiring no public subsidy.

Project plan concluded that a system such as TransMilenio could successfully be conducted by private operators if the routes and service frequency was configured properly and if the public sector covered the costs of building the busway infrastructure.

⁶ Redacted versions of contracts, with the exception of TransMilenio, are publicly available on the respective websites:

Canada Line - www.canadaline.ca

London Underground - www.tfl.gov.uk (Transport for London)

Southern Cross - www.partnerships.vic.gov.au (via Partnerships Victoria)

⁷ Canada Line (2006)

⁸ National Audit Office, UK (2004)

⁹ includes costs for Phase I project planning and procurement; Institute for Transportation & Development Policy (2006)

¹⁰ Victorian Department of Transport (2002)

The sections below detail the procurement phase of each PPP project and analyze the similarities and differences of the procurement phase between the projects.

7.1.1 Canada Line

Canada Line leveraged a traditional PPP procurement model. They issued a Request for Expressed Interest (RFEI), followed by a Request for Proposal (RFP), solicited a Best and Final Offer (BAFO) from down-selected vendors, and then negotiated the final contract with the preferred bidder. See **Figure 13** for a depiction of the Canada Line procurement process.

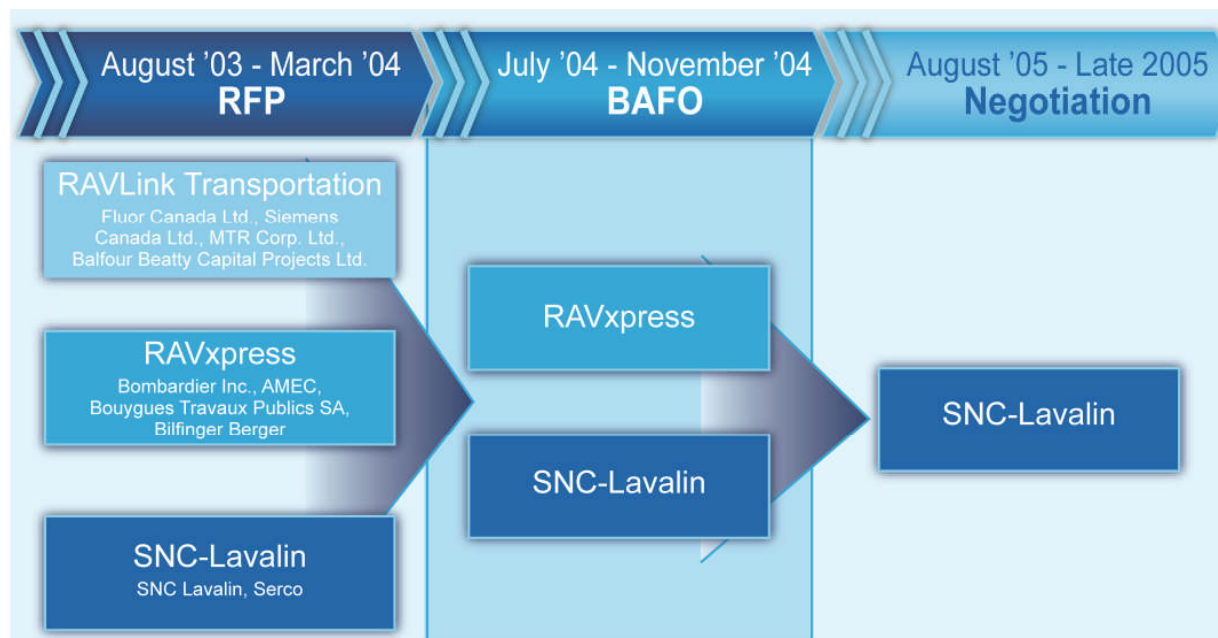


Figure 13: Canada Line Procurement Stages

The procurement phase spanned approximately 28 months from the initial RFP (August 2003) to final contract award (December 2005). Three consortia submitted eligible bids including:

- **RAVLink Transportation** (comprised of Flour Canada Ltd., Siemens Canada Ltd., MTR Corp. LTD., Balfour Beatty Capital Projects Ltd.);
- **RAVxpress** (comprised of Bombardier Inc., AMEC, Bouygues Travaux Publics SA, and Bilfinger Berger); and
- **SNC-Lavalin** (comprised of SNC-Lavalin and Serco).

RAVxpress and SNC-Lavalin were down-selected for a BAFO. Based on the results of the BAFO, SNC-Lavalin was determined the winning bidder. Negotiations of the final concession agreement lasted for 5 months. Ultimately, Canada Line issued one 35-year concession agreement to the concessionaire, SNC-Lavalin. The total cost of procurement was estimated at \$24.8M (2003 USD) (Canada Line, 2006).

Canada Line generated a public sector comparator (PSC) estimate for the project and conducted a Value for Money (VFM) analysis against the initial bids received from vendors. The VFM analysis showed Value for Money in the private sector bids, helping to support this project as a PPP.

Private sector bids were reviewed by an evaluation committee of more than 60 professionals and experts from various public partner agencies. Four broad areas were evaluated including (Canada Line, 2006):

- Design and Construction;
- Operations and Maintenance;
- Finance - net-cost of the system (value for money) including capital costs, operating costs, and ridership revenues; and
- Commercial and Legal aspects.

In addition to these areas, bids were evaluated on the following factors:

- Team's ability and experience;
- Value of transportation benefits;
- Safety in design, construction, and operation; and
- Qualitative factors including an approach to communications and public consultation, environment impact, and design aesthetics.

7.1.2 London Underground

London Underground leveraged a traditional PPP procurement model. They issued a Request for Expressed Interest (RFEI), followed by a Request for Proposal (RFP), solicited a Best and Final Offer (BAFO) from down-selected vendors, and then negotiated the final contract with the preferred bidders. See **Figure 14** for a depiction of the London Underground procurement process.

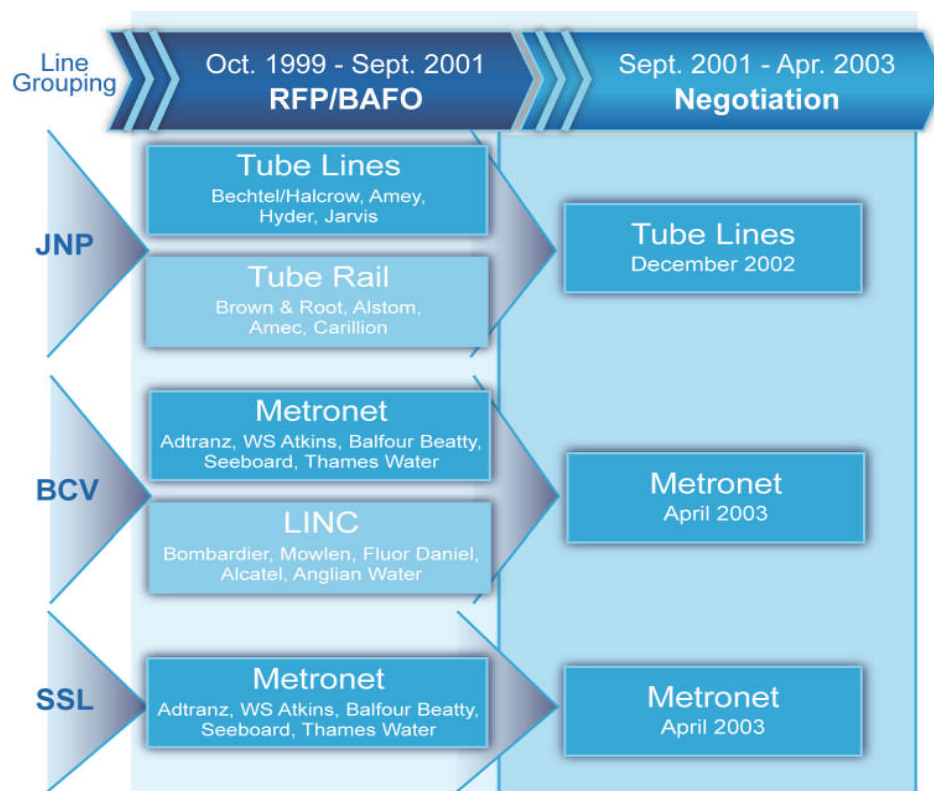


Figure 14: London Underground Procurement Stages

Given the size and scope of the London Underground project (largest PPP project to date), it was divided into 3 distinct more manageable rail line groupings based on the similar typology of the rail lines including:

- **JNP** (Jubilee, Northern, Piccadilly);
- **BCV** (Bakerloo, Central, Victoria, Waterloo & City); and
- **SSL** (District Circle, Metropolitan, East London, Hammersmith & City).

London Underground issued one concession agreement per rail line grouping, for a total of 3 concession agreements. The 30-year concession agreement was broken into four, 7.5 year increments to allow for flexibility in managing the existing infrastructure for any changes related to scope of work, maintenance and station upgrades, and train service (NAO, 2000).

The procurement phase spanned between 39 to 43 months from the initial RFP (October 1999) to final contract award (December 2002 for JNP line) and (April 2003 for BCV and SSL lines). Various bidders participated in the RFP stage, however, due to the scale and complexity of the project only a few bidders remained intact.

For the JNP line, 2 firms participated in the BAFO including (1) Tube Lines (comprised of Bechtel, Halcrow, Amey, Hyder, and Jarvis) and (2) Tube Rail (comprised of Brown & Root, Alstom, Amec, and Carillion). Based on the results of the BAFO, Tube Lines was determined the winning bidder. Negotiations of the final concession agreement lasted for 16 months with final contract award in December 2002.

For the BCV line, 2 firms participated in the BAFO including (1) Metronet (comprised of Adtranz, WS Atkins, Balfour Beatty, Seeboard, and Thames Water) and (2) LINC (comprised of Bombardier, Mowlen, Fluor Daniel, Alcatel, and Anglican Water). Based on the results of the BAFO, Metronet was determined the winning bidder. Negotiations of the final concession agreement lasted for 20 months with final contract award in April 2003. For the SSL line, only Metronet remained intact during the RFP stage. This was due primarily to the high cost of keeping bid teams together throughout the procurement process. Negotiations of the final concession agreement lasted for 20 months with final contract award in April 2003 (NAO, 2004).

The length of the RFP phase and ensuing negotiations was extended due to various legal challenges by then Mayor of London Ken Livingston, who was opposed to the PPP project. Ultimately, the challenges were dismissed and the PPP project moved forward. The total cost of procurement was estimated at \$717.4M (2003 USD).

London Underground generated "shadow bids" in conjunction with the public sector comparator (PSC) in 2000 to estimate the approximate bids from the private sector. In addition, the PSC was used to conduct a value for money analysis against the actual bids received from vendors. The VFM analysis showed value for money in the private sector bids, helping to support this project as a PPP (NAO, 2000).

Private sector bids were reviewed by a panel of public and private sector experts in three main areas:

- Technical
 - Performance - measured in terms of availability, ambience and capability;
 - Detailed Asset Management Plan - first 7.5-year review period focusing on track, signaling, and rolling stock maintenance;

- Relationship Management - plan to manage complex relationships between railway operation and major projects in terms of joint management and planning;
- Safety & Environment - plans to maintain a safety assurance regime and address management of environmental risks and issues;
- Organizational
 - Evidence of well-considered management approach and demonstrated understanding of management issues in a long-term contract;
- Financial
 - Pricing schedule – projected costs for each of the principal components of contracted activities;
 - Annual Infrastructure Service Charge (availability payment) – cost and payment for operations and maintenance and amounts required to service debt and equity; and
 - Financial Model – shows how key financial measures were derived.

7.1.3 TransMilenio

TransMilenio established clear responsibilities between the public and private sector in the PPP. The public sector was responsible for the provision of the infrastructure, planning and design, management of public transport services, and system oversight and control. The private sector has been responsible for acquiring, maintaining, and operating buses and furnishing and operating the fare collection system. TransMilenio solicited bids for trunk and feeder bus operators as well as for a fare collection operator. TransMilenio issued several contracts in Phase 1 and Phase 2. For trunk operators in Phase I, they issued 4 contracts and 3 contracts in Phase II. For feeder operators, they issued 5 contracts in Phase I and 6 contracts in Phase II. For fare collection operators, they issued 1 contract in both Phases I and II. **Figure 15** depicts the concessionaires for trunk and feeder bus operation and fare collection operation.

Concession Agreements	Phase I	Phase II
Trunk Operators	<ul style="list-style-type: none"> • SI99 S.A. • Express del Futuro • S.I.T.M. S.A. Ciudad Móvil • Metrobus S.A. 	<ul style="list-style-type: none"> • Transmasivo S.A. • SI02 S.A. • Connexion Móvil S.A.
Feeder Operators	<ul style="list-style-type: none"> • Consorcio Alimentadores Tercer Milenio – Codatermil • Unión Temporal Uribe Uribe • Sidauto S.A. • Alimentadores Consorciados Alcon • Alimentadores del Norte 	<ul style="list-style-type: none"> • Unión Temporal Alnorte • Unión Temporal Alcapital • Transporte Alimentador de Occidente S.A. – TAO • Consorcio ETMA • SI03 S.A. • Consorcio Citimovil
Fare Collection Operator	<ul style="list-style-type: none"> • Angelcom S.A. 	<ul style="list-style-type: none"> • Unión Temporal

Figure 15: TransMilenio Concessionaires

For TransMilenio Phase I, the procurement phase spanned 7 months from the initial RFP to final contract awards. The RFP for the trunk bus operators and fare collection operator was issued in December 1999 and contract award made to the companies listed above in April 2000. The

RFP for the feeder bus operators was issued in March 2000 and contract award made to the companies listed above in July 2000 (Ardila-Gómez, 2004).

Private sector bids were reviewed and scored by the public sector based on the factors illustrated in **Figure 16**.

