

APPENDIX 12

PACKAGING AND PROCUREMENT
OPTIONS ANALYSIS

Appendix 12 - Packaging and Procurement Options Analysis

1. Overview and Methodology

1.1. Overview

1.1.1. Introduction

The Melbourne Metro Program is one of the largest transport infrastructure projects ever undertaken in Australia. It will transform Melbourne's rail network into an international-style metro system, improving access to and connectivity with the CBD and increasing the capacity, reliability and efficiency of train lines serving Melbourne's growth areas in the north, west and south-east.

The Melbourne Metro Program comprises:

- Two nine-kilometre rail tunnels from South Kensington to South Yarra as part of a new Sunshine – Dandenong Line, new underground stations at Arden, Parkville, CBD North, CBD South and Domain, and tunnel entrances in the vicinity of South Kensington and South Yarra; and
- Wider Network Enhancements which are required across the wider existing above ground rail network (outside of the tunnel and beyond the tunnel portals), including track modifications and signalling system upgrades on lines other than the Sunshine – Dandenong Line.

The State's *Project 10,000* policy identifies major new initiatives to drive growth, investment and jobs for the long-term benefit of Victorians as a key economic pillar for the future. As a key element of the Government's commitment to the project, the State has a desire to develop options for engaging with the private sector with the aim of attracting private investment to the project.

1.1.2. Purpose of this Appendix

Consistent with State's broader project and policy objectives, the purpose of this Appendix is to detail the development of packaging and procurement options and risk allocation structures through which all elements of the Melbourne Metro Program's scope could ultimately be delivered, and that appropriately considers options to work with the private sector in an efficient and cost effective manner.

A high level summary of the key conclusions of the extensive packaging and procurement options assessment undertaken is provided in Chapter 14 of the Business Case.

1.2. Methodology

1.2.1. Procurement objectives

The procurement strategy must drive the delivery of the State’s objectives for the Melbourne Metro Program. The overarching objectives are outlined in Chapter 2 of the Business Case.

In addition to, and to help realise, the overarching project objectives, a number of procurement objectives were also developed. The procurement objectives are a reflection of the project objectives, but with a focus on commercial and delivery related outcomes. They are to deliver value for money through:

- Optimal risk transfer: Ensure the procurement strategy allocates risks to the party best placed to manage them
- Timing: Ensure the procurement strategy is able to deliver the project within State’s time requirements
- Budget certainty: Ensure the procurement strategy provides certainty regarding capital and recurrent costs and performance
- Innovation and incentive: Ensure the procurement strategy incentivises contractor innovation
- Market capacity and interest: Ensure the procurement strategy addresses the market’s capacity and interest to deliver the project.

These objectives have been used to guide the overall development of the packaging and procurement strategy for the project.

1.2.2. Evaluation methodology

The evaluation methodology for the procurement options is consistent with relevant guidance from the Department of Treasury and Finance (DTF) (with specific reference to the High Value High Risk guidelines), as well as Infrastructure Australia’s National PPP Guidelines (with specific reference to *Volume 1: Procurement Options Analysis*), summarised in Figure 1.

Figure 1 - Process for developing packaging and procurement recommendation



- **Step 1:** Key data about the Melbourne Metro Program that is relevant to procurement was gathered, including objectives, scope elements, costs, risks and base assumptions. Procurement analyses undertaken as part of previous business cases and studies relevant to the Melbourne Metro Program were also revisited
- **Step 2:** The key scope elements were assessed against identified value drivers to test whether there are components that would be optimally delivered individually or bundled together
- **Step 3:** The proposed packages (developed in Step 2) were assessed against the shortlisted procurement models.

- **Step 4:** The shortlisted procurement strategies (developed in Steps 2 and 3) were tested and validated with the market through a market sounding process
- **Step 5:** The recommended procurement strategy has been determined based on the assessment undertaken in Steps 1 to 4.

The above considerations cannot be assessed in isolation and therefore the process has been iterative in nature (particularly Steps 2, 3 and 4).

In addition to the above, experiences and lessons learned from procurement precedents in significant rail tunnelling and transport projects from Australia and internationally have been drawn on to inform and benchmark the analysis.

1.2.3. Previous procurement strategy assessments

The Department of Economic Development, Jobs, Transport and Resources (Department) and Public Transport Victoria (PTV) have undertaken a number of previous investigations into options for increasing Melbourne's rail capacity and improving reliability. These previous investigations have also included considerable work on the deliverability and procurement of the project in various forms. This included:

- Melbourne Metro 1 – Procurement Strategy Development, November 2010 (prepared by Ernst & Young) (2010 Procurement Study)
- Melbourne Metro – Market Sounding Update 2012
- Melbourne Metro – Procurement Strategy Update - Interim Report, August 2012 (prepared by PTV)
- Melbourne Metro – Procurement Strategy Update Expert Peer Review, September 2012 (2012 Peer Review)
- Melbourne Metro – Procurement Strategy Update - Delivery Models Options Assessment, January 2013 (prepared by PTV) (2013 Procurement Strategy Update).

The Department validated the methodology and key conclusions reached in the most recent procurement investigations (the 2013 Procurement Strategy Update including the associated 2012 Peer Review), and satisfied itself that much of the analysis and key conclusions remain relevant. In developing this Business Case, efforts have therefore focussed on assessing the most likely packaging and procurement options and refining the procurement strategy to address further developments in the project's design and latest input from recent market sounding sessions.

1.2.4. Procurement strategy workshops

A series of procurement workshops were held with technical teams and other relevant transport projects to inform the development of the recommended procurement strategy for the Business Case. A broad spectrum of stakeholder representatives attended the workshops (as relevant) including from, inter alia, the Department, project advisors, DTF, Department of Premier and Cabinet and PTV. This Appendix reflects the inputs received from and recommendations made by these stakeholders.

2. Step 1: Data gathering

2.1. 2013 Procurement Strategy Update

As noted above, the procurement assessment in the Business Case has included consideration of the findings of the 2013 Procurement Strategy Update, but recognises refinements in the

project's scope and changes in the private sector market and the impact these have upon the preferred packaging and procurement strategy.

2.1.1. Summary of 2013 Procurement Strategy Update findings

The table below summarises the proposed packages and recommended delivery models identified in the 2013 Procurement Strategy Update, following the 2012 Peer Review. It should be noted that the key findings summarised below are materially consistent with the equivalent findings from the 2010 Procurement Strategy.

Table 1 - Summary of 2013 Procurement Strategy Update

Package	Description	Packing rationale and delivery model
Early works	<p>The early works comprised:</p> <ul style="list-style-type: none"> • Tram diversions • Utility relocation and protection • Construction power • Demolitions and relocations. 	<p>Managing contractor.</p> <p>Key drivers of this model were:</p> <ul style="list-style-type: none"> • These works need to be delivered before the core bundle and therefore should be procured as a separate package (or packages) • Given the size and complexity of the project and limitations on the level of resourcing able to be mobilised by the delivery body, this work package is suitable for managing contractor • The managing contractor model can be established in a relatively short timeframe, allowing the managing contractor to be engaged quickly and early in the process • The managing contractor can then provide input into the scope definition, design documentation and construction of the works, ensuring the works are delivered in time for the core bundle to begin • Enables subcontract packages to be procured on a fixed time and cost basis (on a competitive basis) and ensure value for money.
Core bundle	<p>The core bundle comprised:</p> <ul style="list-style-type: none"> • Construction of rail tunnels • Five underground stations • Station fit out and finishes (including mechanical systems, ventilation, station substations, electrical and fire systems and tunnel base slab) • Western portal • Station operations, maintenance and refurbishment. 	<p>PPP using an availability model.</p> <p>Key drivers of this model were:</p> <ul style="list-style-type: none"> • Delivering these works as a single, integrated package minimises the State's exposure to interface risk • Allows greater transfer of design and construction risk.
Eastern portal	<p>The eastern portal comprised:</p> <ul style="list-style-type: none"> • Cut and cover decline structure • Open to air decline structure • Local reconfiguration and realignment of existing lines • Surface tie-in to the existing lines • Mechanical, electrical and fire services. 	<p>Relationship based model.</p> <p>Key drivers of this model were:</p> <ul style="list-style-type: none"> • Separated out as an individual package from the core bundle, as the interface with the existing rail network in the area is complex and it will allow de-risking of the core bundle • Allows management of significant construction interface with core bundle as all parties working within the vicinity can work collaboratively to achieve the best outcomes for the State.

Package	Description	Packing rationale and delivery model
Rail systems	<p>The rail systems comprised:</p> <ul style="list-style-type: none"> • HCS (infrastructure and systems installation from Sunbury to South Yarra) • Installation of tunnel systems (power, lighting and rail installation) • Traction power • Communications • Tunnel substations at stations • Platform screen doors. 	<p>Early contractor involvement leading to either a D&C or alliance component.</p> <p>Key drivers of this model were:</p> <ul style="list-style-type: none"> • Packaged separately to core bundle due to different technical nature and risk profile • Requires the cooperation of a number stakeholders and involvement in the design development of the core bundle package • A relationship based model may therefore be suitable to facilitate this cooperation effectively.
Wider rail network works	<p>The wider rail network works comprised:</p> <ul style="list-style-type: none"> • Track modifications • Station and system upgrades. 	<p>Alliance or Franchisee delivery.</p> <p>Key drivers of this model were:</p> <ul style="list-style-type: none"> • Packaged separately to core bundle due to different technical nature and risk profile • Significant interface with the existing network and the Franchisee, as works are on the existing network and there will be requirement for service interruptions • Alliancing including the Franchisee has the ability to manage complex stakeholders and has a shared risk/gain approach and is performance based.

Source: 2013 Procurement Strategy Update

With respect to the recommendation to deliver the tunnels and stations as a PPP, the 2013 Procurement Strategy Update noted that options for geographically splitting the core bundle into two or three packages should be left open, subject to more detailed market sounding closer to procurement (noting also that contractors who participated in the 2012 market sounding process expressed varying views on this issue with some preferring a single package approach while others preferred it to be broken up into smaller packages). This issue has been considered as part of the packaging and procurement assessment undertaken for the Business Case.

2.2. Project scope

The Melbourne Metro Program scope is outlined in detail in Chapter 7 and Chapter 8 of the Business Case. This scope is the assumed project scope for the purposes of the packaging and procurement assessment documented in this Appendix.

2.3. Key assumptions

The procurement analysis documented in this Appendix is predicated on a number of key assumptions, as outlined in the following sub-sections.

2.3.1. Rolling stock

Procurement of rolling stock for the operation of the new Sunshine to Cranbourne-Pakenham Line will be undertaken separately to the project on a network wide basis. It is currently envisaged that the operation of the new line on opening will require the acquisition of 62 High Capacity Metro Trains (HCMT). PTV is currently procuring the first 37 HCMT, via a PPP model, that will be delivered and operational prior to the project's operational commencement given capacity improvements on the existing Cranbourne- Pakenham Line are required in the short-term. In addition, stabling, wider network power and overhead upgrades will all be delivered

separately, as the HCMT will be deployed to the network in advance of the project. It is assumed that the additional 25 trains will be procured as a modification under the rolling stock PPP contract.

2.3.2. Rail services operation

An assessment of the key commercial considerations regarding the introduction of a second rail services operator for the Sunshine – Dandenong Line, through the infrastructure delivered by the project, was undertaken as part of the procurement assessment for this Business Case. Whilst there are some potential benefits associated with including operations within the project (including greater operator input into design to deliver a better whole-of-life outcome), introducing a second rail services provider for operation of the new Sunshine – Dandenong Line is considered to be a sub-optimal approach vis-à-vis including the project's operations and service delivery within the existing single network-wide franchise arrangements. This is on the basis of the following:

- There are already franchise arrangements in place for the metropolitan train network. The impact on the wider network and the complexity, and additional cost, of a second rail services operator may exceed the whole-of-life and integration benefits of having a dedicated operator for the new Sunshine – Dandenong Line.
- Previous experience of two operators on Melbourne's metropolitan rail network resulted in a number of issues, including difficulty in collective decision-making (e.g. over timetable interfaces); duplication of management resources and functions; contrived and unwieldy arrangements for (necessarily) shared assets (e.g. Metrol); loss of system capacity; loss of potential system flexibility and redundancy in the event of significant system incidents (even where lines are operationally independent of each other); and confusion for passengers as to who is responsible for train operations and service delivery. A single operator simplifies management of the rail network, improves co-ordination between services, secures economies of scale and reduces confusion and uncertainty for passengers.
- Even though the new Sunshine – Dandenong Line will operate as a stand-alone line with dedicated rolling stock, there will continue to be interfaces, including between the metropolitan rail franchisee, V/Line services, freight trains and the new Sunshine – Dandenong Line. This could include interfaces in relation to infrastructure resilience if there is an issue in the new tunnels, at shared or interchange stations such as CBD interchanges and Sunshine, and / or between shared systems and the requirement to develop future network plans (e.g. there could be a need to move or share rolling stock between lines and / or to share stabling or maintenance facilities in the future). The practical and contractual ability to separate one line would also need to be confirmed.
- The Victorian rail sector has been through three iterations of rail franchising (1999, 2004 and 2009). The current arrangements reflect this and strike a delicate balance in terms of fixed and variable (cap and collar style) pricing. Within this context, for example, if a PPP was pursued for the project that included a fully fixed price operational contract, such a structure may not offer optimal value to the State, and may also more broadly impact the pricing of the wider network franchise arrangements.
- Given the capital cost of the project is expected to outweigh the operating cost, if the capital works and operations were procured together the selection of the winning consortium would likely be driven by the best construction outcome and not by who is the best operator. This is in direct contrast to Government's previous policy of selecting a franchisee based on the best operator and operating outcomes.
- Inclusion of train operations would increase the complexity of an already highly complex project procurement process and would increase the level of risk.

2.4. Key project risks

A key consideration in the selection of a packaging and procurement strategy is its ability to promote efficient and effective management of project risks. Risks should be allocated to the party (i.e. either the State or private sector) most capable of managing and/or pricing the risk, potentially lowering the overall cost of the project. The key project risks identified through the risk assessment process at a whole-of-project level were outlined in Chapter 9 and the supporting appendix, together with the identification of potential risk mitigation strategies for these risks.

