



Feasibility Study Guideline

Addendum 2

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Table of Contents

OVERVIEW	5
1. SECTION 1 – NEEDS ANALYSIS	7
1.1. Strategic Objectives.....	7
1.2. Institutional Capacity and Deliverability.....	7
1.2.1. Project Team and Advisors.....	7
1.2.2. Organisational Factors.....	7
1.2.3. Stakeholder Interests.....	8
1.2.4. Budget Availability.....	9
1.3. Output Specifications.....	9
1.4. Scope of the Project.....	9
2. SECTION 2 – OPTIONS ANALYSIS	11
2.1. Option Identification.....	11
2.2. Option Evaluation.....	11
2.3. Recommendation of a Preferred Option.....	13
3. SECTION 3 – PROJECT DUE DILIGENCE	13
3.1. Legal.....	13
3.2. Technical.....	14
3.3. Social and Environmental.....	15
4. SECTION 4 – FINANCIAL FEASIBILITY	15
4.1. The PPP Reference Model.....	15
4.1.1. Refining the PPP Model.....	16
4.1.2. Cost and Revenue Assessment.....	16
4.1.3. Risk Assessment.....	17
4.1.4. Financial Model.....	18
4.2. Establishing Financial Feasibility.....	18
4.3. Sensitivity Analysis.....	19
5. SECTION 5 – AFFORDABILITY	20
5.1. Budget Availability.....	20
5.2. Comparison with PPP Reference Model.....	20
6. SECTION 6 –PRELIMINARY VALUE FOR MONEY	20

6.1. Quantitative Evaluation	20
6.2. Qualitative Evaluation	21
7. SECTION 7 – ECONOMIC VALUATION	22
7.1.1. Assessment of Economic Costs and Benefits	22
7.1.2. Comparison with a “No Project” Scenario	23
7.1.3. Comparison with Next Best Alternative Investment Option	23
7.1.4. Stakeholder Analysis.....	23
7.1.5. Valuation Results and Recommendation	24
8. SECTION 8 – PREFERRED PROCUREMENT MODE	24
9. SECTION 9 – PROCUREMENT PLAN	24
10. CONTENTS OF THE FEASIBILITY REPORT	25
APPENDICES	29
1. CONSTRUCTION OF THE PSC.....	29
1.1. Definition of Public Sector Comparator	29
1.2. Key Elements of the Public Sector Comparator	29
1.2.1. Costs of Service Delivery	29
1.2.2. Risk Transfer	32
1.2.3. Competitive Neutrality Adjustment	32
1.3. Discounted Cash Flow.....	33
1.4. Inflation.....	34
1.5. Illustration of Calculation of the Net Present Value of Public Sector Comparator.....	34
2. ASSESSING INITIAL VALUE FOR MONEY.....	37
3. RISK IDENTIFICATION AND ALLOCATION	39
3.1. Identifying the Project Risks.....	39
3.2. Risk Assessment	40
3.3. Quantifying the Risk.....	42
3.4. Estimating the Probability of Occurrence	43
3.5. Illustration of Estimation of the Value of Risk	43
3.6. Estimating Transferable Risk	46
3.7. Estimating Retained Risk.....	47

3.8. Risk Allocation	47
3.9. Risk Mitigation	47

List of Figures

Figure 1: Process diagram for feasibility study	6
Figure 2: Importance and influence of stakeholder groups	Error! Bookmark not defined.
Figure 3: Public Sector Comparator – Operating Cost Risk Adjustment.....	36
Figure 4: Public Sector Comparator – Operating Cost Cash Flows	36
Figure 5: Public Sector Comparator – Net Present Value.....	36
Figure 6: Initial Assessment of Value for Money	38
Figure 7: Constructing a Risk Matrix – Example of risk valuation table	45
Figure 8: Constructing a Risk Matrix – Timing and probability of consequence	45
Figure 9: Constructing a Risk Matrix – Allocating Cost of Risk	46
Figure 10: Constructing a Risk Matrix – Estimating Present Value of Risk.....	46

List of Tables

Table 1: Categories to be considered when evaluation a solution option	12
Table 2: Value-for-money comparison	21
Table 3: Stakeholder Table.....	Error! Bookmark not defined.
Table 4: Public Sector Comparator – Capital Cost Risk Adjustment.....	35
Table 5: Public Sector Comparator – Capital Cost Cash flows	35
Table 6: Constructing a Risk Matrix – Risk Identification	39
Table 7: Constructing a Risk Matrix – Direct Consequences of risk	40
Table 8: Constructing a Risk Matrix – Example of a risk matrix element	41
Table 9: Constructing a Risk Matrix – Elements of a risk matrix element	48

Overview

The purpose of undertaking a feasibility study is to develop a comprehensive understanding of all aspects of the project including technical, legal, social, economic and financial aspects. The feasibility study is a critical component and technical working document for project preparation and appraisal. The feasibility report summarizes the results of the project feasibility analysis and PPP due diligence.

The feasibility study report forms the basis of the investment decision for all parties and for obtaining approval from the relevant authority. Accordingly, the study needs to be authentic, accurate and thorough to ensure that all the stakeholders in the project get an appropriate assessment of the technical, social, environmental, legal and financial viability of the project.

. The feasibility study report includes the following:

- **Support and justification for the project** – results of the feasibility study providing justification for the investment:
 - Need for the project – gaps identified in the market analysis that would be filled by the project, policy objectives met by the project, alternatives considered;
 - Description of the project, including definition of services / outputs it will provide, location, target user group, technologies to be employed, agencies involved and their responsibilities, project timeline, etc.;
 - Technical description of infrastructure additions required for the project;
 - Social and environmental assessments and planned impact mitigations;
 - Summary of the financial viability of the project;
 - Summary of economic appraisal (benefit / cost analysis);
 - Benefits and costs of the project and their distribution among key stakeholders, including social and environmental impacts;
 - Project implementation schedule.
- **Support for procuring the project as a PPP** – In addition to the general project feasibility results, the feasibility study report includes the following:
 - Capacity of the institution to implement the PPP, plan for implementation and PPP management including capacity building, use of advisors and plan for meeting project development costs;
 - Other due diligence assessments (legal, market sounding);
 - Identification of major project risks and their allocation between the public and private partners;
 - Type of PPP proposed including description of likely finance structure;
 - Requirement for government assistance to the project (such as Viability Gap Fund);
 - Value-for-money (VFM) analysis and result.
- **A section summarizing the justification for the PPP project** – this section will synthesize the qualitative and quantitative case for proceeding with the PPP procurement route. There are many reasons why a PPP may be pursued and it important to make clear what drives the final decision

in setting of a specific project. Apart from highlighting the main benefits of a PPP option, this section should also make clear that such an option would be affordable to the institution over the entire course of the project term.

The sections that follow describe in more detail how an institution should carry out a feasibility study to decide whether conventional public sector procurement or a PPP is the best choice for the proposed project. The sections provide the structure and outline of feasibility study report that should be submitted to the relevant authority. The figure below summaries these steps.

Figure 1: Process diagram for feasibility study



1. Section 1 – Needs Analysis

1.1. Strategic Objectives

There should be sufficient justification for undertaking any project. For a project to be deemed in an institution's best interests it must align with the institution's policy and priorities. Thus, this section must:

- Outline the institution's mission and vision statements and the government policy that specifies its deliverables, with specific focus on the functions that the institution is required to perform in the public interest or on behalf of the public service;
- Show how the proposed project will help the institution achieve the stated objectives by helping to solve an existing problem or meeting a future need;
- Consider whether the project will complement other current or future projects in the area by considering sector strategic plans;
- Consider whether the project would bring any radical change in the structure of the industry and, if so, its implications.

1.2. Institutional Capacity and Deliverability

It is desirable for the institution to demonstrate its commitment and capacity to manage, process, evaluate, negotiate and implement the project.

1.2.1. Project Team and Advisors

The institution should provide the following information with regards to the project team and technical advisors:

- The institution's project officer and project team – including names of the team, allocated roles in the project, relevant skills, brief CV's and the budget available for project management;
- The appointed transaction/technical advisors – including names of the team members, allocated roles in the project, relevant skills, brief CV's and the budget available.

1.2.2. Organisational Factors

The institution should then provide an assessment of organizational issues that could affect project delivery including:

- The lines of decision-making within the institution, focusing on the relationship between the project officer and senior management and the accounting officer/authority;
- Existing capacity constraints relating to the project team and the technical advisors and a plan to address such constraints over the project life cycle;
- Envisaged strategy relating to skills transfer from the technical advisor to the projected team during various stages of the project;
- Envisaged political support for the project.

1.2.3. Stakeholder Interests

The institution should provide information regarding stakeholder interests and participation. Stakeholders are those people or organisations who are likely to be affected by the project or who can influence the success of that project. Stakeholder analysis aims to successfully balance the interests of all the different groups involved in the projects. Specifically the institution should:

- Identify possible key stakeholders – these could be within the institution, other government departments/ spheres of government, organised labour, third parties or the public;
- Assess each stakeholder’s interests, describe the nature of each relationship and the impact of the project on each stakeholder with specific reference to any stakeholder funding, resources or processes that will be impacted(see stakeholder matrix below)

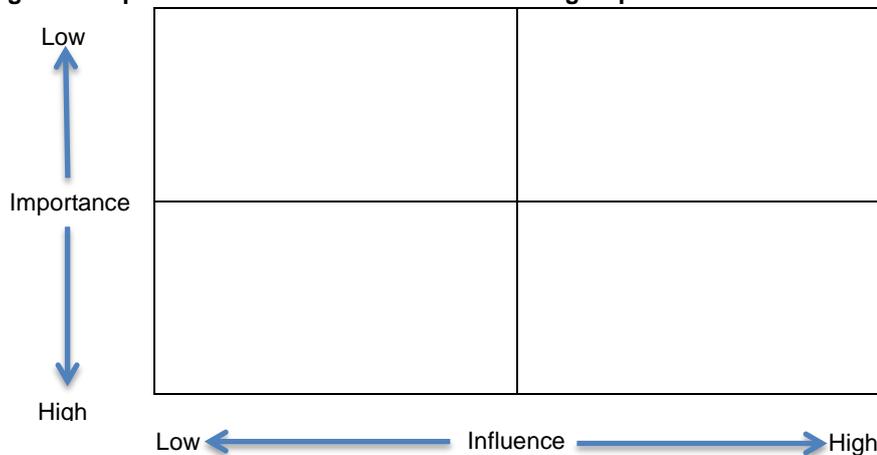
Table 1: Stakeholder Table

Stakeholders	Interests	Potential Project Impacts [+/-]	Relative Priorities of interest
Primary			
Secondary			

Source: Overseas Development Administration (1995) *Short Guidance Notes on How To Do Stakeholder Analysis of Aid projects and programmes*, London: www.dfid.gov.uk

- Assess the power and influence of stakeholders in relation to their ability to influence the success of the project. This can be mapped as shown in the figure below¹.

Figure 2: Importance and influence of stakeholder groups



Source: Overseas Development Administration (1995) *Short Guidance Notes on How To Do Stakeholder Analysis of Aid projects and programmes*, London: www.dfid.gov.uk

- List any consent/permissions that need to be obtained from government stakeholders;
- Prepare a consultation plan that details how and when stakeholder consultation shall take place during the project implementation period;
- Report the nature and outcomes of any stakeholder consultations that may have already occurred.

¹ For example, stakeholders at the bottom right hand quadrant are important because not only are they affected to a high degree but also have a high influence on the outcome of the project.

1.2.4. Budget Availability

The institution should identify and analyse the available budgets. Such a discussion should include:

- A discussion of any assumptions regarding future budgetary commitments required from the government and from which budgets such funds will be allocated;
- A discussion of any consolidation of budgets and ring-fencing for this project;
- Give a sense of the size of the project the anticipated budget or capital expenditure of the project must be specified;
- Outline the potential cost savings from the proposed project. Specifically, a list of line items currently part of the institutions costs that will no longer be incurred if the project were to be implemented.

1.3. Output Specifications

An infrastructure project is developed with the goal of providing certain services and the institution must define the service that it needs to deliver. In addition, PPP procurement, unlike traditional procurement, leaves the design of the facility to the private party and only specifies the outputs needed to insure the service that the infrastructure needs to deliver. Therefore, consideration of a project requires a clear statement of the institutional function via specifying the output/outcome requirements. Thus, the institution must clearly provide the following:

- A clear description of the services the institution is to deliver;
- Details of the output specifications required to deliver the identified services and ascertain whether these specifications will meet the institution's ongoing service needs (i.e. is the solution flexible enough to be adapted to changes in the institution's needs over time);
- Specify the minimum standards required for the outputs to ensure services can be delivered as envisioned;
- Stipulate the performance indicators;
- Detail how the project and the institution's other services are envisaged to interact or coexist

1.4. Scope of the Project

Based on the above output specifications this section should develop a clear, concise definition of the proposed project scope. It should:

- Summarise the project objectives and how they address the institution's strategic objectives;
- Summarise the output specifications;
- Give a list of government assets that would form part of the project;
- Provide a high-level indication of the type of PPP that would be best suited to the project;
- Provide an indicative timeline for the project

Box 1: Output vs. Input Specifications

Conventional procurement specifies the input.

