Australian Government | Infrastructure Australia

July 2021

Defining problems and opportunities

Stage 1 of the **Assessment Framework**

The Assessment Framework comprises an overview, stages 1 to 4 and technical guides:

Overview

1 Defining problems and opportunities

2 Identifying and analysing options

3 Developing a business case

4 Post completion review

Technical guides

The Assessment Framework (including this document) and the Infrastructure Priority List are changing in line with amendments to the Infrastructure Australia Act 2008.

While this transition process is underway, IA will continue to receive and evaluate proposals according to the current process and assessment framework.

For further information
contact engagement@infrastructureaustralia.gov.au

Infrastructure Australia is an independent statutory body that is the key source of research and advice for governments, industry and the community on nationally significant infrastructure needs.

It leads reform on key issues including means of financing, delivering and operating infrastructure and how to better plan and utilise infrastructure networks.

Infrastructure Australia has responsibility to strategically audit Australia's nationally significant infrastructure, and develop 15-year rolling infrastructure plans that specify national and state level priorities.

Online

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Introduction

At a glance

- During **Stage 1** of Infrastructure Australia's assessment process, you will identify and define current or emerging problems and opportunities to be considered for inclusion on the *Infrastructure Priority List*. This will give you a sound foundation to develop efficient and worthwhile solutions during Stage 2 and Stage 3.
- You will document the analysis in your Stage 1 submission to Infrastructure Australia.
- We will assess your Stage 1 submission to determine whether you have:
  - provided evidence that clearly defines the problems and opportunities, including **root causes, timing and magnitude**
  - demonstrated that addressing the problems and opportunities will result in **nationally significant** social, economic and/or environmental benefits.
- Guided by the Assessment Framework, we will assess whether you have demonstrated the strategic case for the problems and opportunities, the scale of problems and opportunities, and that they are capable of being addressed. This document outlines **tools and methodologies** to help you gather this evidence.
- The Assessment Framework has been designed to align with other national, state and territory frameworks. We accept submissions that conform to the relevant state or territory guidelines, so long as they include all the required information as set out in this document. Before submitting, check your submission against our Stage 1 **Assessment Criteria** and **Submission Checklist** to ensure you have met these requirements.
- If we positively assess your proposal, we will add it to the ***Infrastructure Priority List***, which is published on our website.
- We encourage you to **engage with us as early as you can** when developing a proposal, so that we can provide advice to strengthen your submission and clarify any assessment requirements.

Figure 1: Assessment Framework stages

1.1 How to navigate this document

This document is designed for proponents (you) wishing to make a Stage 1 submission to Infrastructure Australia (us) in accordance with the Infrastructure Australia Assessment Framework (the Assessment Framework). If you are unfamiliar with the Assessment Framework, we recommend that you review our **Overview** volume before reviewing this document.

- **Section 1** explains the purpose Stage 1, including how it fits within our broader assessment process and the *Infrastructure Priority List*. It also identifies the key infrastructure decision-making principles that apply to Stage 1 and the benefits of engaging us early in your investigation.
- **Section 2** explains the steps you should follow to develop a high-quality Stage 1 submission. This includes guidance on methods you can use to determine the value of your proposal and collect evidence to support your submission.
- **Section 3** explains the Assessment Criteria we use to assess a Stage 1 submission. Before submitting, you should check your submission against our Assessment Criteria to ensure you have provided all the information required for our consideration.
- **Section 4** provides a submission checklist that clearly lists all of the items that are required or recommended in a Stage 1 submission. Your submission should provide this information in the **Stage 1 submission template** available on our website.

Throughout this document, we will direct you to more detailed technical guidelines where they may assist you to develop your submission.

Box 1: **Key terms**

Assessment Criteria: three overarching criteria we use to assess the merit of every proposal, at every stage of the Assessment Framework – Strategic Fit, Societal Impact and Deliverability.

Business case: a document that brings together the results of all the assessments of an infrastructure proposal. It is the formal means of presenting information about a proposal to aid decision-making. It includes all information needed to support a decision to proceed, or not, with the proposal and to secure necessary approvals from the relevant government agency. Unless otherwise defined, we are referring to a final or detailed business case, rather than an early (for example, strategic or preliminary) business case, which is developed in accordance with state or territory requirements. A business case is prepared as part of Stage 3 of the Assessment Framework.

Option: a possible solution to address identified problems and opportunities. A wide range of options should be considered and analysed to determine the preferred option, which will be recommended in the business case.

Program: a proposal involving a package of projects that are clearly interlinked by a common problem or opportunity. The package presents a robust and holistic approach to prioritise and address the projects, and there is a material opportunity to collaborate and share lessons across states, territories or agencies. The projects can be delivered in a coordinated manner to obtain benefits that may not be achieved by delivering the interventions individually.

Project: an infrastructure intervention. A project will move through the stages of project initiation, planning, delivery and completion. A suite of related projects to address a common problem or opportunity will create a program.

Proponent: an organisation or individual who prepares and submits infrastructure proposals to us for assessment. To be a proponent of a business case (a Stage 3 submission), the organisation must be capable of delivering that proposal.

Proposal: the general term we use for successful submissions to the *Infrastructure Priority List*, across the key stages of project development, specifically – early-stage (Stage 1), potential investment options (Stage 2) and investment-ready proposals (Stage 3). Proposals that have been delivered would be assessed in Stage 4.

1.2 Purpose of Stage 1

The Assessment Framework provides a structured and objective approach to making decisions about infrastructure. It also explains how we assess proposals for inclusion on the *Infrastructure Priority List* (the Priority List).

The Assessment Framework is designed to help you develop high-quality submissions at each stage of project development.

Defining problems and opportunities is the first step in developing a proposal. It involves building a strong evidence-base to fully understand the scale and breadth of problems and opportunities. This will give you a sound basis for identifying and analysing options that could respond to this need as part of **Stage 2: Identifying and analysing options**.

The purpose of Stage 1 is to:

- identify proposals based on current and emerging problems and opportunities that are nationally significant (see **Section 3.3**):
  - problems are social, economic or environmental costs to be avoided
  - opportunities are social, economic or environmental benefits to be gained
- demonstrate that these problems and opportunities are of national significance and that reducing problems or realising opportunities will result in social, economic or environmental benefits. These benefits are demonstrated through evidence of a proposal's:
  - root causes – understanding the underlying drivers of the proposal
  - timing – when problems and opportunities will occur, how they are likely to change over time and how this influences the timeframe for investment
  - magnitude – the size of the problems and opportunities, expressed in monetary terms where possible, to allow comparison across different types of proposals.

The role of the *Infrastructure Priority List*

One of Infrastructure Australia's key responsibilities is to maintain an evidence-based list of nationally significant problems and opportunities to guide infrastructure planning and investment – the Priority List. Problems and opportunities that we assess as nationally significant will be included on the Priority List.

A hierarchy of proposals have developed on the Priority List:

- discrete problems and opportunities (e.g. *Australian Institute of Sport modernisation*)
- major city-shaping problems and opportunities (e.g. *Sydney Metro West*)
- programs of geographically-linked problems and opportunities (e.g. *Bruce Highway upgrade*)
- programs of geographically-distinct, but still related, problems and opportunities (e.g. *Remote housing overcrowding and quality*)
- national problems and opportunities calling for individual submissions (e.g. *National highway electric vehicle fast charging*)

See our **Guide to program appraisal** for further guidance on developing and analysing programs.

Proposals on the Priority List help guide governments and industry on where to direct investment for future options identification and business case development.

Using the Assessment Framework to develop submissions

This document explains how to make a Stage 1 submission to us and our minimum requirements for these submissions. Throughout this document, we clearly indicate where something is a submission requirement. This document also provides guidance on best-practice processes for identifying infrastructure problems and opportunities.

The Assessment Framework, including Stage 1, has been designed to align with other national, state and territory frameworks. It provides guidance on the typical stages of project development and necessary steps for preparing high-quality submissions. We provide a **Stage 1 submission template** and guidance on tools and methodologies that can support your submission to us. **While we prefer submissions in this template and require the information listed in it, you are not required to use our template**. We will accept submissions that conform to the relevant state and territory guidelines, so long as they include all the required information as set out in this document.

Stage 1 supports Principle 1 of our *Infrastructure Decision-making Principles* that 'Governments should quantify infrastructure problems and opportunities as part of long-term planning processes.'[1]

1. Infrastructure Australia 2018, *Infrastructure Decision-making Principles*, Commonwealth of Australia, Sydney. Available at: www.infrastructureaustralia.gov.au/publications/infrastructure-decision-making-principles

1.3 Structure of the Assessment Framework

The Assessment Framework consists of a series of volumes and technical guides. Together, they describe the activities in a typical project development and review process, and how we assess proposals that are submitted to us.

For practicality and ease of use, each submission stage is described in a separate document and supported by the technical guides. This allows you to focus on the guidance most relevant to you and the stage you are up to in project development.

The structure of the Assessment Framework is shown in **Figure 2**. The suite of Assessment Framework volumes is available at **www.infrastructureaustralia.gov.au/publications/assessment-framework**.

1.4 Infrastructure Australia can support your submission

We encourage you to engage with us when developing your Stage 1 submission. You should ideally do this **after** reviewing this guidance and the **Stage 1 submission template**, but **prior** to formally lodging your submission.

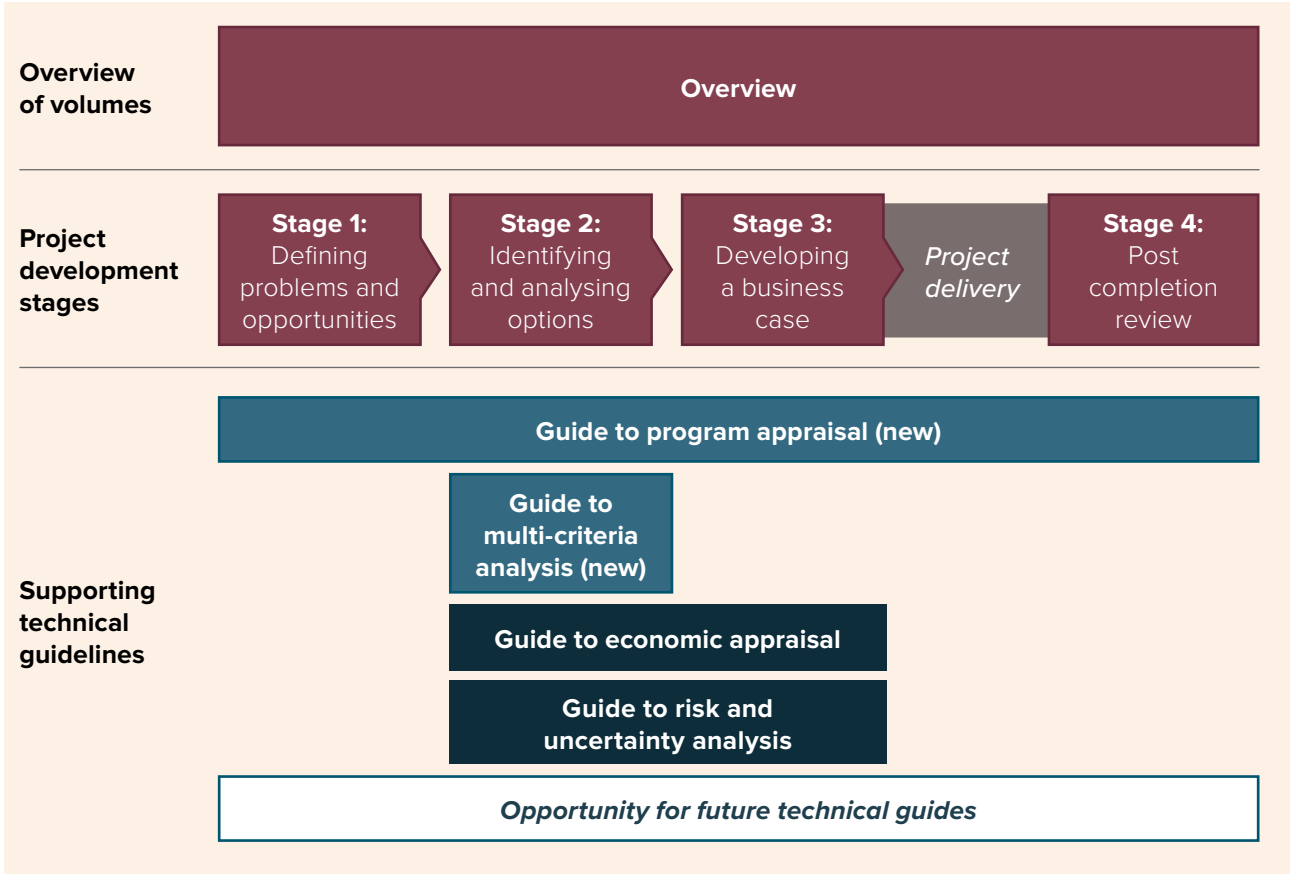
By engaging with us during Stage 1, we can support your submission by:

- advising how to define and value the problems and opportunities
- advising how to frame the problems and opportunities, rather than focus on the solution
- advising how to define the base case (see **Glossary**)
- helping you understand our Assessment Criteria
- providing guidance on how national significance is determined.

When assessing your Stage 1 submission, we will engage directly with you and provide feedback on the proposal and submission material.

If you need further advice on any of the information in the Assessment Framework, please refer to **www.infrastructureaustralia.gov.au/publications/assessment-framework**, contact us via email at **proposals@infrastructureaustralia.gov.au**, or telephone on **02 8114 1900**.