Criteria	Description	Phase I	Phase II
Legal Capacity	Appropriate legal credentials	Eligibility	Eligibility
Economic Capacity	Bidding firm holds the minimum required net equity	150 points	Eligibility
Experience	Specific experience providing passenger service in Colombia and internationally	450 points	450 points
Economic Proposal	Price per km	400 points	350 points
Proposal to the City	Consideration of revenue sharing with TransMilenio and scrapping of buses	N/A	200 points
Bid Team Composition	Share of company's stock held by former bus operators	N/A	200 points
Environmental Performance	Levels of emissions, noise and waste disposal plan	150 points	150 points
Fleet Origin	Manufacture origin	50 points	50 points
TOTAL		1,200 points	1,400 points

Figure 16: TransMilenio RFP Scoring Criteria

7.1.4 Southern Cross Station

Southern Cross Station employed a traditional procurement model with the issuance of a Request for Express Interest (RFEI), followed by a Request for Proposal (RFP), and then a Best and Final Offer (BAFO) from down-selected vendors. This was followed by a final contract negotiated with the preferred bidders. See **Figure 17** for a depiction of the Southern Cross Station procurement process.

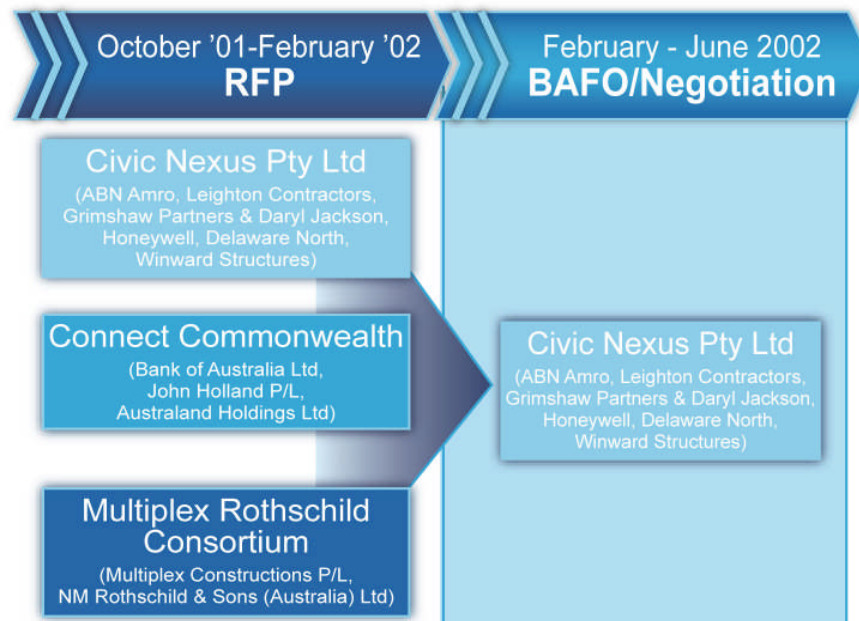


Figure 17: Southern Cross Station Procurement Stages

The procurement phase spanned approximately 9 months from the initial RFP (October 2001) to the final contract award (July 2002). Three consortia submitted eligible bids:

- **Civic Nexus Pty. Ltd.** (comprised of ABN Amro, Leighton Contractors, Grimshaw Partners & Daryl Jackson, Honeywell Ltd., Delaware North, Winward Structures);
- **Connect Commonwealth** (comprised of Bank of Australia Ltd., John Holland P/L, Australand Holdings Ltd.); and
- **Multiplex Rothschild Consortium** (comprised of Multiplex Construction P/L, NM Rothschild & Sons Ltd.).

Of these 3 bidders, only Civic Nexus was down selected for the BAFO, which was eventually determined the winning bidder to build and redevelop the station and develop the surrounding real estate. Negotiations of the final concession agreement lasted only about a month with the cost of procurement totaling \$2.3M (2002 USD).

The Australian state of Victoria generated a PSC estimate for the station and the surrounding real estate and conducted a VFM analysis against bids received from vendors. The VFM analysis showed that although the cost of station construction and redevelopment would have been more economical if conducted through a traditional procurement, the estimated higher value of the surrounding real estate development from private bidders would offset any difference in overall total PPP project cost. This boosted the desirability of private sector bids and the project's delivery through a PPP (Victorian Auditor-General, 2007).

7.1.5 Key Differences

There are several key differences in the procurement traits of each PPP project. The key differences include:

1. Length of time from RFP to Contract Award
2. Number of Concession Agreements/Contracts
3. Length of Concession Agreements
4. Total Cost of Procurement

1. Length of time from RFP to Contract Award

The size and scope of the PPP projects dramatically impacted the length of time from RFP to contract award. The larger the project the longer the duration between issuance of the RFP and final contract award. For example, the procurement period for London Underground, the largest project, took the longest, 39 to 43 months. The next largest project, Canada Line took approximately 28 months from RFP to contract award. Southern Cross Station took approximately 9 months from RFP to contract award. Of the 4 projects, only London Underground had to overcome court challenges that eventually led to a delayed contract award.

The procurement phase of TransMilenio, the smallest project, was very brief. Since the public sector was exclusively responsible for design, construction, and operations of the infrastructure, the PPP project was less complex than a more traditional PPP. It only involved the financing and operations of trunk and feeder buses, as well as fare collection operator. This allowed for a very quick turnaround of only 7 months between the RFP and contract award.

2. Number of Concession Agreements/Contracts

Traditional PPPs typically issue one or two contracts with the private sector. The Canada Line and Southern Cross Station projects exemplified this model by having one concession agreement between the public and private partner. London Underground closely resembled the typical structure; however, given the size and scope of the project, 3 concession agreements were made to two Special Purpose Vehicles, one agreement for Tube Line Holdings and two for Metronet. In contrast, TransMilenio issued concession contracts to numerous contractors for trunk and feeder operators as well as a fare collection operator. This required TransMilenio to interface with multiple private sector parties instead of just one SPV.

3. Length of Concession Agreements

The length of the concession agreements was similar between Canada Line (35 years), London Underground (30 years), and Southern Cross (30 years). However, TransMilenio only offered concession agreements of 10 years or 850,000km to the bus operators. The length of the TransMilenio concession agreement was for a much shorter period of time given that infrastructure operations and maintenance was not included in the TransMilenio PPP project and that the service life for buses is approximately 10 years. The difference in the length of concession agreement was related mostly to the mode of transit, whether it rail or bus.

4. Total Cost of Procurement

There was a significant difference in the cost of procurement relative to the size and scope of the PPP project. For instance, the largest project, London Underground had a procurement cost of, \$717.4M (2003 USD). The London Underground total amount is comprised of \$283.8M (2003 USD) in procurement administration and \$433.6M (2003 USD) for bidder reimbursement. The next largest project was Canada Line, which incurred approximately \$25M (2003 USD) in procurement costs, mostly to cover the costs of outside consultants and experts hired to develop the project plan and evaluate bids. The third largest project, TransMilenio, the smallest of the PPP projects, incurred procurement costs of approximately \$5M (2000 USD) for Phase I procurement and also included project planning (ITDP, 2006). Lastly, Southern Cross, incurred approximately \$2M (2002 USD) in procurement costs.

7.1.6 Key Similarities

There are several key similarities in the financial framework of the PPP projects. The key similarities include:

1. Use of External Consultants to help develop the PPP Project
2. Use of PSC/VFM

1. Use of External Consultants to help develop the PPP Project

These PPP's leveraged external consultants to help navigate the financial, environmental, legal, and regulatory issues associated with these projects. It is not cost effective for the public sector to retain this specialized expertise and the public sector utilizes external consultants to help efficiently transfer risk to the private sector and ensure that the public sector is achieving the best value for money. External consultants are helpful during the development of a public sector

comparator (PSC), development of the RFP, through contract negotiations, and during the development of the final concession agreement.

2. Use of PSC/VFM

Three of the four PPP projects (Canada Line, London Underground, and Southern Cross) employed the use of PSC/VFM analysis when evaluating the private sector bids to determine the feasibility of procuring the project as a PPP versus a traditional procurement. Due to extensive pre-planning and relative small size of the TransMilenio project, PSC/VFM was not utilized.

7.1.7 Lessons Learned

Figure 18 presents lessons learned captured from the analysis of the procurement phase of the PPP projects. DOT agencies or regional offices may consider the following lessons learned related to procurement when pursuing a potential PPP project in the future. **Figure 18** contains the lessons learned, a description or explanation of the lesson and the applicable case study.

Lesson Learned	Description/Explanation	Applicable Case Study
The size and scope of concession agreements need to be reasonable	Public sector officials need to be mindful of the size and scope of a PPP project. If the project is too large or complex, the private sector may charge such a significant premium for the work, that is does not provide VFM. Excessively large, complex projects may limit the number of competitors that bid for the work. However, a PPP project should be large enough to justify the initial procurement costs which are higher for a PPP project. Typical ranges for PPP projects may span from \$100M to \$3-4B.	London Underground
A structured PPP procurement process is beneficial	Following a standard procurement process including: (1) Request for Expressed Interest (RFEI) or Pre-Qualification; (2) Request for Proposal (RFP); and (3) Best and Final Offer (BAFO) helps encourage competition in the private sector and builds confidence that the public sector is taking the necessary steps to receive the best value for money. FTA may have to consider how a PPP procurement process maps to the New Starts planning process to determine the best way to move forward.	Canada Line, London Underground, Southern Cross
Open dialogue with vendors during procurement is beneficial	An open exchange on technical requirements between the public and private sector allows the private sector to craft innovative solutions that may more efficiently meet the requirements of the public sector. The dialogue should be structured within a defined procurement process and should be fair to all participants.	Canada Line
External consultants are often necessary to help structure PPP projects	External consultants help craft the PPP project to efficiently transfer risk to the private sector and ensure the public sector receives the best VFM. Their expertise on previous projects often cannot be replicated by the public sector. Support from external consultants helps achieve an optimal risk transfer to the private sector. PPPs are primarily legal and financial projects; it is often beneficial to have the appropriate legal and financial expertise upfront.	All

Lesson Learned	Description/Explanation	Applicable Case Study
A small pool of PPP expertise in the public sector may be beneficial	While the use of external consultants as advisors to the public sector is common, familiarity and expertise within the public sector on PPPs is important to identify and confirm selection of appropriate projects, to review and validate information provided by external consultants and to provide regular insight to policy makers on program successes and challenges.	Canada Line, London Underground, Southern Cross
Bidder reimbursement may be required for large, complex PPP projects	For large and complex PPP projects, it may be necessary to entice private sector bidders by guaranteeing a fixed dollar amount or percentage of reimbursement for their PPP bid cost.	London Underground
Develop PSC early in the project	Early development of a PSC helps determine the feasibility of moving forward with the PPP. It helps identify whether the cost of pursuing a PPP procurement is worthwhile.	Canada Line, London Underground, Southern Cross
It may be beneficial to conduct Value for Money (VFM) analysis at least two points in time	First, VFM analysis may occur prior to receiving bids (shadow bid) to help determine the feasibility of pursuing the procurement as a PPP. Second, VFM analysis may be conducted after bids have been received to confirm whether VFM can be achieved through the private sector.	Canada Line, London Underground, Southern Cross
Minimize the number of concession agreements	One of the benefits of a PPP structure is that the Special Purpose Vehicle (SPV) is typically the single private sector entity that interfaces with the public sector. This allows the public sector to manage project delivery, commitment, risk, and communications with only one point of contact rather than with multiple parties. It should be noted that in transit projects, it is not uncommon for rail cars to be provided under a separate agreement.	All
For BRT, combining trunk and feeder concessions may help balance the ridership risk	For Bus Rapid Transit (BRT), it may be beneficial to combine trunk and feeder concession agreements. This allows for risks such as ridership and schedule risk to be spread throughout the system and also reduce administration cost.	TransMilenio
For TOD, public sector must take due care in estimating value of commercial development rights	When considering transit-oriented development (TOD), it is important that the public sector accurately value commercial development rights. The public sector may want to solicit multiple estimates to ensure it is properly evaluating the potential benefits that development rights may present to the winning bidder and to the PPP.	Southern Cross

Figure 18: Procurement Lessons Learned

7.2 Analysis of Governance Structures

In all four case studies a dedicated public sector entity was formed for the express purpose to lead and oversee the PPP project. In all four case studies the public sector entity interacted with a primary private sector entity, the SPV. Political leadership was instrumental in the development of the PPPs in three of the four case studies; a public sector expert was on hand to provide guidance in the implementation of the projects. In the U.S., it remains to be seen whether a PPP can and should be led by a newly created dedicated public sector entity or through an existing public sector entity. FTA will need to consider the particular public sector

entities involved and determine who might be best suited to assume this role. **Figure 19** summarizes key features of the governance structure for the respective PPP projects including:

- **Lead Public Partner** - public sector entity responsible for oversight of the PPP project;
- **Special Purpose Vehicle (SPV) or Private Partner(s)** - private sector point of contact that serves as the liaison with the lead public partner;
- **Public Sector Assistance** - key government legislation or guidance supporting the use of PPPs;
- **Public Champion** - public leadership initiating or advocating the project as a PPP; and
- **Use of Independent Auditor** - use of an independent auditor to ensure fairness and help resolve disputes.

Governance Feature	Canada Line	London Underground	TransMilenio	Southern Cross Station
Lead Public Partner	Canada Line Rapid Transit Co. (CLCO)	London Underground Limited	TransMilenio Company	Southern Cross Station Authority (SCSA)
Special Purpose Vehicle (SPV) or Private Partner	InTransitBC	Tube Line Holdings; Metronet	Trust Fund Operator, Multiple bus companies	Civic Nexus
Public Sector Assistance	Partnerships BC	Private Finance Initiatives (PFI); Partnerships UK	None	Partnerships Victoria
Public Champion	Province of British Columbia	Former Prime Minister Tony Blair and Labour Party	Former Mayor Enrique Peñalosa	State of Victoria
Use of Independent Auditor	Yes	Yes	No	No

Figure 19: Governance Structure Comparison

The sections below detail the governance structure of each PPP project and analyze the similarities and differences of the governance structure between the projects.

