



**Australian Transport Council**

2006

# National Guidelines for Transport System Management in Australia



## 2 Strategic transport planning and development

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# Contents

<b>FOREWORD</b>	<b>7</b>
<b>COMMITTEE MEMBERS FOR 2ND EDITION</b>	<b>8</b>
<b>THE NATIONAL GUIDELINES</b>	<b>9</b>
Introduction	10
Background	10
The Framework	11
Further development	21
<b>PHASE 1: OBJECTIVE SETTING</b>	<b>23</b>
1.1 Societal and whole-of-government objectives	23
1.2 Transport system objectives	26
1.3 National transport objectives in Australia	27
1.4 Linked objectives	27
1.5 Performance indicators and targets	28
<b>PHASE 2: POLICY CHOICES</b>	<b>29</b>
2.1 Government direction setting	29
2.2 Options analysis	31
2.3 Transport system indicators and targets	34
<b>PHASE 3: SYSTEM PLANNING</b>	<b>35</b>
3.1 Overview	35
3.2 Multi-modal network planning	36
3.3 Corridor and area planning	41
3.4 Route and link planning	42
3.5 Network assessments and corridor/area studies	42
<b>PHASE 4: IDENTIFICATION OF INITIATIVES</b>	<b>47</b>
4.1 Sources of proposals	47
4.2 Unsolicited private sector proposals	49
4.3 Initiative specification and inter-relationships	51

<b>PHASE 5: APPRAISAL AND BUSINESS CASE</b>	<b>53</b>
5.1 A three-stage approach to appraisal	54
5.2 Stages in the appraisal process	55
5.3 Appraisal tools and methodologies	56
5.4 Risk analysis	58
5.5 Business Case	58
5.6 Links to financial appraisal	59
<b>PHASE 6: PRIORITISATION AND PROGRAM DEVELOPMENT</b>	<b>61</b>
6.1 Prioritisation	61
6.2 Program development	63
6.3 Considering private sector initiatives	65
6.4 Finalisation of the program	66
<b>PHASE 7: PROGRAM DELIVERY</b>	<b>69</b>
7.1 Major activities	69
7.2 Delivery methods	70
7.3 Private sector participation	71
<b>PHASE 8: PERFORMANCE REVIEW</b>	<b>73</b>
8.1 Post-completion evaluation	73
8.2 Review of transport system performance	74
8.3 Review of the Guidelines	77
<b>APPENDIX A: INTERPRETING THE ELEMENTS OF THE TRANSPORT SYSTEM</b>	<b>79</b>
Non-urban setting	79
Urban setting	81
Regional setting	81
Inter-modal	82
Local setting	82
<b>APPENDIX B: BENEFIT–COST ANALYSIS AND OBJECTIVES</b>	<b>85</b>
Environmental and safety objectives	85
Equity objective	86
<b>APPENDIX C: RANKING BY BENEFIT–COST RATIO</b>	<b>87</b>
Combinations of initiatives	87
Borrowed funds and marginal BCR	88
Incremental BCR and staged initiatives	88
Combining BCR and SMT results	88
BCR hurdle rates	89
<b>APPENDIX D: ABBREVIATIONS</b>	<b>91</b>
<b>APPENDIX E: GLOSSARY</b>	<b>93</b>
<b>APPENDIX F: REFERENCES</b>	<b>97</b>
<b>INDEX</b>	<b>99</b>

## TABLES

Table 1:	Transport System Management Framework	16
Table 1.1:	Examples of linked objectives	28
Table 3.1:	ATC draft performance targets for inter-modal trains	45
Table 4.1:	Illustration of application of approval conditions	51
Table A.1:	Routes in Corridor NS and Corridor EW	83
Table C.1:	Two-tier Strategic Merit Test pass—hurdle rate system	89

## FIGURES

Figure 1:	Transport System Management Framework	12
Figure 2:	Transport system planning levels	14
Figure 3:	Objectives, outcomes, challenges, options, solutions	18
Figure 4:	Affordability trade-off triangle	21
Figure 1.1	Objectives and the Framework	24
Figure 2.1:	Options analysis—a road transport example	33
Figure 3.1:	Flowchart of system planning	37
Figure 4.1:	Possible approval process for private sector applicants	50
Figure 5.1:	Three-stage appraisal process	54
Figure 8.1:	Post-completion evaluation	75
Figure A.1:	Interstate setting	80
Figure A.2:	Urban setting	82
Figure A.3:	Sub-area 1	83

## BOXES

Box 1:	Principles underlying the Guidelines and Framework	13
Box 2:	Transport system elements	15
Box 3:	High-level transport options list	19
Box 1.1:	ATC national transport system vision and objectives	27
Box 2.1:	Options analysis	32
Box 3.1:	Examples of intervention benchmarks	40
Box 6.1:	Principles for considering PFI and PPP proposals	67



# Foreword

This document presents a detailed framework for undertaking strategic transport planning and development under the *National Guidelines for Transport System Management in Australia* (2nd edition) endorsed by the Australian Transport Council (ATC) in November 2006. It is part of a series of five documents that comprise the Guidelines. The other documents cover an introduction, detailed information on the appraisal of initiatives, an analytical approach for urban transport proposals and background material.

I gratefully acknowledge the contributions made by committee members towards this very significant piece of work. All of the members have given generously of their time and competencies, over an extended period of time, to make the Guidelines a comprehensive and user-friendly manual that will assist all jurisdictions in the complex business of transport system planning and management. In particular, I acknowledge the significant contribution of the Chair of the Committee, Dr Anthony Ockwell who directed and managed the project throughout its entire process. A list of members is presented elsewhere in this publication.

The Guidelines support transport decision-making and serve as a national standard for planning and developing transport systems. They are a key component of processes to develop and/or appraise transport proposals that are submitted for government funding. Potential users of the Guidelines include governments, private firms or individuals, industry bodies and consultants.

The Guidelines have been endorsed by all Australian jurisdictions. They were developed collaboratively over several years by representatives from all levels of government in Australia through the Standing Committee on Transport (SCOT), in consultation with SCOT modal groups (Austroads, Australian Passenger Transport Group, SCOT Rail Group). The Guidelines have been endorsed by the ATC and the Council of Australian Governments (COAG).

This is the second edition of the Guidelines. It is an expanded and revised edition that reflects directions from SCOT, ATC and COAG as well as feedback from users. The revision has focused on making the material more cohesive, accessible and user-friendly, while maintaining rigour. These improvements will help to facilitate the widespread adoption of the Guidelines that has been specified by COAG.

The terms assessment, appraisal and evaluation are often used interchangeably in practice to mean the determination of the overall merits and impacts of an initiative. In the Guidelines they are used as follows:

- ▮ **Assessment:** A generic term referring to quantitative and qualitative analysis of data to produce information to aid decision-making.
- ▮ **Appraisal:** The process of determining the impacts and overall merit of a proposed initiative, including the presentation of relevant information for consideration by the decision-maker.
- ▮ **Evaluation:** The specific process of reviewing the outcomes and performance of an initiative after it has been implemented.

The current focus of the Guidelines is land transport—road, rail and inter-modal. There is scope to further broaden the Guidelines to cover other modes and transport issues in the future.

It is envisaged that the experiences of users who apply the Guidelines will continue to provide useful insights into areas requiring further improvement. The Guidelines should therefore be seen as an evolving set of procedures and practices. The agencies involved in the development of the Guidelines welcome feedback that will contribute to the process of revision and improvement.

Michael J Taylor  
Chair  
Standing Committee on Transport  
December 2006

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# The National Guidelines

## At a glance

The *National Guidelines for Transport System Management in Australia* provide a national standard for transport planning and development. They focus on land transport and are applicable to road, rail and inter-modal transport.

The Guidelines include a Transport System Management Framework in which strategic planning guides decisions about individual initiatives and programs. There are eight phases in the Framework:

- 1 setting transport system objectives based on government's high-level objectives
- 2 consideration of high-level policy choices
- 3 system planning (network, corridor, area, route and link planning)
- 4 identification of possible transport initiatives
- 5 appraisal and preparation of a Business Case for each initiative
- 6 prioritisation of initiatives and incorporation into a program
- 7 delivery of initiatives and programs, and
- 8 performance review, including continuous improvement of the Guidelines.

The Framework incorporates a 'top-down', multi-phase, strategic approach to transport system management to achieve desired transport system objectives. This approach is complemented by 'bottom-up' information and feedback, to ensure that strategic thinking is informed by practical, lower-level information.

The intended users of the Guidelines are governments at all levels and any individuals or organisations with proposals requiring government funding. The Guidelines are intended to guide the practices of individual jurisdictions. They were developed collaboratively by all levels of government in Australia.

# Introduction

The *National Guidelines for Transport System Management in Australia* provide a consistent framework, processes, methods and tools to assist and guide transport planning and decision-making across all Australian jurisdictions. The aims of the Guidelines are to:

- › support transport sector decision-making
- › provide an approach, and a national standard, for all strategic planning and appraisal of initiatives in transport<sup>1</sup>
- › guide and complement existing practices
- › promote consistency, objectivity and transparency in the assessment of initiatives within and across modes, undertaken by different jurisdictions and analysts
- › move Australia towards a more holistic, multi-modal approach to transport policy, planning and assessment that compares all feasible solutions and takes full account of social, environmental and economic factors (a ‘triple bottom line’ perspective)<sup>2</sup>, and
- › provide a basis for integrating with, and implementing, related initiatives such as the *National Charter of Integrated Land Use and Transport Planning*.

## Background

Traditional transport system management concentrated on individual modes and physical infrastructure. Most jurisdictions have developed detailed guidelines to appraise proposals for individual modes, mainly involving road projects. There have been few comparable guidelines for multi-modal transport strategic planning, or for appraisal of non-road and non-infrastructure initiatives.

The *National Guidelines for Transport System Management in Australia* go some way towards providing this more comprehensive approach. They provide a Transport System Management Framework (the Framework) incorporating a multi-modal approach that currently covers land transport (road, rail, inter-modal).

### *First edition of the Guidelines*

The impetus for developing the Guidelines came from AusLink, the Australian Government’s new approach for national land transport infrastructure. In May 2003, the Standing Committee on Transport (SCOT) endorsed a project appraisal methodology for AusLink (SCOT 2003). SCOT also endorsed two working groups, which comprised representatives from all three levels of government in Australia:

- › *The Guidelines Assessment Methodology Working Group*, which was to develop a methodology and guidelines relevant to all jurisdictions, and
- › *The Transport Planning Data Working Group*, which was to investigate associated data needs (the subject of a separate report, ATC 2004b).

The first edition of the Guidelines (ATC 2004a) was produced by the Guidelines Assessment Methodology Working Group through a genuine collaborative partnership. It incorporated a generic framework, with an initial focus on non-urban land transport (road, rail, inter-modal). There were three volumes—Framework Overview, Project Appraisal and Foundation Material.

- 1 The term *initiative* is used throughout the Guidelines to mean any action to address a transport challenge. An initiative could consist of an infrastructure or non-infrastructure intervention. The term ‘project’ is often used for such actions but it is limited by a perceived association with infrastructure.
- 2 In line with the current worldwide paradigm shift in transport planning and appraisal.

The Australian Transport Council (ATC) endorsed and published the first edition of the Guidelines in November 2004. It sought implementation by the end of 2007.

### ***Second edition of the Guidelines***

In 2005, ATC established a Guidelines Implementation Committee (GIC) comprised of officials from all levels of government in Australia and from the New Zealand Government. The GIC was to review, update and improve the Guidelines in line with learnings and feedback received during their implementation. ATC also asked the GIC to extend the Guidelines to urban transport.

In February 2006, the Council of Australian Governments (COAG) agreed that transport planning and appraisal processes in Australia should be strengthened and coordinated. It stated that this would be achieved by ‘*adopting ATC-endorsed national guidelines for evaluating new public road and rail infrastructure projects by December 2006*’. COAG also requested regular progress reports from ATC.

The process initiated by ATC has included the preparation of this revised and expanded second edition of the Guidelines. The Guidelines have been restructured to make them more concise, accessible and user-friendly, while maintaining rigour. Other activities of the GIC have included extension of the Guidelines to urban transport, a stocktake of progress on implementation, and development of a communications strategy.

The restructured Guidelines comprise five documents, with each document focusing on the needs of a particular audience. This document (**Strategic Transport Planning and Development**) describes the Framework in detail. The other documents are:

- › **Introduction to the Guidelines and Framework**—a brief overview of the direction and content of the Guidelines and Framework.
- › **Appraisal of Initiatives**—a comprehensive guide to appraisal of transport initiatives.
- › **Urban Transport**—supplementary material on urban transport, covering urban transport modelling and appraisal of public transport initiatives.
- › **Background Material**—detailed supporting material.

It is important to note that these ATC-endorsed Guidelines are generic and applicable to all transport settings across Australia. AusLink is just one of the settings to which the Guidelines can be applied.