Figure 2: Structure of the Assessment Framework



2

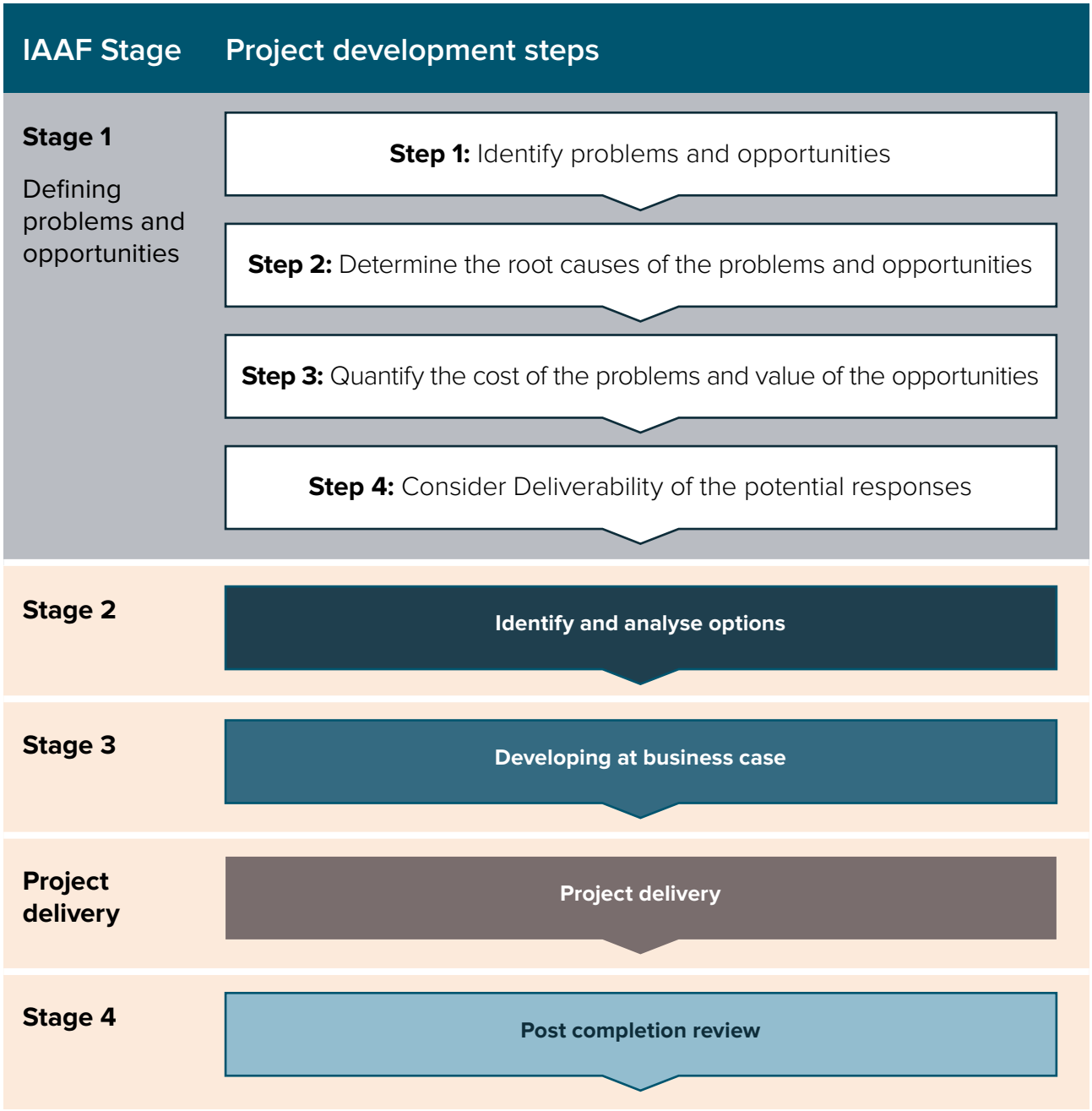
Defining problems and opportunities


NO
ENTRY

2.1 Overview of Stage 1

The Assessment Framework presents our recommended process for project development (see **Figure 3**). Stage 1 therefore sets the foundation for this process.

Figure 3: Process for project development and evaluation



You should analyse problems and opportunities in detail before developing options to address them. We recommend the following process, which is further explained in the subsequent sections:

1. **Step 1: Identify problems and opportunities.** Identify problems and opportunities and analyse their impact against achieving national, state and territory goals and objectives. Consider how these problems and opportunities may change over time, including under potential future scenarios. This should include how any existing proposals are addressing these problems and opportunities and whether there remains a gap in fully resolving them. Useful sources of information include the *Australian Infrastructure Audit*, strategic planning exercises, and state and territory infrastructure strategies.
2. **Step 2: Determine the root causes of the problems and opportunities.** Clarify the underlying causes (for example, urban congestion may be driven by population growth) and how they are likely to evolve over time.
3. **Step 3: Quantify the cost of the problems and value of the opportunities, in monetary terms where possible.** You should consider a high level base case to quantify the size of the problems and opportunities in monetary and non-monetary terms under the continuation of existing conditions. This is necessary to understand and measure what will happen if no investment is made to address the problems and opportunities you have identified.
4. **Step 4: Consider Deliverability of the potential responses.** Consider the potential interventions that are available and any implications for the next stages of investigation.

Box 2: **Why define problems and opportunities?**

Defining problems and opportunities is the first step in infrastructure appraisal, setting the foundation for the whole process.

One of the most common issues in infrastructure development is that solutions are developed before the root causes of problems and opportunities have been properly understood.

This may result in:

- a mismatch between the scale of problems and opportunities and the proposed solutions
- solutions that do not adequately or effectively respond to the root causes of the problems and opportunities, or become less effective as the root cause and its effects change over time
- limiting practitioners in their ability to fully explore viable solutions.

2.2 Step 1: Identify problems and opportunities

The purpose of this step is to identify problems and opportunities and determine their impact on national, state and territory goals and objectives by drawing on robust evidence.

There are a range of sources to help you identify problems and opportunities:

- state or territory infrastructure strategies and plans
- national strategies, plans and guidance documents
- strategic planning exercises, such as transport masterplans, water plans or electricity network plans
- strategic land use plans
- global industry strategies, plans and market trend reports
- direct observations and community input
- the 2019 *Australian Infrastructure Audit* (see **Box 3** for examples)
- the 2021 *Australian Infrastructure Plan* (forthcoming – release mid-2021)
- *Infrastructure beyond COVID-19: A national study on the impacts of the pandemic on Australia,* due to its currency and relevancy
- *Regional Strengths and Infrastructure Gaps* (forthcoming – release mid-2021)
- other published Infrastructure Australia research, such as our Reform Series reports.

Box 3: **Challenges and opportunities identified in the 2019 *Australian Infrastructure Audit***

- Technological advancements are enabling health infrastructure to be more digitally-oriented, from patient care to record keeping and infrastructure management. Embracing new technologies has the potential to reduce time and distance barriers to accessing health care, and improve efficiencies and quality.
- School infrastructure can provide essential community facilities and spaces, such as sporting fields and halls. However, access to school infrastructure is often restricted to ensure student safety and reduce maintenance costs for government. Harnessing the benefits of school infrastructure for community use outside of school hours (while still protecting student welfare), particularly in fast-growing cities where space is scarce, can improve the efficient use of education infrastructure assets and improve health and social wellbeing outcomes for people.
- Transmission networks need to respond to new electricity generation in areas not currently served or without sufficient spare capacity.
- Australia's comparative performance for fixed broadband speeds is poor, and we lag well behind comparable nations. Failure to rapidly improve speeds could be a constraint on boosting productivity and liveability, and attracting businesses that require high levels of digital access.
- Imminent renewals of ageing water assets bring an opportunity to rethink how water and wastewater services are delivered, including through the use of technology to improve efficiency and levels of service. Renewals could help to avoid overinvestment in large, long-lived traditional water and sewerage assets, and make the system more adaptable to future trends and shocks.
- Asset maintenance lacks transparency, consistency and accountability. This is particularly the case for sectors that rely on government funding rather than user charges, such as roads and public transport. Unless addressed, maintenance of our transport networks will become increasingly unsustainable.

Problems and opportunities should be expressed as straightforward statements that are directly linked to existing national, state and territory goals and objectives. For example, across all sectors, the Australian Government recognises that infrastructure:[2]

- provides, or underpins, services that deliver direct economic and social benefits to Australians
- has an important role in shaping cities that are productive and liveable
- provides connectivity to regional and remote parts of Australia.

Problem and opportunity statements should clarify how the problem might reduce or prevent the achievement of these goals and objectives, or how the opportunity might support them, today and in the future. For longer-term problems and opportunities, it is important to consider how the scale will change over time.

There are likely to be trade-offs – a number of objectives may be mutually exclusive and have to be balanced against other important factors and considered relatively. Understanding these trade-offs is important for later stages of project development. As a result, the relevant goals and objectives should be explicitly prioritised for the purpose of the investigation.

The Priority List includes descriptions for all early-stage proposals. **Box 4** provides some examples.

Box 4: **Problems and opportunities should clearly align to the desired outcome**

Early stage proposals from the February 2021 *Infrastructure Priority List* that clearly highlight the underlying problems and opportunities include:

- Water supply and resilience for town and city populations
- Safety on regional and rural roads in Western Australia
- South Australia bulk port capacity
- Public transport access to Melbourne Airport
- Tasmanian waste water treatment environmental compliance
- Canberra public transport capacity
- Road connectivity between Katoomba and Lithgow
- Freight rail access to Port of Brisbane
- Infrastructure services for remote Northern Territory communities.

2. Minister for Infrastructure, Transport and Regional Development 2021, *Statement of Expectations issued to Infrastructure Australia*, Australian Government, Canberra, available at: www.infrastructureaustralia.gov.au/sites/default/files/2020-12/Infrastructure%20Australia%20Updated%20SOE%2020%20Dec%202020.pdf.

Determine Strategic Fit

Before measuring the problem, you should demonstrate how addressing the problems and opportunities aligns with relevant government priorities, as well as other problems, programs and projects. For example, by demonstrating how they align with the relevant government sector, land use, environmental and planning strategies.

Key considerations should include:

- Are the problems and opportunities specifically identified as national, state or territory priorities?
- Is the problem a constraint on the achievement of documented goals, objectives and strategic plans?
- Which stakeholders are impacted by the problems and opportunities?
- What inter-relationships does this problem or opportunity have with other problems, programs and projects? Are there any other wider, strategic impacts that the problems and opportunities create?
- Will the problems and opportunities be addressed by other projects that are planned or underway?
- Is the full extent/scope of the problem, or missed potential of the opportunity if action is not taken, clearly understood?
- How do the problems and opportunities change over time? Are there any critical future 'triggers' (such as full capacity, resource limitations including water shortages, climate change impacts including sea level rise inundation)?
- What are the timeframes for action or resolution? What are the impacts of delaying a response, including consideration of a range of potential future scenarios?
- Is there an understanding of wider strategic impacts that the problems and opportunities create?
- For programs, is there clear alignment of projects to solving a broader common problem or address a strategic outcome, noting the full benefits of individual projects are unlikely to be realised unless they are delivered together?

Problems and opportunities with a defined social objective

As a society, we can choose to deliver certain investments or services to Australians irrespective of their economic and commercial merit. This may be the case where there are strong strategic or social reasons for investing in a proposal, even when the costs are expected to exceed the economic benefits.

Investments that are pursued for social reasons can help significantly improve societal outcomes for Australians, including quality of life, sustainability and resilience, while also providing economic benefits. Setting out the problems and opportunities is particularly important for proposals with a defined social objective. This is because, unlike proposals with a 'productivity' objective, which often have a clear solution, proposals with a social objective often require a more holistic approach to solving the problem or achieving the opportunity. That is, there often is not a clear 'silver bullet', (for example, build the road and there will be health benefits from access to health care). Instead, achieving the social outcomes may require a package of interventions (for example, build the road plus deliver supporting infrastructure and policy reform to achieve health outcomes).

In these cases, a critical first step is to identify the specific social reasons for the investment, then measure and quantify the problem or opportunity. This will enable options that are developed in the later stages to be evaluated against desired social and economic outcomes.

'Quality of life' refers to the wellbeing of individuals and can be measured through the outcomes for individuals. For the purposes of assessing infrastructure proposals, we have identified five key characteristics of quality of life and how infrastructure proposals can impact them (see **Table 1**). We describe these characteristics in more detail in **Section 3.5** of the **Overview** of the Assessment Framework.[3] Generally, these are analysed in terms of the access, quality and cost of the services that support these outcomes.

3. These characteristics align to those described in the OECD's Better Life Index, the UK Office for National Statistics' Measures of National Well-being Dashboard, New Zealand Treasury's Living Standards Framework and the European Union's Quality of Life Indicators.

Table 1: The key characteristics of quality of life

Quality-of-life characteristic	How infrastructure can support this characteristic
Culture	Supporting the continuation and sharing of beliefs, arts, culture, customs and places that define individual and community identity, including through vibrant and socially inclusive meeting places, such as community, entertainment, recreational, arts and cultural facilities.
Living standards	Meeting the basic needs of all users and improving the standard of living of the community. This may include addressing equity issues (including cost-of-living, poverty or entrenched disadvantage), improving liveability and access (whether to social and affordable housing, essential services or utilities, or employment) and accommodating all users, including people with disability.
Learning and development	Improving educational outcomes and fostering skills development to build social capital and productivity at all stages of life, including through access to tertiary and technical education facilities.
Health and safety	Improving the health of the community through access to health services, recreation choices and environmental factors (for example, connectivity for virtual health, active transport, potable water quality and air quality). Improving the safety of the community by reducing risks and improving access to justice services.
Economic and social participation	Providing appropriate access to desired goods and services, including where access is facilitated digitally.

Defining quality-of-life, sustainability and resilience outcomes in your proposal

Investments that are motivated by improving social outcomes (which improve quality-of-life, sustainability and resilience) are often aligned to national, state and territory policy objectives. For example, the Australian Government's *Closing the Gap* agenda seeks to overcome the inequality experienced by Aboriginal and Torres Strait Islander peoples, with targets across health, education, employment, cultural and other outcomes.

If your problems and opportunities are motivated by improving social outcomes, we recommend you consider quality-of-life, sustainability and resilience impacts in your **Stage 1** process by:

- demonstrating alignment – considering how addressing the problem or seizing the opportunity aligns with relevant national, state and territory government goals, policies and objectives
- establishing the case for change – how the underlying problems and opportunities affect quality-of-life, sustainability and/or resilience
- establishing the investment logic – describing how the proposal can change quality-of-life, sustainability and/or resilience outcomes and the potential size of the change
- linking to our quality-of-life, sustainability and/or resilience themes.

Box 22 in **Section 3.3** provides examples of Priority List proposals with strong social objectives.

Problems and opportunities with a defined equity objective

For proposals where there is a defined equity objective, we expect you to provide explicit evidence to support relevant claims. Community Service Obligations (CSOs) provide proponents with a framework around how to define equity objectives. CSOs are used by governments to ensure affordable and acceptable minimum levels of service of essential services for all Australians.

CSOs play a key role in the provision of infrastructure in Australia. The 2019 *Australian Infrastructure Audit* identified that there are over 300 CSOs in transport, energy, telecommunications and water across Australia, with a total annual cost of around $29 billion, or 1.7% of Gross Domestic Product (GDP).[4]

CSOs can apply to both remote and urban areas. Two notable national examples are Australia Post's obligation to apply uniform pricing for standard letters carried by ordinary post, and NBN Co's obligation to provide a minimum broadband service to all premises. In remote areas, the combination of large distances and small populations may result in the cost of delivering these services exceeding the associated benefits, and so these services would not be provided on a purely economic basis.

We recommend that you engage with us early in the process if your problems and opportunities is motivated by improving equity and the costs are expected to exceed the economic benefits. In Stage 1, you should demonstrate that the problems and opportunities has the following:

- Strong rationale to proceed – for example, Australia Post and NBN Co are legally obligated to deliver their CSOs.
- Demonstrate strategic alignment – considering how the problems and opportunities aligns with relevant national, state and territory government goals, policies and objectives.
- Potential to deliver material improvements in quality-of-life to individuals – for example, consider how the proposal can lead to improved health, employment or educational outcomes for an individual or local community.
- Establishing the investment logic – describe how the proposal can change equity and quality-of-life outcomes, and the potential size of the change, where possible.