In conventional procurement the institution must prepare detailed specifications that describe the infrastructure required to deliver the service. The required infrastructure is then put out to tender. After the contract is awarded, the institution must supervise the construction of the infrastructure and ensure compliance with the tender specifications. The institution is responsible for the design and planning of the project, all statutory requirements, and any costs that may arise from unforeseen circumstances that were omitted from the tender specifications.

PPP procurement, on the other hand, specifies the output.

In PPP procurement, the institution defines the service that it needs to deliver. The institution thus leaves the design of the infrastructure to deliver the service up to the private party. In some cases, some inputs may be specified by the institution but, in general, PPP projects should be driven substantially by output specifications which allow for optimal risk transfer to the private party thereby ensuring increased value for money for the institution.

Specifying outputs

Specifying outputs requires the institution to consider the service that needs to be delivered rather than how such a service will be achieved. A useful rule suggested by PPIAF is that output specifications should be SMART, that is: specific, measurable, achievable, realistic and timely². An example of SMART output specifications are given in the table below:

An example of output specifications for an accommodation public-private partnership

Characteristic	SMART	Not SMART
Specific	Refurbish or replace all dwellings on the estate to comply with the government's "decent homes" standard	Refurbish dwellings to a good standard
Measurable	Ensure that all dwellings are structurally sound, with adequate ventilation, lighting, and thermal comfort	Ensure that dwellings to a good standard
Achievable	Maintain internal temperature at X degrees when outside temperature is between Y and Z degrees	Ensure that internal temperature is always maintained at X degrees
Realistic	Ensure that faults with the temperature control system are rectified within 8 hours during business hours and 16 hours outside business hours	Ensure that faults with the temperature control system are repaired within two hours
Timely	Maintain a log of faults and report on performance every month	Provide an annual report on performance

Source: PPIAF(2011) *How to engage with the private sector in public private partnerships in emerging markets*

Source: South African National Treasury PPP Manual (2004), Module 4: PPP Feasibility Study, p. 6; PPIAF (2011), *How to engage with the private sector in public-private partnerships in emerging markets*, p. 34-36

² See PPIAF (2011). *How to engage with the private sector in public-private partnerships in emerging markets*. Available from: <http://www.ppiaf.org/sites/ppiaf.org/files/publication/How-to-engage-with-private-sector-Clemencia-Farquharso-Yecome-Encinas.pdf>.

2. Section 2 – Options Analysis

Once the service requirements have been specified, the institution can identify and evaluate the potential service delivery options available to it in order to meet its needs. Based on an analysis of these options, the institution must then decide which the preferred solution option is, and whether such an option can be structured as a PPP project. However, it should be noted that a decision to implement the project as a PPP is only made after the value for money assessment section of the report. This is because a PPP is not itself a service delivery option but rather a procurement choice relating to the chosen/preferred service delivery option.

2.1. Option Identification

In this section the institution should identify and consider the most viable solution options that will provide the specified outputs³. The options evaluated could include:

- Existing asset solutions: Consider whether existing infrastructure held by the institution might be used. This may involve an upgrade or refurbishment to bring the infrastructure to the required standard and may also bring a cost in the form of revenue forgone if the asset might otherwise be sold;
- Non-asset solutions: Service needs may be met without creating additional assets, through reconfiguring the means of service delivery, developing initiatives to manage demand more effectively, or increasing use of existing assets; or
- New asset-based solutions: New infrastructure may be developed to provide the required service.

2.2. Option Evaluation

Once the most viable solution options have been identified, each option must then be evaluated. The table on the following page provides guidelines for the various aspects that should be considered in such an evaluation. One approach to choosing the best option is multivariate analysis where competing options are weighed up against each other using key variables such as technical robustness/viability, socio-economic impact, and expected financial benefit.

³ See Box 2 below for a practical example.

Table 2: Categories to be considered when evaluation a solution option

Evaluation Category	Description
a) <i>General</i>	Provide a brief account of each solution option focusing on the suitability of each option with regards to providing the output specifications and meeting the institution's strategic objectives.
b) <i>Financial</i>	<p>Provide a preliminary view on the financial impact of each option to be estimated, including estimates of initial capital expenditure, the likely capital and operational costs over the full project cycle, an indication of the affordability of each option and how each option is to be funded.</p> <p>A consideration of how each option is to be funded and whether the option is affordable. Note that any government contribution should be agreed to by the relevant treasury and funding must come from existing budget lines.</p> <p>Indicate the likely PPP structure and private developer payment mechanism for the option.</p>
c) <i>Risk</i>	<p>A preliminary discussion regarding the primary risks to the government associated with each option and any risks that could be potentially passed on to a private party.</p> <p>An examination of the service delivery arrangements for each option and the implications for the interface between services.</p>
d) <i>Socio-economic</i>	Provide a preliminary view on the impact of each option on socio-economic targets on which the institution may wish to deliver in the project (if such targets exist).
e) <i>Technical</i>	<p>A detailed Technical analysis of each option including a supply chain/interface analysis and an assessment of the suitability of the proposed technology for each option.</p> <p>Identification of any site issues relating to the procurement of land for example land use rights, zoning rights, geotechnical analysis environmental issues, relevant legislation, alignment with regional plans and the ease with which these issues can be resolved during the feasibility stage of the project.</p>
f) <i>Legal & Regulatory</i>	<p>A high level analysis of legislative and regulatory compliance .Establish the degree of compliance of the option with respect to procurement legislation and regulations as well sector-specific legislation and regulations.</p> <p>Also note if any elements of the option cannot legally be performed by a private party.</p>
g) <i>Human Resources</i>	<p>Identify the effect on existing institutional staff in terms of both numbers and cost, and undertake a skill and experience audit in order to identify key human resource issues present in each solution option.</p> <p>Perform, where necessary, due diligence with regards to the relevant labour legislation, organized labour agreements and the various aspects affecting staff transfers.</p>
h) <i>Transitional Management</i>	Identify any potential issues that could arise as a result of the transition from the existing services/facilities to the new.
i) <i>Market Ability & Appetite</i>	<p>Provide a preliminary assessment for each solution option of private sector capability and reliability to deliver the services.</p> <p>Assess market appetite for the various solution options, the presence of any local suppliers and the extent of competition in the market. If deemed necessary, the market can also be tested to ascertain the potential interest.</p> <p>Determine whether there is a potential for value for money with regards to service delivery.</p>
j) <i>Qualitative Benefits</i>	Consider any qualitative benefits associated with each option that cannot be captured in the financial quantification of the project.
k) <i>Suitability as a PPP</i>	Consider each of the option's potential to deliver value for money as a PPP. This could include a consideration of the scale of the project, opportunities for risk transfer and market capability and appetite.

Box 2: Option identification and selection

The solution option analysis should set out the range of possible technical, legal and financial options for delivering the required service to the output specifications developed in the previous section.

For example, if an institution requires additional office accommodation then possible solution options could be:

- To rent space in a suitable building;
- To construct a new building;
- To refurbish the existing building.

The latter two options could be achieved using two procurement choices: conventional public sector procurement or PPP procurement. That is, for the refurbishment option, the institution could either undertake the refurbishment and provision of ancillary services itself (or through separate contracts) or it could enter into a PPP where the refurbishment and the ancillary services are provided by a private party. Similarly in the case of a new building, the institution could either choose to construct the building and provide ancillary services itself (or through separate contracts), or it could enter into a PPP where the construction and the ancillary services are provided by a private party.

If, based on an evaluation of the advantages and disadvantages of the various options, the institution decided that the construction of a new building was its preferred solution option then the next sections of the feasibility study must explore both the traditional procurement and PPP options. The decision of whether to procure the solution option as a PPP should only be made after the feasibility of both options has been explored.

Source: South African National Treasury PPP Manual (2004), Module 4: PPP Feasibility Study, p.9

2.3. Recommendation of a Preferred Option

Based on the above evaluation of each option, a recommendation regarding which option should be pursued to the next stage should be made. As mentioned in the previous section, a matrix approach using the above categories can be used to weigh up the evaluation of each option against another to assist in the choice of a preferred option.

No more than three solution options should be chosen and, given due diligence requirements to follow, it is advisable that only one option is chosen at this point. Each chosen solution option should be assessed separately in the financial feasibility section.

3. Section 3 – Project Due Diligence

The purpose of this section is to establish project feasibility with regards to all non-financial aspects of the project. The project due diligence thus involves a technical feasibility study, a social and environmental impacts study and a legal analysis of the project. Where the institution has insufficient experience in such matters outside consultants, experts and surveyors will need to be appointed to perform such studies.

3.1. Legal

Although a preliminary legal analysis was conducted at the options analysis stage, a comprehensive legal due diligence of the preferred option(s) must now be conducted to ensure that all foreseeable legal requirements are met for the development of the project. Such an

analysis is essential since legal issues that are not resolved during the feasibility stage often create significant delays in procurement negotiations and can ultimately impede the conclusion of a PPP agreement.

Such a legal analysis should include, but it is not limited to, a consideration of the following legal issues:

- Land use rights;
- Tax legislation;
- Labour legislation;
- Environmental and heritage legislation;
- Foreign exchange legislation;
- Competition legislation;
- Legislation governing the use of certain financial instruments;
- Sector specific regulations.

3.2. Technical

Based on the service definition and the sizing of the project outlined in the project scope, a technical description of the project should be developed. Such technical specifications should be aimed at finding the least cost solution to meet the demand and service standards and other specified objectives of the institution. The technical description should include:

- Field surveys of the selected project site which, depending on the project, may include: mapping, topographical and geotechnical surveys;
- Consideration of zoning rights, town planning requirements and heritage matters;
- Consideration of environmental conditions that will impact the technical design;
- A preliminary technical design of the facilities required to provide the project outputs. Alternative design options should also be developed in order to take into account certain site-related uncertainties and the variation in demand projections;
- Based on the technology solution and preliminary design a detailed estimate of the project cost should be developed. The project cost estimate should detail the capital expenditure as well as the operations and maintenance expenses that are expected to be incurred.

It should be noted that the technical design is not final and is typically not prepared using the level of detail required of the final specifications. The main purpose of these designs is to establish the minimum technical requirements to be given in the RFP and to allow for an estimate of the project costs to be used in the financial and economic analyses.

3.3. Social and Environmental

Social and environmental assessments are an important requirement of an infrastructure project. Such assessments consider any potential damage to the environment⁴ or impact on society⁵ when undertaking an infrastructure project. Furthermore, it is important to determine whether any detrimental social or environmental impacts of the project outweigh any potential benefits and how negative impacts could be minimized.

Most SADC countries have specific environmental impact assessment (EIA) regulations⁶ with the exception of Malawi and Mauritius who have detailed guidelines for the EIA process in general and/or for key economic sectors. SADC countries mostly follow a form of screening and/or scoping EIA process and every country has a department or directorate responsible for EIA⁷. However, environmental decision making may not always be particularly robust and it is important for the Transaction Advisor to ensure that appropriate standards are met. In addition, comprehensive Terms of Reference are crucial to ensuring all impacts of the proposed project are addressed.

The scope of the social and environmental studies cover the following:

- Determining the quantifiable direct and indirect social and environmental costs and benefits;
- Identifying the non-quantifiable direct and indirect social and environmental costs and benefits;
- Characterizing options for mitigating adverse impacts and estimating the cost of mitigations;
- Identification of permits/licenses needed and any further social and environmental impact studies that will need to be conducted; and
- Provision of information regarding health and safety and other environmental/ social standards that will inform the final output specifications to be included in tender documents.

It is also important to note that the assessment of such social and environmental impacts will form an important input to the economic assessment of the project which is used to estimate the overall impact on societal welfare of the project.

In this regard, it should be stressed that the Terms of Reference document for the EIA is comprehensive so that the necessary information for the relevant authorities to make an informed decision is provided.

4. Section 4 – Financial Feasibility

4.1. The PPP Reference Model

The PPP reference model is a hypothetical private party bid based on the costing borne out in the technical due diligence which meets the service delivery specifications of the institution. The PPP reference project enables the institution to assess the financial feasibility of the

⁴Environmental impacts, for example, include effects on environmental resources due to pollutants or other disturbances.

⁵ Social impacts, for example, include effects on health and livelihoods due to resettlement.

⁶ Note that Botswana's environmental Act has been published but has not yet been passed by parliament.

⁷ See the SADC Environmental Legislation Handbook (2012) for more information regarding SADC member states' environmental legislation.

project as well as establish value for money when the model is compared to traditional public sector service delivery.

4.1.1. Refining the PPP Model

4.1.1.1. Nature of the PPP Procurement Arrangement

A PPP procurement project can either involve the private party performing a function of the Government or the use of certain Government assets for its own commercial purposes. This section must specify the type of PPP procurement that best suits the service delivery output specification or whether it is a combination of these two. The following issues should also be addressed:

- The most appropriate form of PPP to meet service delivery specifications;
- Risks that can be transferred to the private party;
- Proposed tenure of the PPP arrangement;
- Asset ownership, transfer arrangements and treatment of residual value.

4.1.1.2. Proposed Project Structure and Sources of Funding

This section must confirm the proposed PPP structure for the project. It must describe the expected sources of funding and the relationship between the institution, the special purpose vehicle (SPV) (if required), shareholders, lenders, suppliers, subcontractors and other players. It must provide the proposed funding structure by identifying the sources of funding, specifying the recommended debt-equity combination and/or the payment mechanism for the project.