## **The Framework**

The Guidelines are based on the Transport System Management Framework (the Framework) shown in Figure 1. The Framework is a decision support system, with a logical, multi-phase approach. It has been developed on the basis of a range of principles (see Box 1) to facilitate the achievement of high-level transport system objectives.

The Framework’s eight phases can be broadly grouped as follows:

- › objectives-led strategic planning—Phases 1 to 3 (objective setting, direction-setting policy choices, system planning)
- › appraisal and program development—Phases 4 to 6 (identification and rigorous appraisal of initiatives, development of business cases, prioritisation of initiatives, program development), and
- › delivery and performance review—Phases 7 and 8 (program and initiative delivery, review of system performance).

Each phase integrates with, and facilitates the implementation of, previous phases.

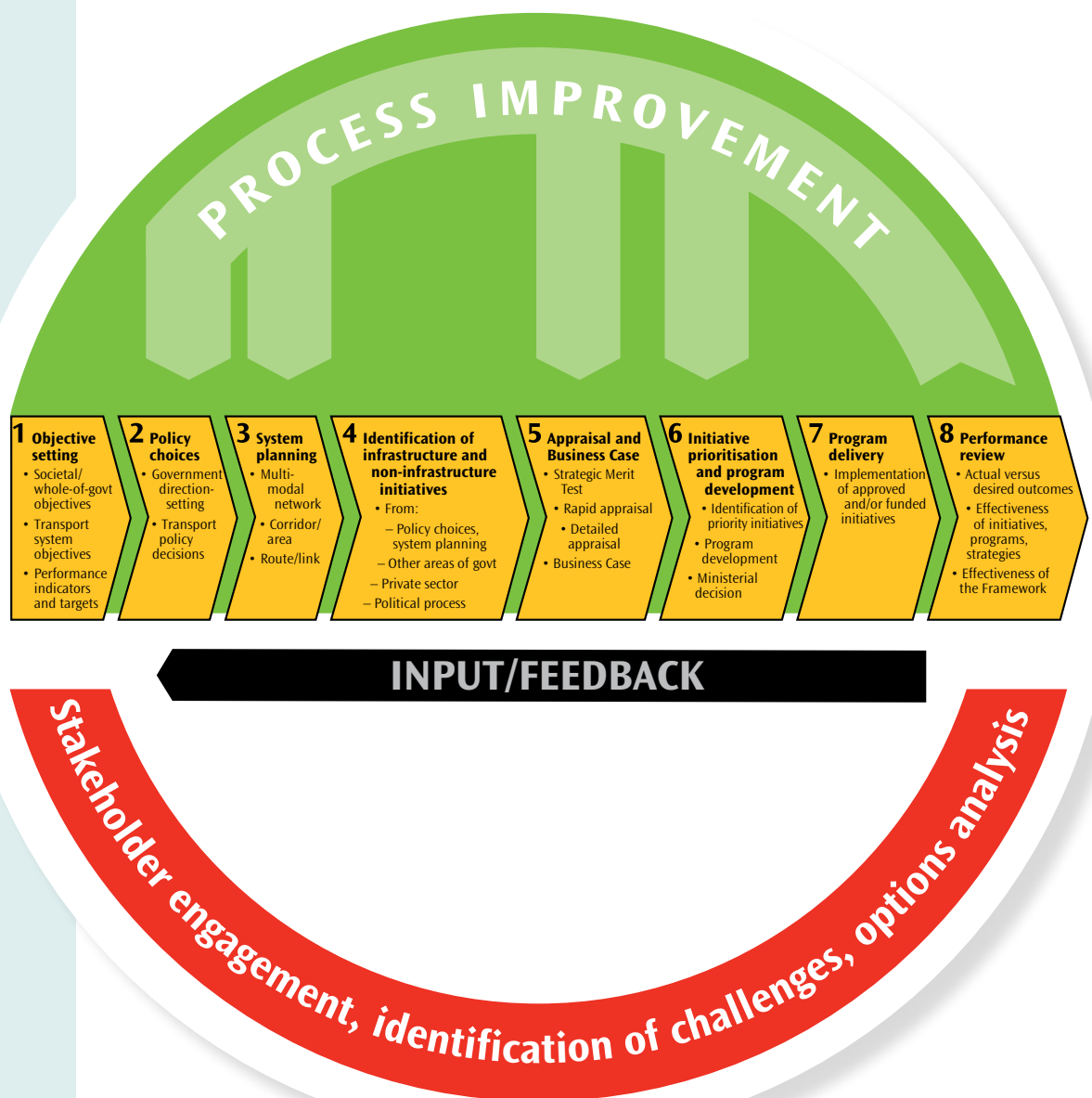
The Framework has a whole-of-system focus, takes a multi-modal perspective and considers both infrastructure and non-infrastructure options. It can be applied to a range of transport settings:

- jurisdictional — federal, state and territory, local government and joint, and
- geographical — urban, non-urban, interstate, intrastate, regional and rural.

The application of the Framework is affected by the complexity of government decision-making, which involves competing objectives, trade-offs, constraints, uncertainty, multiple options and both quantifiable and unquantifiable impacts. Inevitably, a high level of subjectivity and judgment is involved, as in many other decision-making processes.

The Framework recognises these factors and seeks to assist decision-making by reducing complexity and adding consistency, rigour and transparency. It does this by breaking the decision-making process into phases and making good use of data, information and analysis. Importantly, the top-down<sup>3</sup> nature of the Framework facilitates the provision of strategically based advice to decision-makers. The process also includes bottom-up<sup>4</sup> feedback between phases so that top-down and bottom-up approaches are used in a complementary manner.

Figure 1: Transport System Management Framework



3 In Figure 1, top-down is represented by left-right.

4 In Figure 1, bottom-up is represented by right-left.

## Box 1: Principles underlying the Guidelines and Framework

**Multi-modal.** Transport planning and investment decisions should be undertaken from a multi-modal perspective.

**Holistic.** It is important to account for interactions within the transport system and with closely related systems (e.g. land use), bringing together economic, social and environmental considerations.

**Integration.** Processes in the Framework, and actions flowing from it, should account for the need for integration within the transport system and with closely related systems.

**Inter-jurisdictional.** A joint Australian Government, state, territory and local government approach should be adopted to provide advice on key transport challenges that require joint action.

**Objectives-led and responsive.** Actions should be led by high-level jurisdictional objectives and be responsive to government priorities.

**Stakeholder engagement.** Relevant stakeholder engagement and views must play an important role throughout the Framework.

**Data and information.** Advice to decision-makers should be supported by the best available data and information, quantitative and qualitative, objective and subjective.

**Strategic thinking.** Decision-making on individual initiatives benefits from strategic thinking and planning that reflects broader government and community objectives.

**Multiple options.** Transport system challenges should be addressed by giving unbiased consideration to a wide range of potential alternative solutions (infrastructure and non-infrastructure) from the initial stages of planning.

**Affordability.** The strategies and initiatives emanating from the Framework must recognise overall levels of affordability.

**Efficient use of scarce appraisal resources.** Scarce appraisal resources should be used efficiently and effectively.

**Strategic fit.** The initial basis for sorting initiatives should be based on 'strategic merit/fit'.

**Private sector involvement.** Private sector involvement should be encouraged where beneficial.

**Comprehensive yet easy to understand.** Information on the merit of strategies and initiatives should be presented to decision-makers in a way that recognises the full range of impacts, yet should be easily understood and address government objectives and priorities.

**Feedback, learning and continuous improvement.** There must be feedback between phases of the Framework to ensure learning and continuous improvement throughout the process.

In practice, the flow of strategic transport planning and development is not strictly sequential as indicated by Figure 1. Phases overlap, activities in some phases occur more than once, there are direct links between non-sequential phases (e.g. safety objectives and safety programs) and there is no single start or end point.

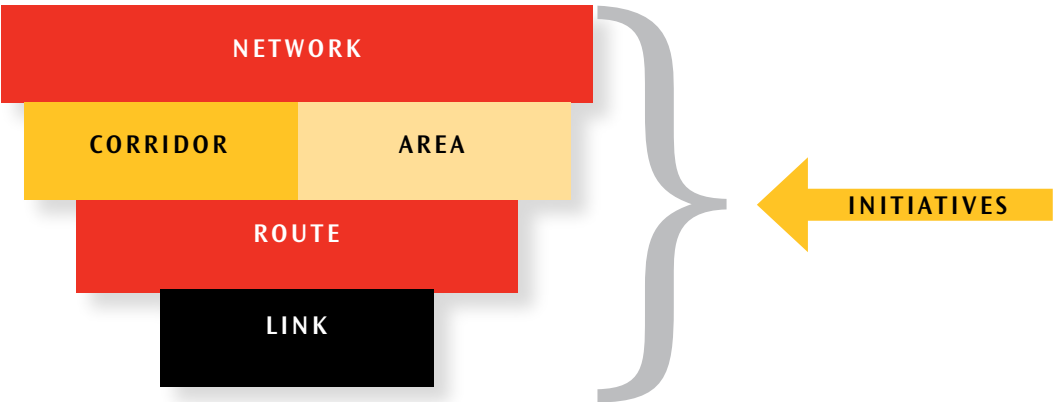
These features do not detract from the usefulness of the Framework. It identifies the key activities that need to be undertaken and demonstrates the key relationships between phases necessary for integrated system management. In the absence of such a structured approach, government decision-making can lack consistency, with misallocation of resources and limited achievement of high-level objectives.

The Framework identifies four levels of planning (see Figure 2) that are based on five transport system elements (see Box 2). Appendix A of this volume provides a detailed interpretation of the transport system elements in various settings (e.g. interstate, intrastate, urban).

The highest level of planning occurs at the network level. In many jurisdictions, network planning has traditionally focused on planning for individual modes. The philosophy behind the Guidelines is that this modal planning should be replaced, or preceded, by multi-modal network planning. The AusLink process provides an example of this preferred approach—it defines a National Land Transport Network and proceeds to plan for that multi-modal network rather than for separate road and rail networks. A multi-modal network planning approach focuses on serving people and freight rather than individual modes.

Table 1 illustrates the inputs, process, analysis and outputs for individual phases of the Framework. The rest of this chapter discusses some of the key features of the Framework. Each subsequent chapter describes one of the phases in detail.

Figure 2: Transport system planning levels



## Box 2: Transport system elements

The Framework incorporates the following definitions of the transport system and its elements (see Glossary for more detailed definitions).

- 1 A *link* is a homogeneous segment of a route. An inter-modal facility, where people or freight are transferred from one mode to another, is also categorised as a link.
- 2 A *route* is a physical pathway connecting two locations for a particular mode. Transport services are operated along these pathways. In land transport, the pathway consists of a continuous length of infrastructure. Shipping lanes and air routes are delineated by operating or regulatory or administrative practices rather than by infrastructure. The route concept is the basis for the definitions of the other elements.
- 3 A *corridor* comprises the parallel/competing modal routes between two locations (e.g. road and rail routes between two capital cities). A corridor is multi-modal where more than one mode operates, and is uni-modal where only a single mode operates (e.g. in many rural areas).
- 4 An *area* consists of a defined geographic space and all the transport routes within it. An area focus, rather than a corridor focus, is often required in urban planning to best account for the highly complex interactions (intersecting routes and dispersed population, activities, trip origins and trip destinations) in urban settings.
- 5 A *network* incorporates all of the routes that provide inter-connected pathways between multiple locations for similar traffics. Networks can be multi-modal or uni-modal. A multi-modal network typically comprises several uni-modal networks. Examples include:
  - › The National Land Transport Network (AusLink, multi-modal). Comprises the national highway network and the interstate mainline rail network, and serves longer-distance traffic of national significance.
  - › The Intrastate Transport Network (multi-modal). Comprises the rural arterial road network and rural intrastate rail network, and serves longer-distance non-urban traffic within a state or territory.
  - › The Urban Transport Network (multi-modal). Includes, for example, the urban arterial road network, public transport network and cycling network. Serves traffic within a city.

Planning at each level considers demand (land use, population, economic and social activities) and supply (infrastructure) factors relevant to the level.

Initiatives can span various levels. For example, an initiative could occur within a link (e.g. adding a road turning bay or rail crossing loop), across the whole link(s) (e.g. a road passing lane) or across an entire route (e.g. road duplication or rail signal upgrading between Melbourne and Sydney).

A transport system for a jurisdiction (or a multi-jurisdictional setting) comprises the relevant transport networks, user sub-system, regulatory and management sub-system, transport operating environment, and physical and social environments.