7.2.1 Canada Line

Canada Line is governed and managed by Canada Line Rapid Transit Co. (CLCO). A special purpose vehicle, InTransitBC, was formed as the single point of responsibility and accountability for the construction and operation of Canada Line. InTransitBC manages construction and operation of Canada Line interfacing with the project lenders and project contractors. **Figure 20** provides a depiction of the Canada Line governance structure.

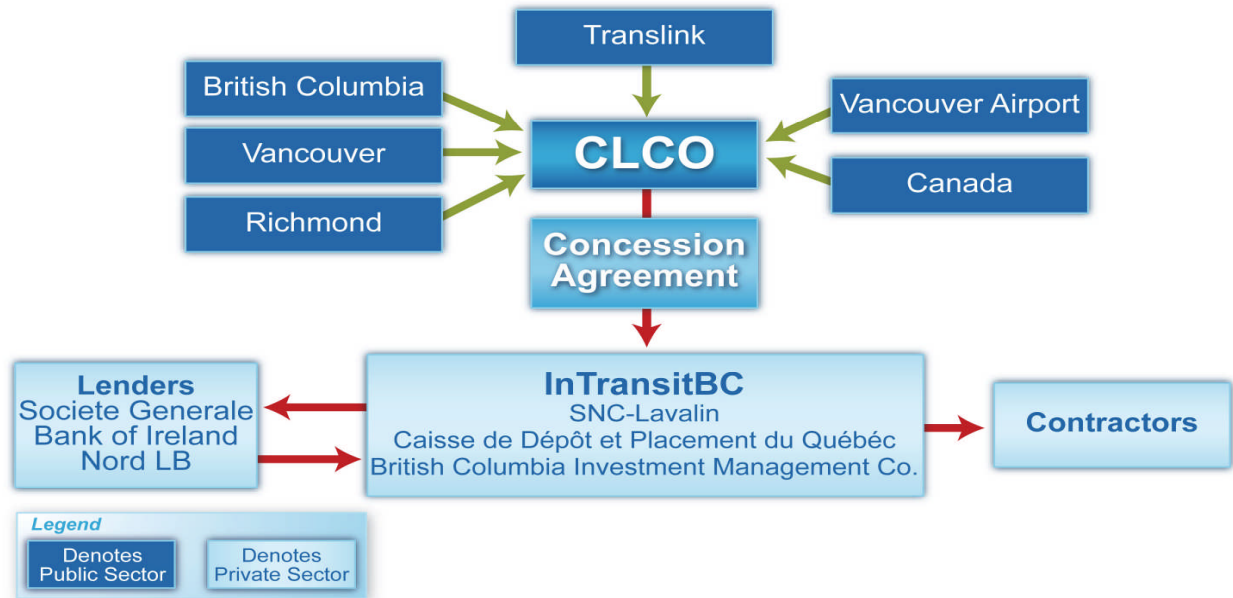


Figure 20: Canada Line Governance Structure

The CLCO is a separate independently governed subsidiary of Translink that is tasked to oversee procurement, design, construction, and implementation of the project. The CLCO represents the public sector funders including:

- Canadian Federal Government;
- Province of British Columbia;
- TransLink - Vancouver regional transit authority;
- Vancouver Airport Authority;
- City of Vancouver; and
- City of Richmond.

The CLCO is governed by a Board of Directors comprised of 9 members, selected by public entities, with no elected officials.

TransLink owns the fixed assets of Canada Line such as the rail lines and stations and sets and collects fares.

InTransitBC is the Special Purpose Vehicle (SPV) created for the sole purpose of construction and operation of Canada Line. InTransitBC coordinates the flow of funds between the lenders and private contractors supporting project construction and operation. InTransitBC will own non-fixed assets such as signals and rail cars. At the end of the concession, these assets will be transferred back to the CLCO. Some elements will be purchased by CLCO at a market rate and others at a nominal rate, per the concession agreement.

The SPV is led by SNC-Lavalin, a Montreal-based construction and engineering firm. SNC-Lavalin has two Canadian equity partners: (1) Caisse de Depot et Placement du Quebec (CDPQ); and (2) British Columbia Investment Management Co. (bcIMC). Three foreign banks provided debt financing including: (1) Bank of Ireland; (2) Société Générale; and (3) NORD/LB (Canada Line, 2006).

The CLCO appointed a former British Columbia Deputy Attorney General as an independent auditor to review and ensure fairness in all stages of the procurement from bid evaluation to final contracting. This auditor also validated the savings from procuring the project as a PPP.

The CLCO also has had a peer review conducted by the American Public Transportation Association and a handful of member transit agencies to review key project milestones and assess overall system readiness.

Several factors helped the Canada Line project to move forward. First, when Vancouver was awarded the 2010 Winter Olympics, the need for the light rail to and from the airport and downtown Vancouver was validated. In addition, the project benefited from PartnershipsBC, a public entity established to encourage the use of PPPs, which provided "in-house" PPP expertise on the project.

7.2.2 London Underground

London Underground is governed and managed by London Underground Limited (LUL). London Underground was organized into three rail line groupings to account for similar typology and reduce the size and risk of the project. The rail line groupings included:

- JNP - Jubilee, Northern, and Piccadilly (3 subway lines);
- BCV - Bakerloo, Central, Victoria, and Waterloo & City (4 subway lines); and
- SSL - District, Circle, Metropolitan, and Hammersmith & City (4 subway surface lines).

Two Special Purpose Vehicles (SPVs) were created, one with Tube Lines for the JNP rail line and one with Metronet for the BCV and SSL rail lines. The SPVs manage and operate trains, railway infrastructure, signalling systems, and stations. They are responsible for modernizing and upgrading railway infrastructure and stations. They also manage interfaces with the project lenders and project contractors (NAO, 2000, 2004).

Due to poor management and oversight, the SPV, Metronet, fell into bankruptcy in the spring of 2008. This was largely due to the complicated nature of the Metronet corporate structure, substantial cost overruns, and its limited authority and control of its subsidiaries Metronet BCV and Metronet SSL, who were the primary managers and executors of Metronet's two concession agreements (TfL 2008). (see Section 7.4.6 Key Lessons)

Figure 21 provides a depiction of the London Underground governance structure.

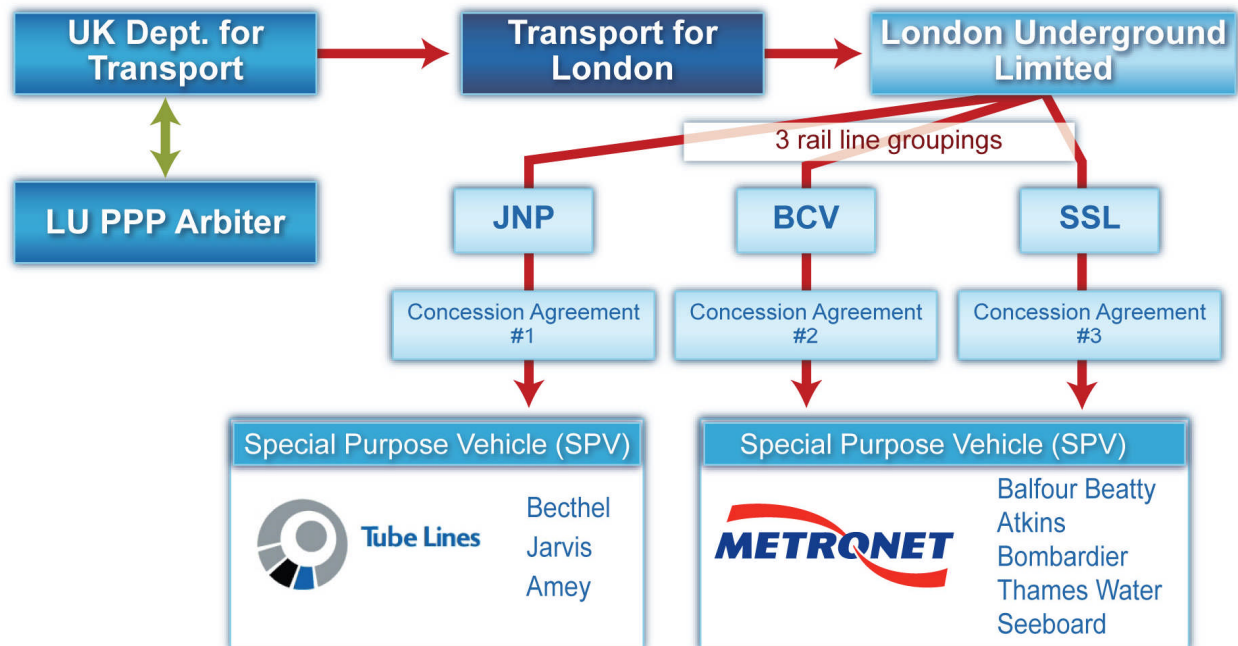


Figure 21: London Underground Governance Structure

LUL is a wholly owned and operated subsidiary of Transport for London (TfL) and tasked to oversee the private sector infrastructure firms and management of the London Underground Tube System including the operation of trains and train drivers and station management and station staff. LUL presents public sector funders including: UK Department for Transport and Transport for London (TfL).

The UK Department for Transport is the primary public sector funder of London Underground and is the national government department responsible for overseeing transportation including air, rail, road, and water transport in the UK.

TfL is the Greater London Transportation Authority that manages the regional commuter bus and rail system, city buses, river passenger service, and London Underground. TfL owns fixed assets such as railway infrastructure and stations. TfL is also the underpinner of lender financing up to 95% (to be discussed in greater detail in Financing section). TfL is governed by an 18-member board appointed by the Mayor of London.

Tube Lines Holdings is the first of two SPVs created for the sole purpose of operations and maintenance of JNP rail line grouping of the London Underground. Tube Line Holdings coordinates the flow of funds between the lenders and private contractors supporting project operations and maintenance. Tube Lines is made up of the following equity partners: (1) Bechtel; (2) Jarvis; and (3) Amey. Lenders for this SPV included: (1) Bank of Scotland; (2) Mizuho Corporate Bank; (3) Société Générale; (4) WestLB AG; and (5) European Investment Bank.

Metronet is the second of two SPVs created for the sole purpose of operations and maintenance of BCV and SSL rail line groupings of the London Underground. Metronet coordinates the flow of funds between the lenders and private contractors supporting project operations and maintenance. Metronet is made up of the following equity partners: (1) Balfour Beatty; (2) Atkins; (3) Bombardier; (4) Thames Water; and (5) Seeboard. Lenders for this SPV

included: (1) Deutsche Bank; (2) Royal Bank of Scotland; (3) UBS Limited; and (4) European Investment Bank.

The Secretary of State for Transport appointed a PPP Arbiter to resolve any conflicts or issues related to (1) price paid to the private firms; and (2) economic efficiency of services provided by the private firms. The PPP Arbiter provided guidance on matters related to the PPP agreement as requested from both the public and private parties.

Several factors helped London Underground move forward. First, improvements to London Underground were a campaign pledge by then Prime Minister Tony Blair and the Labour Party in 1997 to address a substantial maintenance backlog. This helped set the stage for the importance of this project. In addition, the project benefited from PartnershipsUK, a public sector PPP expert and advisor, which provided "in-house" PPP expertise on the project.

7.2.3 TransMilenio

TransMilenio is governed and managed by TransMilenio S.A. Multiple concession agreements were awarded to the private sector including various trunk and feeder bus operators, and a fare collection operator. **Figure 22** provides a depiction of the TransMilenio governance structure.

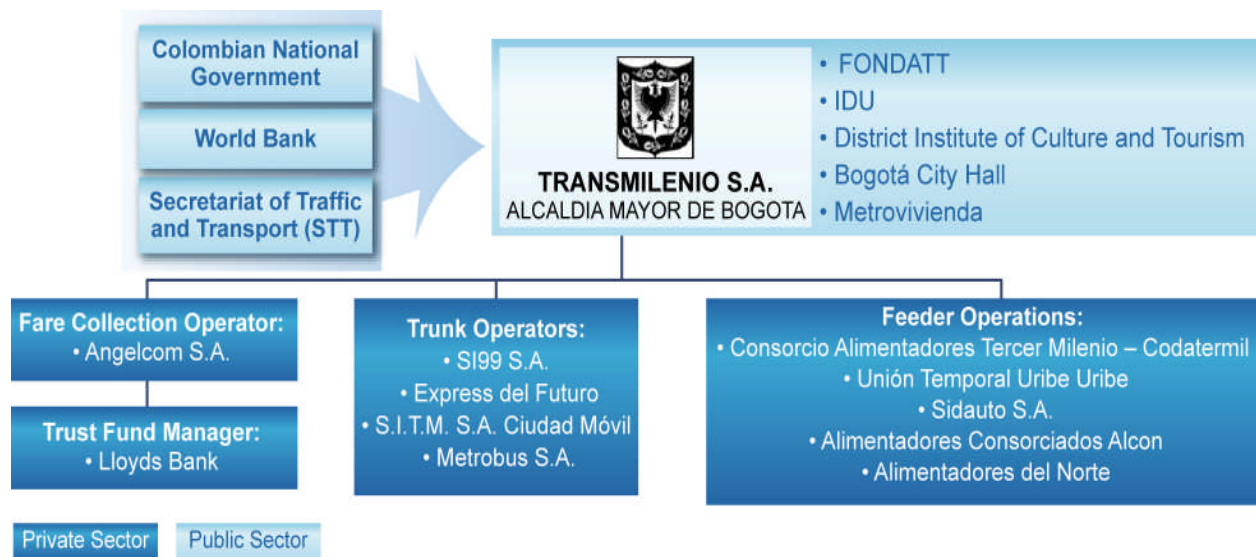


Figure 22: TransMilenio Governance Structure

TransMilenio S.A. is a public sector agency created by Bogotá’s Mayor to manage system planning and monitor daily service. TransMilenio’s duties include the following:

- Oversees system planning, management, and control;
- Monitors operations and issues related to expansion and maintenance;
- Administers contracts with private sector; and
- Assures quality standards are met.