Note that a corporate finance structure is usually only advisable when the project's capital requirements are below what is cost-effective for a project finance structure. A capital contribution by government is also only advisable on demonstration of value for money and on condition that the funds are used towards project assets that will at some point become property of the state. In either case, further analysis of the implications of these two alternative finance models in terms of risk transfer and private party incentives amongst other things will be necessary.

In addition, in the event of possible re-financing of the debt portion, the institution or government should require a share of the resulting profits. For instance, it is common for a 50/50 split of such profits.

4.1.2. Cost and Revenue Assessment

4.1.2.1.1. Determination of Project Costs

One of the key inputs when determining financial feasibility is the cost of the project. The costs of the project should be derived from the detailed project report that is compiled using the various technical studies conducted. The costs associated with such projects can be apportioned into four broad categories:

- Capital Costs – these are the one-time costs incurred for the creation of an asset. These are likely to include the costs of design, land and development, raw materials, construction and equipment;

- Operating Costs—these are costs associated with the daily functioning of the service provided by the new infrastructure created. These could include staff costs, utility charges and other administrative expenses;
- Maintenance Costs – these are costs associated with maintaining the assets in the condition required to deliver the specified outputs over the full project life cycle. These could include raw materials, tools, equipment and labour associated with maintenance;
- Indirect Costs – are a portion of the institution’s overhead costs such as senior management’s time and effort, personnel, accounting, billing, legal services and other institutional resources used by the project. Such costs are likely to be difficult to calculate for some countries and should only be estimated where such cost estimation can be deemed meaningful.

4.1.2.2. Determination of Project Revenues and the Payment Mechanism

The project may also provide opportunities for revenue collection. Project revenues represent the income that is generated from the provision of services to the users. Project revenue could be generated, for example, from user fees for the service, toll revenue or revenue from ancillary sources (e.g. advertising rights). In some countries, depending on the financial viability of the concession, the private party might pay the government a concession fee for the right to collect user fees or alternatively might receive a subsidy.

The identification of core components of the payment mechanism should also be undertaken. The payment mechanism defines how the private party to the PPP is remunerated.

The basic elements of a PPP payment mechanism may include:

- User charges – payment collected directly from users of the service by the private party;
- Government unitary payments – government pay the private party for the services or assets provided based on usage, availability, or related to certain milestones.

In the case of a Government unitary payment mechanism, the following factors should be addressed:

- The amount of the single indivisible unitary payment;
- Whether splitting the unitary payment between services is appropriate;
- Identify the key areas of availability and performance of service;
- Prepare an initial allocation of the unitary payments to these areas in order to verify that appropriate incentives and penalties are created for the service as a whole.

4.1.3. Risk Assessment

Risk is a fundamental part of every project. Traditional public sector procurement has generally not taken risk adequately into account, often resulting in cost overruns. Accordingly, a comprehensive, independent risk assessment should be conducted for the PPP reference model.

The risk assessment should be undertaken by the project transaction advisor and all material risks must be identified and costed. Thereafter, the risks should be analysed and either

allocated to the private party, retained by the institution, or shared. A risk should always be carried by the party best able to manage the risk. Private parties are believed to be able to manage certain risks more efficiently due to their expertise and inherent incentive to innovate.

The various risks identified should be presented in a comprehensive risk matrix to allow for the tracking of risk allocation. Appendix 3 provides an example of a standardised risk matrix as well as a more detailed exposition of risk identification and allocation.

It should be noted that while the risk categories for the PPP reference model are the same as those for the PSC, they are dealt with differently when being incorporated in the two models.

For the PPP reference model the associated costs can be calculated using the costs that the private sector would usually apply to cater for the risk categories identified for the project. In other words, the costs of the risks associated with the project can be incorporated into the model as a line item such as insurance or guarantee costs, increased required return on equity or increased cost of debt. In addition, the cost associated with the retained risks (i.e. those the institution will bare) must also be incorporated into the reference model as specific add-on costs (see Appendix 3 for more detail on retained versus transferable risks).

4.1.4. Financial Model

4.1.4.1. Assumptions of the Model

All assumptions and inputs used in the construction of the financial model must be stated and explained/justified upfront. Any assumptions or inputs used that have not already been addressed in the project costs and revenue determinations above should be addressed in this section. Such assumptions and inputs are likely to include:

- Assumptions regarding the phasing of the capital expenditure;
- Cash flow projection assumptions such as long-term inflation rates, long term interest rates, future income tax rates, depreciation and VAT.

4.1.4.2. Preparation of the Financial Model

This section must give a detailed explanation how the financial model has been developed.

The model must be presented as a discounted cash-flow model. As a result key statements would have to be prepared including a projected profit and loss account, a projected balance sheet, a projected cash flow statement, an assumptions sheet used across the financial statements and a total capital expenditure and its phasing.

The total project cost is estimated as the discounted cash flow (including all direct and indirect costs as well as retained risks) associated with the project. Thus the PPP reference model cost is an 'all-in' cost to the institution for undertaking the project through a PPP. Once the PPP reference model had been adjusted for risks retained by the institution it is referred to as the 'Risk-adjusted PPP reference model'.

4.2. Establishing Financial Feasibility

The financial viability of capital-intensive projects is largely determined by the returns on investment that such a project is expected to earn.

The key financial indicators used to evaluate financial viability may include:

- the Project Internal Rate of Return – indicates the returns generated by the project on the total investment made by all types of investors (lenders and equity investors);
- Equity Internal Rate of Return – indicates the returns generated by the project on the total equity investment made in the project by the equity investors;
- Net present value – gives the summation of the present value of the cash inflows and outflows for the project over the duration of the concession period;
- Debt service coverage ratio – indicates the surplus cash available to the private developer to pay interest to lenders after it has met the required operations and maintenance expenditure;
- Interest coverage ratio – indicates the surplus cash available to the private developer to pay interest to lenders after it has met operations and maintenance expenditure requirements.

Other key project indicators that may need to be determined/developed using the financial model (for instance, the most suitable project term may rely on the debt service and other repayment constraints) could include:

- The project term;
- The suitable debt/equity ratio;
- The annuity payment (if any).

The financial indicators used will need to be compared against a benchmark to indicate whether the project is viable and commercially attractive. Possible benchmarks could be based on the outcomes of similar projects or returns and ratios that are assumed reasonable by a private developer or lenders.

A key part of establishing financial feasibility is to assess whether the project is commercially attractive to private parties. In general, private parties will find a project attractive if it offers good financial returns and requires the private party to bear only reasonable levels of risk. Thus, when the revenue to the private party exceeds costs plus the commercially required return on capital, the project will be commercially attractive and the commercial attractiveness of the project has been established. In the case where the project returns from the projected revenues are not found to be attractive, the possibility of obtaining a capital grant to fund the costs of the project may be explored.

4.3. Sensitivity Analysis

A sensitivity analysis is conducted to determine the financial robustness of the project to changes in the key assumptions upon which the model has been based. At a minimum, changes of 10-30% in the direction most likely to negatively affect the project (e.g. for inflation a 10-30% increase) should be considered for these variables. A list of variables often examined in such a sensitivity analysis are:

- Project term including the construction period and any assumptions regarding phasing and project duration;
- Inflation or interest rates;

- Construction costs;
- Operation costs;
- Market service demand;
- Financing terms;
- Residual values;
- Third party revenue.

Any implications of the sensitivity analysis with respect to the financial feasibility and commercial attractiveness of the project should be discussed.

5. Section 5 – Affordability

This section seeks to determine the suitability of the PPP as a procurement choice in terms of affordability. An assessment of affordability is based on whether the institution will be able to fund the entire project cost over the project lifecycle via budgetary allocations. In order to evaluate this, the institution's budget must be further scrutinized to confirm the affordability of the project.

5.1. Budget Availability

The institution's budget and related allocations are revisited to confirm the availability of funds over the project lifecycle. Often a PPP project's duration extends beyond the institution's planning horizon. If, this is the case then the assessment of budgetary allocations should be based on the realistic assumption that the allocations remain constant in real terms (i.e. any increase in adjustments is only reflective of inflation).

5.2. Comparison with PPP Reference Model

Once budget availability has been established, the available budget must be compared to the PPP reference model to determine whether the project is affordable. In the event that the PPP reference model forecasts costs that exceed the institution's budget, the project output specifications can be revisited and refined, providing it does not significantly compromise the service needs. Alternative service delivery options could also be re-visited. If changes are made to service delivery specifications, then such changes should be reflected in the PPP reference model.

6. Section 6 –Preliminary Value for Money

A value for money estimation is perhaps the most critical element when deciding upon the viability of a PPP project and is a consideration of whether a PPP will indeed provide better value for money than traditional procurement. A full value for money test is only conducted once actual private bids are submitted. However, an initial indication of the potential of value for money is a requirement of the feasibility study.

6.1. Quantitative Evaluation

The preliminary value for money of a project and thus the best procurement method is traditionally determined by comparing the net present value derived from the project to the net present value that would accrue if the institution were to deliver the same service via conventional public procurement (the public sector comparator). That is, a PPP is preferred if the conventional procurement method offers lower value when compared to the value given by the PPP option. The net present value is used in determining the project cost in order to take into account the different timing of cash flows in each model by adjusting for the time value of money.

The public sector comparator is calculated using a detailed approximation of the total costs that would be faced by the institution if it were to deliver the desired infrastructure asset and related services via conventional procurement. Appendix 1 provides a guide on calculating a public sector comparator, whilst Appendix 2 outlines how an initial value for money assessment would be conducted when using a public sector comparator and is also summarized in the table below.

Table 3: Value-for-money comparison

Value-for-money comparison	Public sector comparator	PPP reference
Financial Model		
Legal, financial, technical, commercial, socio-economic, institutional impact of the option		
Costs		
Assumptions for model (inflation, interest rate, tax, VAT, depreciation, budget and MTEF)		
Funding options		
Any contributions by government		
Net present cost	PSC	PPP-ref
Risk adjustments		
Risk adjustments net present cost	RA-PSC	RA-PPP-ref

Source: South African National Treasury PPP Manual (2004), Module 4: PPP Feasibility study

In reality the PSC route of determining Value for Money is difficult to implement, particularly in countries with little prior PPP experience. This is because it is extremely difficult for authorities to reliably estimate ex ante costs and many are unlikely to possess a robust database on outturn (final) costs for similar projects procured under different contracts. In addition, any comparison between procurement options must be between options delivering the same quality of end service and any data that is available is likely to lead to underestimation of the true cost of maintaining the assets in a fully serviceable condition.

6.2. Qualitative Evaluation

With little experience of PPP projects on which to draw and the lack of availability of data countries should draw on a more qualitative approach to determining which procurement route will give the best value for money. Overtime, a more evidence based approach may be applied including a comparison with a public sector comparator. However, it should be noted that no value for money evaluation should ever solely rely on the comparison with a private sector comparator.

Factors that determine whether a project delivers value for money will vary by project type and sector. Infrastructure projects that are most suited to PPP procurement and thus more likely to achieve value for money generally possess the following characteristics:

- The asset provides an essential public service and it is thus desirable for the institution to retain long-term control over it, and ultimately to recover ownership;
- The asset is self-contained, that is it can be built and operated as one unit, with a separately identifiable cash flow;
- The asset has a long life, with little risk of technological obsolescence. If this is not the case, for example in the case of an information technology project, then there is little advantage in signing a long-term contract;
- The asset involves significant capital expenditure, and also requires long-term maintenance;
- The capital cost of the asset should be high enough to justify the higher set-up costs for this complex type of procurement.

When using a more qualitative approach it is useful to bear in mind that projects that are likely to generate improved value for money will do so in at least one of the following ways:

- Reduced whole life costs - the integration of infrastructure design, build and operation, facilitating private sector innovation in design, an avoidance of over-specification and improved maintenance scheduling;
- Better allocation of risk - cost effective transfer of risk to the private sector, enabling efficiency benefits to be generated across the term of the contract;
- Faster implementation - the transfer of design and construction risks, coupled with no payment until the commencement of service delivery, will provide a significant incentive for the private sector to deliver an infrastructure project within a short construction timeframe;
- Improved quality of service - better integration of services with supporting assets, improved economies of scale, the introduction of new technology and innovation in design, and the performance incentives and penalties included in the Public Private Partnership contract; and
- Generation of additional revenue - more intensive exploitation of assets to generate additional revenues, for example from shared use of facilities or the sale of surplus assets.

7. Section 7 – Economic Valuation

The feasibility study should generally also include an economic analysis of the project. An economic valuation is necessary in greenfields projects, capital projects and projects that could have significant externalities. The aim of such an analysis is to go beyond financial flows and correct for distortions that are present in markets to reflect the wider costs and benefits to society in order to determine whether the project is a good use of public resources.

7.1.1. Assessment of Economic Costs and Benefits

Economic costs and benefits are not always the same as the financial benefits and costs. Economic costs include the financial costs but also take into account other externalities such as environmental damage. Economic benefits are a measure of value the project will deliver to people, these are often far greater than the revenues generated from the project.

