

STAGE 2

# Options Analysis Guide

Business Case Development Framework

Release 3.1



Queensland  
Government

The Department of State Development and Infrastructure connects industries, businesses, communities and government (at all levels) to leverage regions' strengths to generate sustainable and enduring economic growth that supports well-planned, inclusive and resilient communities.

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#### **CONTRIBUTORS**

The following resources have been used as references in the development of this guide:

- Victorian Department of Treasury and Finance: Infrastructure investment, investment lifecycle and high-value, high-risk guidelines
- Infrastructure Australia: Assessment Framework
- NSW Treasury: The NSW Government Business Case Guidelines

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The Business Case Development Framework guides the development of business cases for infrastructure proposals. This guide considers Stage 2: Options Analysis as illustrated in Figure 1.

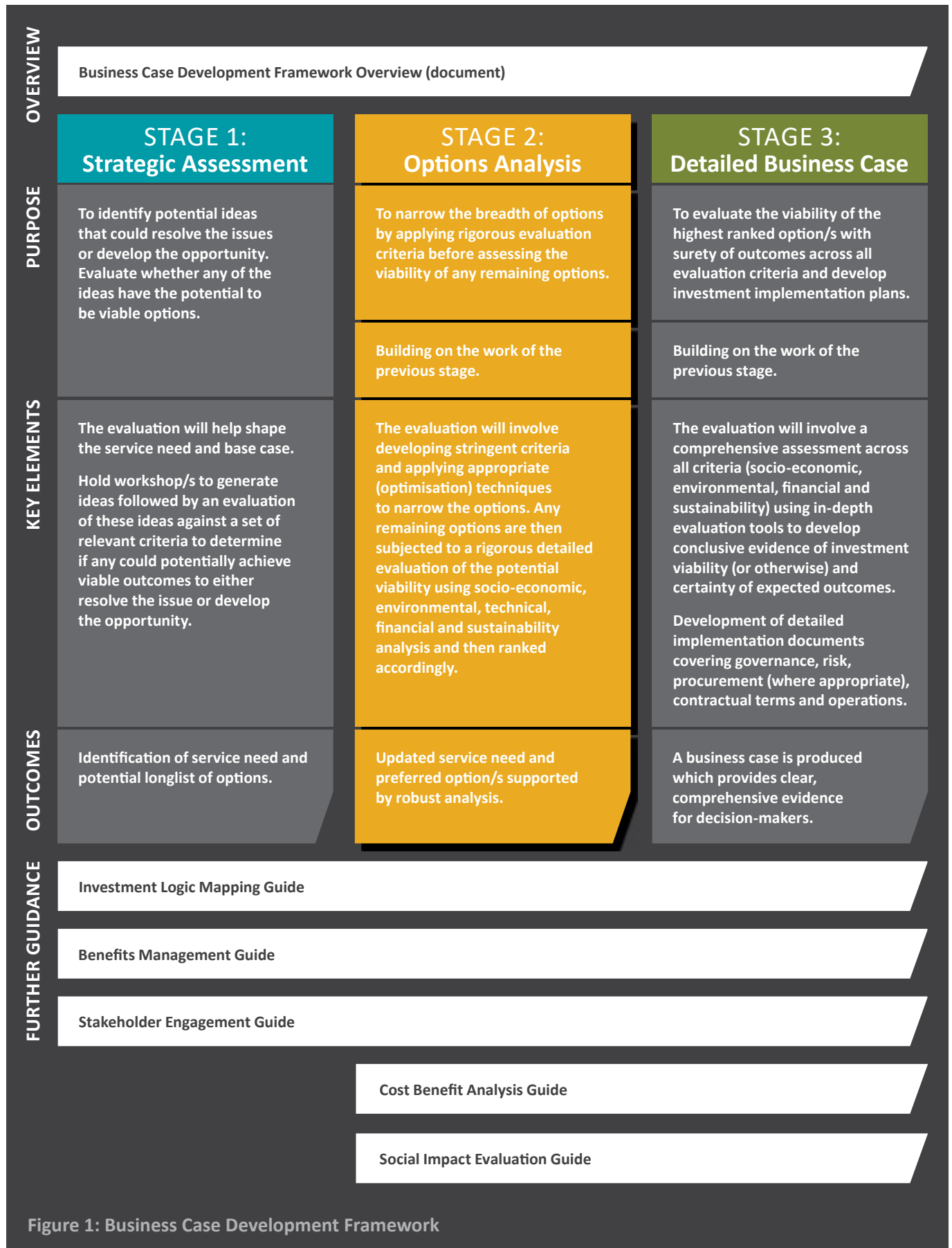


Figure 1: Business Case Development Framework

## POLICY CONTEXT

The Queensland Government is committed to delivering efficient and effective public services through strong people-focused principles and strategic service drivers.

This vision is supported by government's commitment to continuously improve public sector accountability and advance Queensland through innovative service delivery. This will ensure the right infrastructure is delivered in the right place at the right time to meet current and emerging needs.

## WHAT IS A BUSINESS CASE?

A business case is a documented value proposal addressing service need. It aligns with key government strategic objectives and is considered the core management and assurance tool to inform investment decisions that maximise value for taxpayer dollars and benefits for Queenslanders.

The objective of developing a robust, service-need-centric business case is to ensure resource allocation and decisions are well timed, deliver value-for-money, and are fit for purpose. Risks should be appropriately considered and managed to ensure investments are consistent with government priorities and objectives.

A well developed business case provides transparency of analysis to support investment decisions.

## WHAT IS THE BUSINESS CASE DEVELOPMENT FRAMEWORK?

The Business Case Development Framework provides fit-for-purpose guidance in recognition of the different needs, assumptions and considerations for analysis across infrastructure investment proposals.

## PRINCIPLES FOR BUSINESS CASE DEVELOPMENT

CONSIDERATIONS	QUESTIONS
Investment	<ul style="list-style-type: none"><li>» Have non-built solutions been considered?</li><li>» What evidence will the analysis add to substantiate the case for investment?</li></ul>
Decision	<ul style="list-style-type: none"><li>» Does the proposal include all the necessary analysis to inform the decision-maker?</li></ul>
Credibility	<ul style="list-style-type: none"><li>» Has the analysis been informed by contemporary and reliable information?</li><li>» Are considerations and assumptions clearly articulated?</li></ul>
Transparent	<ul style="list-style-type: none"><li>» Has the information been prepared without bias and has consideration been given to managing risks and benefits?</li></ul>
Comparability	<ul style="list-style-type: none"><li>» Does the assessment support comparison to other infrastructure proposals?</li></ul>
Accountability	<ul style="list-style-type: none"><li>» Does the proposal clearly identify a single point of ownership for:<ul style="list-style-type: none"><li>› sponsorship?</li><li>› planning and development?</li><li>› engagement of stakeholders?</li><li>› risk and benefits management?</li></ul></li></ul>

Figure 2: Business Case Development Framework principles

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# Introduction

## How to use this guide

This guide can be used as both a source book and a road map to consider the documentation and concept analysis needed for a robust and transparent Stage 2: Options Analysis. The structure of the guide mirrors that of the Stage 2: Options Analysis Template, with each section referencing what you need to consider for options analysis documentation and reporting.

This guide, its companion template and supporting supplementary guides include a range of tools to guide your business case analysis and documentation. The contents of these documents are important—they include things to consider, assessment criteria and checklists—and will help you develop a business case that supports a robust, transparent and comparable evaluation. As each proposed investment is unique, you should tailor your analysis to fit the proposal. Support any changes with a rigorous and transparent process.

The following key content indicators have been included in call-out boxes to help you use this guide:



### REFERENCE



### TARGET/EXPECTATION



### FLAG/IMPORTANT TO NOTE

There may be instances where an investment decision occurs without a complete prior assessment through the Business Case Development Framework (BCDF). The BCDF is a fit-for-purpose framework recognising that all proposed investments/circumstances are unique and the business case analysis can be tailored to fit the proposal (in some instances these tailored business cases have been referred to as Project Validation Reports, or PVRs).

Even where investment decisions may have been made in advance, a tailored business case should build on the foundations of the BCDF to consider key proposal risks (e.g. social, environment, legal and deliverability) and value-for-money community outcomes, to provide confidence to decision makers.



This guide outlines a minimum standard only. It is not intended to cover all policy obligations or agency requirements.

The level of analysis required for a robust and transparent Stage 2: Options Analysis will vary, depending on the complexity of the proposal.

## Purpose

The purpose of the Stage 2: Options Analysis is to assess the potential options developed at Stage 1: Strategic Assessment.

The Stage 2: Options Analysis builds on the assessment of service need and benefits in the Stage 1: Strategic Assessment. It uses a structured options assessment process where the longlist of options is reduced to a smaller number of robust and defensible shortlist options. The shortlisted options should be analysed to identify preferred option/s for detailed analysis in Stage 3: Detailed Business Case. Completing the activities outlined in Stage 1: Strategic Assessment will support the integrity and quality of your Stage 2: Options Analysis.

This guide is supported by additional detailed material in the Cost Benefit Analysis (CBA) Guide and Social Impact Evaluation (SIE) Guide. The relationship between this document and other Business Case Development Framework (BCDF) documents is shown in Table 1.

## Structure of this guide

The guide is divided into five main sections:

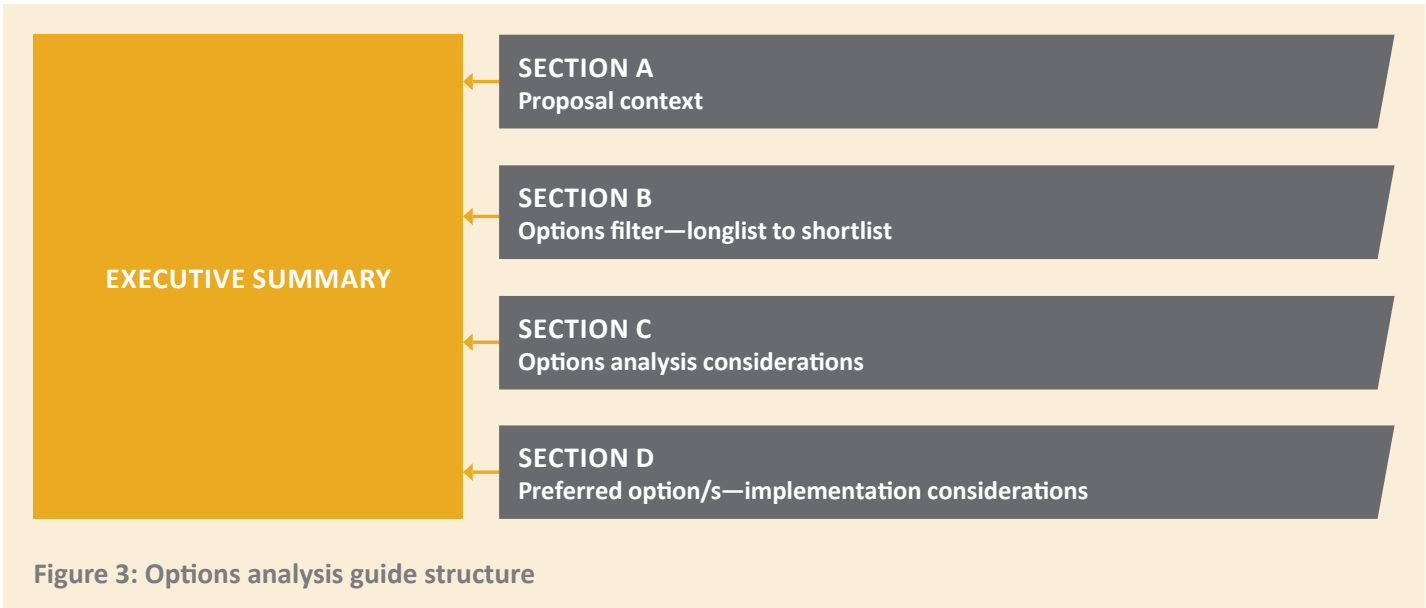
1. Executive summary
2. Section A: Proposal context
3. Section B: Options longlist to shortlist
4. Section C: Options analysis considerations
5. Section D: Preferred option/s—implementation considerations.

Figure 3 presents the options analysis guide structure.

This guide has been designed to work with the Stage 2: Options Analysis Template document.

**Table 1: Business case development**

	<b>STAGE 1: STRATEGIC ASSESSMENT</b>	<b>STAGE 2: OPTIONS ANALYSIS</b>	<b>STAGE 3: DETAILED BUSINESS CASE</b>
<b>Purpose</b>	Conceptualisation: <ul style="list-style-type: none"> <li>» articulates the service need to be addressed</li> <li>» identifies intended benefits</li> <li>» develops a longlist of options</li> </ul>	Options consideration: <ul style="list-style-type: none"> <li>» reconfirms service need</li> <li>» analyses and assesses options</li> <li>» identifies preferred option/s</li> <li>» confirms whether to invest in a Stage 3: Detailed Business Case</li> </ul>	Preferred option/s analysis: <ul style="list-style-type: none"> <li>» reconfirms Stage 2: Options Analysis</li> <li>» confirms the economic, social, environmental and financial viability for investment decision-making</li> </ul>
<b>PAF stage</b>	Strategic Assessment of Service Requirement (SASR)	Preliminary evaluation	Business case
<b>Supporting documents</b>	<ul style="list-style-type: none"> <li>» Benefits Management Guide</li> <li>» Investment Logic Mapping Guide</li> <li>» Stakeholder Engagement Guide</li> </ul>	<ul style="list-style-type: none"> <li>» Benefits Management Guide</li> <li>» Social Impact Evaluation Guide</li> <li>» Cost Benefit Analysis Guide</li> <li>» Investment Logic Mapping Guide</li> <li>» Stakeholder Engagement Guide</li> </ul>	<ul style="list-style-type: none"> <li>» Benefits Management Guide</li> <li>» Social Impact Evaluation Guide</li> <li>» Cost Benefit Analysis Guide</li> <li>» Investment Logic Mapping Guide</li> <li>» Stakeholder Engagement Guide</li> </ul>





# Approach

## Business case development stages

Business case development does not always follow a linear process. However, for efficiency, the Queensland Government recommends that you prepare a business case in several sequential development/analysis stages. Consider and agree key content before you progress further.

Note that some activities will inform or refine earlier assessments (Stage 1: Strategic Assessment) and information developed within sections of the Stage 2: Options Analysis will link to other sections, as illustrated in Table 2.

**Table 2: Key development stages and activities**

STAGE	ELEMENT	KEY ACTIVITIES	OUTPUTS	COMMENTS
<b>Stage 1: Strategic Assessment</b>	Service need identification/clarification  (summary in Section A)	<ul style="list-style-type: none"> <li>» Document the problem/opportunity and justify why a service need exists, including demand</li> <li>» Document the proposal background and strategic environment</li> <li>» Identify stakeholders</li> <li>» Conduct investment logic mapping (ILM) workshop with key stakeholders</li> <li>» Identify high-level initiatives that could respond to the service need</li> <li>» Identify longlist options</li> </ul>	<ul style="list-style-type: none"> <li>» ILM</li> <li>» Proposal background section</li> <li>» Service need section</li> <li>» Strategic considerations section</li> <li>» Initial risk register</li> </ul>	<ul style="list-style-type: none"> <li>» Assessment of service need should be undertaken during the Stage 1: Strategic Assessment and updated and documented in this stage</li> </ul>

## Options analysis

The Stage 2: Options Analysis should:

- » reconfirm the service need and strategic context
- » document how the proposed response contributes to government policy
- » explain the proposal scope, providing sufficient detail to allow decision-makers to understand how the service need will be addressed
- » filter the longlist of options to a shortlist
- » confirm and assess potential options, giving decision-makers confidence that the most appropriate option/s will progress to the Stage 3: Detailed Business Case for more detailed analysis
- » document the economic, social, environmental and financial viability of shortlisted options to support selection of the preferred option/s

- » recommend, where appropriate, option/s to be considered for detailed assessment in the Stage 3: Detailed Business Case (where you will undertake further analysis on the commercial, financial, economic and social viability of the proposal) to allow investment decision-makers to decide whether to invest in the proposal
- » consider whether the preferred option/s is suitable to be delivered as a Public Private Partnership (PPP) or should be progressed by a traditional delivery model.
- » consider value creation and capture opportunities for funding.<sup>1</sup>

The analysis within a proposal is not a linear process. Some activities will inform or refine other assessments, and information developed within sections of the Stage 2: Options Analysis will link to other sections, with all analysis focused on risks and benefits, as illustrated in Figure 4: Development of the Stage 2: Options Analysis.

<sup>1</sup> Aligned to the first three steps outlined in Section C5: Financial Analysis.

**EXECUTIVE SUMMARY**

**STAKEHOLDER ENGAGEMENT**

**SECTION A: Proposal context**

Proposal background  
Governance and assurance  
Service need  
Base case

**SECTION B: Options longlist to shortlist**

Options longlist  
Shortlisting options from longlist

**SECTION C: Options analysis considerations**

Social impact evaluation  
Environmental assessment  
Sustainability assessment  
Economic analysis  
Financial analysis  
Affordability analysis  
Options analysis

**SECTION D: Preferred option/s implementation considerations**

Market considerations  
Delivery model analysis  
Next steps

**BENEFITS**

**RISK**

**CONCLUSIONS**

**RECOMMENDATIONS**

Figure 4: Development of the Stage 2: Options Analysis

## Program versus individual project

You should consider whether to prepare and present a business case for a program, portfolio or for an individual proposal. This should be an early consideration, ideally at Stage 1: Strategic Assessment. For example, a strategic program master plan or investment plan, continues into a Stage 2: Options Analysis program master plan, or portfolio investment plan considering priority options. As the proposal progresses, the need for additional actions or activities may arise at Stage 3: Detailed Business Case.

Using a whole-of-life, whole-of-system program approach to business case analysis can improve infrastructure outcomes. It allows clearer, more transparent decision-making by creating end-to-end visibility of a long-term portfolio investment.

Some considerations when choosing a program or portfolio business case include:

- » Are there many proposals/options (projects) under a single coordinating structure or portfolio?
- » Does each project contribute to the same or similar outcomes?
- » Are the projects part of a long-term plan that needs to be executed and made a priority over an extended period e.g. beyond the forward estimates?
- » Are subsequent projects necessary to achieve full benefits and improved outcomes?
- » What is the value of the program and is approval needed?

The Business Case Development Framework (BCDF) allows fit-for-purpose flexibility for program-based business cases. If a potential program has several major, complex and interdependent projects, consider a business case for the program master plan and a separate business case for each individual project. Identify and apportion the risks, costs, benefits and outcomes to each project, as well as for the combined program/portfolio. You can then develop the business case analysis at the detailed business case stage in the context of its broader program, system or portfolio. Similarly, all aspects applied to analysis at an individual proposal level can also be applied to program-level business cases.

### Note on terms

For the Business Case Development Framework (BCDF), the use of the term 'proposal' refers to the suite of options identified, and subsequently refined, to one or several options.

The 'options analysis' includes the full spectrum of approaches to address the service need (problem/opportunity) e.g. reform, better use, improve existing and new build.

A 'project' is an activity to create a product or service, whereas a 'proposal' is a plan to be considered for the creation of a product or service. Business cases are the development of the plan (or proposal) for investment consideration.

All proposals should consider lifecycle costs (capital and operating), benefits and risks, business and operational changes, regulatory and/or legislative changes as well as infrastructure implementation and service delivery.



## Stakeholder engagement

Stakeholder engagement during options analysis is critical to the quality of the options analysis and outcomes. Stakeholder engagement activities in the Stage 2: Options Analysis help support:

- » greater understanding of different stakeholders' perceptions of the service need, which can help identify appropriate initiatives or options
- » effective identification of stakeholders' expectations about potential options and the benefits, helping to assess potential demand and commercial considerations
- » better outcomes and greater accuracy in identifying public interest considerations
- » establishment of 'social licence' i.e. stakeholders' ongoing approval and social acceptance of a proposal
- » effective risk management (refer Stage 3: Detailed Business Case Guide)
- » improved proposal outcomes when there are overlapping jurisdictions or when approvals are required from multiple departments or independent regulatory agencies. These improved project outcomes may include time, cost and user satisfaction.



Further information on effective stakeholder engagement during proposal development is included in the BCDF Stakeholder Engagement Guide.



Where a proposal is considered to be of national significance, your proposal team should engage with Infrastructure Australia. If Infrastructure Australia is likely to consider the proposal further, make sure your Stage 2: Options Analysis recommendations include two proposal options for further consideration in your Stage 3: Detailed Business Case.

## Overall considerations

The extent of your Stage 2: Options Analysis should be informed by the size, scope, risk and complexity of the proposal. This guide is designed to help you develop a quality, robust and transparent options analysis with a continual focus on effectively managing benefits, risks and stakeholder engagement.

### The analysis for a proposal must be supported by appropriate evidence.

#### Robust evidence:

- » includes sound analysis, assumptions and inputs, and allows for uncertainty, which increases with time
- » uses well-developed quantitative or qualitative data collection techniques
- » adopts defensible methodologies
- » uses appropriate forecasting such as a spreadsheet or model that is purpose built and appropriate
- » explains limitations e.g. small survey size and/or low survey response rate
- » references, where applicable, data and inputs from major statistical and research agencies such as the Australian Bureau of Statistics, the CSIRO or the Bureau of Meteorology.

#### Current evidence:

- » uses the most contemporary information available.

#### Sources of evidence:

- » use agency data collection, published performance indicators and statistical collections
- » include relevant and contemporary population growth (or decline) and demographic change data.



# Executive summary

## Purpose

The executive summary gives the reader a clear and concise overview of all relevant aspects of the proposal and the actions you would like from the investment decision-makers.

## Considerations

Prepare the executive summary after the analyses are complete and you have prepared the conclusions and recommendations sections.

The executive summary should:

- » tell the story and be easy to read
- » include all key aspects of the proposal
- » clearly identify all decisions required and the associated implications
- » be concise, self-contained and able to be read independently of the full options analysis report.

## Content to include

At a minimum, this section should provide a summary of all material aspects of the Stage 2: Options Analysis and the recommendations, as well as:

- » the service need, problem and opportunity statements
- » the targeted outcomes and benefits
- » the options identified (longlist) and your assessment that establishes a shortlist of options
- » all assessments and an analysis of the viability of shortlisted options (risk, cost, economic, environmental, social, sustainability, funding<sup>2</sup>, financial, commercial, delivery and affordability) to support your recommendations
- » recommendations for decision-makers.


To provide a concise overview for decision-makers, include an appraisal summary table to help consolidate the critical information for each of the shortlisted options.

## Outcomes

The reader will be able to understand the key aspects of the proposal including outcomes from the analyses, conclusions and recommendations.

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<sup>2</sup> Including consideration of value creation and capture opportunities where appropriate.



Section A:  
Proposal context

Section A should give information on the strategic context for the proposal. This will form the foundation for the analysis in sections B and C. It should also provide decision-makers with a clear outline of:

- » the proposal's history and background
- » governance and assurance
- » the underlying service need
- » benefits targeted
- » base case.