In addition to these whole-of-project risks, there are range of key risks¹ specific to each works package recommended in this Appendix. An outline of these package specific risks and how the proposed delivery model for each works package will mitigate these risks is provided in the analysis below.

2.5. Impact of other Australian projects on the market capacity for the project

An important consideration in assessing packaging and procurement strategies is the impact of other Australian projects on market capacity. There are a number of current and future projects that could compete for market capacity in terms of both construction and finance, including WestConnex (NSW), Capital Metro (ACT), Forrestfield-Airport Link (WA), the Western Distributor (VIC), Level Crossing Removal Program (VIC), Stage 2 of Sydney Metro (NSW) and Inland Rail (Cwth). Notwithstanding the magnitude of Australia's infrastructure pipeline, activity in the infrastructure market indicates:

- With respect to the depth of the construction market:
 - New entrants to the Australian market with strong balance sheets (for example, Bouygues, Acciona and Salini) are enhancing competition in the market
 - Availability of skilled labour is strong as the resource led infrastructure boom tapers
 - Packages should be structured to match contractor and investor expectations and ensure sufficient competitive tension
 - A key risk has been identified in relation to potential capacity constraints of suitably qualified railway signalling technicians and engineers with in-depth knowledge of Melbourne's metropolitan rail network.
- The financing and equity market for greenfield projects is deepening:
 - *Redacted - commercial-in-confidence*
 - The Queensland Motorways sale process attracted a broad range of new investors to the Australian transport market
 - Strong appetite exists for the infrastructure pipeline from equity sponsors and financiers, notwithstanding the number of projects currently in the market.

Although there are a number of issues that will need to be monitored leading into taking the project to market, including around competing projects and the availability of select specialist resources, the market sounding process indicated strong interest in, and capacity for, the project. As such, market capacity considerations have not been a key constraint in the packaging and procurement analysis presented in this Appendix.

¹ Key risks specific to each works package were identified based on the value of the real risk adjustment attributable to the relevant risk, as documented in the Project Risk Register attached to Appendix 8.

3. Step 2: Packaging options assessment

3.1. Packaging assessment approach

To establish the most appropriate procurement strategy for Melbourne Metro, it is necessary to determine if works should be delivered as a single, integrated package or split into a number of smaller packages.

After consideration of the project’s characteristics, inputs from technical advisers and analysis of approaches adopted or proposed to be adopted on comparable projects, the packaging drivers presented in the table below were developed to support the assessment and comparison of packaging options. These drivers were used to help identify and inform the key differentiating factors between potential packaging options, and were not intended to act as fixed evaluation criteria.

Table 1: Packaging value drivers

Packaging value driver	Description
Technical requirements	<ul style="list-style-type: none"> • Are the technical requirements/skills/capabilities required to deliver the elements of the package similar?
Interfaces and risk profile	<ul style="list-style-type: none"> • Are there synergies from bundling components? • Does the package involve interaction with the existing network and are there any dependencies? • Does the separation of the package create a natural and manageable point of interface with other packages, or does it create undesirable interface risks? • Does the proposed packaging solution support appropriate risk transfer, such that value for money can be achieved by the State?
Innovation	<ul style="list-style-type: none"> • Does the packaging approach create or reduce opportunities for innovation in design, construction and/or a whole of life focus?
Market appetite and capacity	<ul style="list-style-type: none"> • Is there sufficient market interest in delivering the project package? • Does packaging impact on market appetite? • Is there market capacity to deliver the package such that a competitive outcome is likely to be achieved?

Source: Department analysis

The approach used to develop and evaluate packaging options comprised three key steps:

- Consideration of an extensive list of potential packaging options based on factors such as geography and technical discipline.
- Identification of a shortlist of potential packaging options by undertaking a qualitative analysis to determine the most realistic, practical options. Factors considered during the shortlisting process included the potential benefits of delivering elements with specific characteristics separately, the ability of the packaging option to assist in achieving project objectives and reduced interface risks.
- Consideration of shortlisted packaging options against the packaging value drivers to determine the most suitable option.

The recommended packaging approach is outlined in the following sub-sections, including the rationale for the proposed approach.

3.2. Packaging assessment

3.2.1. Early works

Early works comprise works that are needed to enable efficient and on-time delivery of the tunnel and station works and to minimise disruption. This includes relocating and protecting utilities, tram diversions, construction power and works to prepare construction sites.

Site preparatory works are expected to include demolitions, removal or relocation of trees, removal or relocation of monuments, minor road / transport network changes and any other activities required in order to facilitate early commencement of the main works, including for example, temporary works and other works that provide access for surface and underground construction.

Delivery of early works separately to the tunnel and station works is considered the optimal packaging approach for these works. This is consistent with the approach recommended in the 2013 Procurement Strategy. The key reasons for undertaking early works in advance of the tunnel and station works include:

- Preventing delays in the overarching construction program for the tunnel and stations works as scope definition and planning approval of certain early works are on the critical path. It is desirable to commence these activities as soon as possible and complete the works before the State contracts for the tunnel and stations works.
- Enabling delivery of the tunnel and stations to occur in a construction environment where the constraints of existing utilities and transport infrastructure that conflicts with the project alignment are reduced, thereby reducing risk premiums (and by extension, costs) expected to be bid for the tunnel and stations works. This approach will also reduce the interface risks for the tunnel and station works because delivery of these works will not involve direct interface with multiple Utilities Service Providers (USPs) and other third party asset owners/operators.
- Easing the difficulty of packaging such works in the tunnel and stations works as specific parties (e.g. Yarra Trams and utilities providers) need to undertake and oversee certain early works. For example, certain utility relocations can only be undertaken by the asset owners and their pre-qualified sub-contractors.
- Providing an opportunity to more effectively manage and mitigate any necessary disruption to the community, including commuters and businesses. For example, early commencement of the early works will reduce the intensity of disruption by enabling works to be staged (e.g. to avoid multiple road closures at the same time) and will reduce the need for these works to be performed in parallel with the heavy civil construction activities to be undertaken as part of the tunnel and station works.
- Enabling relevant USPs to manage their internal resources more effectively and ensure that resources are available when required (for example, because works can be staged, rather than all undertaken all at once), thereby mitigating any program risks potentially arising from USP resource capacity constraints.
- Providing an opportunity to reduce delivery costs. For example, the shorter construction program should result in reduced cost escalation and savings in project overheads. Similarly, de-risking the tunnel and station works should reduce the risk premium associated with these works.

The commencement of early works in advance of main works is a typical approach that is used on infrastructure projects that have in-ground civil works, particularly linear projects in urban environments such as railway lines. For example, the Regional Rail Link Authority engaged a demolition contractor as well as the metropolitan rail franchisee and interstate rail franchisee (ARTC) to perform early works and the NWRL and Sydney Light Rail projects used a managing

contractor to deliver early works including service relocations, demolitions and construction power.

The table below summarises the recommended approach to packaging of the early works.

Table 3 - Early works packages

Early works package	Key packaging drivers
<p><i>Utilities relocations / protection and site preparation</i> – Relocation / protection of utility services in conflict with the project alignment, plus other site preparatory works (for example, potentially including building demolitions and/or works that provide access for surface and underground construction)</p>	<ul style="list-style-type: none"> • Packaging these works together allows the contractor to generate efficiencies through design integration and streamlining of construction activities, potentially leading to reduced costs. This also allows a single contractor to effectively manage: <ul style="list-style-type: none"> – Asset owners in an integrated and efficient manner given these organisations can often be resourced constrained – Staging and timing of works, reducing the risk of delays and mitigating disruptions. • Packaging all utilities relocations / protection and site preparation together should drive a more effective risk transfer as one party is responsible for total early works delivery meaning there is less scope for gaps in risk allocation, cost shifting and disputes given the reduced level of interfaces.
<p><i>Tram works</i> – Tram diversion works</p>	<ul style="list-style-type: none"> • The tram works have very different technical and risk characteristics to other early works and are to be undertaken in a live light rail and road environment which also leads to significant network interface and stakeholder management issues. Therefore, it is optimal to quarantine these technical requirements and risks from the other early works, and package the tram works separately. • This approach will facilitate a greater role for Yarra Trams in delivery given it is best placed to mitigate and manage service disruptions during construction and to ensure the works achieve the operational outcomes required.
<p><i>Construction power</i> – Provision of power for construction activities</p>	<ul style="list-style-type: none"> • Separate procurement of these works may accelerate the program because MMRA can progress the arrangements with the USPs to ensure power is available for the tunnel boring machines (TBMs) as early as possible. • These works are geographically and technically separable (e.g. compliance with relevant industry acts, etc.) to other early works and therefore do not require any integrated coordination with these other works. • Given the scale and importance of these works it may be desirable for MMRA to have a direct relationship with the USPs in order to oversee delivery of the works.

Source: Department analysis

3.2.2. Tunnels and stations

The tunnel and station works comprise 9km twin tunnels, five stations (including fit-out), mechanical and electrical systems, and, subject to the procurement model(s) adopted for these works, may include structure maintenance, stations operations and maintenance, and commercial opportunities at the new underground stations.

The 2013 Procurement Strategy Update assessed a broad spectrum of 13 alternative packaging options for these works based on three alternative approaches:

1. Core bundle approach with one large package of works.
2. Geographic packaging approach with works split at logical construction staging points.
3. Technical discipline packaging approach with works split based on technical discipline.

The 2013 Procurement Strategy Update ultimately recommended a single package approach, but noted that a geographical split option should be further tested, largely on the basis that

there was some uncertainty at the time in relation to the market's capacity to deliver the works as a single package.

On this basis, for the purposes of the current packaging assessment, the following two options were considered:

- Option 1: Single package – The tunnel and station works are delivered as one integrated works package.
- Option 2: Geographic Split at CBD North² – This option includes two works packages:
 - Package 1: Twin tunnels from the western portal to CBD North, Arden and Parkville stations (including station fit-out), major TBM launch site at Arden and potentially mechanical and electrical systems for this section of tunnels.
 - Package 2: CBD North station and fit-out, tunnels along Swanston Street, CBD South station and fit-out, twin tunnels from CBD South to the eastern portal, Domain station and fit-out, major TBM launch site at either Fawkner Park or Domain and potentially mechanical and electrical systems for this section of tunnels.

Having regard to the packaging value drivers with respect to each of the two packaging options above, a single package approach (Tunnel and Stations package) has been re-confirmed as the preferred packaging solution for the tunnel and stations works. The key reasons for a single package approach include:

- Facilitating a single end-to-end solution that could lead to better service and customer experience outcomes by better integrating works (for example, consistency of station design).
- Avoiding the creation of additional interface risk for design, construction (particularly at the point at which the two packages would meet), program (for example, splitting packages is likely to result in an extended program to allow additional time to provide for an iterative design process and the more complex integration and commissioning processes) and commissioning (for example, to ensure that the tunnel ventilation and rail systems are integrated and commissioned across both packages).
- Enabling more effective ground condition (geological and hydrogeological) risk transfer to the contractor as all high risk locations (such as Arden and the Yarra River crossing) are included in one package allowing risk to be mitigated. In addition, the design and construction interface risk between tunnels and stations is transferred to the same contractor (which is particularly important given Melbourne's geological conditions make splitting these scope elements more technically challenging than certain other locations – for example, because the station box structures must be completed before the TBMs arrive at the stations).
- Providing more scope for innovation as the contractor has greater flexibility to adjust the design, develop alternative staging or program solutions or adopt different construction approaches, including approaches that would reduce disruption. For example, a single package provides increased flexibility for the contractor to develop alternative tunnelling solutions and construction methodologies.
- Having one party responsible for managing site access, safety, industrial relations and disruption (for example, with a single party being responsible for all construction activities in the CBD), thereby further reducing interface risks between works and providing additional opportunities for economies of scale (for example, procurement of TBMs). In addition, key challenges for the delivery of the tunnel and station works include construction site access, lack of lay down areas and the requirement use tunnels for delivery to site of key

² Based on the technical analysis undertaken during this Business Case process this geographic split packaging option was selected as the most likely option for the purposes of this assessment.

equipment. A single package approach facilitates better management of these risks given one party will have responsibility for managing construction and site access.

- Having one party responsible for designing and delivering an end-to-end mechanical and electrical system and fire life safety solution. This is important because these systems are integral to the tunnels and stations being fit for purpose and being able to facilitate the required operational outcomes (for example, because the spacing of ventilation shafts and the effectiveness of the ventilation systems solution can restrict the number of trains per hour and because integrated systems will be necessary to achieve final commissioning).
- Having a single contractor responsible for facilitating the accreditation requirements and managing this metropolitan rail franchisee interface.

Although the interface between two geographically separated packages could be managed, there were no material benefits identified with pursuing a geographic split option for the tunnel and stations.

The mechanical and electrical systems are proposed to be included as part of the Tunnel and Stations works due to the significant design, access and construction interface and because the mechanical and electrical systems are integral to the tunnels and stations being fit for purpose (for example, ventilation systems are essential for the tunnels to be operational).

As far as reasonably practicable, the scope of the Tunnel and Stations package will be defined to exclude works in the existing live rail environment, which involve additional brownfield risks and complexity.

3.2.3. Rail infrastructure

Certain works will be required at the eastern and western portals which involve significant interface with the existing rail network, including cut-and-cover tunnelling works, decline structures and local reconfiguration and realignment of the existing Sunbury, Frankston and Cranbourne-Pakenham Lines (including modifying existing signalling, traction power and communications rail infrastructure).