TransMilenio S.A. is comprised of 5 owners which are public entities in the City of Bogotá. Each is described in **Figure 23**:

Organization	Description
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Organization	Description
Fund for Education and Road Safety of the Secretary of Transit and Transportation (FONDATT)	The traffic and transport authority in the city supports the reorganization process for public transit formerly operating in exclusive lane corridors
Institute for Urban Development (IDU)	Responsible for designing, building and oversight of TransMilenio's system infrastructure
District Institute of Culture and Tourism (ICDT)	Provided advice on cultural impacts on the city during planning and design
Bogotá City Hall	Coordinates all of the local entities that are part of TransMilenio
Metrovivienda	Promotes the development of low-income housing development in areas surrounding the TransMilenio system

Figure 23: Ownership of TransMilenio

The Secretariat of Traffic and Transport (STT) works closely with TransMilenio and is responsible for:

- Overseeing regulation of bus operations in the legacy bus system;
- Planning of bus routes in the legacy bus systems as TransMilenio expands into the territory; and
- Management the scrapping of old buses with the addition of the new TransMilenio buses.

The Colombian National Government funded nearly half of TransMilenio with the World Bank also providing up-front financing for the project.

TransMilenio issued multiple contracts for various aspects of the new BRT system. Between Phases I and II, TransMilenio issued numerous contracts including:

- 7 contracts to the Trunk Operators;
- 11 contracts to the Feeder Operators; and
- 2 contracts to the Fare Collection Operator.

TransMilenio hired a Trust Fund Manager to receive and manage farebox revenue from the fare collection operator and then disperse funds to the appropriate parties as stipulated in the contract agreements (banks, concessionaires, and TransMilenio). The farebox revenue is maintained by the private sector and never directly passes under the reach of a public sector entity (Chaparro, 2002).

Several factors helped the TransMilenio project move forward. First, former Mayor Enrique Peñalosa championed the TransMilenio BRT system as a cost effective means to improving transportation in Bogotá. In addition, TransMilenio was able to learn from BRT projects in Brazil and incorporate lessons learned from those projects (Ardila-Gómez, 2004).

7.2.4 Southern Cross Station

Southern Cross is governed and managed by the Southern Cross Station Authority (SCSA). Civic Nexus, a special purpose vehicle, was formed as the single point of responsibility and accountability for construction and station redevelopment and the operations and management of the station. **Figure 24** illustrates the Southern Cross governance structure.

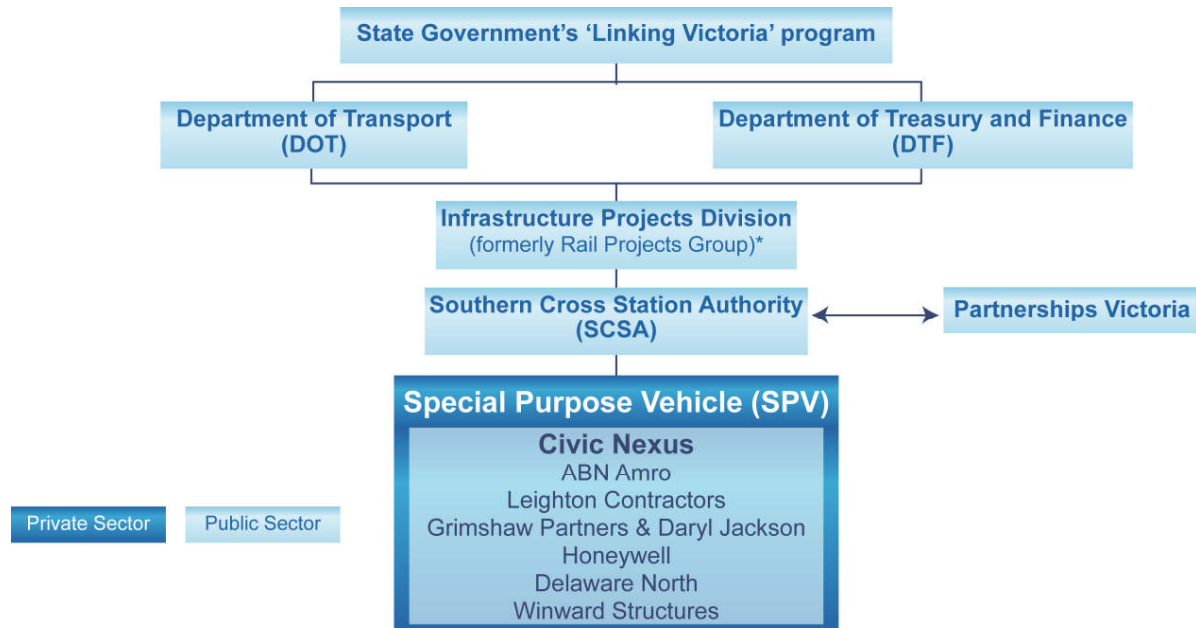


Figure 24: Southern Cross Governance Structure

The SCSA is a statutory body created by the state government of Victoria in 2000 by the Rail Corporation Act of 1996 to monitor and manage redevelopment of the station and the surrounding developable real estate. The SCSA represents the interests of the public sector stakeholders, which include:

- Victoria State Government;
- Victoria State Department of Transport;
- Victoria State Department of Treasury and Finance; and
- Partnerships Victoria.

The SCSA is governed by a 4-member board appointed by the state.

Civic Nexus is the SPV created for the sole purpose of construction, redevelopment, and operations and management of the station. Civic Nexus coordinates the flow of funds between equity shareholder and lender, ABN Amro, and private contractors supporting project construction and operation. As the station manager and operator, Civic Nexus maintains station availability for rail service and the retail and commercial real estate in and around the station. At the end of the concession period, control of these assets returns to SCSA (Victorian Auditor-General, 2007).

Several factors helped the Southern Cross Station move forward. First, the inclusion of development rights to the surrounding real estate helped entice private bidders in redevelopment of the station. Second, redevelopment of the station and surrounding area revitalized a major commuter and rail hub and blighted neighborhood near Melbourne's central business district.

7.2.5 Key Differences

There are several key differences in the governance structure of each PPP project. The key differences include:

1. Establishment of a SPV
2. Entity Responsible for Disbursing Funds

1. Establishment of a SPV

Under a traditional PPP construct, there is one Special Purpose Vehicle (SPV) that serves as the private sector's single point of contact for the public sector. The Canada Line and Southern Cross Station projects each followed this model where there was one SPV. London Underground followed a similar model, however, there were 2 SPVs created due, in large part, to the size and complexity of the project.

In contrast, TransMilenio devised a PPP procurement framework in which various existing bus companies and operators reorganized into a more coherent business structure in order to qualify and bid for the project. TransMilenio Co. directly issued concession agreements to the various bus and fare collection operators in the BRT system and managed those agreements accordingly without the creation of an SPV.

2. Entity Responsible for Disbursing Funds

In three of the four PPP projects, the governing authority was responsible for disbursing payments to the private sector. In Canada Line, CLCO was responsible for disbursing funds; in London Underground, London Underground Limited served this function; and in Southern Cross Stations, Southern Cross Station Authority served this function.

However, with TransMilenio, the public sector never managed the farebox revenues generated by the BRT system. Instead, the revenue went directly from the fare collection operator to the trust fund. The trust fund operator was then responsible for distributing the funds per the contractual agreements, including a set percentage of the overall farebox revenue to TransMilenio.

7.2.6 Key Similarities

There are several key similarities in the governance structure of the PPP projects. The key similarities include:

1. Public Sector Governing Authority
2. Public Sector Sponsorship
3. Political Champion for the PPP Project

1. Public Sector Governing Authority

All of the PPP projects had a public sector governing authority that was established for the sole purpose of implementing the project. The governing authority was often segmented from the other public sector agencies to allow the organization to focus on the successful delivery of the project. The governing authority represented the public sector funders and stakeholders. The governing authority for the PPP projects included:

- **Canada Line:** Canada Line Rapid Transit Co.
- **London Underground:** London Underground Limited

- **TransMilenio:** TransMilenio Co.
- **Southern Cross Station:** Southern Cross Station Authority

2. Public Sector Sponsorship

Each of the PPP projects received public sector sponsorship including PPP expertise and/or specific legislation that helped encourage the use of PPPs. In Canada Line, PartnershipsBC served as a PPP advocate within the province of British Columbia. In London Underground, PartnershipsUK served as a PPP advocate within the UK. In Southern Cross, there was an initiative, Linking Victoria, which sponsored upgrades to roads, rail, and ports which encouraged the use of PPPs. In addition, Partnerships Victoria served a PPP advisory role to support the work of SCSA and management of the PPP. The different mechanisms of public sector sponsorship helped each of these projects to move forward as PPPs.

3. Political Champion for the PPP Project

Each PPP project had a strong political sponsor that helped close the project. The political sponsor helped handle public critiques of the project and keep the momentum behind the project during the planning and procurement phases. Most notably, the London Underground and TransMilenio PPPs had extremely strong political champions, former Prime Minister Tony Blair and former Mayor Enrique Peñalosa, respectively.

7.2.7 Lessons Learned

Table 10 presents lessons learned captured from the analysis of the governance structures of the PPP projects. DOT agencies or regional offices may consider the following lessons learned related to governance when pursuing a potential PPP project in the future. **Figure 25** contains the lessons learned, a description or explanation of the lesson and the applicable case study.

Lesson Learned	Description/Explanation	Applicable Case Study
Strong political leadership helps champion PPP projects	A strong political champion is often required to help move a PPP project forward. Typically, a strong political leader helps promote the use of a PPP and responds to public critiques. Such a champion can be at the national, state or local level, but must have sufficient authority to mobilize resources and support for a project.	All
Forming a public sector governing entity for the express purposes of implementing a project can be beneficial	The public sector governing entity serves as the chief advocate for the project and coordinates with the various public sector stakeholders. The governing entity can be focused solely on the successful delivery of the project. FTA may consider whether an existing transit authority could fill the role as public sector governing entity or whether a separate entity would be beneficial.	All
For BRT operations, it may be beneficial for the governing authority to have some jurisdiction over bus routes of the entire system	In order to gain the efficiencies of a new BRT system, it may be necessary for old bus routes to be phased out as the new ones are phased in. Keeping route maintenance separate from the governing authority makes it difficult to achieve all of the efficiencies expected of a new system. It may be beneficial for the project governing entity to have some jurisdiction over bus routes of the entire system.	TransMilenio

Lesson Learned	Description/Explanation	Applicable Case Study
Some flexibility may be required for construction during existing operations	The public sector needs to examine the flexibility in construction schedules during existing operations for both expected and unexpected changes. Reasonable modifications to the construction schedule will allow the concessionaire to work with existing operators to ensure construction remains on-track while providing limited service disruption to existing operations. It may be unrealistic to establish a daily construction schedule at the beginning of the project; there must be some flexibility allowed.	Southern Cross
Peer Reviewers independently assess if projects are on-track	Conducting "peer reviews" to determine operational readiness is helpful. Peer reviewers may consist of existing transit operators from various metropolitan areas around the world.	Canada Line
A PPP may result in improved oversight of the system and public spending	Public sector employees often place more scrutiny over contractor's work than they would if the public sector was completing the operations and maintenance. This is largely driven by the desire of the public sector to maintain a good public image and to ensure that a PPP is providing value to the taxpayers.	London Underground

Figure 25: Governance Structure Lessons Learned

7.3 Analysis of Partnership Structures

The partnership structures of the 4 PPP projects were quite different based on the size and scope of the project. Many details of the risk transfer related to the partnership are embedded in the concession agreements for the projects. FTA may consider the existing PPP contracting frameworks used in countries such as the Australia, Canada, and the UK in order to identify best practices of transferring risks and including them in concession agreements. **Figure 26** summarizes key partnership characteristics of the respective PPP projects including:

- **Construction Risk** - encompasses risks related to cost, performance, schedule, environmental (land), and utilities;
- **Financing Risk** - encompasses risks related to additional financing costs due to schedule slippage, interest rate risks, variation in Consumer Price Index (CPI), and exchange rate risks; and
- **Maintenance and Operations Risk** - encompasses risk related to maintenance levels, defective components, and service level and quality.

Partnership Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
Construction Risk	Primarily transferred to private sector	Not Applicable	Borne by the public sector who was responsible for infrastructure build	Primarily transferred to private sector

Partnership Characteristic	Canada Line	London Underground	TransMilenio	Southern Cross Station
Financing Risk	Primarily transferred to private sector	Shared between public and private sector; 95% loan guarantee provided by public sector	Financing for bus fleet transferred to private sector	Financing entirely by private sector; public sector contributed development rights to surrounding station real estate
Maintenance and Operations (M&O) Risk	Primarily transferred to the private sector	Shared between public and private sector; Latent defect risk retained by public sector	M&O for bus fleet transferred to the private sector; M&O for infrastructure retained by public sector	Primarily transferred to the private sector

Figure 26: Partnership Structure Comparison

The sections below detail the partnership structure of each PPP project and analyze the similarities and differences of the partnership structure between the projects.

7.3.1 Canada Line

For Canada Line, a Risk Allocation Matrix (RAM) was assembled for various aspects of the project including: Design and Construction, Operations and Maintenance, and Financing. **Figure 27** highlights the RAM for Design and Construction.

