Public Private Partnership Programme

The Public Sector Comparator and Quantitative Assessment

A Guide for Public Sector Entities

September 2015
1 About this Guidance

How to use this guidance

1.1 This guidance has been written by the Treasury PPP Team. It must be read in conjunction with other Public Private Partnership (PPP) guidance and applied in consultation with the Treasury PPP Team. It assumes that the Treasury’s Standard Form PPP Project Agreement will form the basis of the contract to be signed with the private sector partner.¹

1.2 This document should be read by public sector entities (referred to as procuring entities throughout this guidance document) that are considering or implementing PPP as a procurement option for a major infrastructure project; specifically, those staff involved in the development and internal approval of the project business case and procurement process.

1.3 A glossary of terms used throughout this document is available on the Treasury website.²

The New Zealand PPP model

1.4 In the New Zealand context, a PPP is a long-term contract for the delivery of a service, where provision of the service requires the construction of a new asset, or enhancement of an existing asset, that is financed from external (private) sources on a non-recourse basis, and full legal ownership of the asset is retained by the Crown.

1.5 PPP procurement has been implemented in New Zealand for the primary purpose of improving the focus on, and delivery of, required service outcomes from major infrastructure assets. Whole of life services are purchased under a single long-term contract with payments to the contractor based on availability and performance of the asset. The combination of assets and services required to be delivered by the private sector are referred to in this document as the ‘project’.

1.6 The PPP model seeks to improve outcomes by capturing best practice and innovation from the private sector. Lessons learnt from PPP projects can be implemented across a broader portfolio of public assets to significantly leverage the benefits of single PPP transactions. The competitive procurement process, focus on outcomes (with minimal input specifications and constraints), appropriate risk allocation and performance based payment mechanisms that put private sector capital at risk optimise the incentives and flexibility for private sector participants to deliver innovative and effective solutions.

1.7 PPP procurement is only used where it offers value for money over the life of the project, relative to conventional procurement methods. This means achieving better outcomes from a project than if it were procured using conventional methods, for the same, or lower, net present cost.

Questions and further information

1.8 General enquiries about the information contained in this guidance can be sent to ppp@treasury.govt.nz. Other guidance documents and useful information can be found at www.treasury.govt.nz/statesector/ppp.

2 Introduction

2.1 This document provides guidance on developing the Public Sector Comparator (PSC) and undertaking quantitative value for money assessment for a PPP project. It is structured in two parts:

- **Part one** contains an explanation of the PSC and guidance for how to assess the value for money of delivering a project as a PPP compared with conventional public sector delivery.

- **Part two** contains more detailed guidance for agencies and their advisors, including how to develop the PSC and Proxy Bid Model.

2.2 This guidance document is intended to provide an overview of the PSC development process. It is expected that procuring agencies will recruit specialist staff and advisors, and engage with the Treasury PPP Team, when applying the guidance.

Core Definitions

2.3 There are three core terms used in this guidance: the Public Sector Comparator (PSC), the affordability threshold and the Proxy Bid Model (PBM).

Public Sector Comparator

2.4 The PSC is an estimate of the risk adjusted whole of life cost of a project if it were to be delivered by the procuring entity using conventional procurement methods. It is primarily used as a benchmark against which to assess the net present cost of procuring the project as a PPP. The PSC is comprised of the capital, operating and risk management costs of the procuring entity’s reference project and a tax adjustment to enable fair comparison with private sector PPP proposals.

2.5 The PSC should be a realistic estimate of the costs incurred by the procuring entity if it were to deliver the project using conventional public sector delivery methods. These costs should enable the procuring entity to deliver the same scope and quality of service outcomes that are required of the contractor under the PPP contract over the same time period. It should take account of the risk allocation between the procuring entity and the private sector consortium contracted to deliver the project as reflected in the commercial principles developed for the project and included in the PPP contract.

2.6 It is important to note that the PSC may not represent the full costs of the project because it is intended to match the scope of the proposed PPP contract. For example, the PSC for a PPP to design, build, finance and maintain a set of schools would not include salary costs for teachers because the PPP contractor is not responsible for teaching services. Procuring agencies should develop whole of life cost estimates for retained costs to inform investment decisions and budgeting. However, for the purposes of this guidance the term PSC refers only to the costs for those services that are within the scope of the proposed PPP contract, unless otherwise specified.
Reference Project

2.7 The reference project is the whole of life asset and service delivery solution that would be procured using conventional methods if the project was not procured as a PPP. It is primarily used as an input to the PSC and PBM. The reference project should be designed and its costs estimated such that it is capable of achieving the same outcomes and performance requirements that are expected of the private sector under the PPP contract.

Affordability Threshold

2.8 The affordability threshold is disclosed to parties participating in a procurement process for a PPP project (the respondents) as the maximum 'price' that the procuring entity is prepared to pay a contractor for delivery of the project. It is expressed as a single point estimate net present cost. Any proposal with a net present cost in excess of the affordability threshold will be considered non-compliant.

2.9 The affordability threshold should be equal to the PSC less any additional costs that the procuring entity will incur over the life of the contract as a result of procuring the project as a PPP. This may include additional transaction and contract management costs over and above the costs borne through conventional procurement. Accordingly, the net present cost of the PPP project will be no more than the cost of the project if it were procured using conventional procurement methods.

Proxy Bid Model

2.10 The Proxy Bid Model (PBM) calculates the estimated periodic service charge (the unitary charge) that a contractor would require to finance and deliver the project to the level of performance specified in the PPP contract. The procuring entity does not begin paying the unitary charge until the asset is operational and the contractor is delivering the required services.

2.11 The PBM is comprised of the risk adjusted reference project costs with additional private sector financing, tax and PPP specific cost assumptions. It uses the same underlying capital, operating, risk management and tax assumptions as the PSC.

Link with Better Business Cases Guidelines

2.12 The PSC is an important analytical tool for considering the appropriateness of procuring a project as a PPP. It is important for agencies to consider this guidance document carefully during the development of a business case where PPP procurement is one of the procurement options being considered.

2.13 Depending on the type of project being considered it may be appropriate to develop an initial PSC as part of the Indicative Business Case. However, in most instances, the PSC should be fully developed as part of the development of the Detailed Business Case. Procuring entities should contact the Treasury PPP Team for specific advice for their project.

2.14 Guidance on applying the Better Business Cases framework is available on the Treasury website.3 Specific guidance on how to consider PPP procurement in the context of the Better Business Cases framework is included in other Treasury PPP guidance.4

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3 http://www.treasury.govt.nz/statesector/investmentmanagement/plan/bbc
Part One:

The PSC and its Application
3 Overview of the Public Sector Comparator

Introduction

3.1 The PSC is based on the procuring entity delivering the same scope of service and accepting the same risks as those allocated to the private sector under the PPP contract. The PSC comprises the capital and operating costs for a reference project, transferred risk and a tax adjustment. Figure 1 illustrates how the series of cash flows for the PSC are presented as a net present cost.