Delivering the brownfield rail infrastructure works separately to the tunnel and stations works is the optimal packaging approach for these works. This is consistent with the approach recommended in the 2013 Procurement Strategy with respect to the eastern portal works but differs with respect to the western portal works which were previously included in the Tunnel and Stations package. The key rationale for this difference is to exclude from the tunnel and stations package works in the existing live rail environment. The reasons for this conclusion include:

- Extensive works need to be undertaken in close proximity to the live rail network and in a complex, constrained operating environment (noting that, for example, the Sandringham, Frankston and Cranbourne-Pakenham Lines converge in the area where the eastern portal will be built and the Sunbury and Werribee Lines operate where the western portal will be built). This will require multiple service disruptions and associated bus replacement services. Delivery of these works will involve complex, multi-staged construction processes (particularly at the eastern portal) requiring multiple weekend and other occupations over a significant time period. Given the technical nature and risk profile of undertaking these works in the live rail environment, it is imperative that these works are undertaken with significant involvement of rail franchisees and separate to the tunnel and stations works.
- These works will affect the local road network (for example, with substantial works required to the William Street bridge structure at the eastern portal) and the local community. Procuring these works separately to the tunnel and stations package should ensure that the rail infrastructure contractor focuses on managing local disruption and stakeholder issues in these areas.

A single package approach for the rail infrastructure works is considered optimal. Although separate eastern and western portal packages could be managed, a single package is preferable on the basis that:

- The works are of a materially similar nature.
- Track occupations can be coordinated more effectively and disruption can be minimised.
- Separating the rail infrastructure works into two packages would create additional contractual interface, requiring the Tunnel and Stations contractor to engage with two contractors in relation to design, construction and commissioning.
- Separate packages would require an additional procurement process and an additional contract, requiring additional resources from the Department, the market and the rail franchisee.
- Feedback from the most recent market soundings suggested that a single package will be attractive from the market's perspective.

This package will also include the western and eastern turnbacks. These works are similar in nature to the track works at the portals and packaging these works together should enable occupations to be coordinated and disruption minimised.

3.2.4. Rail systems

Rail systems includes conventional signalling, HCS, train and power control systems, ICT and rail system integration. This will involve not only the provision of new rail systems within the tunnels and stations but also the delivery of new rail systems and systems upgrades on the existing Sunbury and Cranbourne-Pakenham Lines. The solution will need to be designed on a system-wide basis and integrated and commissioned across the newly created Sunshine – Dandenong Line.

Delivery of rail systems separately to the Tunnel and Stations is considered the optimal packaging approach for these works. This is consistent with the approach recommended in the 2013 Procurement Strategy. The key drivers of separate delivery are as follows:

- Rail systems are highly complex and will have significant interfaces with the new HCMT rolling stock, existing signalling infrastructure, rail operations and the broader network. Quarantining these works from the tunnel and stations works enable these works to be managed more effectively and allow the main works to be 'de-risked' and delivered at a lower cost.
- Introducing HCS potentially compounds these issues given the specialist nature of HCS and noting that HCS has not yet been implemented anywhere on the Victorian rail network. This degree of technical specialism and uncertainty means that including a fixed scope for rail systems in the tunnel and stations works could lead to large risk premiums for the rail systems elements of the package.
- Procuring the rail systems separately from the tunnel and stations enables the preferred rail systems provider to be selected on a stand-alone, value for money basis.

For completeness, it is noted that certain rail systems installation works within the tunnels and stations will be included in the Tunnel and Stations package. The key driver for this is to minimise program, access and delivery interface risks between the packages (noting that the proposed program to meet the required timelines involves installation of rail systems throughout the tunnels and stations at the same time as mechanical and electrical systems installation, station fitout and other activities which form part of the Tunnel and Stations works).

3.2.5. Wider Network Enhancements

Wider Network Enhancements involve works across the wider existing above ground rail network (outside of the tunnel and beyond the tunnel portals) including track modifications and signalling system upgrades.

The Wider Network Enhancements are being considered separately to the other packages, consistent with the approach recommended in the 2013 Procurement Strategy. The key reasons for considering the wider network works as a separate package (or series of packages) are as follows:

- The scope and location of these works means that they can potentially be undertaken independently of other scope elements.
- They have very different technical characteristics to the tunnel and stations works, are geographically separate, are of a brownfield nature and will be undertaken in a live operating environment with significant interface and stakeholder management issues.
- The required timeframe for procurement and delivery of these works differs to the rest of the project. These works need to be completed to coincide with completion of the tunnel and stations works, but have a much shorter construction duration.

Wider Network Enhancements will be packaged with other works where there are clearly demonstrable benefits such as procurement and/or delivery synergies. As noted above, the eastern turnback will form part of the Rail Infrastructure package and the signalling upgrades on the Sunshine – Dandenong Line will form part of the Rail Systems package. Other Wider Network Enhancements may ultimately form part of these packages and, where appropriate, works will be incorporated with the Level Crossing Removal Project to reduce costs and minimise disruption. Further detailed assessment of any such opportunities will occur as part of the detailed pre-procurement planning activities.

3.2.6. Commercial opportunities and station airspace rights

Commercial opportunities associated with the Melbourne Metro Program include general amenity retail offerings within stations, station airspace rights (over site development) and broader precinct development opportunities. The preliminary packaging outcomes in relation to these opportunities are as follows:

- *Commercial opportunities within stations* – It is desirable to package these with the Tunnel and Stations so that stations can be designed to best accommodate retail and other potential opportunities. The value of these opportunities is not expected to be material in the context of the Melbourne Metro Program’s total capital, operating and maintenance costs.
- *Station airspace rights* – Over site development opportunities exist at CBD North and CBD South stations. Given the significant interface between design and construction of the station boxes and any over site developments, it is desirable to package these development opportunities with the Tunnel and Stations package to manage interface risks and maximise value capture (for example, through integrated design).
- Commercial development on surplus land at Arden – The Arden – Macaulay Precinct presents a significant urban renewal opportunity. It has been determined that the redevelopment opportunities at Arden should be delivered separately from the Tunnel and Stations package because there is limited direct interface between the station works and the broader precinct redevelopment, significant additional work will be required by numerous Government agencies to coordinate and deliver the desired urban renewal outcomes and the timing of any precinct-wide development activities will occur naturally over a significantly longer period than the tunnel and stations works.

Although integrated packaging for within and above station commercial opportunities is considered desirable from a packaging perspective, it is noted that the final packaging solution for commercial opportunities will be largely driven by the procurement approach (for example, because commercial development opportunities are commonly included within PPPs but not within traditional procurement models such as D&C).

3.2.7. Operations and maintenance of new infrastructure and systems

As noted above, the operation of rail services on the Sunshine – Dandenong Line will be provided by the metropolitan rail franchisee. Any reference in this procurement analysis to 'operations and maintenance' therefore does not include the operation of rail services; the analysis contemplates which party is best placed to operate the five new stations and maintain the new tunnel and stations infrastructure.

As the current metropolitan rail operator, the metropolitan rail franchisee is the 'default' operations and maintenance service provider for the Melbourne Metro Program. Notwithstanding this, opportunities to package the operation and maintenance of relevant aspects of the new infrastructure (including stations) and systems with delivery of the capital works has been considered as part of this Business Case in order to identify any opportunities to deliver better customer experience at the new stations, derive whole of life benefits and improve value for money.

However, the approach to packaging of stations operations and maintenance of infrastructure and systems is largely driven by the procurement model(s) adopted for the Tunnel and Stations package (e.g. if a PPP model is adopted, some operations and maintenance activities would be included within the scope of the PPP whereas if a D&C is adopted, all operations and maintenance activities would be packaged independently to design and construction).

Subject to the above, there are a number of different packaging options for including operations and maintenance activities within the Tunnel and Stations package to deliver whole-of-life benefits and minimise interface risks between project components, including:

- At one end of the spectrum, extensive operations and maintenance services could be included in the Tunnel and Stations package (for example, with the scope of services within the stations being similar to the arrangements at Southern Cross Station). This approach may deliver improved customer outcomes, better risk transfer and whole-of-life benefits under a PPP model.
- At the other end of the spectrum, the metropolitan rail franchisee could be responsible for these services. This is consistent with the approach adopted for the remainder of the metropolitan network with the exception of Southern Cross Station.
- Various options exist between these two 'bookends'. For example, the scope of the Tunnel and Stations package could include 'hard' maintenance of the tunnel and stations structures and mechanical and electrical systems, with the remainder of services (stations operations including 'soft' facilities management services) provided by the metropolitan rail franchisee.

The approach to packaging of operations and maintenance is discussed in more detail in Step 3: Procurement options assessment.

3.3. Recommended packaging solution

Using the packaging value drivers, the assessment of packaging options focused on bundling project components to better manage risk, minimise interfaces between project components and the network, provide opportunities for innovation and increase attractiveness and acceptance by the market.

A summary of the recommended packaging strategy is presented in the table below.

Table 4 - Summary of recommended packaging solution

Works package		Description	Estimated cost (P90, Nominal)
Early Works	Tram works	Tram diversion works	
	Utilities relocations / protection and site preparation	Relocation / protection of utility services in conflict with the project alignment, plus other site preparatory works	\$ * m
	Construction power	Provision of power for construction activities	
Tunnel and Stations		Main tunnelling works, construction of five underground stations, station fit-out and mechanical and electrical systems ¹	\$ * n
Rail Infrastructure		Works at the eastern and western portals including cut and cover tunnelling, decline structures and local reconfiguration and realignment of existing lines ²	\$ * m
Rail Systems		Rail systems design (including conventional signalling, HCS, train and power control systems and ICT), installation works, rail systems integration and commissioning ³	\$ * m
Wider Network Enhancements		Works which are required across the wider existing above ground rail network (outside of the tunnel and beyond the tunnel portals), including track modifications and signalling system upgrades	\$ * m

¹ Estimated cost includes installation of rail systems in the tunnel.

² Estimated cost includes the western and eastern turnbacks.

³ Estimated cost includes signalling upgrades on the Sunshine – Dandenong Line.

A procurement options assessment for each package is undertaken in Step 3: Procurement options assessment in Section 4.

* Redacted - commercial-in-confidence

4. Step 3: Procurement options assessment

4.1. Evaluation methodology

The evaluation methodology used by the Department for the procurement options assessment is consistent with relevant guidance from the DTF (with specific reference to the High Value High Risk guidelines), as well as the National PPP Guidelines (with specific reference to *Volume 1: Procurement Options Analysis*).

4.1.1. Evaluation criteria

Having regard to the factors outlined in Step 1 (refer to Section 2), and approaches adopted or proposed to be adopted on comparable projects, the following evaluation criteria were developed to support the value for money assessment of delivery models for the identified works packages.

Table 5 - Procurement options assessment evaluation criteria

Evaluation criterion	Description	Relative priority
Risk management	The extent to which the delivery model allocates risk to the party best placed to manage it.	High

Evaluation criterion	Description	Relative priority
Time	The extent to which the delivery model is able to deliver the project within the State's time constraints and provides time certainty.	High
Price and budget certainty	The extent to which the delivery model supports cost certainty and competitive pricing for capital and whole of life costs.	High
Innovation and incentive	The extent to which the delivery model incentivises the contractor to innovate to meet the required performance outputs and other requirements.	Medium
Flexibility and control	The extent to which the delivery model enables the State to retain flexibility to change specifications and operations over time.	Medium
Market interest and appetite	The extent to which the delivery model assists in maximising market interest amongst the appropriate market participants with the relevant skills, expertise and capacity.	Medium

Source: Department analysis

Following DTF guidance, these criteria have not been numerically weighted. However, some provide inherently greater differentiation between alternative procurement models than others and therefore an indicative 'priority' has been attached to each criterion as set out above.

4.1.2. Evaluation framework

The following ratings were used to assess the suitability and value for money proposition of each shortlisted procurement models against the evaluation criteria.

Table 6 - Procurement options assessment evaluation framework

Scoring	Description
✓✓✓	Procurement option is extremely effective in satisfying the requirements of the criterion
✓✓	Procurement option is effective in satisfying the requirements of the criterion
✓	Procurement option satisfies or partially satisfies the requirements of the criterion
✘	Procurement option is ineffective in satisfying the requirements of the criterion
n/a	Not applicable

Source: Department analysis

4.1.3. Overview of procurement models considered

The following table summarises the procurement models considered in the procurement options assessment, in line with the description provided by the National PPP Guidelines (*Volume 1: Procurement Options Analysis*).

The following overview is provided as general guidance only to assist in determining the most appropriate delivery model for each project package and, to this end, the nature of the commercial arrangements under each of the delivery models can be developed to reflect specific project requirements.

Table 7 - Procurement models considered

Model	Description
Competitive alliance	Competitive alliancing is a form of relationship contracting in which the State collaborates with one or more non-owner parties (e.g. design, constructor, Accredited Rail Transport Operators (ARTOs), etc.) to share risks and responsibilities in delivering the construction phase of a project. Consistent with Victorian and national guidelines and policies, it is assumed that any alliance package would be structured as a competitive target outturn cost (TOC) alliance whereby a TOC is developed by more than one alliance in an environment of competitive tension.
Managing contractor	This form of contracting involves the State appointing a head contractor (the managing contractor) who engages subcontractors to deliver the works. The managing contractor is responsible for administering these subcontracts and accepts some delivery risks. Payment arrangements typically include reimbursement of costs plus allowances for management fees, margins and overheads. The contract may also include an incentive regime in relation to key performance indicators such as cost and schedule targets (with some contracts including a 'guaranteed maximum price', usually subject to defined exclusions). The managing contractor is engaged early in the process to manage the scope definition, design documentation and construction of the works. The managing contractor sometimes performs elements of the design and/or construction and is paid based on an agreed fixed price or schedule of rates. Subcontracted works are tendered on a competitive and transparent basis, where possible on a fixed price, fixed time basis.
Franchisee delivery	The State has entered into Projects Agreements with the metropolitan rail franchisee (Metro Trains Melbourne) and trams franchisee (Yarra Trams), respectively, which provide for these franchisees to deliver infrastructure works on behalf of the State. These arrangements are similar to a managing contractor arrangement, the difference being that it is with the incumbent rail/tram service providers. Consequently, the franchisees could be used to deliver infrastructure under an existing contracting framework, which provides for a cost plus approach with a fixed margin.
D&C	A fixed price, fixed time contract for design and construction of the works in accordance with a design brief prepared by the principal which outlines the functional and key user requirements.
DCM	As for D&C, except that the DCM contractor must also maintain the facility for a specified period – usually between 10 and 30 years.
DBOM	In a DBOM arrangement, the private sector party is responsible for designing, building, operating and maintaining the infrastructure.