The boundaries of problems and opportunities

Defining problems and opportunities typically entails the definition of boundaries, for example:

- Geographical boundaries – problems and opportunities can be measured for a city, a corridor or part of a corridor, a region, a state or a country.
- Jurisdictional boundaries – problems and opportunities could be governed by authorities at varying local, state and/or national levels.
- Temporal scales – problems and opportunities could be analysed across a range of timeframes, to meet current and/or future needs. For example, one problem may be the immediate need to replace a bridge that is reaching the end of its design life, while another may be to upgrade the bridge to meet the future capacity of the surrounding road network.
- Types of impacts – problems and opportunities could be defined by a number of different impacts. For example, one problem may be inaccessibility because of road flooding, another may be crowding of the public transport system, while another may be delays due to road congestion. These impacts may also vary on geographical and temporal scales, and may be exacerbated by the effects of climate change, which will differ based on a region's climate and the severity of impacts that are projected to increase over time.

The boundaries drawn around a problem will influence how options are developed, as different problems and opportunities may have varying types of impacts and boundaries.

Different considerations will be relevant to different infrastructure networks. For example, water supply is a system-wide issue, governed at state and local levels, and therefore the problem should be considered for the entire system. Similarly, the generation of electricity and its supply across transmission and distribution networks, which span large geographical areas, across state and territory boundaries, and are governed at state and national levels.

4. Infrastructure, Australia, *The Australian Infrastructure Audit 2019 | An Assessment of Australia's Future Infrastructure Needs*, Australian Government, June 2019, p 226–227. A total of 315 infrastructure-related CSOs were identified, costing $29,055 million annually ($2017).

Understanding the problem at different levels allows a wider range of options to be considered. For example, there might be options that impact multiple corridors or regions to address a common problem or a proposal may be delivered in stages to meet increasing needs over time. Such inter relationships between proposals are also important to understand, as demonstrated by past examples of proposals submitted to Infrastructure Australia, as shown in **Box 5.**

Identifying program proposals

Where the Stage 1 process identifies a broad package of interlinked problems and opportunities, you should identify the proposal as a program. Doing so will allow you to identify a broad suite of options in Stage 2 to fully address the problems and opportunities, and determine the most appropriate approach to addressing them.

See our **Guide to program appraisal** for further guidance on developing and analysing programs

Box 5: **Examples of inter-relationships**

The WestConnex project in Sydney demonstrated the inter-relationships within the project's stages and to other future infrastructure projects:

- The benefits of the WestConnex project are highly dependent on the completion of the third stage of the project, which connects the extended M4 and M5.
- WestConnex may also increase the benefits of other road expansions, such as a southern extension, because of capacity created on the core motorway network.

The Melbourne road network is another example where inter-relationships are important in the business case. For example, there are complementarities between the M80 Upgrade and a connection between the M80 at Greensborough and the Eastern Freeway.

2.3 Step 2: Determine the root causes of the problems and opportunities

You should develop a comprehensive understanding of the root causes of the problems and opportunities. This should focus on determining the underlying reasons or factors that lead to the problems and opportunities, rather than their symptoms. They should be considered in the context of our Assessment Criteria, as detailed in **Section 3**.

Various analytical tools exist to help you identify and measure prospective problems and opportunities. These include benefits dependency mapping and investment logic mapping,[5] although we suggest you exercise caution when using these tools to ensure you do not select or preference a specific solution before you have appropriately defined the problem and analysed the options (see the **Stage 2** volume).

Understanding problems and opportunities should draw on relevant observations, studies and planning activities. It may be useful to consider:

- **Table 2**, which presents questions that will allow you to better understand and measure the problems and opportunities
- **Box 6**, which presents specific considerations to determine if sustainability and resilience may be a driver or a consideration of your investigation
- **Box 7**, which provides a worked example where resilience is the root cause of a problem
- **Box 8**, which provides a summary of the CSIRO TraNSIT Model, which is a useful tool for understanding supply chain problems and opportunities.

Table 2: Questions to better understand problems and opportunities

Questions	Considerations
What are the impacts of the problems and opportunities? How can the impacts be measured?	For example, for a traffic congestion problem, what are the impacts in terms of delays and crashes, and how many road users are affected? This should consider how the analysis will be supported using valid quantitative data and supplemented with qualitative information.
When is the problem likely to be experienced? How does it change over time?	Near-term problems should be addressed before longer-term problems, all else being equal. For example, if the problem first becomes material in 2036, then it is likely to be too soon to consider a solution for construction now. However, it could be useful to put in place measures to allow for lower-cost future solutions, such as corridor or land use protection. Identify any critical future 'triggers' (such as full capacity, resource limitations including water shortages, climate change impacts including sea level rise inundation), and what timeframes for action/resolution are evident.
What are the root causes? This should clearly distinguish causes of the problems and opportunities, as opposed to symptoms.	For example, a symptom may be crowding on trains. The underlying cause is demand growth driven by employment growth, which cannot be met by operating additional services on the existing infrastructure. Does the root cause relate to social or equity problems and opportunities, such as quality of life, sustainability and/or resilience?

5. *Australian Transport Assessment and Planning Guidelines F2 Problem identification & assessment* and *T6 Benefits Management*, available at: www.atap.gov.au/about/index

Table 2: *Continued*

Questions	Considerations
What are the uncertainties around future projections of the problem? Will the problems and opportunities apply across a number of future scenarios?	What are the assumptions about future trends? What future scenarios would impact the problems and opportunities? For example: • How is the magnitude of the problems and opportunities impacted by higher or lower population growth, changes in employment patterns or consumption patterns, changes in the risks of extreme weather events, or the expectations of individuals and communities? • How will technology changes impact on the problems and opportunities, such as driverless cars or increases in mobile broadband speeds and capacity? • How will planned changes to other interdependent systems impact the problems and opportunities, such as the transition of the energy network to renewable generation, upgrades to the road network, the availability of new modes of public transport, or the development of new health or education infrastructure? • How will possible changes in policy affect the problems and opportunities over time, such as new road user changes, net-zero emissions targets and shifts to electric vehicles? • How might changes in climate affect the future demand for services, such as through increasing energy demands for cooling or changing agricultural transport needs?
What is the geographical reach of the problems and opportunities?	Where are the direct impacts of the problems and opportunities observed, and what are the flow-on effects to interdependent networks and systems, as well as the surrounding place and wider community? Are there any transboundary considerations that cross jurisdictions?
What stakeholders are impacted by the problems and opportunities?	What stakeholders are affected by the problems and opportunities – what is the scale and nature of the impacts?

Box 6: **Does the root cause relate to sustainability or resilience?**

We have embedded sustainability and resilience throughout the Assessment Framework, to influence better outcomes. As such, you should identify whether there are any sustainability or resilience considerations associated with the problems and opportunities. There are two distinct approaches to considering the impacts of a proposal for either the sustainability or resilience of communities – they are:

1. When sustainability and/or resilience is the driver for infrastructure provision (that is, the root causes are sustainability and/or resilience problems and opportunities).
2. When sustainability and/or resilience is a consideration for proposals that are driven by other needs.

You might consider the following questions as part of Stage 1:

Stage 1: Defining the problems and opportunities	
Strategic Fit	Is sustainability or resilience a primary driver of the case for change for the problems and opportunities? Have impacts been considered within an appropriate spatial boundary – including interdependent networks and systems, as well as the place and wider community? Has appropriate temporal consideration been given to impacts across the life of the infrastructure asset or system?
Societal Impact	Do the problems and opportunities respond to or consider social, economic, environmental and governance impacts? If not, has sustainability or resilience been considered as an overlay to the primary problem or opportunity? Do the problems and opportunities relate to or consider potential short and long-term shocks and stresses?
Deliverability	Have risks related to sustainability or resilience been identified, documented and considered for the ongoing investigation?

For an example of considering **sustainability** when defining the problems and opportunities, consider a wastewater treatment plant. This wastewater treatment plant is an aging asset with rising operating and maintenance costs for the local council. The financial sustainability of this wastewater treatment plant, and the expected change in costs of continuing to run the asset going forward, should be considered as a problem that could underpin a business case. Further to this, assume that the existing wastewater treatment plant creates a negative externality in the form of an odour that impacts upon the adjacent community. This negative externality should also be identified as a problem. Any relevant drivers of change should be considered with reference to this problem. For example, if there is strong population growth we may infer that this negative externality increases in magnitude over time, in that it will impact a greater number of people as the population grows.

For an example of accounting for **resilience** when defining problems or opportunities, consider a bridge that needs to be upgraded to improve flood resilience. The area where the bridge is located is expected to experience future increases in heavy rainfall events and inundation under future climate change scenarios. The potential for increased service disruptions due to flooding events, and the possibility of an asset failure as a result of extreme weather, should be considered as the fundamental problem underpinning the business case. Additionally, to account for resilience, you should consider the impact of flooding events on broader interdependent systems (such as power for lighting, the stormwater drainage network) and the wider community (such as bridge closures affecting access to recreational and sport activities).

Box 7: **Measuring the cost of the problem where resilience is the root cause**

Where resilience is the root cause of a problem, it is usually characterised by the likelihood of a set of events that can cause large negative consequences. This can include natural disasters (such as flooding, cyclones, coastal erosion and bushfires) or other disasters (such as dam failure, water quality failure and electrical system outage).

To assist you, below we have provided a worked example of resilience being the root cause of a problem. This example highlights how a problem might be understood relating to flooding, which could result from high rainfall events, possibly combined with failure of a dam (which leads to greater flooding).

The key resilience factors of understanding a problem are what happens if a particular 'event' occurs and the likelihood of this occurring. In this case, understanding the problem would involve:

- determining a set of 'events' to examine. This could include a 1 in 50 year flood, a 1 in 100 year flood, a 1 in 200 year flood and a dam failure event
- understanding the social, economic and environmental consequences for these events. In the case of flooding, this would typically mean understanding:
  - what spatial area would be flooded, how many houses are impacted, how many non-residential buildings are impacted and what infrastructure is impacted
  - what level of damage would occur to these buildings and infrastructure, measured in dollar terms
  - how many people and how much economic activity would be disrupted
  - what the social cost of this disruption would be, measured in dollar terms
  - whether there would be loss of life and injury resulting from the flooding, because evacuations did not occur, and an expected range for how many people might lose their life or be injured
  - the monetised costs of loss of life and injury using value of statistical life measures.

All of the above information is important to understand the components and size of the problem, which then guides the consideration of solutions. Summary measures that combine information on the likelihood and consequences are also very useful. For example, for flooding, the standard measure is the average annual damage (AAD), which combines the likelihood of events and the damage that occurs from each event. A simple example of this type of approach, combining a single flooding event and a single dam failure event, is shown below:

Example of calculating a summary measure of the size of the problem

	Likelihood (A)	Cost of event (B)	AAD: Expected cost of event (A*B)
1 in 100 year flood event	1%	$500m	$5m
Dam failure	0.01%	$10b	$1m
Total			**$6m**

Box 8: **CSIRO TraNSIT Model**

There are many publicly available tools for conducting sector-specific analysis to provide additional quantitative and qualitative data for Stage 1 proposals, as well as for subsequent stages. A noteworthy tool is the CSIRO's Transport Network Strategic Investment Tool (TraNSIT)[6], which models current transport movements and allows us to see what benefits infrastructure delivery will provide for the agricultural and forestry industries.

TraNSIT maps millions of vehicle trips across thousands of supply chains between production and domestic and export markets. For each supply chain path, it selects the least-cost travel path as well as vehicle configuration, accommodating road conditions, driver fatigue regulations and vehicle decoupling costs.

It provides information on freight paths, detailed transport costs and critical link analysis, providing valuable input to inform infrastructure investment and regulatory decisions. By highlighting key areas where infrastructure investment would be most beneficial, the tool in turn helps reduce travel distance and time, saves fuel costs, cuts down on wear and tear to vehicles and produce, and minimises stress for both truck drivers and livestock.

Applications of TraNSIT include:

- analysing the impact of road upgrades such as sealing, first/last mile improvements, access to higher-productivity vehicles
- informing improvements to rail infrastructure including line upgrades, new freight hubs and integration with road transport
- testing the sensitivity of the road and rail network to natural disasters or other disruptions and their impact on freight access to markets
- optimising supply chains in the private sector
- forecasting freight volumes, supply chain dynamics and bottlenecks under future production and climate scenarios
- testing regulatory changes such as driver fatigue, road and rail pricing and tolls.

6. CSIRO, *Transport Network Strategic Investment Tool* (TraNSIT), available at: www.csiro.au/en/Research/LWF/Areas/Landscapes/Transport-logistics-TRANSIT.

2.4 Step 3: Quantify the cost of the problems and value of the opportunities, in monetary terms where possible

Consider the base case

Project appraisals compare the costs and benefits of doing something, the project case, with not doing it, the base case. The base case is a real-world scenario of what is expected to occur in the absence of new investment.

A high-level consideration of the base case in Stage 1 provides a fundamental foundation for evaluation and comparison of prospective options for a proposal at later stages of project development.

At Stage 1, a base case is used:

- to measure the costs of problems, that result from continuing under existing conditions without intervention
- to provide a baseline for measuring the benefits of realising the opportunity.

The base case should identify the expected outcomes of a 'do-minimum' situation,[7] reflecting the continued operation of the network or service under good management practices. We recommend the committed and funded expenditure approach to defining the base case, but recognise that some states and territories use the planning reference case approach.

Detailed guidance and our requirements for developing the base case are provided in the **Guide to economic appraisal**.

Identify and quantify the problems and opportunities

Quantifying the cost of the problems or the value of opportunities in monetary terms is an important step in understanding the potential benefits that can be realised and demonstrating the case for change. At Stage 1, the purpose is to and get a high-level understanding of the magnitude and urgency for action.

We recommend that this step is a preliminary analysis of the problems and opportunities, to:

1. identify and describe the impacts of specific relevant problems and opportunities, based on the high-level problems and opportunities identified in **Step 1** (**Section 2.2**)
2. quantify the impacts, providing evidence as relevant
3. monetise the impacts of these problems and opportunities, where possible.

The methodology and level of detail should be proportionate to the stage of analysis. Therefore, simplifying assumptions should be applied, such as using standard parameter values, such as Australian Transport Planning and Assessment (ATAP) parameter values for transport proposals or data from existing comparable studies. These impacts will be explored in more detail and analysed with greater rigour in later stages.

This process is a key foundation for later stages of the Assessment Framework, as problems and opportunities with the largest impacts should be prioritised (that is, problems with large ongoing costs should be addressed first), along with near-term problems.

7. Every Commonwealth, state and territory guidance document recommends a 'do-minimum' base case.

Box 9: **Why monetise problems and opportunities?**

Determining the size and timing of problems and opportunities focuses options development on appropriate cost options. It also allows for problems to be compared more easily within and across sectors as well as states and territories.