3.2 The PSC is used in setting the affordability threshold for PPP procurement, which sets the maximum price the procuring entity will pay for the project and directly influences decisions made by respondents in preparing their proposals. Therefore, inputs to the PSC must be robustly estimated.

Figure 1: Components of the PSC

Purpose of the PSC

3.3 The PSC is one of the tools used to assess the appropriateness of procuring the project as a PPP and is an important benchmark and evaluation tool used during the PPP procurement process. Additionally, having a detailed understanding of the cost for different scope and risk items will enable the procuring entity to make informed judgements about any trade-offs that may be required during contract negotiations.
The Reference Project

3.4 Defining the reference project is a critical first step in developing the PSC. The reference project should reflect the most likely and efficient form of conventional procurement and service delivery that the procuring entity would use to deliver its whole of life solution for the project.

3.5 The procuring entity should first determine the outcomes and performance specifications it requires from the project. The reference project should be designed and its costs estimated such that it is capable of achieving the same outcomes and performance requirements that are expected of the private sector under the PPP contract.

3.6 Developing credible cost estimates for the reference project will usually require the procuring entity to invest in a level of design documentation, although this may not be required for projects where alternative methodologies can provide an equivalent level of robustness (for example, detailed unit cost benchmarks).

3.7 The reference project should:

- Reflect a best practice conventional procurement and service delivery approach.
- Deliver the same level and quality of service that will be required from the contractor and include all capital and operating costs associated with designing, building and operating /maintaining the asset or facilities.
- Recognise the need to coordinate design, construction, operations and maintenance to optimise whole of life costs.

Transferred Risk

3.8 Examples of transferred risks that the contractor will typically be expected to manage under a PPP include the risk of not completing the construction of the asset within the cost estimate or the required timeframes, or not achieving the required operational performance.

3.9 Respondents will price their proposals taking into account their assessment of the financial impact of the risks they are required to bear under the PPP contract. Given that many of the risks to be transferred to the contractor under the PPP will be borne by the procuring entity in the reference project, the value of transferred risks must be included in the PSC to ensure a fair comparison with respondents’ proposals.

Tax Adjustment

3.10 The tax adjustment is designed to remove net competitive advantages that accrue to the procuring entity by virtue of its public ownership and its exemption from paying income tax. This allows a fair and equitable assessment between the PSC and proposals received for the project.

Presentation of the PSC

3.11 Robust input data and processing of that data in accordance with this guidance should produce forecast cash flows and a net present cost that represents the PSC. The forecasts should be prepared on a monthly or quarterly basis, depending on the phase of the contract life cycle. For example, monthly forecasting might be appropriate during the construction and contract start up phases. Quarterly forecasting might be appropriate for the operating term of the contract. The periods chosen should align with the periodicity of the PBM.
Process

3.12 PPP procurement is a relatively long process. In this regard the PSC is not a ‘one-time’ calculation and will need to be monitored during the procurement process and updated at appropriate milestones if inputs change. Typical milestones include:

- **Business case**: as part of the assessment of whether the project can be procured as a PPP and deliver value for money.

- **Issue of the Request for Proposals (RFP)**: the PSC should be reviewed and, if required, updated to assist in setting the affordability threshold to be included in the RFP.

- **During the proposal preparation**: The PSC and the affordability threshold should not be changed once the RFP has been issued to respondents. However, there may be rare situations where new information comes to light during the proposal preparation process that is material to the cost assumptions in the PSC. In these circumstances it would be appropriate to update the PSC to reflect the new information and issue a revised affordability threshold to respondents. If an update is necessary then it should be communicated to respondents in a timely manner.

Timing and Economic Assumptions

3.13 The PSC should estimate the cash outflows associated with constructing and operating the asset over a time period that matches the proposed PPP contract. The key timing and economic assumptions will include:

- Discount date
- Operating period
- Operating costs
- Operating cost escalation
- Operational commencement
- Construction period
- Construction costs
- Construction escalation
- Labour cost escalation
- Operational commissioning period

3.14 Guidance on the discount rate to be used is included in Section 8. The timing of cash flows should reflect the estimated timing of when payments are made (not accrued) and discounting conventions should reflect the timing of cash flows within each period (for example, end of period or mid period).

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5 For example, where additional geotechnical investigations being undertaken for, or by, respondents as part of their due diligence reveals new information that would materially impact on construction costs for the reference project.

6 The default discount date will be the anticipated date of Financial Close.
4 Quantitative Assessment

Introduction

4.1 PPP procurement is only used where it offers value for money over the life of the project, relative to conventional procurement methods. For the New Zealand PPP model, this means maximising the service benefits and outcomes of an investment at \textit{no greater cost than if it were delivered using conventional procurement and service delivery methods.}

4.2 Quantitative assessment involves comparing the net present whole of life cost of a PPP procurement option against the PSC. The assessment is made during the following stages of a PPP project:

- During the development of the business case by comparing the net present cost of the PSC against the net present cost of the unitary charge calculated by the PBM. Confidence that any gap between the PBM and PSC can be offset by the private sector delivering efficiencies in underlying capital, operating and risk management costs is a prerequisite to a project being procured as a PPP.

- When proposals are received from respondents in a PPP procurement process by comparing the affordability threshold to the net present cost of respondents’ proposed unitary charge payments.

- As a condition to reaching Financial Close by comparing the net present cost of the final unitary charge to be contractualised against the maximum transaction limit approved by Cabinet.

4.3 The quantitative assessment is only part of the analysis needed to determine whether a project should be delivered conventionally or through a PPP. A qualitative assessment should also be undertaken to consider:

- \textbf{Viability}: For example, can the service volume and quality required by the procuring entity be adequately and unambiguously captured in a performance based contract?

- \textbf{Desirability}: For example, will the incentives and risk transfer incorporated in the PPP contract produce benefits for the procuring entity that it could not achieve through conventional procurement?

- \textbf{Achievability}: For example, does the private sector have the capacity and capability to deliver the project?

4.4 Further guidance regarding qualitative analysis of PPP procurement is contained in other guidance published by the Treasury PPP Team.\textsuperscript{7}

Procuring Entity’s Internal Costs

4.5 The procuring entity will incur costs procuring the project using its conventional approach and subsequently managing the contract(s) for the design, build and operation/maintenance of the project. Similarly, it will incur costs in undertaking the PPP procurement and managing the PPP contract.

\textsuperscript{7} Refer note 4 above
4.6 If the procuring entity’s internal transaction and contract management costs are forecast to be higher for PPP procurement than conventional procurement then this cost differential must be deducted from the PSC for the purpose of setting the affordability threshold and undertaking the quantitative assessment outlined below. Treating the procuring entity’s internal costs in this way is necessary to ensure that the total cost of the PPP is no more than if the procurement and delivery were undertaken using a conventional approach.