**Table 1: Transport System Management Framework**

	PHASE	INPUTS	PROCESS/ANALYSIS	OUTPUTS
T R A N S P O R T  S Y S T E M  M A N A G E M E N T  F R A M E W O R K	1. Objective setting	Societal and whole-of-govt objectives. Whole-of-govt strategic plans. Feedback from other phases.	Govt decision-making processes.	Transport system objectives.
	2. Policy choices	Phase 1 outputs. Feedback from other phases.	Options analysis. Policy studies. Demand analysis. Infrastructure studies. Integrated land use/transport planning.	High-level transport policy decisions. Transport system performance indicators and targets.
	3. System planning	Phase 2 outputs. Feedback from other phases.	Options analysis. Network assessments (e.g. deficiency analyses, economic assessments). Literature reviews. Multi-modal corridor/area studies. Demand analysis. Scenario analysis.	Defined multi-modal network. Multi-modal network objectives, performance indicator(s) and target(s). Multi-modal network strategies. Definition of corridors/ areas. Objectives, performance indicator(s) and target(s) for each corridor/area. Multi-modal corridor/area strategies. Definition of routes/links. Route/link objectives, performance indicator(s) and target(s). Route/link plans.
	4. Identification of initiatives	Phase 3 outputs. Feedback from other phases.	Initiatives from top-down strategic planning. Other sources (other agencies, private sector, political direction).	List of identified initiatives.
	5. Appraisal and Business Case	Phase 4 outputs. Feedback from other phases.	Options analysis. Initiative appraisal (Strategic Merit Test, rapid appraisal, detailed appraisal).	Initiative appraisal reports. Business Case for each initiative.
	6. Prioritisation and program development	Phase 5 outputs. Feedback from other phases.	Determination of short-run investment priorities. Prioritisation of initiatives. Approval of program.	Published forward program (3–5 yrs). Firm initiatives (1–2 yrs). Indicative initiatives (3–5 yrs).
	7. Program delivery	Phase 6 outputs. Feedback from other phases.	Detailed initiative planning/design. Budget management. Initiative management. Selection of delivery mechanism.	Delivered initiatives. Actual system performance.
	8. Performance review	Phase 7 outputs.	Post-completion initiative evaluation. Program audit. Outcome performance review (actual performance vs targets). Framework review.	Feedback to improve transport system performance (go back to start of process). Proposed changes to Transport System Management Framework. Lessons for the future.



## ***Objectives, outcomes, challenges, options, solutions***

The Framework directs all actions towards achieving transport system objectives—statements of desired outcomes not yet achieved. The gap between actual and desired outcomes presents a challenge and creates the need for action.

Various terms are used, often interchangeably, when talking about ‘reasons for action’. These terms include problem, issue, deficiency, opportunity and need. The term *challenge* is used in the Guidelines to cover all of these situations.

A key feature of the Framework is that it considers the full range of potential solutions or options (both infrastructure and non-infrastructure) to the challenges at hand. This is a pre-requisite for effective decision-making. Identification and analysis of options, or alternative possible solutions to a challenge, is a fundamental aspect of the Framework. This approach provides the best opportunity to move beyond the narrow focus on infrastructure and single-mode solutions that has prevailed in the past.

Options analysis should be undertaken during several phases of the Framework—developing policy advice, systems planning, and identifying and appraising individual initiatives. This is illustrated in Figure 3, which also shows the relationships between objectives, desired and actual outcomes, challenges and options analysis.

Options analysis is undertaken with different levels of rigour and objectivity depending on the phase of the Framework. In early phases (policy choices, network, corridor and area planning), the assessment should be broad-brush, relying on readily available data and analysis with a high degree of professional judgement and subjectivity. In later phases (route and link planning, initiative identification, initiative appraisal, program development) options analysis should be more rigorous, relying on more detailed data and analysis, with less emphasis on professional judgement and subjectivity.

Options analysis ensures a wide range of potential solutions is considered early in the Framework. If options are identified only in later phases, there is a risk of focusing on a small range of initiatives that may have limited effectiveness, and having to more frequently repeat activities from some earlier phases.

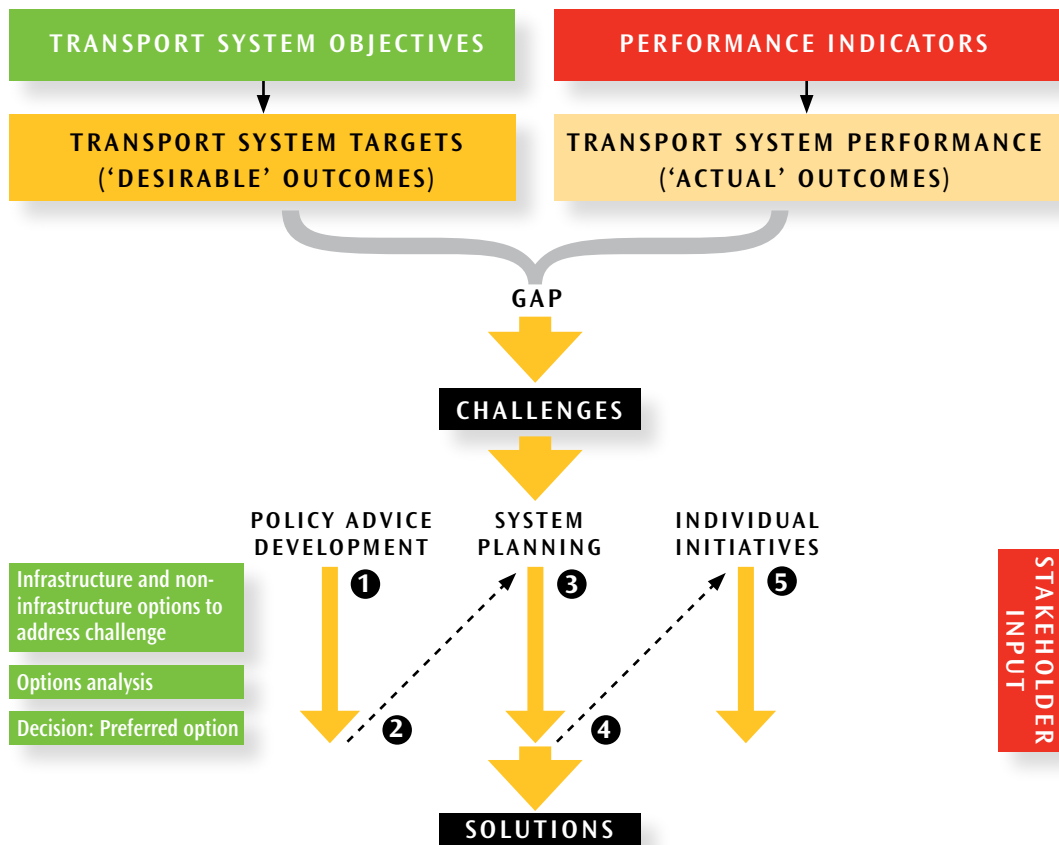
A useful practical tool in options analysis is the *Options List* detailed in Box 3. The Options List provides a list that illustrates the potential high-level alternatives that are available to address transport challenges in pursuit of transport objectives and targets. It encourages consideration of the full range of policy instruments. These policy instruments may be used individually or in combination. Some of them may be outside the direct responsibility of the government or its agencies.

Box 2.1 and Figure 2.1 and Section 2.17 of Volume 5 of the Guidelines discuss options analysis in more detail.

## ***Role of strategic planning***

Objectives-led strategic planning is the focus of Phases 1 to 3 of the Framework. It plays a key role at the start of the Framework process by setting the desired broad direction of the transport system.

Figure 3: Objectives, outcomes, challenges, options, solutions



Strategic planning can be complex and challenging. It balances many competing factors including value judgments, subjective assessments and political considerations that cannot be reduced to quantitative measures. Nevertheless, the process should be well-informed, with feasible outputs based on realistic forecasts. It must incorporate enough in-built flexibility to be responsive to changing futures.

Information for strategic planning comes from a range of sources, including data analysis (context scans, literature reviews, demand studies and forecasting, scenario planning) and stakeholder engagement. Key drivers of strategic planning include:

- › transport infrastructure configuration and condition
- › government and stakeholder expectations
- › existing government policies and legislation
- › policy instruments available to government
- › technological change, and
- › constraints such as availability of funding.

Consultation with other levels of government is important where responsibilities intersect.

### ***Information support for decision-making***

Throughout the Framework, providing all of the necessary information for the various levels of decision-making makes for informed decisions. Information on the merit of strategies and initiatives must be presented to decision-makers in a way that recognises the full range of impacts. It must also be easily understood and address government objectives and priorities.

### Box 3: High-level transport options list

- › **Status quo** do nothing or no action required.
- › **Use existing transport system** in a different way or more efficiently.
- › **Modify or add to existing transport system** with new infrastructure, modified service or regulations.
- › **Alter proposed transport task** in conjunction with another option.
- › **Technological solution.**
- › **Organisational or process change.**
- › **Education and information provision.**

This requires careful consideration of the information available and how it is presented. Summary information that identifies the key impacts and trade-offs involved in a decision should be foremost in the presentation. This, however, does not mean that rigour should be sacrificed—summary information must always be supported by more detailed assessments and documentation. In the Guidelines, there are references to various formats (e.g. the Appraisal Summary Table, see Section 5.3.2) to help guide how to present good summary information to decision-makers.

The Framework incorporates key roles for both quantitative and qualitative information<sup>5</sup>. Where quantitative information is available, it can greatly assist decision-making. On the other hand, important considerations that can only be described in qualitative terms should not be omitted from the decision-making process. For example, the Strategic Merit Test (discussed in Phase 5), which is qualitative, is an important part of assessing whether proposed initiatives align with transport system objectives, policies and strategic plans.

### *Stakeholder engagement*

The Framework recognises that transport system decisions are made within a complex political environment in which the views of a range of stakeholders need to be understood. Stakeholder engagement processes are a key component of all phases of the Framework.

Stakeholder engagement usually includes organisations that represent individuals, businesses and groups affected by a strategy or individual initiatives. It can take many forms—formal or informal, reactive or proactive, top-down or bottom-up. There should also be engagement between the levels of government involved in the decision-making process.

Engagement processes, including their timing, must be carefully planned if successful outcomes are to be achieved. Various engagement approaches are available. The nature and details of the approach in a particular situation will depend on the issue under consideration and the stakeholders.

The views of stakeholders are often based on anecdotal evidence and may be highly subjective. Accordingly, the Framework also emphasises the critical role of structured thinking and analysis, which can help to test conclusions reached by intuition and subjective views alone. Structured thinking and analysis can draw out conclusions from available data, provide projections about the future, test the viability of options and compare alternative options.

Such a process, which combines the views of stakeholders with analysis of experiences elsewhere and of the system in question, can only improve the quality of advice to decision-makers.

5 A further distinction is between monetised and non-monetised information. Some benefits and costs can feasibly and reliably be expressed in monetised terms. Other benefits and costs that can only be expressed in non-monetised terms are equally important in transport planning and development. Monetised and non-monetised information should therefore be presented side-by-side in an unbiased manner. See further discussion in Phases 5 and 6.

## *Role of analysis, data and tools*

In the Framework, the level of assessment becomes progressively more detailed as decisions move from strategic planning to specific initiatives. Strategic planning requires only broad-brush indicative assessment, which is mainly qualitative, whereas final decisions about the exact nature and timing of initiatives require detailed assessment and information.

A major issue is the lack of coherent transport data required to most effectively implement the Framework. In November 2004, ATC separately endorsed the National Transport Data Framework (NTDF) as an approach to address this deficiency (ATC 2004b).

Analytical and decision-support tools play a key role in the Framework. The following is a (non-exhaustive) list of commonly used tools:

- › transport system performance indicators
- › economic analysis—market failure analysis, economic analysis (networks, maintenance and new proposals), benefit–cost analysis (BCA), adjusted benefit–cost analysis, cost-effectiveness analysis
- › multi-objective analysis, multi-criteria analysis, planning balance sheet, goal achievement matrix
- › demand analysis, scenario analysis
- › financial and budget analysis
- › environmental and social impact assessment (monetised and non-monetised)
- › equity and distributional impact assessment, and
- › regional and employment impact assessment.

Different jurisdictions use, and will continue to use, different combinations of these tools. The Framework provides a way in which the various elements can be brought together into a single framework.

## *Time frames*

The Framework incorporates both short-term and long-term perspectives. The time frame shortens as the process moves from Phase 1 through to Phase 8. For example, network, corridor, area, route and link strategies are generally cast in 15–20 year time frames. In contrast, decisions about initiatives and program development and delivery involve a three- to five-year time frame, within which the most practical considerations (one to three years) play a key role.

For maximum effectiveness, the shorter-term considerations should be set in a strategic context. This context consists of both:

- › **longer-term considerations** such as future demographic trends, transport demand, long-term environmental considerations and the reservation of land for future infrastructure expansion, and
- › **shorter-term considerations** such as government priority issues (e.g. safety), usually specified in the policy choices in Phase 2.

## *Affordability*

To be realistic and achievable, the Framework has as a starting point that transport proposals must compete for funding with other sectors. The level of funds for *desired* transport initiatives usually exceeds the funding capacity of government. This introduces a trade-off between funding, achieving performance targets and time, illustrated by the ‘trade-off triangle’ in Figure 4.