Model	Description
PPP	A PPP is typically a long-term service contract between the public and private sectors where the State pays the private sector (typically a consortium constituted as a Special Purpose Vehicle (SPV)) an availability service fee to deliver infrastructure and related services over an agreed project term (typically 15-30 years). The SPV typically designs, builds and finances the facilities and operates and/or maintains them to specified standards. The SPV is financed by equity and non-recourse or limited recourse debt and is financially responsible for the asset's condition and performance throughout the concession.

There is a large range of procurement models available to the State for the identified works packages. The approach to identifying the most likely procurement models for each works package was to consider the factors outlined in Step 1 (refer to Section 2) and Step 2 (refer to Section 3) in the context of the suitability of procurement models to particular works packages, the outcomes of which were consistent with the 2013 Procurement Strategy Update, where many models were deemed not suitable for certain packages. Therefore only the most likely procurement models have been assessed for each of the works packages. For example, models such as construct only and construction management were not considered appropriate for any project packages and alliancing and managing contractor were discounted for the Tunnel and Stations package due to the high importance placed on construction innovation, risk transfer and the desire for a fixed price contract.

4.2. Procurement assessment – Early Works

4.2.1. Procurement assessment summary

As noted above, early works comprise above/below ground utility relocations, tram diversions, provision of construction power to the TBM launch sites, and other site preparatory works including demolition works.

The recommended approach to procurement of early works packages is summarised Table 8.

Table 8 - Early works procurement approach

Early works package	Procurement assessment
Utilities relocations / protection and site preparation	<p>Delivery of the majority of the utilities relocation and protection works is recommended to be via a Managing Contractor approach. This should ensure that the works are delivered quickly, that the State has sufficient flexibility to adjust scope if required as the project's design is further developed and that the benefits of coordinating and managing a diverse range of works and utility owner/operator interfaces are realised.</p> <p>It is recommended that any other early works to prepare construction sites, including works that provide access for surface and underground construction, are delivered as part of the Managing Contractor arrangement. However, the State will consider opportunities for including some elements of these works in the Tunnel and Stations package where there are clearly demonstrable benefits (for example, the State may wish to retain the ability to offer buildings provisionally nominated for demolition to the tunnel and stations contractor for use as a construction management base).</p>
Tram works	The recommended option is franchisee delivery under the Projects Agreement between the State and Yarra Trams as Yarra Trams is best placed to manage the significant interfaces with the existing tram network and to ensure that the works achieve the operational outcomes required.
Construction power	Provision of additional construction power at selected worksites is recommended to be delivered via a direct agreement with relevant power providers because delivery of these works does not have significant interfaces with other early works, this provides the State with more direct control over these works and because including these works within the scope of the Managing Contractor arrangement might result in additional costs (due to the Managing Contractor's margin, overheads, etc.) for potentially limited benefit. However, opportunities to include these works within the scope of the Managing Contractor arrangements will be considered if this can be achieved on a value for money basis.

Source: Department analysis

In addition to the above, a number of contractor participants in the 2015 packaging and procurement market sounding process expressed an interest in participating in the delivery of the project’s early works, including under a Managing Contractor or similar delivery model.

For completeness, it is noted that the Managing Contractor will not be precluded from tendering for future project work packages or prejudiced during future selection processes, subject to complying with the probity requirements to be specified as part of the Managing Contractor procurement process.

4.2.2. Mitigation of key work package specific risks

The key risks³ specific to the early works and how the recommended delivery model for each of the major early works package will mitigate these risks is summarised below.

Table 9 - Mitigation of key early works risks

Key risks	Mitigation under delivery model
Utilities relocations and site preparation (Managing Contractor)	
<ul style="list-style-type: none"> Risk of delay in approvals under the telecommunications and/or pipeline Acts resulting in delayed commencement of the Tunnel and Stations works. Enabling/early works not adequately scoped and scheduled resulting in additional works being added to the Tunnel and Stations works causing delay. Enabling/early works not completed as required within the specified timeframe causing delay. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> The Managing Contractor will be responsible for the procurement of applicable approvals / consents / authorisations required for the performance of the works. The Managing Contractor will also be responsible for verifying and completing all designs provided by, or on behalf, of the State. With respect to overarching timely completion, the Managing Contractor Agreement will include a target program setting out key milestone completion dates and an overall completion date. The target program will form the basis for measurement of the Managing Contractor’s achievement of the time related KPIs.
Tram infrastructure works (Yarra Trams delivery under the Projects Agreement)	
<ul style="list-style-type: none"> Interface issues arise with Yarra Trams resulting in scope changes and/or delay e.g. acceptance of infrastructure into service. Works are not completed as required within the specified timeframe causing delay to Domain Station construction commencement. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> The State has entered into the Projects Agreement with Yarra Trams to facilitate the collaborative delivery of tram works on behalf of the State. The existing contractual framework provides an effective mechanism in which to manage interface issues, particularly given the nature, scale and cost of these works is consistent with the type of works typically managed by Yarra Trams under the Projects Agreement. These works are required to be completed by early 2018 in order to facilitate construction of the Tunnel and Stations package. Given that Yarra Trams operates the existing tram infrastructure, Yarra Trams is arguably best placed to ensure the timely delivery of these works. In addition, the existing performance incentives in the Projects Agreement would be reviewed to ensure appropriate incentives are offered for timely completion.

³ Key risks specific to each works package were identified based on the value of the real risk adjustment attributable to the relevant risk, as documented in the Project Risk Register attached to Appendix 8.

Key risks	Mitigation under delivery model
Provision of construction power (Direct agreements with USPs)	
<ul style="list-style-type: none"> • Risk that HV power to TBM construction sites is inadequate resulting in significant upgrades to local or remote substations. • Power utilities cannot meet anticipated future power consumption demand, leading to inability to achieve expected level of service. • Provision of construction power not completed as required within the specified timeframe causing delay. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> • Given the scale and importance of these works it is desirable for MMRA to have a direct relationship with the USPs in order to oversee delivery of the works and ensure the HV power is adequate to enable effective TBM operation. • Direct agreements with USPs for delivery these works should accelerate the program because MMRA can progress the arrangements with the USPs prior to appointment of the Managing Contractor ensuring power is available of all TBM's as early as possible.

Source: Department analysis

4.3. Procurement assessment – Tunnel and Stations

The Tunnel and Stations package capital works include the main tunnelling works, construction of five underground stations, station fit-out and mechanical and electrical systems.

As noted above, there is a large range of procurement models available to the State for the Tunnel and Stations package, however, based on analysis undertaken in developing the current procurement strategy, the D&C, DCM and PPP models have been identified as the most likely procurement models for the Tunnel and Stations package.

4.3.1. Qualitative comparison of traditional and PPP procurement models

Performance comparison of traditionally procured projects and PPPs

The most authoritative study of the relative performance of PPPs and traditional procurement (i.e. construct only, D&C, etc.) in Australia is that released by the University of Melbourne in December 2008.⁴ This study assessed the cost and time performance of 25 PPP projects and 42 traditionally procured projects throughout Australia since 2000. The study found that:

- From the time the relevant contract is signed:
 - The PPPs experienced average construction cost over-runs of 4.3 per cent, compared with 18 per cent for the traditionally procured projects. PPP projects provide far greater cost certainty than traditional contracts and there is little variation in cost of a PPP project after the contract is signed
 - The average construction phase delay for the PPPs was 1.4 per cent, compared with 25.9 per cent for the traditionally procured projects.
- Only 43.3 per cent of traditionally procured projects were completed within 5 per cent of the expected cost.

This study therefore found that the State remains exposed to a higher degree of cost/time uncertainty under the contractual arrangements for traditionally procured projects vis-à-vis PPPs beyond the date of contractual commitment.

⁴ Colin Duffield, Peter Raisbeck and Ming Xu, National PPP Forum – Benchmarking Study, Phase II – Report on the performance of PPP projects in Australia when compared with a representative sample of traditionally procured infrastructure projects, University of Melbourne, 2008.

In addition to the University of Melbourne study, a number of older studies have also sought to test the performance of PPPs relative to traditionally procured projects:

- Mott MacDonald (2002) – The study found that capital expenditure resulted in a 1 per cent cost overrun on average for PFI/PPP projects relative to an average of 47 per cent for traditional procurement projects.
- National Audit Office, UK (2003) – The study found that 76 per cent of PFI projects were delivered on time and 78 per cent on budget, compared to 30 per cent on time and 27 per cent on budget for traditional procurement.
- Standard & Poors (2007) – Of 161 survey responses, 61 per cent believed PPPs have a better track record of delivery than traditional procurement, 30 per cent said ‘it depends’ and 9 per cent disagreed.
- Allen Consulting Group (2007) – Cost overruns experienced by traditional projects were 35.3 per cent and in the case of PPPs, it was 11.6 per cent. The weighted time overrun was 25.6 per cent for traditional procurement and 13.2 per cent for PPPs.

Other benchmarking studies relevant to rail projects

The studies below have not explicitly sought to compare the performance of traditionally procured projects and PPPs. They do, however, provide highly relevant context in considering the level of cost risk and uncertainty historically encountered on major rail projects:

- Procedures for Dealing with Optimism Bias in Transport Planning (Department of Transport, UK) – This guidance was produced by the British Department of Transport to assist with costing transport projects. The guidance indicated that rail projects typically required an uplift in project budgets of 40 per cent, compared to similar scope road projects which required an uplift of only 15 per cent. Although this data relates to business case costings (rather than contract pricing) and is therefore of limited relevance, it does highlight the inherent complexity and risk associated with rail projects which can give rise to an additional level of cost uncertainty when compared to other sectors.
- Underestimating Costs in Public Works Projects (Journal of the American Planning Association) – This study of 258 transportation projects found that rail projects incur the highest difference between actual and estimated costs, and that the average difference between actual and estimated costs for rail projects is substantially higher than that for other types of infrastructure.

4.3.2. Analysis against evaluation criteria

The table below presents a summary of the analysis against each evaluation criterion, focusing on the key points of differentiation between the various delivery models.

Table 10 - Tunnel and Stations procurement assessment

Evaluation criterion	D&C	DCM	PPP
Risk management	<ul style="list-style-type: none"> Provides a prima facie comparable level of design and construction risk transfer as the DCM and PPP models, but does not allow for the transfer of any post construction maintenance risk to the private sector. With respect to the construction period, traditional procurement models (including D&C) have historically provided a lower level of protection against risk for the State since the project is State funded, leaving the State with little option but to continue to support projects and absorb the consequences of risks eventuating. With respect to post construction defects, the contractor would be contractually bound to return to the site and make good defects until the expiry of the defects liability period.⁵ Beyond the expiry of the defects liability period, the State would need to bring a claim against the contractor for breach of contract or tort for any major defects in the construction work. After the expiry of the defects liability period (typically 12-24 months) the State would need to prove design or construction "fault" (it is not like a warranty) which gets harder to establish as time moves on. To the extent that part of the works are 'building works' for the purposes of the <i>Building Act 1993</i> (Vic), any such claim is subject to a 10 year limitation period. 	<ul style="list-style-type: none"> The risk transfer associated with the DCM model should be prima facie greater relative to a D&C given the delivery of maintenance on a fixed price basis should incentivise a greater level of whole of life focus. However, as the D&C cost is paid in full during the delivery phase, the extent of the financial incentives for the contractor to ensure the tunnel and stations continue to perform as expected in the medium to long term is limited to the value of any performance security and the maintenance payments at risk (which is expected to be immaterial relative to the capital cost of the construction works). 	<ul style="list-style-type: none"> The majority of design, construction, maintenance and relevant facilities management (FM) services risks on a whole-of- life basis are able to be transferred to the private sector. The introduction of private finance offers material level of protection from risk for the State (e.g. the State typically does not pay under a PPP until works are completed⁶ and does not have direct contract management of the D&C contractor). In addition, it provides additional discipline and scrutiny of risk compared to traditional procurement (i.e. financier due diligence and oversight). Competition between bidders is based on minimising whole-of-life costs and the private sector is at risk for integrating design, construction, maintenance and relevant FM services to achieve an optimal whole of life outcome. For example, although the contractor would be at risk for any deficiencies in the assets until the expiry of the defects liability period under the D&C / DCM models, the State would have limited recourse against the constructor for any material issues that were to arise post the expiry of this period (which would be limited by both the builder's liability cap and, to the extent the works are 'building works' for purposes of the <i>Building Act 1993</i> (Vic), the 10 year statutory time limitation on bringing claims). In comparison, under a PPP the financiers' capital would still be at risk and subject to abatement for the full concession term.
Scoring (Priority: High)	✓	✓✓	✓✓✓
Time	<ul style="list-style-type: none"> Financial incentives can be built into D&C contracts to encourage timely completion. For example, the payment arrangements could be structured on a milestone completion basis and/or a portion of any milestone/progress payments could be retained until final completion. In addition, D&C contracts typically include liquidated damages to cover the owner's genuine pre-estimated loss arising from any delay to 	<ul style="list-style-type: none"> The timing incentives and issues associated with a DCM model are likely to be materially similar to the D&C model. 	<ul style="list-style-type: none"> The use of private finance results in very significant incentives for on time completion when compared to purely publicly financed procurement methods due to the added financial incentive to achieve commercial acceptance (i.e. the operating term will be truncated if there is a delay for which relief is not provided, resulting in lost service payments, and the builder will be required to provide material liquidated

⁵ The defects liability period is typically 12-24 months from Practical Completion (although noting this can be agreed and defined differently under the relevant contract).

⁶ Or, where contributions are made during the design and construction phase, these are structured to ensure there is no erosion of the 'typical' PPP risk transfer.