Such costs and benefits are likely to vary significantly depending on the nature of the project and the sector. In general, an assessment of economic costs and benefits should draw on the findings of the market analysis, scope, and technical social and environmental feasibility and should include the following:

- Market valuations of the inputs to the project, adjusted for distortions in the market such as taxes or subsidies;
- Quantification of the valuation placed on the services by users, that is, their willingness to pay for the service as opposed to what they actually pay;
- A valuation of the secondary or spill-over costs and benefits (externalities) arising from the project. These include the impacts of the project on the broader economy and any non-market factors highlighted by the social and environmental assessment (for example pollution);
- The balance of the economic benefits and costs, that is the net economic benefit, should be calculated and expressed in present value terms.

Note that quantifying benefits and costs that do not have an observable monetary value (i.e. that do not have a market price) can often be subjective in nature and thus a strong and defensible methodology will have to be presented in order to justify the way in which the valuation has been conducted.

7.1.2. Comparison with a “No Project” Scenario

The economic feasibility study should compare the project to a ‘no project’ scenario. The ‘no project’ option is simply the scenario in which the project is not undertaken and service delivery remains at its current level. This scenario gives an indication of the benefits derived when the project is not implemented and provides the ‘base case’ to which the economic costs and benefits of the current investment option can be compared. In other words, it allows one to confirm that the net economic benefit of the project is greater than the net economic benefit of the “no project” option. The choice of the “no project” option and the economic valuation thereof will need to be justified.

7.1.3. Comparison with Next Best Alternative Investment Option

A comprehensive economic assessment of a PPP investment should also include a consideration of the next best alternative investment that could achieve a similar result. A comparison of the economic costs and benefits of these scenarios gives an indication of by how much the economic benefits of the current option’s outputs exceeds those of next best alternative, given the difference in investments. The choice of such a ‘next best alternative’ and the economic valuation thereof will need to be justified in the document.

7.1.4. Stakeholder Analysis

The economic assessment should also contain a stakeholder analysis. Section 1.2.3 focuses on identifying and understanding the interests, importance and influence of the various stakeholders involved in the project.

In terms of the economic model, stakeholder analysis divides the various costs and benefits accruing to the project amongst the various stakeholders. Such stakeholders should include the private developer, the government, the project entity and the public/society.

Such an exercise is important because even though a project may have a positive net economic benefit, certain stakeholders may be left less well off than before. In other words, it identifies those stakeholders who are likely to benefit from the project and those who do not. In addition, stakeholders who are significantly negatively affected will need to be compensated for their loss of welfare. For example a community that is displaced as a result of the project will need to be suitably relocated and compensated.

7.1.5. Valuation Results and Recommendation

This section summarises the results of the above economic evaluation and comparison scenarios and draws conclusions from these results.

Firstly, to determine whether a project is economically viable (i.e. whether it should proceed) the net present value of the costs and benefits that occur over the life of the project must be calculated. If such a value is negative then generally the project should not be pursued.

Secondly, the EIRR is calculated to determine whether it delivers the socially required rate of return (i.e. the economic discount rate). The EIRR is the rate of return at which the present value of the economic costs and benefits of the project are equal. Projects for which the EIRR is higher than the economic discount rate are considered to be economic investments. Note that the economic discount rate should be chosen either using previous project experience or international standards and guidelines. In either case, the use of the chosen rate will need to be substantiated.

Third, the comparison of the project with the 'do nothing' and 'next best alternative' scenarios is conducted using the NPV's of the different scenarios. Provided that the net economic benefits are greater than the 'do nothing' option and deemed sufficiently above those of the 'next best alternative' when taking into account the difference in investment for the two scenarios, the project can be considered economically worthwhile.

Finally, the stakeholder analysis should indicate that no parties are severely negatively impacted by the project and that no one sector benefits to the (significant) detriment of another. In general, an economically viable project should generate a net economic benefit (even if it is in some cases small) for all stakeholders (if a group is negatively affected by the project then the stakeholder analysis should consider how this group will be compensated).

8. Section 8 – Preferred procurement mode

This section will synthesize the qualitative and quantitative case for proceeding with the PPP procurement route. There are many reasons why a PPP may be pursued and it important to make clear what drives the final decision in setting of a specific project. Apart from highlighting the main benefits of a PPP option, this section should also make clear that such an option would be affordable to the institution over the entire course of the project term.

9. Section 9 – Procurement Plan

A procurement plan must be developed to demonstrate that the institution has the capacity and budget to undertake the procurement of the PPP. The procurement plan should include the following:

- A project timetable detailing key project milestones and approvals (both internal and external to the institution) required;
- A GANTT chart of the procurement process, including all approvals and work items necessary to achieve approvals;
- Confirmation of sufficient funds in the institution's budget to take the project through the procurement process;
- Project stakeholders and extent of involvement in PPP;
- The recommended procurement practice and procedures suited to the PPP project at hand;
- A list of any potential challenges to the project and a discussion on how the TA and project team will address these issues including contingency plans for dealing with deviations in the timetable and budgets;
- The project team and their assigned functions during procurement, as well as governance procedures to be followed particularly regarding decision-making;
- An appropriate quality assurance process for the procurement documentation;
- Type of information to be made available to bidders and how such information will be established;
- The bid evaluation process and teams.

10. Contents of the Feasibility report

- Introduction
 - Covering letter from the accounting officer/authority
 - Executive summary
 - Introduction
 - Project background
 - Approach and methodology to the feasibility study
- Section 1 – Needs Analysis
 - Institution's Strategic Objectives
 - Institutional Capacity and Deliverability including:
 - Project Team and Advisors
 - Organisational Factors
 - Stakeholder Interests
 - Budget Availability
 - Output Specifications

- Scope of the Project
- Section 2 – Options Analysis
 - Option Identification
 - Option Evaluation
 - Recommendation of a preferred option
- Section 3 – Project Due Diligence
 - Legal Aspects including:
 - Land use rights;
 - Tax legislation
 - Labour legislation
 - Environmental and heritage legislation
 - Foreign exchange legislation
 - Competition legislation
 - Legislation governing the use of certain financial instruments
 - Sector specific regulations
 - Technical Aspects including:
 - Field surveys of the selected project site which may include, depending on the project, mapping, topographical and geotechnical surveys
 - Consideration of zoning rights, town planning requirements and heritage matters.
 - Consideration of environmental conditions that will impact the technical design; and
 - A preliminary technical design of the facilities required to provide the project outputs. Alternative design options should also be developed in order to take into account certain site-related uncertainties and the variation in demand projections.
 - Based on the technology solution and preliminary design a detailed estimate of the project cost should be developed.
 - Social and Environmental Aspects including
 - Determining the quantifiable direct and indirect social and environmental costs and benefits;
 - Identifying the non-quantifiable direct and indirect social and environmental costs and benefits;

- Characterizing options for mitigating adverse impacts and estimating the cost of mitigations;
 - Identification of permits/licenses needed and any further social and environmental impact studies that will need to be conducted; and
 - Provide information regarding health and safety and other environmental/ social standards that will inform the final output specifications to be included in tender documents
- Section 4 – Financial Feasibility
 - The PPP Reference Model
 - Refining the PPP model (proposed project structure and sources of funding)
 - Cost and Revenue Assessment
 - Determination of Project Costs
 - Determination of Project Revenues and the payment mechanism
 - Risk Assessment – an independent risk assessment should be conducted with regards to the PPP reference model. The risk assessment should be undertaken by the project transaction advisor and all material risks must be identified, evaluated and consequently allocated to either the private sector or the institution. The various risks identified should be presented in a comprehensive risk matrix to allow for the tracking of risk allocation.
 - Financial Model (risk adjusted)
 - Assumptions of the model
 - Preparation of the financial model
 - Establishing Financial Feasibility
 - Sensitivity Analysis
- Section 5 – Affordability
 - Budget availability
 - Comparison with PPP reference Model
- Section 6 – Preliminary Value for Money Assessment
- Section 7 – Economic Valuation
 - Assessment of Economic Costs and Benefits
 - Comparison with a “No Project” Scenario
 - Comparison with next best alternative investment option
 - Stakeholder Analysis

- Valuation Results and Recommendation
- Section 8 – preferred procurement mode. This section will synthesize the qualitative and quantitative case for proceeding with the PPP procurement route.
- Section 9 – Procurement Plan
- Annexure 1: Statements for information verification and sign off from each advisor to the project
- Annexure 2: PSC model (if applicable)
- Annexure 3: PPP reference model
- Annexure 4: Risk assessment and comprehensive risk matrix
- Annexure 5: Document list (a list of all documents related to the project, where they are kept, and who is responsible for ensuring that they are updated)

Appendices

1. Construction of the PSC

The construction of the public sector comparator should be a flexible process. It should take into account the varying characteristics and circumstances of the project at hand as well as the potential form of the PPP agreement. This annexure aims to familiarize practitioners on the key elements of the Public Sector Comparator (PSC) and how it is constructed.

1.1. Definition of Public Sector Comparator

The Public Sector Comparator can be defined as a hypothetical risk-adjusted cost to the government for the output specification produced as part of a PPP procurement exercise. The PSC has the following characteristics:

- It is expressed as a net present value term;
- It is based on recent public sector procurement for a similar service delivery requirement (recent public sector procurement information should also capture the inefficiencies in the system);
- It effectively captures the risk inherent in the project and procurement process envisaged.

For projects where no track record for public procurement exists, the institution should consider devoting additional resources and time in the options analysis stage to ensure that the alternatives to the PPP procurement are clearly identified.

The PSC acts as a benchmark for comparison when choosing the preferred bid. Hence to be a valid benchmark against which private sector bids can be compared fairly, the PSC must reflect not only certain procurement costs but also the additional costs that may arise on account of the risks inherent to the project. During the procurement process, risks should be identified, and ways in which these risks can be mitigated considered. It is necessary to assess the impact of these risks on costs, estimate their probabilities, and explore and appreciate the sensitivity of these estimates (see Appendix 3 for a full treatment of risk identification and allocation). Comprehensive accounting for risk is required to ensure that valid and informed comparisons can be made amongst the bids and between the bids and the PSC.

1.2. Key Elements of the Public Sector Comparator

The public sector comparator consists of the following elements:

- Primary Public Sector Comparator which reflects the costs of service delivery;
- Risk both retained and transferable;
- The competitive neutrality adjustment.

Each element of the PSC is analysed in greater detail in the subsequent sections.

1.2.1. Costs of Service Delivery

1.2.1.1. Direct Capital Costs

The direct capital costs are the costs directly associated with the provision of the service. The basic capital costs should include the basic costs of capital assets, such as buildings, required for the project, including any fit-out costs required to convert an existing property to the required use. Cost estimates should reflect the full resource costs of the project. In particular, they should include the opportunity cost of any assets already owned by the institution and which are to be used in the project. If the asset could be sold or used for another purpose, then the use of that asset in the project has an opportunity cost.

All assumptions and sources of information, in particular relating to the costing and timing of expenditure, should be clearly listed. Sometimes PSCs are constructed on the assumption that major construction work will be delayed due to constraints on the availability of public capital. This approach is not recommended as such assumptions are inherently non-verifiable and past experience has shown that the availability of public capital tends to be quite volatile even over relatively short periods. If there is any doubt regarding the availability of public capital, a sensitivity analysis should be undertaken to quantify the effect of delayed construction work.

However, assumptions about the start, completion, and if applicable, the phasing of construction work should reflect what would be expected in the public sector and will not necessarily correspond to the bidders' proposals.

The construction techniques assumed in estimating capital costs should reflect recent actual practice in the public sector using existing plans for a site or the likely approach (the costs should not be amended in the course of the tender process to mimic the 'bidders' proposals). These may evolve over time and clients involved in a series of similar procurements should not automatically assume that assumptions used in a previous PSC will remain valid. Sometimes the assumptions will need to be amended to reflect changes in conventional procurement practices.

The assumptions regarding cost or time overruns should reflect recent experience of conventional procurement. However, judgement must be applied to assess the relevance of that experience. For instance, the size and complexity of a project will have a direct impact on the risk of delay and it would be misleading to apply data from recent relatively small projects to a PSC for a very large project. International experience suggests that cost over-runs are more likely on larger projects. In addition, time delays tend to be correlated with the size of the project.

1.2.1.2. Operation and Maintenance Costs

The direct costs associated with operation and maintenance of the project should be included in constructing the PSC. While the exact nature of the cost would be dependent on the service to be delivered, the costs would broadly include:

- Operating costs:
 - Cost of inputs;
 - Cost of employees directly involved in service delivery including wages and salaries, employee entitlements, superannuation, training and development etc.;
 - Direct Management costs;

- Insurance.
- Maintenance costs
 - These are recurrent and will be linked to maintaining the capacity and quality of the asset rather than upgrading or improving the asset. Maintenance cost typically includes raw materials (spares), tools and equipment and the employee costs associated with maintenance work.

The cost estimates for a number of these items can be determined by drawing on similar projects undertaken in the public sector. Since PPP agreements normally involve long tenures, the effect of inflation on the costs during the term of the agreement would be significant. However, as the construction and comparison of the PSC is being undertaken at prices in the base year, effects of inflation should be excluded. The forecasted operating and maintenance costs of the PSC should reflect, to a reasonable degree, improvements in service delivery on account of technological improvements or learning from past experience. This would ensure that the PSC reflects a reasonably accurate picture of value for money from traditional procurement methods.