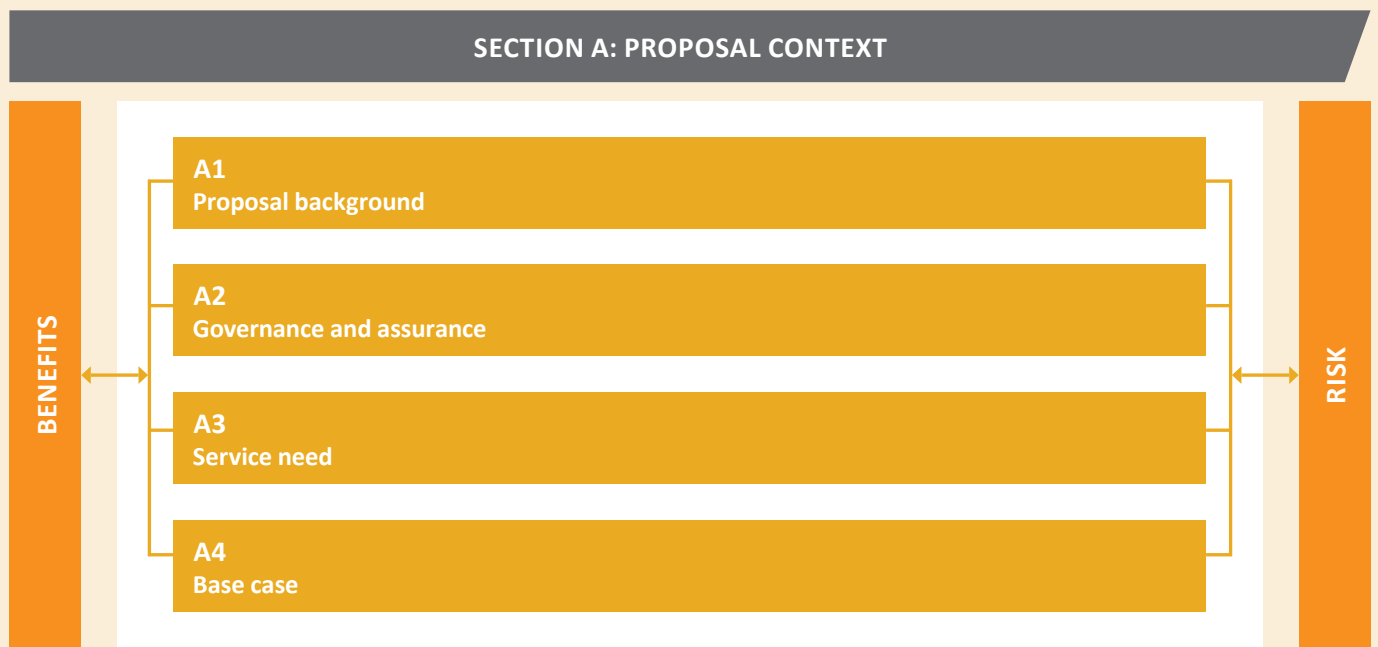


Figure 5: Overview of proposal context

# A1 Proposal background

## Purpose

The background provides a concise history and context for the proposal.

## Considerations

- » Infrastructure proposals sometimes develop over several years. If this is the case, your proposal background should note any effect this time period has had on the underlying assumptions and approaches to your proposal.
- » Review the output and analysis from the Stage 1: Strategic Assessment including identifying any material changes since it was prepared. Note how you have considered the previous stage in progressing the proposal through to Stage 2: Options Analysis. This may include:
  - › planning and policy changes and impacts e.g. strategic considerations, alignment and changes in government objectives
  - › changes to proposal objectives, scope, needs, demand, benefits and risks
  - › changes to the environment e.g. new initiatives or options, emerging stakeholders, emerging opportunities, economic changes, population demographics, social and political changes
  - › any concerns about the timeliness and validity of data used to justify the service need—and subsequent adjustments needed
  - › review longlist options analysis to make sure your analysis is still robust and/or test your options against changes that have emerged since Stage 1: Strategic Assessment.



Consider the potential for optimism/momentum bias and, if appropriate, conduct an independent review of the Stage 1: Strategic Assessment analysis, outcomes and recommendations.



## Content to include

Table 3 lists the required content and considerations for this section.

**Table 3: Proposal background content considerations**

CONTENT	CONSIDERATIONS
<b>Proposal environment</b>	<ul style="list-style-type: none"> <li>» Location (include a map)</li> <li>» Investment context e.g. Proposal originated during a period of drought or higher economic activity</li> <li>» History of the proposal</li> <li>» Scope and depth of all relevant investigations and studies</li> <li>» Related projects and proposals</li> </ul>
<b>History of the proposal</b>	<ul style="list-style-type: none"> <li>» Background to the proposal including:               <ul style="list-style-type: none"> <li>› when a problem/opportunity was selected for consideration</li> <li>› when the service need was first identified</li> <li>› an outline of any relevant planning works</li> <li>› any feasibility studies undertaken (previous and ongoing), noting their scope, depth and results</li> </ul> </li> <li>» Summary of previous decisions</li> <li>» Details of any assurance processes you completed to support the strategic analysis stage</li> </ul>
<b>Review of Stage 1: Strategic Assessment</b>	<ul style="list-style-type: none"> <li>» Review the Stage 1: Strategic Assessment or output from a Strategic Assessment of Service Requirement (SASR) or Strategic Business Case (SBC) to confirm the service need, benefits targeted, initiatives and longlist options.</li> <li>» Document any material changes since the Stage 1: Strategic Assessment was prepared, noting how you considered changes as you progressed the proposal through the Stage 2: Options Analysis. Material changes may include:               <ul style="list-style-type: none"> <li>› planning and policy changes</li> <li>› changes and impacts e.g. strategic considerations/alignment/changes in government objectives</li> <li>› changes to proposal objectives, scope, needs, benefits and risks</li> <li>› changes to the environment e.g. new initiatives/options, emerging stakeholders, emerging opportunities, economic changes, and social and political changes</li> <li>› any concerns (and subsequent adjustments) regarding the age and validity of data used to justify the service need.</li> </ul> </li> <li>» The longlist of options developed at Stage 1: Strategic Assessment form the basis for Stage 2: Options Analysis.</li> <li>» The longlist of options should be reconsidered here to ensure it remains current and relevant.</li> </ul>

## Outcomes

The proposal background should clearly explain where the proposed initiative is located and why the proposal came about, including reference to contemporary information and policy developments.

## A2 Governance and assurance

### Purpose

This section should consider the arrangements for developing, approving and assuring the Stage 2: Options Analysis.

### Considerations

#### GOVERNANCE

- » Governance arrangements will vary depending on the complexity of the proposed options and the number of agencies with responsibilities in delivering the option/s.
- » Review any governance arrangements established for the previous stage to make sure they are still appropriate.

#### ASSURANCE

- » Assurance gives grounds to assess whether the options analysis is robust and gives a sound basis for decision-makers to consider the proposal.
- » Assurance should be informed by the complexity and risk of the proposal.
- » The nature and extent of assurance activities should be informed by:
  - › **The nature and risk of the proposal options:** Assess the overall risk and potential financial exposure associated with the options. Risks (including financial, social and environmental) that are rated as high for completing the options analysis should inform the specific assurance activities.

Before completing the Stage 2: Options Analysis, you should undertake a Gate 1 Assurance Review (if considered appropriate). The results of this review should be incorporated into the analysis and should be documented and noted in this section.

Gateway reviews are mandatory for ICT-related initiatives. The Queensland Government Chief Information Office (QGCIO) can give you further information on the requirements for ICT-related gate reviews.



Documenting the governance and assurance arrangements for the options analysis assures the decision-makers that the appropriate people, expertise and agencies have participated and that you have undertaken robust and evidence-based options analysis.



Assurance activities are designed to improve the efficiency and effectiveness of a proposal and the quality of its outputs.

- › **The experience and maturity of the agency or department:** The extent of assurance activities you need will also depend on your agency's experience and maturity in previous infrastructure assessments and/or in developing business cases.
- » Principles to underpin establishing assurance activities include:
  - › **Complete:** documents contain all the information necessary for an investment decision.
  - › **Reliable and reasonable:** the quality of the information is appropriate to address specific requirements of the option and can be relied on because it has been prepared with appropriate expertise and rigour.
  - › **Comparable:** the information is presented in a way that allows 'like-for-like' comparison with other option analysis processes.
  - › **Transparent:** the information has been prepared without bias and with all risks, implications and mitigations clearly documented.
  - › **Owner-engaged:** throughout the development of the options analysis, the Senior Responsible Owner (SRO) was engaged and is ultimately accountable for justifying the service needs and the benefits identified in the options analysis.
- » The Stage 2: Options Analysis and the economic, cost and risk, financial and commercial assessments should be independently peer reviewed and assured.

## Content to include

Table 4 lists the required content and considerations for this section.

**Table 4: Governance and assurance content considerations**

CONTENT	CONSIDERATIONS
<b>Proposal development governance</b>	<p>The governance arrangements should consider:</p> <ul style="list-style-type: none"> <li>» the proposal owner</li> <li>» the project team, including roles and responsibilities for elements of the work</li> <li>» the project steering committee, including central agency and, if appropriate, DSDILGP representation</li> <li>» a project control group</li> <li>» working groups</li> <li>» overall approach to developing the proposal.</li> </ul> <p>When planning who should be involved, consider:</p> <ul style="list-style-type: none"> <li>» The project steering committee should include representation of agencies/individuals who can or may influence the outcomes/progress of the proposal in this and future stages</li> <li>» The project control and/or working groups should include representatives who have specific knowledge and expertise to guide the development of the options analysis, including potential end-users.</li> <li>» Governance structures for the development and approval of the proposal should align with existing agency structures where possible.</li> </ul>
<b>Stage 2: Options Analysis approval governance</b>	<ul style="list-style-type: none"> <li>» Approval governance should include agency approval processes, Cabinet Budget Review Committee and, if appropriate, Cabinet.</li> </ul>
<b>Assurance mechanisms</b>	<p>Assurance mechanisms may include:</p> <ul style="list-style-type: none"> <li>» specialist reviewers to review both the approach and content of the document</li> <li>» peer and technical review to ensure the analysis is reliable, accurate and effectively supports a robust and transparent cost, risk, commercial and economic assessment. The review should include: <ul style="list-style-type: none"> <li>› the methodology and approach</li> <li>› data</li> <li>› supporting assumptions</li> <li>› modelling analysis.</li> </ul> </li> <li>» executive review</li> <li>» project health and governance reviews</li> <li>» focused technical reviews e.g. in response to an identified or perceived issue</li> <li>» Gateway Reviews.</li> </ul>

## Outcomes

Governance and assurance should clearly explain your structures and arrangements to manage and oversee the proposal development, as well as what approval processes and structures are needed. They should also communicate the approval processes and structures.

## A3 Service need

### Purpose

This section should clearly explain the service need (problem and/or opportunity) you are addressing and the demand for the proposal. The service need analysis is a critical input into the base case and the key analysis in sections B, C and D.

### Considerations

- » The service need may result from a problem/opportunity, which you should have identified in the earlier stage analysis.
- » When describing the service need, consider the cause, who/what (i.e. stakeholders) are affected and how. Describe how stakeholders are affected. Include evidence of the cause and impact of the problem/opportunity to support the identified service need. Evidence should be robust and current, and documented in the business case, where appropriate. Describe the timing of the problem/opportunity—is it immediate, interim, ongoing or escalating?
- » An investment logic mapping (ILM) workshop involving relevant stakeholders will help craft a shared understanding of the service need. Refer to the Investment Logic Mapping (ILM) Guide for additional guidance.
- » Consider whether to continue with an initiative if the proposal has been developed in response to a perceived current problem or future opportunity (i.e. 'nice to have') but cannot be supported by robust evidence.
- » If you have completed a strategic assessment before the options analysis, review the service need and identified options to ensure they are still valid. Any changes since the previous stage may affect the following options analysis elements:
  - › current state, including the strategic context
  - › expected future benefits, costs or risks, including demand
  - › options evaluation and selection of the preferred option
  - › stakeholders
  - › governance arrangements.
- » If you have not completed a strategic assessment before your options analysis, undertake the foundation of service need, benefits and initiatives analysis in Stage 1: Strategic Assessment.



The service need analysis should be sufficiently detailed to convey to decision-makers the underlying reason for the proposal.

The level of detailed demand analysis you undertake should give a high degree of confidence that the analysis is contemporary, robust and transparent, while also clearly documenting any limitations and constraints.



## A review of the service need should focus on:

### Effectiveness

What impact does the problem/opportunity have on the effectiveness of service delivery? Provide:

- » details of the effects of the problem/opportunity economically, socially and environmentally (include evidence)
- » demand analysis to help capture areas of need and any potential substitution effects

### Regulatory

Is the service need a statutory/regulatory requirement? Provide:

- » details of the relevant statutory, regulatory or organisational policy requirements and how they are currently being met or failing to be met
- » details of changes to statutory, regulatory or policy settings that have created an effect on existing services

### Service failure

Is the service no longer fit for purpose? Provide:

- » details of the extent of service failure and the effect on customers/users

### Extent

What are the broader links of the service need and the associated problem/opportunity? Provide:

- » the geographic and demographic reach of the service need, including relevant maps and supporting graphics
- » details of how the service need aligns with relevant strategic initiatives, regional and local plans, and the State Infrastructure Strategy (SIS)
- » any matters of national significance; consider the involvement of Infrastructure Australia
- » a summary of related projects and their potential impact on the benefits targeted by the proposal, noting any potential opportunities for integration and coordination

### Improved efficiency and reduced costs

Is the service need related to existing efficiency issues? Provide:

- » details and evidence of how service delivery is affected by underperformance or lack of infrastructure
- » quantified details of the impact of potential improvements, if the service need is met

### Timing considerations

Why does government need to act now? Provide:

- » explanation of any urgency in responding to the problem or seizing the opportunity
- » the timeframe for any potential impacts.

## Content to include

This section should include content as outlined in Table 5 below.

**Table 5: Service need content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<ul style="list-style-type: none"> <li>» Document the approach used to identify the service need.</li> <li>» Include details of any investment logic mapping exercise or research completed.</li> </ul>
<b>Service need statement</b>	<p>A service need statement should include two main elements:</p> <ol style="list-style-type: none"> <li>1. the problem/opportunity and how it will evolve over time</li> <li>2. why the problem/opportunity needs to be addressed now.</li> </ol> <p>The service need and supporting analysis should capture:</p> <ul style="list-style-type: none"> <li>» the ‘root causes’ of the problem and effects, noting how they may change over time (worsen or improve)</li> <li>» whether changes in demand (anticipated or existing) will affect the problem/opportunity (provide evidence)</li> <li>» an outline of the rationale for the service need to be addressed</li> <li>» risk and uncertainty, including climate change—refer Section A4: Base case</li> <li>» assumptions used for any projections or modelling</li> <li>» detail of the timing and extent of the problem/opportunity</li> <li>» estimated cost of problem/opportunity where possible.</li> </ul>
<b>Stakeholders</b>	<p>The options analysis is focused on risks and benefits. To understand the proposal impacts (benefits and risks to be mitigated), it is important to know which key stakeholders will (or may be) affected.</p> <ul style="list-style-type: none"> <li>» Stakeholders may include those with an actual or perceived interest e.g. environmental groups.</li> <li>» Stakeholders who can influence the design or delivery of the proposal options should be considered for all aspects of the options analysis.</li> <li>» Stakeholder assessment should include: <ul style="list-style-type: none"> <li>› the stakeholders—who they are</li> <li>› their level of interest</li> <li>› when to engage them</li> <li>› the type of information to share</li> <li>› their needs and expectations, both process and outcome</li> <li>› any needs or expectations that are mandatory e.g. accessibility requirements.</li> </ul> </li> </ul> <p>The stakeholder section in the service need chapter should summarise who is affected by the problem/opportunity, including individuals and groups who will be affected by the proposal either during construction or when it is in operation.</p> <p>If it is not appropriate to consult with external stakeholders while developing the proposal, you should consult representatives of stakeholder groups or staff who understand stakeholders’ perspectives and needs.</p> <p>The stakeholder analysis for the service need will support the development of the following content:</p> <ul style="list-style-type: none"> <li>» option selection and design (and, through this, cost and risks)</li> <li>» social impact evaluation</li> <li>» economic analysis</li> <li>» public interest considerations</li> <li>» sustainability assessment</li> <li>» environmental assessment.</li> </ul>

CONTENT	CONSIDERATIONS
<p><b>Current state</b></p>	<p>The current state describes the conditions influencing the service need. It provides a baseline from which the reader can understand what changes will happen if the proposal goes ahead.</p> <p>Documentation may include:</p> <ul style="list-style-type: none"> <li>» the stakeholders’ experiences</li> <li>» the physical condition of the infrastructure</li> <li>» performance issues</li> <li>» potential future state, including climate change</li> <li>» whole-of-life, whole-of-system implications.</li> </ul> <p>This section may include a discussion on the need for government intervention, implication of time delays, policy changes, changes in the proposal environment and any concerns with the relevancy of data used in previous analyses i.e. strategic assessment and options analysis.</p> <p>The current state analysis supports the development of the following content:</p> <ul style="list-style-type: none"> <li>» base case</li> <li>» options analysis, selection and design</li> <li>» social impact evaluation</li> <li>» economic analysis</li> <li>» public interest considerations</li> <li>» sustainability assessment</li> <li>» environmental assessment.</li> </ul> <p>There should be a strong relationship between the current state and the base case. The base case should incorporate the service need analysis and include further refined analysis to create the reference point for the social, economic (net incremental costs/benefits), financial and commercial analyses.</p>
<p><b>Targeted benefits</b></p>	<ul style="list-style-type: none"> <li>» Targeted benefits consider the intended benefits when responding to the service need, problem/opportunity. <ul style="list-style-type: none"> <li>› Benefits should be expressed in relation to their effect on proposed beneficiaries.</li> <li>› Benefits should be specific and relevant to the options.</li> </ul> </li> <li>» At the start of an options analysis, consider using an impact/benefits workshop, incorporating key stakeholder input to establish an initial benefit register to help frame further analysis.</li> <li>» To understand the targeted benefits when addressing the service need, you may need to consider and document: <ul style="list-style-type: none"> <li>› the intended outcome/s for the options and the benefits targeted</li> <li>› likely beneficiaries and their potential needs and expectations</li> <li>› an indication of any benefits that may be more highly regarded than others</li> <li>› previous post-assessments or lessons learned from previous projects</li> <li>› any assumptions that underpin the targeted benefits</li> <li>› any dependencies that have been identified</li> <li>› an indication of how critical the intended outcomes and benefits are</li> <li>› potential disadvantages and risks to achieving the benefits (include this information in the risk register).</li> </ul> </li> </ul>

CONTENT	CONSIDERATIONS
<b>Implications of not proceeding</b>	<p>Describe what is likely to happen if the proposal does not go ahead.</p> <ul style="list-style-type: none"> <li>» Implications might be social, economic, financial, environmental and sustainability focused as well as related to the performance of the asset/service. Include any potential equity and public interest concerns.</li> <li>» Include the implications of delaying a response (e.g. capacity limits will be reached, failure to meet government or legislative requirements, significant reduction in the level of service).</li> <li>» Frame the implications of not proceeding in terms of the effects on stakeholders.</li> </ul>

## Outcomes

The reader should understand the service need, the current state, benefits targeted and the implications of not proceeding.



## A4 Base case

### Purpose

The base case should set the critical baseline against which you analyse the social, economic and financial/commercial assessments. The base case should be an option in the longlist developed at Stage 1: Strategic Assessment. At this stage, the base case should be further refined and substantiated.

### Considerations

Developing and analysing a base case is essential as it:

- » shows the action and investment required by government in the absence of the proposal
- » is both the first option, and a point of comparison for all other options
- » is the benchmark against which the shortlisted options will be assessed.

The base case should be tightly specified and modelled on a whole-of-system, whole-of-life basis including all expected impacts, expenditures and benefits.

Developing and analysing a robust, transparent and evidence-based base case sets the frame of reference for the social, economic, environmental and financial analysis of the investment proposal. In all cases, developing a robust base case needs very careful consideration. The principle that underlines any base case is that it represents a realistic, practicable or workable assessment of the business-as-usual (BAU) state of the world.

The BAU base case should consider a whole-of-life, whole-of-system, whole-of-state perspective. Where appropriate, you should consider the proposal within the context of an existing program (systems perspective).

BAU forecasting should be a reasonable approximation of what is anticipated in an uncertain future. Things to consider when assessing uncertainty include:

- » That uncertainty (technological change, climate change, demographics, globalisation etc.) usually increases with time, resulting in declining confidence in forecasts and projections. These factors need to be integral to all aspects of your base case (and options) including:
  - › setting the evaluation period and terminal values
  - › benefit flows and sensitivity analysis
  - › scenario analysis.
- » The base case forecast/projections should not continue in straight-line perpetuity if the service levels or factors are unrealistic. This will determine the investment horizon at which a decision will need to be made.



Within an investment proposal, the projected performance of the option is compared with the situation expected to exist in the future (base case). The base case should describe the expected performance and situation, and may include an existing asset, program or policy change.

The base case documents a forward-looking baseline against which the economic and financial/commercial assessments of the investment proposal are completed.

- » Consider foresighting/alternate futures—including scenario and/or sensitivity analysis testing for options analysis and options design—to confirm resilience and sustainability in infrastructure investment (options and design).
- » Consider future trends, for example, as identified in Infrastructure Australia’s Australian Infrastructure Audit (2019), including:
  - › quality of life and equity
  - › cost of living and incomes
  - › community preferences and expectations
  - › economy and productivity
  - › population and participation
  - › technology and data
  - › environment and resilience.
- » Include, where appropriate, active consideration of climate change risks (adaptation and mitigation, supply and demand impacts and opportunities).

These considerations feed into the analysis and documentation of the following, in some cases interdependent, variables:

- » expected demand for and use of relevant existing infrastructure services
- » cost—Capital Expenditure (CAPEX), Operational Expenditure (OPEX), recurring CAPEX, rapidly declining service quality or significantly increasing maintenance costs
- » social trends e.g. demographic trends

- » technological trends e.g. the emergence of electric and automated vehicles
- » climate change impacts.
- » Practical examples of base case considerations include:
  - › **Keep safe and keep operating:** minimum expenditure to keep the asset/infrastructure operationally safe. For example, in the absence of the option, the state will continue to fund the operational cost of basic services like education, health, infrastructure maintenance, prisons etc. into the foreseeable future (beyond the forward estimates period).
  - › **Make safe and stop operating:** minimum expenditure to prevent any wider endangerment but without continuing to operate an asset in its existing fashion or provide the current service. For example, asset classes subject to changing regulatory regimes or climatic variability that make them non-conforming to continue operating into the future without additional safety-related investment. Examples include bridge and dam infrastructure.
  - › **Reasonable changes:** that could be 'reasonably expected' to happen given statutory obligations and/or professional standards. This could include modest spending to improve the effectiveness of existing assets and to maintain social licence to operate. Within these constraints, the government could defer investment in infrastructure capital expenditure until it has considered other non-infrastructure solutions. In such a case, the evaluation period may need to be truncated to the point in time where the investment becomes necessary.
  - › Importantly, in this scenario, the state may eventually need to invest in an infrastructure solution if the level of service in the business-as-usual (BAU) base case becomes unsustainable because for instance:
    - public expectations change causing significant political and social licence risks
    - service quality is unsustainable
    - legal or regulatory requirements change.
- › In some circumstances, BAU may represent a do-minimum, CAPEX spend where the level of service is sustainable from a social licence, legal or regulatory perspective. This may be linked to exploring other non-infrastructure solutions and/or a specified, likely short, evaluation period e.g. 7 to 10 years.
- › In some circumstances, the proposal may address some elements of BAU, for example, it may fund some OPEX in BAU. In this case, the option will need to be considered in the financial and economic analysis.
- › In some circumstances, such as those requiring the maintenance of absolute service levels, the state may not have any non-infrastructure deferral options to maintain BAU to meet reasonable community expectations, legal or regulatory requirements (which may be in the very short term or immediate). In this case, it may be possible that the BAU base case is in effect the option to ensure the most cost-effective solution, using a cost effectiveness assessment (CEA), while also assessing how well the proposal meets the business-as-usual service standards.
- » It is essential to account for current and future asset performance, potential reduction in service level and associated costs.
- » Elements in common across base cases:
  - › full life cycle benefits and costs including any actions which will be required in future to ensure the asset can operate at the relevant service levels
  - › should be consistent with most of the key assumptions in the options except, for example, funding
  - › costs and disbenefits of the problem should, to the extent possible, be monetised for the cost benefit analysis (CBA) and the financial and commercial analyses.

The base case should be well developed and articulated at the Stage 1: Strategic Assessment stage.

- » At Stage 2: Options Analysis, the BAU base case should be reconfirmed to align it to contemporary developments e.g. environmental or operating changes (legal, regulatory or policy). The base case should also be refined to fully reflect expectations, including projected demand profiles.
- » Significant inputs for determining a base case will originate from the service need assessment (nature and composition of demand) and benefits analysis, and from the previous stage development (Stage 1: Strategic Assessment). It is recommended to consult cost accountants, reporting units, strategic asset managers, asset performance teams and portfolio analytical areas within your organisation to identify and describe the base case.
- » Use the most contemporary state and federal government statistical forecasts and projections (social and economic parameters including demographics, population growth etc.).
- » Use the most contemporary service delivery and asset performance forecasts and projections from the proposal owner agency, statutory authority or commercial entity.