For example:

- If the cost of the problem is monetised at $30 million per year, or $372 million in present value terms (7% real discount rate over 30 years), then solutions costing $800 million would not be feasible solely on economic grounds.
- If multiple problems are identified, such as flooding of a road and congestion on the road, and the economic costs of these are measured respectively at $5 million per year and $100 million per year, then options that are more likely to address congestion are likely to have a higher benefit. That is, the problems do not have equal weight in their impact on the Australian community.
- Large sources of costs or benefits should not be excluded from the analysis just because they are difficult to quantify or monetise, where 'large' means they might alter the decision outcome.

There may also be social or strategic objectives that need to be taken into account and these should be evidenced accordingly.

We expect your Stage 1 submission to include a discussion on the monetised value of the problems and opportunities, combined with the forecast time period they are likely to occur.

While some costs and benefits can be easily monetised, this may not be feasible in all cases. Infrastructure investments can have significant broader benefits that may be difficult to quantify, for example, improved accessibility could increase the number and frequency of people attending educational courses or visiting a doctor for check-ups. This would deliver educational and health benefits.

In some cases, achieving these broader benefits is a key reason for investment. Where they cannot be monetised, they should be identified and quantified where possible, and supported by evidence.

Box 10: **Engage with us where it is difficult to measure the cost of a problem or the value of an opportunity**

Where it is difficult to measure the cost of the problems or the value of the opportunities, this will become an important issue for later analysis, so you should discuss this directly with us.

A qualitative, judgement-based analysis of the problems and opportunities is often only of limited value, but may be used to supplement quantitative analysis. However, we recognise that, in some cases, qualitative analysis may be the only available material with which to analyse the problems and opportunities. In such cases, we recommend that you have early discussions with us.

Measuring quality-of-life impacts

We recognise that monetising some broader quality-of-life impacts can be difficult. Any quality-of-life impacts that cannot be monetised should be supported with other evidence to validate the improvement. To support impacts that may be difficult to monetise, you should:

- Describe the link from the identified problem or opportunity for the community to the services and infrastructure, to understand the quality-of-life impacts.
- Identify quantitative indicators that capture the impact of addressing the problems or seizing the opportunities.
- Provide evidence of the impact, which could involve survey outcomes or insight from relevant academic literature. Where possible, indicate the potential change in quality-of-life outcomes that should be expected from the proposal.

There are a number of publicly available sources that provide metrics on social outcomes by region that may be relevant. Note that it is important to avoid double counting of impacts in the analysis. **Table 3** provides examples of indicators that could be used to understand and evidence quality-of-life impacts.[8] This quantitative and qualitative evidence should be used to underpin monetising the problem. **Table 7** in the **Stage 2** volume provides a list of relevant data sources for quality-of-life indicators.

8. Sources include: ABS data; BITRE *Progress in Australian Regions* annual yearbook; and Torrens University *Social Health Atlases of Australia*.

Table 3: Example indicators for demonstrating quality-of-life impacts

Quality-of-life characteristic	Example indicators
Culture	• Importance of Aboriginal and Torres Strait Islander cultures to the community • Access to community services, meeting places, sports and cultural facilities • Surveys capturing belonging and connection to the town or city
Living standards	• Unemployment rate • Median weekly income • Rate of homelessness • Rate of incarceration • Access to energy sources • Access to social and affordable housing
Learning and development	• Literacy rates (including digital literacy) • Numeracy rates • Level of educational attainment
Health and safety	• Life expectancy at birth • Mortality rate • Level of chronic disease • Access to medical services • Physical activity levels/sport participation • Air or potable water quality
Mobility and connectivity	• Non-compliances with *Disability Discrimination Act 1992* (Cth) • Access to essential goods and services • Digital affordability • Digital access • Average commute time (e.g. contribution to 30 minute cities)

Measuring quality-of-life impacts in remote and regional areas

Addressing problems or seizing opportunities in remote areas may provide a range of broader benefits, including indirect benefits (both social and economic) that may be harder to measure compared to urban contexts. As an example, consider a transport problem in a remote area compared to an urban area:

- Addressing a transport problem in an urban area might be viable based on travel time savings benefits alone because of the volume of road users, despite alternative routes existing.
- In the remote area, there may be no alternative ways to access essential services (such as health or education) or allow residents to engage with one another. Addressing this problem could fundamentally improve the quality-of-life for residents. The smaller number of potential users in the remote area may mean that addressing the problem is not economically viable based on transport benefits alone. Therefore, the broader quality-of-life benefits (such as improved access to health and education services) may be instrumental to supporting the rationale for addressing the problem in the remote area.[9] These broader benefits often motivate investments in remote areas, and it is important that you include these in your analysis.

In addition, infrastructure services are a key input for businesses and poor infrastructure can be a significant barrier to doing business, and to attracting and retaining people to live and work in regional and remote areas. These are important factors for overall remote and regional community development.

We acknowledge that these broader impacts can be challenging to accurately quantify and monetise. Broader impacts could be evidenced by providing qualitative and quantitative information.

For example, you could describe the impact of current infrastructure on residents accessing health or education centres, and the further impact of extreme weather conditions, such as a wet season that causes significant disruption. In this case, it would be relevant to provide information on:

- the frequency that the residents access health and education services, compared to relevant benchmarks
- the frequency and duration of disruptions each year
- any other relevant information, such as safety incidents that have occurred as a result.

As for quality-of-life impacts generally, these impacts in remote and regional areas should be linked to quality-of-life indicators such as those described in **Table 3**.

A worked example of how broader quality-of-life impacts benefits could be investigated in a remote area is provided in **Box 10**.

9. A study of US transit systems found that broader economic benefits (such as the benefit from additional trips to work, health services or education) substantially outweighed traditional economic benefits (such as travel time savings and car ownership avoidance). For more details of this study, see National Center for Transit Research, *Cost-benefit analysis of rural and small urban transit*, July 2014.

Box 11: **Worked example of understanding quality-of-life impacts in a remote area**

A remote area in Western Australia has a large indigenous population. The main road into this area is closed for three months of the year during the wet season due to flooding. Without access to the nearest town via this road, residents are only able to access the town via helicopter (an expensive alternative) or via road to a significantly further destination (a time-consuming alternative). Evidence has been provided to demonstrate that poor accessibility to the nearest town during the wet season is driving poorer health outcomes in the area relative to similarly sized towns, as residents are unable to access the health facilities with ease.

It is proposed that addressing this problem would:

- provide broader quality-of-life benefits due to improved health outcomes that result from improving access to health facilities
- provide traditional economic benefits – for example, lowering the cost of travel for residents compared to the current travel options
- contribute to the Australian Government fulfilling its declared strategic priorities, such as *Closing the Gap*.

To evaluate the broader quality-of-life benefit of improved access to health services, we note that the area suffers from poorer health outcomes relative to the rest of Western Australia (WA):

- The median age of death for residents in the area is 59, relative to the WA median age of death of 80
- The average number of avoidable deaths per 100,000 people in the area is 670, relative to 121.9 for WA overall
- The average number of emergency department presentations per 100,000 people in the area is 17,000 compared to 31,260 in WA overall.

To substantiate the claim that poor health outcomes are caused by poor accessibility due to the road closure, a survey has been conducted on a random sample of residents from the area to understand how the road closure affects the behaviour of residents. Survey results indicate that residents are strongly discouraged from travelling to the town centre for medical reasons due to long durations of road closure, long travel time and prohibitive costs.

It is well documented that regular medical checks are important to: 'check for current or emerging medical problems; assess your risk of future medical issues; prompt you to maintain a healthy lifestyle; and update vaccinations.'[10]

Regular medical checks are important for individuals at high risk of illness. Further, there is some international academic evidence to suggest that ensuring access to medical services can promote life expectancy and improve quality of life for individuals. This is one motivation behind the Northern Territory's strategic health plan to promote access to medical services and limit hospital avoidance.[11, 12]

It follows that ensuring access to medical services is likely an important factor in promoting health outcomes. Addressing the problem is likely to contribute to improved health outcomes by providing residents with access to health services, as substantiated by quantitative metrics, survey results (qualitative and quantitative support), and literature. Proceeding to Stage 2 is likely to generate options such as upgrading the road and providing digital connectivity for virtual health services, which directly address the identified problem.

10. Better Health Channel, Victorian Government, *Regular Health Checks*, p 1.
11. Hao et al. 2020, *Adequate access to healthcare and added life expectancy among older adults in China*, BMC Geriatrics 20, p 129; National Center for Transit Research, *Cost-benefit analysis of rural and small urban transit*, July 2014, pp 5–9.
12. Northern Territory Government, *Northern Territory Health | Strategic Plan 2018–2022*, pp 20–21.

How to monetise problems and opportunities

As part of your submission, you should capture all relevant costs of the problems and value of the opportunities in monetary terms. That is, a dollar value associated with the problems and opportunities compared to:

- current levels of service – for example, this could measure the increase in congestion over time relative to today under the base case
- a higher level of service (for a problem) – for example, this could measure the level of congestion over time relative to free flow or uncrowded conditions.

Stage 1 of the Assessment Framework focuses on identifying the cost of the problems and value of the opportunities, which are different to proposal benefits and investment costs.

- **The cost of the problems and value of the opportunities** capture the tangible outcomes that could be unlocked by action, measured as the economic, social and environmental impact to society. They provide an estimate of the maximum benefits that could reasonably be achieved by solving the problem or realising the opportunity.
- **Proposal benefits** relate to the measurable improvement derived from taking action and are measured in Stage 2 and Stage 3.
- **Investment costs** are the cost of the intervention to solve problems or realise opportunities and are measured in Stage 2 and Stage 3.

The strongest evidence base is the scale and the monetary value of the cost of the problems or the value of opportunities. This is discussed in detail in in the subsequent sections. At Stage 1, this should be a high-level estimate based on simplifying assumptions.

To quantify the cost of the problems and value of the opportunities, we recommend that you start by breaking down the root causes of the problems or opportunities that you determined in **Step 2** (see **Section 2.3**). For example:

- For transport problems and opportunities, any factors that change the supply and demand may be relevant. For example, road transport-related problems generally arise due to population growth, land use change, deteriorating road conditions, flooding, limited connectivity/accessibility, changes in technology, and so on. These root causes can lead to congestion, safety, vehicle operating and vehicle emission cost problems.
- A water-related opportunity may arise due to additional water being available for productive use, providing value through the market value of commodities produced by this water. These factors can lead to consumptive use benefits such as the value of additional water in various uses such as mining, urban, industrial and agricultural uses.

This understanding should then be carried through to future assessment stages, including options analysis and business case development, to ensure that the problems and opportunities are being completely addressed.

Box 11 provides example methodologies for quantifying and monetising problems and opportunities for different sectors.

Box 12: **Methods for monetising problems and opportunities**

The following tables provide relevant methodologies for quantifying and monetising problems and opportunities.

Transport sector examples

Problems and opportunities	Methodology
Road transport costs (travel time, vehicle operating costs, greenhouse gas emissions, reliability)	Additional travel time, vehicle operating costs, etc. of the base case, compared with free-flow conditions.
Freight costs (travel time, vehicle operating costs, greenhouse gas emissions, reliability)	Comparison of the base case against a scenario with more direct routes, higher mass limits, etc.
Public transport costs (crowding, reliability)	Additional costs for public transport users compared with a reasonable benchmark.
Maintenance costs	Growth above typical maintenance or renewal costs due to a life-expired asset. Costs associated with increased levels of maintenance and repair due to increasing climate risks, such as extreme temperatures, bushfire and flood events. Cost of replacement for assets in areas exposed to future coastal inundation.
Regional road network safety improvements	Number of crashes on regional roads, by severity and by taking the proportion that may be attributable to infrastructure deficiencies (i.e. not driver behaviour).

Box 12: **Methods for monetising problems and opportunities** *continued*

Water sector examples

Problems and opportunities	Methodology
Potable water availability	Cost of additional water restrictions (based on willingness-to-pay) for number of households, by severity. Alternatively, the cost of sourcing additional water (e.g. trucking, water reuse and recycling).
Water quality	Cost of additional testing and treatment to maintain water quality. This could include water quality impacts due to increasing risks from climate change such as bushfires and extreme temperatures (ash and bushfire debris, or increased risk of algal blooms).
Agriculture opportunity	Considering land available, crop types and yields, water use and the gross margins (i.e. production revenue less variable costs) for crops.
Industrial activity	Typically based on willingness-to-pay for the water. Alternatively, the producer surplus of water use and comparison with best alternative use.
Maintenance costs	Growth above typical maintenance or renewal costs due to a life-expired asset for water and wastewater infrastructure. Costs associated with increased levels of maintenance and repair due to increasing risks from climate change such as extreme rainfall and flood events. Alternatively, the cost of replacement for assets in areas exposed to future sea level rise inundation.

Box 12: **Methods for monetising problems and opportunities** *continued*

Energy sector examples

Problems and opportunities	Methodology
Energy availability	Cost of connection to energy grid and energy pricing (peak and off-peak).
Network reliability	Costs associated with the provision of additional network capacity and redundancy (new or upgraded transmission lines, substations and other energy infrastructure) to meet increasing energy demands.
Maintenance costs	Costs associated with increased levels of maintenance and repair due to ageing assets and increasing risks from climate change such as damage and network disruption from bushfire and storm events. Alternatively, the cost of replacement for assets in areas exposed to future sea level rise inundation.
Decentralisation	Typically based on willingness-to-pay or the upfront costs of decentralised power.
Integration of renewable energy generation sources	Costs associated with development of new renewable sources and network upgrades to service new areas of renewable energy generation.

Box 12: **Methods for monetising problems and opportunities** *continued*

Social sector examples

Problems and opportunities	Methodology
Health impacts	Typically measured for individuals through estimates of remaining life, disability or pain burdens and assumptions on the value of a statistical life year. Society-wide impacts can be measured through hospital admission rates and reductions in health costs.
Education impacts	Typically measured through a community's willingness-to-pay for improved services and lifetime earning impacts. Can also be measured through benefits to the Australian economy that can occur through better skilled workers, higher employability and increased productivity.
Accessibility impacts	User and externality (e.g. emissions) costs if users would need to travel further to access services, or the costs of not travelling if users no longer travel.
Green/blue space impacts	Capturing how much users value a precinct (willingness-to-pay or potentially travel costs as a proxy), as well as non-use value, health impacts, environmental impacts, business profits.
Remote housing overcrowding	Based on the number of people in overcrowded housing in remote areas, compared with non-remote areas and the impact on quality-of-life outcomes. The Priority List proposal focused on education, using research on educational outcomes for people in crowded vs. non-crowded housing. Health and safety could also be explored.
Coastal inundation protection strategy	Costs can be developed from: • number of affected properties in vulnerable locations by flood height (metres), according to future Australian flood modelling scenarios and years • typical house flooding and evacuation costs • flood scenario severity and likelihood • average occupancy.