Evaluation criterion	D&C	DCM	PPP
Scoring (Priority: High)	✓✓	✓✓	✓✓✓
Price and budget certainty	<ul style="list-style-type: none"> A D&C provides the State with a fixed price for the construction phase only. Whilst risks are often 'transferred' under fixed time, fixed price contracts, experience suggests that governments typically retain or do not effectively pass on certain risks under D&C contracts and the State's direct involvement in project funding means the State has a greater exposure to claims during construction. D&C Contractor 'mindset' is typically that variations <u>will</u> be sought and additional payments are expected to an extent. D&C models do not naturally incentivise the contractor to focus upon the delivery of the lowest whole of life cost (i.e. there is limited incentive for design and construction to minimise maintenance costs and/or to deliver operational efficiencies throughout the asset's life). 	<ul style="list-style-type: none"> The DCM model should promote a higher degree of cost certainty than a D&C and with the inclusion of maintenance services. In addition, the DCM model could generate some whole-of-life benefits through the combination of design and construction with maintenance. However, DCM contractor 'mindset' is likely to be more closely aligned to a D&C on the basis that the mindset is that of a contractor and not the 'owner' of the asset (as per a PPP). 	<p>damages to cover the private sector cost of finance). Furthermore, with the interests of third parties such as financiers being aligned with the State's objectives in this respect (and actively monitored through delivery), the PPP option typically gives the highest degree of certainty over on time delivery (as evidenced by the independent studies referred to above).</p> <ul style="list-style-type: none"> A PPP model potentially enables more effective allocation of risk to the private sector, providing a significant degree of cost certainty in relation to the design and construction of the Tunnel and Stations package (as evidenced by the independent studies referred to above). Whilst PPP projects are not immune to delays or cost overruns, there are strong financial incentives to complete on time and on budget so that the SPV obtains the benefit of service payments when its debt financing costs become payable. Maintenance and relevant FM services costs are also known and agreed upfront, thereby providing the State a high degree of budget certainty with respect to these costs for the full concession period. This is supported by the research cited above. The inclusion of private finance will result in higher financing costs for a PPP compared to both D&C and DCM. However, in typical availability-based PPP arrangements, the additional private sector cost of finance is deemed to provide value for money on the basis that it is more than offset by the improved whole-of-life cost outcomes, additional commercial rigour and/or more comprehensive risk transfer that can be achieved under a PPP when compared to traditional procurement methods.

⁷ It is noted that any such payment mechanism (e.g. such as a delay in the provision of milestone payments) would need to be considered in light of the contractor's ability to raise short term finance / provide its own working capital, and in consideration of the associated financing costs that would likely be passed-through to the State. In addition, the level of liquidated damages under a D&C must be formulated based on a genuine pre-estimation of loss and therefore cannot be a 'penalty'.

⁸ Colin Duffield, Peter Raisbeck and Ming Xu, National PPP Forum – Benchmarking Study, Phase II – Report on the performance of PPP projects in Australia when compared with a representative sample of traditionally procured infrastructure projects, University of Melbourne, 2008.

Evaluation criterion	D&C	DCM	PPP
Scoring (Priority: High)	✓✓	✓✓	<ul style="list-style-type: none"> In addition, consistent with many recent Australian PPPs, it is assumed at a PPP model for this project would include capital contributions (in some form) from government during the design and construction phase and/or following completion of the asset to reduce the costs associated with private finance while still maintaining the risk transfer and other benefits typically associated with PPPs.
Innovation and incentive	<ul style="list-style-type: none"> The most material opportunities for innovation for the Tunnel and Stations package relate to design and construction methodologies for the construction works. As such, a D&C contract should provide significant opportunities and incentives for innovation. However, the absence of any post construction services may limit the opportunity for the State to drive innovation that delivers whole of life cost efficiencies (although noting that construction innovation is likely to be the most critical factor in relation to the Tunnel and Stations package given its value relative to the value of whole of life services). 	<ul style="list-style-type: none"> The DCM model provides improved scope for design and construction innovation compared to the D&C model as a result of a greater emphasis on achieving lower whole of life costing. However, the consequences of failing to minimise long term operation and maintenance costs (and therefore the incentive to genuinely optimise whole of life costs) is limited to the value of the ongoing maintenance payments and any performance security. With respect to the Tunnel and Stations package, the value of the recurring maintenance and lifecycle costs relative to the capital value of the works will be very low and, therefore, the ability of the DCM model to drive a materially better whole of life focus vis-à-vis a D&C may not be significant in this instance. 	<ul style="list-style-type: none"> The long-term nature of PPP contracts and their more output-focused structure provides prima facie greater scope for the private sector to bid innovative solutions which can deliver the required infrastructure and services at a lower whole of life cost. This is based on a number of factors including: <ul style="list-style-type: none"> Integration of design, construction, maintenance and certain service delivery into the one structure can drive better innovation both during the design and construction and in service delivery phases (which is supported by service provider and maintenance contractor input into the design process). The presence of long term private finance and the linkage of service payments to performance outcomes results in very significant incentives to drive value through an integrated, whole of life approach to design and costing. However, in the context of the project it must be recognised that this is potentially somewhat reduced due to: <ul style="list-style-type: none"> Lack of flexibility in relation to the alignment because the approval process and stakeholder interfaces will mean there is not significant scope for the private sector to materially alter the alignment. Rail Operations are not included in scope. PPPs provide an opportunity for the private sector to provide innovative solutions in relation to commercial opportunities, potentially providing significant community benefits and enhancing value for money (for example, by partially offsetting the cost of the project). This could potentially be a significant issue

Evaluation criterion	D&C	DCM	PPP
<p>Scoring (Priority: Medium)</p> <p>Flexibility and control</p>	<p>✓</p> <ul style="list-style-type: none"> Given that the State would be responsible for directly contracting with the contractor and for funding the construction costs, a D&C model can provide a greater degree of flexibility in relation to the agreement of scope variations during the design and construction phase (although the fixed price nature of the contract still limits flexibility to some degree). This is important as the project will operate as part of a broader rail network, and not as a standalone asset. However, a material variation can expose the State to a significant claim (for example, as was the case on the Regional Fast Rail Project). The State has very limited experience of managing and controlling the delivery of similarly sized and technically complex D&C construction projects. Although the State successfully delivered Regional Rail Link on time and on budget utilising traditional procurement models, it is noted that recent major tunnelling projects delivered in Melbourne (e.g. CityLink, EastLink and East West Link (noting this project ultimately did not proceed)) were delivered using a PPP model. 	<p>✓</p> <ul style="list-style-type: none"> The flexibility and control outcomes associated with a DCM model during the design and construction phase are likely to be materially similar to the D&C model. With respect to the operations and maintenance phase, it is possible to structure the maintenance contract to provide for the flexibility to modify the services specifications. In addition, the State would have the flexibility to terminate the maintenance contract early (potentially subject to a relatively small termination payment) or to extend the maintenance term through exercising options. 	<p>for this project because integrating in-station commercial opportunities (such as retail outlets) and over site developments with the stations design could provide an opportunity to materially enhance the value of any such commercial opportunities and also minimise disruption (for example, because an integrated approach could enable the commercial opportunities to be developed at the same time as the Tunnel and Stations package, rather than after the Tunnel and Stations works have been completed).</p> <p>✓✓</p> <ul style="list-style-type: none"> PPP contracts are typically less flexible than D&C / DCM models due to the long-term nature of the contracts and the constraints which arise from the inclusion of private sector finance (noting this may also potentially be a positive given the State may be less likely to change scope unless critical). Although a typical PPP contract would include mechanisms to enable modifications, this process is often more complicated than the variations regimes under traditional procurement models, for example due to the very fixed price nature of (and long term financing structure), and additional parties involved in (e.g. banks), PPP contracts. The agreement of modifications and the pricing thereof can also be more complex where any such changes require additional private sector finance and/or where the changes might impact the risk profile of the project or private sector returns.
<p>Scoring (Priority: Medium)</p> <p>Market interest and appetite⁹</p>	<p>✓✓</p> <ul style="list-style-type: none"> Contractors in the 2015 market soundings generally indicated that they were open to a variety of procurement methods and would bid for the Tunnel and Stations package irrespective of whether it was 	<p>✓✓</p> <ul style="list-style-type: none"> Although there might be slightly less market appetite for this model compared to a D&C model (for example, because some construction firms do not provide maintenance services and as such would 	<p>✓</p> <ul style="list-style-type: none"> As noted for the D&C model, contractor market appetite is expected to be strong under any procurement model.

⁹ Refer to Section 2 for a detailed summary of the key themes from the packaging and procurement market sounding processes held in June 2015 and December 2015, respectively.

Evaluation criterion	D&C	DCM	PPP
Scoring (Priority: Medium)	<p>delivered under a PPP model or a traditional delivery model (e.g. a D&C).</p> <ul style="list-style-type: none"> A select number of contractors indicated a preference for the Tunnel and Stations package to be procured via a traditional delivery model – although none indicated that their interest was contingent on traditional procurement. <p>✓✓✓</p>	<p>need to partner with another organisation), there should still be sufficient market appetite and capability for the project to be delivered via a DCM.</p> <p>✓✓✓</p>	<ul style="list-style-type: none"> Equity sponsor and financier appetite for the Tunnel and Stations package is also expected to be strong. Market sounding participants indicated the market currently has a growing capacity for larger assets, with a large volume of competitive debt and equity available. <p>✓✓✓</p>

Source: Department analysis

4.3.3. Summary of assessment

Based on the comparative analysis summarised above, the delivery models have been assessed and rated as per the table below.

Table 11 - Summary of assessment

Evaluation criterion	Priority	D&C	DCM	PPP
Risk transfer	High	✓	✓✓	✓✓✓
Time	High	✓✓	✓✓	✓✓✓
Price and budget certainty	High	✓✓	✓✓	✓✓✓
Innovation and incentive	Medium	✓	✓	✓✓
Flexibility and control	Medium	✓✓	✓✓	✓
Market interest and appetite	Medium	✓✓✓	✓✓✓	✓✓✓
Overall ranking		3	2	1

Source: Department analysis

The analysis undertaken for this Business Case, including qualitative VFM assessment, recommends delivery under an availability based PPP model as the optimal procurement approach as this drives the strongest value for money proposition. This is consistent with the findings of the previous procurement studies and the 2012 Peer Review. The key drivers for this recommendation for each of the procurement assessment evaluation criteria are as follows:

- *Risk management* – PPPs achieve a significant and effective transfer of risk, with the majority of design, construction, maintenance and relevant facilities management (FM) services risks transferred to the private sector on a whole-of-life basis. This is a significant issue given the complexity and high risk nature of the tunnelling and civil works within the Tunnel and Stations package. Although a similar contractual risk allocation could contractually be achieved under other models, the risk transfer is enhanced under a PPP because private sector capital is at risk for the duration of the concession (typically 15-30 years). The introduction of private finance also provides additional discipline and scrutiny of risk (for example, including financier due diligence and oversight). As noted below, the robustness of this risk transfer has been demonstrated on previous PPP projects.
- *Time* – The use of private finance results in very significant incentives for on time completion when compared to ‘traditional’ procurement methods due to the additional financial incentive to achieve final completion (for example, noting that service payments will be lost). This is supported by independent research which found that the average construction phase delay for a sample of PPP projects was 1.4 per cent compared to 25.9 per cent for traditionally procured projects.¹⁰
- *Price and budget certainty* – The extensive and robust risk transfer achieved under PPP contracts provides the State with a high degree of budget certainty for the duration of the concession. This is supported by the research cited above which found that PPPs

¹⁰ Colin Duffield, Peter Raisbeck and Ming Xu, National PPP Forum – Benchmarking Study, Phase II – Report on the performance of PPP projects in Australia when compared with a representative sample of traditionally procured infrastructure projects, University of Melbourne, 2008.

experienced average construction cost overruns of 4.3 per cent compared to 18% for traditionally procured projects (only 43 per cent of which were completed within 5 per cent of the expected cost). Although PPPs involve additional costs associated with private finance, this is considered to provide value for money on the basis that it is more than offset by the improved whole-of-life focus, additional commercial rigour and robust risk transfer. It is also noted that, consistent with many recent Australian PPPs, it is assumed that the Tunnel and Stations PPP will include capital contributions from the State during delivery and/or following completion to reduce the costs associated with private finance while still achieving the risk transfer and other benefits associated with PPPs (see Chapter 14 of the Business Case for further details). The additional cost and budget certainty is considered to be a material issue for the Tunnel and Stations package given its risk profile, the complexity of the works and the value of this package (for example, a 20 per cent cost overrun could equate to approximately \$1bn of additional costs). Victorian experience on other complex PPPs which have encountered issues during the design and construction phase (for example, Southern Cross Station, CitiLink, Victorian Desalination Plant, Biosciences Research Centre (AgriBio) and Hopkins Correctional Centre) has shown the risk transfer to be robust, with the private sector bearing significant additional costs in order to deliver these assets.

- *Innovation and incentive* – Although a PPP model may not result in additional innovation compared to other delivery models in relation to tunnel design or construction methodologies (because these innovations will be driven by the contractor and could be incentivised under other procurement models), it should provide additional incentive to focus on whole-of-life design innovation (for example, in relation to the stations, mechanical and electrical systems, tunnel ventilation, etc.), FM services (for example, within the stations) and commercial opportunities (such as retail outlets and other customer amenities within stations and over site development). If the PPP is responsible for designing, building and operating the stations this could lead to additional innovation in design and service delivery which enhances the customer experience (a key priority and area of focus for PTV).
- *Flexibility and control* – Although PPP contracts are typically less flexible than D&C / DCM models, PPP contracts do include mechanisms to enable modifications. Importantly, it is also noted that rail operational flexibility and control will be retained to a large extent because rail services will continue to be delivered as part of the metropolitan franchise arrangements, with franchisee involvement in the design of rail systems and with rail systems within the tunnels (e.g. signalling and train power) being operated and maintained by the metropolitan rail franchisee (see below).
- *Market appetite and interest* – Market sounding participants stated that they would be interested in a PPP for the Tunnel and Stations package and market appetite is expected to be strong under this procurement approach. The market soundings also indicated that there should be strong appetite from equity investors and financiers.