## Content to include

This section should include content as outlined in Table 6 below.

**Table 6: Base case content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	The approach to defining the base case including any limitations and assumptions.
<b>Base case</b>	<p>Base cases should be documented using the evidence base and information found in your research to identify:</p> <ul style="list-style-type: none"> <li>» current and future expected performance</li> <li>» level of service provisioning</li> <li>» regulatory requirements</li> <li>» expected service levels</li> <li>» expected degradation of asset</li> <li>» service levels</li> <li>» expected expenditures.</li> </ul> <p>Include the following content in the base case section:</p> <ul style="list-style-type: none"> <li>» full description of current performance</li> <li>» full description of future expected performance</li> <li>» interim solutions to be delivered in the absence of the proposal, including their costing and impact on performance</li> <li>» any reduction in the delivery of that performance (or level of service)</li> <li>» complete and detailed costings of maintaining the business-as-usual approach.</li> </ul> <p>Developing a base case is closely linked to the basis for setting the evaluation period, terminal value and the assessment of the net financial and economic benefit flows. This means you should agree key factors before starting to develop your proposal. These include:</p> <ul style="list-style-type: none"> <li>» service need</li> <li>» base case</li> <li>» evaluation period</li> <li>» methodology for the social, financial and economic analyses, including approach to cost benefit analysis (CBA) and terminal value.</li> </ul> <p>Review regulatory, legislation or policy changes, which may in some cases be embedded in the options design. These considerations should have been fully explored in the earlier stage analysis.</p>
<b>Base case statement</b>	<p>All base cases:</p> <ul style="list-style-type: none"> <li>» include full life cycle benefits and costs, including any actions that will be needed in future to ensure service levels continue to operate</li> <li>» are consistent with the assumptions in the proposal case/s</li> <li>» have costs and disbenefits of the problem expressed in money terms for the CBA and the financial analysis, as far as possible.</li> </ul>

CONTENT	CONSIDERATIONS
<p><b>Link to other analysis and documentation</b></p>	<ul style="list-style-type: none"> <li>» Significant inputs for determining a base case will originate from the service need assessment (nature and composition of demand) and benefits analysis, and from your previous stage development (Stage 1: Strategic Assessment).</li> <li>» The economics (base case), social impact evaluation (baseline) and financial analysis each need to clearly and transparently articulate the approach, analysis, and methodology used in the base case determination.</li> <li>» All three sections should be checked for consistency of application. The Queensland Government SIE and CBA guides provide additional guidance for base case or baseline analysis and documentation requirements.</li> </ul>

## Outcomes

A well-articulated base case:

- » provides information on what the situation will be in the absence of the proposed investment, program modification, policy change or options being approved
- » documents how the base case has been developed and refined from the earlier stage analysis (Stage 1: Strategic Assessment)
- » provides a full description of the expected performance of the existing asset, program or policy setting
- » includes current operational practice and other related assets, for example the operation of multiple dam assets in tandem operating regimes
- » highlights the expected ongoing effects that could reasonably be expected or are forecast
- » describes the implications of not undertaking any additional change to the existing asset, program or policy setting
- » provides a basis for comparison across options.

# Health check A

#	HAVE YOU COMPLETED THE FOLLOWING TASKS?	SECTION	COMPLETED
1	Documented the proposal background	A1	<input type="checkbox"/>
2	Reviewed the Strategic Assessment of Service Requirements (SASR)/Stage 1: Strategic Assessment/Strategic Business Case (SBC) and/or other previous work	A1	<input type="checkbox"/>
3	Documented any material changes since the SASR/Stage 1: Strategic Assessment was completed	A1	<input type="checkbox"/>
4	Documented governance and assurance arrangements	A2	<input type="checkbox"/>
5	Documented the service need (noting any changes since the Stage 1: Strategic Assessment)	A3	<input type="checkbox"/>
6	Identified stakeholders, and had an engagement approach approved and documented (if not previously completed)	A3	<input type="checkbox"/>
7	Documented targeted benefits (noting any changes since the Stage 1: Strategic Assessment)	A3	<input type="checkbox"/>
8	Developed the longlist that was developed in the Stage 1: Strategic Assessment. If not, develop a longlist in alignment with the Stage 1: Strategic Assessment Guide	A3	<input type="checkbox"/>
9	Defined the base case	A4	<input type="checkbox"/>
10	Updated the benefits and risk registers	Appendices 2 and 3	<input type="checkbox"/>
11	Included all sources of evidence underpinning the service need, base case or options in the reference list for the Stage 2: Options Analysis.		<input type="checkbox"/>
#	CRITICAL DECISION POINTS		
1	Has the service need been reviewed to confirm that it is still the same now?		<input type="checkbox"/>
2	Is the proposal still valid after considering any changes to the general environment, demand data or the introduction of other programs or initiatives since your Stage 1: Strategic Assessment was completed?		<input type="checkbox"/>
3	Is the proposal subject to optimism/momentum bias?		<input type="checkbox"/>



## Section B: Options longlist to shortlist

Section B should reconsider longlist options and discuss the initial options assessment process.

It should give decision-makers a clear outline of the longlist of options, the process for filtering options and the subsequent shortlist.

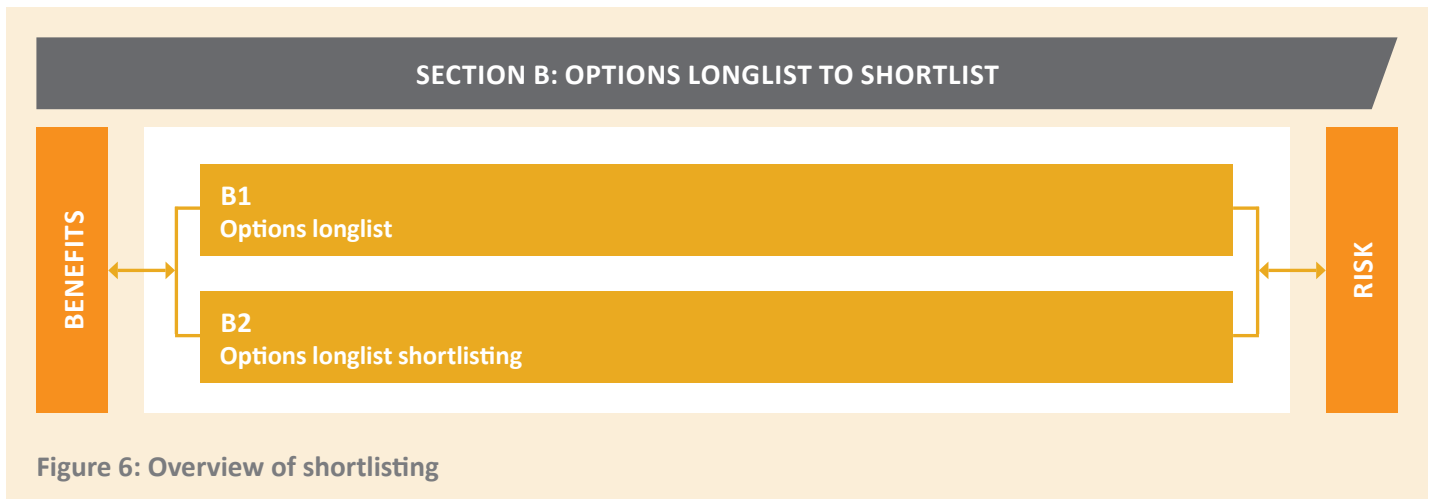


Figure 6: Overview of shortlisting

# B1 Options longlist

## Purpose

This section should document the longlist options from your Stage 1: Strategic Assessment that you will analyse in this stage. It should give clarity and understanding of the range of options being considered and show clearly and credibly how your recommended options will deliver the targeted benefits.

## Considerations

- » If you have generated longlist options as part of Stage 1: Strategic Assessment, then review them at this stage to ensure they are still valid. Consider whether you should identify further potential options.
- » There is typically more than one way to solve a problem. As infrastructure is ultimately built to deliver a service, explore non-asset solutions to service needs (such as policy reforms or the better use of existing infrastructure) as a priority before you consider asset-based solutions.
- » The options longlist should include all types of options for improving service performance, as specified in the options hierarchy of the State Infrastructure Strategy (SIS) including:
  - › reform—typically non-asset initiatives (consider regulation and legislative change)
  - › better use—influence demand i.e. not building new capacity
  - › improve existing—relatively low-cost capital works (compared to new build) to enhance current infrastructure
  - › new—construct new infrastructure.



If you have not generated options or completed a Stage 1: Strategic Assessment, undertake this according to the guidance in the Stage 1: Strategic Assessment Guide before going further.



While there is a clear preference for non-build options in the SIS hierarchy, in many situations multiple options will be needed to achieve the desired outcome.

For example, a combination of better use and improving current infrastructure could delay the need for new infrastructure, while reforming current laws in combination with new infrastructure could reduce the cost of new infrastructure.



## Content to include

This section should include content as outlined in Table 7 below.

**Table 7: Options longlist content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<ul style="list-style-type: none"><li>» Briefly document the approach used to identify the longlist options.</li><li>» Include details of any investment logic mapping exercise or research completed.</li></ul>
<b>Options longlist</b>	<ul style="list-style-type: none"><li>» For each option, document (at a minimum) the following:<ul style="list-style-type: none"><li>› description of how the option is intended to function, how it addresses the service need identified and how it can best achieve the targeted outcomes</li><li>› other outcomes and benefits that would be achieved by the option</li><li>› stakeholders affected or required</li><li>› potential negative impacts and risks</li><li>› infrastructure and non-infrastructure requirements, noting the option types in the State Infrastructure Strategy hierarchy</li><li>› timeframe</li><li>› scalability.</li></ul></li></ul>

## Outcome

The options longlist will clearly articulate the details of each of the options to be considered for shortlisting.



To ensure decision-makers have a broad understanding of the features of each option, give a detailed description to include (where relevant):

- » service capacity
- » service provider
- » service level
- » service hours
- » operating model.

## B2 Options longlist to shortlist

### Purpose

Options shortlisting from your longlist should show a robust and defensible assessment of the options longlist and how you generated a shortlist of options to be analysed in more technical detail in Section C.

### Considerations

The shortlisting process to generate the final shortlist for analysis in Section C may involve a number of steps and considerations including:

1. an initial screening to consider whether any changes in the investment context will make any of the longlist options unacceptable
2. a high-level assessment to consider how each option addresses the political and strategic context of the investment decision, including how it addresses:
  - a. strategic and policy alignment
  - b. legal and regulatory concerns
  - c. public interest considerations
  - d. strategic risk.



You should exclude options from the shortlist where they do not give feasible solutions in the context of wider political, social and legal environments, or any other relevant contexts.

Any options you discard, and the rationale for this, should be shown in this section.

Using these key considerations to assess the feasibility of the options longlist will inform the development of criteria for further analysis in step 3.

3. Shortlisting—a detailed multi-criteria analysis to filter options on the remaining longlist to generate an options shortlist.

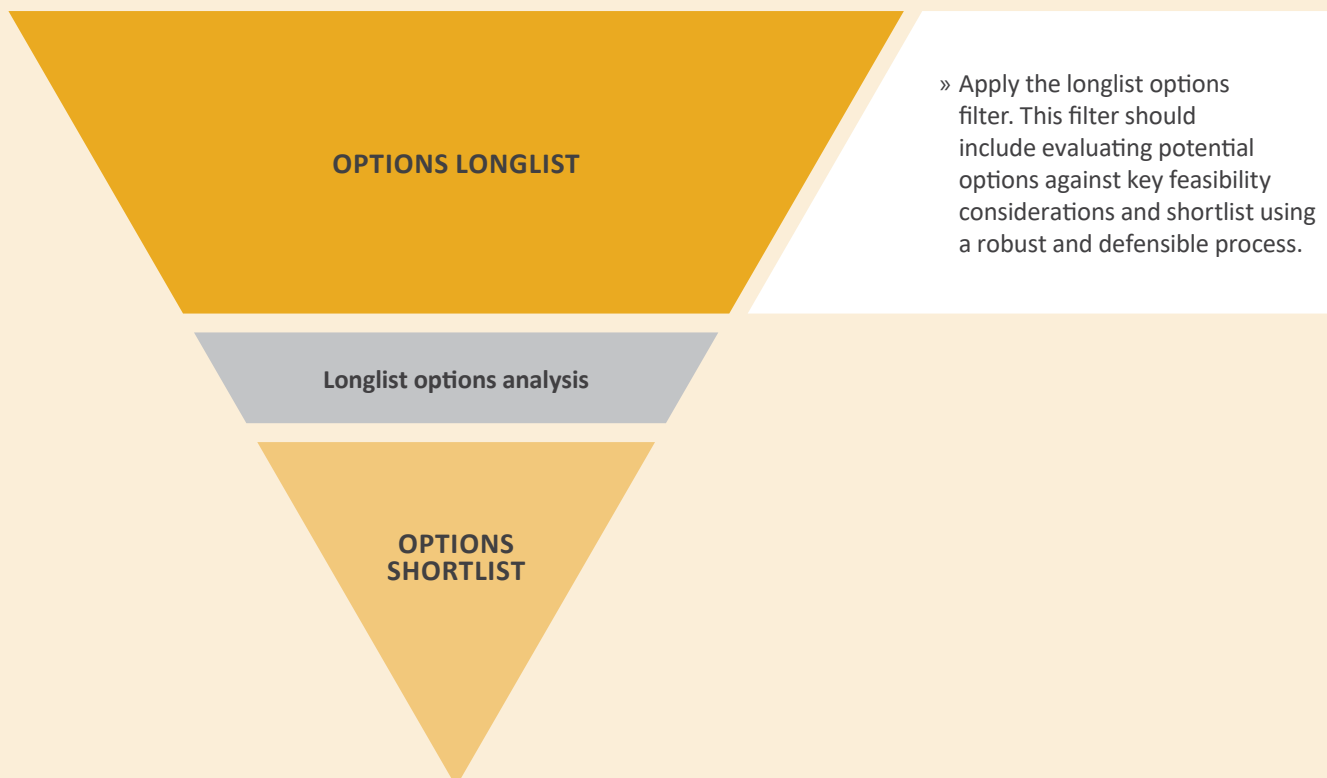


Figure 7: Options shortlisting steps

## High-level assessment

You should complete a high-level assessment to ensure that all options are feasible solutions before you progress to actual shortlisting. Relevant considerations include:

- » alignment to strategic objectives and existing policies
- » alignment to the service need
- » legal and regulatory considerations
- » public interest considerations
- » strategic, political and integration risks.

Specific considerations are shown in Table 8.

**Table 8: Considerations in a high-level assessment**

STRATEGIC CONSIDERATIONS	
<b>Strategic alignment</b>	<ul style="list-style-type: none"> <li>» Consider how the potential options contribute to or are aligned to the strategic objectives of the agency and government, and to the relevant national objectives and programs (where appropriate).</li> <li>» Consider the fiscal environment and industry context.</li> </ul>
<b>Policy issues</b>	<ul style="list-style-type: none"> <li>» Consider the effect, if any, of existing policies and standards on the identified options (or vice versa) within all levels of government, agency and relevant stakeholder environments.</li> <li>» Identify any limitations imposed by the policies and standards, and the known effect on the options (such as any effect on benefits).</li> <li>» Classify effects and limitations as either an advantage or disadvantage.</li> </ul>
LEGAL AND REGULATORY CONSIDERATIONS	
<b>Legislative issues</b>	<ul style="list-style-type: none"> <li>» Identify any specific legislative requirements or issues (both current and foreshadowed) relevant to the options (or the ongoing operation of the options) that may prevent, impede or have a significant impact. This may include items such as state and federal government agreements, planning, approvals, environmental considerations, native title or cultural heritage considerations.</li> </ul>
<b>Regulatory issues</b>	<ul style="list-style-type: none"> <li>» Identify any regulatory considerations relevant to the options that may prevent, impede or have a significant impact. This may include matters that influence market competition such as competition or pricing matters, or jurisdictional responsibilities.</li> </ul>
<b>Other legal matters</b>	<ul style="list-style-type: none"> <li>» Include any other legal matters which may influence the options, for example:               <ul style="list-style-type: none"> <li>› standing agreements and existing contracts that may need renegotiation or payment of compensation, or may restrict the actions of the government or agency e.g. competitive dealings</li> <li>› agreements or contracts that are in the process of being finalised or renegotiated</li> <li>› contractual disputes</li> <li>› claims by third parties, including native title and cultural heritage claims</li> <li>› court decisions that may impact the legislative powers of government</li> <li>› legal or contractual issues associated with the proposed delivery strategy.</li> </ul> </li> </ul>

## PUBLIC INTEREST CONSIDERATIONS

### Public access and equity

- » Consider the public interest implications for each option.
- » Review each option to ensure its design allows all groups in society to effectively share its expected benefits. Options should be redesigned to remove potential causes of inequity where possible. Document:
  - › any disadvantaged groups who may use the infrastructure or service and how they will use it
  - › any areas of potential inequity of access caused by the proposed location or pricing of services
  - › any social and economic impacts.

### Impact on stakeholders

- » Assess each option for its potential effect on stakeholders, including individuals and communities. Include a list of stakeholders, the area of interest or effect and any engagement activities needed. Areas of public interest may include:
  - › property impacts
  - › environmental concerns
  - › access or use changes.
- » Confirm the effects on all stakeholders (the community, service delivery partners etc.) and explore any new concerns. The consultation process should establish whether the community is likely to give the proposal a social licence to operate.

### Consumer rights

- » Identify any potential consumer rights issues for each option. Outline where each option does or does not provide sufficient safeguards, particularly for those to whom government has a higher duty of care. This is beyond any legal obligation and acknowledges government's broad responsibility to the community and service recipients.

### Safety and security

- » Consider safety and security factors including corruption, crime, public-health risk, quality and security of supply. Assess all options for any potential security and community safety issues.
- » Consider whether security of supply is a concern if the market is not mature.

### Privacy

- » Identify any potential privacy issues for each option to give assurance that users' privacy rights are protected. Government obligations, whether in relevant legislation or government policy, should also be highlighted.

## RISK

### Risks

- » Consider any strategic, political and/or integration risk that the potential options may cause.
- » Document the risks and note whether they can be mitigated.

## Shortlisting

- » Shortlisting involves evaluating the longlist of options against robust and defensible criteria to generate a shortlist of options for more detailed analysis, as detailed in Section C.
- » The shortlisting criteria should include the considerations in the high-level assessment as well as other option-specific criteria.



You can use a range of decision-making tools to filter options. Multi-criteria analysis is one tool. The purpose of a multi-criteria analysis is to assess options using set objectives, which align with: the key benefits and outcomes targeted, the service need to be addressed, and key feasibility considerations. Sample tables for performing multi-criteria analysis are included in Appendix 5.

Criteria for shortlisting should be established in consultation with subject matter and technical experts, and should be measurable and realistic. Sensitivity-test weightings to confirm your results are realistic and defensible.



## Keeping Options Open

A robust options analysis should ensure that sufficient efforts are dedicated towards identifying the best solution to an identified problem or service need.

As part of this, it is important to keep the span of options open until solutions are fully investigated and it is clear which is preferred, unless options are clearly unviable or inferior to the set of solutions being canvassed. This can include shortlisting a wider range of options from the longlist, and even progressing some options to the Detailed Business Case (DBC) stage of

analysis if appropriate. For example, if two options cannot be readily differentiated based on the level of information and analysis to date.

This is because more detailed information is likely to become available as the analysis develops, which can result in the preferred option/s changing. As such, keeping options open ultimately minimises analysis efforts and whole-of-life costs even though more resources are being spent on analysis in the short term.

Table 9 lists the criteria to include.

**Table 9: Options longlist content and considerations**

CONTENT	CONSIDERATIONS
<b>Service need</b>	» How the potential options will address the service need (problem/opportunity)
<b>Benefits</b>	» How the potential options deliver the targeted benefits » Whether incremental benefits that align with the government’s strategic direction are possible in the wider community—consider all levels of government
<b>Specific option criteria</b>	» Whether the option addresses specific needs of the proposal in addition to addressing the service need
<b>Impact on stakeholders</b>	» How the options affect stakeholders, including individuals and communities, through any concerns such as: › property impacts › environmental concerns › access or use changes.
<b>Public interest considerations</b>	» Whether the options are in the public interest, including ensuring consumer rights, safety, security and privacy
<b>Risks</b>	» Any strategic, political and/or integration risks caused by the potential options » Whether the risks can be mitigated
<b>Legal issues</b>	» How any specific legislative and/or regulatory requirements or issues (both current and foreshadowed) or other legal matters relevant to the options (or their ongoing operation) may prevent, impede or have a significant impact
<b>Strategic and policy alignment</b>	» How the potential options contribute to or are aligned with the strategic objectives of the agency and government, and the relevant national objectives and programs (where appropriate) » What impact, if any, existing policies and standards have on the identified options (or vice versa) within all levels of government, agency and relevant stakeholder environments » How the fiscal environment and industry context might influence the delivery of the option
<b>Policy issues</b>	» Any limitations imposed by the policies and standards, and their effect on the options (such as any effect on benefits)



This section should clearly recommend potential options that will form the shortlist to take forward for the next, more detailed technical analysis (Section C). If all identified options fail the considerations, tests and filters, you will need to reconsider the proposal.

## Content to include

This section should include content as outlined in Table 10 below.

**Table 10: Options shortlist content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<ul style="list-style-type: none"> <li>» Document the approach used to shortlist the options.</li> <li>» Include details of any workshops, including the attendees.</li> <li>» Describe the assumptions, sources of information, and the supporting reasoning used to evaluate and filter options.</li> <li>» Check that your shortlisting has followed a common-sense process to selecting or discarding options i.e. it should be easy to explain and understand.</li> </ul>
<b>Initial screening</b>	<ul style="list-style-type: none"> <li>» Document the results of any initial screening and justify your decision for any options no longer considered acceptable.</li> </ul>
<b>High level assessment</b>	<ul style="list-style-type: none"> <li>» Document the results of the high-level assessment and justify any options discarded.</li> </ul>
<b>Shortlisting</b>	<ul style="list-style-type: none"> <li>» Identify the shortlisted options that pass the comprehensive review and will be further analysed at the next stage.</li> </ul>
<b>Summary</b>	<ul style="list-style-type: none"> <li>» Summarise the shortlisted options and briefly describe the reasons for shortlisting or discarding each option.</li> <li>» The recommended options shortlist should be clearly presented and show your reasoning for how the agency, government and community will benefit, and how the options will achieve government objectives. Provide clear details for each remaining option including:               <ul style="list-style-type: none"> <li>› intended outcomes—what the option will accomplish (i.e. objectives and benefits), specifically noting how the claimed benefits for the option compare to the targeted benefits</li> <li>› scope—inclusions and exclusions, and how the option will address the service need</li> <li>› a description of how the shortlisted options would be implemented</li> <li>› any disadvantages of the options</li> <li>› requirements for complementary infrastructure and/or opportunities for integration and coordination with other proposals</li> <li>› any infrastructure components of the options, canvassing a number of technical solutions and engineering possibilities.</li> </ul> </li> <li>» Conduct a risk assessment for the shortlisted options.</li> <li>» Rank shortlisted options according to how much they contribute to the targeted benefits.</li> </ul>

## Outcome

This section will produce a clear options shortlist for further analysis (in Section C) and will explain why other options were discarded from further consideration.