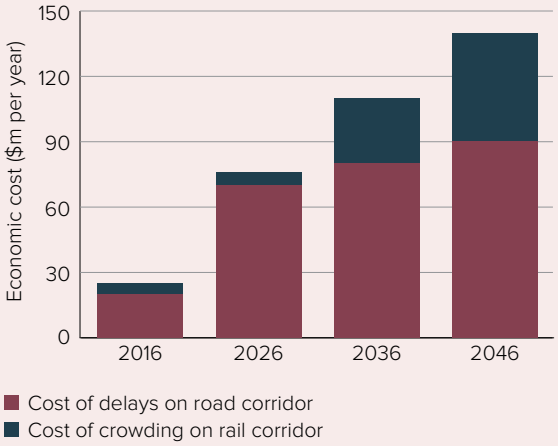
Box 13: **Summary of monetising the cost of the problem**

A strategic planning exercise has been undertaken for a major city transport system. Using this information, a proponent can show the size and pattern of economic (problem) costs for a particular corridor or for a number of corridors:

- to measure the cost of delays on the road network, the proponent could estimate the economic cost of additional time and vehicle operating costs for road users relative to free flow conditions
- to measure the cost of crowding on the rail network, the proponent could measure the cost to users of travelling in more crowded conditions relative to non-crowded trains and/or stations.

Considering this over time, such as in the following chart, shows the relative size of the problem and how it changes. In this example, annual road congestion costs increase rapidly from $20 million in 2016 to $70 million in 2026, while rail crowding costs are smaller in 2016 but increase to $50 million per year in 2046.

The present value of these costs is $930 million, using a 7% discount rate over 30 years. Therefore, a proposed road project that costs $3 billion to address the problem would likely cost more than the benefits it would provide, and smaller scale options should be considered.

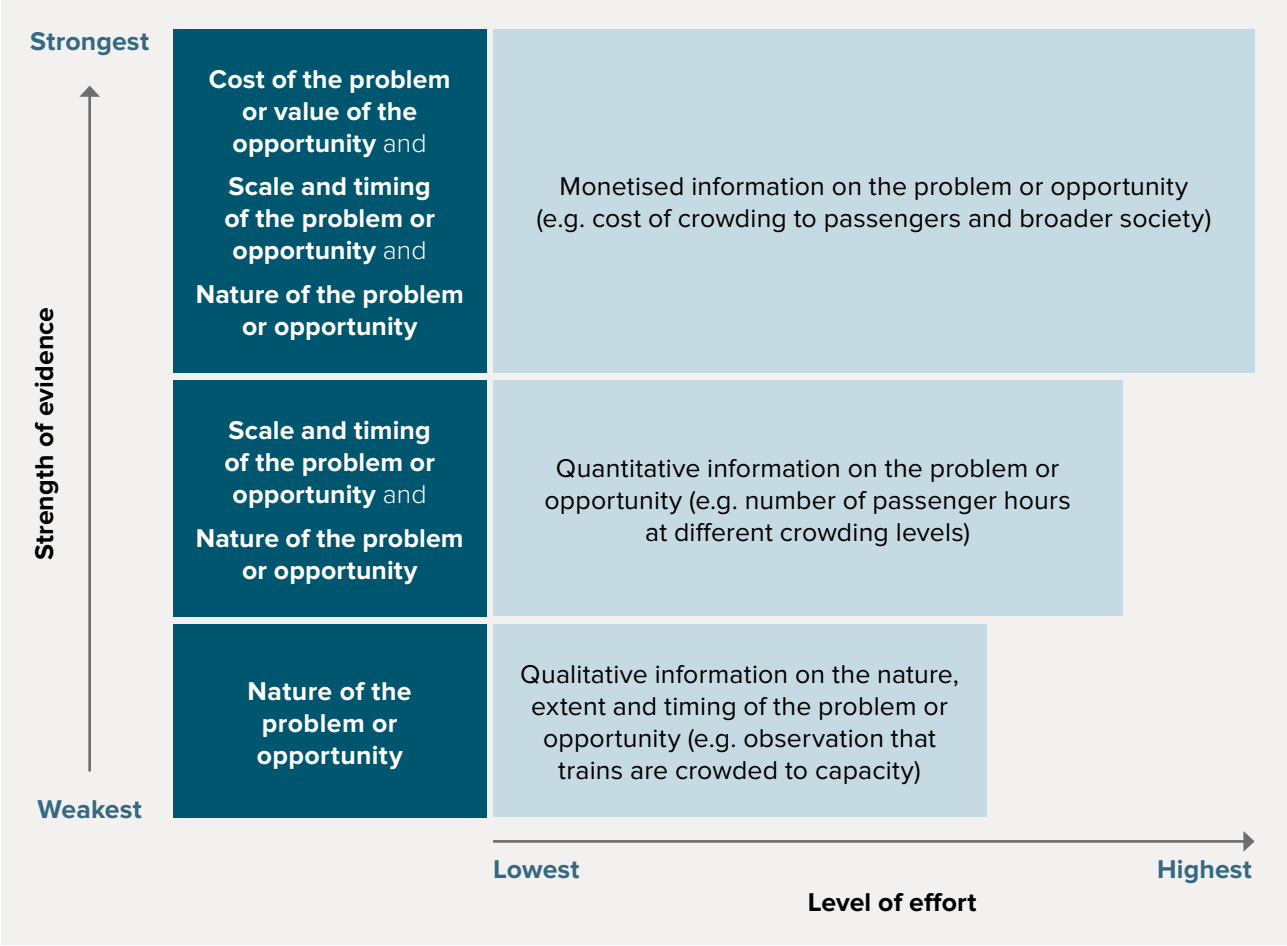


How to present costs and benefits

Quantitative evidence is a key part of understanding problems and opportunities objectively.

We consider the value of monetised information, supported by estimated quantities and qualitative descriptions, to be the strongest form of evidence, as shown in **Figure 4**. This information may come from detailed simulation/forecasting models or be based on recent and relevant studies, such as surveys and consultation.

Figure 4: The three tiers of evidence for problems and opportunities



We recommend the use of quantified and monetised estimates when analysing problems and opportunities to enable comparison between different types of problems and opportunities. Evidence of broader strategic or social benefits, which may be harder to quantify, should be supported by qualitative information.

Therefore, costs of problems and benefits of opportunities should be presented as:

- **Monetised information.** Where possible, monetised values of the costs under the base case or benefits of the opportunity should be provided, as described in the previous section. To understand the size of the problems compared to opportunities and the appropriateness of potential solutions, you should provide the present value. See the **Guide to economic appraisal** for guidance on calculating present values.
- **Quantified information.** This approach may be used where there are difficulties in monetising specific costs and benefits, in particular where the necessary evidence base is not available. Quantification provides an indication of the challenges or opportunities faced, but may not capture the overall magnitude of the problem. When the problem is quantified, but not monetised, it is useful to provide benchmarks for comparison and the number of stakeholders impacted, to demonstrate the magnitude. Quantified information should be accompanied by qualitative information linking the problems and opportunities to societal welfare – for example, reference values for a comparison group or service standard.
- **Qualitative description.** In general, you should quantify and/or monetise the problem. However, this may not be possible for benefits where appropriate tools or data do not exist. Where this is the case, qualitative descriptions of the impacts should be provided and supported by evidence.

You should include supporting calculations for any quantified and monetised information in your submission. Where calculations are particularly complex or methodologies are developing, information on the methodology used will support our assessment.

Box 14: **What do we mean by qualitative, quantitative and monetised information?**

Qualitative, quantitative and monetised information provide progressive detail on the nature, magnitude and timing of the problems and opportunities, as shown below.

Impact	Qualitative	Quantitative	Monetised
Current (2020)			
Property damage from flooding	Damaged properties at...	Likelihood of damaged properties in location(s): 0.05% p.a. risk for 30,000 properties	$3 million p.a.
Injuries or fatalities from flooding	Injury to local population	Risk of injury to local population: 0.05% p.a. risk for 70,000 people	$700,000 p.a.
Social impacts to disadvantaged groups due to displacement	Impacts disproportionately affect lower-income groups	40% of injuries affect bottom 20% of income distribution	N/A
Near term (2025)			
Property damage from flooding	Damaged properties at...	Likelihood of damaged properties in location(s): 0.08% p.a. risk for 65,000 properties	$15.6 million p.a.
Injuries or fatalities from flooding	Injury to local population	Risk of injury to local population: 0.08% p.a. risk for 155,000 people	$2.5 million p.a.
Social impacts to disadvantaged groups due to displacement	Impacts disproportionately affect lower-income groups	40% of injuries affect bottom 20% of income distribution	N/A

2.5 Step 4: Consider Deliverability of the potential responses

The Priority List provides a credible pipeline of nationally significant proposals for governments at all levels to choose from. Therefore, we also consider the ability to address the underlying problems and opportunities.

We consequently require you to consider the range of potential responses to problems and opportunities. On this basis, you should consider initial Deliverability implications of the potential responses, and incorporate lessons learnt from similar problems and proposals. The aim here is not to develop solutions to the problems and opportunities, but to consider, if solutions exist, any key risks of responding to the problems and opportunities, and lessons from where interventions have been delivered previously.

Key considerations should include:

- Are the problems and opportunities capable of being addressed, for example, through reform, demand management, better use and/or new capital?
  - **Consider if solutions exist which can be delivered for less than the cost of the problems and value of the opportunities.** It may be useful to consider the size present value of the identified problems and opportunities to consider the maximum 'solution envelope' of the solution.
  - For example, if the cost of the problem is monetised at $30 million per year or $372 million in present value terms (7% real discount rate over 30 years), then solutions costing $800 million may not be worth considering.
- Do the potential interventions have any detrimental environmental impacts?
- Can the risks and uncertainties surrounding the problems and opportunities be identified and managed, for example climate change, cyber security, population change and/or industry trends? Are they temporary or permanent?
- Is it better to adapt or prevent the problems and opportunities, for example, through demand management?
- Where relevant, has corridor or precinct protection been considered to preserve opportunities and avoid potential barriers to meeting future needs?
- Has past experience (for example, using post completion reviews of similar projects) been used to inform future circumstances for the problems and opportunities?
- For programs, is there a material opportunity to collaborate and share lessons across states and territories to address a common problem or opportunity?

The potential interventions that are available should inform planning for the next stages of investigation.

2.6 Worked examples of identifying and quantifying the cost of problems and value of opportunities

Box 14 and **Box 15** provide worked examples of how a problem can be expressed in monetary values. A further example is provided in **Box 16**, which includes a case study of how broader economic benefits were quantified for a health precinct.

Box 15: **Worked example of a traffic congestion problem**

This worked example describes a standard process for determining problem costs based on observed traffic numbers multiplied by appropriate default parameter values.

Background

A regional town is situated on a major highway between two larger regional cities. In recent years, this section of the highway has experienced increased traffic due to sustained population and employment growth. This has resulted in significant congestion in the town as existing signalised intersections cannot effectively manage the increased traffic volumes. Additionally, the growth in vehicle numbers has also increased the occurrence of crashes.

Projections for future population growth and employment opportunities suggest that traffic congestion is likely to continue to increase over time.

Quantifying the cost of the problem

The method to quantify the costs will vary for each component of the problem and the data available at the time.[13] The steps below are an example and are not necessarily exhaustive:

Gather data

- 45,000 passenger vehicles pass through the town each weekday. It is standard practice to analyse the problem costs annually. This can be achieved by using observed annual data or applying an expansion factor to daily or weekly traffic data.
- A weekday to annual expansion factor of 333 is identified by the state transport department in a recent study of the corridor.
- 14,985,000 (45,000 x 333 annual expansion factor) passenger vehicles pass through the town as part of their journey each year.
- According to population forecasts, plans for increased economic activity and observed traffic growth, the daily vehicle volume is expected to increase by 5% by 2026, and 15% by 2036.
- Over the past 10 years, five people have lost their lives on the highway through the town. There have also been approximately 50 incidents in the last 10 years that resulted in serious injury on the road.
- The signalised intersections add approximately five minutes of journey time on average due to stop-start traffic patterns for through-traffic compared to free-flow conditions. A five-minute duration is 8% of one hour *(5/60 = 0.08)*. No changes in trip time due to population growth is assumed, although this may need to be reconsidered at future stages.

13. There is a hierarchy of analysis that can be used to estimate the problem, reflecting the complexity of the methodology and data availability. For example, accounting for different types of traffic (e.g. light vehicles, heavy vehicles), different trips (work, leisure), different trip times (peak, off-peak) requires more data compared with a simpler approach that uses observed splits from comparable studies. We recommend that the methodology and level of detail is proportionate to the stage of assessment. For example, at Stage 1, a simplifying assumption that assumes 10% of vehicles are heavy vehicles and 90% are passenger vehicles could be applied if a transferable study near the region has previously confirmed this split. Any simplifying assumptions should be transparently documented in the submission and underpinned by sound logic.

Box 15: **Worked example of a traffic congestion problem** *continued*

Estimate travel time value

- Travel times have associated costs. The ATAP Guidelines provide travel time parameters. This includes the value of time for various types of vehicles and trips (e.g. private and business).[14] The value of time for private car trips is approximately $18 ($2020) per passenger-hour. The state transport department has published a recent study in the area which identifies an occupancy rate of 1.7 people per passenger vehicle. Our guidance on vehicle occupancy rates is detailed in our **Guide to economic appraisal.**
- Using this information, a five-minute delay costs each person $1.50 per trip *($18 x 0.08 (i.e. 5 minutes denominated per hour)).* Approximately 15 million passenger vehicles pass through the town each year, which implies 25.5 million people are affected *(14,985,000 x 1.7)*. The current cost of the travel time delay is therefore $38,211,750 *($1.50 x 25.5 million)* per annum.
- Future projections of traffic growth and average trip times can be used to project these costs forward to the medium term (e.g. 2026) and longer term (e.g. 2036). In 2026 the travel time costs will equal $40,122,338 *(current travel time costs x 105%)*. In 2036, these costs will equate to $46,140,688 *(current travel time x 115%)*.

Estimate vehicle operating costs

- There are costs associated with operating a vehicle. These costs are driven by several factors, including travel speed, distance, duration, vehicle type, road condition etc. Reducing the level of congestion and increasing travel speeds will generally reduce vehicle operating costs. Sophisticated modelling can be run to estimate the VOC. At Stage 1, a simplifying approach may be required due to data limitations.
- The road through the town is approximately one kilometre in length. The state transport department states that the VOC per kilometre is on average approximately 40 cents ($2020). The annual VOC is $5,994,000 *(14,985,000 vehicles x 40 cents x 1 kilometre)*. In 2026, the VOC will reach $6,293,700 *(current VOC x 105%)*. In 2036, these costs will equate to $6,893,100 *(current VOC x 115%)*.
- The proponent has made a simplifying assumption that approximately 25% of these VOCs are likely to be reduced. This is based on VOC curves, which were published by the state transport department. Therefore, the avoided VOC is currently $1,498,500 *($5,994,000 x 25%)*, and estimated to increase to $1,573,425 *($6,293,700 x 25%)* in 2026, and $1,723,275 *($6,893,100 x 25%)* in 2036.