1.2.1.3. Third Party Revenue and Capital Receipts

Certain PPP agreements may involve not only costs but also potential third party revenues which could lead to a reduction in the costs to the institution. The price and quantity variables that determine revenue should be identified and the potential equilibrium price and quantity determined.

When deciding on the price of the service, the institution should consider the pricing of alternate sources of similar services. The institution may also need to consider the input of experts when demand forecasting (depending on a cost benefit trade-off of obtaining such expert information).

When determining the PSC the institution's capital receipts could include the revenue from upfront sale, lease or disposal of an asset and/ or residual value treatment of the asset at the end of the PPP agreement term. Such revenues should be deducted from the PSC according to their expected timing.

A PPP agreement could involve rationalisation or restructuring of a project with pre-existing assets and subsequent disposal of the surplus assets. When estimating the primary PSC using the conventional procurement method, the treatment of such a disposal should be considered. Reliable estimates of receipts from such disposal should be deducted from the PSC. If the estimated value of the asset sale is fairly large, the institution could consider employing the services of specialist in this regard.

If, at the conclusion of the PPP agreement, the institution accepts the asset for zero or nominal consideration, then the economic effect is that the supplier must earn a return on its initial investment through the service charges payable during the service period. However the institution is left with an asset with a remaining useful economic life and as a result the service charges should be deducted from the NPV to reflect the true net cost of the services provided under the contract.

Where such a deduction is made to the cost of the PPP option an equivalent deduction should be made to the PSC. In each case the value of the asset to the client is the appropriate figure. The difference between these two figures is usually immaterial and it is generally regarded as

acceptable to exclude the residual value on the grounds that it will not affect the comparison. The key point is to achieve consistency of approach, i.e. either include a deduction for residual value in both calculations or exclude it in both calculations. However, it is best practice to include the figures as this demonstrates that the matter has been addressed.

The public sector may, at the conclusion of the PPP agreement, have the option to pay an amount equal to market value at the end of the contract, in order to retain the asset, or to pay nothing and to “walk away” (i.e. leave the asset with the supplier). In the case of the latter no residual value deduction relating to the service payments is needed to calculate the NPV of the services received under the PPP. However, for the PSC calculation a deduction is needed to avoid overstating the cost of services (otherwise the PSC would represent the cost of services for X years + the cost of asset with Y years remaining useful economic life after X years of service). Where estimates of residual value are required care must be taken to ensure the value is consistent with the level of maintenance assumed in the operating cost forecasts.

1.2.2. Risk Transfer

The risks associated with service delivery are unique to the project. The first step in estimating a risk adjusted PSC, is to identify and estimate the cost associated with each risk of the project. The underlying objective of risk identification is that the party best able to handle a particular risk should carry that risk. Optimal risk transfer would be the key to maximizing the value of a project.

The underlying premise of all PPP transactions is value for money. The objective of value for money should be to obtain optimal risk transfer rather than maximum risk transfer. Value for money is improved by transfer of appropriate risk to the private party who can either reduce or decrease the probability associated with the specific risk. However, if the risk cannot be effectively managed by the private party, the value for money will decline as the premium demanded by the private party can outweigh the benefit to the institution.

1.2.3. Competitive Neutrality Adjustment

Competitive neutrality adjustments remove any net competitive advantages that accrue to a government by virtue of its public ownership. Such an adjustment allows a like-with-like value for money assessment and includes only advantages that accrue to a government business that are not equally available to a bidder (i.e. it does not include differences in performance or efficiencies that arise in a competitive market). Typical competitive advantages include taxes, such as land tax, that are only levied on private enterprises. Competitive disadvantages from public ownership typically relate to heightened public scrutiny and reporting requirements not faced by private enterprises.

Competitive neutrality inclusions generally fall into one of two categories⁸:

- *Differences in state taxation obligations faced by virtue of public sector ownership*: state taxes are an additional cost to bidders that government may not incur. To the extent these are additional costs not borne by the institution, an equivalent cost needs to be imputed in the PSC;
- *Differences in state regulatory costs imposed by virtue of public sector ownership*: The government project may be exempt from complying with legislation, regulation or other material

⁸Infrastructure Australia (2008) National Public Private Partnership Guidelines: Volume 4 Public Sector Comparator Guidance.

requirements; alternatively the government may face additional regulatory requirements. In the case of the former, an inclusion of the costs of compliance to the standard required of the bidders is required, whilst in the latter, a deduction to the PSC is necessary.

1.3. Discounted Cash Flow

The public sector comparator identifies and estimates the project cash inflows and outflows and the discounted cash flow analysis estimates the value of this cash flow at a single point in time. The Discounted Cash Flow (DCF) follows a process whereby all future cash flows are forecast over a given period and then adjusted to a common reference date, taking into account the time value of money and risks associated with a project. The estimation of the PSC using the Discounted Cash Flow method thus requires two basic elements:

- Forecasted net cash flows from the project;
- Discount rate.

The discounted cash flow model is based on the assumption that a dollar today is worth more than a dollar received tomorrow. The effect of discounting is to bring a variety of different values and ranges of future cash-flows back to today's values. That is, to produce the net present value (NPV) of a stream of future cash-flows. In the case of a PSC, the NPV is actually a net cost figure (i.e. all of the costs of the project to the institution less the receipts associated with the project). Since the cash flow stream for the PSC and the PPP reference project or bids received can vary significantly, the use of discounted cash flow is particularly important.

The sum of the DCFs over the entire period of the project forms the net present cost (NPC). The NPC is a useful measure because it is a compatible dollar figure which is easily interpreted and readily comparable to other projects or bids expressed in NPC terms for the same reference date.

The following techniques for minimising errors are suggested in the UK Technical Note on How to Prepare a Public Sector Comparator:

- Ensure there is a clear audit trail from the calculation of NPV to the undiscounted cash flow to the base assumptions producing the cash flow for the PSC to the supporting evidence for the assumptions. This will assist a reviewer identifying any inconsistencies or other errors;
- The discount factor applied to each years' cash flow should be shown to minimise the possibility of confusion over base dates for discounting cash flows; and
- The financial data should be kept as simple as possible to minimise the risk of arithmetical error and avoid spurious accuracy.

For projects that the institution believes are not very complex and where the risks associated with the project can be readily quantified as cash flow items, the use of government bond rates of similar maturity as the term of the project is often recommended. In more complex projects where such assessment and quantification of risk as a cash flow item is not possible, the discount rate used in calculating the discounted cash flow is typically the cost of capital of the project. The cost of capital of a project can be determined using the Capital Asset Pricing Model (CAPM). The calculation of cost of capital based on the CAPM model is as follows:

$$R_k = R_f + \beta (R_m - R_f)$$

Where,

R_k represents the cost of capital for the project

R_f represents the risk free rate, the interest on Government bonds of equivalent term as the project could be taken as proxy

β represents the project beta or the degree to which the returns of the project are likely vary with the return on the market

R_m represents the return on market portfolio

The choice of the appropriate discount rate should be specific to the requirements of the project and should be decided upon by the institution with the expert inputs of its transaction advisors.

The discount rate decided on by the institution would be used to discount the PSC, the PPP Reference Project and the private party bids received.

1.4. Inflation

The PSC should be developed using nominal values and not real costs. All costs should be expressed as nominal values so that inflation is included. The inflation projections to be used should be based on the inflation forecasted by the Central Bank.

An illustration of the process of discounting for a hypothetical technology hub is presented below. This illustration for calculating the net present value of cash flows has been adapted from the UK Technical Note on *How to construct a Public Sector Comparator*. Please note that cost figures used in this illustration do not represent the actual cost in setting up a technology hub and have been used solely for the purposes of illustrating the process of calculation of the PSC.

1.5. Illustration of Calculation of the Net Present Value of Public Sector Comparator

The institution/government is considering a project to developing a technology hub for centralising all of its functions including customer/end user interface. Based on a preliminary estimate of available land owned by the institution, a site has been identified which presently has some structure and equipment. The capital cost estimated for the project is approximately USD 107 million. Site development will cost approximately USD 18 to 20 million and the equipment to run the centre about USD 10 million. After an initial assessment of the project site, it is understood that some of the structure and equipment on the site can be sold. The estimated value of such an asset is about USD 5 million. The initial term of the project is estimated at 10 years and the overall operating costs during this period are likely to be about USD 150 million.

Subsequent to an initial analysis of project details, the project team believes that the capital costs of the project are subject to the risk of construction cost overrun, changes in original design, and construction costs being higher than budgeted. As a consequence, they believe that these costs should also be reflected in the capital cost cash flow estimates of the project. Presented in the figures below is the estimated capital cost cash flow which incorporates risks associated with capital costs.

Table 4: Public Sector Comparator – Capital Cost Risk Adjustment

Capital Cost Risk Adjustment			Million USD
Project Year	Construction Risk	Maintenance Cost Risk	Total Risk Adjustment
0	3	2.1	5.1
1	3.1	3.5	6.6
2	2	5	7
3	2	3.1	5.1
4	3	3.4	6.4
5	1	3.6	4.6
6		3.3	3.3
7		2.7	2.7
8		2.5	2.5
9		2.8	2.8
10		2.9	2.9

Table 5: Public Sector Comparator – Capital Cost Cash flows

Capital Cost Cash Flows						Million USD
Project Year	Building	Site Development	Equipment	Capital Receipts	Risk Adjustment	Total Capital
0				2.5	5.1	2.6
1	15	5	3	2	6.6	27.6
2	25	7	2		7	41
3	32	6	5		5.1	48.1
4	30				6.4	36.4
5	5				4.6	9.6
6					3.3	3.3
7					2.7	2.7
8					2.5	2.5
9					2.8	2.8
10					2.9	2.9

The project team then went ahead and estimated the operating cost of the project. There is a common belief in the team that certain changes are envisaged by the government which would limit the function of the technology hub. This aspect is likely to be related to certain regulatory compliance issues and separation of execution and regulation functions of the institution. The project officer believes that the risk from such regulatory changes is significant and material enough to include its impact in calculating the operating costs of the project. The second important element of operating risk relates to technological risk which the team believes is very real and material for the technology hub proposed and should be captured in the cost of the project. The figures below present the calculation for operating cost cash flows of the project over the ten year term of the project.

Figure 3: Public Sector Comparator – Operating Cost Risk Adjustment

Operating Cost Risk Adjustment				Million USD
Project Year	Regulatory Risk	Technological Risk	Total Risk Adjustment	
0				0
1				0
2				0
3				0
4				0
5				0
6	3	10		13
7	3.5	9		12.5
8	6	9.8		15.8
9	8	9.9		17.9
10	8	9.8		17.8

Figure 4: Public Sector Comparator – Operating Cost Cash Flows

Operating Cost Cash Flows					Million USD
Project Year	Building	Equipment	Risk Adjustment	Total Operating Costs	
0	1	2.5	0		3.5
1	1.5	2.1	0		3.6
2	3.8	1.8	0		5.6
3	7	1.5	0		8.5
4	10	1.9	0		11.9
5	15	1.75	0		16.75
6	15	1.5	13		29.5
7	22	1.7	12.5		36.2
8	20	1.5	15.8		37.3
9	21	1.8	17.9		40.7
10	21	1.65	17.8		40.45

Having calculated the capital and operating cost cash flows, the team now estimates the total undiscounted cash flow of the project. This figure is calculated at approximately USD 410 million. However the team is aware that this does not take into account the time value of money and hence they now calculate the discounted cash flow for the project with an assumed discount rate taken at 5%. The figure below show the calculation of the discounted cash flow of the project and the Net Present Value of the Public Sector Comparator thus arrived at.