Assessment Framework

4.7 PPP projects incur additional costs over and above the costs of conventionally delivered projects. These additional costs relate to private sector financing and Special Purpose Vehicle (SPV) costs, and the procuring entity’s additional internal costs that are specific to PPP procurement. In order to provide a value for money solution to the procuring entity, the contractor delivering the project through a PPP will need to offset these additional costs through construction, operating, or risk management efficiencies. These efficiencies need to be achieved while delivering the project outcomes to the required standard.

4.8 Figure 2 summarises the framework for assessing value for money. It shows how the maximum net present cost that the Crown would be willing to pay for a PPP project is equal to the PSC less any additional internal transaction and contract management costs. In order to recommend PPP as a procurement option, the procuring entity must have confidence that the private sector can, and will, deliver the minimum efficiencies required to offset the additional internal costs of PPP procurement.

Business case analysis

4.9 Quantitative assessment of a PPP is undertaken by comparing the net present cost of the PSC cash flows against the net present cost of the unitary charge produced by the PBM. For most projects, the net present cost of the PSC cash flows will be less than the net present cost of the unitary charge calculated by the PBM, as the PBM includes private sector financing and SPV administration costs.

Figure 2: Efficiency gains required
4.10 It is difficult to estimate what level of efficiencies the private sector could achieve for a given project before receiving proposals from respondents. However, using subject matter experts, it is possible to assess whether the private sector can produce the minimum efficiency gains required for PPP procurement to deliver value for money. Confidence that the private sector can deliver these efficiencies is a prerequisite for recommending that a project should be procured as a PPP.

Approvals

4.11 The recommendation to procure a project as a PPP, together with the net present cost of the PSC, needs to be formally approved by Cabinet. The recommendation will be taken to Cabinet by the relevant responsible Minister for the procuring entity and the Minister of Finance.

Internal approvals

4.12 The framework and process for internally approving the PSC may differ between procuring entities. However, it is common for the project governance group, key business lines and the Chief Executive to all have a role in reviewing and approving the PSC internally.

Cabinet approvals

4.13 PPP projects are typically large and complex projects that create long-term fiscal liabilities for the Government. Therefore, Cabinet has specific approval rights over the project.

4.14 Procuring entities must seek Cabinet approval of the recommendation to procure the project as a PPP, together with the PSC. As part of this approval, Cabinet must also approve a maximum transaction limit, which is the PSC less the net present cost of any additional procuring entity costs specific to PPP procurement. Cabinet must also approve any change in the maximum transaction limit after the business case has been approved.

4.15 When approving the business case recommending PPP procurement for the project, Cabinet may delegate authority to make adjustments to the PSC to joint Ministers (the relevant responsible Minister for the procuring entity and the Minister of Finance).

4.16 The discount rate used to value the PSC may change over the course of a project (see Section 6). Therefore, the net present cost of the PSC can change without any of the underlying nominal costs changing. Discount rate driven changes in the value of the PSC do not need prior approval from Ministers provided that:

- Treasury is consulted and agrees with changes to the discount rate.
- There are no changes in the underlying nominal costs of the PSC.
- A PPP procurement is still demonstrated to be value for money in accordance with the guidance above.

4.17 Given the potential for the present value of the PSC to vary solely due to changes in the discount rate, all references to net present cost in approval documents should also state the discount rate used to two decimal places (e.g., $100 million net present cost using a nominal discount rate of 8.25 percent).
Setting the Affordability Threshold

4.18 The affordability threshold is the maximum price that the procuring entity is prepared to pay for the project. It is equal to the PSC less any PPP-specific costs the procuring entity will incur over the life of the project. The net present cost of respondents’ proposals must not be greater than the affordability threshold or the proposal will be considered non-compliant.

4.19 A robust development process should produce a PSC that the procuring entity can be confident it could deliver the project within using conventional procurement and delivery methods. Following the quantitative assessment outlined above, the procuring entity should also be confident that the private sector could overcome any additional costs incurred as a result of procuring the project as a PPP and be able to deliver the outcomes required from the project within the affordability threshold.

Financial Close

4.20 The final quantitative assessment occurs immediately prior to Financial Close. Authority to bring the project to Financial Close is vested in a nominated official from the procuring entity.

4.21 One of the conditions that must be met before the nominated official can exercise their authority is that the final unitary charge (incorporating then current interest rates) has a net present cost no greater than the maximum transaction limit that was approved by Cabinet prior to commencing the procurement. Advisors should be available to undertake appropriate analysis and confirm that the condition is met.
Part Two:

Detailed Guidance
5 Risk Quantification

Introduction

5.1 Respondents to a PPP procurement process will price the risks they are expected to bear under the PPP contract. That is, the price of their proposals will include allowances for their estimate of the costs they expect to incur in managing and dealing with risks transferred to them.

5.2 The PSC must include comprehensive and realistic estimates of the financial impact of all quantifiable and material risks that the procuring entity would be exposed to under conventional procurement and delivery methods. This is consistent with the PSC representing the full cost of the procuring entity delivering the proposed scope of work to be included in the PPP contract.

5.3 In addition to specific risk events, the PSC must also take into account the risk that volume or unit cost (rate) inputs used to forecast the total cost of the reference project are materially inaccurate relative to actual outturn costs. The extent of forecasting inaccuracy will vary between projects. For example, it might be possible to forecast prices and quantities for some less complex building projects with a high degree of accuracy. More complex projects, or projects where certain physical parameters are inherently difficult to forecast, such as projects with large earthworks and uncertain ground conditions, may have higher levels of forecasting inaccuracy.

Types of Risk

Systematic and unsystematic risk

5.4 There are two broad categories of risk that need to be considered and accounted for in the PSC and the PBM:

- **Unsystematic risks** (also called unique, specific or diversifiable risks) which are specific events associated with an individual project (e.g., the risk that ground conditions are materially worse than thought).

- **Systematic risks** (also called market risk or non-diversifiable risk) which result from economy-wide events that affect all businesses (e.g., the risk that a general economic downturn renders key sub-contractors insolvent).

5.5 In project risk quantification, unsystematic risks should be quantified in the cash flow projections through quantitative modelling techniques (for example, sensitivity analysis, scenario analysis, simulation modelling, Monte Carlo modelling). Systematic risks are factored into the discount rate and should not be included in the cash flows.

5.6 The remainder of this section discusses how unsystematic risks should be quantified and included in the PSC cash flows. Section 6 discusses how the discount rate for PPP projects should be estimated to incorporate the systematic risks that are transferred to the private sector in a PPP project.