Estimate safety costs

- Road crashes and the resulting injuries/ property damage have associated economic costs. ATAP publishes associated costs by type and severity,[15] while states, territories and agencies sometimes provide relevant local values. Based on an inclusive willingness-to-pay (WTP) approach, a fatal accident has an associated cost of $8,335,119 ($2020), while serious injuries have an associated cost of $435,007 ($2020).[16]
- The annual safety costs associated with the road in the town are a combination of the probability of fatal accidents and serious injuries occurring per year. There is, on average, 0.5 fatal accidents and five serious injuries on this stretch of highway per year (i.e. five fatal accidents and 50 serious injuries every 10 years). Without intervention, this equates to $4,167,560 *(0.5 fatal accidents x fatal accident crash cost)* plus $2,175,036 *(five serious injuries x serious injury crash cost)* respectively, or $6,342,595 combined per annum.

14. Transport Infrastructure Council, (2016). Australian Transport Assessment and Planning Guidelines, PV2 Road Parameter Values. Section 3, available at www.atap.gov.au/parameter-values/road-transport/3-travel-time.
15. Transport Infrastructure Council, (2016). Australian Transport Assessment and Planning Guidelines, PV2 Road Parameter Values. Section 4.3, available at www.atap.gov.au/parameter-values/road-transport/4-crash-costs.
16. Average crash costs by crash severity for rural roads using the inclusive WTP approach, which are escalated to June 2020 values using CPI. Transport Infrastructure Council, (2016). Australian Transport Assessment and Planning Guidelines, PV2.

Box 15: **Worked example of a traffic congestion problem** *continued*

- In 2026, total safety costs will equal $6,659,725 *(current safety costs x 105%)*. In 2036, these costs will equate to $7,293,985 *(current safety costs x 115%)*.
- The proponent understands that, even if the infrastructure is upgraded, it is impossible to diminish or save all safety costs. At this stage, a benchmark approach was used which compared the crash rates on the current road against a similar road in the region that was recently upgraded. This benchmark approach identified that approximately 50% of the safety costs may be reduced.
- The reduced safety costs, assuming 50% of accidents are avoided, equate to $3,171,298 currently, $3,329,863 in 2026, and $3,829,342 in 2036.

Estimate environmental costs

- Environmental costs relate to the environmental impact, including air pollution, greenhouse gas emissions and noise impacts, caused by vehicle use. ATAP publishes environmental cost parameters per passenger and vehicle kilometres travelled.[17]
- Environmental costs are generally measured in terms of the change in passenger or vehicle kilometres travelled, as opposed to the level of congestion or travel times.[18] At this stage, the proponent will be unable to gather the relevant data on how vehicle kilometres travelled may change in addressing the problem.
- This cost is unlikely to be significant relative to the travel time, VOC and safety costs and is therefore acceptable to discuss qualitatively. However, at later stages of the Assessment Framework, the proponent will be required to quantify these costs. Some proposals may also have environmental impacts which are outside the scope of the parameters reported by ATAP, such as clearing native vegetation to deliver new infrastructure. These costs should also be considered at later stages.

Total

- Total costs of the problem that have been quantified are a combination of the travel time, VOC, and avoided safety costs. Currently, these costs equate to $40,070,873 annually. These costs are expected to grow to $42,074,417 in 2026, and $46,081,504 in 2036.

Outcomes

This analysis estimates the current and future cost of the problem. This is the type of analysis that we require for a Stage 1 submission, which we use to assess the scale of the problem to determine if it is nationally significant. In this case, the problem cost meets our national significance threshold (see **Section 3.3**).

This is a minimum level of analysis to assess Societal Impact of the problems and opportunities, which should be accompanied by relevant evidence, such as traffic studies and demand models. Submissions should be supported by consideration of our Strategic Fit criterion and a preliminary analysis of Deliverability.

17. Transport Infrastructure Council, (2020). Australian Transport Assessment and Planning Guidelines, PV5 Environmental parameter values, available at www.atap.gov.au/parameter-values/environment/index.
18. In practice, the level of congestion may affect environmental costs as slower travel time may increase fuel consumption resulting in additional air pollution and greenhouse gas emissions. This type of environmental impacts, however, is not reflected in current methodologies to quantify environmental impacts.

Box 16: **Worked example of an irrigation precinct opportunity**

Background

This worked example describes a standard process for determining opportunity value based on a high-level estimate of agricultural production value.

A proponent in regional Australia wants to develop an agricultural precinct. The area has good soil and climatic conditions and there is access to a reliable, undeveloped water supply. The proponent thinks there may be an opportunity to develop 30,000 hectares of greenfield irrigated agricultural land by building a new dam that would be capable of delivering 150,000 ML of water to the precinct each year with high certainty.

Quantifying the value of the opportunity

The method to quantify the value of the opportunity will vary for each component of the opportunity. The following steps provide an example of how this may be done, but are not necessarily exhaustive:

Gather data

Gather relevant data regarding new prospective agricultural production through publicly available state databases and a survey of prospective water users to determine:

- amount of available land for development
- suitability of various crop types
- potential yield per crop type
- water use per crop type
- gross margins[19] (i.e. production revenue minus variable costs) per hectare of land per crop type
- evidence of water demand and the breakdown of demand over time and for various crops, including under different future climate scenarios
- projected future changes in climate, including increased rainfall variability and higher temperatures that may increase evaporative losses.

Agricultural production value

The proponent has identified that of the 30,000 hectares of land that could be developed, half of this could be used to grow peanuts, while the other half could grow soybeans. These crops were deemed suitable given the soil quality and climatic conditions.

The proponent was unable to gather data on the net margins associated with the crops. However, they had access to a database of gross margin values. The proponent researched the gross margins for peanuts and soybeans using online resources such as state government databases. The proponent cross-checked these with a small number of growers in the region who broadly confirmed the numbers were reasonable.

The proponent then determined that for every hectare of land, peanuts would generate an annual gross margin of $2,000 and soybeans would generate an annual gross margin of $800 at full production.

Based on observed data from a nearby region, the proponent estimates that, on average, both peanuts and soybeans will use approximately 5 ML of water per hectare.

The gross margin for these crops over this area would therefore equate to $30,000,000 ($2,000 * 15,000 Ha) per annum for peanuts, and $12,000,000 ($800 * 15,000 Ha) per annum for soybean. This totals $42 million per annum in agricultural value potential (assuming full production maturity).

19. Gross margin may be an appropriate simplification at Stage 1 as a more practical way to demonstrate that there is a problem or opportunity of national significance. Net margins should be applied in later stages for detailed analysis.

Box 16: **Worked example of an irrigation precinct opportunity** *continued*

Other impacts

There are likely other benefits and costs associated with the proposal, such as social and environmental impacts. Quantifying these impacts may require more detailed information than is currently available. As such, the proponent quantified these impacts, where possible, and discussed non-quantifiable impacts qualitatively. For example, the potential impacts of dams on ecosystems, water quality and downstream environments are well researched and could be described qualitatively at this stage. Projected changes in climate are quantifiable (within a range of uncertainty) and could be used to estimate potential changes in rainfall and evaporative losses, to determine the impact on dam storage.

Outcomes

The analysis estimates the current and future cost of the opportunity. This is the type of analysis that we require for a Stage 1 submission, which we use to assess the scale of the opportunity to determine if it is nationally significant. In this case, the opportunity value meets our national significance threshold (see **Section 3.3**).

This is a minimum level of analysis to assess Societal Impact of the opportunity, which should be accompanied by relevant evidence, such as demand forecasts. Submissions should be supported by consideration of Strategic Fit and a preliminary analysis of Deliverability. The costs of realising the opportunity (that is, the costs of constructing the dam) do not form part of estimating the value of the opportunity itself. The costs and feasibility of potential solutions are addressed in later stages of the assessment process.

Box 17: **Case Study of investment in the John Hunter Health and Innovation Precinct**

Background

The John Hunter Health Campus (JH Health Campus), consisting of John Hunter Hospital (JH Hospital), John Hunter Children's Hospital (JH Children's Hospital) and Nexus (adolescent Mental Health), is the tertiary referral and teaching hospital for over 900,000 people of the Hunter and New England regions, as well as for northern NSW.

The existing hospital infrastructure is not suited for delivering contemporary and future digitally enabled models of care. For example, the current size of the operating theatres and emergency department limits the clinical service's ability to accommodate new models of care, technologies and equipment. The JH Health Campus faces significant capacity constraints with its average occupancy for admitted patients at 98%, with no capacity to accommodate projected growth in demand for services. For service planning purposes, a target of 85% average annual occupancy is generally applied to accommodate seasonal fluctuations in demand. The JH Health Campus has one of the busiest emergency departments in New South Wales.

The proposed John Hunter Health and Innovation Precinct (JHHIP) will deliver major infrastructure enhancements to enable the implementation of contemporary models of health care and provide capacity to service projected growth in demand over the next 10 years.

Quantify the cost of the problem

The method to quantify the cost of the problem varies for each service component with reference to NSW Health's benefit valuation methods. The following steps provide an example of how this may be undertaken, but are not necessarily exhaustive. NSW Health's *Guide to Cost-Benefit Analysis of Health Capital Projects*[20] provides more detail on the methods used to monetise these impacts.

Gather data

The proponent gathered data demonstrating the observed problems and opportunities, including:

- Capacity constraints – average occupancy rate compared with the target occupancy rate (described above) and future growth in demand expected to exceed physical capacity.
- Emergency department's capacity constraints – total annual services provided exceed the technical design and space capacity of the department.
- Problems and opportunities identified with qualitative evidence were:
  - opportunities for delivering contemporary and future digital models of care
  - clinical redesign initiatives including increased use of telehealth and virtual beds
  - cost of patient transfer to other hospitals associated with intensive care capacity constraints.
  - constraint in delivering better integrated health, education, research and community services.

Estimate cost of poorer patient outcomes due to inpatient capacity constraints

- Patients accessing inpatient treatment are expected to experience a reduction in their pain and suffering. The cost of bed capacity restraints and impact on patients without the capital investment can be measured by the potential change in admissions and the value of patient's lives saved and quality of life which are diminished by poor health (NSW Health 2018, p.26).
- Poorer health outcomes for patients is estimated by the proponent as $1.094 billion in present value terms (7% real discount rate over 20 years).

20. NSW Health, 2018, *Guide to Cost-Benefit Analysis of Health Capital Projects*, NSW Government, viewed 10 May 2021, available at www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2018_021.pdf.

Box 17: **Case Study of investment in the John Hunter Health and Innovation Precinct** *continued*

Estimate cost of ED overcrowding

- Overcrowded EDs have longer wait times which have been linked to a higher risk of patient death or 'increased mortality' (NSW Health 2018, p.27).
- Increased mortality due to ED overcrowding is estimated by the proponent as $181 million in present value terms (7% real discount rate over 20 years).[21]

Estimate additional travel costs

- Additional travel costs for patients, carers and family members who present to other health service locations due to capacity constraints in JH Health Campus (estimated in accordance with standard transport planning methods and parameters).
- Travel time costs for patients required to travel to other health service locations – estimated by the proponent as $133 million in present value terms (7% real discount rate over 20 years).

Outcomes

Considering the analysis described above and our own internal research, we assessed the proposal to be nationally significant in the long-term (10–15 years). We were also satisfied that the potential JHHIP development and revitalisation could support benefits beyond a 'business as usual' hospital upgrade, which would normally be part of a state-funded program.

21. Note that the NSW Health *Guide to Cost-Benefit Analysis of Health Capital Projects* only applies the risk of ED overcrowding to the expected incremental number of presentations *triaged as category 1 and 2* (not all ED patients).

3

How we assess Stage 1 submissions

3.1 Assessment of Stage 1 submissions

We assess Stage 1 submissions for inclusion on the Priority List using the Assessment Framework. More details on the Priority List are provided in the **Overview** volume.

Your Stage 1 submission should demonstrate the strategic case for the problems and opportunities, the scale of the problems and opportunities, and whether it is capable of being addressed.

Infrastructure Australia accepts Stage 1 submissions at any time.

Our information requirements for Stage 1 assessment are set out in the Submission Checklist in **Section 4**. We encourage you to submit the business case and supporting material in their entirety, where they have already been prepared.

We follow a two-step pathway (as shown in **Figure 5**) to assess each proposal seeking to be added to the Priority List.

Figure 5: *Infrastructure Priority List* assessment pathway

Box 18: **Our information requirements for Stage 1**

To make a Stage 1 submission for potential inclusion on the Priority List, we require the following information:

- A description of the problems and opportunities – including location, timing, root causes, impacted stakeholders and Strategic Fit.
- Qualitative and quantitative evidence describing the impact of the problems and opportunities.
- Monetised value of the problems and opportunities.

We will assess the national significance and priority of the problems and opportunities based on the strength of evidence provided to us.

3.2 Assessment Criteria

To assess problems and opportunities presented in Stage 1 submissions, we consider them against our Assessment Criteria and associated themes. You should consider every theme, and make reference to them in your submission as relevant, **noting that the level of significance will differ and not all themes may be applicable to all proposals**.

The following sections outline how our Assessment Criteria apply to Stage 1.

Note that we consider additional guiding outcomes when assessing program submissions. See the **Guide to program appraisal** for our requirements for program submissions

Strategic Fit

For a Stage 1 assessment, Strategic Fit focuses on whether the proposal identifies problems and opportunities of national significance that constrain the achievement of stated goals.

Table 4: Stage 1 Strategic Fit considerations

Theme	Guiding outcomes
Case for change	• There is sufficient evidence to identify the root causes and effects of the problems and opportunities. • The full extent/scope of the problem, or missed potential of the opportunity if action is not taken, is clearly understood. • There is an understanding of how the cost of the problem or value of the opportunity will change over time, including identifying any critical future 'triggers' (such as full capacity, resource limitations including water shortages, climate change impacts including sea level rise inundation), and timeframes for action/resolution are evident.
Alignment	• The problem is a constraint on the achievement of documented goals, objectives and strategic plans. • The problems and opportunities will not be addressed by other proposals that are planned or underway.
Network and system integration	• There is an understanding of other wider, strategic impacts that the problems and opportunities create. • The problems and opportunities are considered in terms of its interdependencies with other existing/future infrastructure within the network. • For programs, there is clear alignment of individual proposals to solving a broader common problem or addressing a strategic outcome – individual proposals are unlikely to be beneficial unless they are part of the program.
Solution justification	*Not assessed in Stage 1.*
Stakeholder endorsement	• Stakeholders impacted by the problem or who would benefit from realisation of the opportunity have been identified and consulted

Societal Impact

At Stage 1, we require evidence demonstrating the cost of the problems and value of the opportunities, as demonstrated by evidence-based analysis.

This is summarised in **Table 5**, with additional considerations for each theme provided in the subsequent sections.

Table 5: Stage 1 Societal Impact considerations

Theme	Guiding outcomes
Quality of life	• How much and why quality of life is impacted by the problem or improved by the opportunity is understood. • The unique needs of stakeholders/communities within the boundary of the problems and opportunities are considered.
Productivity	• The problem is reducing or slowing growth of productivity by restricting access to services and employment, or there is an unrealised opportunity. • The value of the problems and opportunities is determined using valid, relevant data (such as the Audit or a relevant, recognised methodology or evidence base).
Environment	• Environmental impacts, positive and negative, of resolving the problems or realising the opportunities have been identified. • There are no known or suspected material irreversible environmental impacts of resolving the problems or realising the opportunities.
Sustainability	• The problems and opportunities clearly define both the positive and negative long-term impacts of doing nothing versus taking action.
Resilience	• Short- and long-term shocks and stresses that the problems and opportunities may be vulnerable to and/or aims to address are identified. • The problems and opportunities consider the community's ability to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses. • Where resilience is a driver of the proposal, it is evaluated based on a range of plausible futures of the problems and opportunities, using scenario analysis. The resilience of interdependent systems and the broader community has been considered as part of this evaluation.