## Health check B

#	HAVE YOU COMPLETED THE FOLLOWING TASKS?	SECTION	COMPLETED
1	Considered and documented the strategic alignment with policy, legislation and regulations that may affect options (or vice versa)	B2	<input type="checkbox"/>
2	Considered and documented any public interest impacts of the options	B2	<input type="checkbox"/>
3	Considered and documented strategic considerations	B2	<input type="checkbox"/>
4	Explained any options amended or discarded in the light of high-level considerations	B2	<input type="checkbox"/>
5	Filtered longlist options to a manageable number in a robust and defensible manner	B2	<input type="checkbox"/>
6	Updated the benefits register	Appendix 2	<input type="checkbox"/>
7	Updated the risk register considering Section B analysis	Appendix 3	<input type="checkbox"/>
8	Updated the stakeholder engagement plan	Appendix 4	<input type="checkbox"/>
9	Included all sources of evidence underpinning the service need, base case or shortlisted options in the reference list for the options analysis		<input type="checkbox"/>
#	CRITICAL DECISION POINTS		
1	Have you identified any strategic, legal, regulatory, market or public interest considerations that could result in the options not proceeding?		<input type="checkbox"/>
2	Are the options still valid considering any changes to the general environment or demand data, or the implementation of other programs or initiatives since the Stage 1: Strategic Assessment was completed?		<input type="checkbox"/>
3	Are any of the assessments showing optimism/momentum bias?		<input type="checkbox"/>



## Section C: Options analysis considerations



Section C should present key analysis you have conducted to support your evaluation of the shortlisted options. It will inform the selection and recommendation of the preferred option/s.

The analysis of shortlisted options should focus on the following key factors:

- » economic—benefit cost ratio (BCR), incremental BCR, internal rate of return (IRR) and net present value (NPV)
- » social impact evaluation
- » environment assessment
- » sustainability assessment
- » financial and commercial analysis
- » affordability.

An outline of the recommended key analysis you need to complete in this section is shown in Figure 8.

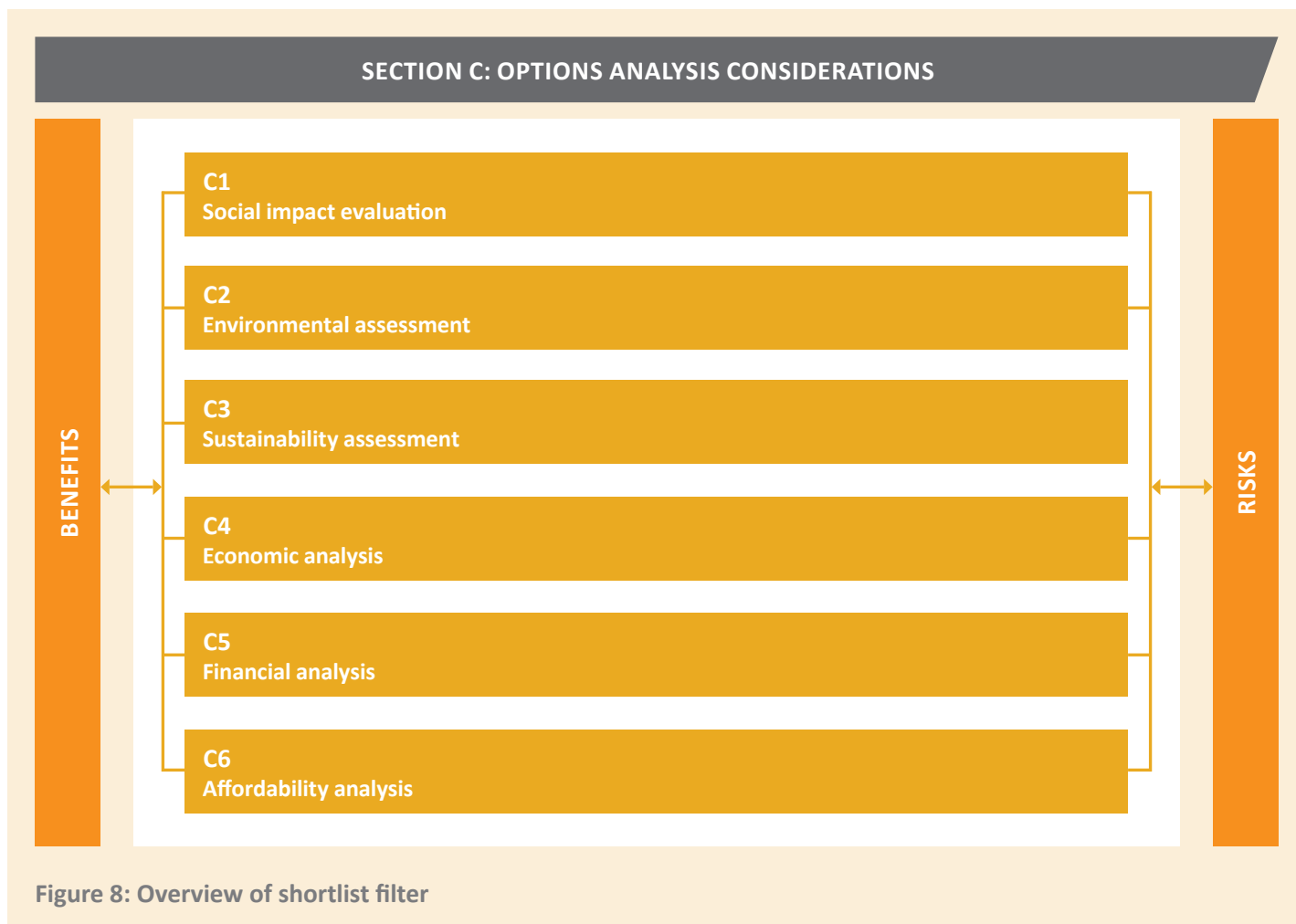


Figure 8: Overview of shortlist filter

# C1 Social impact evaluation

## Purpose

The social impact evaluation (SIE) should document:

- » the social and other benefits of the options
- » negative impacts to be mitigated
- » opportunities to create additional social value for the options.

The SIE provides an important input for the economic, environmental, sustainability, financial and commercial analyses.

## Considerations

- » The social impact evaluation documents the positive contribution all infrastructure proposals make to society, as well as ensuring that any negative effects are identified and mitigated.
- » The social value of an option is the change (increase) between the social impact baseline and the value that the option is forecast to achieve.
- » Where social benefits are included in the economic analysis, ensure benefits are incremental to the base case.
- » Social impacts do not need to be measurable to be considered but you should try to quantify or monetise as many social impacts as possible for inclusion in the cost benefit analysis (CBA).
- » All material qualitative and quantitative impacts and benefits should be incorporated in the economics section socio-economic narrative. They should also be considered in the financial analysis and recorded in the risk and benefits register.
- » Identified social impacts can be divided into three categories, as illustrated in Table 11.
  - › social impacts that can be quantified and monetised (include in the CBA)
  - › social impacts that can be quantified and not monetised
  - › social impacts that cannot be quantified or monetised.
- » The type of social impacts and the evaluation approach you should use is illustrated in Table 11.



The Social Impact Evaluation Guide gives detailed guidance on how to undertake a social impact evaluation.



The SIE focuses on three key areas:

- » What value will the option achieve?
- » What negative effects need to be mitigated and, when mitigated, what is the residual impact?
- » What additional opportunities could be designed into the option to create additional value?

Social impacts should be considered and described in terms of their relationship to the community stakeholders.



The considerations and output of the social impact evaluation give valuable input into the economic, environmental and financial analyses.

These analyses do not have a linear relationship but all contribute to each other. For a Stage 2: Options Analysis, you should identify and describe the social impacts of shortlisted options in detail. This social impact evaluation allows options to be compared for their value to the community.

**Table 11: Relationship between social impacts and approach**

RELATIONSHIP BETWEEN SOCIAL IMPACTS AND APPROACH				
	QUALITATIVE	QUANTIFIED	MONETISED	APPROACH
Social impacts	✓	✓	✓	Include in SIE, economics, CBA, benefits register and risk register
	✓			Include in SIE, economics, benefits register and risk register
	✓	✓		Include in SIE, economics, benefits register and risk register

Where a proposal has had a social impact assessment (SIA) included as part of an environmental impact assessment (EIA), you should review the findings of the SIA and consider any additional analysis required by a social impact evaluation (SIE).



## Content to include

This section should include content as outlined in Table 12 below.

**Table 12: Social impact evaluation content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<ul style="list-style-type: none"> <li>» Document how the social impact evaluation was undertaken.</li> <li>» If you cannot quantify social impact, explain why in the approach section. It is useful to briefly describe the steps needed to quantify social impacts for future reference. Analysis of social impacts should be consistent across all the options you are assessing.</li> <li>» Queensland Government has developed a three-step process for evaluating social impacts. Further details on completing a social impact evaluation can be found in the Social Impact Evaluation Guide.</li> </ul>
<b>Social impact baseline</b>	<ul style="list-style-type: none"> <li>» Document the social impact baseline.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>» Document the outcomes of the social impact evaluation using the template provided. Evaluate the options by:               <ul style="list-style-type: none"> <li>› determining whether each identified social impact can be quantified and monetised</li> <li>› determining the appropriate evaluation approach for each social impact</li> <li>› ensuring all social impacts that can be monetised are incorporated into the CBA</li> <li>› ensuring all social impacts that cannot be monetised undergo an impact risk assessment.</li> </ul> </li> </ul>
<b>Impact summary</b>	<ul style="list-style-type: none"> <li>» Document:               <ul style="list-style-type: none"> <li>› the value the options are expected to achieve</li> <li>› the negative impacts and how they will be mitigated</li> <li>› opportunities for enhancing positive impacts.</li> </ul> </li> </ul>

## Outcomes

The reader should understand the following:

- » the social value that the options are expected to create for different stakeholders
- » how any social risks will be mitigated
- » any other potential opportunities to create social value that are not currently included in the options design and implementation plan.

## C2 Environmental assessment

### Purpose

The environmental assessment should examine the proposal's environmental impact, including specific actions needed to meet all relevant policy, regulatory and legislative requirements, and any likely community concerns. This ensures that the environmental impacts of all options are clearly accounted for in the options analysis and decision-making process.

### Considerations

- » For the Stage 2: Options Analysis, identify the environmental impacts of all shortlisted options and describe them in detail for comparison with the base case. The extent and scope of the analysis should provide the decision-maker with enough information and evidence to make an informed decision about the environmental benefits and risks of the preferred option/s.
  - » The environmental assessment should be based on a whole-of-system, whole-of-life, whole-of state approach, incorporating future trends, climate change, forecasting and resilience analysis.
  - » Community expectations and/or government policy, regulation or legislation may dictate that some of the environmental impacts of a shortlisted option/s are avoided, mitigated or offset. The costs and benefits of this should be included in the economic and financial analysis.
- » Any remaining (or residual) environmental impacts should then be assessed. These residual environmental impacts can be divided into three assessment categories and should be managed differently:
    1. Environmental impacts that can be quantified and monetised should be included in the CBA.
    2. Environmental impacts that can be quantified and not monetised should be included in the quantitative environmental assessment.
    3. Environmental impacts that cannot be quantified or monetised should be included in the qualitative environmental assessment.
  - » The results of the environmental assessment for impacts that cannot be monetised should be reflected in the risk assessment and incorporated in the options filtering process as outlined in Section C7. This will help with selecting an option/s to be potentially carried forward to Stage 3: Detailed Business Case.
  - » Environmental impacts included in the CBA should be documented in the environmental assessment section. You will need to propose units of measure for environmental impacts included in the quantitative environmental assessment. All environmental impacts should be described in detail.

Environmental impacts should be referenced in assessing deliverability, sustainability, social impact evaluation, risk assessment, and economic and financial analysis.



## Content to include

The environmental assessment should respond to all considerations in Table 13.

**Table 13: Environmental assessment content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<p>Document how the environmental assessment was undertaken.</p> <p>The process should include:</p> <ul style="list-style-type: none"> <li>» identifying and reviewing information from relevant previous studies</li> <li>» identifying all potential environmental issues and impacts</li> <li>» including an assessment of how environmental issues and impacts may affect the options.</li> </ul> <p>For each shortlisted option, identify and categorise the relevant environmental considerations and impacts. An outline of potential environmental considerations is given in the Stage 2: Options Analysis Template.</p> <p>At Stage 2: Options Analysis, the level of analysis should aim to identify and broadly consider any critical issues that may affect the viability of the proposal and each individual option. It should also allow comparison of environmental impacts and costs across options to contribute to filtering the options.</p> <p>You will undertake more detailed consideration during Stage 3: Detailed Business Case development if the proposal is progressed.</p>
<b>Assessment outcomes</b>	<p>In the table included in the Stage 2: Options Analysis Template, document the outcomes of the environmental assessment against all factors:</p> <ul style="list-style-type: none"> <li>» legislation and permit requirements</li> <li>» planning and land use</li> <li>» property impacts</li> <li>» topography, geology and soils</li> <li>» water quality</li> <li>» hydrology</li> <li>» flora and fauna</li> <li>» climate and air quality</li> <li>» climate change</li> <li>» noise and vibration</li> <li>» natural resource management and use including energy and water</li> <li>» landscape and visual amenity</li> <li>» cultural heritage</li> <li>» waste management.</li> </ul>
<b>Assessment summary</b>	In a table, compare the outcomes for each shortlisted option.

## Outcomes

The environmental assessment should clearly explain and assess:

- » the proposal's environmental impact for each option
- » specific actions needed to meet all relevant policy, regulatory and legislative requirements
- » any community concerns.

## C3 Sustainability assessment

### Purpose

The sustainability assessment should consider the design, construction applications, and operational arrangements of options to ensure they optimise governance, environmental, social and economic outcomes.

### Considerations

- » The sustainability assessment should address how best to plan, design and deliver the options from a long-term, whole-of-life sustainability perspective. The overall sustainability of the proposal may influence whether the government chooses to fund it.
- » The sustainability assessment should significantly draw on the analysis undertaken throughout your proposal development, including the economic analysis, environmental assessment and social impact evaluation. These assessments should be based on a whole-of-life view of the proposal, and where relevant, a whole-of-system, whole-of-state approach. They should incorporate future trends, foresighting and resilience analysis. Such analysis might include considering forecast changes to: quality of life and equity; cost of living and incomes; community preferences and expectations; economy and productivity; population and participation; technology and data; environment; emissions reduction; and climate risks.

- » Queensland Government requires sustainability assessments for proposals with a capital value of more than \$100 million. Regardless of the capital value, it is best practice to look for opportunities to achieve sustainability benefits throughout the proposal lifecycle, regardless of any capital threshold, particularly in the case of building projects which will often fall below this capital threshold, but which may contain significant opportunities.
- » To assess sustainability opportunities that apply to the proposal, you should use either fit-for-purpose, nationally-recognised rating and certification schemes, tools and supporting technical expertise, or, at a minimum, apply the BCDF approach.

Further guidance is given in Stage 3: Detailed Business Case Guide: Appendix 1: BCDF Sustainability Assessment: Approach and Templates.

### Sustainability analysis:

- » supports the effective and efficient use of resources
- » helps 'futureproof' proposals by considering future trends
- » encourages innovation in planning, design and delivery
- » considers opportunities to reduce emissions
- » gives assurance to decision-makers that decisions are based on a comprehensive view of governance, economic, social and environmental considerations
- » ensures the costs and benefits assessment includes broader sustainability considerations.

Assessing sustainability early in the proposal life cycle will result in improved long-term outcomes for the community and environment, and will highlight economic implications.



Suitable assessment tools include:

- » the Green Building Council of Australia's (GBCA) Green Star rating tools (Green Star—Design and As Built and Green Star—Communities), which are used for building projects (inclusive of any type of commercial building, health, education, rail stations and residential apartment buildings), and master-planned precincts and communities (see [www.gbca.org.au](http://www.gbca.org.au))
- » the Infrastructure Sustainability Council's (ISC) Infrastructure Sustainability rating tools (Planning, Design and As Built, and Operations), which are mostly used on linear infrastructure such as transport (roads, rail, ports and airports); utilities (such as networks, pipelines, renewable energy assets); as well as green and blue infrastructure (waterways, reserves, recreation and cycle/walkways)<sup>1</sup>. For example, the ISC planning tool, which has general applicability throughout the proposal lifecycle development, includes a scorecard to assess the materiality of sustainability considerations. The scorecard can be accessed on the ISC website at [www.iscouncil.org](http://www.iscouncil.org). These tools provide multiple frameworks to consider how to assess sustainability throughout a project life cycle, and can also help inform the environmental assessment undertaken at a Stage 3: Detailed Business Case. They provide a common language for project stakeholders to understand what is required, and, where certification is achieved, help deliver independent third-party assurance to the community, investors, and government that project outcomes promised are delivered.
- » Calling on sustainability expertise early in the proposal development phase and ensuring that documentation (including risk and benefit registers) is carried forward to project delivery and operations can help if you need subsequent independent third-party certification.
- » Applying sustainability principles early can also maximise benefits and effectiveness. Helping determine what should be built (a sustainable asset) and later how it is built (a sustainability project) ensures you achieve optimal outcomes at least cost.
- » Ongoing sustainability assessment processes enhance confidence that performance and long-term sustainability outcomes will be delivered.

## Queensland Government approach

Queensland Government has collaborated with ISC and the GBCA to develop an approach for internal project teams to consider sustainability for both linear infrastructure and buildings.

The approach includes completion of an assessment template, which may need to be supported by a sustainability workshop/s to assess the materiality of the criteria impacted by the options. Ideally, sustainability assessment considerations should be integrated with other business case development work streams e.g. multi-disciplinary risk, co-design and/or value engineering workshops.

The approach and supporting assessment templates can be adapted to support early stage options analysis and comparison.

The sustainability assessment templates and an example of how to approach internal validation and assessment, including a description and guiding questions for the principles, are included in Stage 3: Detailed Business Case Guide; Appendix 1: BCDF Sustainability Assessment: Approach and Templates.

The sustainability assessment templates are also included in the Stage 3: Detailed Business Case Template.

For linear infrastructure the approach with ISC has been developed across four assessment themes and 17 categories based on ISC sustainability criteria as outlined in Table 14.

For building proposals, a collaboration with the GBCA has developed a similar assessment tool aligned with the Green Star rating scheme. Principles to consider in your assessment are included in Table 15: GBCA sustainability assessment principles—buildings.

<sup>1</sup> In modern cities, the boundaries between property and infrastructure are increasingly blended (such as integrated station or over station developments). Therefore, ISC and the GBCA have collaborated and released guidance for projects seeking dual certification. This is intended to ensure efficient and streamlined certification of sustainability outcomes for both infrastructure and building projects within the infrastructure boundary.

<sup>2</sup> Queensland Government environment and science agencies have additionally collaborated with ISC to map longer-term policy objectives. The ISC Policy Mapping Matrix may provide agencies with helpful recommendations about how to reflect or incorporate sustainability objectives in a business case.



**Table 14: ISC sustainability assessment principles—linear infrastructure**

GOVERNANCE	ENVIRONMENT	SOCIAL	ECONOMIC
Context	Energy and carbon	Stakeholder engagement	Options assessment and business case
Leadership and management	Green infrastructure	Legacy	Benefits realisation
Sustainable procurement	Environmental impacts	Heritage	
Resilience	Resources	Workforce sustainability	
Innovation	Water		
	Ecology		

Table 15: GBCA sustainability assessment principles—buildings

PROJECT SETUP AND MANAGEMENT	INDOOR ENVIRONMENT QUALITY	ENERGY	TRANSPORT	WATER	MATERIALS	LAND USE AND ECOLOGY	EMISSIONS	INNOVATION
Green star accredited professional <sup>3</sup>	Indoor air quality	Greenhouse gas emissions	Sustainable transport	Potable water	Lifecycle impacts	Ecological value	Stormwater	Innovative technology or process
Commissioning and tuning	Acoustic comfort	Peak electricity demand reduction			Responsible building materials	Sustainable sites	Light pollution	Market transformation
Adaptation and resilience	Lighting comfort				Sustainable products	Heat island effect	Microbial control	Improving on green star benchmarks <sup>3</sup>
Building information	Visual comfort				Construction and demolition waste		Refrigerant impacts	Innovation challenge <sup>3</sup>
Commitment to performance	Indoor pollutants							Global sustainability <sup>3</sup>
Metering and monitoring	Thermal comfort							
Responsible building practices								
Operational waste								

<sup>3</sup> These components are not applicable at this early stage of proposal development.

## Outcomes

The sustainability assessment, in combination with the socio-economic, financial and environmental assessments, give decision-makers evidence of how the options will contribute to quadruple bottom line outcomes. Table 16 presents sustainability assessment content and considerations.

Sustainability matters should be addressed in:

- » the environmental assessment
- » the social impact evaluation
- » the risk assessment
- » the economic analysis
- » the cost estimate
- » the deliverability assessment.

The benefits register, risk register, stakeholder engagement plan (where applicable) and the appraisal summary table should be updated in response to the outcomes of this assessment.

Proposal documentation should highlight the results of this assessment to identify material positive or negative impacts that affect the targeted benefits or create disadvantages that either cannot be managed or require very careful ongoing management.

Where possible, include defensible analysis and documentation of the costs and benefits associated with the sustainability assessment, including future accreditation activities.

If sustainability elements are significant and potentially important to inform decision-makers of key risks or further actions needed, they should be discussed in the conclusions, recommendations and/or implementation plan.

## Content to include

**Table 16: Sustainability assessment content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	Document the approach and methodology used to identify material sustainability factors for the options in order to understand and propose possible mitigation measures for immediate and long-term effects e.g. the Queensland Government approach outlined in Stage 3: Detailed Business Case Guide Appendix 1.
<b>Assessment</b>	Document the outcomes of the sustainability assessment e.g. using the Queensland Government's approach.  For proposals that are applying for an ISC rating or Green Star accreditation, the documentation may include a self-assessment against the applicable rating scheme tool, including benchmark targets.
<b>Summary</b>	Summarise and contrast the differences in assessed sustainability between the options.

## C4 Economic analysis

### Purpose

The economic analysis should develop a coherent socio-economic narrative of the qualitative and quantitative costs and benefits of the options. It should be supported by a robust and transparent cost benefit analysis (CBA), which is a highly effective way to compare potential options.

### Considerations

- » The socio-economic (economic) analysis should create a clear narrative about the quantitative and qualitative economic benefits and the costs of the options. This analysis should be informed by a robust and transparent cost benefit analysis, social impact evaluation, benefits analysis, financial, commercial, sustainability and environmental assessments.
  - » The balance of this qualitative and quantitative economic focus will vary between proposals, depending on the purpose of the assessment and the availability of data and other resources. A fundamental part of economic analysis is identifying and documenting all material social benefits and costs as comprehensively as possible. These benefits and costs should focus on the effects on people and community, rather than on organisations or decision-makers, and should be observable consequences that are material and/or measurable.
  - » This assessment should draw on your analysis undertaken throughout the life cycle of developing the proposal, including the financial analysis, environment, sustainability and social impact evaluations. The assessment should be based on a whole-of-life, whole-of-system, whole-of-state approach, incorporating future trends, foresighting and resilience analysis (including scenario and sensitivity analysis).
  - » Consider future trends including:
    - › quality of life and equity
    - › cost of living and incomes
    - › community preferences and expectations
    - › economy and productivity
    - › population and participation
    - › uncertainty and risk, including changes in technology, demographics, climate and environment.
- » The goal of economic analysis conducted in the Stage 2: Options Analysis stage is to provide a strong basis for filtering options and to document the economic merit of the preferred option/s.
    - › Identifying all costs and benefits is fundamental to any economic analysis.
    - › You can find specific guidance for the CBA in the Cost Benefit Analysis Guide.
  - » Where value creation and capture (VCC) opportunities have been identified, care should be taken to avoid double-counting of benefits and the value uplift associated with these benefits. For example, counting travel time benefits and any consequent land value uplift.
  - » Care should be taken to ensure any value creation and capture analysis is undertaken from an economic perspective, refer to Section C5: Financial Analysis for guidance on VCC analysis.



You can find the BCDF guidance for the economic cost benefit analysis, approach, reporting, checklists and assurance requirements in the Cost Benefit Analysis Guide.



It is important that the economic analysis considers whole-of-life, whole-of-system and whole-of-state implications.

As the economic analysis involves forecasts of an uncertain future (due to technological change, climate change, demographics, globalisation etc.) all aspects of the analysis should incorporate foresighting and scenario-testing these uncertainties and risk. For example, in considering climate risk adaptation and mitigation, you need to assess costs, benefits and risks for supply, demand and market developments, as well as considering opportunities.

As uncertainty normally increases with time, resulting in declining confidence in forecasts and projections, you will need to set a timeline for the evaluation period, capturing residual economic values (if any) and the profile of benefit and cost flows.

## Content to include

The economic analysis and documentation should include the content and considerations as outlined in the CBA Guide and in Table 17.