Affordability can be incorporated in the strategic planning process by considering expected future funding when setting long-term performance targets. It is reasonable for those targets to be moderately aspirational and to contain an element of ‘stretch’. However, expectations must

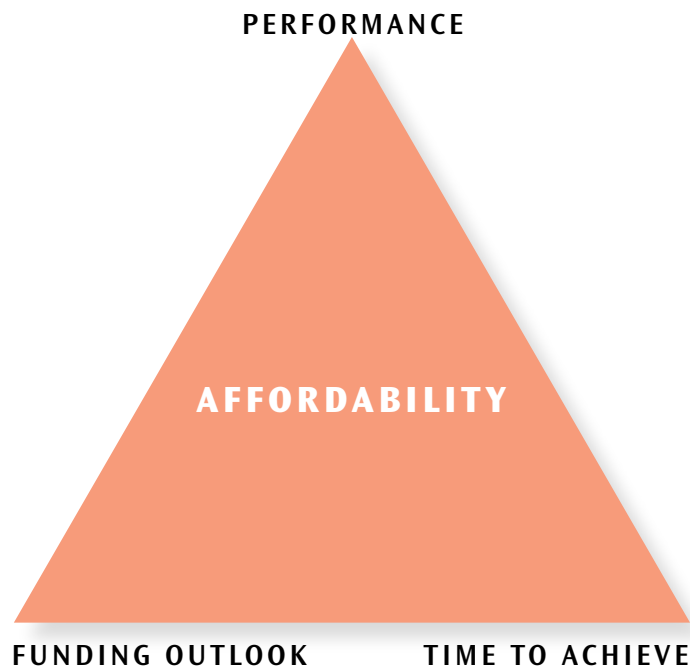
be manageable, with targets grounded in reality, to permit affordable incremental achievement through short-term investment cycles.

During program development and delivery, several options may be considered if available funds fall short of the original expectations. The long-term target may be changed, the time frame for achieving the target may be extended, or the target may be achieved for only a part of the network through prioritisation.

Where targets have been determined from information about stakeholder needs, it may be preferable not to amend the targets in the short term and to adjust the other parameters during program development.

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**Figure 4: Affordability trade-off triangle**



### ***Learning, feedback and continuous improvement***

The Framework incorporates a philosophy of learning from practical application, so feedback loops play a key role in the Framework.

Figure 1 broadly indicates the direction of progress through the Framework and provides a driving mechanism to ensure that decision-makers are provided with strategic advice. Feedback between phases ensures that the top-down approach is informed by good bottom-up information. The learnings from one phase are used to review and improve earlier phases, and to facilitate continuous improvement of outcomes and the Framework.

Bottom-up information can include analysis of data and the views of stakeholders.

## **Further development**

The second edition of the Guidelines represents the state of play at September 2006. The Guidelines are a living document. They will continue to be updated. However, it is proposed that this second edition be revised in three years.



## PHASE

# 1

## Objective setting

### At a glance

Achieving agreed transport system objectives is the driving force of the Framework. These objectives provide high-level statements of what governments are attempting to achieve through transport.

Transport system objectives should reflect, and contribute to achieving, societal and whole-of-government objectives. These broader objectives incorporate economic, social and environmental goals.

Practical examples of transport system objectives include:

- › safer transport to support safer communities
- › efficient and effective transport to support industry competitiveness
- › environmental management to support environmental conservation
- › security of the transport system, including critical infrastructure, and
- › accessibility to promote equity and social cohesion.

The relative importance of individual objectives will vary significantly across the community and, in some cases, between governments.

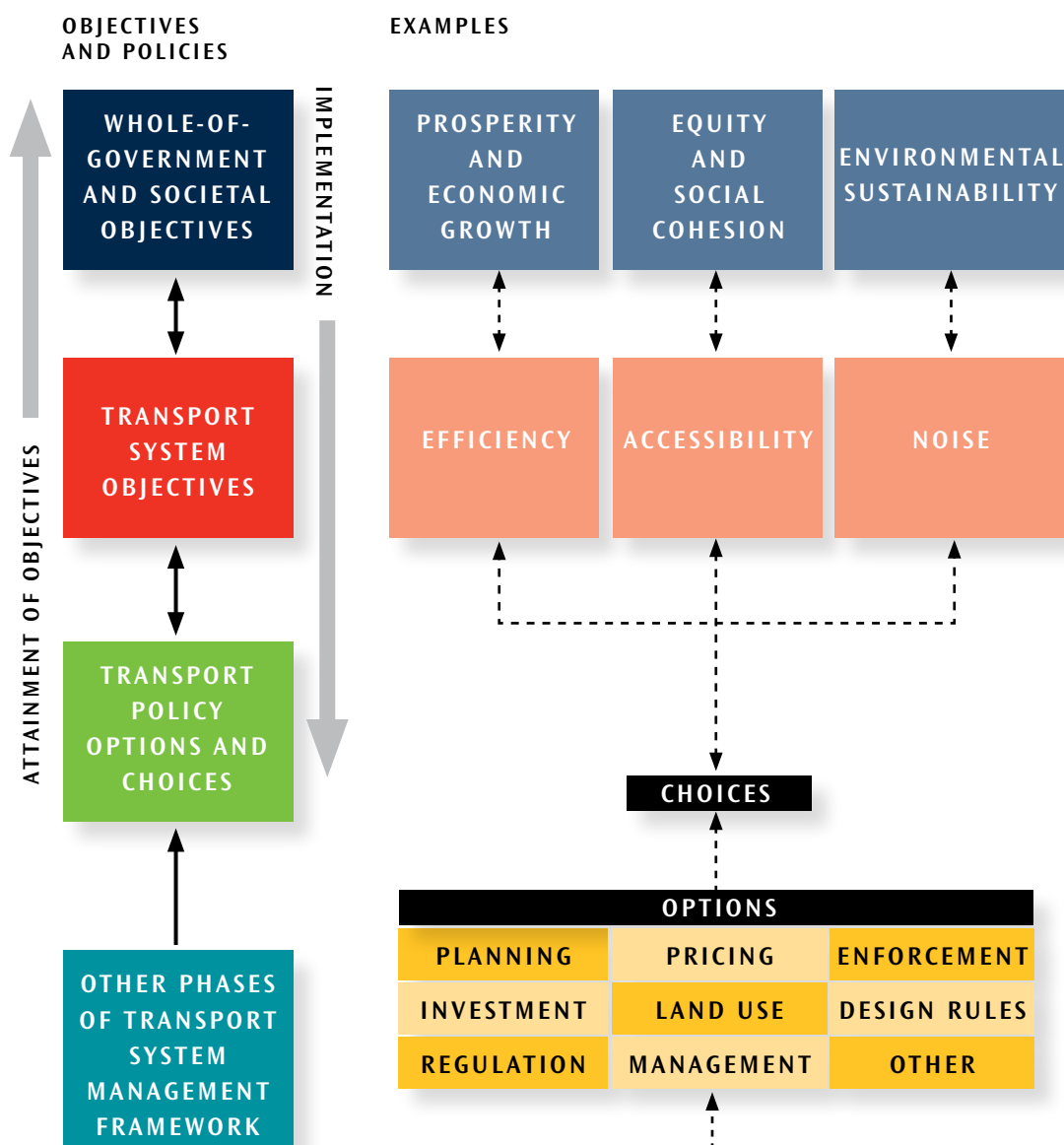
The transport system objectives used for decision-making may represent the position of a particular jurisdiction or be a joint inter-governmental position developed through collaboration. Objectives should be reviewed at appropriate times so that they can reflect changes in community and government priorities.

### 1.1 Societal and whole-of-government objectives

Phase 1 of the Framework involves setting high-level objectives for the transport system. These objectives should reflect, and contribute to achieving, broader societal and whole-of-government objectives.

Figure 1.1 illustrates the links between objective setting (Phase 1) and the conversion of transport system objectives into transport policy choices (Phase 2). Objective setting underpins all subsequent phases of the Framework.

Figure 1.1 Objectives and the Framework



The underlying aim of transport system management is to make the best possible contribution to achieving societal and whole-of-government objectives that reflect community values. Examples of societal objectives include economic prosperity, equity, security and environmental sustainability.

### 1.1.1 Economic objectives

Economic objectives are a key concern for communities and governments. These objectives include:

- » promoting economic development, trade or exports
- » raising levels of income and prosperity
- » increasing economic efficiency, and
- » creating employment.

The focus of economic objectives varies according to the level of government. The Australian Government is particularly concerned with the economy as a whole. This reflects its powers under the Australian Constitution and the national impact of its activities. For example, initiatives that improve general industry competitiveness affect many parts of the community. Similarly, better



export performance provides higher real incomes for many Australians through a stronger exchange rate and lower import prices. In contrast, state, territory and local governments typically focus on economic objectives below the national level (e.g. industry development within a state or specific region).

Economic objectives are important to the community because they directly relate to living standards and the ability to meet other societal goals. For example, income levels are correlated with many of the factors that determine quality of life. Societies with better economic performance are also typically more able to divert resources to achieve environmental and social goals.

### **1.1.2 Social objectives**

Social objectives are also important to communities and governments. These objectives include a wide range of the prerequisites for a stable, positive and progressive society including:

- » fair distribution of income
- » adequate access to services (e.g. health and education)
- » good levels of social interaction and support
- » social cohesion, and
- » equity between geographic areas (e.g. in access to services).

### **1.1.3 Environmental objectives**

Environmental objectives have become increasingly important to communities and governments. Examples of these objectives include:

- » the desire to live in clean, healthy, stress-free surroundings
- » concerns about the well-being of future generations (e.g. sustainability and intergenerational equity)
- » protection of sites with heritage, indigenous and cultural values
- » recognition of the intrinsic value of the natural environment, and
- » liveability of urban centres.

### **1.1.4 Triple bottom line**

The 'triple bottom line' concept is increasingly used as a framework for measuring and reporting corporate performance to reflect a broad range of community values. It originated in the private sector where, in addition to the financial performance of the firm, social and environmental indicators are often reported.

More recently, governments and government agencies have also adopted the triple bottom line concept, replacing 'financial' aspects with broader 'economic' aspects. They have employed the triple bottom line as a topmost statement of objectives. The Framework also adopts a triple bottom line approach (economic, social and environmental objectives).

### **1.1.5 Objectives and outcomes**

Objectives are closely related to outcomes and are often the flip-side of the same coin. They are statements of desirable outcomes that have not yet been achieved. For example, the level of greenhouse gas emissions is an outcome and reducing greenhouse gas emissions is the corresponding objective. Similarly, the number of road injuries or fatalities is an outcome and a reduction in road injuries or fatalities is the desired objective.

## 1.2 Transport system objectives

Achieving agreed transport system objectives is the driving force for the Framework. These objectives provide a high-level statement of what government is attempting to achieve through transport.

The transport system has a major impact on the extent to which many societal and whole-of-government objectives are achieved. For example, transport can facilitate economic activity, social interaction and access to community services. However, some transport impacts (e.g. noise, pollution) can create challenges, or impediments, to achieving societal and whole-of-government objectives.

Transport's contribution to government and societal objectives is maximised if transport system management is driven by objectives that are closely related to societal and whole-of-government objectives. This approach is adopted in the Framework.

For a private firm, maximising shareholder value (through a focus on profit) is the key overall objective. Managing a transport system is more complex as it involves multiple objectives that are often interrelated, but also competing. Transport system management also has to consider a particularly wide range of stakeholders.

Transport system objectives can either represent the position of a specific jurisdiction (i.e. a particular government) or be a joint, inter-governmental position developed through collaboration (e.g. through ATC).

### 1.2.1 *Examples of transport system objectives*

Economic aspects of transport system objectives include vehicle operating costs, travel time and service quality (e.g. comfort, reliability and safety). Environmental objectives include limiting air pollution (particulates), atmospheric impacts (e.g. greenhouse gases), noise, visual disamenity, barrier effects and damage to the natural environment (e.g. impact on water management). Social objectives include accessibility, particularly for remote and rural areas. Safety is both an economic objective, due to the high cost of crashes, and a social objective, because of the devastating effects on individuals. Security is also an economic and social objective.

Practical examples of transport system objectives include:

- ▮ safer transport to support safer communities
- ▮ efficient and effective transport to support industry competitiveness and export growth
- ▮ environmental management to support environmental conservation
- ▮ security of the transport system, including critical infrastructure, and
- ▮ minimum whole-of-life costs and maximum whole-of-life performance of assets.

### 1.2.2 *Scope and relative importance of objectives*

After transport system objectives have been identified, decision-makers can consider the relative importance of each objective. This helps to facilitate decision-making when there are trade-offs between objectives (e.g. efficiency and equity). Trade-offs are common in transport decisions.

The relative importance of individual transport objectives will vary significantly across the community and, in some cases, between governments. Considerations such as mobility, travel time and vehicle operating costs are obviously important to transport users. However, some stakeholders may emphasise environmental factors (e.g. vehicle emissions, noise) or equity issues (e.g. adequate access by remote communities to essential goods and services).

In terms of land transport, the Australian Government focuses on increasing the efficiency of freight and business passenger travel to promote Australia's international competitiveness. It places a high priority on access to centres of industry, terminals, ports and airports.

State, territory and local governments share many of the priorities of the Australian Government, but also place a high priority on the full range of passenger transport services. They typically focus on transport objectives below the national level (e.g. public transport in a particular city, state or territory).