Figure 5: Public Sector Comparator – Net Present Value

Net Present Value (Public Sector Comparator)					Million USD
Project Year	Capital Costs	Operating Costs	Total Undiscounted Cash flows	Discounted Cashflows*	
0	2.6	3.5	6.1		6.1
1	27.6	3.6	31.2		29.7
2	41	5.6	46.6		42.3
3	48.1	8.5	56.6		48.9
4	36.4	11.9	48.3		39.7
5	9.6	16.75	26.35		20.6
6	3.3	29.5	32.8		24.5
7	2.7	36.2	38.9		27.6
8	2.5	37.3	39.8		26.9
9	2.8	40.7	43.5		28.0
10	2.9	40.45	43.35		26.6
Net Present Value (Public Sector Comparator)					321.1

*Discount Rate assumed at 5%

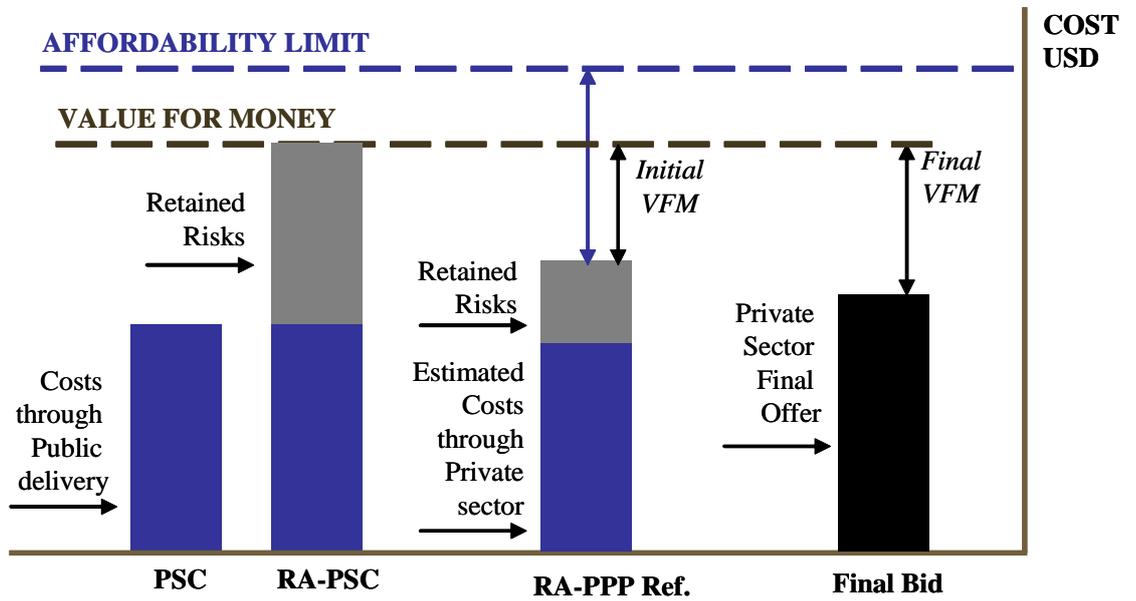
2. Assessing Initial Value for Money

As explained earlier, authorities should initially apply a more qualitative approach to determining Value-for-Money and will focus on increasing competitive pressure throughout procurement. Over time, a quantitative comparison of the PSC and PPP reference may be applied as an initial value for money test. This initial Value-for-Money test needs to be performed by the institution to demonstrate the rationale for undertaking PPP procurement. The final Value-for-Money analysis is a part of the PPP procurement phase wherein the private party bids received for the project are compared to the PSC to determine the actual value for money of the project. To perform the initial value-for-money test, the institution should:

- *Verify the PSC and PPP reference projects:* perform a check of the two calculations is undertaken to ensure that the projects meet the service delivery specifications, all costs associated with the specifications are incorporated, and all risks have been valued appropriately. Also, ensure that the costs have been calculated on a whole life basis and that the underlying assumptions are reasonable and appropriate.
- *Establish the initial indication of value for money:* The institution is required to give an initial indication of value for money that the project is likely to provide if it were procured through PPP rather than conventional public procurement.
 - The comparison of the PSC and the PPP reference projects is based on the net present value of cash flows. This is preferred as the timing of cash flows for the two projects may not be identical and the NPV calculates the present value of all future cash flows, thereby enabling comparison. It is therefore critical that the underlying assumptions (discount rate, inflation rate, etc.) used in calculating the NPV in both cases should be identical.
 - As previously discussed in Appendix 1 the treatment of residual asset value also has an impact on the comparison between the PSC and the PPP reference project.
 - In the case where the PPP does not pass the residual value risk to the private party, the asset simply returns to the institution for zero or nominal consideration, and the private party earns a return on the initial investment through the service charges payable. Since the institution is left with an asset with a remaining useful life, there is a deduction of the Net Present Cost of the service charges to reflect the lower true net cost of the service provided under the contract. If such a deduction from the PSC is made then the same should also apply to the PPP reference project. The residual value can also be excluded from the estimates as it will not have an impact on the difference between the PSC and the PPP reference project. However, it is important to be consistent in the approach to dealing with residual value (i.e. it should either be included in both cases or excluded in both cases).
 - Where the PPP contract involves passing residual risk to the private party, the institution usually has the option of paying an amount equal to the market value at the end of the contract in order to retain the asset, or to pay nothing and leave the asset with the private party. In this case, no residual value deduction is needed from the NPV of the service payments to calculate the NPV of the services under the PPP. However, for the PSC model calculation, an assumption is made regarding the deduction needed to avoid overstating the cost of services.

- The figure below provides a schematic representation of the value for money test. In the absence of a PSC calculation, final VFM will entail a comparison of the PPP reference against the final preferred bid from the procurement process.

Figure 6: Initial Assessment of Value for Money



3. Risk Identification and Allocation

Risk is an inherent part of all projects. In the context of the PSC, risk reflects the potential for additional costs above the base case or for revenue below it. For the PSC to provide a meaningful test of value-for-money when compared to the private bids, it must include a comprehensive and realistic pricing of all quantifiable and material risks.

When constructing the PSC, the value of risk is included in the cash flow numerator. This is seen as offering the following advantages:

- By valuing risk as a separate cash flow item, government is better able to focus on the key factors influencing the optimal level of risk allocation;
- Cash flow valuation takes better account of the timing of risk by analysing the risk profile of each risk. For example, construction risk arises early in the project, while upgrade and residual value risks arise towards the end;
- The value and impact of a particular risk may vary over time; and
- Cash flow valuation provides a transparent methodology by using a consistent government discount rate across projects.

3.1. Identifying the Project Risks

The first step in managing and allocating risk is to identify all risks associated with a project. Risks are usually identified by reference to generic risk categories and/or risks based on different phases of the project. The risks associated with project phases include: bid phases; negotiations with bidders; construction; operation and transfer risks. The first two project phase risks are not accounted for in the PPP agreement. An illustrative list of risks associated with a project are presented in the table below.

Table 6: Constructing a Risk Matrix – Risk Identification

Risk category	Description of risk
Commissioning risk	The risk that the infrastructure will not receive all approvals to satisfy the output specification, such as changes in legislation which cause a specific output specification to not materialise
Construction risk	The risk that the construction of the assets required for the project will not be completed on time, budget or to specification
Demand (usage) risk	The risk that actual demand for a service is lower than planned
Design risk	The risk that the proposed design will be unable to meet the performance and service requirements in the output specification
Environmental risk	The risk that the project could have an adverse environmental impact which affects project costs and was not foreseen in the environmental impact assessment
Financial risk	The risk that the private sector over stresses a project by inappropriate financial structuring
Force majeure risk	An act occasioned by an unanticipated, unnatural or natural disaster such as war, earthquake or flood of such magnitude that it delays or destroys the project and cannot be mitigated
Industrial relations risk	The risk that industrial relations issues will adversely affect construction costs, the project timetable and service delivery
Latent defect risk	The risk that an inherent defect exists in the structure being built or equipment used, which is not identified upfront and which will inhibit provision of the required service
Operating risk (service under-performance)	The risks associated with the daily operation of the project, including an unexpected change in operating costs over and above the budget

Risk category	Description of risk
Performance risk	The risk that the operator will not perform to the specified service level, such as a power generator supplying less power than demanded
Change in law risk	The risk that the current regulatory regime will change materially over the project or produce unexpected results
Residual value risk	The risk relating to differences from the expected realisable value of the underlying assets at the end of the project
Technology obsolescence risk	The risk that the technology used will be unexpectedly superseded during the term of the project and will not be able to satisfy the requirements in the output specification
Upgrade risk	The risks associated with the need of an asset upgrade over the term of the project to meet performance requirements

Source: Partnerships Victoria, Technical Note on Public Sector Comparator

The depth and accuracy of information collected should reflect the materiality of the costs (or revenues) to be quantified. It would generally be inappropriate to devote excessive time and resources to valuing minor or less sensitive risks. For the purpose of constructing the PSC, only material risks should be included.

3.2. Risk Assessment

After all material risks have been identified, the next step would be to assess and quantify the consequence of each risk. The two factors impacting the consequence of the risk are first the likelihood of its occurrence and second the size of the impact if it were to materialise.

The consequences of risk can be either direct or indirect. Direct consequences include time and cost overruns over and above the initial base costs used in the Raw PSC. Indirect consequences arise from the interaction between risks, where the occurrence of one risk has knock-on implications for other aspects of the project. When identifying the consequences of a particular risk, the potential interaction between risks needs to be considered. This is particularly relevant where the risk would delay the critical path and has a knock-on effect throughout the project.

Table 7: Constructing a Risk Matrix – Direct Consequences of risk

Risk category	Direct Consequence
Commissioning risk	Additional ramp-up costs, cost of maintaining existing infrastructure or providing a temporary alternative solution where this leads to a delay in the provision of the service
Construction risk	Additional raw materials and labour costs, cost of maintaining existing infrastructure or providing a temporary alternative solution where this leads to a delay in the provision of the service
Demand (usage) risk	Reduced revenue based on lower throughput
Design risk	Cost of modification, redesign costs
Environmental risk	Additional costs incurred to rectify an adverse environmental impact on the project, incurred from the construction or operation of the project or pre-existing environmental contamination
Financial risk	Additional funding costs for increased margins or unexpected refinancing costs
Force majeure risk	Additional costs to rectify
Industrial relations risk	Increased employee costs, lost revenue or additional expenditure during delay in construction or post-construction service provision
Latent defect risk	Cost of new equipment or modification to existing infrastructure
Operating risk	Increased operating costs or reduced revenue over the project term
Performance risk	Cost of failing to comply with performance standards
Change in law risk	Cost of complying with new regulations
Residual value risk	Lower realisable value for underlying assets at end of project term

Risk category	Direct Consequence
Technology obsolescence risk	Cost of replacement technology
Upgrade risk	Additional capital costs required to maintain specified service above the level included in the raw PSC
Maintenance risk	Increased cost of repairs above the level included in the raw PSC

Source: Partnerships Victoria, Technical Note on Public Sector Comparator

A useful tool for identifying the consequences and financial impact of risk is a risk matrix. A comprehensive risk matrix should be more than an indication of whether each risk should be transferred, retained or shared. It should also identify the main consequences, financial impact and potential mitigation strategies for each risk. This allows the risk matrix to serve as a reference point for valuing risk in a PSC. An example of a risk matrix is presented in the table below:

Table 8: Constructing a Risk Matrix – Example of a risk matrix element

Risk	Cause	Consequence of risk	Potential financial impact	Strategy/ mitigation
Commissioning risk – delay in service provision	(1) Failure to complete or construct adequately	Cost and time overruns (e.g. additional ramp-up costs) Cost of maintaining existing infrastructure or providing a temporary solution because of inability to deliver the new facility as planned	Dependent on extent of time overrun Known (monthly/daily) cost but dependent on extent of time overrun Dependent on probability of risk occurring	Allocate risk to bidder; fixed time and price contract with an experienced builder Ensure construction company provides a liquidated damages bond
	(2) Council failure to deliver approvals in a timely manner	Cost and time overruns (e.g. additional ramp-up costs) Cost of maintaining existing infrastructure or providing a temporary solution because of inability to deliver the new facility as planned	Dependent on time taken to acquire approvals (if they can be obtained at all) Dependent on probability of risk occurring	Simplify approval process (as far as is reasonable) Obtain as many approvals as is possible prior to contract signature Use best legal advisers to determine and obtain all approvals required
	(3) Flaws in output specification	Cost and time overruns (e.g. additional ramp-up costs) Cost of maintaining existing infrastructure or providing a temporary solution because of inability to deliver the new facility as planned	Dependent on extent of time overrun Known (monthly/daily) cost but dependent on extent of time overrun Dependent on probability of risk occurring Potential cost of redefining the output specification Dependent on probability of risk occurring	Remove high risk technological elements from specification (keep it simple and unambiguous) Nature of commissioning tests should be clearly spelt out upfront, focusing attention on whether the output specification will be met

Source: Partnerships Victoria, Technical Note on Public Sector Comparator

It is useful to separate the different causes and consequences of each risk for two reasons:

- Different consequences may have a different probability of occurring — typically, more severe consequences have a lower probability of occurring; and
- It may be optimal to allocate different causes for the same risk between the parties, based on their ability to manage it at least cost.

This process is performed for each risk to complete the risk matrix. The entire process should be thoroughly documented to ensure an adequate probity trail exists to justify the risk valuation and allocation, and to allow for future review of the process.

Having identified the material risks and assessed the variety of potential consequences, it is then necessary to estimate the probability of each of the consequences occurring. There are various risk valuation techniques that can be used to provide probability estimates. These range from simple techniques that provide a subjective estimate of probability, to more advanced techniques that produce weighted probabilities for specific risks based on given confidence intervals, and single comprehensive risk estimates for all project risks using multivariable statistical techniques.

3.3. Quantifying the Risk

This step involves assessing the financial impact of the risk. Given that the project risks are captured only in the numerator of the cash flows rather than being an intrinsic element of the discount rate, a contingency factor should be included in each major risk category (e.g. construction, operations and maintenance) to account for any unobservable costs which would otherwise lead to the undervaluation of identifiable and quantifiable risks.

The amount of the contingency that should be added to the major risk categories depends on a number of factors, including:

- The accuracy of information used in valuing the particular risk;
- The size of the contingency (as a proportion of the underlying cost) — this will be inversely proportional to the amount of resources devoted to valuing the observable components of the risk;
- The degree of uncertainty for completeness.

The institution should also gather contingency risk data from previous public procurement projects and base its contingency factor for a particular risk or risk category on this, as well as supplementary information from the private sector where appropriate (e.g. where these have not been previously included). The value of each risk is then calculated individually using the following probability weighted formula:

$$\text{Value of risk} = \text{consequence} \times \text{probability of occurrence} + \text{contingency}$$

Once the consequences and probability of the occurrence have been quantified, the value of each risk can be determined. There is often more than one possible consequence for a particular risk. The value of each risk in such cases is the sum of all these probability weighted consequences (assuming the consequences are all independent), plus a contingency amount.