Risk	Public Sector (CLCO)	Private Sector (InTransitBC)
Delays in final approval of detailed design	X	
Schedule (delay in completion)		X
Cost Overruns		X
Environmental (design of civil works / electrical and mechanical equipment)		X
Environmental (land)	X	
Environmental (during construction)	Shared	
Utilities risk	Shared	
Failure to integrate physical systems (Civil Works and Electrical/Mechanical systems)		X
Unsatisfactory quality of construction work		X
Change in requirements from Agencies	X	
Force Majeure	X	
System commissioning tests are not conclusive		X
Vehicle Supply (initial procurement)		X

Figure 27: Canada Line RAM for Design and Construction

Some notable risks include:

- **Construction Schedule** – risk transferred to InTransitBC; payments based on completing construction milestones, penalties and incentives;
- **Construction Cost Overruns** – fixed-price contract transferred risk to InTransitBC to cover any cost overruns during the construction phase;

- **Quality of Construction** – risk transferred to InTransitBC; during construction, lender’s independent engineer would: (1) check the design; (2) confirm the Project Manager’s quality control; and (3) check working drawings to ensure information going to the site is compatible with signed-off designs ; availability payments incentivized timely and quality construction; lenders also had step-in if InTransitBC did not follow loan contract commitments;
- **Utilities** – risk shared; the public sector is responsible for the initial identification of utilities on the site; the private sector is responsible for managing the construction process and accommodating identified utilities; if undisclosed utilities are discovered and increase construction costs, the private sector would be compensated; and
- **Environmental (Land)** – risk remains with public sector if land condition is not adequate; chemical or other environmental contamination should have been addressed prior to project commencement.

Figure 28 highlights the RAM for Operations and Maintenance.

Risk	Public Sector (CLCO)	Private Sector (InTransitBC)
Fare revenues lower than forecast	Shared (90/10)	
Operating and maintenance do not meet performance specifications		X
Electrical and Mechanical equipment defects		X
Service level and quality		X
Change requirements from Agencies	X	
Change in law with significant operational and financial impacts	X	
Force Majeure	Shared	
Vehicle Supply (on-going maintenance)	X	
Environmental		X
Physical damages to the rapid transit system/security issues in stations	Shared	
Inadequate condition of the assets at the end of concession period		X
Availability		X

Figure 28: Canada Line RAM for Operations and Maintenance

Some notable risks include:

- **Revenue** – although 10% of InTransitBC’s monthly payment during operations will be tied to meeting ridership threshold, much of ridership risk is held by CLCO and Translink;
- **Vehicle Supply (on-going maintenance)** – due to uncertainty in vehicle availability and price changes in the future, the risk is maintained by CLCO and Translink;
- **Environmental** – risk borne by InTransitBC per concession agreement; compliance with environmental requirements rigorously assessed during commissioning;
- **Physical damage to transit system / station security** – risk shared; InTransitBC has comprehensive insurance package over transit system; if security issues are not adequately handled by InTransitBC, public sector will take over security controls; and
- **Inadequate condition of asset at end of concession** – risk borne by InTransitBC; inspection mechanism to be included in concession agreement.

Figure 29 highlights the RAM for Financing.

Risk	Public Sector (CLCO)	Private Sector (InTransitBC)
Interest Rate Risk (during procurement)	X	
Interest Rate Risk (design/construction)		X
Interest Rate Risk (ops)		X
Variation in CPI (design/construction)	Shared	
Variation in CPI (ops)	X	
Exchange rate		X
Commercial insurance (construction/ops)		X
Un-insurable risks (ops)	X	

Figure 29: Canada Line RAM for Financing

Some notable risks include:

- **Variation in CPI (design/construction)** – risk borne by private sector; typical pricing index of an average basket of goods not always the most accurate indicator to predict price fluctuations of material costs such as steel or cement; dependent on external forces and difficult to predict; and
- **Exchange rate higher than forecast** – risk borne by private sector; risk due to financing from foreign lenders (\$ CAN vs. € Euro); dependent on global economic forces and difficult to predict.

7.3.2 London Underground

For London Underground, a Risk Allocation Matrix (RAM) was assembled related to the operations and maintenance of the system. **Figure 30** details the specific risk transfer between the public and private sector.

Risk	Public Sector (LUL)	Private Sector (Tube Lines & Metronet)
Cost Overruns		X
Environmental		X
Financing	Shared	
Force Majeure	Shared	
Latent Defect	X	
Station Availability		X
Train operation		X
Service Level and Quality	Shared	

Figure 30: London Underground RAM

Some notable risks include:

- **Financing** - initially private sector responsibility until they started having difficulty obtaining financing; government stepped in and offered to back up to 95% of private sector financing excluding any private equity;
- **Latent Defects** - retained by public sector due to the age of the system; it was difficult to inspect and know the condition of every piece of infrastructure before the concession agreement was signed; intended to cover catastrophic failures (e.g., deterioration of late-19th century cast iron tunnels); and

- **Station Availability and Train Operations** - completely transferred to the private sector; failure to meet station availability and train operation specifications result in a reductions to the infrastructure service charge (availability payment).

7.3.3 TransMilenio

For TransMilenio, a Risk Allocation Matrix (RAM) was assembled related to various aspects of the project. **Figure 31** details the specific risk transfer between the public and private sector.

Risk	Public Sector (TransMilenio S.A.)	Private Sector (Bus Operators)
Ridership		X
Infrastructure Availability	X	
Vehicle Supply/Availability of Buses		X
Service Level and Quality	Shared	
O&M (fleet and equipment)		X
O&M (infrastructure)	X	
Financing (fleet and equipment)		X
Financing (infrastructure)	X	

Figure 31: TransMilenio RAM

Some notable risks include:

- **Ridership** – private sector assumes the ridership risk; farebox revenues are deposited in a trust fund and dispersed to concessionaries based on input from TransMilenio and an agreed upon disbursement methodology; TransMilenio is never in possession of the farebox revenue;
- **Infrastructure Availability** – public sector helped to secure loans and kept a \$20M reserve for contingencies such as infrastructure construction delays (for Phase I) and also served to stabilize fares due to any increases; and
- **Service Level & Quality** – TransMilenio defines the scheduling and service quality for which the private sector must comply. Operators are measured on user ratings, reliability and punctuality; performance penalties are assessed and held by the trust fund operator; the bus operator with the best performance “wins” the funds at select intervals; this money does not go to TransMilenio.

7.3.4 Southern Cross Station

For Southern Cross, a Risk Allocation Matrix (RAM) was assembled related to various aspects of the project. **Figure 32** details the specific risk transfer between the public and private sector.

Risk	Public Sector (SCSA)	Private Sector (Civic Nexus)
Site	Shared	
Design		X
Schedule (Construction)	Shared	
Commissioning		X
Force Majeure	Shared	
Legislative/Political	X	
Financial		X
Demand (Commercial Development)		X

Risk	Public Sector (SCSA)	Private Sector (Civic Nexus)
Operations and Maintenance		X
Scoping (Outputs)	X	
Market		X

Figure 32: Southern Cross RAM

Some notable risks include:

- **Schedule (Construction)** - initially held by the private sector until construction access issues and environmental contamination led to cost overruns and project delays for contractors. Rather than going to court, dispute on losses and proper risk allocation was resolved through negotiation between the State, SPV, and contractor;
- **Legislative/Political** - risk that government or political leadership will exercise its powers in such a way as to impinge or disadvantage the project. This could include reduction or discontinuation of future funding or changing laws or policies. Risk is assumed by the private sector except for cases where the State creates or amends legislation specifically and exclusively pertaining to the station; then it is assumed by the state; and
- **Demand (Commercial Development)** - initial uncertainty by the public sector in the market demand for commercial development in the real estate surrounding the station. Risk transferred to private sector through PPP and dependent on redevelopment of station by the private sector.

7.3.5 Key Differences

There are several key differences in the partnership structure of the PPP projects. The key differences include:

1. Ridership Risk
2. Financing Risk

1. Ridership Risk

Each of the projects treated ridership risk differently (with the exception of Southern Cross). In Canada Line, there was a slight transfer of ridership risk (10%) to the private sector and outlined in the concession agreement. In order for the private sector to receive their full availability payment, the ridership thresholds set forth by Canada Line must be met. In London Underground, there was no transfer of ridership risk to the private sector. With TransMilenio, the ridership risk was completely transferred to the private sector bus operators. In the case of Southern Cross, there was no transfer of ridership risk since the focus of the project was station redevelopment and transit operations were under the management of a private operator.

2. Financing Risk

The financing risk was handled quite differently by each project. In Canada Line, the vast majority of the financing risk was transferred to the private sector including interest rate risks (during construction), differential inflation risk, and exchange rate risk. In London Underground, the financing risk was shared between the public and private sector. The government backed 95% of private financing, putting the public sector at substantially greater risk than any of the other projects. With TransMilenio, the financing risk for the bus fleet was completely transferred

to the private sector. However, the financing risk for the infrastructure build remained with the public sector. In Southern Cross, the financing risk was completely transferred to the private sector, which provided 100% of the capital for the project.

7.3.6 Key Similarities

There are several key similarities in the partnership structure of the PPP projects. The key similarities include:

1. Operations and Maintenance
2. Availability

1. Operations and Maintenance

Each of the projects transferred considerable risk to the private sector concessionaire during the operations and maintenance phase. Station availability, train/bus operation, and service level and quality were almost exclusively transferred to the private sector in all of the projects. The private sector was responsible for keeping the transit system running per the specifications set forth in the concession agreements. This transfer of operations and maintenance risk helps the public sector allocate the necessary funds for operations and maintenance over the the contract period.

2. Availability

Whether it be transit service availability as in Canada Line, London Underground, and TransMilenio or facility availability as in London Underground and Southern Cross, these PPP's structured contract agreements that created incentives for on-time or top level performance and disincentives in the form of abatements or penalty fees for not meeting targeted performance goals. With these performance regimes, these contract agreements transferred availability risk to the private sector and worked to maximize economic and efficient performance and service.

7.3.7 Lessons Learned

Figure 33 presents lessons learned captured from the analysis of the partnership structures of the PPP projects. DOT agencies or regional offices may consider the following lessons learned related to partnership structures when considering a potential PPP project in the future. **Figure 33** contains the lessons learned, a description or explanation of the lesson and the applicable case study.

Lesson Learned	Description/Explanation	Applicable Case Study
It is difficult to transfer considerable ridership and/or farebox risk in a transit rail project	Inherently, transit rail projects are not profitable. They are intended to alleviate congestion, improve liveability, and provide other societal benefits. In Canada Line, a small portion of the ridership risk was transferred to the private sector which may be a good model to follow for future transit rail projects. However, significant ridership and/or farebox risk transfer to the private sector is difficult to achieve since transit rail is not intended to be profitable.	Canada Line, London Underground

Lesson Learned	Description/Explanation	Applicable Case Study
Operations and maintenance risks may be transferred almost exclusively to the private sector	A key benefit of a PPP is that the public sector mandates service levels for the private sector entity. This helps adequately maintain the capital asset and meet the expectations of system users. Transfer of operations and maintenance risks also allows the public sector to plan and budget a steady stream of funding for the project rather than absorb potentially costly maintenance items during the concession period.	All
Financing for transit rail projects is likely to be a mix of public and private funds	Given the significant capital cost associated with transit rail projects, public sector monies will most likely be required during the initial financing. It may be most beneficial to obtain as much private sector funding as possible, but public funds; sometimes as much as 80% are required in a PPP agreement.	Canada Line, London Underground
Public sector must appropriately account for contamination risk	When dealing with a facility modification or upgrade (brownfield project), the public sector must be careful in thoroughly considering risks related to contamination whether it be environmental or other. The private sector may seek significant returns to assume this risk. In some cases, it may be beneficial for the public sector to assume these risks as part of the concession agreement.	Southern Cross

Figure 33: Partnership Structure Lessons Learned

7.4 Analysis of Financing

The project financing profiles for the 4 PPP projects varied based on the size and scope of the project. FTA can compare and contrast its existing funding models with the ones listed below. Financing factors that FTA may want to consider include project affordability, market desirability, and level of committed public funding. **Figure 34** summarizes key financial measures of the respective PPP projects including:

- **Value of PPP Project** - total cost of the project including public and private sector financing;
- **Initial Share of Private Sector Funding** - percentage of private sector financing to total cost of the project; this initial funding is repaid to the private sector over the life of the concession agreement;
- **Debt to Equity Ratio of Private Funding** - ratio of debt to equity financing by the private sector;
- **Annual Payment to Private Sector During Concession Agreement** - maximum value of payments to the private sector per year; and
- **Use of Loan Guarantees** - use of loan guarantees by the public sector to alleviate outstanding concerns of private sector lenders.

Financial Measure	Canada Line	London Underground	TransMilenio	Southern Cross Station
Value of PPP Project	\$1.47B (2003 USD)	\$24.62B (2003 USD) 7.5 yrs.	\$995M (2005 USD)	\$321.8M (2002 USD)
Initial Share of Private Sector Funding	35%	26%	21%	100%

Financial Measure	Canada Line	London Underground	TransMilenio	Southern Cross Station
Debt to Equity Ratio of Private Funding	85:15	91:9	80:20	86:14
Annual Payment to Private Sector During Concession Agreement(s)	Not Publicly Disclosed	\$1.6B	No set amount; Dependent on farebox revenue	\$17.0M
Use of Loan Guarantees	No	Yes	No	No

Figure 34: Financing Comparison

The sections below detail the financing of each PPP project and analyze the similarities and differences of the financing between the projects.