Transferred versus retained risk

5.7 Under a PPP contract, unsystematic risks are transferred to the private sector, retained by the public sector or shared between both. The procuring entity should transfer all
unsystematic risks to the contractor unless a better value for money outcome can be achieved by the procuring entity retaining specific risks. This reflects the principle that each risk should be allocated to the party best able to manage it for the least cost.

5.8 Risk allocation should be based on the scope of services for the PPP, an assessment of the ability of each party to reduce the probability and impact of a risk occurring, and the risk allocation incorporated in the Treasury’s Standard Form PPP Project Agreement.

5.9 Retained risks are those risks that the procuring entity proposes to bear itself under the PPP. Examples of retained risks include law changes with material capital or operating cost impacts applying specifically to the project and the risk of obtaining a designation for the project under the Resource Management Act 1991.

5.10 The procuring entity should identify and quantify all material retained and transferred risks. However, only transferred risks should be included in the PSC. This is because respondents to the RFP will only price the risks that have been transferred to them, so in order for the PSC to act as a comparable benchmark it must exclude retained risks. Estimates of retained risks will be useful for internal project budgeting and for adjusting the PSC if a decision is made during the procurement process to transfer additional risks to the PPP contractor.

### Identifying Risks

5.11 Initially risks should be identified through consideration of precedent projects and in consultation with the Treasury PPP Team. The list of initial risks should be refined by subject matter experts, typically through a workshop process attended by relevant procuring entity staff, advisors and a representative from the Treasury PPP Team. The output of the workshop is a PSC risk register that should contain as a minimum:

- A description of each risk.
- The timeframe over which the risk may eventuate and whether it is a ‘one off’ or recurring risk.
- The likelihood of the risk occurring (expressed as a probability percentage).
- The cost if the risk does occur and whether it is a ‘one off’ or recurring cost.
- The basis on which the cost impacts have been established.
- How each risk will be allocated under the PPP contract (retained, transferred or shared).

5.12 The workshop process to identify risks requires careful management to ensure that all relevant risks are identified and described. The workshop will need to be guided to ensure:

- It focuses on identifying and quantifying risks to the reference project assuming conventional procurement and delivery methods (risk management benefits available to a PPP contractor and not the procuring entity should not be included).
- The risk register excludes systematic risks, which are accounted for through the specification of the discount rate.
- Expert, but subjective, judgements of probability and impact do not suffer from ‘optimism bias’.
• Care is taken to not 'double count' risks that may already be captured in contingencies within the underlying cost estimates (it is preferable for these contingencies to be removed and the risks that they are intending to cover be modelled specifically).

5.13 Appendix A contains high level guidance on the categories of risks that would typically be included in a risk register for a design, build, finance and maintain PPP (which excludes core operations from scope) and the allocation of risks between the procuring entity and the contractor.

Quantifying Risks

Cost impact of individual risks

5.14 The value of transferred risk should reflect the current level of knowledge about the project and the cost of potential future events occurring during the term of the PPP contract. The probability and cost impact of a risk occurring will depend significantly on the nature of the project. Probabilities and costs for some risks might be lower where the reference project has been specified to a higher degree.

5.15 The cost impact assessment must be completed from the procuring entity's perspective. Only those risks that would have a cost impact on the procuring entity under conventional procurement and delivery methods (if they were to occur) should be included. Likewise, the cost impacts should reflect the likely costs that the procuring agency would incur to manage the risk.

5.16 Events that are considered uninsurable (for example, an act of terrorism or certain force majeure events) are generally excluded from the analysis as they are almost always retained risks and are also either unquantifiable or have a very low probability of occurrence and therefore will not have any material impact on modelled outcomes.

5.17 Risks that do have a cost impact should be expressed as a distribution. A common distribution for quantifying risks is a symmetrical triangular distribution which requires workshop participants to estimate the minimum, most likely and maximum cost impact of the risk if it were to occur. For example:

• The minimum impact may represent a 10% probability that the cost will be less than or equal to this amount.
• The most likely impact may represent a 50% probability that the cost will be less than or equal to this amount.
• The maximum impact may represent a 90% probability that the cost will be less than or equal to this amount.

5.18 The distribution of cost impact for some risks may have a different 'skew'. These should be identified and justified during the risk workshops and the probability estimates adjusted accordingly.

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Price (rate) and quantity forecasting

5.19 Forecasting the cost of constructing and operating the reference project will require assumptions about the quantity and price of materials and inputs. These quantities and prices will inevitably be subject to inaccuracies when compared with final outturn costs, with the level of inaccuracy varying depending on the nature of the project and the quality of the forecasting.

5.20 Where there is a relatively high level of uncertainty, prices and quantities should be expressed as a range. This might be expressed as an uncertainty range around a point estimate. For example, $x +/- 10%. This approach enables price and quantity uncertainties to be modelled and expressed as a distribution and combined with the cost impact distribution of the specific risks identified in the risk workshop.

Risk modelling

5.21 The approach of identifying cost impacts at different levels of probability means there will not be a single estimate of the total risk attributable to the project. The likelihood and cost impact estimates in the risk register should be used as inputs to a risk model that simulates potential outcomes. The application of Monte-Carlo simulation, for example, will generate numerous potential outcome values, which will allow the risks to be expressed as a distribution. The following matters should be considered when constructing the risk curves:

- The distribution for each risk.
- The relationship or correlation between individual risks or categories of risks (including any diversification benefits).
- Whether potential cost impacts are expressed in nominal or real terms.
- How the outputs will interface with the PSC and PBM models.
- Diversification impacts on the total risk value.

5.22 Adding the risk distribution into the PSC will convert the PSC into a probability distribution. For example, the PSC at the P60 level can be interpreted as a 60 percent probability that actual costs would be less than or equal to the P60 number. The same approach can also be used to express the PBM as a probability distribution (Figure 3). Expressing both the PSC and PBM as distributions rather than as point estimates provides further information about the potential impact of risks on the total cost of the project and the level of efficiencies the private sector will need to generate in order to at least match the PSC and provide value for money.
5.23 Risk modelling results must be reviewed for reasonableness. This might involve:

- Comparing the initial views on risk occurrence and impact with the modelled cash flow impact on the PSC.
- Testing model outcomes using different distributions to ensure that the profile is consistent with expectations.
- Comparing the percentage increase in the net present cost of various components of the reference project as a result of the risk quantification exercise against comparable precedent projects.

5.24 Ultimately, a single point on the distribution curve must be chosen in order to determine a single point estimate of the PSC. Selecting a point estimate requires an assessment of, among other things, the level of risk that the procuring entity is prepared to take that the PSC is above (or below) what the actual outturn cost would be if the project was procured using conventional methods. The expectation is that the forecasted costs will always be the result of a robust analytical process and that, all other things being equal, point estimates should be within the P50 to P75 range.