**Table 17: Economics analysis content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	<p>Clearly document the approach adopted for the proposal CBA. This should be highly detailed, transparent and include reference to and documentation of:</p> <ul style="list-style-type: none"> <li>» all significant qualitative and quantitative benefits, costs and risks (including sensitivity analysis)</li> <li>» assumptions underlying the CBA e.g. base price year, discount rate, modelling and forecasting assumptions including, where appropriate, consideration of resilience and climate change risk sensitivity analysis and scenarios</li> <li>» key inputs: costs, demand modelling for the analysis and key analytical observations e.g. elasticity of demand</li> <li>» detailed description of the base case and the analysed options.</li> </ul> <p>Document how the assessment was undertaken, its assumptions and limitations.</p>
<b>Benefits</b>	Evaluate all qualitative and quantitative benefits for all options.
<b>Costs</b>	Evaluate all qualitative and quantitative costs for all options.
<b>Cost benefit analysis (CBA) results</b>	Undertake a robust CBA analysis for all options e.g. net present value (NPV), benefit cost ratio (BCR), incremental BCR, internal rate of return (IRR), and sensitivity and scenario analysis. Include the central case, full NPV profile, P50 and P90 (or equivalent) cost and the level of design used.
<b>Comparative economic analysis narrative</b>	Document a coherent economics narrative to incorporate the qualitative and quantitative cost and benefit information in the SIE and the CBA. The economics narrative could be for the overall proposal including a concise narrative about differences in the socio-economic and CBA (BCR and NPV) outcomes between options. Consider using IBCR analysis to filter options.
<b>Sensitivity and scenario analysis</b>	Conduct sensitivity analysis of all parameters (not a simple +/-20% or 30% etc.) as outlined in the Cost Benefit Analysis Guide. Document scenario analysis including foresighting and alternate futures.

CONTENT	CONSIDERATIONS
<b>Quality assurance review results</b>	Document the process and outcomes of the peer review analysis (and, where relevant, a Gateway review) including robust and transparent consideration of how to resolve any issues. Confirm CBA analysis against Section 6.1 Quality and 6.2 CBA Health Check in the CBA Guide.
<b>Summary</b>	Summarise the difference between the options, and identify the preferred option.

## Outcomes

A clearly explained, robust and transparent economic analysis provides:

- » a coherent statement of the socio-economic effects and incremental CBA results (BCR, IBCR, IRR and NPV) to support the options analysis
- » information to incorporate into the options filtering analysis, conclusions, recommendations and executive summary
- » detailed documentation of the methodology and all the key assumptions
- » detailed documentation of all benefits and cost cash flows for all the years in the evaluation period
- » analysis of uncertainty and risk including sensitivity and scenario analysis
- » assurance activities to support a robust and defensible economic analysis.



A well explained, transparent and robust economic CBA gives a strong basis for options filtering and a coherent narrative of the incremental net economic benefits for the preferred option/s.

## C5 Financial analysis

### Purpose

The financial analysis should support robust and transparent options analysis by:

- » developing sound budget estimates for capital and operating cash flow to inform the budget viability of the proposal
- » analysing and quantifying proposal risks across options to inform the uncertainty surrounding proposal costs and benefits
- » linking capital costs in the proposal budget to whole-of-life costs for service delivery to inform the impact on ongoing budgeting requirements for both operating and maintenance costs
- » evaluating against capital and operating budget or funding constraints to determine whether the proposal can achieve the service need within capital constraints
- » developing and evaluating pre-feasibility commercial investment metrics (if required) to determine whether the proposal is commercially viable (if appropriate).



Queensland Treasury should be consulted for help with exploring the potential for private sector funding and/or financing.

A well-articulated and robust financial analysis provides a strong basis for options filtering and also gives decision-makers a clear understanding of the financial costs, revenues and risks of the options including, where appropriate, critical information on commercial viability.

The financial analysis also provides critical cost and risk information for the economics, affordability and delivery model analysis. Where appropriate, it includes full and transferable building information modelling (BIM) information for the next stage of the proposal lifecycle (procurement and delivery), if the proposal proceeds to Stage 3: Detailed Business Case.

The options analysis should follow the proposal owner's BIM requirements and clearly document how these would be adopted. The costs of BIM analysis, including maintenance of a BIM model for the life cycle of the proposal, should be considered.



## Considerations

- » The financial analysis consists of three different evaluations:
  1. Budget analysis (mandatory)
  2. structuring analysis (to be developed depending on the circumstances of the investment)
  3. commercial analysis (to be developed for commercial investments).
- » Some of the key actions to support a robust, transparent and clearly explained financial analysis (financial analysis summary, report and appendices) include:
  - › clearly documenting the financial analysis approach and analytical outputs needed for the economic cost benefit analysis
  - › evaluating the budget analysis and affordability requirements for the proposed investment and, where appropriate, a commercial investment evaluation (pre-feasibility or feasibility assessment)
  - › evaluating whole-of-life, whole-of-system and whole-of-state financial implications
  - › aligning with the analysis and methodology used in the economic analysis for the base case, service need (demand), evaluation period and terminal/residual values
  - › calculating most likely outcomes (e.g. expected values), which are likely to be different from the P50 value. Report the full profile of outcome including the P50 and P90 (or equivalent) values, and level of design (percentage or class etc.) utilised
  - › fully analysing and justifying the rationale underpinning the methodology, data and assumptions. Where appropriate, analyse their significance for the financial investment evaluation e.g. use an assumptions book in the financial modelling analysis
  - › fully analysing and justifying the rationale for all parameters used in the financial analysis
  - › fully analysing and justifying the rationale for risk quantification across all parameters including OPEX, CAPEX and revenue showing how they have been incorporated into the analysis. Include any residual risks that require further consideration in the next stage of the investment life cycle or may be material for the investment decision. (See more details in the section on financial risk considerations below.)
  - › undertaking sensitivity analysis to evaluate the key variables and assumptions that impact on the estimated financial and budget outcomes. They must be evaluated to the lowest level for CAPEX, OPEX, revenue elements and risks to determine which elements are most sensitive to changes
  - › employing robust deterministic and/or probabilistic methods for sensitivity analysis, including clearly and transparently outlining all assumptions and derivations, and peer-review to ensure contingency estimates are justifiable and defensible (refer Appendix 1: Design, Cost and Risk)



The level of analysis and design should be consistent for all options to allow like-for-like comparison between options.

- › undertaking scenario analysis to evaluate alternate futures or other macro-influences. This is a key input for the socio-economic, environmental and sustainability analysis.
  - › ensuring sensitivity analysis methods and results are peer-reviewed to ensure contingency estimates are justifiable and defensible (see Appendix 1: Design, Cost and Risk)
  - › when undertaking probabilistic sensitivity analysis, using well-specified design and cost inputs in line with industry benchmarks and guidelines, and provide sufficient data to support statistical estimation, analysis, and reporting (see Appendix 1: Design, Cost and Risk)
  - › evaluating the budget analysis to determine both the absolute and incremental effect on the forecast budget for both the department and the state. Check whether the investment is within expected capital and operating constraints.
- » As input into Section C6: Affordability analysis, evaluate possible financing and funding structures to determine the most appropriate approach e.g. government provision, joint venture, Public Private Partnerships (PPP). This will include evaluating key contractual terms and conditions for proposed structures e.g. term sheets.
    - › Financing structures are linked to how the infrastructure will be procured including government provision and Public Private Partnerships (PPP).
    - › Structuring analysis also determines the most appropriate funding structures including user pays e.g. pricing, value capture and private sector contributions.
    - › Where user-contribution structures are considered, the evaluation approach will need to consider different pricing approaches and the evaluation approach e.g. discount rate.
    - › The evaluation should identify the key risks/benefits of each structure and recommend a preferred approach for the proposed investment.
    - › The results of this will be input for Section C6: Affordability analysis.
  - » Summarise the key points from the evaluation in a summary table including key financial parameters in nominal (budget) and net present value (NPV) terms.
  - » The output of the financial analysis is a key input into C7: Options analysis.



## Financial risk considerations

- » There are two broad ways to identify risk:
  1. Qualitative risk assessment is the first step in risk assessment and involves determining, for each identified risk:
    - a. the triggers of risk, their impacts and the likelihood of those occurring
    - b. the consequences of the risk and any risk mitigation with revenue or cost consequences.
  2. Quantitative risk assessment involves assessing the likelihood of the risk happening and the associated financial consequences. It combines:
    - a. the likelihood of costs, revenues and benefits being different from the expected values
    - b. the consequences i.e. the difference between the actual and expected values.
- » The likelihood of the risk happening, and its consequences determines the quantum of the risk, and the level of risk analysis and mitigation you need to undertake. The outputs of risk assessments can be simulated using a probabilistic, Monte Carlo or other simulation, which will give the probability of different revenue and cost estimates.
- » Not all risks you identify will affect revenues or costs but some risks may have wider implications for social, environmental or economic outcomes.
- » Undertake benchmarking of the risk allocation against previous and similar projects (if available) to determine whether the proposed risk allocation is broadly consistent. Benchmarking helps give decision-makers further confidence that costs are realistic and unbiased.

### Key considerations

A robust financial analysis includes the following key considerations:

- » The evaluation period and methodology for determining terminal value should meet best practice evaluation techniques and should be completed in the methodology section at the beginning of the financial analysis. See Section A4: Base case and Section C4: Economic analysis.
- » For true comparison, collect revenue and costs for the same base year (real values).
- » 'Nominal dollars' are values at a specific point in time, are usually across financial years, and are unadjusted. When you collect information from the cost estimator and other contributors to the analysis, the base year must be clear and agreed.
- » 'Real dollars' have been adjusted for inflationary effects. Escalation rates must be clearly identified in generating outturn amounts.
- » Identify all current and future cash flows with supporting data (historical, forecast or benchmarked) if possible.
- » The discount rate is applied to nominal cash flows to account for the risk associated with the proposal and the time-value of money (in all cases the discount rate used should match the cash flows it is applied to).
- » Ensure terminal value estimates (which in many instances will be very low or nil) comply with national and international accounting practices e.g. consider accounting depreciation values in the context of asset impairment, market-to-market values, uncertainty, and commercial and economic reality.
- » In all cases, residual or terminal value estimates should include end-of-life capital and exit costs. This means, in some cases, terminal value may be negative.

The approach to conducting a financial analysis should:

- » identify all whole-of-life, whole-of-system and whole-of-state cash flows (i.e. capital and operating costs) over the life of the option
- » identify and assess the ongoing risks that might create, enhance, prevent, degrade, accelerate or delay the expected cash flows
- » risk-adjust all revenues and costs, as appropriate. Report Monte Carlo or other risk analysis summary results including key risks, modelling and full financial NPV distribution profiles (including most likely or expected case), P50 and P90 (or P90 equivalent) values. Note the level of design or class used
- » consider budgetary impacts, as well as potential government (local, state and federal) funding sources
- » conduct a stringent independent peer review of all financial analysis assumptions, methodology and outputs, and resolve any issues to ensure a robust and transparent analysis.



## Quality assurance review

Conduct an independent peer review of the financial analysis to assist its development and to confirm the soundness and appropriateness of the methodology, technical procedures and processes associated with the analysis and results. The review report should include a summary of the independent peer reviewer's findings, particularly in relation to the adequacy of rationale documentation, methodology, key risks and uncertainties, assumptions and results.

Seek ongoing technical advice throughout the financial analysis process to ensure a robust and transparent analysis.



## Commercial considerations

Undertake commercial analysis in line with best-practice investment standards while making sure it also meets the needs of the investing parties and shareholding Minister's department.

The commercial analysis should include relevant stakeholder input to ensure it facilitates informed investment decisions. It should also include financial and due diligence information to allow a robust, transparent, thorough and substantiated evaluation of the proposal.

Consider the following when conducting the commercial analysis:

- » expected revenues including competitive environment, market risk etc.
- » contractual arrangements such as take or pay arrangements etc.
- » investment risk profile and associated risk-return profile
- » competitive neutrality (as appropriate)
- » regulated returns (as appropriate)
- » pricing methodology
- » financing structures, ownership structures etc.
- » risk mitigation, back-to-back contracting etc.

## Value creation and capture

Some projects present opportunities to deliver enhanced public value creation through strategic project design. As part of broader financial analysis, proponents should consider the potential for additional revenue streams from value creation and capture (VCC) opportunities.

VCC provides:

- » a potential model for additional funding streams
- » a better beneficiary-contributes approach to traditional public-funding
- » analysis and evidence base to support implementation of more equitable infrastructure funding models.



The analysis and its outcomes, including the methodology, assumptions and outputs, should be documented and independently peer reviewed.

### APPLICATION

Consideration of the Value Creation and Capture Guidelines<sup>1</sup> is a requirement for Queensland Government agencies and delivery partners when delivering significant state government infrastructure investments.

In line with grouping interrelated projects as a program, VCC opportunities can be applied across a program of works.

Project sponsors should follow the implementation steps outlined below. Value creation activities will not always be followed by the implementation of a value capture mechanism, as the required implementation steps are constrained by the principles. If the steps are unable to be completed in accordance with the principles, then project sponsors may decide not to proceed. For instance, if agencies are not able to clearly identify the value being created, or explicitly identify the beneficiaries, then value capture may not be viable and subsequent implementation steps are not required.

While consideration of the Value Creation and Capture Guidelines is a requirement, implementation of VCC will only be appropriate in particular circumstances. Any application of a specific VCC mechanism will need to be considered on a case-by-case basis and is subject to Cabinet Budget Review Committee consideration as part of the broader project approval process.

<sup>1</sup> As found in supplementary guidance to the Queensland Treasury Project Assessment Framework.

# Defining Value Creation and Capture

## VALUE CREATION

Value creation delivers enhanced public value. Emphasising value creation through strategic project design can lead to enhanced economic and financial, social, and environmental outcomes. Examples of benefits could include increased job opportunities and workforce participation, increased recreational infrastructure and green space, improved accessibility and public safety for users (for example, seniors and people with disability) and enhancement of natural catchment areas.

## VALUE CAPTURE

Value capture is the act of collecting a portion of the benefits from public infrastructure investments that flow to the value of land or increased activity. The application of value capture funding mechanisms can help to meet the cost of establishing, upgrading and maintaining a wide variety of infrastructure forms.

## Principles

VCC principles (or considerations) should be applied to the analysis of VCC opportunities. The principles provide a framework for considering the application of value capture mechanisms in the development of infrastructure funding strategies.

### VALUE CREATION MUST BE INTEGRATED INTO PROJECT DESIGN

Integrated planning will maximise productivity and liveability returns and optimise both the core objectives and the value creation opportunities generated by the infrastructure.

### CREDIBLE ANALYSIS OF BENEFITS, COSTS AND RISKS

Value creation and capture approaches should be underpinned by an evidence base, including credible investigation of benefits, costs and risks. Value capture is a funding mechanism and its 'costs' and 'benefits' are distinct from those that are captured in the economic analysis (i.e. they should *not* be incorporated in the CBA)

### VALUE CAPTURE MUST CONSIDER EQUITY AND FAIRNESS

Value capture mechanisms provide for beneficiaries of infrastructure investment to make a fair and proportional contribution to the cost of that infrastructure.

There should be a clear nexus between the value created by the infrastructure, the beneficiaries who are in receipt of that value and the transparent application of funding mechanisms that provide for sharing of value to fund infrastructure provision.

### APPLICATION OF VALUE CAPTURE MUST BE PRACTICAL

Like all sources considered for proposal funding, value capture must be transparent, practical and efficient to apply.

### A SOCIAL LICENCE MUST BE DEVELOPED

Where appropriate, value capture infrastructure projects should involve stakeholder consultation and engagement to identify expected beneficiaries and build effective social licence. This may include comprehensive stakeholder engagement.

### GOVERNANCE STRUCTURES MUST BE FIT FOR PURPOSE TO DELIVER VALUE CREATION AND CAPTURE

Appropriate governance arrangements will need to be implemented. This should be 'fit for purpose', reflecting the project characteristics, combination of participants, funding sources and risk allocation.

### VALUE CREATION AND CAPTURE SHOULD SUPPORT SUSTAINABLE DEVELOPMENT

State and local government planning frameworks contain provisions to promote sustainable development, including sustainable settlement patterns and sustainable urban design.

This includes ensuring that all environmental, societal and economic considerations are appropriately balanced.

## Implementation steps

There are five key steps outlined in the Value Creation and Capture Guidelines that are designed to guide the consideration of value creation and capture in the development of major projects or programs across the project lifecycle. Consideration of the first three steps are directly relevant to Stage 2.

### 1. IDENTIFY THE VALUE CREATED BY THE INFRASTRUCTURE

Value capture allows the identification and capture of an equitable portion of the value released by new infrastructure. It is fundamental to a value capture approach that the value uplift benefits from the infrastructure are clearly established.

### 2. IDENTIFY THE BENEFICIARIES THAT CAN REALISE THE VALUE

Beneficiary mapping should be completed during analysis to ensure a clear line of sight to the outcomes to be achieved for those parties and the value capture mechanisms that can potentially generate funding streams.

Potential beneficiaries include: landowners, occupiers, and developers; users and operators; businesses; and governments.

### 3. VALUE THE BENEFITS THAT CAN BE REALISED BY THE BENEFICIARIES

In order to make the case for value capture, it is necessary to not only identify the value created by infrastructure and the beneficiaries of that value, but to have a reliable and feasible means to estimate how much value can be realised by these beneficiaries such that relevant capture mechanisms can be equitably designed and applied.

### 4. CONSIDER SUITABLE MECHANISMS

Value capture mechanisms are the instruments by which the value created by the infrastructure or planning decision can be captured and used to contribute to the cost of delivery. There are a variety of potential mechanisms – both passive and active – to be considered.

### 5. IMPLEMENT MECHANISM AND REALISE FUNDING

Once implemented, the funding derived via the project mechanism should be used to contribute toward the cost of funding the infrastructure project or program or, where appropriate, to contribute toward the general cost of core government infrastructure provision and service delivery.

### ADDITIONAL GUIDANCE MATERIAL

In considering VCC analysis, a range of other publications may be useful. These include:

- » Queensland Government Project Assessment Framework Value Creation and Capture Guidelines <https://www.treasury.qld.gov.au/programs-and-policies/project-assessment-framework/>
- » Victorian Government, Department of Premier and Cabinet, Value Creation and Capture Framework, February 2017 <https://www.vic.gov.au/value-creation-and-capture-framework>
- » Infrastructure Australia, Capturing Value: Advice on making value capture work in Australia, December 2016. <https://www.infrastructureaustralia.gov.au/publications/capturing-value-advice-making-value-capture-work-australia>
- » Global Infrastructure Hub, Innovative Funding and Financing Framework <https://www.gihub.org/innovative-funding-and-financing/>
- » Global Infrastructure Hub, Case Studies <https://www.gihub.org/innovative-funding-and-financing/case-studies/>
- » Infrastructure Australia, Assessment Framework, July 2021 <https://www.infrastructureaustralia.gov.au/publications/assessment-framework>

## Content to include

This section should include content as outlined in Table 18 below.

**Table 18: Financial analysis content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	Document the approach used in your analysis.
<b>Financial analysis results</b>	<p>Document the financial analysis results for each relevant shortlisted option, including:</p> <ul style="list-style-type: none"> <li>» all revenues and costs (both capital and operating costs)</li> <li>» a summary of the revenues and costs in nominal and present value (PV) terms, together with any necessary commentary concerning specific associated issues. Calculate a financial net present value (FNPV) applying an appropriate risk-adjusted discount rate. In all cases, the discount rate used should be consistent with the type of cash flows it is applied to i.e. real or nominal</li> <li>» budgetary impacts, as well as potential government (local, state and federal) funding sources for the shortlisted options, including opportunities for value creation and capture</li> <li>» adjusted revenues and costs for risk. Report Monte Carlo analysis summary results including key risk, modelling assumptions (including level of design used) and report full FNPV distribution profiles including most likely (or expected value), P50 and P90 or P90 equivalent values.</li> </ul>
<b>Sensitivity analysis</b>	Document the financial sensitivity analysis results of key parameters, including e.g. using summary information from the Monte Carlo analysis. This should not be a simple +/- percentage but results for all parameters noting the level of design or class used.
<b>Quality and assurance</b>	Document the process and outcomes of any peer review analysis (and where relevant Gateway review), including robust and transparent response to resolve any issues.
<b>Building information modelling</b>	<p>The project team should follow the relevant proposal owners BIM requirements. Clearly document how these requirements will be adopted.</p> <p>Costs for using BIM for options should consider:</p> <ul style="list-style-type: none"> <li>» maintenance of the model for the life of the asset</li> <li>» capacity and capability development, where there is an identified need for in-house expertise (usually outsourced)</li> <li>» efficiency benefits from using BIM.</li> </ul>

CONTENT	CONSIDERATIONS
<p><b>Value capture</b></p>	<p>Explore the opportunity for value creation and capture to help in the funding proposal. Value capture involves raising funding contributions from those who derive a benefit from the infrastructure (other than users). Most commonly, value capture mechanisms are targeted at capturing a portion of the uplift in land values attributable to infrastructure investment.</p> <p>Appropriately designed mechanisms for value capture can help fund infrastructure proposals. Application of VCC mechanisms improve proposal affordability aspects. In some circumstances, they can have efficiency and equity advantages compared with government contributions. A value creation and capture assessment undertaken as part of an options analysis should use the following process:</p> <ol style="list-style-type: none"> <li>1. identify the value created by the infrastructure</li> <li>2. identify the beneficiaries that can realise the value</li> <li>3. value the benefits that can be realised by the beneficiaries</li> </ol> <p>By the conclusion of Stage 2: Options Analysis, where VCC opportunities are apparent, at least steps 1, 2 and 3 should be completed. Additionally, if appropriate, consideration could also be given to step 4:</p> <ol style="list-style-type: none"> <li>4. consider suitable mechanisms to capture value</li> </ol> <p>Appropriate considerations include:</p> <ul style="list-style-type: none"> <li>» the potential viability of VCC mechanisms, based around identification and practicality</li> <li>» whether the proposed investment offers value uplift that can be identified and evaluated, including for example, offering enhanced commercial opportunities</li> <li>» relative place within a program. For example, where previous similar or related projects (as part of a program) developments have been assessed for VCC opportunities, then these opportunities may be further developed in the context of the current project.</li> </ul> <p>If there is value uplift opportunity, evaluate the potential mechanisms to capture the uplift considering the following principles:</p> <ul style="list-style-type: none"> <li>» Value creation must be integrated into project design</li> <li>» Value creation and capture must be guided by credible analysis of benefits costs, and risks</li> <li>» Value capture must consider equity and fairness</li> <li>» Application of value capture must be practical</li> <li>» Social licence must be developed</li> <li>» Governance structures must be fit-for-purpose</li> <li>» Value creation and capture should support sustainable development.</li> </ul> <p>Consideration of commercial opportunities should align with recently developed ‘Value Creation and Capture Guidelines’<sup>4</sup>. Stakeholder consultation and support are critical to successfully activating value capture mechanisms.</p>

## Outcomes

A well-articulated, robust and transparent financial analysis gives decision-makers a clear understanding of the financial costs, revenues and risks of the investment proposal including, where appropriate, critical information on commercial viability.

The financial analysis will:

- » clearly highlight expected risk adjusted cost and revenue estimates

- » highlight the proposal risk and their implications for the proposal
- » link capital costs in the proposal budget to whole-of-life costs for service delivery to inform the impact on ongoing budgeting requirements for both operating and maintenance costs
- » evaluate and clearly articulate capital and operating constraints to highlight whether the proposal can achieve the service need within capital constraints
- » consider finance and funding alternatives as part of C6: Affordability analysis.

<sup>4</sup> Value Creation and Capture guidelines – supplementary guidance to the Project Assessment Framework.

## C6 Affordability analysis

### Purpose

The affordability analysis should present information that allows decision-makers to assess whether each option is affordable over the whole of its life, by considering all sources of current funding, as well as additional funding sources.

All infrastructure investments will need to be funded over the life of the infrastructure regardless of the mechanism used to finance the investment. Funding is needed for both the initial cost of the investment (construction) and the ongoing maintenance and operation of the infrastructure service.