3.4. Estimating the Probability of Occurrence

The techniques for estimating the probability of occurrence of a consequence vary from simple probability valuation techniques based on subjective estimates to more advanced probability valuation based on multivariate statistical techniques.

- **Simple probability valuation:** In its most basic form probability valuation involves making subjective estimates of the likelihood of the occurrence of each risk. It is normally based on past experience, current best practises and anticipated improvements in future. One such technique is to make point estimates. This would involve realistically estimating the extent to which the final cost of the project is likely to be above or below the estimated value of the PSC. Each point estimated will be associated with a likely consequence and the consequence would be dependent on the materiality of the occurrence to the project. In case of subjective estimates as well as in empirical estimation, all assumptions related to the estimation should be clearly stated and documented.
- **Advanced probability valuation:** These techniques involve estimating the probability of occurrence by creating a probability distribution and interpreting resulting outputs. These distributions are based on professional experience, supported where available by historical information and reliable assumptions from similar recent projects. Once these distributions have been calculated, a reliable estimate of probability can be provided at a given level of accuracy (known as the confidence interval). Statistical risk measures have the advantage that they are based on rigorous economic principles, use a mix of professional experience and available information, and map a variety of possible outcomes. Conversely, they have the disadvantage that they can be more complicated to calculate and interpret and may require a significant amount of reliable information to determine an appropriate distribution. This may be significantly mitigated where experienced risk professionals are engaged, increasing the ability to make reliable and objective forecasts. The accuracy and reliability of probability distribution estimates therefore depends on the capability to provide reasonable forecasts of likely outcomes, supported by the quality of available information. Instead of estimating each risk and its components separately, it may be possible to calculate a single risk measure through multivariable analysis and simulation. These techniques typically involve the use of computer-based simulation packages. One accepted method of multivariable analysis is the Monte Carlo simulation. This technique constructs an artificial probability distribution for total risk, or a subset of risks, based on assumed or actual distributions for each of the individual risks. It then provides a single value for risk by simultaneously solving a number of different risk relationships.

The choice of risk valuation technique should depend on the size and complexity of the project and the cost benefit analysis of using an advanced probability valuation technique.

3.5. Illustration of Estimation of the Value of Risk

This illustration of estimating risk is adopted from Partnerships Victoria- Public Sector Comparator, Technical Note.

Consider the construction of a number of new educational facilities with a total base cost of USD100 million. Closer examination indicates that the following risk consequences are associated with construction of the facilities:

- **Likely increase in construction costs (based on average cost overruns):** Evidence suggests there is a 15% probability that actual total construction costs will be the same as the initial base

cost (included in the raw PSC). It is also determined that there is a 40% probability that total construction costs will exceed the base amount by 10% ('likely' scenario), a 25% probability that costs will exceed the base amount by 15% ('moderate' scenario), and a 15% probability of a 25% increase in costs ('extreme' scenario). In addition, there is a 5% probability that costs will be 5% below the base amount;

- **Increase in costs arising from a delay in the construction schedule (time overrun):** Assume the cost of delay is a uniform USD 4 million per year, accumulating at a constant rate over the year. The procurement team estimates there is a 15% probability that the facilities will be completed on time, a 50% probability that completion of the new facility will be delayed by one year, and a 25% probability that construction will be delayed by 18 months. In addition there is a further 10% probability that the delay will be two years;
- **The cost of providing similar services during the delay period, generally from existing facilities ('service maintenance'):** In this case, the probability of needing to provide similar services is assumed to be directly related to the probability of a time overrun, and that the cost of utilizing existing facilities to meet required demand will be USD 3 million per year;
- **Increase in construction costs if the planned facility is not sufficient and additional treatment capacity needs to be added ('upgrade costs'):** The procurement team estimates there is a 20% probability that the facilities will be completely adequate and no upgrade will be required. In the event that additional upgrades are required over the initial design, it is estimated that there is a 40% probability that the cost will be approximately 5% of the initial base amount ('likely' scenario), a 30% probability that the cost will increase by 7% ('moderate' scenario), and a further 10% probability that the cost will increase by 10% ('extreme' scenario); and a contingency factor of 2% is also included to account for any unobservable costs associated with construction risk.

These scenarios can be represented in a simple risk valuation table.

Figure 7: Constructing a Risk Matrix – Example of risk valuation table

Scenario	Outcome	Consequence	Probability	Value of Risk
Cost Overruns				
Below Base Figure	95	-5	5%	-0.3
No Deviation from Base	100	0	15%	0.0
Overrun- Likely	110	10	40%	4.0
Overrun- Moderate	115	15	25%	3.8
Overrun- Extreme	125	25	15%	3.8
<i>Subtotal</i>				<i>11.3</i>
Time Overruns				
No Time Overrun	100	0	15%	0.0
Overrun- Likely	104	4	50%	2.0
Overrun- Moderate	106	6	25%	1.5
Overrun- Extreme	108	8	10%	0.8
<i>Subtotal</i>				<i>4.3</i>
Service Maintenance				
No Deviation from base	100	0	15%	0.0
Overrun- Likely	103	3	50%	1.5
Overrun- Moderate	104.5	4.5	25%	1.1
Overrun- Extreme	106	6	10%	0.6
<i>Subtotal</i>				<i>3.2</i>
Upgrade Costs				
No Deviation from base	100	0	20%	0.0
Overrun- Likely	105	5	40%	2.0
Overrun- Moderate	107	7	30%	2.1
Overrun- Extreme	110	10	10%	1.0
<i>Subtotal</i>				<i>5.1</i>
Contingency Factor (2% value of project)				2
Total Value of Risk =				25.9

The timing of each possible consequence then needs to be assessed. This may be different for a number of consequences within a particular risk, and is represented in the simple matrix below.

Figure 8: Constructing a Risk Matrix – Timing and probability of consequence

Consequence	Year 0	Year 1	Year 2
Cost Overrun	70%	30%	
Time Overrun	71%	29%	
Service Maintenance*		71%	29%
Upgrade Cost*		100%	
Contingency Factor*	70%	30%	

*In practice, these risks may be expected to occur in later years. However, for illustrative purposes, all consequences are assumed to occur in Years 0-2.

For example, the cost of providing a similar service will only be incurred once the service is expected to be delivered under the timetable assumed in the reference project (e.g. Year 1). The timing of the contingency factor is assumed to be the same as the cost overrun. The subtotal cost of each risk component is then allocated across the term of the project according to the time weightings given above. For example, the cost overrun component (in real terms) would be allocated as follows:

Figure 9: Constructing a Risk Matrix – Allocating Cost of Risk

(USD Million)

Consequence	Year 0	Year 1	Year 2
Cost Overrun	7.9 (11.3 x 70%)	3.4 (11.3x 30%)	0 (11.3 x 0%)

Each of the components then needs to be converted into nominal cash flows to account for the effect of inflation. In this example, inflation is assumed at 2.5% per year.

Figure 10: Constructing a Risk Matrix – Estimating Present Value of Risk

(USD Million)

Cost	Year 0	Year 1	Year 2
Construction Risk			
Cost Overrun	7.9	3.4	0
Time Overrun	3.1	1.2	0
Service Maintenance	0	2.3	0.9
Upgrade Cost	0	5.1	0
Contingency Factor	1.4	0.6	0
Real Cost	12.4	12.6	0.9
Nominal Costs (assuming inflation at 2.5% p.a.)	12.4	12.9	1
Discounted Cash Flow	12.4	11.9	0.8
Present Value of Construction Risk	25.1		

Thus the present value of construction risk for this project has been estimated at USD 25.1 million.

3.6. Estimating Transferable Risk

All risks of the project can be classified as either Transferable Risk (those that institution seeks to allocate to bidders) or Retained Risk (that institution is willing to accept). However, there may be situations where specific components of a particular risk are allocated between parties, or where an overall risk is shared. In the former situation, the particular risk needs to be separated into both its Transferable and Retained Risk components. Risk sharing may occur in accordance with an agreed formula contained in a negotiated contract. For example, where a department or agency is not expected to be the only end-user of an asset or service, government may specify a base level of demand it will support. Bidders may be required to take demand risk above this base level.

Where a risk is classified as a Transferable Risk, bidders should be given a substantial degree of flexibility to determine the best method of controlling the costs associated with that risk. This creates a powerful incentive for bidders to manage the risk in the overall interests of the project, while delivering greater value for money to government. This is further enhanced through the use of a performance-based payment mechanism. Achieving an optimal risk allocation can have substantial value for money implications.

Once all the Transferable Risks have been identified, the size and timing of the expected cash flows associated with each risk needs to be aggregated to determine the NPC of the

Transferable Risk component of the PSC. Each of the risks should be included as a separate cash flow item and then added to form the Transferable Risk component, to allow for a detailed analysis of the key risks and their sensitivity to the overall PSC.

3.7. Estimating Retained Risk

Retained risk is that component of the risk of the project that the institution will continue to bare in a PPP arrangement. The scope of Retained Risk reflects the nature of the project and the output specification. Where government retains responsibility for the provision of core services, these should not be considered in the intended risk allocation, as they are not part of the project. For example, in a project for the provision of educational facilities, government maintains the responsibility of providing teachers and developing the curriculum outside the project. This risk does not form part of the project's Retained Risk.

Once all the Retained Risks have been identified, the size and timing of the expected cash flows associated with each of these risks needs to be aggregated to determine the NPC of the Retained Risk component of the PSC. Each of the risks should be included as a separate cash flow item and then added to form the Retained Risk component to allow for a detailed analysis of the key risks and their sensitivity to the overall PSC.

3.8. Risk Allocation

The principle governing risk transfer is that each risk should be allocated to whoever is best able to manage it at least cost, taking into account public interest considerations. This requires an optimal rather than maximum transfer of risk. It is determined by assessing the ability of each party to reduce the probability of a risk occurring, and to minimise the consequences if that risk eventuates.

It is unlikely that either government or bidders will be best suited to manage all the risks of a project. Factors to be considered include:

- The nature of the project;
- The respective strengths and ability of each party to manage a risk (this may change over time as each party's risk mitigation skills improve);
- Flexibility of the output specification (whether any constraints exist which influence the method for managing risk);
- Previous levels of risk transfer (this indicates the historical success of each party in managing particular risks and the potential ability to manage risk in the future);
- Prevailing market attitudes towards risk;
- Public interest factors; and
- Other policy considerations.

3.9. Risk Mitigation

Risk mitigation is a component of risk allocation. Risk mitigation is any action that can be taken to reduce:

- The likelihood of a risk materialising; or
- The consequences to the contracting party taking the risk, if it does materialise.

Risk mitigation is an attempt to reduce the relevant party's exposure to the risk and inherently increases the likelihood of achieving (or bettering) the project's base case scenario. Mitigation practices vary depending on the risks being considered and whether the party concerned is a private or public one.

Private sector risk mitigation mechanism is passing through the risk to a third party. It is one of the most commonly used and readily available risk mitigation option for private parties is to pass the risk on to other parties who are able to control it at a lower risk premium. This supplementary risk allocation creates a chain of risk bearers, each best placed to control the particular risk, and each insulated from the collective risks which the private party would otherwise have to bear. Other private sector risk mitigation mechanisms include insurance, use of financial market instrument and developing diversified project portfolios. Public sector risk mitigation measures are similar to those used in the private sector. Additionally an institution could consider taking steps to reduce the risk during the procurement stage.