5.25 Selecting a point estimate with a higher P-value will provide greater certainty that the actual outturn cost would be less than or equal to the PSC. However, given that the New Zealand PPP model encourages respondents to the RFP to maximise the quality of outcomes within the affordability threshold (based on the PSC), selecting a higher P-value upon which to base the point estimate of the PSC will mean that the cost of the project to the procuring entity is likely to be higher (but also that the quality of outcomes should increase accordingly). Selecting a point estimate with a lower P-value will reduce the costs to the procuring entity, but increase the risk that the affordability threshold will be set too low for respondents to deliver the desired outcomes.
5.26 Consideration should also be given to the shape (standard deviation) of the PSC distribution. Cost in a ‘wide’ distribution will be more sensitive to changes in the P-value than cost in a ‘narrow’ distribution. Figure 4 illustrates that the net present cost at P50 is the same regardless of the shape of the distribution but that the net present cost of the P75 point estimate is lower in a narrow distribution than in a wide distribution.

Figure 4: Net present cost sensitivity to changes in probability (P-value)

5.27 Factors that influence the shape of the distribution include the level of inaccuracy assumed in the procuring entity’s price and quantity forecasts (with greater inaccuracies widening the distribution) and the level of knowledge about the treatment for specific risks. Procuring entities can reduce the variability of forecast point estimates by developing the design detail of the reference project, thereby increasing the accuracy of price and quantity forecasts, and treatments for specific risks.
6 Proxy Bid Model

Introduction

6.1 The PBM represents the cost of the risk adjusted reference project with the addition of private sector financing, tax and PPP specific costs. The PBM calculates the estimated periodic amount (the unitary charge) that a contractor would require as payment for delivering all of the services and providing the financing required for the project.

Figure 5: Components of the Proxy Bid Model

6.2 As a result of additional private sector costs, the net present cost of the PBM will be higher than the PSC. This difference between the PSC and the PBM provides an indication of the efficiencies that the contractor would have to find in order to deliver the project at a net present cost equal to or less than the PSC. The contractor will also need to find further additional efficiencies to in order to offset the procuring entity’s additional internal PPP procurement costs in order to deliver the project within the affordability threshold (refer Figure 2).

6.3 The key outputs from the PBM are:

- The periodic unitary charge over the term of the PPP project agreement.
- The present value of the unitary charge in order to undertake the quantitative assessment described in Section 4.

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9 For example, SPV administration costs and the costs of developing proposals.
• Information needed to model the impact of the PPP on the procuring agency’s financial statements and funding requirements. The PBM can be ‘solved’ such that its net present cost equals that of the PSC. The unitary charge of the ‘solved’ PBM can be used to provide guidance to the procuring entity on the potential annual costs of the PPP that it will have to fund.

Methodology

6.4 The PBM takes all of the input costs from the PSC, including capital and operating costs and quantified risks, and uses current financial market interest rates, observable interest margins, equity returns and gearing levels to derive an appropriate financing structure for the project.

6.5 The critical inputs in the PBM not included in the PSC are the financing assumptions. The PBM is typically modelled assuming funding is provided on a non-recourse basis to a SPV.¹⁰

6.6 The PBM should be developed in line with the following steps:

• Project operating revenues (if any), operating expenses and capital expenditure are used to generate operating cash flows for the project.

• PPP specific costs such as SPV administration costs are added to the PSC costs.

• Debt, equity and taxation cash flows that broadly reflect current market conditions are added to the operating cash flows.

• The unitary charge is calculated to meet all of the costs of the project, including taxation and the required return on, and return of, debt and equity capital.

Cost, Timing and Economic Assumptions

6.7 The PBM uses the same cost, timing and economic inputs as used in the PSC. That is, the same base capital and operating costs, risk adjustments and escalation profiles apply to the PBM as to the PSC.

Forecasting periods

6.8 Monthly forecasting will generally be appropriate during the construction period. The period convention during the operating term of the contract will be determined by a number of factors but primarily the financing structure, particularly the debt facilities, and the anticipated frequency of unitary charge payments. For example, if the interest rate for one or more of the contractor’s debt facilities is referenced to the 90 day bank bill rate then modelling will be required on a quarterly basis (strictly 90 day periods) to provide accurate calculations of interest rate costs.

¹⁰ The SPV will most likely be a limited liability company or limited partnership. In a typical structure the SPV will contract with a construction sub-contractor to build the asset and an operator to operate and maintain the asset. It will borrow in its own right to pay the construction sub-contractor for building the asset. The debt and equity funding will be advanced to the SPV by investors on the strength of the payments that the SPV will expect to receive under its contract with the procuring entity.
Financing Assumptions

6.9 Overall structural assumptions need to be made for the financing approach adopted in the PBM. For example:

- Financing cash flows during the construction period: A reasonable assumption, consistent with recent PPP projects, is that the cash outflows during construction are financed firstly with debt, with equity to be contributed after all debt is drawn down. However, equity is committed from commencement of the PPP contract with consequential fees being paid to the equity providers.

- Construction debt interest: Capitalised through to the end of construction when it is incorporated into a term debt facility.

- The term facility refinancing: Refinanced with a bullet repayment that pays down the balance of the outstanding debt with a new term facility on nominated refinancing dates.

6.10 The Treasury PPP Team maintains a record of financing terms observed in all PPP procurement processes to date and should be consulted on appropriate assumptions to be applied to individual projects.

Gearing levels

6.11 PPP projects are typically highly geared. A high level of debt in the financing structure for a PPP will be cost effective (the return on debt is lower than the return on equity). A debt to equity ratio of 85:15 would not be unusual for a PPP.

6.12 The maximum level of debt will be a function of debt sizing criteria agreed between the contractor and its lenders. Debt sizing criteria will typically include a maximum gearing ratio (debt as a percentage of debt plus equity) and a maximum Debt Service Coverage Ratio (DSCR). The DSCR is the ratio of cash available for debt servicing to debt service costs, inclusive of interest and fees. The maximum gearing ratio and DSCR constrain debt to a level that can be serviced with an acceptable cash flow buffer.

Debt tenor

6.13 The debt facility during construction will typically be in place for the entire construction period and will convert into a term facility at, or near, the end of construction (it may include the lock in period). Re-financing of the term facility will occur periodically where the tenor of the underlying debt is shorter than the contract term.

6.14 The available tenor of debt facilities in New Zealand is relatively short by international standards. This means that multiple re-financings of the term debt might be required.

6.15 The debt tenor is important because fees will be charged at each refinancing. These fees need to be accounted for in the unitary charge calculation, as the unitary charge needs to provide sufficient cash to cover fees as well as interest payments and principal repayments.