As well as delivery of the main tunnelling works, construction of five underground stations, station fit-out and mechanical and electrical systems, the scope of the Tunnel and Stations PPP will also include:

- Delivery of certain rail systems works (e.g. installation of rail systems within the tunnels).
- Maintenance of relevant tunnels and stations infrastructure (including mechanical and electrical systems) and provision of facilities management services within the stations in order to incentivise a focus on whole of life benefits and improve value for money
- Commercial opportunities within the stations and above the station structures (over site developments at CBD South and CBD North) to improve value for money and ensure an integrated approach. For completeness, it is noted that delivery of over site development will not be included in the Tunnel and Stations PPP Project Agreement; it will be subject to

separate contractual arrangements (e.g. a Development Agreement) procured as part of a single, integrated procurement process.

Under the terms of the availability based PPP, the private sector will be responsible for ensuring that the infrastructure is available by a specified completion date and for the duration of the contract term in accordance with the defined specifications and requirements. Service payments will be lost if the infrastructure is delivered late and the payments will be abated during the operating term if the infrastructure is unavailable or if services are not delivered to the required standards.

Certain works are recommended to be delivered by the PPP as 'returned assets' to be operated and maintained by the metropolitan rail franchisee. This is desirable to reduce operational interface risks and to provide improved operational outcomes.

4.3.4. Mitigation of key work package specific risks

The key risks specific to the Tunnel and Stations package and how the recommended availability PPP model will mitigate these risks is summarised below.

Table 12 - Mitigation of key Tunnel and Stations risks

Key risks	Mitigation under delivery model
<ul style="list-style-type: none"> • Risk of delay in delivering the detailed design of the project adversely impacting the overarching project timeline. • Construction program is too aggressive leading to delay and additional costs. • Ground conditions encountered during tunnelling activities are significantly worse than anticipated. • TBMs do not perform as specified leading to a slower production rate, project delay, changes to construction methodology and/or redesign. • Material defects in either the design or construction of the tunnels and stations become apparent during commissioning or operations phases. • Inadequate consideration of O&M during detailed design results in additional costs during operations. • Failure to design and construct in compliance with key operations standards. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> • PPP Co would bear the impact of delayed delivery of the tunnel and stations because the service payments would not commence until the works reach completion (except for very limited risks borne by the State). • PPP Co would bear the risk of latent ground conditions (with very limited exceptions). • PPP Co would remain responsible for availability of the assets over the life of the service contract. This would drive a whole of life focus in relation to design and construction of the works. • Maintenance and relevant facilities management services costs are known and agreed upfront, thereby giving the State a high degree of budget certainty with respect to these costs. • PPP Co would continue to be responsible for defect rectification after expiry of the defects liability period and would bear the risk of defects for the full term of the contract.

Source: Department analysis

4.4. Procurement assessment – Rail Infrastructure

As noted above, the Rail Infrastructure package involves extensive works that would need to be undertaken in close proximity to the live rail network (including the Sandringham, Frankston, Cranbourne-Pakenham Lines at the eastern portal and the Sunbury and Werribee Lines at the western portal) and involves interfacing with rail franchisees and freight services. These works require significant occupations and associated bus replacement services, as well as interfacing with the tunnel and stations works.

The competitive alliance and Franchisee delivery relationship based models have been considered for the purposes of the current analysis (noting that the assumed structure of the alliance is a competitive TOC alliance which would include the State, the metropolitan rail franchisee and the Rail Infrastructure package contractor(s) (including designers) as participants). In addition, for completeness, a D&C model has also been assessed.

4.4.1. Analysis against evaluation criteria

The table below presents a summary of the analysis against each evaluation criterion, focusing on the key points of differentiation between the various delivery models.

Table 13 - Rail Infrastructure procurement assessment

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Risk management	<ul style="list-style-type: none"> • Early involvement of the contractor with the Project Team and the ARTOs during the design phase increases the opportunity to understand the Rail Infrastructure technical complexities and to better identify, mitigate and manage risks. An alliance model is expected to provide the optimal forum through which these risks can be managed, with the State, the contractor(s) and the ARTOs all working together on a 'best for project' basis. • Given the level of construction complexity associated with the Rail Infrastructure package, the alliance structure provides the opportunity for the State, ARTOs and contractors to work collaboratively to ensure risks are identified and managed collectively. This provides continued ability of the State and contractors to deal with the complexities and develop approaches to manage risks as they arise, be they constructability issues, scope change risks or risks in relation to ARTO access and occupations. 	<ul style="list-style-type: none"> • The Franchisee model may have some prima facie advantages over an alliance in terms of better management of risks relating to network integration and approvals and accreditation. This is on the basis that elements of the Rail Infrastructure works interface directly with live rail infrastructure, the metropolitan rail franchisee is best placed to manage the occupations regime for metropolitan services. • Notwithstanding the above, the following factors are relevant: <ul style="list-style-type: none"> – One of the key drivers of an alliance is to capture these benefits by including the metropolitan rail franchisee in the alliance and incorporating appropriate incentives. – The nature and scale of Rail Infrastructure works is much larger than the type of works typically managed and delivered by the metropolitan rail franchisee. This may introduce another level of delivery risks when compared to an alliance. For example, the metropolitan rail franchisee would need to subcontract these works meaning that the State would have no direct contractual relationship with (or ability to control) the party delivering these complex works. It also places more strain on metropolitan rail franchisee resources to manage the project compared to the competitive alliance model. – The works are not constrained to the metropolitan rail network and will affect V/Line and freight services as well as the local road network. The scope and the associated risks therefore extend beyond the nature of works typically undertaken under the Projects Agreement (in addition to being of a much higher value). – As discussed in the D&C column to the right, the design and construction complexity of the Rail Infrastructure package is such that it may be difficult to effectively transfer these risks under a fixed time, fixed cost contract on a value for money basis. It is therefore difficult to understand how the metropolitan franchisee could procure these works 	<ul style="list-style-type: none"> • The design and construction complexity of the Rail Infrastructure package is such that it may be difficult to effectively transfer these risks under a fixed time, fixed cost contract on a value for money basis (i.e. without a significant risk premium). For example, it will be difficult to pre-agree a fixed occupations regime for the entire delivery phase when entering into the contractual arrangements because the need for occupations is likely to evolve and change as design is further developed and as the works are delivered. It is therefore likely that the contractor would need to include a significant risk premium to manage these risks and/or that the State may be exposed to material claims and variations.

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Scoring (Priority: High)	✓✓✓	✓✓	✓✓
Time	<ul style="list-style-type: none"> The alliance model provides an opportunity to develop construction approaches that provide an optimal balance between time required for construction, access and occupations which should increase confidence that timeframes can be met. Pain/gain sharing mechanisms can be built into the alliance to provide incentives for the parties to complete the works within the required timeframes. The ARTOs will be party to the alliance and able to assist in defining requirements, assisting with a 'best for project' and best for network balanced approach to occupations and access, and providing continued engagement and flexibility during construction. The alliance model also provides an opportunity to commence the delivery phase early and for the alliance partners to develop collaboratively approaches to construction that balance access / occupation regimes which may support shorter construction timeframes (rather than relying on predefined occupations and access regimes). 	<p>from subcontractors on a value for money basis on the basis envisaged by the Projects Agreement.</p> <ul style="list-style-type: none"> There is a key interface with the Tunnel and Stations PPP and the contractual framework under the metropolitan rail franchisee model would not be able to impose liquidated damages commensurate with the adverse impact on the PPP if, for example, either of the portals were not delivered on time. <ul style="list-style-type: none"> Financial incentives could be built into the Franchisee model to encourage timely completion. For example, the payment arrangements could be structured on a milestone completion basis and/or a portion of any milestone/progress payments could be retained until final completion. In addition, the metropolitan rail franchisee should be strongly driven to complete the works and bring them into service (particularly the realignment of the existing lines) in order that they can meet their service delivery obligations under the Franchise Agreement (although it is likely that the franchisee would be granted relief from its operational performance regime while the works are being delivered which would reduce this incentive to some degree) and start generating revenue from these works (i.e. farebox revenue). 	<ul style="list-style-type: none"> Financial incentives can be built into D&C contracts to encourage timely completion. For example, the payment arrangements could be structured on a milestone completion basis and/or a portion of any milestone/progress payments could be retained until final completion. In addition, D&C contracts typically include liquidated damages to cover the owner's genuine pre-estimated loss arising from any delay to completion. However, given the significant design and construction complexity and extensive and uncertainty of interfaces with the ARTOs, the time required to clearly define scope and understand risks and articulate these in tender documents will be substantial. Further, the ability to develop a deliverable construction program within a predefined access regime is unlikely for these works, with flexibility required in relation to occupations and the complexities in relation to constructability (meaning that the State would likely be exposed to extension of time claims from a D&C contractor for these works, thereby eroding some of the time-based risk transfer).
Scoring (Priority: High)	✓✓	✓✓	✓
Price and budget certainty	<ul style="list-style-type: none"> Although an alliance does not result in a fixed price contract (on the basis that fixed pricing cannot be obtained on value for money basis – i.e. without a significant risk premium), the alliance model provides an opportunity to develop a full understanding of risks and scope to develop a TOC, with consultation between the State, contractors and ARTOs. This 	<ul style="list-style-type: none"> Although the metropolitan rail franchisee may bear some risk in relation to the cost of delivering the works (for example, the franchisee's margin might be at risk), the metropolitan rail franchisee is unlikely to provide a fixed price for the works. Although the franchisee might be able to drive some competitive tension in the procurement of 	<ul style="list-style-type: none"> Under a D&C model the metropolitan rail franchisee is not contractually incentivised to collaboratively work with the State to minimise design and construction costs.

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Scoring (Priority: High)	<p>collaborative process should provide confidence that the TOC is achievable (with the alliance parties bearing a degree of cost risk if the TOC is not achieved).</p> <ul style="list-style-type: none"> In addition, the alliance is proposed to be structured as a competitive TOC alliance whereby a TOC is developed by two competing alliances, thereby introducing competitive tension into the tender process. The earlier involvement of the contractor(s) with the project team and with input from the ARTOs (and incentivised participation by the ARTOs) should also ensure a more clearly defined scope and specifications and better understanding of the access and occupations regimes, resulting in more effective risk pricing than achievable under the D&C model. Recent experience on the three competitive TOC alliances for the Regional Rail Link demonstrated strong price and budget performance. 	<p>subcontractor works (although this may be challenging as noted above), the arrangement between the State and the franchisee would effectively be entered into on a 'sole source' basis (in contrast to a competitive TOC alliance). This could result in a less certain and/or more generous budget.</p> <ul style="list-style-type: none"> Under this approach the franchisee would be entitled to a margin on all works required for the entire package, thereby resulting in significant 'margin on margin' (noting that the subcontractor(s) would also require a margin for delivering the works). Under an alliance the franchisee would only be entitled to a margin on any works it delivers. 	<p>✓</p>
Innovation and incentive	<ul style="list-style-type: none"> Early involvement of the contractor with the State and ARTOs increases the opportunity to identify innovation and optimise the access regimes. The State will also share in the benefit of further innovations identified (post development of the TOC) during design and construction. The collaborative alliance environment allows all parties to modify the design and construction approach on an on-going basis, on a best for project basis. This can create incentive for all parties to be 'innovative' when dealing with risks and issues as they arise (whereas, for example, under a D&C there would be little or no incentive for the metropolitan rail franchisee to contribute to innovative 'workaround' solutions such as different occupations regimes). 	<ul style="list-style-type: none"> The Franchisee model provides improved scope for design and construction innovation compared to the D&C model as a result of the metropolitan rail franchisee being in the best position to optimise the access regimes. 	<ul style="list-style-type: none"> Given the nature of these works, the relatively fixed nature of a D&C contract may make it difficult for the contractor to innovate during the detailed design development process or during delivery of the works because any changes to scope or the occupations regime would require a variation. In addition, under a D&C model, the State potentially would not share in any innovation benefits realised during design and construction.
Scoring (Priority: Medium)	<ul style="list-style-type: none"> The alliance model provides significant flexibility to change the scope, design or construction approach post contract award. 	<p>✓</p> <ul style="list-style-type: none"> The State could implement a contracting structure under the Projects Agreement whereby a significant degree of flexibility is built into the process. 	<ul style="list-style-type: none"> Although a D&C contract would include a variations regime to enable changes post contract award, the fixed time, fixed price nature of the contract limits

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Scoring (Priority: Medium)	<ul style="list-style-type: none"> The alliance model also has the flexibility to amend occupations and access regimes with the ARTO as they are part of the alliance. <p>✓✓✓</p>	<ul style="list-style-type: none"> The State would have less direct control over the delivery of the works than under an alliance because it would have no direct relationship with the subcontractors engaged by the franchisee to deliver the works. <p>✓✓</p>	<p>flexibility to some degree. In particular and as previously discussed, as the metropolitan rail franchisee would not be party to the contract there may be a lack of flexibility (or appropriate incentives for the metropolitan rail franchisee) to manage any required changes to the access and occupations regime. Given the uncertainty in relation to occupations, a flexible framework will be particularly important for this package.</p> <p>✓</p>
Market interest and appetite ¹¹	<ul style="list-style-type: none"> Contractor market appetite is expected to be strong under any procurement model. Market sounding participants indicated a preference for a competitive alliance delivery method for packages involving significant interface with the ARTOs and therefore support using a competitive alliance model for the Rail Infrastructure package. This model is arguably the 'market standard' approach for high value, complex, brownfield works in a live rail environment and has been proved for similar works on Regional Rail Link. <p>✓✓✓</p>	<ul style="list-style-type: none"> The State would need to confirm the capacity and appetite of the metropolitan rail franchisee to complete these works and negotiate appropriate commercial terms. Notwithstanding the above, as per alliance, contractor market appetite for the downstream roles is expected to be strong. <p>✓✓</p>	<ul style="list-style-type: none"> As per alliance, contractor market appetite is expected to be strong under any procurement model. However, there is likely to be less market appetite for a D&C than an alliance (and/or strong market push-back in relation to a 'typical' D&C risk allocation) given the complexity of these works, the significant interface with the live network and the need for multiple / extensive occupations. <p>✓</p>
Scoring (Priority: Medium)	<p>✓✓✓</p>		

Source: Department analysis

¹¹ Refer to Section 2 for a detailed summary of the key themes from the packaging and procurement market sounding process held in June 2015 and December 2015, respectively.