Assessing sustainability

Sustainability is a cross-cutting theme that is reflected across a number of themes within our Assessment Criteria. You should consider sustainability throughout your development and analysis, but we also consider sustainability as a specific theme within our Societal Impact criterion to recognise sustainability outcomes and good practice. **Table 6** demonstrates how we consider sustainability outcomes within applicable themes in our assessments.

The key activity when considering sustainability at this stage centres on determining whether sustainability is a core driver in the case for change. Examples of this are climate change and/or population change requiring changes in infrastructure provision. This is a fundamental step in embedding sustainability within your project development as it then flows into **Stage 2** and **Stage 3**. A further example of embedding sustainability into your project development at this stage is provided in **Box 19**.

Table 6: Stage 1 sustainability considerations

Criteria	Theme	Sustainability considerations
Strategic Fit	**Case for change**	The definition of the problems and opportunities and their root cause(s) takes into account longer-term drivers such as climate change and population growth.
	Alignment	The proposal directly contributes to relevant national, state and local government goals, objectives, policies and strategic plans, relating to issues such as emissions reduction and circular economy practices.
	Network and system integration	The proposal improves an infrastructure network or system's viability, for example, in the transition to a low carbon economy.
	Solution justification	The timing of the problems and opportunities has been considered to avoid or minimise any negative social, economic and/or environmental impacts in the future, either on the network/system, or on another part of the network/system.
	Stakeholder endorsement	The proposal has considered engagement in a transparent way, which is inclusive of all communities/cultures and is aligned to relevant policy objectives and commitments.
Societal Impact	**Quality of life**	The proposal considers the needs of sustainable communities through improving or maintaining quality of life, well-being, heritage and culture.
	Productivity	Addressing the problems and opportunities will provide value-for-money returns over the long term, increase productivity and provide sustainable employment opportunities.
	Environment	The proposal minimises any negative impact on the environment, through protecting natural assets, minimising the impacts of materials used and adopting sustainable design practices.
	Sustainability	The proposal identifies problems or opportunities for optimising social, economic, environmental and governance outcomes efficiently and responsibly throughout the asset's life.
Deliverability	**Implementation**	The problems and opportunities can be addressed without compromising other sustainability considerations, such as adversely impacting the environment.
	Capability & capacity	The proposal considers both its short- and long-term employment needs, while also seeking to improve market capacity.

Assessing Resilience

Resilience is a cross-cutting theme that is reflected across a number of themes within our Assessment Criteria. Like sustainability, you should consider resilience throughout your development and analysis, but we also consider resilience as a specific theme within our Societal Impact criterion to recognise resilience outcomes and good practice. **Table 7** demonstrates how we consider resilience outcomes within applicable themes in our assessments.

Where resilience is a driver of the proposal, it may be relevant to apply scenario analysis based on a range of plausible futures to evaluate the value of problems or opportunities. See the **Guide to risk and uncertainty analysis** for guidance on scenario analysis.

Table 7: Stage 2 resilience considerations

Criteria	Theme	Resilience considerations
Strategic Fit	**Case for change**	The proposal defines clear problems and opportunities relating to resilience or identifies resilience considerations for proposals driven by other needs (for example, the management of risks posed by shocks and stresses and the future uncertainty of these).
	Alignment	The proposal demonstrates alignment with and/or directly contributes to relevant national, state and local government goals, objectives, policies and strategic plans relating to resilience, including shock and stresses such as bush fires, coastal inundation and cyber-attack.
	Network integration	The problems and opportunities consider wider system resilience and redundancy, such as its role in emergency response or how it improves network redundancy.
	Stakeholder endorsement	The proposal has considered a diverse set of stakeholders, seeking to understand the broad range of potential current and future challenges being experienced.
Societal Impact	**Quality of life**	The proposal considers the protection of quality of life, well-being, heritage and culture during and after shocks and stresses. Improved quality-of-life outcomes contribute to community resilience.
	Productivity	Addressing the problems and opportunities will improve the ability to absorb and recover from shocks and stresses to ensure there is minimal disruption to productivity dividends.
	Environment	The proposal considers how to absorb and resist shock and stresses to minimise impacts on the broader physical environment.
	Resilience	The proposal has the ability to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses.
Deliverability	**Implementation**	The problems and opportunities can be addressed without compromising the ability of communities to respond to shocks or stresses, such as a transport corridor that may have broader flood immunity benefits.

Box 19: **How we assess sustainability or resilience considerations at Stage 1**

The following examples present different sustainability or resilience problems and opportunities and a high-level overview of the information we would seek to assess them. These examples should help you embed these considerations throughout proposal development.

Sustainability	An **opportunity** may have been identified relating to the energy efficiency of public housing stock. • To assess this sustainability consideration, we would review monetised and qualitative evidence regarding the increased cost associated with maintaining existing energy infrastructure. • We would also assess quantitative evidence demonstrating the environmental impact associated with the resource-intensive existing infrastructure.
Resilience	A **problem** may have been identified relating to extreme heat impacts on regional rail networks increasing both service disruption and maintenance costs. • To assess this resilience consideration, we would review monetised and qualitative evidence regarding the increased frequency and cost of service disruptions and associated maintenance. • We would also assess qualitative evidence covering the expected increase in temperature, including future climate projections.

Deliverability

For a Stage 1 assessment, Deliverability focuses on the delivery risks of responding to the problems and opportunities and whether they are likely to be manageable.

Table 8: Stage 1 Deliverability considerations

Theme	Guiding outcomes
Implementation	• The problems and opportunities are capable of being addressed, through reform, demand management, better use and/or new capital.
Capability & capacity	*Not assessed in Stage 1.*
Governance	*Not assessed in Stage 1.*
Risk	• The risks and uncertainties surrounding the problems and opportunities can be identified (e.g. climate change, cyber security, population change, industry trends and whether they are temporary or permanent). • An assessment has been made whether it is better to adapt or prevent the problems and opportunities.
Lessons learnt	• Past experience has been used to inform future circumstances for defining the problems and opportunities. • For programs, there is a material opportunity to collaborate and share lessons across states and territories to address a common problem or opportunity.

3.3. What makes problems and opportunities nationally significant?

The *Infrastructure Priority List* presents an evidence-based list of nationally significant infrastructure proposals.

Our Act defines nationally significant infrastructure as being:

1. transport infrastructure; and
2. energy infrastructure; and
3. communications infrastructure; and
4. water infrastructure;

in which investment or further investment will **materially improve national productivity.**

We also consider social infrastructure.

Our Statement of Expectations provides further direction, stating that the Priority List should include a future pipeline of projects expected to contribute to national productivity (see **Box 21**) or be otherwise socially beneficial (see **Box 22**). It also states that proposals should be included on the Priority List based on assessed merit.

As a guide, for a proposal to be considered nationally significant, it should concern problems and opportunities that will have more than $30 million per annum impact on the economy (nominal, undiscounted). We also take potential unquantified social benefit considerations into account.

The monetised impact reflects the economic cost of the problems and/or value of the opportunities, not the financial (capital) cost of addressing them. We expect potential impacts cited in submissions to be quantified and supported by evidence, but recognise that some types of social and environmental impacts (such as irreversible environmental damage, loss of cultural heritage, or health and safety impacts) may not be readily quantifiable, particularly during the early stages of project development.

Alongside the impact on the economy, the following characteristics can make a proposal nationally significant:

- The proposal will contribute to the Australian Government fulfilling its declared strategic priorities (for example, Closing the Gap targets).
- The proposal affects or is likely to affect more than one state or territory, such as a network utility operation.
- The proposal relates to an asset or location that is unique and will have a materially positive effect on national identity or cultural standing.
- The proposal relates to an asset that is demonstrated as critically important for access/connectivity, where the only alternatives are prohibitive (for example, water pipeline, freight rail line, road corridor). This would be most relevant for access/connectivity during a critical incident and/or for assets serving remote communities.

For each of these characteristics, a proposal should demonstrate its broad impact on the wider community or infrastructure system. That is, it should not be limited to the local area and instead have wide-reaching influence. National significance does not require the asset to operate nationally, or provide a service that impacts the entirety of Australia. Rather the asset, and its functioning, must be significant from a national perspective.

For Stage 2 and Stage 3 submissions to be considered for the Priority List, we require them to address a problem and/or realise an opportunity that is nationally significant.

If a proposal is not designated as nationally significant, it cannot be included on the Infrastructure Priority List. However, this does not preclude you from seeking or receiving Australian Government funding for that proposal.

Box 20: **Our threshold for national significance**

Our economic productivity threshold for national significance ($30 million per annum impact on the economy) has been in place since 2016. We have retained the economic productivity threshold in this edition of the Assessment Framework, and have supplemented it with other factors that will assist in identifying nationally significant priorities.

We will be considering an increase to the threshold for future updates to the Assessment Framework. This may also consider a separate, higher threshold for programs of work.

Box 21: **What do we mean by productivity?**

The Australian Productivity Commission defines productivity as:

> the efficiency with which the economy as a whole, convert inputs (labour, capital, and raw materials) into outputs. Productivity grows when outputs grows faster than inputs, which makes the existing inputs more productively efficient.[22]

We have identified some common ways in which infrastructure proposals can directly raise productivity:

- Increasing access through capacity enhancements to infrastructure networks (transport, energy, telecommunications, etc.).
- Increasing an infrastructure network's efficiency, reliability and/or resilience to disruption.
- Reducing maintenance costs for an infrastructure network.
- Improving travel times for workers and freight transport.
- Reducing vehicle operating costs for workers and freight transport.
- Providing health benefits from increased use of active transport.

You should demonstrate the net productivity benefits (that is, benefits minus costs) of your proposal via the CBA.

Table 5 explains how we consider productivity as part of our Societal Impact criterion. We assess the productivity benefits of each proposal submitted to us and it informs our decision-making. For further guidance on how you can demonstrate productivity benefits in your submission, see the **Stage 3** volume and our supplementary **Guide to economic appraisal**.

22. Australian Productivity Commission 2015, *What is productivity and how is it measured?*, 20 May 2021, available at: www.pc.gov.au/news-media/pc-news/previous-editions/pc-news-may-2015/productivity-and-how-measured.

Box 22: **What do we mean by socially beneficial?**

There are a number of ways you can demonstrate how your proposal is socially beneficial:

Criteria	Theme	What you need to demonstrate
Strategic Fit There is a strong case for action, the proposal aligns to the achievement of stated goals, and there is a clear fit with the community.	**Alignment**	The proposal directly contributes to relevant national, state and local government goals, objectives and policies relating to social welfare (e.g. Closing The Gap) or there is a Community Service Obligation (see **Glossary**) in place.
	Network integration	The proposal is a key enabler, catalyst or 'first piece' in a transformational program of work.
Societal Impact The social, economic and environmental value of the proposal is clearly demonstrated by evidence-based analysis.	**Quality of life**	There is a clearly defined social (equity) problem or opportunity that requires addressing.
	Sustainability	The proposal will significantly influence the behaviour and sustainability of our communities.
	Resilience	The proposal significantly improves the ability of communities to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses.

Box 23: **Proposals on the 2021 Priority List that include unquantified characteristics**

The following proposals on the Priority List include significant unquantified social benefits:

Australian Institute of Sport revitalisation (ACT) – a unique national facility, the proposal recognises the potential loss of world-class athletes to other countries.

Indigenous art and cultural facilities program (National) – recognises the cultural (as well as economic) benefits for Aboriginal and Torres Strait Islander peoples and the potential to improve national identity.

Northern Territory remote community power generation program (NT) – recognises the value of energy supply sources for remote Northern Territory communities.

Remote housing overcrowding (National) – recognises the opportunity for better health, safety, education and employment outcomes from good-quality housing.

Some impacts of these proposals have been identified qualitatively at Stage 1, but would be quantified in subsequent stages.

3.4 Outputs of our assessments

When we complete our assessment of a submission to the Priority List, we will:

- inform you of our decision on whether we found your proposal to be:
  a. nationally significant
  b. suitable for the Priority List
- add successful proposals to the online version of our Priority List
- publish a summary of our evaluation (Stage 3 submissions only)
- provide you with feedback on our decision.

Positively assessed proposals are summarised on the Priority List. We also publish more detailed evaluation summaries for investment-ready proposals (Stage 3).

See **www.infrastructureaustralia.gov.au/infrastructure-priority-list**.

It is worth noting:

- where submissions are not successful, this does not mean they are not worth pursuing or revising in more detail for a future submission
- where submissions are not listed on the Priority List, this does not preclude them from seeking Australian Government funding
- we will assess all submissions. However, we will not revisit earlier submissions again unless there is new information that has a bearing on the previously assessed stages.

3.5 Removing proposals from the Infrastructure Priority List

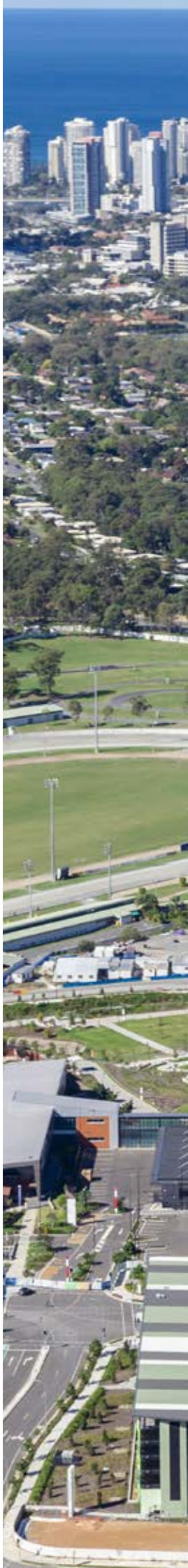
Proposals may be removed from the Priority List for a number of reasons:

1. The proposal receives a commitment of funding for delivery from the Australian Government.
2. The proposal proceeds to construction (major contracts are awarded).
3. The proposal is withdrawn because the problem or opportunity is no longer nationally significant. (Evidence of the change, such as change in forecast demand, is required to support this action).
4. The proposal is withdrawn because it no longer meets our Strategic Fit or Deliverability criteria.

4

Submission Checklist

If you are making a Stage 1 submission to us, you will need to provide documentation supporting the identified problems and opportunities.



Stage 1 Submission Checklist

Table 10 provides our submission checklist, which clearly lists all of the items that are required or recommended in a Stage 1 submission. The editable **Stage 1 Submission Template** that we require to accompany your submission is available at **www.infrastructureaustralia.gov.au/submit-a-proposal**. Any supporting information can be provided in relevant state, territory or agency templates.