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11 Equity investors are restricted from selling their equity stake in the project during the lock-in period, typically ending 12 months following Service Commencement.
The cost of debt financing

The cost of debt can be specified according to the following formula:

\[ R_d = b + m + f \]

Where:

- \( b \) = base interest rates.
- \( m \) = interest rate margin.
- \( f \) = debt issuance costs and other financing fees.

Base interest rates

6.16 The default approach to debt financing expected in all PPP projects is:

- The contractor will be required to provide the procuring entity with a fixed base interest rate for the duration of the construction period and the lock-in period (initial hedge period).
- After the initial hedge period, the contractor will not be required to provide a fixed interest rate unless it can do so for the entire term of the senior debt (noting that debt is typically fully repaid before the expiry of the PPP contract). In the absence of the private sector providing a long-term fixed interest rate solution, the contractor will be paid on the basis of floating interest rates (typically the 90 day bank bill rate). Hedging requirements for the term of the contract after the end of the lock-in period will be subject to separate arrangements between the Treasury and the procuring entity and will not involve the contractor.

6.17 The base interest rates to apply will be:

- A base swap rate matching the duration of the initial hedge period.
- The base interest rate forecast to apply after the initial hedge period will be provided by the Treasury PPP Team. These forecasts may change over the course of a PPP procurement process in response to changes in market conditions, including leading up to Financial Close.

Interest rate margins

6.18 Interest rate margins (credit margin over the base interest rates) can be estimated by reference to margins applied in recent PPP projects and taking into account current market conditions. The margins should be assumed to reduce following completion of construction, to reflect a reduction in exposure to design and construction related risks.

Financing Fees

6.19 Fees will be payable in relation to equity and debt finance. Consistent with recent market trends, the following types of financing fees should be included in the calculation of the unitary charge:

- Arrangement fees paid at Financial Close, expressed as a percentage of the total debt facility size.
Commitment fees, which are a percentage to be paid quarterly on undrawn debt facility balances. The fee rate will be expressed annually but paid quarterly.

Refinance fees, which are assumed to be ‘one off’ fees paid after the committed facility matures at each refinancing event.

Repayment profile

6.20 The term facility debt can be amortised using a credit foncier repayment profile ‘sculpted’ to take into account the project’s DSCR requirements. This method of amortisation provides flexibility around repayments so they can vary in accordance with lumpy expenditure such as lifecycle maintenance expenditure. The sculpted debt approach is common to projects of this nature.

6.21 Depending on the nature of the project, it may be appropriate to incorporate a Debt Service Reserve Account (DSRA). This will typically hold a balance equivalent to a number of months of future debt service obligations. The initial balance of the DSRA would be funded through the construction facility.

6.22 The alternative is to establish a debt service reserve facility. This will incur fees, similar to the other debt facilities incorporated into the capital structure, as opposed to interest costs associated with establishing a funded DSRA.

Target equity return

6.23 The target post-tax equity IRR underpins the calculated level of the unitary charge. The PBM calculates a unitary charge that provides sufficient cash to meet the post-tax equity IRR after operating costs, debt service costs and any SPV taxation. The target post-tax equity IRR should be set taking into account general market conditions, by reference to appropriate evidence of investor returns and in consultation with the Treasury PPP Team.

Taxation Calculations

6.24 If the SPV is a limited liability company then it will pay tax on assessable income. If the SPV is a limited liability partnership then assessable income will be taxed in the hands of the SPV investors. The unitary charge needs to deliver sufficient cash to cover the tax costs, whether they are incurred at the SPV or investor level.

6.25 A tax calculation will be required as part of the unitary charge calculations. A tax calculation will also be required to produce the tax adjustment discussed in Section 7.

6.26 The tax calculations should take into account the contractual structure incorporated into the Treasury Standard Form PPP Project Agreement and be consistent with the IRD’s Public Rulings on the PPP contractual framework and any subsequent future rulings.12

Goods and Services Tax

6.27 The inputs to the PBM should be exclusive of Goods and Services Tax (GST). This will produce a unitary charge exclusive of GST.

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6.28 GST cash flow timings may have a working capital impact. RFP respondents will model GST flows and incorporate the financing cost of any timing issues into the unitary charge. However, the impact on the unitary charge is unlikely to be material so GST modelling will not usually be undertaken for the PBM.

**Unitary Charge Profile**

**Indexation**

6.29 The unitary charge can be modelled on the basis it will be escalated in line with forecast escalation of the underlying costs. However, different costs are likely to escalate at different rates which means the escalation rate applied to the unitary charge will need to represent a weighted average of the underlying cost escalation rates.

6.30 Typical indices that escalation rates are derived from are:

- Consumer price index (CPI), to reflect general inflation in operating costs.
- Labour cost index (LCI), to reflect inflation in personnel costs.

6.31 Not all of the unitary charge will be adjusted for cost escalation. A component will be fixed and not escalated. The fixed component will usually represent the proportion of the unitary charge to be applied to servicing the capital used to construct or deliver the project.

6.32 Some financing structures incorporate indexed equity. For example, where a component (or all) of the outstanding equity at the end of each period is indexed to CPI with a consequential impact on the unitary charge.

**Maintenance Reserve Account**

6.33 Operating expenditure will be comprised of both costs that will not change significantly from period to period and costs that will be volatile or ‘lumpy’. Lifecycle maintenance expenditure will typically be the primary cause of significant spikes in the unitary charge.

6.34 The variability in expenditure caused by lifecycle maintenance and other lumpy expenditure can be incorporated unadjusted from the PSC into the unitary charge. This will result in a lumpy unitary charge profile.

6.35 Alternatively, the unitary charge can be smoothed to remove the variability caused by the lumpy expenditure. This is achieved by assuming that the SPV will deposit cash into a designated reserve account over time and draw on this to fund subsequent lumpy lifecycle maintenance expenditure. Senior debt repayments will be sculpted around movements in the reserve account balances.

6.36 There will be a financing cost to the procuring entity of using a reserve account to smooth the impact of lumpy operating expenditure on the unitary charge. In comparison, there will not be any financing cost within the PBM if the lumpy expenditure is passed through to the unitary charge with no smoothing. Therefore smoothing is unlikely to provide value for money and is not recommended unless stability of cash flow is important for the procuring entity.
7 Tax Adjustment

Introduction

7.1 Private sector respondents for a PPP contract will be taxpayers, whereas public sector entities do not usually pay tax. A tax adjustment is included in the PSC to minimise the impact of differences in tax status to ensure a fair comparison between the PSC and private sector PPP proposals.

Impact of Taxation

7.2 The unitary charge will be calculated to provide the PPP contractor with sufficient cash to:

- Pay interest at pre-tax rates.
- Pay any tax incurred by the SPV.
- Make distributions to equity providers that will allow them to pay any tax they incur on those distributions and provide them with their required post-tax return.