4.4.2. Summary of assessment

Based on the comparative analysis summarised above, the delivery models have been assessed and rated as per the table below.

Table 14 - Summary of assessment

Evaluation criterion	Priority	Alliance	Franchisee	D&C
Risk transfer	High	✓✓✓	✓✓	✓✓
Time	High	✓✓	✓✓	✓
Price and budget certainty	High	✓✓	✓	✓
Innovation and incentive	Medium	✓✓✓	✓	✓
Flexibility and control	Medium	✓✓✓	✓✓	✓
Market interest and appetite	Medium	✓✓✓	✓✓	✓
Overall ranking		1	2	3

Source: Department analysis

The analysis undertaken for this Business Case recommends delivery under a competitive alliance as the optimal procurement approach for the Rail Infrastructure package. This is consistent with the approach recommended in the 2013 Procurement Strategy Update (including the supporting 2012 Peer Review) as it relates to the eastern portal works, noting that the western portal works were previously included in the Tunnel and Stations package. The State should have a high level of confidence in the competitive TOC alliance model given its successful Regional Rail Link experience.

The key drivers for this recommendation for each of the procurement assessment evaluation criteria are as follows:

- *Risk transfer* – Given the significant interface risks with the existing network and the rail franchisees, it will be difficult for the private sector to develop a fixed price, fixed time proposal on a value for money basis without the rail franchisees’ input and cooperation. A competitive alliance model is expected to provide the best commercial framework through which these risks can be managed in a live rail environment.
- *Time* – The complexity of the works (particularly at the eastern portal), including the need for rail occupations, creates significant program risk and any delay will potentially have adverse consequences for the delivery of the project. An alliance framework is best placed to mitigate this risk because the competitive alliance parties can commence design and construction planning early and, if an unforeseen event does occur, the parties are motivated to collectively resolve the situation in the timeliest manner.
- *Price and budget certainty* – A competitive alliance including appropriate KPIs should deliver a level of certainty and provide value for money. In addition, the alliance is proposed to be structured as a competitive TOC alliance, thereby introducing significant competitive tension into the tender process.
- *Innovation and incentive* – Under a competitive alliance delivery method, the ARTOs will be directly involved in the planning and delivery phases, which should facilitate the development of innovative approaches to design, construction and access by the

contractor(s). This approach should also align incentives and create an environment in which ARTO interface can be appropriately managed.

- *Flexibility and control* – A competitive alliance delivery method provides significant flexibility to deal with any necessary changes in scope, design and/or construction methods during delivery.
- *Market interest and appetite* – Market sounding participants indicated a preference for an alliance delivery method for packages involving significant interface with the existing rail network and ARTOs and therefore support using a competitive alliance model for the Rail Infrastructure package.

In addition to the above, certain Rail Infrastructure works will need to be undertaken in a densely populated area, requiring significant rail and road disruptions. These works will therefore have a significant impact on the local community. Under an alliance model all parties will be incentivised to work together to effectively manage communications and relationships with the community.

The metropolitan rail franchisee will operate and maintain the majority of the works delivered by the Rail Infrastructure alliance.

4.4.3. Mitigation of key work package specific risks

The key risks specific to the Rail Infrastructure package and how the recommended competitive alliance model will mitigate these risks is summarised below.

Table 15 - Mitigation of key Rail Infrastructure risks

Key risks	Mitigation under delivery model
<ul style="list-style-type: none"> • Stakeholder interface with ARTOs (MTM, V/Line, VicTrack, etc.) less effective and efficient than expected resulting in delay. • There is insufficient ARTO capacity, or the franchisee is under-resourced for the project. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> • The key risks in this package relate to the interface issues in relation to the live rail network. A competitive alliance model is expected to provide the best forum through which these risks can be managed, with the State, the contractor(s) and the ARTOs all working together to identify, mitigate and manage these risks. This extends to understanding and mitigating risks around the franchisees' capacity to deliver the works. • As the ARTOs will be directly involved in the planning and design of the works, this should align incentives and create an environment in which the ARTO interface can be appropriately managed and appropriate ARTO resources applied.

Source: Department analysis

4.5. Procurement assessment – Rail Systems

As noted above, rail systems are highly complex and will have significant interfaces with the Tunnel and Stations package, new HCMT rolling stock that will operate on the new Sunshine – Dandenong Line, existing signalling infrastructure, rail operations and the broader network. Rail systems are also fundamental to the successful commissioning of the Tunnel and Stations package and to successful integration of the new infrastructure into the existing network.

The competitive alliance and Franchisee delivery relationship based models have been considered for the purposes of the current analysis (noting that the assumed structure of the alliance is a competitive TOC alliance which would include the State, the metropolitan rail franchisee and the rail systems contractor(s) as participants). In addition, for completeness, a D&C model has also been assessed.

4.5.1. Analysis against evaluation criteria

The table below presents a summary of the analysis against each evaluation criterion, focusing on the key points of differentiation between the various delivery models.

Table 16 - Rail systems procurement assessment

Evaluation criterion	Alliance	Franchisee Delivery	D&C
<p>Risk management</p>	<ul style="list-style-type: none"> • Early involvement of the contractor(s) with the project team and the ARTOs during the design phase increases the opportunity to understand the rail systems technical complexities and to better identify, mitigate and manage risks. An alliance model is expected to provide the optimal forum through which these risks can be managed, with the State, the rail systems provider(s) and the ARTOs all working together on a 'best for project' basis. • A competitive alliance model including the rail systems contractor(s) and the rail franchisee enables the rail systems provider(s) to develop a rail systems solution in an environment that includes appropriate incentives for all parties (including the rail franchisee) to work together to achieve the requirements. This is particularly important for the rail systems package given that a large proportion of the works relate to upgrading existing infrastructure that will form part of the new Sunshine – Dandenong Line and noting that franchisee acceptance of the rail systems will be critical to the success of the project. 	<ul style="list-style-type: none"> • The Franchisee model may have some prima facie advantages over an alliance in terms of better management of risks relating to network integration and approvals and accreditation. • Notwithstanding the above, the following factors are relevant: <ul style="list-style-type: none"> – One of the key drivers of an alliance is to capture these benefits by including the metropolitan rail franchisee in the alliance and incorporating appropriate incentives. – The scale and nature of the rail systems package (and therefore its risk profile) is different to the types of works typically delivered by the franchisee. For example, the franchisee has not previously delivered HCS projects and the highly complex systems integration and commissioning required for this project will be materially different and will involve significantly more risk than works typically delivered by the franchisee (such as local conventional signalling and power upgrades). The franchisee is therefore arguably not best placed to manage these risks without specialist input. – The rail systems package has the potential to create significant delays to commissioning and the operational commencement of the project (particularly given HCS technology is currently untested on Melbourne's rail network and noting the complex integration and commissioning requirements discussed above). 	<ul style="list-style-type: none"> • The design, installation, integration and commissioning complexity of the rail systems package is such that it may be difficult to effectively transfer these risks under a fixed time, fixed cost contract on a value for money basis (i.e. without a material risk premium). For example, given the extent of works that relate to upgrading existing infrastructure, it will be difficult to pre-agree a fixed occupations regime for the entire delivery phase when entering into the contractual arrangements because the need for occupations is likely to evolve and change as the rail systems design is further developed and as the works are delivered. The complexity of the systems integration and commissioning required for this project will also be difficult to price on a fixed time, fixed cost basis – particularly prior to undertaking detailed design (which would be undertaken post signing a contract under a D&C model), without significant franchisee input (noting that franchisee acceptance of the rail systems will be critical to the success of the project) and without certainty as to the tunnels and stations design and the access regime for integration and commissioning activities.
<p>Scoring (Priority: High)</p>	<p>✓✓✓</p>	<p>✓✓</p>	<p>✓</p>
<p>Time</p>	<ul style="list-style-type: none"> • The ARTO stakeholders have a particular interest in the rail systems design and operations and can delay commissioning if rail systems do not meet their requirements. As such, an approach to enable coordination of these key stakeholders and involvement in the rail systems design and installation is required. A competitive alliance model is expected to provide the best forum through which this can be achieved to manage this interface. 	<ul style="list-style-type: none"> • Financial incentives could be built into the franchisee model to encourage timely completion. For example, the payment arrangements could be structured on a milestone completion basis and/or a portion of any milestone/progress payments could be retained until final completion. • In addition, the metropolitan rail franchisee should be strongly driven to complete the works and bring them into service (particularly the realignment of the existing lines) in order that they can realise capacity 	<ul style="list-style-type: none"> • Financial incentives can be built into D&C contracts to encourage timely completion, including milestone/progress payments and/or liquidated damages. • The ability to develop a deliverable installation program within a predefined access regime is unlikely for the rail systems, with flexibility required in relation to occupations for the brownfield works and access to the tunnels and stations for final integration and commissioning (meaning that the

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Scoring (Priority: High)	<ul style="list-style-type: none"> The alliance model also provides an opportunity to commence the development phase early to ensure that the works meet the operational requirements within the required timeframes. 	<ul style="list-style-type: none"> uplifts that are expected to be delivered from the roll-out of HCS technology. 	<p>State would likely be exposed to extension of time claims from a D&C contractor for these works, thereby eroding some of the time-based risk transfer).</p>
Price and budget certainty	<ul style="list-style-type: none"> The alliance is proposed to be structured as a competitive TOC alliance whereby a TOC is developed by two competing alliances, thereby introducing competitive tension into the tender process. 	<ul style="list-style-type: none"> Although the metropolitan rail franchisee may bear some risk in relation to the cost of delivering the works (for example, the franchisee's margin might be at risk), the metropolitan rail franchisee would not provide a fixed price for the works. Although the franchisee might be able to drive some competitive tension in the procurement of subcontractor works (although this may be challenging as noted above), the arrangement between the State and the franchisee would effectively be entered into on a 'sole source' basis (in contrast to a competitive TOC alliance). This could result in a less certain and/or more generous budget. Under this approach the franchisee would be entitled to a margin on all works required for the entire package, thereby resulting in significant 'margin on margin' (noting that the subcontractor(s) would also require a margin for delivering the works). Under an alliance the franchisee would only be entitled to a margin on any works it delivers. 	<ul style="list-style-type: none"> Under a D&C model the metropolitan rail franchisee is not contractually incentivised to collaboratively work with the State to minimise design and installation costs and to achieve successful commissioning of the rail systems (notably including the new HCS technology).
Innovation and incentive	<ul style="list-style-type: none"> Early involvement of the contractor with the State and ARTOs increases the opportunity to identify innovation in design and optimise the access regimes for the brownfield works. This will be particularly important in the context of rolling-out the new HCS technology which is currently untested on Melbourne's metropolitan network. In addition, an alliance should drive / facilitate innovation by bringing all stakeholders together with aligned incentives and a focus on 'best for project' outcomes. 	<ul style="list-style-type: none"> The Franchisee model provides improved scope for design innovation compared to the D&C model as a result of the metropolitan rail franchisee's direct involvement in the design process and in setting the access regime for the brownfield works. 	<ul style="list-style-type: none"> It would be difficult for a D&C contractor to innovate in design to the extent possible under an alliance due to the lack of direct franchisee involvement (noting that franchisee acceptance of the rail systems will be critical to the success of the project). Given the nature of these works, the relatively fixed nature of a D&C contract may make it difficult for the contractor to innovate during the detailed design development process because any changes to scope or the occupations regime would require a variation.
Scoring (Priority: Medium)	✓✓✓	✓	✓

Evaluation criterion	Alliance	Franchisee Delivery	D&C
Flexibility and control	<ul style="list-style-type: none"> The alliance model provides significant flexibility to change the scope, design or installation approach post contract award. The alliance model also has the flexibility to develop the systems design, amend occupations and access regimes with the ARTO (as they are part of the alliance) or adjust the approach to systems integration and commissioning to align with the Tunnel and Stations package (for example, the access regime for these activities). 	<ul style="list-style-type: none"> The State could implement a contracting structure under the Projects Agreement whereby a significant degree of flexibility is built into the process. The State would have less direct control over the delivery of the works than under an alliance because it would have no direct relationship with the subcontractors engaged by the franchisee to deliver the works. 	<ul style="list-style-type: none"> Although a D&C contract would include a variations regime to enable changes post contract award, the fixed time, fixed price nature of the contract limits flexibility to some degree. In particular and as previously discussed, as the metropolitan rail franchisee would not be party to the contract there may be a lack of flexibility (or appropriate incentives for the franchisee) to manage any required changes to the access and occupations regime. Given the uncertainty in relation to detailed design of the systems, integration and commissioning and the occupations regime for the brownfield works, a flexible framework will be particularly important for this package.
Scoring (Priority: Medium)	✓✓✓	✓✓	✓
Market interest and appetite ¹²	<ul style="list-style-type: none"> A key market risk has been identified in relation to potential capacity constraints of suitably qualified railway signalling technicians and engineers with in-depth knowledge of Melbourne's metropolitan rail network. In the event that there are resource constraints, this will be an issue under any procurement model (i.e. this is not only relevant to the alliance model). Notwithstanding the above, contractor market appetite is expected to be strong under any procurement model with a number of major signalling providers actively seeking opportunities in the Australian market. Market sounding participants indicated a preference for a competitive alliance delivery method for packages involving significant works on the existing network and ARTO interface and therefore support using a competitive alliance model for the rail systems package. 	<ul style="list-style-type: none"> As per the alliance, there is a potential capacity constraint of suitably qualified railway signalling technicians and engineers. The State would need to confirm the capacity and appetite of the metropolitan rail franchisee to complete these works and negotiate appropriate commercial terms. Notwithstanding the above, as per alliance, contractor market appetite for the downstream role is expected to be strong. 	<ul style="list-style-type: none"> As per the alliance, there is a potential capacity constraint of suitably qualified railway signalling technicians and engineers. As per alliance, contractor market appetite is expected to be strong under any procurement model. However, there is likely to be less market appetite for a D&C than an alliance (or strong market push back against a 'typical' D&C risk allocation) given the complexity of these works, the significant interface with the live network and the need for multiple / extensive occupations.
Scoring (Priority: Medium)	✓✓✓	✓✓✓	✓✓

Source: Department analysis

¹² Refer to Section 2 for a detailed summary of the key themes from the packaging and procurement market sounding process held in June 2015 and December 2015, respectively.