## 1.3 National transport objectives in Australia

At a national level, transport system objectives have been identified by the Australian Transport Council (ATC). ATC provides a forum for Commonwealth, State, Territory and New Zealand Ministers to consult and provide advice to governments on the coordination and integration of all transport policy issues.

The national vision and transport system objectives adopted by the ATC are presented in Box 1.1 (ATC 2005). Community values and industry aspirations will change over time. However, high-level objectives such as those shown in Box 1.1 are likely to remain relevant and provide sound direction for a significant period.

## 1.4 Linked objectives

Lower-level objectives are developed as the process of transport system management moves down the Framework. Achieving transport system objectives must remain the driving force for decision-makers throughout the process.

The Framework provides a consistent focus by integrating and linking objectives as shown in Table 1.1. There is a close connection with the four planning levels shown in Figure 2. Objectives at one level inform and guide the specification of objectives at the next level; high-level transport system objectives are reflected in more detailed objectives at subsequent levels, right down to the 'link' level.

### Box 1.1: ATC national transport system vision and objectives

#### VISION

- › To maximise the contribution of effective transport to Australia's productivity, quality of life and equity.
- › In pursuing this vision, ATC recognises that transport is 'seamless', both between modes and between domestic and international transport.

#### OBJECTIVES

- › To make this vision a reality, ATC will be seeking to achieve a transport system that is efficient, safe, sustainable, accessible and competitive.

Objectives for individual initiatives are shown separately in Table 1.1 as initiatives can span various levels (see discussion in Box 2). Table 1.1 includes several examples of 'initiative objectives' to illustrate this point.

This approach enables planning practitioners to use direction, knowledge and priorities from other levels of planning to inform decision-making in each situation. Specific, localised planning then contributes to achieving higher-order planning and priorities (Queensland Government 2003). With this approach, decisions are more likely to be integrated and consistent.

Individual initiatives can contribute to the achievement of multiple higher-level objectives and outcomes if the initiatives are complementary and mutually reinforcing. For example, road pricing can impact positively on transport efficiency, the environment and safety.

Moving down the levels of planning, lower levels explain in progressively more detail and practicality 'how' the transport system objectives will be delivered. Moving up the levels, higher levels provide progressively broader reasons 'why' specific actions are undertaken.

The linked objectives also provide an effective mechanism for reviewing the success of the Framework and its components (see discussion of Phase 8).

**Table 1.1: Examples of linked objectives**

OBJECTIVE LEVEL	SAFETY EXAMPLES
Societal/whole-of-government	Public safety
Transport system	Improve safety in the transport system in State X
Network	Reduce fatalities on the transport network in City Y
Corridor/area	Reduce fatality rate in Corridor Z
Route	Reduce fatality rate on Road A in Corridor Z
Link	Reduce fatality rate on narrow 1.3-kilometre section of Road A immediately north of Tidy Town
Initiative	Introduce network-wide random drug testing Upgrade rest areas along Road A Improve intersection of Road A and Road B

## 1.5 Performance indicators and targets

The Framework incorporates a series of performance indicators and targets that are mechanisms to operationalise objectives. A performance indicator is a measure that enables monitoring of performance in terms of progress towards a specific, defined objective. A performance target is the desired level of performance for a specific, defined performance indicator and hence an objective. A target may include a time frame for achievement.

Performance indicators and targets should:

- › preferably be expressed in quantitative terms
- › cover attributes that are important to transport users (e.g. travel time, safety) and that reflect a broader stakeholder perspective (e.g. noise, pollution)
- › not be biased towards a particular transport mode or towards infrastructure (e.g. road upgrade) rather than non-infrastructure (e.g. land use) solutions, and
- › preferably be based on analysis to ensure that the targets are realistic.

Each objective should have a specified performance indicator and target. For example, the consideration of safety during corridor planning might comprise:

- › *objective*—improved transport safety within the corridor
- › *performance indicator*—number of fatalities within the corridor, and
- › *performance target*—10 per cent fall in fatalities within the corridor by 2010.

Other examples of targets include annual levels of fatal and serious injuries to be reduced by 30 per cent by 2015, rural travel times not to increase until 2010, and no more than 10 per cent variability in freight travel time along major routes.

Performance indicators and targets can play a useful role at any of the levels shown in Table 1.1.

## PHASE

# 2

## Policy choices

### At a glance

Pursuing the transport system objectives identified in Phase 1 begins with governments making high-level transport policy choices in Phase 2. Examples of these choices include:

- › relative roles of specific modes (e.g. road and rail)
- › emphasis on infrastructure versus non- infrastructure solutions
- › roles of the public and private sectors
- › specification of jurisdictional accountabilities, and
- › system performance targets.

Policy choices made in Phase 2 provide guidance for subsequent decisions in the Framework, to achieve transport system objectives.

Policy choices are usually complex and involve a range of trade-offs. A critical trade-off is between economic efficiency and equity (e.g. decisions about the allocation of funds between regions). Efficiency and equity considerations should be addressed in the Business Case for each proposed initiative.

Options analysis plays a key role in policy choices and in later phases of the Framework. It includes the consideration of both infrastructure and non-infrastructure approaches to address individual transport challenges.

## 2.1 Government direction setting

The Framework provides a systematic process for achieving the transport system objectives identified in Phase 1. Phase 2 requires policy choices to be made by government. The identification of policy choices should also be informed by the outcomes of other phases (especially Phase 3) in earlier applications of the Framework.

### 2.1.1 *What are transport policy choices?*

Transport policy choices are direction-setting decisions that, in turn, provide guidance for decisions in subsequent phases of the Framework. They are the means by which government specifies the general direction of transport system management to best achieve the objectives set in Phase 1.

There is an important distinction between transport policy choices and other decisions made later in the transport system management process. Transport policy choices are made by governments, typically cover high-level strategic issues, and provide direction for subsequent decisions by government agencies and other parties. They are foundational rather than operational decisions, which are made in later phases.

Key strategic transport policy choices include:

- the relative importance of different transport system objectives such as equity, economic efficiency, safety, regional development and environmental management
- identification of transport system performance indicators and targets
- specification of the responsibilities of individual jurisdictions
- the degree to which objectives should be pursued through land use initiatives (e.g. local government planning) rather than transport initiatives
- the relative roles of different modes in achieving transport system objectives (e.g. preference for greater use of public transport in urban areas and an increased share of freight traffic for rail transport)
- the relative roles of transport infrastructure (e.g. new motorways, road widening) and non-infrastructure solutions (e.g. pricing, regulation, education, travel behaviour change, access management)
- the relative importance of strategies to make the best use of existing infrastructure (e.g. traffic management) and building new infrastructure
- the level of priority for initiatives in particular locations (e.g. urban areas, regional centres, small towns, remote communities)
- the extent to which priority is given to specific types of initiatives (e.g. rest areas, stations, noise barriers, signalling improvements, town by-passes, flood mitigation)
- the relative emphasis on maintenance and rehabilitation compared to new capital works
- total funding for transport and aspects of its allocation (e.g. pools of funds by purpose, category or program, priority funding for particular locations or outcomes, minimum funding for specific issues or types of initiatives)
- the roles of the public and private sectors (e.g. in the finance, design, construction, ownership and operation of motorways), and
- positions on partnering arrangements (e.g. ATC processes, alliances, public private partnerships) between different levels of government and between government and the private sector.

These high-level strategic policy choices are made at senior levels of government. They involve the minister(s) with responsibility for transport, but typically include other ministers and cabinet.

Policy choices are usually guided by the outcomes of policy analysis and by stakeholder views on the policy options being considered. Stakeholder engagement can simply involve consultation with stakeholders by the relevant minister or agency, but can also incorporate formal engagement processes.

The extent of stakeholder engagement will vary between stakeholders, and be affected by the circumstances of each policy issue. It is important to identify the appropriate mode of engagement and to understand the views of a range of stakeholders. At the same time, there is a risk that exposing underdeveloped policy positions to a broader audience will merely raise expectations rather than facilitate agreement on particular positions.

### **2.1.2 Communication and implementation**

Transport policy choices are made in a complex, dynamic political environment, and may be revised at government's discretion or through parliamentary processes. In some situations, this

may lead to a requirement for changes in subsequent phases of the Framework. However, it will be more difficult (and typically more expensive) to respond to policy changes at later stages of the transport system management process.

As policy choices play a central role in the Framework and are likely to change over time, they must be communicated effectively to transport agencies and other stakeholders. The key means of communication include:

- long-term strategy documents embracing many aspects of the transport system (e.g. multi-modal infrastructure provision and land use)
- strategic statements for individual modes, and
- policy statements on specific issues (e.g. safety, pricing, environmental management).

These documents and statements may form part of parliamentary legislation, be formally released at special events or be publicised through the media.

Also, transport agencies often develop supporting lower-level operational policies such as requirements to use best-practice approaches or to adopt specific processes during the pre-construction phases of initiatives. These supporting policies should be re-assessed frequently to ensure that they remain relevant and consistent with government's high-level strategic transport policies and priorities.

### **2.1.3 *Efficiency and equity impacts***

Policy choices are usually complex and involve a range of trade-offs. A critical trade-off is between efficiency gains and equity impacts.

In most policy contexts, equity issues involve variations across the community in terms of income, wealth and access to services. For transport planning, the focus is more on stakeholder expectations about accessibility and social cohesion as well as the allocation of funds between regions with different population densities.

Economic efficiency gains from transport initiatives (particularly infrastructure investment) are strongly dependent on the level of usage. If funds were allocated purely on the basis of economic efficiency (i.e. based on benefit–cost ratios only), the proportion of funds going to relatively less-populated areas (and the resulting service levels) would be too low to gain widespread community support.

In the Framework, equity considerations can be incorporated in policy decisions through various means. Options include specifying infrastructure standards, specifying funding shares, using weightings and using a combined approach. These options are discussed further in Volume 5 of the Guidelines.

A balance usually needs to be struck between economic efficiency and equity impacts, and the choice is inevitably subjective. The efficiency and equity effects of each initiative should be identified in a comprehensive Business Case (see Phase 5 discussion). Final decisions are made by the appropriate minister, taking into account all relevant factors.

## **2.2 Options analysis**

Some of the policy choices identified in Section 2.1.1 involve the consideration of multiple options. This highlights the importance of options thinking or analysis to address transport challenges. Options analysis plays a key role in several phases of the Framework—policy choices (Phase 2), system planning (Phase 3) and appraisal of initiatives (Phase 5).

Box 2.1 and Figure 2.1 provide a practical example of options analysis in terms of policy choices for dealing with a high-level road transport challenge. The example highlights the importance of considering the full range of modal options as well as infrastructure and non-infrastructure alternatives.

Some jurisdictions may choose to specifically focus on non-infrastructure policy and planning in its own right. This could be justified on the grounds of trying to achieve a better balance in transport planning, given that infrastructure investment has traditionally received higher priority in the planning process.

However, any specific non-infrastructure planning should follow, and be guided by, broader options analysis where both infrastructure and non-infrastructure options are considered side-by-side on an equal basis. The left-hand side of Figure 2.1 illustrates some of the considerations that could be addressed in non-infrastructure planning.

### Box 2.1: Options analysis

There is usually more than one way of dealing with a transport challenge. For example, it may be appropriate to use both infrastructure and non-infrastructure measures and a multi-modal approach rather than a single modal solution. Usually, the options are not mutually exclusive and work best in concert.

Various demand management measures are available to make the best use of existing infrastructure and minimise the need for infrastructure expansion. Demand management measures include:

- *Integrating land use planning with transport planning.* This approach can be effective in locating transport-generating land use activities (e.g. major residential and industrial developments) near existing infrastructure that has spare traffic capacity. Land use planning is also critical for protecting new transport routes from urban encroachment.
- *Education programs.* For example, 'Travel Smart' initiatives encourage commuters to think about their travel patterns and use public transport as an alternative to car travel. Education is also effective in influencing cultural values towards making transport choices that promote 'sustainable transport'.
- *Regulatory and policy measures.* These measures can either prohibit certain transport actions or act as an incentive for transport users to make decisions that achieve desired transport outcomes. They could encompass, for example, fees for infrastructure use, speed limits, and acceptable routes and vehicle types. Regulatory and policy measures could also involve subsidies to encourage transport on particular modes.
- *Technology measures.* These measures (e.g. Intelligent Transport Systems) could include variable message signs and traffic signal synchronisation for road or communications and control technology for rail (e.g. ARTC's new Advanced Train Management System).