We classify submission items as **required**, **recommended** or **good practice**, as described in **Table 9**.

We encourage you to engage with us when developing your Stage 1 submission, ideally after reviewing this guidance and the Stage 1 submission checklist, but prior to formally lodging your submission. We can provide advice and initial review to ensure you are meeting our requirements, which may avoid us seeking clarification or requesting additional work be completed.

Contact us to discuss your proposal before submission and to arrange a secure file transfer facility for your submission. You can contact us via email at **proposals@infrastructureaustralia.gov.au** or call us on **(02) 8114 1900**.

Table 9: Classification of submission checklist requirements

Required	Proponents must provide evidence justifying their analysis of required items.
Recommended	Proponents must consider recommended items and provide supporting evidence justifying if they have not been considered.
Good practice	Proponents should consider these discretionary items as part of good practice, but they may not apply to all proposals.

Table 10: Stage 1 Submission Checklist

Item	Requirement
Proposal information	
Overview of problems and opportunities	Required
Proponent information	Required
Confidentiality requirements	Required
Post completion reviews of similar projects	Good practice
Step 1: Identify problems and opportunities	
Description of the problems and opportunities	Required
Location of the problems and opportunities	Required
Alignment with relevant government policy objectives, strategies and other problems/opportunities/programs	Required
Step 2: Determine the root causes	
Root causes of the problems and opportunities, including time period	Required
Step 3: Quantify the cost of the problems and value of the opportunities, in monetary terms where possible	
Information about the problems and opportunities. For each problem or opportunity, provide for the short, medium and long-term: • name of the problem or opportunity • qualitative description • quantitative evidence • annual monetised value of the problem or opportunity ($m, nominal) • any supporting evidence	Required
Present value of the problems and/or opportunities ($m, real, base year)	Required
Stakeholders impacted and stakeholder engagement activities	Required
Description of assumptions about future trends in drivers	Required
Step 4: Consider Deliverability of the potential responses	
Suitability of known responses	Required
Proposed planning, delivery and operating agencies	Required

Glossary

Term	Definition
Appraisal	The process of determining the impacts and overall merit of a proposal, including gathering and presenting relevant information for consideration by the decision-maker.
Assessment	For the purposes of the **Assessment Framework**, this refers to Infrastructure Australia's evaluation of proposals submitted to us for inclusion on the ***Infrastructure Priority List*** or for a funded proposal review.
Assessment Criteria	The three criteria Infrastructure Australia assesses proposals against: **Strategic Fit, Societal Impact** and **Deliverability**.
Assessment Framework	A publicly available document that details how Infrastructure Australia assesses infrastructure proposals. It provides structure to the identification, analysis, appraisal, and selection of proposals and advises proponents how to progress through the following four stages: • Stage 1: Defining problems and opportunities • Stage 2: Identifying and analysing options • Stage 3: Developing a business case • Stage 4: Post completion review
Australian Infrastructure Audit	Published in August 2019, the Audit was developed by Infrastructure Australia to provide a strategic assessment of Australia's infrastructure needs over the next 15 years. It examined the drivers of future infrastructure demand, particularly population and economic growth. Data from the Audit is used as an evidence base for **assessments** of proposals for inclusion on the ***Infrastructure Priority List***.
Australian Infrastructure Plan	The 2021 Plan was developed by Infrastructure Australia as a positive reform roadmap for Australia. Building off the evidence base of the Audit (see ***Australian Infrastructure Audit***), the Plan sets out solutions to the infrastructure challenges and opportunities Australia faces over the next 15 years, to drive productivity growth, maintain and enhance our standard of living, and ensure our cities remain world class. The 2021 Plan supersedes the February 2016 Plan.
Base case	A project **appraisal** compares the costs and benefits of doing something (a 'project case') with not doing it (the 'base case'). The base case should identify the expected outcomes of a '**do-minimum**' situation, assuming the continued operation of the network or service under good management practices. We recommend the committed and funded expenditure approach to defining the base case, but recognise that some states and territories use the planning reference case approach.
Base year	The year to which all values are discounted when determining a present value. (See **discounting** and **discount rate**).
Benefit–cost ratio (BCR)	This is the ratio of the present value of economic benefits to the present value of economic costs. It is an indicator of the economic merit of a proposal presented at the completion of a cost–benefit analysis. (See **cost–benefit analysis**).
Business case	A document that brings together the results of all the assessments of an infrastructure proposal. It is the formal means of presenting information about a proposal to aid decision-making. It includes all information needed to support a decision to proceed, or not, with the proposal and to secure necessary approvals from the relevant government agency. Unless otherwise defined, we are referring to a final or detailed business case, rather than an early (for example, strategic or preliminary) business case, which is developed in accordance with state or territory requirements. A business case is prepared as part of Stage 3 of the **Assessment Framework**.
Capital cost	The initial fixed costs required to create or upgrade an economic asset and bring it into operation. This includes expenses such as the procurement of land, buildings, construction, labour and equipment.

Term	Definition
Cost–benefit analysis (CBA)	An economic analysis technique for assessing the economic merit of an infrastructure proposal. It involves assessing the benefits, costs, and net benefits to society the proposal would deliver. It aims to attach a monetary value to the benefits and costs wherever possible and provide a summary indication of the net benefit. (See **benefit–cost ratio**).
Delivered proposal (Stage 4)	Once we've assessed the post completion review of a delivered project we will list it on the Infrastructure Priority List as a delivered proposal.
Deliverability	One of three overarching **Assessment Criteria** we use to assess the merit of every proposal, at every stage. This criterion asks: can the proposal be delivered successfully? We assess whether the proposal is capable of being delivered successfully, whether risks have been identified and sufficiently mitigated, and whether there is a plan in place to realise the benefits. This criterion is divided into five themes: ease of implementation, capability and capacity, project governance, risk and lessons learnt.
Demand forecasting	The activity of estimating future demand (such as public transport patronage, vehicle volumes or water usage) in a particular year or over a particular period.
Discount rate	The interest rate at which future dollar values are adjusted to represent their present value (that is, in today's dollars). This adjustment is made to account for the fact that money today is more valuable than money in the future. **Cost–benefit analysis** should use real social discount rates.
Distributional effect	A change (positive or negative) in the economic welfare of a group of individuals or firms caused by a proposal.
Do-minimum	A base case reflecting the continued operation of the network or service under good management practices. It should assume that general operating, routine and periodic maintenance costs will continue to occur, plus a minimum level of capital expenditure to maintain services at their current level (e.g. maintaining access or reliability) without significant deterioration. This may include asset renewals and replacement of life-ending components on a like-for-like basis, as well as committed and funded projects and smaller scale changes required to sustain viable operations under the base case. (See **base case**).
Early-stage proposal (Stage 1)	Stage 1 submissions that are positively assessed by us are listed on the ***Infrastructure Priority List*** as an early-stage proposal.
Impact	A generic term to describe any specific effect of a proposal. Impacts can be positive (a benefit) or negative (a cost).
Impact timeframe	For early-stage proposals (Stage 1), this indicates when the problem or opportunity is likely to have a nationally significant impact.
Indicative delivery timeframe	For investment-ready proposals (Stage 3), this provides the proponent's indication of when the proposal is likely to be delivered and operational.
Infrastructure	Physical assets and facilities that enables organisations to provide goods and services to the community and improves quality of life, efficiency, accessibility and liveability of our cities and regions. This includes, but is not necessarily limited to, transport, energy, telecommunications, water and social (such as health, education, social housing and community facilities) infrastructure.
Infrastructure Australia Act	The *Infrastructure Australia Act 2008* (Cth) is the legislative framework by which we operate and report through our responsible Minister (the Minister for Infrastructure, Transport and Regional Development).
Infrastructure Priority List	The Priority List is a credible pipeline of nationally significant infrastructure proposals that are seeking investment. Every proposal on the Priority List is expected to contribute to national productivity or to be otherwise socially beneficial. It is a statement of where governments, the community and the private sector can best focus their infrastructure efforts.
Investment-ready proposal (Stage 3)	Stage 3 submissions that are positively assessed by us are listed on the ***Infrastructure Priority List*** as investment-ready proposals.

Term	Definition
Monetised	Where a quantified impact has a corresponding dollar value attached to it. (See **impact**).
Nationally significant problem or opportunity	The *Infrastructure Australia Act 2008* (Cth) defines nationally significant infrastructure as including transport, energy, communications, and water infrastructure 'in which investment or further investment will materially improve national productivity'. We also consider social infrastructure, such as health, education, social housing and community facilities. As a guide, for a proposal to be considered nationally significant, it should concern a problem or opportunity that will have more than $30 million per annum impact on the economy (nominal, undiscounted). We also take unquantified social benefit considerations into account.
Net present value (NPV)	The monetary value of benefits minus the monetary value of costs over the appraisal period, with discount rates applied (See **discount rate**).
Network	Infrastructure networks are the physical assets that enable the provision of services such as transport connectivity, power, water and internet.
Non-infrastructure options/ solutions	Proposals that avoid the need for significant expenditure on new or upgraded infrastructure. For example, changes to pricing or reforms to regulations.
Opportunity	An evidence-based reason for action that results from a gap between an actual and a desired outcome. In the context of the Assessment Framework, an opportunity is informed by the ***Australian Infrastructure Audit*** and by our collaboration with proponents to identify jurisdictional and national opportunities.
Option	A possible solution to a problem, including base case options such as 'do nothing' or 'do minimum'. (See **base case**).
Options analysis	The analysis of alternative options for solving an identified problem or realising an identified opportunity. (See **option**).
Pathway	In the context of the Assessment Framework, this refers to the steps we move through in the assessment of an infrastructure proposal.
Place	A geographical area within a clearly defined boundary. A 'place' can be scaled at different levels, for example, a precinct, strategic centre or sub-region.
Place-based	A 'place-based' approach to infrastructure applies a wide lens to consider the total impact and needs of a particular community or place over the longer-term. It adopts an integrated approach to land use and infrastructure planning. It takes a cross-sectoral view of the interrelated infrastructure and amenity needs of a place, and identifies how and when these should be delivered. (See **place**).
Potential investment options (Stage 2)	Stage 2 submissions that are positively assessed by us are listed on the ***Infrastructure Priority List*** as potential investment options.
Price year	The year in which the prevailing prices are used in the analysis for the valuation of impacts.
Problem	An evidence-based reason for action that results from a gap between an actual and a desired outcome. In the context of the Assessment Framework, problems are informed by the ***Australian Infrastructure Audit*** and by our collaboration with proponents to identify jurisdictional problems and national problems.
Productivity	The efficiency with which the economy as a whole convert inputs (labour, capital and raw materials) into outputs. Productivity grows when outputs grow faster than inputs, which makes the existing inputs more productively efficient.
Project	An infrastructure intervention. A project will move through the stages of project initiation, planning, delivery and completion. A suite of related projects to address a common problem or opportunity will create a **program**.

Term	Definition
Program	A proposal involving a package of projects that are clearly interlinked by a common **problem** or **opportunity**. The package presents a robust and holistic approach to prioritise and address the projects, and there is a material opportunity to collaborate and share lessons across states, territories or agencies. The projects can be delivered in a coordinated manner to obtain benefits that may not be achieved by delivering the interventions individually. (See **project**).
Proponent	An organisation or individual who prepares and submits infrastructure proposals to us for assessment. To be a proponent of a business case (a Stage 3 submission), the organisation must be capable of delivering that proposal. (See **business case**).
Proposal	The general term we use for successful submissions to the ***Infrastructure Priority List***, across the key stages of project development, specifically – early-stage (Stage 1), potential investment options (Stage 2) and investment-ready proposals (Stage 3). Proposals that have been delivered would be assessed in Stage 4.
Qualitative	A description of an impact that does not rely on quantitative or monetised information.
Quantitative/quantified	A description of an impact that utilises, presents or references values, numbers or statistics.
Real prices	Prices that have been adjusted to remove the effects of inflation. They must be stated for a specific base year, for example '2016 prices'. (See **base year**).
Resilience	The ability of the community to anticipate, resist, absorb, recover, transform and thrive in response to shocks and stresses to realise positive social, economic and environmental outcomes.
Risk	Events that have probabilities of occurrence that are predictable and outcomes that can be estimated with some confidence.
Root cause	The underlying causes and drivers of a proposal and how they are likely to change over time. (See **proposal**).
Social discount rate	Discount rates translate future costs and benefits to a common time unit, comparing costs and benefits that accrue at different times by expressing them as an equivalent amount in today's dollars. In the economic appraisal, a real discount rate should be used that considers societal resources. (See **appraisal** and **discount rate**).
Social, economic and environmental impact	The positive and negative effects of a proposal, with regards to: • social: quality-of-life effects, such as social exclusion and access to services, employment and safety. • economic: productivity effects, such as productive capacity, economic capability, global competitiveness. • environmental: effects such as greenhouse gas emissions, waste treatment, noise pollution, visual intrusion, heritage impacts.
Socially beneficial	Something is socially beneficial if you can demonstrate an evidence-based improvement that will change the quality of life of Australians. For example, through improved health outcomes, access to services/employment, and improved environmental outcomes.
Societal wellbeing	The welfare of Australian society as a whole. Effects on societal wellbeing, often referred to as impacts, can be positive (a benefit) or negative (a cost), and form the basis for **cost–benefit analysis**.
Societal Impact	One of three overarching **Assessment Criteria** we use to assess the merit of every proposal, at every stage. This criterion asks: what is the value of the proposal to society and the economy? We assess whether the social, economic and environmental value of the proposal, and its contribution to community sustainability and resilience is clearly demonstrated by evidence-based analysis. This criterion is divided into five themes: quality of life, productivity, environment, sustainability and resilience.

Term	Definition
Strategic Fit	One of three overarching **Assessment Criteria** we use to assess the merit of every proposal, at every stage. This criterion asks: is there a clear rationale for the proposal? We assess whether there is a strong case for action, the proposal aligns to the achievement of stated goals and there is a clear fit with the community. This criterion is divided into five themes: case for change, alignment, network and system integration, solution justification and stakeholder endorsement.
Themes	Themes are outcome areas within our Assessment Criteria. Each criterion is divided into five themes. (See **Assessment Criteria, Strategic Fit, Societal Impact** and **Deliverability**).
Sustainability	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Travel time savings	The benefit of less time spent travelling as a result of a project. The number of hours saved is typically modelled for both personal and business travel across a network, then converted to a monetary value for use in **cost–benefit analysis**.
Willingness-to-pay (WTP)	The maximum amount a consumer is willing to pay for a given quantity of a particular good or service (rather than go without it). It is measured as the total area under the demand curve up to the given quantity.

Infrastructure Australia is an independent statutory body that is the key source of research and advice for governments, industry and the community on nationally significant infrastructure needs.

It leads reform on key issues including means of financing, delivering and operating infrastructure and how to better plan and utilise infrastructure networks.

Infrastructure Australia has responsibility to strategically audit Australia's nationally significant infrastructure, and develop 15-year rolling infrastructure plans that specify national and state level priorities.

www.infrastructureaustralia.gov.au