7.4.1 Canada Line

Canada Line is a \$1.47B project (2003 USD) of which 65% is funded by the public sector and 35% by the private sector (See **Figure 35**). The overall financing included:

- 35% from InTransitBC (private sector);
- 22% from the Canadian Federal Government;
- 17% from TransLink (regional transit authority);
- 13% from Vancouver International Airport;
- 12% from Province of British Columbia; and
- 1% from the City of Vancouver.

Of the private sector funding, 85% is debt financed and 15% is equity financed. The debt financing was provided by the Bank of Ireland, NORD/LB, and Société Générale. Equity funding came from the winning bidder, InTransitBC. The equity contributors from InTransitBC were SNC-Lavalin, bclMC, and CDPQ, each of which contributed one-third of the equity funding. No loan guarantees were made by the CLCO. All funding was at-risk.

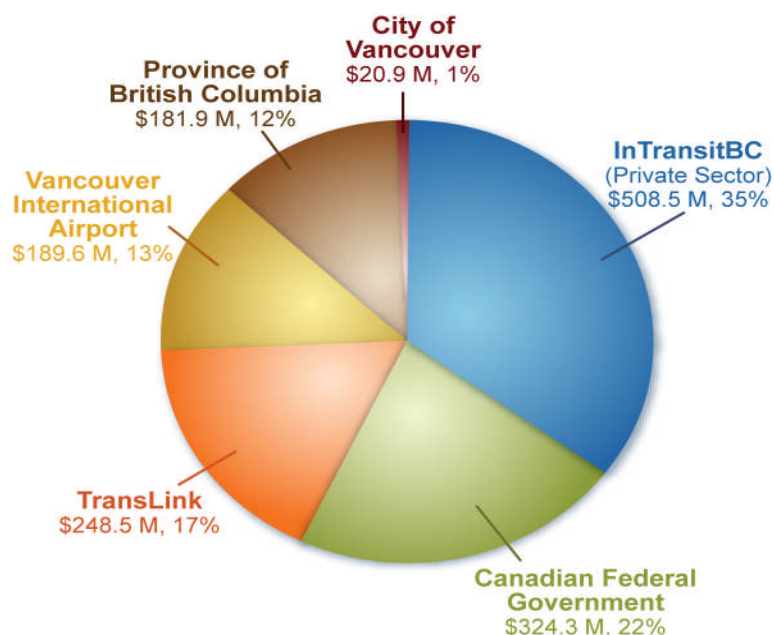


Figure 35: Canada Line Funding Profile

Several public sector partners contributed funds to the CLCO. The CLCO facilitated payment to the SPV, InTransitBC, via the terms and conditions set forth in the concession agreement. During construction, payments were made from the CLCO to InTransitBC based on milestone payments. An independent engineer certified completion of key construction tasks which triggered payments to InTransitBC. During operations, payments will be made from the CLCO to InTransitBC via availability payments. And although availability payment amounts have not been publicly disclosed, it is known that payments will be made on a monthly basis per the specifications in the concession agreement once service begins in August 2009. This payment will include:

- 70% of payment based on **vehicle availability** and adherence to the transit schedule;
- 20% of payment based on **quality of service** - passenger accessibility, comfort and convenience, and maintenance and upkeep of vehicles and stations; and
- 10% of payment based on meeting **ridership thresholds**.

7.4.2 London Underground

London Underground is the largest financial PPP project in the world to date. It is a 30-year concession agreement that is broken into four, 7.5-year contracts to allow for flexibility in managing an existing infrastructure. The financial data presented are for the first 7.5 year increment of the project.

The first 7.5-year concession is a \$24.62B project (2003 USD) of which 74% is funded by the public sector and 26% by the private sector (See **Figure 36**). Public sector financing came from the UK Department for Transport, Transport for London (TfL), and the European Investment Bank. The overall financing included:

- 67% from UK Department for Transport and TfL;
- 22% from 7 primary private lenders (Bank of Scotland, Mizuho Corporate Bank, Société Générale, WestLB AG, Deutsche Bank, Royal Bank of Scotland, and UBS Limited);
- 7% from the European Investment Bank;
- 3% from Tube Lines and Metronet (equity); and
- 1% from Other Conditional Loans/Lines of Credit.

Of the private sector funding, 91% is debt financed and 9% is equity financed. Debt financing was provided by 7 primary lenders (Bank of Scotland, Mizuho Corporate Bank, Société Générale, WestLB AG, Deutsche Bank, Royal Bank of Scotland, and UBS Limited). Equity financing came from the 2 concessionaires: Tube Lines and Metronet. The equity partners for Tube Lines were Bechtel, Jarvis, and Amey. The equity partners for Metronet were Balfour Beatty, Atkins, Bombardier, Thames Water, and Seaboard.

Due to scale, size, and cost of the London Underground project, TfL underpinned financing with coverage of up to 95% of total private financing in order to make the overall PPP affordable and more agreeable for the private sector to bid and undertake.

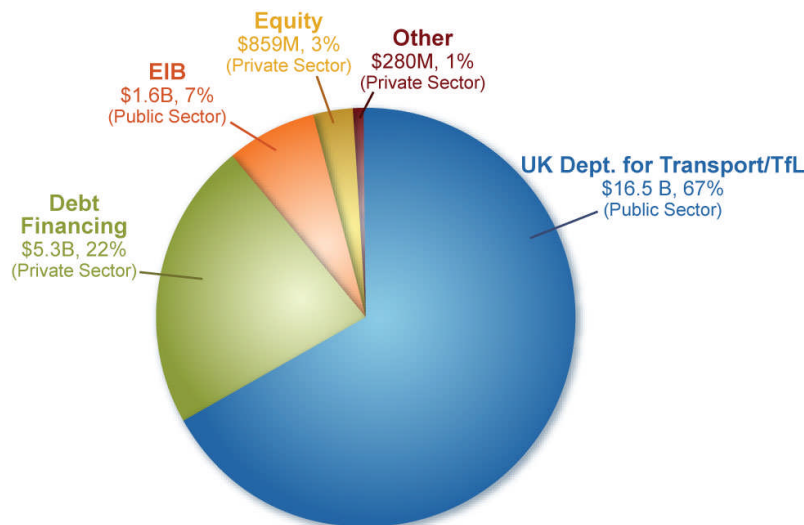


Figure 36: London Underground Funding Profile

The UK Department for Transport provides a \$1.6B-1.7B infrastructure grant to TfL each year. London Underground receives farebox revenues of approximately \$1.6B per year. There is an Infrastructure Service Charge (ISC) of \$1.6B per year which is divided between the 3 rail line grouping and 2 SPVs. Failure to fully meet the factors documented below would result in a deduction of payment from London Underground to the SPVs during operations and maintenance:

- **Availability** – measure of reliability of trains, signaling, and track and station based equipment;
- **Capability** – measure of passenger’s journey time from entrance to exit;
- **Ambience** – measure of condition and cleanliness of trains and stations;
- **Maintenance and upkeep** of facilities including clocks and restrooms; and
- **Refurbishment and modernization** of stations and trains.

Payment is made from London Underground to SPVs once every four weeks and is based on a complex formula incorporating customer time and impact of delays; and deductions for not meeting those benchmarks. The purpose of the payment scheme is to incentivize operations and ensure timely and efficient service in the most critical places and stations during the busiest times of the day.

7.4.3 TransMilenio

TransMilenio is a \$995M project (2005 USD) of which 79% is funded by the public sector and 21% by the private sector (See **Figure 37**). For Phase I, the public sector funding totalled \$240M including:

- 6% from the World Bank;
- 46% from a Local Fuel Surcharge;
- 28% from Local General Funds; and
- 20% from the National Government.

For Phase II, the public sector funding totalled \$545M including:

- 66% from the National Government; and
- 34% from Local Fuel Surcharge.

Of the private sector funding approximately 80% is debt financed and 20% is equity financed. The debt financing was primarily provided by vehicle suppliers such as Volvo and Mercedes, not traditional lending institutions such as commercial banks. Equity financing came from the various winning bidders for Phase I and Phase II trunk and feeder bus operators and the fare collection operator. In Phase I, the public sector helped to secure loans and kept a \$20M reserve for potential infrastructure delays and to mitigate the impact of major fare increases.

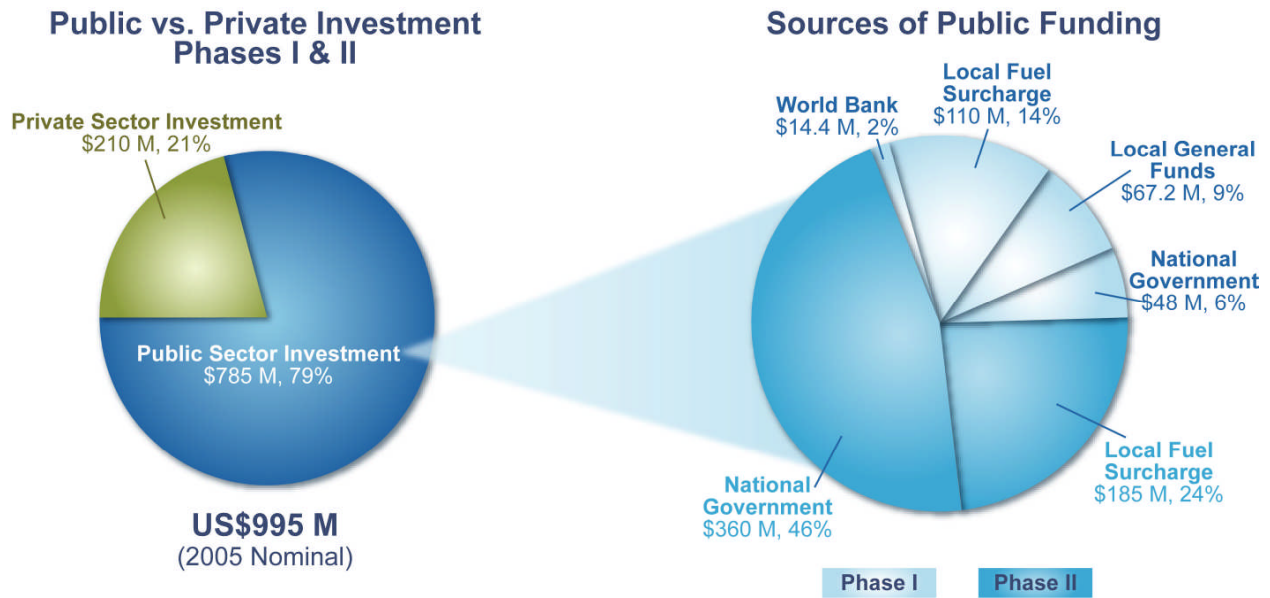


Figure 37: TransMilenio Funding Profile

In TransMilenio, the public sector never manages or controls the farebox revenue. Passengers purchase their tickets at the fare collection station and those funds are deposited to the Trust Fund operator on a daily basis. The trust fund operator is responsible for disbursing funds to TransMilenio, Lenders, and the concessionaires, based on the terms and conditions of the concession agreements. See **Figure 38** for a depiction of the flow of funds.

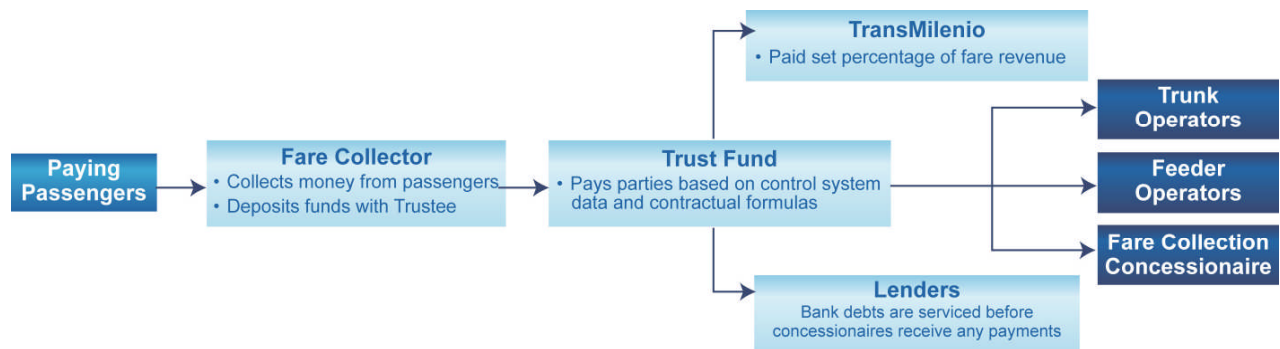


Figure 38: Flow of Funds for TransMilenio

Figure 39 illustrates the farebox distribution rules for TransMilenio stakeholders.

Stakeholder	Basis of Payment	% Cap for Payment
TransMilenio	% of Total Farebox Revenue	3% in Phase I; 5% in Phase II
Feeder Operators	Per Passenger	20% of Total Revenue
Fare Collection Operator	Tickets Sold	11% of Total Revenue
Trust Fund	% of Total Farebox Revenue	<1% of Total Revenue
Trunk Operators	Proportional amount of km Driven	Remainder of Farebox Revenue

Figure 39: Farebox Distribution Rules

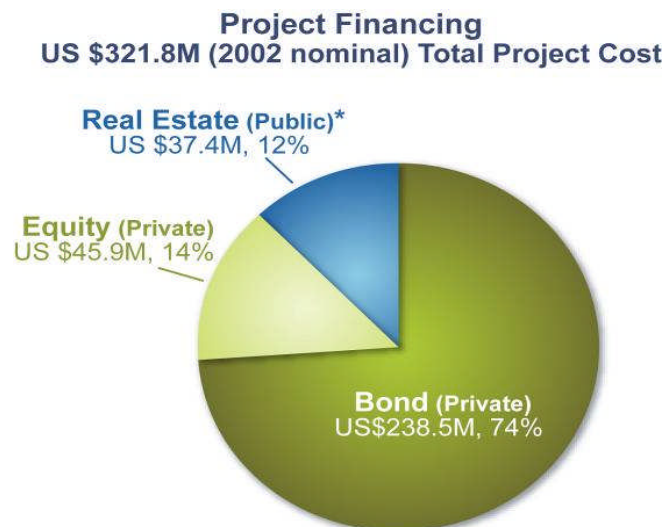
Once the allocation is determined for each of the stakeholders, detailed formulas are used to distribute the exact payment to each of the feeder and trunk concessionaires. The trunk operators are paid proportionally based on the number of kilometres travelled by all operators.