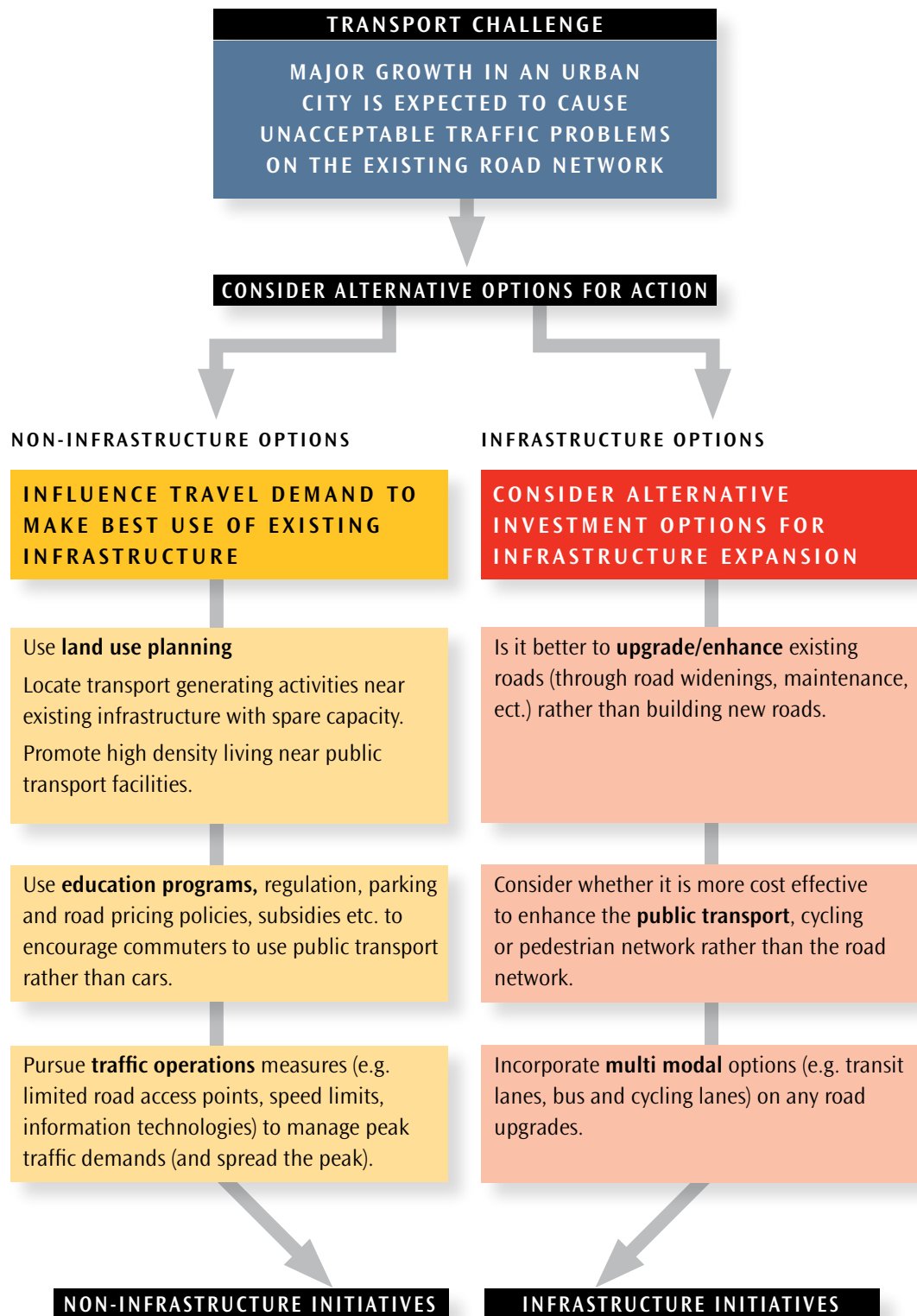
When the solution to a transport challenge requires infrastructure expansion, various options may be considered including:

- mitigating traffic demands on a particular mode (e.g. a road) by investing in capacity in alternative modal networks (e.g. public transport or cycling).
- expanding existing infrastructure rather than building infrastructure on new routes, an option which can be particularly effective in built-up urban areas where land for new transport routes is limited.

Figure 2.1 provides a diagrammatic example of different options that could be considered in dealing with a high-level road transport challenge.



Figure 2.1: Options analysis—a road transport example



## 2.3 Transport system indicators and targets

A key policy choice for governments is setting transport system performance targets that are linked to the transport system objectives defined in Phase 1.

Transport system performance indicators and targets should be based on the principles outlined in Section 1.5. Targets should be consistent with other policy choices made in Phase 2 and be affordable and achievable from a total system perspective.

Examples of long-term multi-modal transport system performance targets include:

- › annual level of fatal and serious injuries to decline by 30 per cent by 2015
- › rural travel times not to increase until 2010, and
- › emissions from transport vehicles not to increase until at least 2015.

It may also be desirable to specify performance targets for shorter periods—e.g. a five-year period covered by forward investment programs.

Transport system performance targets provide guidance for developing multi-modal network, corridor and area strategies, and route and link plans on a consistent basis. This top-down perspective increases the likelihood that the performance of individual modes, networks, corridors, areas, routes and links will support the achievement of transport system objectives.

## PHASE

# 3

## System planning

### At a glance

System planning involves developing affordable network, corridor and area strategies, followed by route and link plans. These strategies and plans build on the policy choices made in Phase 2 to provide a big-picture, top-down view that guides identification of initiatives (Phase 4) and development of an integrated program (Phase 6).

The network strategy is shaped within the context of budget constraints, multi-modal options, and infrastructure and non-infrastructure solutions. Over time, it facilitates consistency of approach across the corridors or areas and transport modes that comprise the network.

System planning is undertaken through a combination of studies and stakeholder engagement. Data collection and analysis provide essential input into strategy development. Network, corridor and area assessments generate key information on factors such as land use and economic activity. These factors in turn drive transport demand, traffic composition, demand forecasts and the condition of the existing system.

Consultation with stakeholders and between different levels of government is also fundamental to system planning.

### 3.1 Overview

The first three phases of the Framework are components of objectives-led strategic planning. System planning (Phase 3), which is the last phase in the strategic planning process, can be considered in terms of two sets of activities—network, corridor and area planning (the main focus of this chapter) and route and link planning.

In Phase 2, various direction-setting policy choices are made. In Phase 3, planning at several levels builds on these policy choices through processes to develop multi-modal network, corridor and area strategies plus route and link plans. These strategies and plans provide a big-picture, top-down view to guide the identification of initiatives (Phase 4) and the development of an integrated program of individual initiatives (Phase 6).

Network planning can precede corridor and area planning. An alternative approach is to start with corridor and area planning, then base network planning on the collective results of this planning

plus the outcomes of any quantitative network assessments (see Section 3.5 below). With each approach, network planning and corridor and area planning must be closely linked through an integrated and iterative process. The results at one level of planning will be adjusted over time to reflect developments in, and feedback from, the other levels of planning.

A similar iterative process is required between corridor and area planning and route and link planning.

During system planning, there must be a consistent focus on examining alternative options. The broad options include transport and non-transport alternatives, multi-modal solutions, and infrastructure and non-infrastructure approaches. As noted in Section 2.2, there may be a specific role for non-infrastructure planning.

## 3.2 Multi-modal network planning

A network incorporates all routes that provide inter-connected pathways between multiple locations for similar traffics. Networks can be multi-modal or uni-modal—a multi-modal network typically comprises several uni-modal networks (see examples in Box 2).

Network planning in many jurisdictions has traditionally focused on planning for individual modes. The philosophy underlying the Guidelines is that this modal planning should be replaced, or preceded, by multi-modal network planning. If modal network strategies are developed, they should be inferred from, and guided by, multi-modal network strategies (and preferably by multi-modal corridor and area strategies).

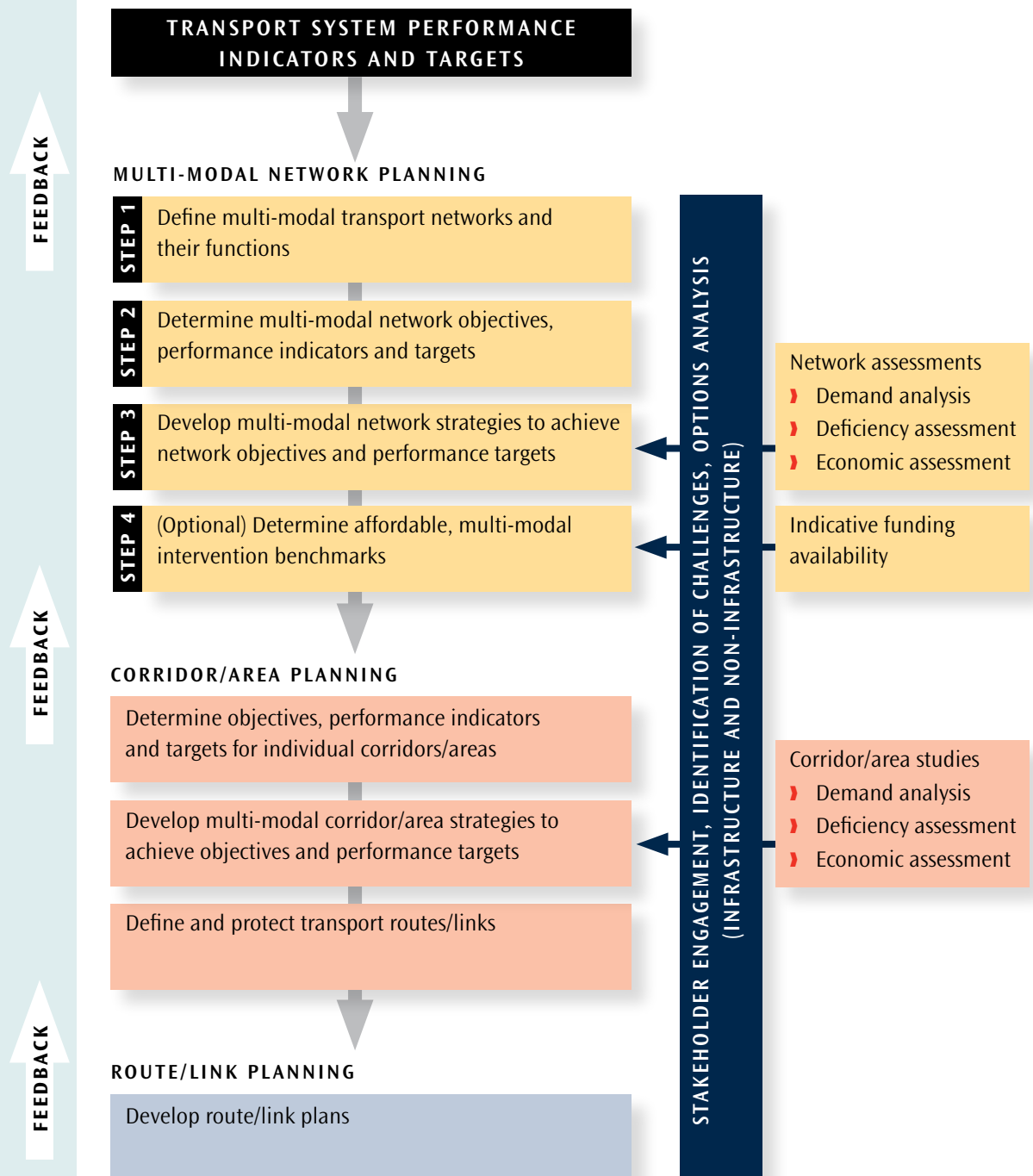
Network planning involves developing a vision of how the transport network should be performing in the future (e.g. up to 15–20 years ahead). The vision must be consistent with the transport system objectives (determined in Phase 1) and with the transport system performance targets and other policy choices (determined in Phase 2). The vision should be embodied in a multi-modal network strategy document.

The multi-modal network strategy must be affordable within current and expected funding. Explicit consideration of affordability should help to manage stakeholder expectations and ensure consistency in the treatment of corridors and areas in subsequent planning and program development (Phase 6).

### 3.2.1 Steps in multi-modal network planning

Figure 3.1 illustrates the process of multi-modal network planning as well as the links to network assessments, funding availability, corridor and area planning, and route and link planning.

Figure 3.1: Flowchart of system planning



There are four steps in multi-modal network planning:

- 1 Define the multi-modal transport networks and their functions.
- 2 Determine multi-modal network objectives, performance indicators and targets.
- 3 Develop multi-modal network strategies to achieve system objectives and performance targets, taking into account the policy choices made in Phase 2 and the analysis contained in network assessments.
- 4 Determine affordable, multi-modal intervention benchmarks (or standards) for infrastructure investment, ensuring that the benchmarks are consistent with system objectives and strategies. This is an optional step.

### **Step 1—Define the multi-modal networks and their functions**

Identifying the multi-modal networks to which funding will be directed is the first step of network planning. Networks should be specified on the basis of achieving the best overall match with transport system objectives; they should be determined from a big-picture perspective to maximise delivery of overall transport system objectives.

The AusLink White Paper provides an example of multi-modal network definition (Australian Government 2004, p. x). It describes the National Network as ‘...a single integrated network of land transport linkages of strategic national importance’. The National Land Transport Network is based on specified corridors and connections ‘that together are of critical importance to national and regional economic growth, development and connectivity’. They incorporate:

- › national and inter-regional transport corridors, including connections through urban areas
- › connections to ports and airports, and
- › other rail and road inter-modal connections.