The initial investment can be funded either upfront (equity) or over time (debt) through a series of repayments such as principal and interest.

### Considerations

Proposal affordability is measured by the expected risk-adjusted finance net cost (both direct and indirect) to the state of delivering the options through traditional delivery.

### Funding principles

There is currently no universal framework for determining the optimal mix of funding sources for infrastructure investments. The characteristics of the industry, infrastructure and commerciality will affect the available funding sources. Consider these core principles in assessing the mix of funding sources for each infrastructure investment:

- » User-contribution mechanisms potentially allow infrastructure to be provided cost-effectively and may increase willingness to invest in new infrastructure.
- » Value capture mechanisms can be considered where the infrastructure will benefit stakeholders who are not just the direct users.
- » Developer contributions are usually expected for infrastructure that is necessary for land or property development.
- » Where infrastructure provided for the public is unlikely to have user-contribution or value capture opportunities. Hence, government funding will likely be required where users do not pay and/or where beneficiaries cannot be identified.

Overlaying these principles are a number of other important considerations including:

- » A funding mechanism may generate community cost and not deliver net positive benefits.
- » User-charging may only fund marginal private benefit leading to the undersupply of infrastructure and limiting the positive benefits to the wider community.
- » The funding mechanism should consider public equity effects of user charges or value capture mechanisms.
- » Vertical equity should consider whether those on lower incomes are bearing a relatively greater burden than those on higher incomes.
- » Horizontal equity should consider whether infrastructure beneficiaries are bearing more of the funding burden than those who do not benefit.
- » Consider current community and industry acceptance of funding methods e.g. user charges, developer contributions and asset sales.

## Funding envelope

The capacity to fund new infrastructure investments will be limited by the available funding options.

As such, funding sources are critical as the willingness of the public to pay either taxes/charges or accept a reduction in the quality or quantity of government services will impact the quantum of new infrastructure development/replacement.

## Content to include

This section should include content as outlined in Table 19 below.

**Table 19: Affordability assessment content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	Describe your approach in undertaking the affordability assessment.
<b>Funding options</b>	<p>There are five common options for funding of infrastructure investments:</p> <ol style="list-style-type: none"> <li>1. government appropriations</li> <li>2. user-contribution mechanisms</li> <li>3. value capture mechanisms</li> <li>4. developer contributions</li> <li>5. asset sales.</li> </ol> <p>Funding should consider both the initial cost of the investment (construction) and the ongoing maintenance and operation of the infrastructure.</p> <p>Provide clarity around the initial investment either upfront (equity) or over time (debt) and consider a series of repayments.</p> <p>(See Stage 3: Detailed Business Case Guide, Appendix 2: Funding options).</p>
<b>Analysis outcomes</b>	<p>Present the results of the affordability assessment, acknowledging all underpinning assumptions from the options analysis, including the implications of changing the preferred delivery model.</p> <p>Identify the affordability of the preferred option/s. This could include an assessment of staging options, revenue sources (if applicable), preferred delivery options and funding availability (both capital and operating costs), conditions and timing—acknowledging the delivery options being considered will have implications for funding profiles.</p>

## Outcomes

- » The affordability analysis should present information that allows decision-makers to assess if the preferred option/s is affordable over the whole of its life.
- » Sources of existing funding, as well as additional funding from other sources, should be fully investigated and analysed.



# Health check C1

Before progressing further with the options analysis, complete the following checklist. If an item has not been completed, include an explanation in the relevant section.

#	HAVE YOU COMPLETED THE FOLLOWING TASKS?	SECTION	COMPLETED
1	Identified, described and categorised all potential social impacts for each option (relative to the baseline)	C1	<input type="checkbox"/>
2	Determined the ability to quantify and/or monetise social impacts	C1	<input type="checkbox"/>
3	Completed an environmental assessment for each option	C2	<input type="checkbox"/>
4	Completed a sustainability analysis for each option including comparative analysis	C3	<input type="checkbox"/>
5	Completed an economic analysis narrative and cost benefit analysis (CBA)	C4	<input type="checkbox"/>
6	Completed key economic analysis according to the CBA guide, including reporting IBCR, BCR, NPV using P50 and P90 cost for each option	C4	<input type="checkbox"/>
7	Identified all option generated revenues and costs	C5	<input type="checkbox"/>
8	Created a financial model that forecasts or projects the cash flow profile generated over the full evaluation period	C5	<input type="checkbox"/>
9	Completed value capture and user charging assessment	C5	<input type="checkbox"/>
10	Provided detailed consideration for, and analysis of value creation and capture opportunities, and implications for proposal funding.	C5	<input type="checkbox"/>
11	Determined the consequences of identified risks for the financial cash flow estimates and/or wider benefit and cost estimates associated with each option	C5	<input type="checkbox"/>
12	Undertaken Monte Carlo simulation (e.g. using Crystal Ball or @Risk software) on the financial cash flows reporting full NPV profile, P50 and P90 values and the level of design used  Is this level of design at an acceptable level and is the differential between P50 and P90 cost commensurate with this level of design?	C5	<input type="checkbox"/>
13	Considered affordability of each option (considering all the previous analysis performed in the options analysis)	C6	<input type="checkbox"/>
14	Documented the methodology adopted for the affordability assessment	C6	<input type="checkbox"/>
15	Updated the risk register to include risk assessments from C1 to C6	Appendix 3	<input type="checkbox"/>
16	Undertaken an independent peer review on the methodology, assumptions and outputs of the assessments (particularly economic and financial/commercial assessments)	C4 and C5	<input type="checkbox"/>

## C7 Options analysis

### Purpose

The options analysis section should consider the key analysis in Section C to enable you to shortlist and rank options and identify the preferred option/s to progress to Stage 3: Detailed Business Case, if recommended.

### Considerations

- » The selection of the preferred option/s should be informed by the key economic analysis outcomes (BCR, IBCR, IRR and NPV) but should also consider criteria from Section C analysis including:
  - › social
  - › environmental
  - › sustainability
  - › financial and commercial<sup>4</sup>
  - › delivery and affordability
  - › strategic, legal and risk considerations.

- » Where criteria cannot be quantified, a qualitative scope of each option's level of contribution towards each criterion could be applied to supplement the analysis. Rules could be developed to convert quantitative and qualitative data to a common scale to help give clear judgements for the shortlist process.
- » Where the options have been modified in Section C, review the options to ensure the benefits initially attributed to the investment continue to be achievable. This may affect the cost benefit analysis or social impact evaluation.
- » Document the priority of the proposal, including option staging considered and a description of the key impacts if the proposal does not proceed.
- » Where there is insufficient information or detail to confidently select a single option, you may forward several options to the decision-maker. The detail will then be further assessed in a Stage 3: Detailed Business Case, if progressed. (Note that proposals that are likely to be considered by Infrastructure Australia include two options for Stage 3: Detailed Business Case).

A suggested options analysis summary table is shown in Table 20.

**Table 20: Example options analysis summary**

OPTION ASSESSMENT	OPTION 1	OPTION 2	OPTION 3
<b>STRATEGIC APPRAISAL</b>			
<b>Alignment to objectives (state, community, agency)</b>	Low	Medium	Medium
<b>Effectiveness in addressing the service need and achieving the benefits sought</b>	Low	Low	Medium
<b>Alignment with State Infrastructure Strategy options assessment—reform, better use, improve existing, new</b>	Medium	Low	High
<b>SOCIAL, ENVIRONMENTAL AND SUSTAINABILITY APPRAISAL</b>			
<b>Social impacts</b>	Positive (low)	Positive (low)	Positive (medium)
<b>Environmental impacts</b>	Negative (low)	Negative (low)	Positive (low)
<b>Sustainability impacts</b>	Low	Low	Low
<b>ECONOMIC APPRAISAL</b>			
<b>Benefit cost ratio</b>	0.9	1.1	1.2
<b>Net present value (NPV)</b>	-\$xxm	\$xxm	\$xxm

<sup>4</sup> For commercial entities or government-owned corporations, the primary consideration is commercial viability.

OPTION ASSESSMENT	OPTION 1	OPTION 2	OPTION 3
<b>FINANCIAL AND AFFORDABILITY APPRAISAL</b>			
<b>Risk</b>	Medium	High	Medium
<b>Financial NPV</b>	\$xxm	\$xxm	\$xxm
<b>DELIVERABILITY APPRAISAL</b>			
<b>Risk</b>	Medium	High	Medium
<b>Financial NPV</b>	\$xxm	\$xxm	\$xxm
<b>Potential for Public Private Partnership (PPP) delivery</b>	Low	Low	Medium
<b>OUTCOME</b>			
<b>Ranking</b>	<b>3</b>	<b>2</b>	<b>1</b>

The preferred option/s should be documented and should include the information listed in Table 21.

**Table 21: Preferred options matrix**

<b>PREFERRED OPTIONS</b>	
<b>OPTION X: [OPTION TITLE]</b>	
<b>Intended outcomes</b>	What the option will accomplish (i.e. objectives, benefits), specifically noting how the benefits compare to the original benefits targeted
<b>Affordability and value-for-money</b>	How the preferred option will deliver value-for-money
<b>Scope</b>	Inclusions and exclusions and how the option will address the service need
<b>Implementation</b>	A description of how the shortlisted option would be implemented, including reference to planning approval(s)
<b>Disbenefits</b>	A summary of disbenefits of the option
<b>Infrastructure</b>	A summary of any infrastructure components of the options, canvassing a number of technical solutions and engineering possibilities
<b>Other requirements</b>	Any requirements for complementary infrastructure and/or opportunities for integration or coordination with other proposals
<b>Risk assessment</b>	The results of the risk assessment conducted on shortlisted options

- » Consider how the preferred option/s is likely to deliver value-for-money and be affordable over the life of the option, referencing:
  - › the estimates of the preferred options costs and benefits
  - › socio-economic viability (BCR, NPV and IRR)
  - › depth of technical investigations
  - › scenario and sensitivity analysis
  - › market sounding and preliminary procurement strategy.



This section should present the results of the key quantitative and qualitative analysis to rank the shortlist options, giving a robust and defensible recommendation on the preferred option/s.

**Table 22: Shortlist rank summary**

SHORTLIST OPTIONS	FINANCIAL	ECONOMIC	SOCIAL	ENVIRONMENTAL	
	FNPV	BCR	MONETISED (NPV)	QUALITATIVE	MONETISED (NPV)
Base case					
Options 1					
Options 2					
Options 3					
Options ...					

An initial benefits management plan may be developed for each option if appropriate. The initial benefits management plan should include details of:

- » benefit description
- » benefit owner
- » anticipated beneficiaries

- » stakeholders
- » KPIs/measures
- » dependencies
- » high-level activities and timeframes to achieve the benefits
- » reporting requirements.

## Content to include

This section should include content as outlined in Table 23 below.

**Table 23: Options analysis content and considerations**

CONTENT	CONSIDERATIONS
<b>Approach</b>	Document your approach to ranking the options and selecting the preferred option/s, noting any limitations and assumptions.
<b>Analysis summary</b>	Summarise the outcomes of your analyses for each of the shortlisted options including: <ul style="list-style-type: none"> <li>» economic</li> <li>» social</li> <li>» environmental</li> <li>» sustainability</li> <li>» financial and commercial</li> <li>» affordability</li> <li>» strategic, legal and risk considerations.</li> </ul>
<b>Preferred option/s</b>	Document the preferred option/s noting how the preferred option/s is likely to deliver value-for-money and be affordable over its life. Refer to the estimates of the preferred option’s costs and benefits, socio-economic viability (BCR, IRR and NPV), depth of technical investigations, sensitivity and scenario analysis, and other analyses outcomes.

## Outcomes

The options analysis should clearly document a robust and transparent ranking of your shortlist options and should recommend a preferred option/s to proceed for more detailed analysis in the Stage 3: Detailed Business Case.

The Stage 2: Options Analysis should also ensure that the recommended preferred options are viable across quadruple bottom line considerations (economic, social, environment and financial).

## Health check C2

Before progressing further with the Stage 2: Options Analysis complete the following checklist.

#	HAVE THE FOLLOWING TASKS BEEN COMPLETED FOR EACH OPTION?	SECTION	COMPLETED
1	Documented all sources used, assumptions made, and methodology adopted for selecting your preferred option/s (selection process is clear, robust and defensible)	C7	<input type="checkbox"/>
2	Completed documentation for preferred options of: <ul style="list-style-type: none"> <li>» intended outcomes</li> <li>» socio-economic viability (BCR, NPV and IRR etc.)</li> <li>» scope</li> <li>» implementation (including reference to planning approvals)</li> <li>» disadvantages</li> <li>» infrastructure considerations</li> <li>» risk</li> <li>» affordability and value-for-money</li> <li>» any other requirements (e.g. commercial viability)</li> </ul>	C7	<input type="checkbox"/>
3	Described: <ul style="list-style-type: none"> <li>» key impacts associated with the preferred option/s</li> <li>» priority of the preferred option/s</li> <li>» implications of not proceeding with the preferred option/s</li> </ul>	C7	<input type="checkbox"/>
4	Explained what is required for the preferred option to successfully achieve the targeted outcome	C7	<input type="checkbox"/>
5	Summarised the service need or problem, outcome and targeted benefits, and summarised the options analysis in the conclusion to the Stage 2: Options Analysis		<input type="checkbox"/>
6	Updated the risk register	Appendix 3	<input type="checkbox"/>
#	CRITICAL DECISION POINTS		
1	Have any issues been identified that could result in the shortlisted options not proceeding?		
2	Do any of the assessments show optimism/momentum bias?		



Section D:  
Preferred option/s implementation  
considerations

Section D should discuss the process for implementing the proposal. It should give decision-makers assurance that the preferred options are an appropriate solution to address the service need and deliver value-for-money for the state. Mitigate any risk issues raised or reconsider that option.

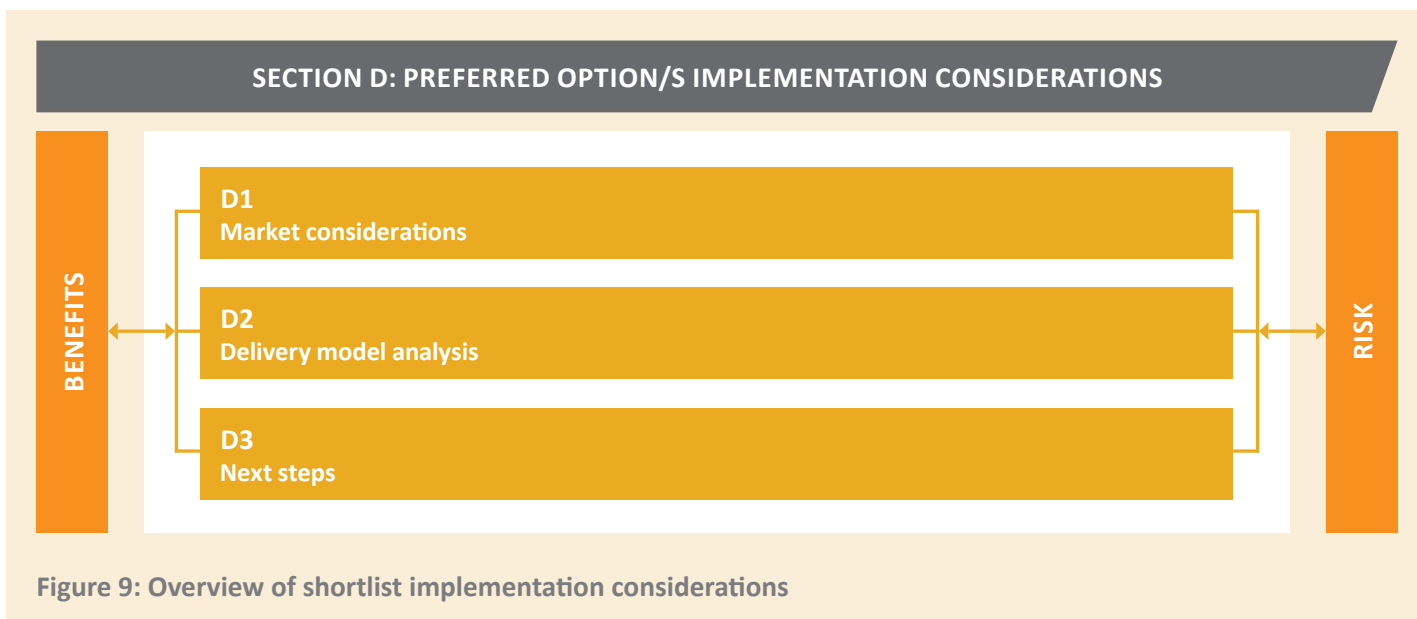


Figure 9: Overview of shortlist implementation considerations

# D1 Market considerations

## Purpose

This section supports:

- » the investment decision-making process
- » the development of a preliminary procurement strategy
- » identification of opportunities and risks related to procurement.

## Considerations

As the level of private sector involvement varies considerably between proposal options, information should be sought from the private sector concerning the proposal. This may include:

- » market information regarding market risk appetite, availability of contractors and any other major projects that may compete for resources
- » potential delivery models and issues concerning the proposal from an industry perspective
- » proposal options feasibility, appetite/attractiveness and risk sharing
- » feedback on matters such as the proposal option's scope and specification, and any opportunities for design and construction innovation.

Where the proposal option/s are highly sensitive to assumptions about the attractiveness, likely involvement of the private sector and the terms on which that involvement might occur, those assumptions should be validated through market sounding.

- » Market sounding during proposal development builds upon and provides more detail than Stage 1: Strategic Assessment. It also identifies any changes or impacts in the market since Stage 1: Strategic Assessment completion.
- » Subject to the type of option, market sounding may be required to capture the design phase to increase its effectiveness.
- » Information provided by the market should be critically evaluated if there is different or inconsistent feedback and response. Care must be taken to ensure participant expectations regarding implementation and options are managed appropriately and with due regard for probity.
- » Market consideration activities may include documenting the results of a desktop review undertaken prior to, and supporting, the market sounding activities.



Market sounding can also be used to gain feedback on ways to present the proposal to the market to increase its attractiveness and reduce obstacles.

Queensland Treasury can assist with the development of a Market Sounding Plan if required.



Where there are multiple projects that draw on the same market and resources, the proposal should seek to outline potential interfaces between them and the resulting impact (i.e. strained market capacity or potential for staged development).



## Content to include

This section should include content as outlined in Table 24 below.

**Table 24: Market considerations**

CONTENT	CONSIDERATIONS
<b>Market sounding objectives</b>	<p>Market sounding refers to the collection of activities to determine the market’s appetite for involvement and/or explore possible solutions. Document the objectives for market sounding. They may include:</p> <ul style="list-style-type: none"> <li>» obtaining market information including risk appetite and the availability of contractors</li> <li>» acquiring feedback on matters such as proposal scope and specification, the opportunity for design and construction innovation, timeliness for the bidding process and bidder selection criteria</li> <li>» providing information to the market e.g. on proposal requirements.</li> </ul>
<b>Market sounding approach</b>	<p>This may involve detailed desktop market sounding of trends and issues including formal requests for information. In some cases, this will involve conducting formal market sounding processes using structured engagement with industry.</p> <p>As market sounding should focus on the private sector as a whole rather than on any individual company, structured engagement requires careful consideration regarding which companies and industry groups to approach.</p> <p>Planning and structuring the engagement is important to minimise the risks of providing information to companies which may give them an unfair advantage during any future procurement processes.</p> <p>A clear probity protocol is required to assist in managing such risks. Probity protocols should not prevent discussions with the market but they should ensure care is exercised so no company has, or is perceived to have, received or provided information that offers them an unfair advantage in any subsequent procurement process.</p>
<b>Market feedback</b>	<p>Feedback typically includes:</p> <ul style="list-style-type: none"> <li>» feedback on options and risk allocation</li> <li>» market preference on size and staging (work packages).</li> </ul>
<b>Assessment of market capability</b>	<p>Consider the market capability and interest including delivery or financing options. This should include local market engagement during options analysis development as well as delivery.</p> <p>Where the local market is to be targeted during delivery, this should be reflected in the economic and financial analyses.</p> <p>Information from this section is used to inform the financial and risk assessment sections.</p>

## Outcomes

Document key market feedback information including risk, market capability and other considerations which will inform deliverability assessment, environmental assessment, the social impact evaluation, the risk assessment and cost estimates.

## D2 Delivery model analysis

### Purpose

The delivery model analysis should evaluate potential delivery models and recommend a delivery model that is likely to optimise value-for-money. The analysis should also consider packaging options for the delivery including private finance models (if appropriate). The objective of the assessment is to identify the best-value delivery model that will meet the service need.

### Considerations

Treasury's Project Assessment Framework mandates that in all circumstances private sector procurement must be considered for all proposed investments with an expected capital cost greater than \$100 million. This consideration is facilitated through the delivery model analysis.

You can find further guidance on undertaking a value-for-money assessment in the Project Assessment Framework (PAF) and the National PPP Guidelines. Workshops will be needed to explore the detailed assessment required to evaluate the delivery model, including packaging considerations.

The delivery model analysis should consist of the following multiple stages:

- » Source and analyse data needed to undertake the evaluation, including proposal objectives and requirements, risk, option characteristics (e.g. design, operations, agency capability and market sounding analysis). You will need to develop detailed data to reach an informed evaluation of potential benefits.
- » Evaluate packaging to decide which elements of the investment should be included or excluded in the evaluation e.g. operations and maintenance. Also evaluate whether to break up construction into separate packages e.g. rail, road, signalling.
- » The analysis should detail supporting evidence, analysis and rationale. Issues to consider include:
  - › brownfield versus greenfield infrastructure
  - › discrete elements of procurement
  - › easily separable portions of work e.g. geographically
  - › analysis of risks and interface issues
  - › operating environment
  - › site accessibility
  - › staging opportunities and requirements.



Engage Queensland Treasury at the earliest possible stage in the business case process to explore options for private sector funding and/or financing.

- » Evaluate whether private finance models are suitable to procure the investment. As part of this evaluation consider:
  - › the ability to derive output-based specification
  - › risk allocation between government and private sector providers
  - › efficiency cost benefits
  - › revenue opportunities
  - › market appetite and interest
  - › potential for innovative solutions.
- » Develop qualitative criteria and associated weightings for the delivery model evaluation.
- » Shortlist delivery models for evaluation by considering:
  - › proposal objectives
  - › agency capability
  - › efficiency cost benefits
  - › characteristics of the procurement model e.g. inclusion or exclusion of operations, similar investments locally that set a precedent, comparable projects across other jurisdictions and industries, and relevant historical experience.
- » Determine appropriate cost criteria and associated weightings consistent with relevant guidelines.
- » Undertake your evaluation in line with relevant guidelines to justify the preferred procurement approach.
- » Undertake additional checks to confirm the preferred procurement model. These checks could include a sensitivity analysis and engaging the market to confirm interest, capability and availability.

The analysis should use value-for-money criteria to assess whether potential private financial procurement models could generate value for the state.

Each potential procurement model should include some form of private financing to fund infrastructure construction, and should consider other variants of ownership, maintenance and operations.

## Traditional delivery model

Traditional delivery models may include those listed in Table 25.

**Table 25: Traditional delivery models**

1	Design and construct including early contractor involvement and early tenderer involvement
2	Design, construct and maintain
3	Design, construct, maintain and operate
4	Alliance/competitive alliance
5	Managing contractor

Engage those with the experience and professional judgement to help select the most relevant delivery models to evaluate. Not all of these delivery models may be suitable for the specific circumstances. Other delivery models may be evaluated instead or in addition to these options.

## Private finance delivery model assessment

A private finance arrangement is a risk-sharing relationship between the public and private sectors to deliver public infrastructure (and associated services) with a component of private sector finance.

## Value-for-money

Value for money drivers may include:

- » option scale
- » risk allocation
- » whole-of-life costing
- » innovation
- » improved asset utilisation
- » economies of scale
- » competitive process.