7.3 Consequently, the unitary charge will be sufficient to pay all tax on the returns on the capital (debt and equity) provided to finance the construction of the asset and any other investment needed during the contract term, and provide the debt and equity investors with their required post-tax rates of return.\(^\text{13}\)

7.4 In contrast, public entities are generally not taxpayers. Therefore, the PSC cash flows do not include any explicit tax outflow for returns on the capital provided to finance the construction of assets. This difference in tax status is one of the reasons why the PSC cash flows will be different to the cash flows that drive the unitary charge calculation in the PBM.

Rationale for Adjustment

7.5 The difference in tax status between the procuring entity and the private sector participants in a PPP provides the PSC cash flows with a cost advantage compared to the unitary charge. However, the tax status difference is a function of policy and legislation. It is not something that private sector entities can change or influence in the context of pricing a proposal for a PPP contract. Furthermore, because the component of the unitary charge attributable to tax to be paid by the debt and equity investors will eventually be returned to the Crown when the tax is paid, it should not be a factor that influences the choice of procurement.

7.6 Taxes other than income tax on investment returns (for example, tax on construction company profits) are likely to be the same under either a conventional procurement or a PPP so their impacts do not need to be neutralised.

\(^{13}\) It will also provide sufficient cash to pay for the operating costs, lifecycle maintenance and the return of capital to the investors.
Adjustment Process

7.7 The impact of the difference in tax status needs to be neutralised to enable a fair comparison between the PSC and the PBM (and the price of private sector proposals). This could be achieved by calculating the present value of the PSC and the unitary charge using a pre-tax discount rate, reflecting that the PSC cash flows and the unitary charge are, in effect, pre-tax cash flows.

7.8 However, the discount rate used to calculate the present value of the unitary charge and the PSC cash flows is specified, in the first instance, as a post-tax weighted average cost of capital (WACC).

7.9 WACC is specified on a post-tax basis because, among other reasons, some of its key parameters can only be observed on a post-tax basis. Furthermore, it is not appropriate to simply gross-up the post-tax discount rate using the corporate tax rate (28%), as forecast cash tax in each year is unlikely to be 28% of the pre-tax cash flows (because of timing and permanent tax differences) and the forecast period is finite.

7.10 Therefore, the following process needs to be followed to correctly estimate the present value of the tax adjustment:

- Calculate the present value of the PSC cash flows using the post-tax discount rate (post-tax WACC).
- Calculate the tax payable on SPV pre-financing earnings (cash flows available to the providers of debt and equity) in the PBM.
- Calculate the present value of the tax payable (calculated in 2) using the post-tax discount rate.
- Adding the present value of the tax payable (calculated in 3) to the present value of the PSC cash flows (calculated in 1).
8 Discount Rates

Introduction

8.1 The discount rate is used to calculate the present value of the:

- Forecast capital and operating costs (both inclusive of quantified transferred risks) in the PSC.
- Unitary charge in the PBM.
- Tax adjustment to the PSC.
- Unitary charge proposed by respondents.

8.2 The present values are used for a number of purposes and at various times during the procurement process. In particular:

- The present values of the PSC forecast costs and the PBM unitary charge are used as inputs into the assessment of the appropriateness of procuring the asset or service through a PPP.
- The present value of the PSC is used to set the affordability threshold for disclosure in the RFP.
- The present value of each respondent’s proposed unitary charge is used to test that they are less than or equal to the affordability threshold.
- Monitoring the present value of the preferred bidder’s unitary charge during the preferred bidder stage to ensure that the present value of the unitary charge remains below the approved transaction limit leading up to, and at, Financial Close.

8.3 A consistent discount rate specification must be used for all present value calculations to ensure that the analyses, assessments and decisions being made on the basis of the present values are robust and have integrity. The discount rate should reflect the cost of capital for the project, adjusted for the systematic risks that the private sector is expected to bear under the PPP contract.

The Discount Rate Model

8.4 A procuring entity considering investment in an asset to deliver services faces two important decisions:

- **Investment decision**: Whether it is sensible to invest in the asset in the first instance. This will require consideration of, among other things, whether society is better off foregoing current consumption and reallocating resources to investment in the asset. The assessment required for this decision is focused on the relationship between economic benefits and economic costs.

- **Procurement decision**: If the cost benefit analysis concludes that investment is appropriate, the next decision is how to procure the asset and the associated services. In the context of this document the decision is between conventional procurement or PPP procurement.
8.5 The analysis at both of these decision points requires present values of benefits and costs or revenues and expenditure to be calculated using appropriate discount rates. The appropriate discount rate to use for the investment decision should be developed in consultation with the Treasury PPP Team and in accordance with published guidance.14

8.6 The procurement decision can be characterised as the procuring entity determining what delivery approach will provide the best combination of quality of service, management of project risk and cost effectiveness. Value for money is an important component of the procurement decision. The discount rate is used to calculate and compare the present day cost of procuring a project as a PPP and procuring the project using conventional methods.

**Risk adjusted cost of capital**

8.7 A fundamental principle underpinning the calculation of the discount rate for the procurement decision is that it should reflect the marginal cost of capital for the project. That is, a cost of capital that is based on the returns of alternative investment opportunities with similar risk profiles to the project.15

8.8 The rate at which the government can borrow from financial markets (the risk free rate) is not an appropriate discount rate for the procurement decision. The risk free rate reflects that lenders to the government are not exposed to risks relating to the performance of public sector investments and have their rate of return underpinned by the government’s power to tax.

8.9 The risk free rate does not adequately reflect risk that will be borne by investors in a project, regardless of whether it is the procuring entity or the private sector through a PPP. In contrast, respondents to an RFP will be pricing their required rates of return on investment capital to reflect the risk of their investment in the project. Using the risk free rate to discount the PSC would be inconsistent with the true cost of capital for the project and the cost of financing the project as a PPP. Consequently, the quantitative assessment would be biased against procuring a project as a PPP.

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Specification of the Discount Rate

8.10 A single discount rate specification is to be used in all present value calculations. This is to be calculated as a post-tax, nominal WACC using Equation 1. This is a standard specification of the cost of capital used widely in New Zealand.

**Equation 1: Weighted average cost of capital**

\[
WACC = R_d \times (1 - T_c) \times \frac{D}{V} + R_e \times \frac{E}{V}
\]

Where the variables are:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R_d)</td>
<td>The pre-tax cost of debt (comprised of base interest, credit risk margin and other debt issuance costs).</td>
</tr>
<tr>
<td>(T_c)</td>
<td>The prevailing corporate tax rate.</td>
</tr>
<tr>
<td>(D, E \text{ and } V)</td>
<td>The market values of debt and equity respectively. (V) is the sum of (D) and (E). Therefore, (\frac{D}{V}) and (\frac{E}{V}) represent the relative weighting of debt and equity used to finance the project.</td>
</tr>
<tr>
<td>(R_e)</td>
<td>The cost of equity capital and represents the return required by equity investors to compensate them for the variability of the return on their investment (dividends and capital gains). The variability is a function of the:</td>
</tr>
<tr>
<td></td>
<td>o Variability in operating profit before interest.</td>
</tr>
<tr>
<td></td>
<td>o Influence of debt servicing on cash flows. As debt investors take priority over equity investors in terms of receiving compensation out of cash flow, the returns to equity investors are influenced by the level of prior fixed obligations payable to debt investors (ie, financing risk).</td>
</tr>
</tbody>
</table>

8.11 The cost of equity is estimated using the Brennan-Lally specification of the capital asset pricing model (CAPM). This is presented in Equation 2.