4.5.2. Summary of assessment

Based on the comparative analysis summarised above, the delivery models have been assessed and rated as per the table below.

Table 17 - Summary of assessment

Evaluation criterion	Priority	Alliance	Franchisee	D&C
Risk transfer	High	✓✓✓	✓✓	✓
Time	High	✓✓	✓✓	✓
Price and budget certainty	High	✓✓	✓	✓
Innovation and incentive	Medium	✓✓✓	✓	✓
Flexibility and control	Medium	✓✓✓	✓✓	✓
Market interest and appetite	Medium	✓✓✓	✓✓✓	✓✓
Overall ranking		1	2	3

Source: Department analysis

The analysis undertaken for this Business Case recommends delivery under a competitive TOC alliance as the optimal procurement approach for the Rail Systems package. This is broadly consistent with the approach recommended in the 2013 Procurement Strategy Update in that the earlier strategy also recommended a relationship based procurement model. The State should have a high level of confidence in the competitive TOC alliance model given its successful Regional Rail Link experience – including the use of this approach for the rail systems package (Work Package G).

The key drivers for this recommendation for each of the procurement assessment evaluation criteria are as follows:

- *Risk transfer* – Given the significant interface risks with the existing network and the rail franchisees, and the significant complexities in relation to systems design, integration and commissioning, the private sector could not develop a fixed price, fixed time proposal on a value for money basis (i.e. without a significant risk premium) and without the rail franchisees’ input. A competitive alliance model including the rail systems contractor(s) and the rail franchisee enables the rail systems provider(s) to develop a rail systems solution in an environment that includes appropriate incentives for all parties to work together to achieve the requirements. This is particularly important for the rail systems package given a large proportion of the works relate to upgrading existing infrastructure that will form part of the new Sunshine – Dandenong Line.
- *Time* – The ARTO stakeholders will be interested in the rail systems design and operations and can delay commissioning if rail systems do not meet their requirements. This requires an approach that coordinates these key stakeholders’ involvement in the rail systems design and installation. A competitive alliance model is the best forum to achieve this.

- *Price and budget certainty* – A competitive alliance that includes appropriate KPIs should deliver a level of certainty and provide value for money by aligning the commercial interests of the alliance participants, reducing the likelihood of costly scope changes.
- *Innovation and incentive* – An alliance should drive / facilitate innovation by bringing all stakeholders together with aligned incentives and a focus on ‘best for project’ outcomes.
- *Flexibility and control* – A competitive alliance introduces flexibility in the design process and enables the State to access the expertise and innovative thinking of rail systems providers.
- *Market interest and appetite* – Market sounding participants indicated a preference for an alliance delivery method for packages involving significant ARTO interface and therefore support using a competitive alliance model for the rail systems.

Consistent with the rest of the metropolitan rail network, the metropolitan rail franchisee will operate and maintain the rail systems.

4.5.3. Mitigation of key work package specific risks

The key risks specific to the rail systems package and how the recommended competitive alliance model will mitigate these risks is summarised below.

Table 18 - Mitigation of key rail systems risks

Key risks	Mitigation under delivery model
<ul style="list-style-type: none"> • Stakeholder interface with ARTOs (MTM, V/Line, VicTrack, PTV, etc.) is less effective and efficient than expected resulting in delay. • There is insufficient ARTO capacity, or the franchisees are under-resourced for the project. 	<p>Key factors relevant to the proposed delivery model that mitigate these risks include:</p> <ul style="list-style-type: none"> • The key risk mitigating factors relating to ARTO involvement outlined for the Rail Infrastructure also apply to Rail Systems.

Source: Department analysis

4.6. Procurement assessment – Wider Network Enhancements

A defining characteristic of the Wider Network Enhancements is that they will be undertaken in a brownfield, live rail environment. Works need to be conducted in a manner that enable the passenger rail and freight networks to continue to operate with minimal disruption during construction, requiring careful scheduling and staging, and management of access and occupations.

As the rail network is a complex operating environment with multiple interdependencies and interfaces, having the metropolitan rail franchisee, contractors and other stakeholders work closely together in this environment is critical to the project’s success.

As the scope of the Wider Network Enhancements is developed to a greater level of definition and design, optimum packaging will be assessed considering aspects such as coordinated construction staging to minimise disruption to the network.

Given the significant interface risks involved, the potential for unforeseen changes and the importance of stakeholder management, a competitive alliance or metropolitan rail franchisee delivery model may be suitable for aspects of these works to help manage these risks and

ensure on budget and on time delivery (noting that the Department will also seek opportunities for fixed time, fixed cost models, where appropriate).

As previously noted, certain Wider Network Enhancements will be included in the Rail Infrastructure and Rail Systems packages. The remaining Wider Network Enhancements will be subject to a separate, more in-depth stand-alone packaging and procurement assessment (noting that the procurement processes for these works do not need to commence for several years), including consideration of opportunities for certain works to be incorporated with the Level Crossings Removal Project. Consistent with the rest of the metropolitan rail network, the metropolitan rail franchisee will operate and maintain these enhancements.

4.7. Preliminary packaging and procurement solution

Table 19 summarises the structure of the preliminary packaging and procurement solution as developed under Step 2 and Step 3.

Table 19 - Preliminary packaging and procurement solution

Works package		Description	Procurement model
Early Works Estimated cost of capital works: \$ * m	Tram works	Tram diversion works	Yarra Trams led
	Utilities relocations / protection and site preparation	Relocation / protection of utility services in conflict with the project alignment, plus other site preparatory works	Managing Contractor
	Construction power	Provision of power for construction activities	Direct USP procurement
Tunnel and Stations Estimated cost of capital works: \$ * m		Main tunnelling works, five underground stations, station fit-out, mechanical and electrical systems, specific operation and maintenance services for the infrastructure delivered by the package and commercial opportunities at the new stations ¹	Availability based PPP
Rail Infrastructure Estimated cost of capital works: \$ * m		Works at the eastern and western portals including cut and cover tunnelling, decline structures and local reconfiguration and realignment of existing lines ²	Competitive alliance
Rail Systems Estimated cost of capital works: \$ * m		Rail systems design (including conventional signalling, HCS, train and power control systems and ICT), brownfields installation works, rail systems integration and commissioning ³	Competitive alliance
Wider Network Enhancements Estimated cost of capital works: \$ * m		Works which are required across the wider existing above ground rail network (outside of the tunnel and beyond the tunnel portals), including track modifications and signalling system upgrades	Case by case

¹ Estimated cost includes installation of rail systems in the tunnel.

² Estimated cost includes the western and eastern turnbacks.

³ Estimated cost includes signalling upgrades on the Sunshine – Dandenong Line.

In addition to the above, it is also noted that:

- The metropolitan rail franchisee will operate the services using the infrastructure delivered by the project as there are significant advantages to maintaining a single operator across the network.

- The HCMTs that will operate on the Sunshine – Dandenong Line will be procured separately to the project on a network wide basis. PTV is procuring HCMTs that will be deployed on the Dandenong Line to meet short-term capacity requirements.

5. Step 4: Market validation

5.1. Market sounding process background

The preliminary packaging and procurement solution outlined above, along with a number of other procurement and packaging options that were considered as potential but less favoured options, were then taken forward to Step 4: Market validation to test the market's views on packaging, procurement models, risk allocation and service(s) delivery.

Two stages of packaging and procurement market soundings were undertaken by the Department in conjunction with DTF and its external advisors. Stage 1 was undertaken in June 2015 and involved 16 domestic and international entities representing tunnelling and station contractors, financial sponsors, signalling systems providers and rail designers. Stage 2 was undertaken in December 2015 and aimed to build on the outcomes of Stage 1 and focus on more granular packaging and procurement issues relevant to establishing the project's 'go-to-market' procurement strategy. Stage 2 involved 26 participants from substantially the same sectors as Stage 1.

5.2. Market sounding key themes

Key themes from the market sounding processes relevant to establishing the overarching procurement strategy outlined in this Appendix included:

- There is strong domestic and international market interest in the project and broad support for the packaging and procurement strategy. A clear majority of participants stated that the size of the Tunnel and Stations and the PPP delivery model is attractive and acceptable from a market capacity perspective. There was market interest in all works packages.
- Participants indicated the market currently has a growing capacity for larger assets, with a large volume of competitive debt (*) and equity available. There was also support for State capital contributions for the Tunnel and Stations PPP.
- The key project risks were seen to be the rail franchisee / existing network interface risk (particularly during the commissioning stage), ground conditions risk, the need to manage the works in the CBD (including the interface with local businesses) and industrial relations risk. All of these risks were considered manageable provided appropriate commercial arrangements between the State, rail franchisee and the relevant contractors can be established (as applicable).
- All participants indicated a preference for the Tunnel and Stations PPP to be quarantined from the live rail environment at the portals, indicating clear market support for separate delivery of the portal works. Most civil contractors indicated that it would make sense for the eastern and western portal works to be packaged together given the works are of a similar nature.
- The majority of participants supported delivering the rail systems separately to the Tunnel and Stations package, primarily due to the associated brownfield risks and the limited number of signalling providers with knowledge of Melbourne's rail network.
- Most participants suggested that early establishment of the Rail Systems Alliance could assist in managing the interface between this package and the Tunnel and Stations PPP.

5.3. Additional market interactions

For completeness, it is noted that a structured process of further market testing of the recommended packaging and procurement strategy will be undertaken progressively as part of the detailed pre-procurement planning activities.

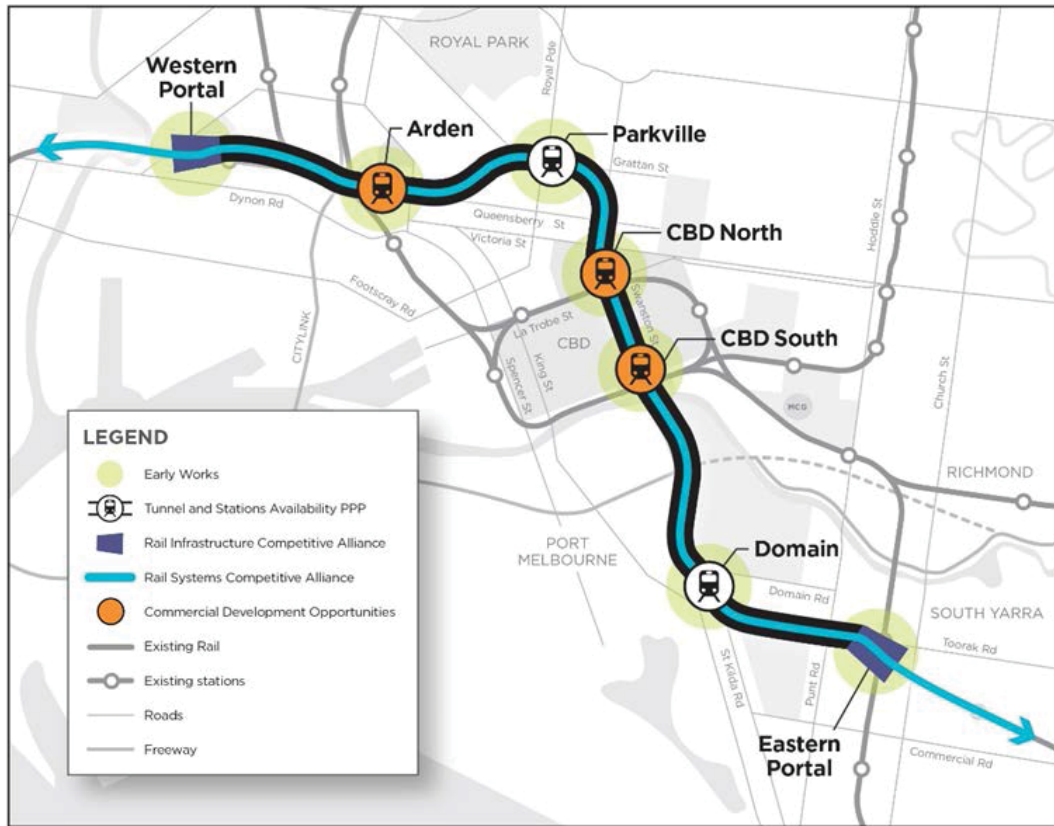
6. Step 5: Business Case recommendation

The analysis above indicates that:

- An availability PPP is the optimal procurement strategy for the Tunnel and Stations package and that there is market capacity and appetite for delivery of these works under this structure.
- A range of project works should be packaged and procured separately to the Tunnel and Stations package.

The Figure 2 shows a project procurement strategy alignment map outlining the relevant works packages and associated delivery models.

Figure 2 - Procurement strategy alignment map



- Early Works**
- Utility services relocation / protection (Managing Contractor)
 - Other site preparatory works (Managing Contractor)
 - Tram diversion works (Franchisee Works)
 - Construction power (Utility Service Provider)

- Tunnel and Stations (Availability PPP)**
- 9km tunnel
 - Five underground stations, including fit-out
 - Mechanical and electrical systems
 - Rail systems installation within the tunnel and stations
 - Station operations and maintenance
 - Tunnel maintenance
 - Over site developments at CBD South and CBD North

- Rail Infrastructure (Alliance)**
- Track decline and tunnel cut and cover structures at the Eastern and Western portals
 - Reconfiguration and realignment of existing tracks
 - Modification of existing rail infrastructure e.g. signalling, overhead traction power

- Rail Systems (Alliance)**
- High capacity signalling
 - Conventional signalling upgrade
 - Information and communication technologies
 - Overhead traction power
 - Train control

- Wider Network Enhancements (not depicted)**
- Works which are required across the wider existing rail network, including turnbacks and signalling system upgrades
 - Packaging and delivery model to be determined

Further work will be undertaken as part of detailed pre-procurement planning activities for the project to determine the precise scope delineation between works packages, including developing strategies to mitigate interface risks. This work will also consider the outcomes of the further market interactions noted above.