Different networks perform different functions. For example, the National Land Transport Network (AusLink) primarily focuses on long-distance passenger and freight movements of national significance. An intrastate land transport network (i.e. the rural arterial road and regional rail networks) facilitates long-distance movements of freight and passengers within a state or territory. In contrast, a transport network in a major city (urban arterial road, public transport, cycle path networks, etc) focuses on moving people to and from work and recreational activities, facilitating business activity and moving urban freight.

The relative importance of individual modes in a multi-modal network will vary across the network in response to differences in the primary function of each part of the network.

### **Step 2—Determine multi-modal network objectives, performance indicators and targets**

Network objectives provide a top-down view of how the multi-modal network should perform in the future (e.g. up to 15–20 years ahead) in order to achieve transport system objectives. They incorporate expectations about how the network should perform in order to meet the demands placed on it.

Network performance indicators and targets should be based on the principles outlined in Section 1.5. The targets should be consistent with policy choices made in Phase 2 and be affordable and achievable from a total network perspective.

Examples of long-term multi-modal network performance targets include:

- › annual level of fatal and serious injuries in rural transport to decline by 30 per cent by 2015
- › rural travel times not to increase until 2010
- › no more than 10 per cent variability in travel times on major interstate freight routes
- › noise levels for residents along major urban transport routes not to increase by more than 2dB(A) before 2020, and
- › emissions from transport vehicles not to increase until at least 2015.

Although the vision for the network covers a 15–20 year horizon, it may also be desirable to specify performance targets for shorter periods, such as a five-year period covered by forward investment programs. For example, interim targets may be used for equity reasons, to bring the entire network to a specified minimum level of performance at an earlier date. Achieving this minimum level consistently across the network may also provide better network performance than having isolated network sections with varying levels of performance.

Multi-modal network performance targets also guide the development of multi-modal network, corridor and area strategies, and route and link plans, on a consistent basis. This top-down perspective increases the likelihood that the performance of corridors, areas, routes and links will support the achievement of multi-modal network objectives and targets.

However, not all corridors and areas will have the same multi-modal objectives and performance targets. Variations are needed to reflect local circumstances revealed in detailed corridor and area analyses. For example, the targets for a corridor or area with a poor safety record may require a 40 per cent reduction in annual fatal and serious injuries by 2015, whereas a 30 per cent reduction may be specified for a better-performing corridor or area.

### **Step 3—Develop multi-modal network strategies**

The third step in multi-modal network planning is developing multi-modal network strategies. These strategies incorporate a top-down view of how the transport network should desirably develop into the future. The strategies indicate the actions needed to contribute to achieving network objectives and performance targets.

Multi-modal network strategies should be expressed in generic terms and not be location-specific. Locational aspects are specified in corridor and area strategies and in route and link plans. However, network strategies may make a distinction between urban and non-urban initiatives to reflect different transport contexts. For example, strategies to address congestion and transport noise are more relevant in an urban context than in a non-urban context.

Network planning can either precede corridor and area planning or be developed from the collective results of corridor and area planning and quantitative network assessments. Feedback between these two levels of planning is critical, enabling multi-modal network strategies to be reviewed and adjusted over time.

Network strategies typically incorporate a mixture of infrastructure and non-infrastructure initiatives (see Section 2.2 for a discussion of non-infrastructure strategies). These strategies must reflect policy choices made in Phase 2 and may include a mixture of strategies that apply to all modes and strategies that are mode-specific. It is important that any associated development of modal plans reflects the multi-modal network strategies.

### **Step 4—Determine affordable, multi-modal intervention benchmarks (optional)**

This is an optional step<sup>6</sup> in which intervention benchmarks identify specific circumstances that act as ‘warrants’ or ‘triggers’ for investment designed to achieve a particular infrastructure standard. The circumstances usually relate to road or rail track conditions and traffic volumes. Box 3.1 provides examples of these benchmarks.

Benchmarks determined at the network level may subsequently need to be modified in corridor and area plans to reflect local circumstances. However, network and corridor or area intervention levels should be consistent. It may be desirable to develop interim benchmarks that align with an interim vision for the network.

Austroroads has developed a comprehensive set of guides and procedures that is generally accepted as providing national benchmarks for best practice in design, construction, maintenance and user

<sup>6</sup> Use of this step will depend on each jurisdiction’s view on the usefulness of using benchmarks or standards in planning. The issue of infrastructure standards is discussed in Section 1.2 of Volume 5.

aspects of the Australian road system (<http://www.austroads.com.au/>). They provide a suitable guide to intervention strategies. For rail, the Australasian Railway Association produces the National Code of Practice.

As intervention benchmarks apply across the entire network, they must be affordable from a network perspective—i.e. be within current and expected future funding. Setting affordable benchmarks covering 15–20 years for a network plan can be difficult given future funding uncertainties. It may be necessary to develop different funding scenarios with different sets of benchmarks. The steps to achieve affordable benchmarks include:

- › understanding the configuration of the existing network
- › understanding how alternative configurations of a future network could achieve desired performance targets
- › estimating the costs to achieve the alternative configurations
- › forecasting future funding levels, and
- › determining the configuration that optimises outcomes in terms of the performance indicators, within funding constraints.

### **Box 3.1: Examples of intervention benchmarks**

- › Road widening on rural two-lane roads to 10 metres to be considered when high volume of traffic is reached, e.g. >1 000 Annual Average Daily Traffic (AADT) or where there is a significant volume of heavy traffic (e.g. 20 per cent for 500 AADT and 5 per cent for 2 000 AADT).
- › Road duplication for rural roads to be considered when traffic volumes exceed 10 000 AADT or where there is a significant component of heavy vehicles interacting with tourism traffic.
- › More, and longer, passing loops and eventually track duplication when train delays or unreliability exceed the standard accepted by the market.
- › Resealing of roads to depend on a number of factors but, as a general guide, a frequency of between seven and 10 years being likely for surface seals (depending on the climatic zone) and around 14 years for thin asphalt seals.
- › Pavement rehabilitation to be an option where pavement has deteriorated to a point where it no longer meets serviceability requirements such as roughness and rutting or where it is structurally inadequate for current or expected loadings, with consideration of whether a pavement is still functioning well after reaching its design life to determine the intervention time.
- › Implementing initiatives to reduce transit times for rail and road when they exceed certain levels.
- › Implementing initiatives to reduce fatalities and serious injuries consistent with meeting national targets.
- › Rail track upgrading when the deterioration and safety risks become uneconomic or exceed acceptable levels.
- › Bridge rehabilitation or replacement to be determined by structural integrity and performance of the bridge, with the time of intervention related to safety risk analyses and the score the structure receives, with the safety of the public to be paramount at all times when prioritising bridge maintenance.



### 3.3 Corridor and area planning

The aim of corridor and area planning is to identify options and priorities for initiatives consistent with the network strategy and policy choices. The output is a corridor or area strategy that, among other things, can provide guidance for the corridor or area on issues such as the relative priority of investment versus maintenance, the balance between infrastructure and non-infrastructure solutions and the type and mix of initiatives (e.g. investment, regulation).

A corridor or area strategy is a cooperative long-term plan identifying the transport challenges within a corridor or area and the potential initiatives and priorities to meet those challenges. Figure 3.1 indicates that corridor and area planning involves three main activities:

- 1 setting corridor or area objectives and performance indicators and targets
- 2 developing multi-modal corridor or area strategies, and
- 3 defining and protecting the routes and links in the corridor or area.

The objectives and targets for the corridor or area strategy should be consistent with the transport system objectives and targets.

A 15–20 year corridor or area strategy should stipulate a multi-modal approach to achieve objectives and performance targets. As with the network strategy, the corridor or area strategy may contain interim performance targets for equity or operational reasons.

A corridor or area strategy should be tailored to the circumstances of the corridor or area, taking into account the results of studies and stakeholder engagement. The strategy will also be affected by transport demand and capacity within the corridor or area, and should accommodate the network strategy and policy choices made by government in Phase 2 of the Framework. Other corridor and area considerations such as land use patterns, environmental issues and freight logistics should be taken into account.

It is important to check for consistency in strategies across various corridors and areas. Complete consistency is not essential, as local and regional circumstances will play a key role in determining the strategy for any given corridor or area. However, there is merit in the idea of consistency in strategic plans at least for connected corridors and areas.

Take, as an example, the Melbourne–Sydney and Sydney–Brisbane corridors. If there was a strong pro-rail strategy for one corridor but a strong pro-road strategy for the other corridor, the difference in strategies could have significant implications for inter-modal transfers in Sydney.

The last step in corridor and area planning is to define and protect routes and links to facilitate potential future development. Most routes will already be established and contain transport infrastructure. However, routes that could potentially be developed in future may be incomplete (i.e. missing certain sections) or only at the concept stage. In corridor and area planning, these missing routes or links are usually identified as lines on a map. This approach recognises that detailed route or link planning and the necessary land acquisitions are yet to occur.

As a final task, the network strategy should be re-visited to see if it needs to be refined to reflect the outcomes of corridor and area planning.

## 3.4 Route and link planning

Route and link planning are not specifically addressed in the Guidelines. It is expected that bodies such as Austroads and rail organisations will address this more specialist, detailed type of planning. However, some guiding principles can be identified.

Route and link planning should be undertaken in the context of corridor and area strategies. Where a new route is required, route planning will involve the consideration of alignment options and detailed planning for the preferred alignment. This will lead to the purchase of land for future development of the new route.

A link plan should contain a statement of intent broadly indicating expectations about the future function of the link and likely future initiatives (e.g. duplicate link by 2020). There will be link-specific performance indicators and targets, supported by strategies and investment priorities that reflect local needs but are within the context of the corridor or area strategy and route plan.

A link plan is not usually as complex as a route plan or corridor or area strategy, unless there are major contentious issues (e.g. a road widening program that requires property acquisitions or threatens a fauna species). In some cases, the size or complexity of a corridor or area may require the development of discrete route or link plans to effectively plan and manage infrastructure within the corridor or area.

As a link plan will typically cover 15–20 years, it may contain interim performance targets aimed at bringing the link to a minimum appropriate performance level within the planning horizon. Priority links are usually nominated for initial attention due to funding limitations.

Because transport initiatives are closely related to links, it is often desirable for link plans to provide a basis for planning and designing initiatives.

## 3.5 Network assessments and corridor/area studies

The system planning process emphasises the importance of a top-down, big-picture perspective, coupled with stakeholder engagement, for identifying transport initiatives. System planning can also benefit significantly from complementary information such as the results of quantitative network assessments and corridor or area studies.

Quantitative analysis of data is a key input into the planning process. It can be used to draw out major conclusions, develop projections, test and compare the viability of options, and confirm or correct conclusions reached by intuition and dialogue alone.

### 3.5.1 *Nature of assessments and studies*

Network assessments and corridor and area studies analyse transport system performance at a broad, indicative level, sacrificing detail to gain breadth.<sup>7</sup> To be cost-effective and timely, loss of some detail is necessary, but the conclusions of broad studies are not substitutes for detailed assessments. It is preferable, although not essential, to undertake network assessments prior to component corridor and area studies.<sup>8</sup>

7 Obtaining complete knowledge of all potential initiatives would be an impossibly resource-intensive task. Partial knowledge may, however, result in failure to identify highly beneficial solutions and lead to wasteful allocation of resources to evaluate initiatives with poor prospects.

8 As discussed above, system planning is an iterative process, with feedback between network planning and corridor/area planning. Provided that there is interaction, network assessments and corridor/area studies can proceed in any order or concurrently.

A network assessment can provide information to assist with:

- › categorising a network into sub-networks, including the corridors and routes to include in the network
- › identifying needs at a high level
- › selecting priority corridors, areas, routes or links for close attention
- › considering relationships between corridors and areas, and
- › comparing across corridors, and across areas, to ensure that the allocation of funds is broadly in line with transport system objectives and government policies.

A corridor or area study usually considers a single transport corridor or area and provides information to:

- › suggest infrastructure and non-infrastructure solutions for further investigation to develop into proposals for initiatives
- › assist in formulating corridor or area objectives by testing the costs, benefits and effects of implementing different strategies, within various budget constraints
- › explore cross-modal and upstream–downstream relationships between initiatives, including identifying situations where initiatives should be bundled together (e.g. a program of lengthening passing loops), and
- › provide data to assist analysts to estimate the costs and benefits of specific initiatives and to assist governments to check appraisals.

### **3.5.2 Data requirements**

Network assessments and corridor or area studies are heavily based on quantitative analysis. Some potential data requirements are described in detail in Section 1.3 of Volume 5 of the Guidelines. They include data on:

- › population
- › economic activity
- › transport infrastructure
- › vehicle numbers and traffic composition
- › flows of passengers and freight, including origin–destination estimates
- › environmental and heritage considerations
- › safety, and
- › social factors.

### **3.5.3 Demand forecasting and analysis**

Information about future demand for transport services is a key component of network assessments, corridor and area studies, and assessment of initiatives. Approaches to this task can be considered in three categories:

- › extrapolation of past trends
- › extrapolation relating the forecast variable (e.g. traffic) to one or more explanatory variables (e.g. population), usually through an econometric model, and
- › judgment, including scenario analysis.