**Equation 2: CAPM**

\[
R_e = R_f \times (1 - T_i) + \beta_e \times TAMRP
\]

Where:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R_f)</td>
<td>Risk free rate – the return on a risk free asset.</td>
</tr>
<tr>
<td>(T_i)</td>
<td>Investor tax rate.</td>
</tr>
<tr>
<td>(\beta_e)</td>
<td>Equity beta, which is calculated as:</td>
</tr>
</tbody>
</table>
| | \[
\beta_e = \left(1 + \frac{D}{E}\right) \beta_a
\]
| Where: | \(\beta_a = \) asset beta |
| \(TAMRP\) | Tax adjusted market risk premium. |
8.12 The specification of the WACC model in Equation 1 and the CAPM in Equation 2 is consistent with the specification of the cost of capital used by the Commerce Commission for setting price paths for regulated businesses. It is also used by most private sector companies and corporate finance analysts in New Zealand when evaluating investment projects. It takes account of the specific features of the imputation of dividends in New Zealand. The CAPM specification is also generally consistent with the model used to determine the Treasury’s public sector discount rate.

**Inputs**

8.13 The key discount rate inputs should reflect the nature, risks and structure of the project being evaluated. The individual inputs to the model are presented in Table 1. The values of some of the inputs will vary between projects while others will be consistent between projects but may vary over time. As a consequence the discount rate for each PPP project is likely to be different.

8.14 In line with broader Treasury guidance on developing discount rates for a project, if a cost of capital in its entirety or inputs to the cost of capital calculation can be observed from closely comparable projects then these should be used in the first instance. For PPP projects, cost of capital inputs can be observed in the financial models that respondents provide as part of their proposals. The cost of capital for each proposal is developed under competitive tension (both as between capital providers to different consortia, and as between capital providers and other members of a given consortium) and can be assumed to be efficiently priced. Therefore, previous projects will be an important source of information on cost of capital inputs when deriving the cost of capital for a specific project.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>D/V and E/V</td>
<td>Relative proportions of debt and equity in the capital structure. This is referred to as gearing.</td>
<td>PPP projects are typically highly geared (high levels of debt and relatively low levels of equity) at commencement of the operating period. The actual level of gearing will depend on the nature of the project but an accommodation or roading PPP could have gearing in excess of 80% (but unlikely to be in excess of 90%). PPP projects with significant service components and greater degrees of risk transfer may have gearing lower than 80%.</td>
</tr>
<tr>
<td>( R_d )</td>
<td>The project’s cost of debt.</td>
<td>The total return to the providers of debt capital comprising the interest rate on debt plus debt issuance costs or fees. The cost of debt in the WACC should be consistent with the cost of debt used in the cash flows to derive the unitary charge in the PBM.</td>
</tr>
<tr>
<td>( T_c )</td>
<td>The corporate tax rate.</td>
<td>The prevailing corporate tax rate.</td>
</tr>
<tr>
<td>( R_f )</td>
<td>The risk free rate of interest (long-term government stock yields).</td>
<td>Government stock yields are appropriate indicators of risk free rates. Risk free rates can be derived by observing forward longer term rates from the then current government stock yield curve. For example, the ten year rate that will apply in ten years time.</td>
</tr>
</tbody>
</table>

---

16 Costs charged by the debt providers to establish the debt facility, maintain the commitment of undrawn amounts and refinance the debt.
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_i$</td>
<td>Investor tax rate.</td>
<td>Assumed to be equal to the prevailing corporate tax rate.</td>
</tr>
<tr>
<td>$B_e$</td>
<td>Equity beta = $B_a^* (1 + D/E)$. $B_a$ is the asset beta.</td>
<td>Asset betas reflect the contribution to portfolio risk of an investment, independent of financing (ie, the riskiness of the business itself). It is expected that most assets or services being delivered through PPP procurement are likely to be exposed to relatively low levels of systematic risk and that asset betas for most PPP projects will fall within a similar range. The Treasury PPP Team should be consulted in relation to setting an asset beta for WACC calculations.</td>
</tr>
<tr>
<td>TAMRP</td>
<td>Tax adjusted market risk premium</td>
<td>To be consistent with the prevailing tax adjusted market risk premium used by the Commerce Commission.</td>
</tr>
</tbody>
</table>

**Updates**

8.15 The discount rate for a given PPP project may need to be updated prior to Financial Close. This is to take account of any material changes in underlying base interest rates as advised by the Treasury PPP Team.
Appendix A: Risk Allocation Example

The following table provides example risk allocations between the procuring entity (Crown risk) and the contractor.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Crown Risk</th>
<th>Contractor Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific change in law</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>General change in law</td>
<td>Shared</td>
<td>Shared</td>
</tr>
<tr>
<td>Force majeure events</td>
<td>Shared</td>
<td>Shared</td>
</tr>
<tr>
<td>Uninsurable risks</td>
<td>Shared</td>
<td>Shared</td>
</tr>
<tr>
<td>Insurance costs: construction operation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Financial Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base interest rate movements</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Credit margin and fee increases</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Exchange rate movements</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Site Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unforeseeable contamination</td>
<td>Shared</td>
<td>Shared</td>
</tr>
<tr>
<td>Ground conditions</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archaeological artefacts</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Obtaining a planning designation (under the Resource</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Management Act 1991)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance with designation and obtaining all other</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>regulatory approvals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treaty of Waitangi risks (risk that the land becomes the</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>subject of a claim under the Treaty)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate specification of requirements</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Design Delayed</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Fitness for purpose</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Construction Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inaccurate cost estimates</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Interruption and delay</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Prime contractor financial distress</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Industrial action</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Commissioning (Operational Readiness)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Operational Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost escalation above CPI/LCI</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Costs or capability inadequate to achieve contracted</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>performance levels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td>Crown Risk</td>
<td>Contractor Risk</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Change in specific operating standards, legislation, regulations or specification</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Failure of electricity, water or other utility service:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Downstream</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Utilities costs and volumes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Lifecycle Risks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of asset</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Asset management / facilities maintenance provider financial distress</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Significant and deliberate user damage to facility</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>