You should undertake the value-for-money evaluation using a multi-criteria analysis. The analysis should detail supporting evidence and rationale including the following:

- » your ability or otherwise to develop an output-based specification covering defined requirements and performance indicators. You must justify your rationale for being able to achieve this.
- » how you have evaluated risk allocation between government and the private sector. Show:

- » details of the expected risks, analysing which party is best placed to manage those risks to determine the optimal risk transfer
- » your assessment of cost certainty and the likelihood of variations or scope creep
- » whether private finance can cost risks efficiently, including an evaluation of the risk premium needed to transfer these risks.
- » evaluation of potential cost efficiency benefits detailing what bundling benefits are expected and why those benefits are expected e.g. substantive operating cost relative to the capital cost
- » evaluation of all potential revenue opportunities that could be developed to offset the expected capital and operating costs
- » assessment of the market appetite, interest and ability to undertake the proposed investment. You need detailed evidence to support this assessment
- » investigation of innovative and creative solutions to meet the investment objectives.

Other factors you need to evaluate include the contract term and the benefits of developing on a holistic basis e.g. coupling infrastructure construction with maintenance.

## Content to include

Undertake the delivery model analysis in line with the approach below, which evaluates the preferred delivery model using a five step process. The evaluation should involve a number of workshops (at least two but could be up to four). Workshops should include:

- » internal government stakeholders with extensive knowledge of the proposal and of the construction, maintenance and operational environment
- » experienced and skilled advisors (where appropriate)
- » external consultants with private equity and private sector construction, maintenance and operational experience in the relevant industry.

### STEP 1. DATA

Gather and analyse data to cover the following areas:

- » Confirm the proposal objectives i.e. service need or opportunity (the objectives need to be adequately defined to determine whether the delivery model will affect their achievement).
- » Confirm the proposal requirements (needed to inform market sounding).
- » Confirm proposal characteristics (needed to both inform market sounding and to evaluate whether delivery models will be affected). Evaluate the potential for innovation in design, delivery, operation and maintenance, and whether the proposal has easily definable output requirements that could have performance measures.
- » Undertake a transparent and independent evaluation of whether your agency (with its network of personnel, skills, systems etc.) can manage the proposal's implementation across the different delivery model alternatives (e.g. does the agency have the capability to undertake a Public Private Partnership).
- » Revisit your market analysis for each stage of evaluation e.g. pre-feasibility options analysis (initial discussions), feasibility, detailed business case (preferred proposal) and procurement development.
- » Undertake a detailed risk assessment for all investment risks, such as financial, legal, technical, design, environmental, social, etc. Each risk should be quantified (where possible) to allow an understanding of the expected costs if delivery is retained by government or transferred to the private sector under an alternative delivery model.
- » Undertake a detailed evaluation of the whole-of-life costings to understand:
  - › packaging
  - › build and maintenance dependencies and synergies
  - › capital versus operating costs
  - › life cycle management for the proposal
  - › whether there are opportunities for cost savings under different delivery model alternatives.

- » Undertake a packaging evaluation to determine which elements of the investment should be included in the delivery model evaluation and which should be sourced independently (usually through government). The packaging evaluation should also analyse in detail whether multiple construction packages would be suitable.
- » Undertake all analysis necessary to inform economic evaluation of outcomes under different delivery models.
- » Investigate whether the proposal has scope to generate additional revenue streams.
- » Determine the likely number of bidders for the proposal through market sounding.
- » Undertake preliminary, detailed legal assessments on whether a long term contract is suitable for the proposal.

### STEP 2. SHORTLISTING

Shortlist a selection of delivery model alternatives (Workshop 1) using data gathered and analysis undertaken in step 1. Focus on the following for each delivery model:

- » ability to fully deliver the proposal objectives
- » suitability e.g. brownfield versus greenfield
- » existing and proposed operating environment
- » proposal recurrent budget or capital funding constraints
- » operating model e.g. government-managed services
- » split between capital, operating, and maintenance costs agency capabilities
- » market appetite.

### STEP 3. VALIDATION

Validate your shortlisted alternatives by:

- » comparing your analysis to previous investments delivered in different jurisdictions, noting any differences that would be relevant to your selection of preferred delivery model alternatives
- » reviewing lessons learnt that have particular relevance to the current proposal
- » checking any structural or market changes e.g. market preference for availability structures, interest rate environment
- » market sounding feedback.

### STEP 4. ANALYSIS

This stage analyses the delivery models for the shortlisted alternatives (Workshop 2).

You should determine appropriate criteria for the analysis and allocate weightings based on each criteria's likely effect on achieving value-for-money. The same criteria and weighting should be applied to each shortlisted delivery model alternative.

The delivery model analysis should be used consistently whatever type of delivery models are shortlisted i.e. whether they are only private finance, traditional or a combination.

Value-for-money is determined by considering benefits relative to costs. A delivery model choice can affect both the expected benefits and costs. Your delivery model evaluation should consider both the likely range of cost outcomes (financial) and likely range of benefit outcomes (financial and non financial). Non financial outcomes can be assessed using techniques such as economic and social evaluations.

The delivery model assessment should be focused on determining which alternative is likely to generate the highest value-for-money outcome for the state. Value-for-money is assessed using:

- » Financial evaluations—focus on the costs to the state that will affect the state’s cash flow profile, such as capital and operating costs.
  - › This category will also evaluate cost offsets such as revenue opportunities associated with different delivery models.
- » Non-financial evaluations—focus on economic, social and environmental benefits that could be achieved with different delivery models.
  - › This category should consider both disadvantages and costs e.g. noise, and advantages such as better quality of life.

To establish the cost and quality criteria, break down criteria into the maximum number of sub-criteria that are relevant and can be evaluated. Each sub-criterion should then be weighted based on its impact on value-for-money outcomes.

- » The total weightings of all sub criteria (cost and quality) should add up to 100 per cent.
- » The weighting split between cost and quality should be based on the type of project.
- » The importance of the qualitative criteria and their effect on value-for-money should be used to decide an appropriate weighting e.g. low non-financial values might represent 20 per cent of the weighting.

Only criteria that are relevant to outcomes for all delivery models should be included in the assessment. If impacts are minimal, inconclusive or similar for all delivery models, exclude that criterion from the assessment.

Trade-offs between outcomes will become obvious in evaluating the alternative delivery models. It is unlikely that one model will score highly in all categories. For example, a high level of state control will potentially reduce opportunities for innovation, or a constrained timeframe for delivery may increase cost. Consider the relative priority of the proposal’s targeted objectives and outcomes when setting the criteria and weightings.

## **COST**

A criterion should only be included in the cost category where it will affect the expected cost of delivery (design, construction, maintenance and operation). All qualitative criteria should be assessed in the quality category. A cost should also only be included where it is expected to be different in the different delivery model alternatives e.g. innovation in different delivery models may change construction costs, operational costs, maintenance costs or financing costs.

The relative weighting of each sub-category should also take into account its comparative value over the investment horizon of the proposal i.e. transaction costs relative to whole-of-life costs.

Example cost categories may include:

- » capital costs (vary due to different competitive tension in delivery model alternatives)
- » operating costs (should only be included where at least one delivery model includes an operating component)
- » maintenance costs (should only be included where at least one delivery model includes a maintenance component)
- » transaction costs (should only be included if the cost for one delivery model is substantially different from the other delivery models. If transaction costs are insignificant, they should be excluded)
- » risk of cost variation (only include this when the total risk can be quantified and where the optimal risk allocation for one delivery model is substantially different to the other delivery models). Individual risks should only be assessed where one or more delivery models achieves optimal risk allocation at a significantly lower cost compared to other models
- » other e.g. cost of environmental offsets.

All cost categories must be evaluated over the same investment horizon.

## **QUALITY**

The qualitative criteria will be determined by the type of investment. Only qualitative criteria that significantly affect non-financial outcomes should be included in the assessment. For each qualitative criterion assessed, clearly explain its link to the investment’s objectives and non-financial outcomes e.g. social. Consider the following:

- » Level of service: to maintain level of service at or above minimum service standard over the economic life of the investment. This is unlikely to apply where delivery models do not include operations and maintenance.
  - › Only include this criterion where one delivery model is expected to provide a higher level of service compared to others. The level of service can be broken down into multiple sub-categories as needed.

- » Innovation: to improve investment non-financial outcomes through innovative solutions.
  - › Only include this criterion where one delivery model is expected to include innovative solutions that lead to better non-financial outcomes compared to other delivery models.
- » Timing: to complete investment to align with a non-negotiable date or event. Note that deferring the timing may generate considerable financial and non financial benefits.
  - › Only include this quality category if the economic assessment shows that an early start will give significant advantages and if one of the delivery models achieves a worthwhile time difference.
- » Environment: to minimise environmental impacts.
  - › Only include this criterion where one delivery model is expected to achieve better environmental solutions than others.
- » Equity: to improve equity through improved public accessibility, consumer rights and security.
  - › Only include this criterion where one delivery model is expected to achieve better equity outcomes than others.
- » Sustainability: to achieve sustainability over the investment's economic life. This includes assessing whether the delivery models will use resources and energy effectively while achieving social returns for stakeholders.
  - › Only include this criterion where one delivery model is expected to achieve better sustainability outcomes than others.
- » Economic externalities: to minimise negative externalities and enhance positive externalities for stakeholders, including how delivery models will perform for factors such as noise and pollution.
  - › Only include this criterion where one delivery model is expected to achieve better economic outcomes than others.
- » Flexibility: where a proposal's operations are either not suited to a long term contract or the output requirements are uncertain, then it may need flexibility to undertake modifications over the contract term or flexibility of the operational phase contractual period. In this case, flexibility would be a valid criterion for evaluation.

Decide on criteria weightings based on their effect on achieving value-for-money across all delivery models. You can use mathematical approaches such as Rank Order Centroid, Pairwise or Swing Weighting to set better weightings. Whichever method you use for weightings, you should have sufficient justification and rationale for each weighting from the analysis and evidence developed during Step 1.



If the recommended delivery option is a PPP with private finance, report the outcomes of the assessment (including the preferred PPP delivery model) in accordance with the National PPP Guidelines and the Queensland Treasury, Project Assessment Framework (PAF) PPP guidelines.

## STEP 5. EVALUATE

Develop a tool for multi-criteria analysis (such as Multi Attribute Utility Theory) to evaluate and rank the delivery model alternatives.

Develop a spreadsheet or similar tool to undertake the evaluation (Workshop 3).

Score each criterion, either on a relative basis to each other or on an absolute achievement basis. Get each participant to score each criterion independently first to gather diversity of opinion, then invite comprehensive discussion to find scoring consensus.

- » Each score should go through an iterative process and sense checking.
- » Scores must be justified and have a supporting rationale given (preferably sourced from Step 1).
- » Spreadsheets and supporting rationale should be circulated to participants for final consultation and modification.
- » Use resulting scores to identify and rank preferred delivery model/s.

## Outcomes

- » Evaluating and analysing potential delivery models results in the recommendation of a procurement model that is likely to optimise value-for-money in delivering the investment.
- » The analysis explores packaging options for the procurement as well as development of private finance models (if appropriate) ensuring all options have been considered.

## D3 Next steps

### Purpose

This section should document the next steps in developing your proposal. This may include plans for progressing the proposal to the Stage 3: Detailed Business Case.

### Considerations

If your Stage 2: Options Analysis is recommending that a preferred option/s continues to a Stage 3: Detailed Business Case, you will need to develop a high-level delivery and resource plan for Stage 3: Detailed Business Case.

### Content to include

This section should include content as outlined in Table 26.

**Table 26: Next steps content and considerations**

CONTENT	CONSIDERATIONS
<b>Plan for developing a detailed business case</b>	<p>The plan should examine the requirements for a Stage 3: Detailed Business Case including:</p> <ul style="list-style-type: none"><li>» governance</li><li>» clarity regarding scope</li><li>» a list of required investigations</li><li>» resource requirements</li><li>» key proposal milestones, (including planning and approval processes), including date and responsible person</li><li>» proposed stakeholder engagement activities</li><li>» cost estimate for developing the detailed business case</li><li>» details of any urgency required.</li></ul>

### Outcomes

The next steps section will clearly articulate the way forward for the proposal, including where appropriate, progress to a Stage 3: Detailed Business Case.

# Conclusions

## Purpose

Conclusions should draw together the key analysis findings from sections A, B, C and D.

## Approach

Clearly articulate the outcome of the options analysis filtering process including the economic, social, financial and environmental merit of the proposal. Explain how the preferred options meet the service need and delivers these quadruple bottom line outcomes.

Summarise key issues that could affect the delivery of the proposal and its benefits.

Document conclusions drawn from the following analyses (where relevant):

- » strategic considerations (government-level issues and risks, and legislative issues)
- » options analysis, incorporating socio-economic analysis, including CBA results (BCR and NPV), financial/commercial, sustainability and environmental considerations
- » assumptions, limitations and constraints of the options analysis
- » any implementation issues including any approvals issues and timeframes.

## Outcomes

The conclusions section should clearly explain and draw together the key findings from Section A, B, C and D.



# Recommendations

## Purpose

The recommendations section should clearly outline the actions that decision-makers should consider further.

## Considerations

- » Document your justification for the proposal to proceed, by incorporating all the aspects considered in sections B, C and D, and particularly the socio-economic viability of the proposal as outlined in Section C4: Economic analysis.
- » If the recommendation is to proceed i.e. the preferred option/s are viable, summarise the preferred option/s to progress to Stage 3: Detailed Business Case.
- » Summarise the recommended delivery option for the preferred option/s.
- » Complete the benefits and risks registers and note any possible future risk and benefits activities.
- » If the recommendation is to proceed to Stage 3: Detailed Business Case, this section should also:
  - › seek approval for the implementation plan (and associated documents)
  - › highlight significant issues or risks for decision-makers (if appropriate)
  - › include recommendations about optimal timing.
- » Factors from the options analysis that typically require recommendations include:
  - › the viability and endorsement of the preferred option/s (economic, social, environmental, financial, affordability and commercial)
  - › progression to procurement and approval of the implementation plan
  - › key activities/thresholds that need to be achieved before the proposal goes ahead
  - › identification of significant issues or risks
  - › key timeframes, timing and governance arrangements.
- » If the outcome of the options analysis concludes that a non-infrastructure preferred option/s should progress, the executive summary should include recommendations about the governance arrangements, oversight and ownership of the proposal in future.

## Outcomes

- » The recommendations section should:
  - › clearly note the proposal outcome i.e. whether the preferred option/s is viable, rejected or modified
  - › clearly outline the actions required by the investment decision-maker.

## Health check D

#	HAVE THE FOLLOWING TASKS BEEN COMPLETED?	SECTION	COMPLETED
1	Reviewed and documented market considerations	D1	<input type="checkbox"/>
2	Completed qualitative assessment of a range of potential delivery models (traditional and PPP), determining which delivery model is likely to deliver the best value-for-money	D2	<input type="checkbox"/>
3	Documented the methodology adopted for the delivery model assessment	D2	<input type="checkbox"/>
4	Summarised the outcomes of a traditional delivery model assessment	D2	<input type="checkbox"/>
5	Summarised the outcomes of a value-for-money PPP assessment	D2	<input type="checkbox"/>
6	Completed and documented a Gate 1 Assurance Review (if required)	A2	<input type="checkbox"/>
7	Prepared a detailed delivery and resource plan for the Stage 3: Detailed Business Case (if required)	D3	<input type="checkbox"/>
8	Summarised the service need or problem, outcome, targeted benefits and options analysis in the conclusion to the Stage 2: Options Analysis	A3	<input type="checkbox"/>
9	Documented conclusions	Conclusions	<input type="checkbox"/>
10	Documented recommendations	Recommendations	<input type="checkbox"/>
11	Completed an executive summary	Executive summary	<input type="checkbox"/>
12	Updated the risk register	Appendix 3	<input type="checkbox"/>
13	Review the finalised options analysis to assess whether: <ul style="list-style-type: none"> <li>» it is complete</li> <li>» the information is contemporary, reliable and reasonable</li> <li>» it is robust, defensible and transparent</li> <li>» it clearly documents ownership</li> <li>» assessments and documentation enable the options analysis to be compared to others.</li> </ul>		<input type="checkbox"/>
#	CRITICAL DECISION POINTS		
1	Has refining the options during options analysis assessments resulted in any benefits no longer being valid?		
2	Is the proposal still valid considering any changes to the general environment, underpinning service need demand or the implementation of other programs/initiatives since the options analysis was completed?		
3	Is the preferred option/s economically, socially and environmentally viable?		

# Glossary

<b>Benefit</b>	<p>A measurable improvement resulting from an investment perceived as an advantage by one or more stakeholders.</p> <p>Benefits might initially be stated in terms of the outcomes being targeted in response to a problem/opportunity before being refined in terms of the potential benefits that will be achieved from one or more options.</p>
<b>Benefits management</b>	<p>The identification, definition, monitoring, optimisation and realisation of benefits.</p> <p>Benefits management is a whole-of-life, whole-of-system process.</p> <p>Benefits management involves measurable improvement resulting from the investment in the potential option and contributes to one or more objectives sought by an agency or government.</p>
<b>BCDF</b>	<p>The Queensland Government Business Case Development Framework  <a href="https://www.statedevelopment.qld.gov.au/">https://www.statedevelopment.qld.gov.au/</a></p>
<b>Disbenefit</b>	<p>An adverse impact illustrated through a measurable decline resulting from a negative consequence of implementing a particular solution.</p>
<b>Outcome</b>	<p>The result of change, normally affecting real world behaviour<sup>5</sup>.</p>
<b>PAF</b>	<p>Queensland Government's Project Assessment Framework  <a href="https://www.treasury.qld.gov.au/projects-infrastructure/initiatives/project-assessment-framework/index.php">https://www.treasury.qld.gov.au/projects-infrastructure/initiatives/project-assessment-framework/index.php</a></p>
<b>Stage 1: Strategic Assessment</b>	<p>Previously referred to as Strategic Business Case.</p>
<b>Stage 2: Options Analysis</b>	<p>Previously referred to as Preliminary Business Case.</p>

<sup>5</sup> UK Office of Government and Commerce definition

# Appendix 1: Design, Cost and Risk in Options Analysis

## Purpose

The project design, cost estimate and risks are interrelated/interdependent variables. They are defined and refined as the project progresses from one stage to another.

The analysis should be targeted so that an appropriate level of design and project knowledge is available to inform robust, reliable and transparent cost estimates at any stage in an infrastructure proposal assessment.

During options analysis, this would be oriented towards shortlisted options and the analysis of a preferred option as an input to Stage 3. However, sufficient engineering and design efforts should be available throughout all stages of options analysis to provide confidence to decision makers.

## Key considerations

Engineering and design efforts should provide context to the reference design for each option (sometimes referred to as project definition), informing robust and transparent cost estimates for all major project elements. Reference design analysis should include: scope, project scheduling, identification of risks and constraints, and any assumptions used.

Key considerations include: analysis of all key inputs; design and operating principles; design complexity; interdependencies of design elements; use of benchmarking data; sequencing requirements; the level of resources/effort used to inform design and cost estimates; assurance activities; and the assessment of risk and uncertainty including sensitivity analysis.

## Analysis and inputs

Engineering and design efforts should include technical investigations and engineering/architectural design

identifying the nature and limits of works, cost assumptions and escalation rates, interdependencies and interfaces (e.g. existing property or infrastructure, grade separations), and any constraints.

As the cost estimate is refined through the analysis and project lifecycle (e.g. Stage 2: Options Analysis and Stage 3: Detailed Business Case), increasing emphasis should be placed toward project aspects which account for the greatest cost and/or risk. However, all elements within a cost schedule should be considered.

These efforts should also incorporate technical aspects such as hydrology and geotechnical considerations, as well as inputs relevant to the design, such as social and environmental impact, legal and regulatory considerations, demand and economic analysis. These efforts should also respond to the risk profile of the project, such that more detailed design on specific elements is available in response to any risks identified.

## Design complexity

The required level of engineering and design efforts will be guided by project characteristics and complexity, as well as the availability of comparable project data, with the aim to integrate a sufficient level of project knowledge into cost and risk estimates (refer Table 27). The aim is to ensure cost estimates reflect the state of the design, the project risk profile and corresponding level of contingency at each stage.

As such, complex or bespoke projects which lack comparable project data will require more fit-for-purpose design and technical investigation to support robust, transparent, and defensible analysis to provide confidence to decision makers. Quantity surveyors (supported by engineers) will use relevant data, including from comparable projects and benchmarking, to inform cost estimates regardless of the level of project complexity and design.

**Table 27: Illustrative complexity and level of design**

ILLUSTRATIVE INPUT TO DESIGN AND COST ESTIMATES	NON-COMPLEX	COMPLEX
<b>Project complexity</b>	Non-complex: routine or repeatable project; no complicating technical factors or unique service delivery requirements	Complex: bespoke project with complicating technical and/or service delivery requirements
<b>Illustrative level of project design</b>	20% (concept level)	30% (concept level)
<b>Engineering and design efforts to inform reference design</b>	Design (including engineering and/or architecture) Technical investigations	Design (including engineering and/or architecture) Technical investigations
<b>Quantified risk and contingency range</b>	90% to 70%	90% to 70%

## Benchmarking analysis

Where reference projects and comparable project data is readily available, benchmarking combined with design works and technical investigation can support an informed robust, transparent, and defensible analysis. However, benchmarking is not a substitute for inadequate design.

## Level of resources to dedicate to engineering and design efforts

At all stages of analysis, resources should be appropriately allocated to higher levels of cost and risk impacted items in engineering and design. Expenditure for engineering and design efforts is minor relative to the total project cost, but can materially influence investment decisions and delivery outcomes.

Sophisticated design efforts and thorough engineering investigations in the planning stage inform more robust analyses. This is particularly important as the key drivers of cost escalations (and assumption error) often relate to unforeseen risks and the delivery environment (e.g. timing, labour, site-specific factors). Critically, thorough engineering and design efforts help to establish realistic set co-design and delivery model approaches, to support analysis of proposals through later stages. Consequently, the analysis provides greater certainty and confidence to decision makers throughout the planning and procurement stages of an infrastructure proposal.

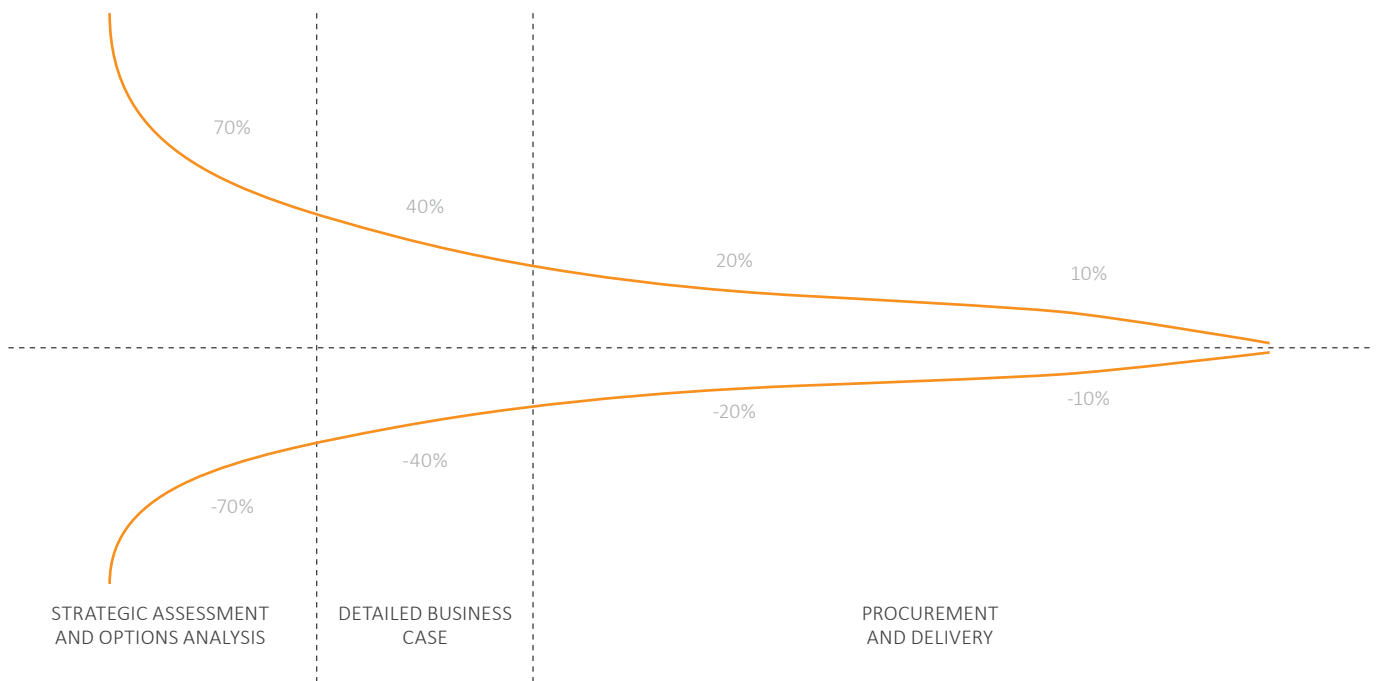
## Engineering and design efforts in cost estimation

Developing a robust cost estimate requires a well-defined scope, sufficient data and appropriately qualified professionals (including quantity surveyors) with sufficient peer review checks.