An illustration of a risk matrix adopted from Partnerships Victoria's Note on Risk Allocation and Contractual issues, is presented in the following pages:

Table 9: Constructing a Risk Matrix – Elements of a risk matrix element

Risk Category	Description	Mitigation	Preferred Allocation
Existing structure (refurbishment/ extensions)	Risk that existing structures are inadequate to support new improvements	Private party will pass to builder which relies on expert engineering reports	Private party
Site conditions	Risk that unanticipated adverse ground conditions are discovered which cause construction costs to increase and/or cause construction delays	Private party will pass to builder which relies on expert testing and due diligence	Private party
Approvals	Risk that necessary approvals may not be obtained or may be obtained only subject to unanticipated conditions which have adverse cost consequences or cause prolonged delay	Prior to beginning the tender process government may seek a planning scheme amendment or environmental impact assessment taking risk of a route diversion or special measures to protect environmental values; for example in the case of linear infrastructure (road, rail, pipeline); during the tender process by means of a Project Development Agreement both government and the private party may achieve a measure of pre-contractual certainty allowing an early start to the approval process and a sharing of costs	Private party possibly up to a specific cost amount unless government assumes because of complexity or sensitivity
Environmental (1)	Risk that the project site is contaminated requiring significant expense to remediate	Reliance on expert reports and insurance	Private party will generally assume the risk although because of the time and cost implications of full due diligence for each bidder, some risk sharing may be a cost effective solution particularly using a regime for allocation of cost consequences such as a Material Adverse Effect regime
Environmental (2)	Risk that prior to financial close offsite pollution has been caused from a government preferred site	Government to commission reports; government should also have greatest knowledge of past uses of its site	Government may assume responsibility by way of indemnity or obligation to compensate for unidentified off

Risk Category	Description	Mitigation	Preferred Allocation
	(any site) to adjacent land		site pollution pre financial close where the site is a preferred government site
Environmental (3)	Risk that prior to financial close (in case of a non-government site) or after financial close (any site) offsite pollution is caused to adjacent land	Private party can manage site activity	The private party will be in control of activities on the site post financial close and will be required to assume risk of offsite pollution caused by those activities; also it will take risk of offsite pollution from any site which is not a government preferred site (even if it occurs pre-completion)
Clean-up and rehabilitation	Risk that the use of the project site over the contract term has resulted in a significant clean up or rehabilitation obligation to make the site fit for future anticipated use	Private party able to manage the use of the asset and attend to its maintenance and refurbishment; government may require sinking funds if it is to resume the site and its use is liable to result in significant clean-up/rehabilitation cost	Private party to take risk (whether government is to resume or not) and must demonstrate financial capacity or support to deliver the site in the state required by government
Native title	Risk of costs and delays in negotiating indigenous land use agreements where project site may be subject to native title or risk injunction and/or invalidity of approvals	Search of registers and enquiry if appropriate and take expert advice	Government will usually take risk on government preferred sites as it generally has a better understanding of procedures, has special powers of acquisition and use of native title land for infrastructure and is usually in best position to manage this risk; government is also in better position to negotiate where policy discourages use of compulsory acquisition power
Cultural heritage	The risk of costs and delays associated with archaeological and cultural heritage discoveries	Search of registers and enquiry if appropriate and take expert advice	Government will generally take risk on government preferred site as it generally has a better understanding of procedures, and is usually in best position to manage this risk otherwise private party takes responsibility
Availability of site	Risk that tenure/access to a selected site which is not presently owned by government or private party cannot be negotiated	Bidders obligation to secure access prior to contract signing	Private party, as it makes the decision to bid on a non-preferred site
Design	The risk that the design of the facility is incapable of delivering the services at anticipated cost	Private party may pass risk to builder/architects and other subcontractors while maintaining primary liability; government has the right to abate service charge payments where the risk eventuates and results in a lack of service - it may ultimately result in termination where the problem cannot be suitably remedied	Private party will be responsible except where an express government mandated change has caused the design defect
Construction	The risk that events occur during construction which prevent the facility being delivered on time and on cost	Private party generally will enter into a fixed term, fixed price building contract to pass the risk to a builder with the experience and resources to construct so as to satisfy the private party's obligations under the contract	Private party will be liable unless the event is one for which relief as to time or cost or both is specifically granted under the contract, such as force majeure or government intervention
Commissioning	The risk that either the physical or the operational commissioning tests which are required to be completed for the provision of services to commence, cannot be	No payment by government until all physical and operational commissioning tests have been successfully completed	Private party, although government will assume an obligation to cooperate and facilitate prompt public sector attendance on commissioning tests

Risk Category	Description	Mitigation	Preferred Allocation
	successfully completed		
Interest rates pre-completion	The risk that prior to completion interest rates may move adversely thereby undermining bid pricing	Interest rate hedging may occur including under Project Development Agreement	Government may assume or share
Sponsor risk	The risk that the private party is unable to provide the required services or becomes insolvent or is later found to be an improper person for involvement in the provision of these services or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure	Ensure project is financially remote from external financial liabilities, ensure adequacy of finances under loan facilities or sponsor commitments supported by performance guarantees; also through the use of non-financial evaluation criteria and due diligence on private parties (and their sponsors)	Government
Financing unavailable	The risk that when debt and/or equity is required by the private party for the project it is not available then and in the amounts and on the conditions anticipated	Government requires all bids to have fully documented financial commitments with minimal and easily achievable conditionality	Private party
Further finance	The risk that by reason of a change in law, policy or other event additional funding is needed to rebuild, alter, reequip etc. the facility which cannot be obtained by the private party	Private party must assume best endeavours obligation to fund at agreed rate of return with option on government to pay by way of uplift in the services charge over the balance of the term or by a separate capital expenditure payment; government to satisfy itself as to likelihood of this need arising, it's likely criticality if it does arise, and as to financial capacity of private party to provide required funds and (if appropriate) budget allocation if government itself is required to fund it	Government takes the risk that private finance is unavailable
Change in ownership	The risk that a change in ownership or control of the private party results in a weakening in its financial standing or support or other detriment to the project	Government requirement for its consent prior to any change in control. private party will seek to limit this control to circumstances where substantive issues are of concern such as financial capacity and probity	Government risk as to the adverse consequence of a change if it occurs; private party risk that its commercial objectives may be inhibited by a restrictive requirement for government consent to a change
Refinancing benefit	The risk (upside) that at completion or other stage in project development the project finances can be restructured to materially reduce the project's finance costs	Government will assure itself that likely benefit has been factored into competitive bids to avoid the risk that the private party will be allowed to earn super profits from the project	Private party to benefit; government will share in limited circumstances (essentially, in symmetrical risk allocation and super profits)
Tax changes	The risk that before or after completion the tax impost on the private party, its assets or on the project, will change	The financial returns of the private party should be sufficient to withstand such change; with respect to specific infrastructure taxation particularly that relating to transactions with government, the private party should obtain a private tax ruling	Private party
Inputs	The risk that required inputs cost more than anticipated, are of inadequate quality or are unavailable in required quantities	Private party may manage through long term supply contracts where quality/quantity can be assured; private party can address to some extent in its facility design	Private party unless government controls inputs e.g. water catchments
Maintenance and Refurbishment	The risk that design and/or construction quality	Private party to manage through long term subcontracts with	Private party

Risk Category	Description	Mitigation	Preferred Allocation
	is inadequate resulting in higher than anticipated maintenance and refurbishment costs	suitably qualified and resourced sub-contractors and through formal or informal consultation processes with government	
Changes in output specification outside agreed specification range	Risk that government's output requirements are changed after contract signing whether pre or post commissioning	Government can mitigate this risk to an extent by minimising the chance of its specifications changing and, to the extent they must change, ensuring the design is likely to accommodate it at least expense; this will involve considerable time and effort in specifying the outputs up front and planning likely output requirements over the term	Government
Operator failure	Risk that a subcontract operator may fail financially or may fail to provide contracted services to specification	Government will carry out due diligence on principal subcontractors for probity and financial capacity and commission a legal review of the major subcontracts including the guarantees or other assurances taken by the private party; if failure does occur the private party may replace the operator or government may require operator replacement	Private party is fully and primarily liable for all obligations to government irrespective of whether it has passed the risk to a subcontractor
Technical obsolescence or innovation	Risk of the contracted service and its method of delivery not keeping pace, from a technological perspective, with competition and/or public requirements	Private party may arrange contingency/reserve fund to meet upgrade costs subject to government agreement as to funding the reserve and control of reserve funds upon default; also monitoring obligations in the contract and work on detailed, well-researched output specifications (government) and design solution (private party)	Private party except where contingency is anticipated and government agrees to share risk possibly by funding a reserve
General economic downturn	In a user pays model, the risk of a reduction in economic activity affecting demand for the contracted service	Where government is the primary off-taker the private party will seek an availability payment element; otherwise the private party will ensure robust financial structure and sponsor/financier support	Private party except to the extent that government has committed to an availability payment element or agreed to provide redress for impact of government subsidised competition
Competition	In a user pays model the risk of alternate suppliers of the contracted service competing for customers	Private party to review likely competition for service and barriers to entry	Private party except to the extent that government has committed to an availability payment element or agreed to provide redress for impact of government subsidised competition
Demographic change	The risk of a demographic/socio-economic change affecting demand for contracted service	Private party to review likely competition for service, barriers to entry	Private party except to the extent that government has committed to an availability payment element
Inflation	Risk that value of payments received during the term is eroded by inflation	Private party seeks an appropriate mechanism to maintain real value e.g. via linkage to CPI; government concern to ensure its payments do not overcompensate for inflation and to avoid any double payment for after costs adjustments e.g. on changes in policy/law	Private party takes risk on the methodology adopted to maintain value; government shares to the extent of agreed indexation
Withdrawal of support network	The risk that, where the facility relies on a complementary government network, that support is withdrawn or varied adversely affecting the project	Private party will seek financial redress against change which unfairly discriminates against the project particularly on a user pays project where revenue is directly affected; under an availability model private party will seek to	Government where the change discriminates against the project

Risk Category	Description	Mitigation	Preferred Allocation
		avoid abatement if government 'prevention' is cause of unavailability	
Changes in competitive network	The risk that an existing network is extended/ changed/ re-priced so as to increase competition for the facility	Private party will seek financial redress against change which unfairly discriminates against the project by government subsidising competition (existing or new)	Private party except to the extent that government provides redress for appropriate, discriminatory changes
Interface (1)	The risk that the delivery of core services in a way which is not specified/anticipated in the contract adversely affects the delivery of contracted services	Government manages core service activities allowing it to influence the materialisation of interface risk and its consequences; other mitigants include an upfront assessment (by both government and the private party) of the likely interface issues, continual review and monitoring and development of a communications strategy in respect of delivery of the two related services; government will also specify in the contract the extent of core services and the way in which they will be delivered so that only manifest and adverse changes and deficiencies can trigger this risk	Private party except to the extent that government provides redress for appropriate, discriminatory changes
Interface (2)	The risk that the delivery of contracted services adversely affects the delivery of core services in a manner not specified/anticipated in the contract	Private party manages contracted service activities	Private party
Industrial relations and civil commotion	Risk of strikes, industrial action or civil commotion causing delay and cost to the project	Private party or its sub-contractors manage project delivery and operations	Private party
Approvals	The risk that additional approvals required during the course of the project cannot be obtained	Private party to anticipate requirements	Private party unless government has initiated the change requiring approval
Changes in law/policy (1)	The risk of a change in law/policy of the State Government only, which could not be anticipated at contract signing and which is directed specifically and exclusively at the project or the services and which has adverse capital expenditure or operating cost consequences for the private party	Government may mitigate its liability for such change by monitoring and limiting (where appropriate) changes which may have these effects or consequence on the project and via mechanisms in the contract allowing compensation only above a pre-agreed 'Significant Amount'; also requiring the private party to effect the change in such a manner that the financial effect on government is minimised and, if payment is required, that payment is made in a way and a time best suited to government (e.g., pay on a progressive scale); also (in a user pays model) having in place a regulatory regime which allows pass through to end users	Government: although the parties may share the financial consequences of capital cost increases in an agreed way, for example by the private party meeting a percentage of the cost up to a specific limit and government meeting any excess
Changes in law/policy (2)	In some cases, the risk of a change in law/policy (at whatever level of government it occurs) which could not be anticipated at contract signing which is general (i.e. not project specific) in its application and which causes a marked increase in capital costs and/or has	Government mitigates by excluding changes such as tax changes or changes for which the private party is compensated under a CPI adjustment or similar and only allowing compensation above a pre-agreed Significant Amount; also, again mechanisms could be used to minimise and manage financial impact on government and (where	Government: although the parties may share the financial consequences of capital cost increases in an agreed way for example by the private party meeting a percentage of the cost up to a specific limit and government meeting any excess

Risk Category	Description	Mitigation	Preferred Allocation
	substantial operating cost consequences for the private party	appropriate) a regulatory regime to allow pass-through to end users	
Regulation	Where there is a statutory regulator involved there are pricing or other changes imposed on the private party which do not reflect its investment expectations	Private party to assess regulatory system and may make appropriate representations	Private party
Force majeure	The risk that inability to meet contracted service delivery (pre or post completion) is caused by reason of force majeure events	Private party given relief from consequences of service discontinuity; if uninsurable, private party may establish reserve funding; government to establish contingency for alternate service delivery; if insurable, private party must ensure availability of insurance proceeds towards repair of asset and service resumption and government is to be given the benefit of insurance for service disruption costs	Private party takes the risk of loss or damage to the asset and loss of revenue, government takes some risk of service discontinuity both as to contracted service and core service subject to insurance availability and will need to arrange alternative service provision the cost of which will be met from redirected service payments and (if insurable) any shortfall made up from insurance proceeds
Technical obsolescence	The risk that design life of the facility proves to be shorter than anticipated accelerating refurbishment expense	Private party may have recourse to designer, builder or their insurers	Private party, but in certain high technology projects costs may be anticipated and shared
Default and Termination	Risk of 'loss' of the facility or other assets upon the premature termination of lease or other project contracts upon breach by the private party and without adequate payment	Private party (and its debt financiers) will be given cure rights (time and opportunity) to remedy defaults by the private party which may lead to termination including under tripartite deed with financiers; also only serious breaches by the private party to lead to termination; if termination occurs pre completion government may (but need not) make payment for value in the project on a cost to complete basis; if it occurs post completion the private party may receive fair market value less all amounts due to government; government will require step in rights to ensure access and service continuity until ownership/control issues are resolved	Private party will take the risk of loss of value on termination
Residual value on transfer to government	The risk that on expiry or earlier termination of the services contract the asset does not have the value originally estimated by government at which the private party agreed to transfer it to government	Government will impose on the private party maintenance and refurbishment obligations, ensure an acceptable maintenance contractor is responsible for the work, commission regular surveys and inspections; it may also direct funds from the project into dedicated controlled sinking fund accounts to accumulate funds sufficient to bring the asset to agreed condition and/or (if required) obtain performance bonds to ensure the liability is satisfied	Government