

Progressive Delivery Models in Public Transit Infrastructure: Financial and Delivery System Evolution

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Learning Objectives

Understand evolving project delivery systems (PDS)

Contrast traditional P3s with progressive models

Assess financial implications of different models

Apply integrated project-finance thinking

Traditional Delivery Models

Key Models

- DBB (Design-Bid-Build): Sequential delivery; owner manages design, bids out construction
- DB (Design-Build): Contractor responsible for both design and construction
- DBFOM (P3): Private partner designs, builds, finances, operates, and maintains infrastructure

Common Traits

- Emphasis on fixed-price contracts and risk transfer
- Limited collaboration during design

Responsibility	DBB	DB	DBFOM (P3)
Design	Owner	Contractor	Private Partner
Build	Contractor	Contractor	Private Partner
Finance	Owner	Owner	Private Partner
Operate	Owner	Owner	Private Partner
Maintain	Owner	Owner	Private Partner

What Are Progressive Delivery Models?

Progressive Design-Build

- Phase 1: Contractor involved early to develop design and target cost
- Phase 2: Construction proceeds once target price is agreed

Alliance Contracting

- Shared governance and painshare/gainshare incentives
- Joint ownership of risks and solutions

Off-ramp Feature

• Owners retain option to exit if unable to agree on Phase 2

Responsibility	Progressive DB	Alliance
Design	Shared	Shared
Build	Contractor	Shared
Finance	Owner/Shared	Owner
Operate	Owner	Owner
Maintain	Owner	Owner

Key Features of Progressive Models

Early contractor involvement

Open-book pricing and transparency

Shared risk management

Emphasis on project outcomes



Financial Implications of P3s

- Fixed-price contracts embed risk premiums
- Equity and private debt raise capital cost
 - Public financing: ~2–4%
 - P3 financing: ~6–9%

Canada Line P3

- Opened *three months early* in August 2009, before the 2010 Winter Olympics and within the fixed budget
- Special Purpose Vehicle (SPV) led by ProtransBC for a \$2.1B total capital cost
- ~\$720 million in private equity (primarily from SNC-Lavalin and the British Columbia Investment Management Corporation)
- 35-year availability payments for ~\$3.5B with ~\$40M/year in operations and maintenance





Source: Wikimedia

Progressive Model Financing



- Phased approach allows for financial commitments to align with project certainty and readiness
- Consider a transit facility project with uncertain utility relocation and evolving community requirements.
 - In a progressive DB model, Phase 1 is funded using public capital to complete scoping and estimating.
 - Once the design is refined and risks are better understood, Phase 2 financing—potentially involving private or blended sources—is secured with greater certainty, thereby avoiding the cost of private capital when risk premiums would otherwise be highest.

Delivery Model Comparison

Model	Risk Transfer	Cost Certainty	Flexibility	Complexity
DBB	Low	High	Low	Low
P3	High	High	Low	High
Progressive	Moderate	Moderate	High	Moderate
Alliance	Shared	Low	Very High	Low

Case Study – King County Metro

- Model: Progressive DB
- Scope: \$115M electric bus facility, 120 charging bays
- Outcomes
 - Delivered on schedule due to early contractor involvement in planning and scheduling, allowing potential issues to be identified and addressed before construction began
 - Compared to similar transit facility projects delivered via traditional design-bid-build methods, which often experienced cost overruns in the 10–15% range due to scope gaps and reactive change orders, the Progressive DB approach held final cost within 3% of the target estimate established at the end of Phase 1
 - Supported sustainability and transit electrification by integrating design expertise early, ensuring the facility could accommodate evolving battery-electric bus technology
 - Collaboration resulted in responsive community engagement as designers and builders worked jointly with stakeholders to incorporate feedback, leading to fewer revisions and smoother approvals



Case Study – Manukau Harbour

- Model: Alliance Contract
- Scope: \$180M bridge duplication and interchange
- Outcomes
 - Delivered ahead of 2011 Rugby World Cup
 - Integrated, co-located team
 - Risk/reward framework drove shared performance gains
 - The project team set a target cost of NZD \$180M.
 - Final actual cost was NZD \$176M.
 - The \$4M savings were distributed between the owner and contractors based on a pre-agreed formula (e.g., 50/50). If instead the final cost had been NZD \$184M, the \$4M overrun would have been shared as well.
 - This structure aligned all parties toward minimizing unnecessary costs and proactively solving problems together.



Synthesis & Implications

- The choice of delivery model is not just about how to pay for a project. It also affects:
 - Risk profiles
 - Total lifecycle cost
 - Schedule
- Progressive delivery is most effective when there's scope uncertainty or complex stakeholder needs.
- Engineers need to understand the mechanics of these models to make informed decisions.

Delivery Model Scenario

• You are advising a planning team on a new transit project.

Project Overview

- \$500M Light Rail Transit (LRT) project
- 12 km dual-track, 14 surface stops
- One operations and maintenance facility
- 30 LRV units to be procured
- Complex utility coordination and high stakeholder sensitivity

Key Questions

- 1. Which delivery model is most appropriate and why?
- 2. How would you allocate major risks (design, utilities, capital)?
- 3. Estimate lifecycle cost impacts based on cost of capital range.
- 4. How will the model support community/stakeholder engagement?

Model	Risk Transfer	Cost Certainty	Flexibility	Capital Cost Range	Estimated Lifecycle Interest
DBB	Low	High	Low	2.0–3.5%	~\$262M
DBFOM (P3)	High	High	Low	6.0–9.0%	~\$798M
Progressive DB	Moderate	Moderate	High	3.0–5.0%	~\$426M
Alliance	Shared	Low	Very High	2.5–4.0%	~\$364M

Resources

- World Bank PPP Knowledge Lab: <u>https://ppp.worldbank.org/public-private-partnership/</u>
- Infrastructure Ontario AFP Guides: <u>https://www.infrastructureontario.ca/en/what-we-do/major-projects/model-selection/</u>
- Progressive Design-Build: A Primer on This Collaborative Delivery Approach: <u>https://www.colliersprojectleaders.com/insights/progressive-design-build/</u>
- The Economic Impact of Canadian P3 Projects: Why Building Infrastructure 'On Time' Matters: <u>https://www.cancea.ca/wp-content/uploads/2017/11/CANCEA-Report-The-Economic-impact-of-Canadian-P3-projects-for-publication.pdf</u>