7.4.4 Southern Cross Station

Southern Cross is a \$321.8M (2002 USD) of which 100% is funded by the private sector (See Figure 40). The overall financing included:

- 74% from Civic Nexus (private sector) in bonds;
- 14% equity investment from ABN Amro of Civic Nexus (private sector);
- 12% from the value of commercial development real estate rights transferred from the public to the private sector

The bulk of the private sector financing was provided by Civic Nexus team lead ABN Amro, which issued the bonds and provided project equity. The debt to equity ratio on the private financing was 84:16. The value of rights to commercial development was for real estate surrounding the Southern Cross Station. These rights were transferred to the private sector after the winning bid was awarded to Civic Nexus. No loan guarantees were made by SCSA and all funding was at-risk.



*commercial development rights transferred from the public to the private sector

Figure 40: Southern Cross Funding Profile

SCSA facilitated payment to the SPV, Civic Nexus, via the terms and conditions set forth in the concession agreement. Payments began to the private sector once station construction and redevelopment was complete and operations and maintenance began. They average \$17.0M

(2002 USD) per year for the 30-year concession agreement. These payments are known as Core Service Payments (CSP), which are also known as availability payments and comprised of (SCSA, 2009):

- 75% for the capital component - reimbursement to the private sector for station redevelopment;
- 22% for operations and maintenance - station operations and maintenance; and
- 3% for insurance - public sector covering the cost of insuring station operations.

7.4.5 Key Differences

There are several key differences in the financial framework of each PPP project. The key differences include:

1. Use of Loan Guarantees or Reserve Funds
2. Types of Lenders Used for Debt Financing
3. Result of Performance Penalties

1. Use of Loan Guarantees or Reserve Funds

Two of the PPPs projects used loan guarantees or reserve funds to help sure up the confidence of investors. For example, in London Underground, the public sector underpinned up to 95% of total private financing, providing a significant loan guarantee to the lenders. With TransMilenio, there was a \$20M reserve fund setup for any infrastructure delays and to help keep passenger fares low. Neither Canada Line nor Southern Cross Stations used loan guarantees or reserve funds when structuring the PPP project.

2. Types of Lenders Used for Debt Financing

Another difference between the PPP projects related to the diversity of lenders. In Canada Line and London Underground, there were various international lending institutions that helped finance the respective projects. Since both Canada and the UK had experience with PPP's, international lenders were more willing to participate in the process. With TransMilenio, lending institutions were limited to Colombian banks and vehicle suppliers such as Volvo and Mercedes. TransMilenio did not leverage the use of international lending institutions. In Southern Cross, a single bank, ABN Amro Australia Ltd., provided 100% of the project financing, raised mostly through bond issues.

3. Result of Performance Penalties

Each PPP project had explicit performance criteria for the concessionaries. In three of the four PPP projects, if the concessionaire was penalized for not meeting a specific performance criterion, it would impact that amount of their availability or service payment. However, in the case of TransMilenio, if a concessionaire failed to meet a performance criterion, it was deducted from their service payment, but it remained in the overall pool of funds to be distributed to the private sector. For example, if a trunk operator was penalized for their performance, the same amount of farebox revenue existed and those penalty funds would be redistributed to a higher-performing operator. Although the public sector had no way of recouping any of the penalties, it created an incentive for bus operators to maintain a top level of performance.

7.4.6 Key Similarities

There are several key similarities in the financial framework of the PPP projects. The key similarities include:

1. Use of Private Sector Funding including Debt and Equity
2. Use of Performance Incentives to Encourage Strong Performance of Concessionaires
3. Capital Contributions of National and Local Public Funding

1. Use of Private Sector Funding including Debt and Equity

Each PPP project leveraged the private sector to help fund the initial investment of the project. In the case of TransMilenio, 100% of the bus fleet was financed by the private sector. In Southern Cross, 100% of the financing was provided by the private sector. Concessionaires secured debt financing from private lending institutions and were able to apply equity into the project in order to secure a return on investment and assure the public sector of a long-term commitment to the project.

2. Use of Performance Incentives to Encourage Strong Performance of Concessionaires

Each PPP concession agreement detailed specific performance criteria for concessionaires. Performance criteria encourage the private sector to achieve outstanding results in order to achieve their full payment per the concession agreements. This improves service quality to system users. If the concessionaire fails to meet any performance criterion, their payment would be reduced according to the specifications in the concession agreement.

3. Capital Contributions of National and Local Public Funding

Three of the four PPP projects obtained initial public funding from both the national and local level. This showed a strong commitment to the PPP projects from multiple levels of government. In the case of Southern Cross, 100% of capital costs came from the private sector. In general, private interest and investment is contingent on project size, economics, and level of public sector funding contribution.

7.4.7 Lessons Learned

Figure 41 presents lessons learned captured from the analysis of the financial framework of the PPP projects. DOT agencies and regional offices may consider the following lessons learned related to financing when pursuing a potential PPP project in the future. **Figure 41** contains the lessons learned, a description or explanation of the lesson and the applicable case study.

Lesson Learned	Description/Explanation	Applicable Case Study
Public sector loan guarantees may negatively impact PPP projects	Public sector loan guarantees may undercut the due diligence by lenders which are a key element of a successful PPP project. If lenders are assured a large percentage of their investment, they may be less inclined to take the necessary steps to perform due diligence before and during the contract period.	London Underground

Lesson Learned	Description/Explanation	Applicable Case Study
Public sector should have a contingency plan in the event of PPP failure	The public sector should maintain a contingency plan in the event the concessionaire goes out of business or becomes insolvent. In the case of London Underground, when one of the SPVs went bankrupt, the public sector had to scramble to determine the next steps and eventually had to assume the responsibilities of that concessionaire. It is important that the public sector consider and evaluate such situations and risks in order to mitigate the impact of such failures.	London Underground
Public sector should have a means to recoup/retain monies associated with performance penalties	Developing specific performance penalties helps encourage the concessionaire to deliver a high quality product or service. However, the public sector should develop a means to recoup or retain the penalties associated with unsatisfactory performance results.	TransMilenio
Public sector may consider the use of development rights to nearby government-owned real estate (if applicable)	The inclusion of development rights to nearby government-owned real estate can be leveraged to bolster overall affordability and desirability of a PPP project. It can be applied in lieu of or in conjunction with existing public sector project funding contributions.	Southern Cross

Figure 41: Financing Lessons Learned

7.5 Analysis of Key Challenges

There were several challenges that were shared between the 4 PPP projects analyzed. This section presents the similar challenges and highlights a few specific challenges related to each PPP project.

7.5.1 Common Challenges

The DOT and FTA may want to consider the common challenges presented below when considering a PPP procurement.

1. Challenges Faced by SPVs
2. Changes in Political Leadership and Political Conflict
3. Community Perception and the Role of Public Consultation

1. Challenges Faced by SPVs

In two of the case studies there were challenges to the structure and solvency of the SPV. In Canada Line, Serco, a multinational UK-based firm, was unwilling to cede project equity and dropped out of the partnership during final contract negotiations with CLCO before the start of construction. SNC-Lavalin, the lead concessionaire, then formed limited partnership (LP) SPV, InTransitBC, with 2 new partners, bclMC and CDPQ, once approval was granted by the CLCO.

In London Underground, one of the SPVs, Metronet, collapsed only 4 years into the 30-year concession largely due to cost overruns and poor oversight. TfL opened up Metronet and its contract to auction, but received no bids. TfL then had to resume public sector operations and maintenance for the rail lines previously managed by Metronet.

2. Changes in Political Leadership and Political Conflict

Changes in political leadership and political conflict were apparent in two of the case studies. In London Underground, there was ongoing political dissonance between the national government and local government. From its inception, the London Underground PPP was opposed and criticized by Mayors of London and the Managing Director of TfL, yet the national government was able to maintain the project as a PPP. The Mayor of London filed a lawsuit against the PPP. However, the courts eventually ruled in favor of the national government allowing the PPP to move forward.

With TransMilenio, changes in political leadership have taken the future expansion of TransMilenio BRT back to the drawing board. In Bogotá, the term of Mayor was capped at 3 years with no opportunity for re-election until the mid-2000s. The short term of the Mayor made it challenging to move forward on large capital projects and to see them to completion. In 2006, a new mayor was elected and re-scaled the Phase III expansion of TransMilenio deciding to include a study on the feasibility of heavy rail options in the city. Changes in political leadership pose a significant challenge to PPPs that are designated into phases and that are not supported by a long-term (i.e., 30-year) concession agreement.

3. Community Perception and the Role of Public Consultation

Public consultation played a significant role in several of the PPP projects. In Canada Line, public consultation lasted a few years (2003-2006). The public was consulted in 4 phases: Project Definition, Pre-Design; Preliminary Design; and Detailed Design. The significant public consultation efforts by Canada Line improved public perception of the project.

In TransMilenio, outreach was conducted to existing bus operators and the general public. TransMilenio reached out to bus operators to explain the bidding process and how they could benefit from a PPP structure. TransMilenio also reached out to the general public to help alleviate their concerns of dedicated bus ways. Some citizens were concerned the dedicated bus ways would increase automobile congestion by taking away lanes from roads and highways. Ultimately, public consultation helped both of the PPP projects move forward with the public's goodwill and support.

7.5.2 Project Specific Challenges

In addition to the challenges that were shared between the projects, there were various individual challenges for each PPP project. Individual challenges are highlighted below.

7.5.2.1 Canada Line

The following individual challenges are noteworthy in the Canada Line project:

1. Validity of Ridership Estimates Questioned
2. Canada Line Rail Technology did not Integrate with Existing Infrastructure
3. Disruption to Local Businesses

1. Validity of Ridership Estimates Questioned

Canada Line estimated ridership to be 100,000 persons per day after one-year of operational capability. Various citizen groups and others have questioned the validity of these estimates. The lenders and Canada Line leadership believe the estimates will turn out to be correct because Canada Line is in a developed corridor and transit ridership has increased dramatically over the last 10 years. Canada Line built in some ridership risk for the private sector in terms of making their availability payment (10%) dependent on meeting ridership thresholds.

2. Canada Line Rail Technology did not Integrate with Existing Infrastructure

In order to prevent a train monopoly by Bombardier Inc, the engine supplier for the existing SkyTrain system also in Vancouver, the CLCO opted for an open bid competition to allow for different rail technologies. Ultimately, a different technology was selected which means the SkyTrain and Canada Line systems will not be directly connected and require a transfer of riders walking from one system to the other. According to the CLCO, open competition generated the best value for money for taxpayers.

3. Disruption to Local Business.

There was a significant amount of disruption to local businesses which eventually led to a lawsuit. A local shop owner recently won and was awarded \$500,000 (2009 USD) in damages for lost business due to construction. The case is currently under appeal by the CLCO. The disruption was primarily due to cut and cover tunnel construction, which was initially to be done block by block through Vancouver. Instead, the construction contractor proceeded to construct the cut and cover tunnel all at once rendering blocks of the city practically impassable. The consideration that this would have on a local business was never addressed by either IntransitBC or the CLCO. A major factor often overlooked in PPP contract agreements is the impact of construction on residents and businesses in existing neighborhoods and thoroughfares.

7.5.2.2 London Underground

The following individual challenges are noteworthy in the London Underground project:

1. Project Scale, Scope, and Affordability of Bidders
2. Metronet's Internal Governance Structure

1. Project Scale, Scope, and Affordability of Bidders

The public sector initially thought that private firms would be able to apply more equity to the project, but once bidding began, it became clear that due to the size and scope of the project, greater debt financing was required. Eventually the sheer magnitude of the project led the public sector to guarantee up to 95% of private sector financing in order to secure necessary funds for the project. This guarantee means lenders are less exposed to risk creating a moral hazard and an environment where lenders may be less likely to maintain their due diligence.

2. Metronet's Internal Governance Structure

Metronet was one of two SPVs and was responsible for operations and maintenance of two rail line groupings. Metronet managed two independent subsidiaries with each managing a rail line grouping of its own. In terms of decision making, the two subsidiaries acted independently with little regard for the larger Metronet holding company causing a lack of corporate accountability and responsibility, which ultimately doomed the SPV and resulted in Metronet's bankruptcy.

7.5.2.3 TransMilenio

The following individual challenges are noteworthy in the TransMilenio project:

1. Competition from the legacy bus system
2. Tension between TransMilenio and STT

1. Competition from the legacy bus system

TransMilenio only encompasses about one-quarter of the bus routes in Bogotá. Therefore, there is little room for TransMilenio to raise fares due to: 1) low fares of the numerous legacy bus operators, and 2) socio-economic position of the target population.

2. Tension between TransMilenio and STT

There was tremendous tension between TransMilenio, who oversaw the implementation of the PPP, and STT, which approved bus routes within the city. Tensions arose from wage gaps between TransMilenio and STT employees and funding gaps between the agencies. STT employees tried to make the work of TransMilenio more difficult by slowly approving new bus routes within the city.

7.5.2.4 Southern Cross Station

The following individual challenges are noteworthy in the Southern Cross Station project:

1. Station construction delays

Due to design and material supply issues related to station roof construction, previously unknown environmental site contamination, and station and access issues related to an existing private rail operator, Civic Nexus and its contractor Leighton had difficulty in keeping the construction on schedule. Although the initial contract faulted the private sector for the delays, after a global settlement agreement, the public sector made a compensatory payment to the private sector and assumed more of the risks associated with the station design, environmental contamination, and facilitation of access to the station vis-a-vis the existing private rail operator.