In the early stages of the project, the scope and risks are being defined such that the cost estimate accuracy will be low with a wide range of possible outcomes. As shown in the example in Figure 10, it is expected that the cost estimate will become more accurate over time as the design is refined and more project information (informed by targeted engineering and design efforts) becomes available.

Engineering and design efforts should support this process by enhancing the reference design, refining the project scope, informing the cost and work breakdown schedule, clearly documenting technical decisions and assumptions, and developing an evidence base to support the appraisal of risks, and calculation of contingencies. A 'basis of estimate' document should outline any assumptions and exclusions underpinning the cost estimate. This analysis should inform robust, defensible, and transparent cost estimates and provide confidence to decision makers as the cost estimates progress the business case stages. Indicative minimum level of design considerations are outlined in Table 28.

Where the project cost history is such that estimates progress well above the first or previous cost estimates, a post-delivery and benchmarking review should be performed to inform future projects.



**Figure 10: Example indicative estimate accuracy across the infrastructure lifecycle**

**SOURCE:** Victoria Treasury, Risk, Time, Cost and Contingency (RTCC) Guidelines, <https://www.dtf.vic.gov.au/sites/default/files/document/Risk%2C%20Time%2C%20Cost%20and%20Contingency%20Guidelines.docx> , [Accessed 20 July 2022].

**Table 28: Indicative design, risk and cost estimates for Options Analysis and Detailed Business Case**

INDICATIVE INPUT TO DESIGN AND COST ESTIMATES	OPTIONS ANALYSIS (STAGE 2)	DETAILED BUSINESS CASE (STAGE 3)
<b>Indicative level of design</b>	15% to 30%	30% to 70%
<b>Engineering and Design Efforts to inform reference design</b>	<p>Technical investigations</p> <p>Establishment of service need and demand to support the design of the longlist options</p> <p>Longlist: concept design (engineering and/or architecture), order of magnitude estimate and/or benchmarking of recent comparable projects (if appropriate).</p> <p>Shortlist: Project design that is able to reasonably compare shortlisted options</p>	<p>Technical investigations</p> <p>Preliminary or Schematic design (engineering and/or architecture)</p> <p>Nomination of applicable cost estimate class/category</p> <p>Design informs costing estimates that are robust, defensible, and risk adjusted with an appropriate contingency allowance, with a well-defined scope and breakdown of projects costs</p>
<b>Indicative contingency range</b>	90% to 70%	70% to 40%
<b>Purpose</b>	<p>Longlist: Screening, “what if” analysis, engineering and design efforts examine differences in high-level alternatives</p> <p>Shortlist: Concept design data that is able to reasonably compare project options.</p>	Design provides the approved budget estimate of the project

## Assurance activities

Analysis should be undertaken by subject matter experts/advisors (including quantity surveyors, engineers, and financial analysts) with an appropriate level of expertise to inform cost and risk estimates that are robust and defensible.

Like all technical analysis completed for proposals, engineering and design efforts should be subject to appropriate assurance arrangements. Assurance mechanisms should include specialist peer and technical review which assesses the: appropriateness of engineering/architectural solutions; the cost/risk/contingency estimate and the basis of estimate; as well as the validity of any assumptions. Additional focused technical reviews should be undertaken in response to any identified or perceived issues, to ensure that all outstanding issues are resolved or reflected in the cost and risk estimates.

While peer review is important at all stages of analysis, it is especially important during the early stages. This is because, as shown in Figure 3, analysis at one stage will determine or constrain subsequent analysis in further stages. That is, an inadequate demand or service need assessment is likely to result in an incorrect scope/design in response to that analysis, cascading to inappropriate costing and risk, financial and economic analysis.

As part of these arrangements, engineering and design efforts should also align with best practice guidance (e.g. for the built environment QDesign from the Office of the Queensland Government Architect (OQGA)).

Principles underpinning engineering and design assurance activities include:

- » Completeness: engineering and design outputs contain a sufficient level of technical information and project knowledge necessary to provide confidence in analysing cost estimates (with contingencies), and risks.
- » Transparency: the information has been prepared without bias and with all assumptions, risks and mitigations, and compliance with legislative or standards clearly documented. Emphasis should be placed on transparently outlining assumptions used in the analysis, and the reasoning underpinning them.

Peer reviewers and supporting advisers must be appropriately qualified and delegated to review analysis strictly within their domain of expertise and experience in the sector. For example, Quantity Surveyors should be tasked only with reviewing quantity surveyors work, and not economic or financial advisers. Similarly, appropriately qualified/experienced designers and design peer reviewers. The advisers and peer reviewers appropriate to each stage of analysis is shown in Figure 11 below. Note that this may be an iterative process, and not linear in nature.

Figure 11: Stages of analysis and appropriate peer review



## Sensitivity analysis

Sensitivity analysis is a method used to account for risks and uncertainties with key parameters used in analysis, by assessing the possible impact of risks and uncertainties on project outcomes. Its objective is to assess the robustness of project outcomes to variables which determine its viability.

Sensitivity analysis span deterministic and probabilistic approaches. Deterministic methods include: range-based methods (considering the range of values of each project cost element), factor-based methods (reviewing factors which will influence project outcomes and using that analysis to calculate a single overall range), or reference-class forecast methods (basing the contingency on the historical difference between the initial base estimate and final cost of a similar “class” of projects). Probabilistic methods use the

above analysis and inputs, but additionally utilise statistical sampling to simulate the effect of uncertain variables on model outcomes. Regardless of method, all sensitivity analysis must be supported by an appropriately qualified quantity surveyor.

### DETERMINISTIC SENSITIVITY ANALYSIS

Deterministic sensitivity analysis methods apply a predetermined or defined percentage of contingency for the project. This is often the simplest approach to contingency calculation but involves a high degree of subjectivity and judgement, and may be difficult to justify or defend if derived from intuition or past experience. As such, deterministic approaches should use a robust method, with all assumptions and derivations clearly and transparently outlined, and peer-reviewed to ensure they are justifiable and defensible.

The following methods should be used for deterministic sensitivity analysis:

- » Factor-based methods – This method determines the contingency through a strategic review of the factors that will influence the project’s ability to manage its cost outcome. It is most applicable during the early stages of the project lifecycle, where there is likely to be insufficient information or resources available to undertake a more detailed assessment.
- » Range-based methods – This method considers the range of values that the elements comprising the project cost estimate could take, and aggregates this to arrive at a single contingency estimate. This method should ideally calculate the minimum, maximum, and mean values for each element, and assumes that all elements are uncorrelated, and therefore that the mean values and variances are statistically additive.
- » Reference-class forecasting methods – This method determines the contingency based on the gap between the initial base estimate and final costs of a “class” of related previous projects. To be effective, this method requires a sufficient number of appropriate reference projects to be identified from past data, and assumes the project being compared to will behave in broadly the same way as the others in the reference set.

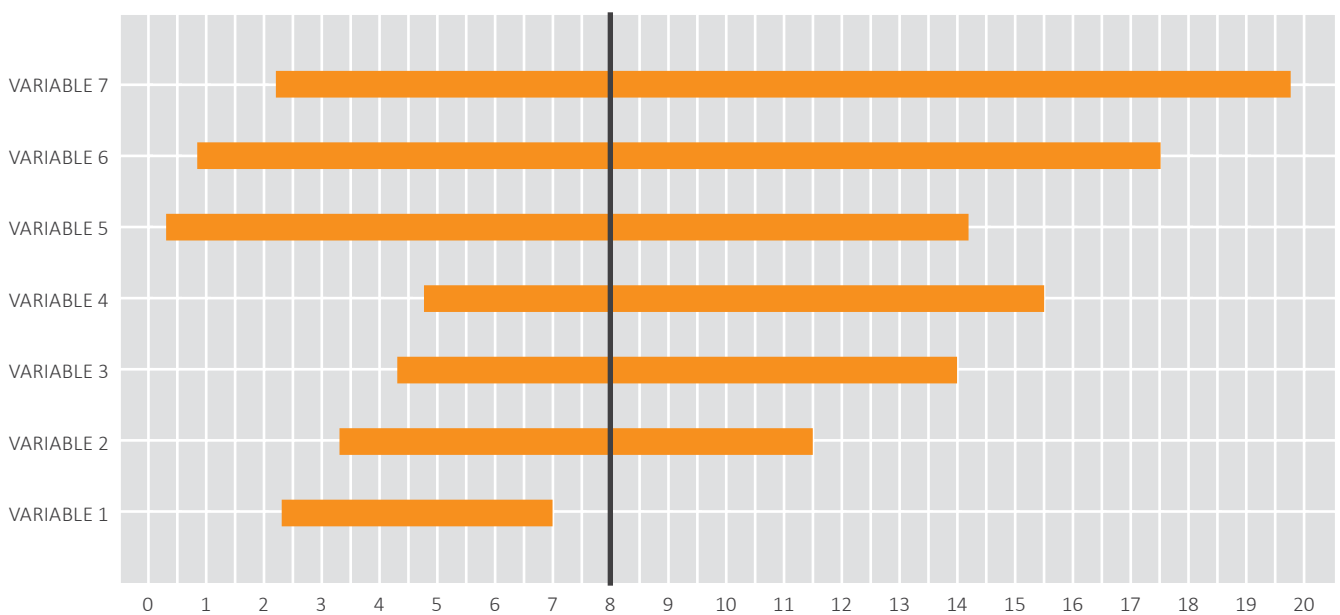
### PROBABILISTIC SENSITIVITY ANALYSIS

Probabilistic analysis is a computer-based technique that uses statistical sampling and probability distributions to simulate thousands of iterations to determine the risk adjustment of variables on model outcomes (often referred to as Monte Carlo analysis). It is frequently used to determine contingency estimates in infrastructure projects with large uncertainties in costs to give an indicative range of outcomes for the key components (e.g. tornado graph Figure 12) and total cost.

The appropriate use of probabilistic techniques rests on well-specified design and cost inputs, sufficient data to support statistical estimation and analysis, and the correct interpretation and application of results. While using more advanced techniques than deterministic methods, probabilistic methods are not value-free and can involve a material degree of subjectivity. Appropriate judgement is still required to arrive at a robust contingency estimate, for example when defining the probability distribution and range for variables estimated using Monte Carlo analysis.

As such, probabilistic analysis should only be used where there is sufficient data and project knowledge to support a probability density function that is robust and appropriate to the parameters being estimated. Underlying assumptions inputted to the probabilistic analysis should be transparent, robust and defensible. Failing this, the use of probabilistic techniques would produce spurious results and should be avoided. Rather, a transparent deterministic method should be used.

Figure 12: Example Tornado Chart



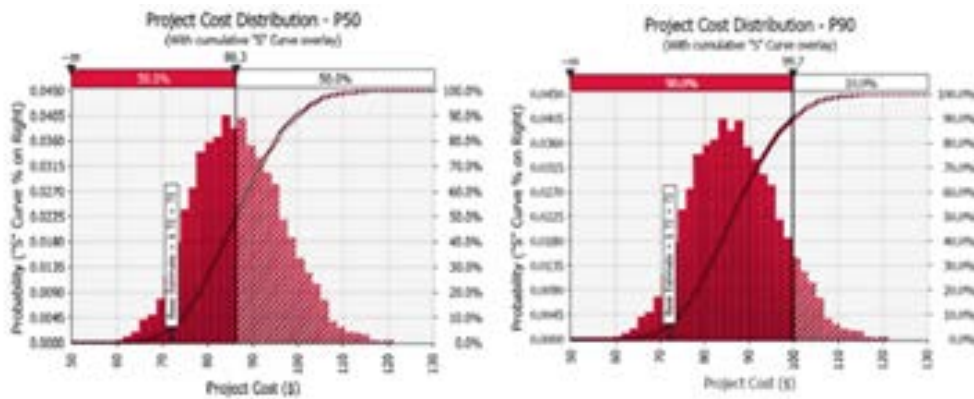
## P-values in probabilistic analysis and simulation



Each generated estimate of total project cost from a probabilistic simulation can be given a p-value indicating the likelihood that the cost will be less than or equal to that amount. For example, a P50 cost estimate would represent

an estimate of project cost with sufficient contingency that there is a 50% expectation that the cost of the project would not exceed this level (visually represented in Figure 13 below).

**Figure 13: P50 and P90 cost distribution examples**



**SOURCE:** <https://www.finance.gov.au/government/commonwealth-investment-framework>

Probabilistic outputs should be applied and interpreted appropriately. A P50 and P90 value is not an indication of the level of design or the quality of the analysis. Rather, it is a probabilistic estimate of the parameter value based on

the range and probability distribution assumptions used to generate the estimate. As such, a P90 estimate for a low level of design would not represent a high level of confidence in the cost estimates for the project.

In practice, some analysis used by Quantity Surveyors may be based on ranges for each variable, using a technique called range analysis. This practice bases the defined range of values for a variable typically on historical record/knowledge, which is then used to drive Monte Carlo analysis. Most importantly, there is often no scope for peer review to undertake detailed checks on these assumptions and judgement used in the range analysis, and to verify the basis of estimate.

As such, the use of range analysis as an input to probabilistic analysis assumptions should be supported by risk analysis workshops and historical data sets. This should be clearly and transparently disclosed in all probabilistic analyses reporting results, including all assumptions, analysis and the basis for ranges used in defining the probability distribution.

Probabilistic analysis outputs should identify the variables which are likely to have the largest impact on business outcomes, and provide their confidence interval. This should be clearly presented in a tornado chart (as shown in Figure 13). While the chart may indicate each variable's individual impact on the overall cost as independent to each other, in reality, many input variables can be interrelated and may not vary independently.





## Reference to specific guidance

In developing appropriate levels of design, and risk adjusted cost estimates, overarching risk appetite statements should be satisfied to ensure alignment with proponent acceptance of risk. Whole-of-Government, Sector- and Agency-specific guiding advice should be applied.

Examples include:

- » A Guide to Risk Management, A Guide to Risk Management- Queensland Treasury, accessed 07.03.2023
- » Project cost estimating manual, Project cost estimating manual (Department of Transport and Main Roads) (tmr.qld.gov.au), accessed 07.03.2023.

Application of such guides encourages improved practice.

## Examples of parameter and expected values

The parameter values used for a proposal cost estimate should reflect a robust and transparent assessment of price and volume that is based on most up-to-date data and costings. This should include considerations of the current market capacity and supply chain reality, usually assessed by a quantity surveyor, and reflecting the level of design.

Clearly, if the level of design is not very high (e.g. 5% – 10%), then the level of confidence in the estimates will be very low. This is particularly so when key parameter values are volatile and changing rapidly, and variable across different parameters. In these cases the expected values / ranges need to be carefully assessed.

### EXAMPLE 1: PRICE VOLATILITY

Suppose that the price of concrete is to be calculated as a key input into the cost estimates. Concrete prices typically range from \$10/t to \$30/t, based on historical data over the past 3 years. However, due to supply chain and capacity constraints, concrete prices have recently approached \$30/t over a sustained period.

The expected value in this instance is not the historical average of concrete prices over the past 3 years<sup>5</sup>, but needs to be assessed (by a quantity surveyor) in the current context of \$30/t, as the recent price increase suggests sustained higher prices is likely over the project construction period.

As such, the expected value should be calculated at the points in time in the construction ramp-up period and include the application of escalation rates reflecting a defensible and transparent projection of future prices for each of the key parameters. This should be performed by a quantity surveyor working in close consultation with the financial adviser.

### EXAMPLE 2: VOLUME

Suppose that the volume of concrete is to be estimated as an input for options analysis. As the reference design at this stage of the analysis is nascent, the exact volume of concrete needed is not yet known, and subject to uncertainty.

A single estimate is unlikely to reflect this uncertainty and is insufficient to quantify the true amount of concrete needed. The estimate should therefore include a confidence interval that is defensible, transparent, and reflects the project complexity and level of project design.

<sup>5</sup> This is because the expected value of a random variable is not necessarily equal to its historical average. The expected value of a random variable represents the most likely outcome, which is the weighted average of all possible values of that variable (i.e. the entire population). This may not be the same as the historical average, which represents only a sample of all possible values (in this example, the sample is the historical price of concrete over the past 3 years).

## Appendix 2: Benefits register

Benefits identified during Stage 2: Options Analysis development should be captured in a benefits register. Table 29 presents an example of a benefits register. Initially, the benefits register might only involve completed columns for:

- » benefit description
- » statement of problem/opportunity or proposed initiative the benefits relate to
- » related stakeholder/s
- » potential beneficiary
- » possible measures
- » relative importance.

At Stage 2: Options Analysis stage, the benefits register is used to ensure that options address the targeted benefits and enable stakeholders' needs to be incorporated into the options design. The benefits register in the Stage 2: Options Analysis should include information gathered (and retained) during Stage 1: Strategic Assessment, as well as the suggested category of the benefit, dependences, risks and other relevant considerations. Further information on refining benefits can be found in the Benefits Management Guide and the Social Impact Evaluation Guide.

**Table 29: Example benefits register**

INITIAL BENEFIT REGISTER					
BENEFIT DESCRIPTION	PROBLEM/OPPORTUNITY STATEMENT OR POTENTIAL INITIATIVE	RELATED STAKEHOLDER/S	POTENTIAL BENEFICIARY	POSSIBLE MEASURES	RELATIVE IMPORTANCE

## Appendix 3: Risk register

While developing a Stage 2: Options Analysis, risks should be captured in a risk register. Risk assessments are sometimes very linear in their approach and fail to reflect links with broader system disruptors so think broadly for potential risks.

Initially the risk register might only involve completed columns for:

- » risk description
- » trigger
- » impact.

At Stage 2: Options Analysis, the risk register is used to identify and shape options and to identify stakeholders. Further details will be included in the risk register as the options are further refined in the Stage 2: Options Analysis. Table 30 presents an example of a risk register.

**Table 30: Example risk register**

RISK REGISTER							
RISK CATEGORY	RISK DESCRIPTION	TRIGGER	IMPACT	LIKELIHOOD	CONSEQUENCE OF RISK	RISK RATING	CONTROL STRATEGY
	THERE IS A RISK THAT ...	... CAUSED BY ...	.. RESULTING IN ..				
<b>Delivery</b>	There is a risk construction is delayed.	... caused by extended periods of rain.	... resulting in an extended construction period which may impact on ...	Likely	Major	High	Ensure the schedule includes sufficient float to account for potential weather delay.
<b>Demand</b>	There is a risk local growth strategies may change under the newly elected local council.	... caused by new local councillors having a stronger preference for urban containment.	... resulting in lower traffic volumes and toll revenue.	Possible	Moderate	Medium	Agency to keep in close and regular contact with council.

## Appendix 4: Initial stakeholder engagement plan

A stakeholder engagement plan includes the stakeholders relevant to the service need who should be considered during Stage 2: Options Analysis. The stakeholder engagement plan should document the methods and frequency with which stakeholders will be engaged. The stakeholder engagement plan is a living document and should be adjusted throughout Stage 2: Options Analysis development.

Stakeholder engagement is highly recommended. If you choose not to engage with stakeholders during Stage 2: Options Analysis development, use a draft stakeholder engagement plan to document stakeholder interests in the initiative.

At Stage 2: Options Analysis, the stakeholder engagement plan should include:

- » stakeholder name/description
- » extent of stakeholder interest and influence in the service need/potential initiative
- » proposed mechanism for stakeholder engagement (i.e. inform, consult, active participation)
- » risks of engaging (or not) with stakeholders
- » proposed strategies for managing stakeholder risks.

See example in Table 31.

**Table 31: Example stakeholder engagement plan**

INITIAL STAKEHOLDER ENGAGEMENT PLAN					
STAKEHOLDER NAME/ DESCRIPTION	INTEREST LEVEL (H,M,L)	INFLUENCE LEVEL (H,M,L)	PROPOSED MECHANISM AND ACTIONS	RISKS	RISK MANAGEMENT STRATEGIES

## Appendix 5: Multi-criteria analysis

The following tables provide examples for developing a multi-criteria analysis to filter the options longlist, using the supporting analysis undertaken. This is the first stage of options filtering and results in an options shortlist.

The process to set the criteria and criteria weighting for multi-criteria analysis is important. The right weighting will support selection of the best options and avoid later reworking.

Consider using numeric values for comparison and selection of preferred options.



- » These tables are provided as examples only.
- » The assessment criteria should be tailored to individual proposals to ensure the approach is relevant.
- » The supporting analysis used to evaluate the options longlist is critical.

**Table 32: Example multi-criteria analysis**

<b>BENEFITS SOUGHT</b> This assessment considers the degree to which the potential options realise the benefits sought [insert benefit].	
<b>DESCRIPTION</b>	<b>SCORE</b>
The option: » does not deliver the benefits sought.	0
The option: » partially delivers the benefits sought.	1
The option: » partially delivers the benefits sought, with the possibility of increasing the degree of benefits realised with further investment.	2
The option: » fully delivers the benefits sought.	4
The option: » fully delivers the benefits sought; provides additional incremental benefits for the wider community.	5
<b>STRATEGY AND POLICY</b> This assessment considers the degree to which the potential options are aligned with other government initiatives.	
<b>DESCRIPTION</b>	<b>SCORE</b>
The option: » does not support the delivery of other government initiatives, and. » is not aligned with the timing of other government initiatives.	0
The option: » partially supports the delivery of other government initiatives, or » is partially aligned with the timing of other government initiatives.	1
The option: » partially supports the delivery of other government initiatives, and » is partially aligned with the timing of other government initiatives.	3
The option: » fully supports the delivery of other government initiatives and is consistent with a whole-of-government approach, or » is fully aligned with the timing of other government initiatives.	4
The option: » fully supports the delivery of other government initiatives and is consistent with a whole-of-government approach, and » is fully aligned with the timing of other government initiatives.	5

**SERVICE NEED**

This assessment considers the degree to which the potential options sufficiently address the service need.

DESCRIPTION	SCORE
The option: » does not address the service need.	0
The option: » partially addresses the service need.	0
The option: » partially addresses the service need, with the possibility of fully addressing the service need with further investment.	1
The option: » fully addresses the service need.	4
The option: » fully addresses the service need, and » provides additional incremental benefits for the wider community.	5

**LEGAL AND REGULATORY**

This assessment considers the degree to which the potential options are aligned with applicable legal and regulatory requirements.

DESCRIPTION	SCORE
The option: » does not align/meet the required legal and regulatory requirements.	0
The option: » partially aligns/meets the required legal and regulatory requirements.	1
The option: » fully aligns/meets the required legal and regulatory requirements.	3



### SUSTAINABILITY CONSIDERATIONS

This assessment considers the degree to which the potential options contribute to the sustainability goals.

DESCRIPTION	SCORE
The option: » does not meet any of the outlined sustainability goals.	0
The option: » partially meets the outlined sustainability goals.	1
The option: » meets all the outlined sustainability goals.	3

### MARKET CONSIDERATIONS

This assessment considers the degree to which the market can deliver the options.

DESCRIPTION	SCORE
For the option: » There is no market capability to deliver this option.	0
For the option: » There is limited market capability to deliver this option	1
For the option: » There is market capability to deliver this option.	3

### PUBLIC INTEREST CONSIDERATIONS

This assessment considers the degree to which the potential options are aligned with the evaluated public interest considerations. (i.e. public access and equity, impact on stakeholders, consumer rights, safety and security, and privacy).

DESCRIPTION	SCORE
The option: » does not meet any of the outlined public interest categories.	0
The option: » does not meet all of the outlined public interest categories.	1
The option: » meets all the outlined public interest categories.	3

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