2. Devising a regime of key performance indicators and measures for the concessionaire

During the planning stages, SCSA had difficulty in defining and measuring appropriate level standards for the eventual concessionaire in the PPP. SCSA had limited project knowledge and experience since Southern Cross was the first project of its kind in Victoria and Australia. SCSA eventually adopted a model of adaptability where key performance indicators are can be periodically re-evaluated and adjusted accordingly.

7.6 Analysis of Success Factors

There were several success factors that were shared between the 4 PPP projects analyzed. The section presents the similar success factors and highlights a few specific success factors related to each PPP project.

7.6.1 Common Success Factors

The DOT and FTA may want to consider the common success factors presented below when planning a future PPP procurement.

1. Strong political leadership and sponsorship
2. Open dialogue during procurement
3. Formation of a dedicated public entity responsible for project oversight and interface with the private sector
4. Key risks transferred to the private sector
5. PPP expertise sought upfront while crafting the procurement
6. Contracting arrangement secured stable long-term funding from the public sector

1. Strong political leadership and sponsorship

In order to move forward with a PPP procurement, there needs to be buy-in from key political figures in order to help move the project forward. Inherently, there will be nay-sayers who are opposed to a PPP project based on the fact that a private company stands to make a sound return on investment from the project. They will argue that a traditional public sector procurement is adequate. In order to counteract some of these criticisms, it is imperative to have a key political figure that is advocating the use of the PPP and fully explaining the justification for pursuing the project as a PPP.

In Canada Line, political leadership at the national, state, and local levels were aligned in their support for the construction of Canada Line. The province of British Columbia has a favorable environment towards the use of PPPs.

With London Underground, former Prime Minister Tony Blair strongly supported the procurement of London Underground as a PPP in 1997. The former Prime Minister's leadership was required to counteract lawsuits filed by the former Mayor of London Ken Livingston who strongly opposed the PPP project. In the end, the national government was able to influence the use of a PPP for the project.

In TransMilenio, former Mayor Enrique Peñalosa made the development of a BRT system a priority of his administration. His plan to pursue this as a PPP was in part to overcome the inadequacies and inefficiencies of the legacy bus system. Based on his leadership, he was able to quickly move the TransMilenio BRT from concept to reality during his 3-year Mayoral term.

Southern Cross was driven by the state's \$1.1B "Linking Victoria" initiative sponsored by the Victorian government to upgrade road, rail, and port transportation infrastructure across the state. The initiative brought together the State's Department of Transport and Department of Treasury and Finance and Partnerships Victoria, the State's public sector PPP expert, to support and determine the cost-effectiveness and viability of a PPP.

2. Open dialogue during procurement

Open dialogue during the procurement phase establishes a better understanding of requirements between the public and private sector. Open dialogue helps avoid simple miscommunications that can be costly once the project has already begun. In addition, open dialogue can help alleviate concerns that private sector bidders may have on a PPP procurement.

In Canada Line, Jane Bird, the CEO of CLCO, observed that an open exchange between the public and private sector on the technical requirements of the project helped InTransitBC craft a solution that sufficiently met the CLCO's requirements at a reduced price.

In TransMilenio, the project was inclusive of bus operators from the legacy bus system. In order to allay the fears of existing operators that believed a PPP model would put them out of business, TransMilenio took 2 courses of action: 1) TransMilenio sponsored several open discussions with affected bus operators before the procurement process began to explain how the PPP project would be structured; and 2) Existing bus operators were given preference in the scoring of bids.

3. Formation of a dedicated public entity responsible for project oversight and interface with the private sector

Establishing a single point of contact for the public sector helps in better managing the PPP arrangement. All funding, contracting, and communications can be run from this single point of contact. Delinking this group from an existing agency helps bring the discipline and focus required to implement a major capital project on budget, on-time, and meeting project specifications.

In Canada Line, the Canada Line Rapid Transit Co. (CLCO) was formed as a subsidiary of TransLink for the sole purpose of overseeing procurement, design, construction, and implementation of the Canada Line project. CLCO was the face to the SPV, InTransitBC.

London Underground Unlimited (LUL) was formed as a wholly owned and operated subsidiary of Transport for London (TfL) to oversee private sector infrastructure firms and management of the London Underground Tube system. LUL was the face to the private sector concessionaires.

The TransMilenio Co. was formed as a solely publicly held stock-based public sector agency created to manage system planning and daily service supervision. TransMilenio Co. was the face to the private sector bus operators and fare collection operators.

The Southern Cross Station Authority was formed as a statutory body under the Rail Corporation Act (1996) as a independent agency under the guidance of Victoria's Department of Transport and Department of Treasury and Finance to manage the station's redevelopment. SCSA was the face to the SPV, Civic Nexus.

4. Key risks transferred to the private sector

One of the primary benefits of a PPP structure is the transfer of key risks from the public sector to the private sector. This helps the public sector avoid the costs associated with poor project management and establishes a consistent flow of funds in future years that can be known well in advance.

In Canada Line, InTransitBC assumed design, construction, vehicle supply, financing, and operations and maintenance risk that in many cases would have resided with the public sector in a traditional procurement. These risks were described and embedded in the concession contracts.

With London Underground, the concessionaires assumed risks for cost overruns, environmental matter, station availability, and train operation, as well as shared responsibility with the private sector in terms of financing, and service level and quality.

In TransMilenio, the private sector took on 100% of the ridership risk. TransMilenio offered no subsidies to bus operators or the fare collection operator. All financing and operations and maintenance related to bus operators was assumed by the private sector.

In Southern Cross, the private sector provided 100% of the upfront financing and assumed design, construction, and operations and maintenance risks. With the upfront financing, the private sector was fully vested in the success of the overall project including the construction and redevelopment of the station and the surrounding real estate.

5. PPP expertise sought upfront while developing the procurement

The public sector leveraged specialized expertise during the procurement phase. The public sector contracted with financial, environmental, regulatory, and legal personnel in order to help craft the PPP projects and determine if the public sector was achieving value for money. It is not cost effective for the public sector to maintain masses of PPP experts; therefore, a need exists to supplement any in-house expertise with that of the private sector. All 4 PPP projects reviewed utilized specialized expertise.

6. Contracting arrangement secured stable long-term funding from the public sector

One benefit of a PPP arrangement is that the concession agreement commits the public sector to a stable, long-term funding agreement. Without a long-term contract (i.e., concession of 30 to 35 years), it is difficult for the public sector to commit the resources to maintaining an existing infrastructure.

In Canada Line, the 35-year concession, committed the public sector to the design, development, and operations and maintenance of the system over an extended period of time. This removes the project from potential funding cuts in the future that may impair the maintenance and operations of the system.

In London Underground, the system had an enormous back log of maintenance and repair items that were not being funded. Once the PPP agreement was in place, it committed the public sector to a steady stream of funding for 30 years to help improve existing infrastructure.

In Southern Cross, the 30-year concession agreement allowed for the necessary station operations and maintenance support in the future years and ensured a level of ongoing commercial development in the surrounding area.

7.6.2 Project Specific Success Factors

In addition, there were various individual success factors for each PPP project. Individual success factors are highlighted below.

7.6.2.1 Canada Line

The following individual success factors are noteworthy in the Canada Line project:

1. Use of Independent Reviewers to Monitor Project Progress
2. Due Diligence and Expertise of Lenders

1. Use of Independent Reviewers to Help Ensure the Projects Progress

Canada Line leveraged independent "peer reviews" to determine operational readiness; peer reviews consisted of existing transit operators from various metropolitan areas around the world. These reviews provided the public sector with some comfort that the system was prepared for operation, based on experienced practitioners. Gaps could be closed before any problems are introduced to the riding public.

2. Due Diligence and Expertise of Lenders

InTransitBC lenders provided ongoing project oversight during construction period by hiring an independent engineer to assess completed construction milestones and track schedule progress. Lenders had a tested and proven contract model based on previous European PPP projects where the contract covers any losses due to missed milestones or penalties by InTransitBC in the form of liquidated damages, damages in the form of monetary compensation set forth in the contract.

7.6.2.2 London Underground

The following individual success factors are noteworthy in the London Underground project:

1. Splitting the large project into 3 manageable line groupings
2. Overhaul of decades old engineering standards and asset management plans

1. Splitting the large project into 3 manageable line groupings

London Underground split the PPP procurement into 3 "manageable" groupings which provided the private sector with higher comfort level regarding the very large investment required by the project. London Underground split the rail line groupings based on rail infrastructure (tunnel lines, surface lines, etc...) to allow for more uniform operation and maintenance. The groupings were small enough for capable private infrastructure firms to manage and for lenders to make capital available.

2. Overhaul of decades old engineering standards and asset management plans

The long-term funding of the PPP project helped encourage an overhaul of decades old engineering standards and asset management plans. The establishment of these standards

ultimately led to lowered operations and maintenance costs and improved overall system efficiency.

7.6.2.3 TransMilenio

The following individual success factors are noteworthy in the TransMilenio project:

1. Quick procurement time allowed project to move from concept to reality within a few years
2. Clear segregation of public sector and private sector responsibilities

1. Quick procurement time allowed project to move from concept to reality within a few years

The quick procurement time allowed the TransMilenio get off the ground quickly. TransMilenio went from concept to initial operations in 35 months. Infrastructure build began less than a year after Mayor Peñalosa's election. Trunk concessions were issued within 4 months of the RFP. Feeder concessions were issued within 5 months of the RFP. The quick procurement allowed Mayor Peñalosa to demonstrate success in the brief 3-year Mayoral term.

2. Clear segregation of public sector and private sector responsibilities

The clear segregation of public and private sector responsibilities established a clear vision for the project. The public sector was responsible for the provision of infrastructure. The private sector was responsible for innovative fare collection technology and the purchase, operations, and maintenance of new bus fleet over time.

7.6.2.4 Southern Cross Station

The following individual success factors are noteworthy in the Southern Cross project:

1. Discipline of the Contract Process
2. Freedom for Private Sector to Innovate

1. Discipline of the Contract Process

Under the contract arrangements, the private sector assumed all key risks and costs associated with redevelopment, including construction costs, construction delays, design risks, and operational risks. Risks were negotiated and re-allocated through the global settlement, which came as a result of resolving the construction delays due to the environmental contamination, design modifications, and station access issues. These risks are now shared with the state.

2. Freedom for Private Sector to Innovate

The project scope allowed for innovation by the private sector with regard to project design. The new design led to a massive make-over of station and surrounding areas in conjunction with smart property development. The public sector received a product with innovative design that it most likely would not have received had the state undertaken construction and design.

In addition, the private sector was able to rapidly develop and revitalize the neighborhood surrounding the station. The value of the development rights proved to be significantly higher under the private sector than what was planned initially by the public sector.

8.0 Conclusion

Public private partnerships (PPP's) in transportation have shown a great measure of promise in countries around the world in recent years as a complementary and alternative method of procurement. In countries such as Australia, Canada, Colombia, and the United Kingdom, PPP's have served to encourage private investment and participation to reliably finance, construct, and manage large complicated transit projects. Case studies in the countries above demonstrate that although PPP's can improve the delivery of a particular project, there are a number of intermediate steps, ranging from project planning and scoping to financial modelling to contracting and risk allocation, necessary to achieve this objective.

A number challenges such as the validity of ridership estimates, rail technology integration, and disruption to local businesses in the Canada Line Project were matched by numerous successes including open dialogue during procurement, use of independent reviewers to monitor project progress, and the due diligence and expertise of lenders. The delivery of the Canada Line rail system through a PPP has brought value to the taxpayer in the form of an automated light-rail system connecting downtown Vancouver with the city of Richmond and Vancouver International Airport 3 months earlier than scheduled, alleviating congestion, and in plenty of time for the 2010 Winter Olympics.

The London Underground posed a challenge by its sheer size as a very large crowded heavy rail system with a vast aging infrastructure. The development of the London Underground PPP led to the innovation of dividing the system into 3 similar and more manageable rail line groupings and also the modernization of engineering standards and procedures and service benchmarks. And although one of its concessionaires eventually went bankrupt, which has posed a tremendous challenge, it also has had the benefit of ensuring long-term funding for ongoing maintenance and operations and longer-term capital projects such as station and signalling system upgrades that were grossly lacking before the project began.

TransMilenio was brought to life by the political will of Bogotá Mayor Enrique Peñalosa to solve an existing problem of inefficient transit through the use of smart bus rapid transit. Dedicated busways, pre-pay passenger platforms, and pedestrian walkways and plazas created a system with an image more in line with that of a metro subway. Incentivizing legacy bus operators to reorganize through the bidding process, transferring ridership risk to the private sector and building busway infrastructure, and project planning that created a system that required no subsidies and paid for itself were key factors in making TransMilenio a success.

The redevelopment of Southern Cross Station was a project that may not have been completed in such a fashion without the inclusion of the development rights to the surrounding real estate. As a long-running established commuter and regional transit hub and a prime location adjacent the Melbourne central business district, Southern Cross Station had the necessary ingredients for a successful PPP. Despite encountering its fair share of challenges with the construction of its iconic roof, contractor access issues, and environmental contamination, the public sector including the State of Victoria and Southern Cross Station Authority was able to negotiate a resolution with the private sector by adopting a conciliatory attitude.

In total, there were 6 common factors that allowed these 4 PPP's to be successful:

1. Strong political leadership and sponsorship to drive the PPP.
2. Internal and external PPP expertise sought while crafting procurement.
3. Open dialogue between the public and private sector during procurement.
4. Creation of a dedicated public entity responsible for project oversight and interface with the private sector.
5. Transference of key risks to the private sector.
6. Contracting arrangement secured stable long-term funding from the public sector.

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