These methods are not mutually exclusive and can be used in combination. The choice of technique depends on data availability, resources and the validity of the extrapolation process.

Scenario analysis is a potentially useful tool when major change is occurring and the future is highly uncertain. Scenarios can describe a range of possible future circumstances and outcomes. In contrast, the traditional approach to forecasting focuses on a single forecast (typically based on one set of assumptions), which is unlikely to accurately predict ‘the’ future.

The purpose of scenario planning is to identify, and consider the potential impact of, several plausible 'futures'. The alternative futures will typically involve significantly different challenges, risks and opportunities for individual activities and organisations. Scenario analysis helps transport practitioners and decision-makers to avoid the trap of thinking (and planning on the assumption) that the future is going to be just like the present, only a little bit more.

Scenario analysis makes the assumptions used in transport planning more explicit and facilitates better management of risk. It can contribute to improved understanding of factors likely to significantly affect transport and the interplay between these factors. Transport practitioners can then more effectively consider the implications for transport planning, increasing the likelihood that resulting strategies will effectively address future demands on the transport system.

Demand forecasting methods are discussed in greater detail in Section 2.4 of Volumes 3 and 5 of the Guidelines.

### 3.5.4 *Deficiency assessment*

Deficiency assessment involves comparing the network and its components with specified benchmarks. It is a relatively simple way of obtaining an initial indication of possible challenges in a network, corridor or area, and potential initiatives.

The deficiency assessment may focus on how transport system performance compares with performance benchmarks or on how the physical infrastructure compares with physical benchmarks.

Examples of performance benchmarks include:

- ▮ roads: vehicle numbers per lane per day, average vehicle speed, level of service, crash rates and accessibility indices<sup>9</sup>, and
- ▮ rail: transit times, contracted train paths, above-rail delays, below-rail delays, incidents, track availability and temporary speed restrictions.

The 2001 mainline rail infrastructure audit provides an example of a performance-based deficiency assessment (ARTC 2001). ATC endorsed draft performance targets for the mainline rail network to identify potentially worthwhile upgrading investments. These targets are presented in Table 3.1.

Examples of physical infrastructure benchmarks include:

- ▮ roads: load limits, lane widths, shoulder widths, design speeds, curvatures, gradients, intersections per kilometre and flood immunity, and
- ▮ rail: rail weights, speed limits, gradients, lengths of passing loops and height restrictions.

Deficiency analysis based on physical standards has an obvious role to play where the objective is to provide infrastructure at, or above, a certain minimum standard for equity reasons or network connectivity.

Deficiency assessment has several advantages. It is relatively straightforward to implement and can provide a preliminary indication of possible initiatives that may warrant more detailed investigation. The main limitation of deficiency assessment is that it does not take direct account of the economic worth of remedying a deficiency, which is driven primarily by costs and demand.<sup>10</sup>

9 Accessibility indices can provide benchmarks for comparing the relative disadvantages of different locations. These indices can also be used to compare initiatives in terms of the extent to which they promote accessibility. Estimation of accessibility indices for medical centres, educational facilities and centres of employment can assist with the investigation of social issues. Volume 5 of the Guidelines illustrates a simple accessibility index.

10 For example, a deficiency that is expensive to remedy could generate an initiative with a disappointing BCA result. Conversely, a deficiency that is cheap to remedy, and economically warranted, might be missed. With respect to demand, deficiency assessments based purely on the physical infrastructure simply ignore demand considerations. Performance benchmarks related to volume–capacity ratio do take account of demand, but not the economic value of demand. A deficiency on part of the network having low utilisation might not be worth addressing, while an identical deficiency on a highly trafficked section of infrastructure could give rise to a worthwhile initiative.

**TABLE 3.1: ATC draft performance targets for inter-modal trains**

CORRIDOR	ON-TIME RELIABILITY <sup>a</sup> (PER CENT)	TRANSIT TIME <sup>b</sup> (HRS)	TRAIN LENGTH <sup>c</sup> (METRES)	DOUBLE STACK (CONVENTIONAL CONTAINERS)
Melbourne–Sydney	75 <sup>d</sup>	10.5	1500	No
Sydney–Brisbane	75 <sup>d</sup>	17.5	1500	No
Melbourne–Brisbane	75 <sup>d</sup>	29.5	1500	No
Melbourne–Adelaide	80	11.5	1500	No
Melbourne–Perth	80	56.0	1500 Adelaide east	No
	80	56.0	1800 Adelaide west	Yes
Sydney–Perth	80	65.0	1500 Parkes east	No
	80	65.0	1800 Parkes west	Yes
Adelaide–Perth	80	41.0	1800	Yes
Adelaide–Sydney	75 <sup>d</sup>	26.0	1500 Parkes east	No
	75 <sup>d</sup>	26.0	1800 Parkes west	Yes

- a. Percentage of inter-modal freight services (21-tonne axle loads and capable of a maximum speed of 115 kilometres per hour) arriving not more than 15 minutes after their scheduled destination time.
- b. Average scheduled transit time for all inter-modal freight services (21-tonne axle loads and capable of a maximum speed of 115 kilometres per hour) on the corridor, i.e. terminal-to-terminal time making no adjustment for time zones.
- c. Unrestricted length for interstate services, i.e. the train length up to which operators can operate any scheduled interstate services without reference to the track manager.
- d. On-time reliability for these corridors is expected to be lower in the short term as significant investment is required to improve performance.

Note: The term *inter-modal trains* refers to high performance trains in direct competition with road transport.

Therefore, if the aim is to use deficiency assessment to help initial identification of initiatives that have economic worth (i.e. that are economically warranted), benchmarks should be set at levels where intervention is likely to yield an acceptable BCA result. These benchmarks can be set on the basis of experience using the results of past appraisals of proposed initiatives carried out using BCA.<sup>11</sup>

### 3.5.5 Economic assessment

Deficiency assessment, using economically warranted benchmarks (as discussed above), provides a very high-level indication of funding across the whole network that might be economically justified. It also highlights parts of the network, corridor or area where there is potential for economically advantageous new initiatives.

The next step in the assessment process is to specify the scope of these potential initiatives in hypothetical broad-brush terms<sup>12</sup> and subject them to conventional economic assessment (i.e. BCA). This can be undertaken at the network level, the corridor or area level, or at both these levels. Because a corridor or area is less extensive than a network, the BCAs in corridor and area studies can be undertaken at more detailed levels than the BCAs in network assessments. This additional level of detail makes it possible to use ‘what if’ scenarios to explore a wide range of options on both the supply and demand sides.

The level of detail of BCAs at network, corridor or area levels is, however, superficial and considerably less than that of the rapid BCAs undertaken in the rapid appraisal of individual initiatives in Phase 5 (see also discussion in Section 1.3 of Volume 3 of the Guidelines).

11 Lower benchmarks might be set for more highly utilised parts of the network and vice versa. This is particularly relevant if a categorisation system is in place for a network, and the category levels are strongly correlated with usage.

12 Such as duplicating particular lengths of two-lane road or lengthening rail passing loops.

Undertaking superficial BCAs for a large number of potential initiatives on a network, corridor or area basis provides a more refined picture of likely future investment needs than deficiency assessment.

In undertaking these assessments, it is important to recognise the potential contribution of non-infrastructure solutions such as demand management, changes in land use policies, and improvements in freight logistics. Non-infrastructure solutions can be integrated into economic assessments (and superficial BCAs) by estimating the effects on transport demand and implementation costs, where these are significant.

The optimal timing of interventions is another key consideration in these assessments. The Bureau of Transport and Regional Economics (BTRE) has undertaken economic assessment of networks using an optimal timing criterion to identify potential investment needs where there is no budget constraint (see Section 1.4 of Volume 5 of the Guidelines and Harvey, 1995). This methodology shows that a new construction initiative is warranted if its economically optimal implementation time occurs in the past. The economically optimal time for an initiative to come online is the first year when the benefits forgone by delaying the initiative by one year exceed the saving in capital costs. At this time, the benefit–cost ratio (BCR) will be at least 1.0.<sup>13</sup>

With demand projections and potential initiatives, a preliminary time profile of economically warranted initiatives can be developed. Applying the optimal timing methodology usually reveals a backlog of initiatives that are immediately warranted, as their economically optimal times are in the past. The analysis can also be taken a stage further by specifying budget constraints, in the form of funding levels over long periods of time. The timing and mix of initiatives can be adjusted accordingly.

Network assessment and corridor or area studies also provide a framework to assess whether performance targets are feasible given technical, behavioural and other constraints. The studies can also indicate whether performance targets are achievable at an acceptable cost in terms of other objectives sacrificed. The feasibility of performance targets can be tested using the superficial BCA methodology with back-calculation.

The steps are to:

- 1 set a (quantitative) performance target
- 2 estimate the benefits from meeting that target
- 3 specify an acceptable cut-off BCR, and
- 4 divide the benefits by the BCR to obtain the maximum capital cost of an initiative that will be acceptable to meet the target.

Knowing the acceptable limits for initiative costs, planners can develop options that are more likely to pass detailed BCAs in Phase 5 (appraisal and Business Case).

Finally, it should be noted that maintenance initiatives raise unique issues as they are difficult to put into a BCA framework. Section 1.5 of Volume 5 of the Guidelines provides information about deficiency assessment and economic assessment for maintenance initiatives.

13 For more information on optimal timing of initiatives, see the discussion of first-year rate of return in Volume 5 of the Guidelines.

## PHASE

# 4

# Identification of initiatives

### At a glance

A range of initiatives can potentially address transport challenges and contribute to achieving transport system objectives. These initiatives include infrastructure improvements and non-infrastructure approaches such as pricing, regulation and land use planning.

Proposals for transport initiatives typically come from four sources:

- › objectives-led strategic planning (Phases 1 to 3)
- › other areas of government agencies
- › the private sector, and
- › the political process.

Unsolicited private sector approaches should be subject to an approval process involving both the entities and any subsequent proposals.

Information about relationships between individual initiatives (independence, complementarity, substitutability) can assist decision-makers to appropriately classify initiatives and submit them for appraisal.

## 4.1 Sources of proposals

Various initiatives can be used to address transport challenges and contribute to achieving transport system objectives. Examples include:

- › capital investment (e.g. new or upgraded infrastructure)
- › infrastructure maintenance
- › travel demand management (using pricing or travel behaviour change)
- › traffic management systems (e.g. ramp metering)
- › regulation
- › better logistics practices
- › integration of transport modes, and
- › changes in land use policies (e.g. zoning).

Proposals for transport initiatives typically come from four sources: objectives-led strategic transport planning (Phases 1 to 3), other areas of government agencies, the private sector and the political process. Proposals are preliminary and need to be subjected to detailed appraisal (and therefore accepted or rejected) in Phase 5.

#### **4.1.1 Objectives-led strategic planning**

Phases 1 to 3 provide government with a ‘top-down’ basis for identifying initiatives that can potentially contribute to achieving transport system objectives. This includes various network-wide deficiency assessments and corridor or area-based economic assessments, incorporating preliminary demand analysis and BCA. The list of potential initiatives flowing from strategic planning is, therefore, likely to provide a more rigorous basis for later program development than proposals generated by other sources.

Proponents outside the strategic planning process should be advised that proposals consistent with government-endorsed transport system objectives, policies and strategies will be considered more favourably. Proponents should also be encouraged to include evidence of such consistency in their submissions, and be required to demonstrate that a full range of options has been considered to address a particular challenge.

#### **4.1.2 Other areas of government agencies**

Operational areas of government transport agencies may submit ‘bottom-up’ proposals for transport initiatives outside the strategic planning process. Agencies often have regional offices that are aware of local conditions and requirements. However, these agencies may not necessarily be directly involved in broader strategic planning processes, except for being consulted as stakeholders.

Government agencies without direct involvement in transport may also seek support and funding for transport initiatives. For example, a regional development agency might propose upgrading a road to a remote community as part of a strategy to improve living standards in the region. In these circumstances, proposals should be considered in the context of the broader strategic planning process. However, the extent to which an integrated approach can be achieved may be affected by factors such as the involvement of multiple ministers and agencies and the relative importance of non-transport objectives (e.g. defence).

#### **4.1.3 Private sector**

In Australia, government has traditionally been the major provider of transport infrastructure. However, the private sector now has a substantial role in infrastructure provision and associated transport activities.

Private sector organisations or individuals (singly or in partnership) may submit transport proposals to government for approval or funding. These proposals may be based on an examination of transport system strategies or on perceptions and aspirations independent of these strategies.

The activities of private sector organisations are focused on objectives such as revenue and profit maximisation that may differ significantly from government objectives such as equity and environmental quality. Private sector proposals that require government approval or funding should therefore be consistent with the transport system objectives, policies and strategies. Consistency will be maximised if the private sector is aware of, and has access to, relevant objectives, policies and strategies.

It is also important to have specific procedures for the submission and consideration of private sector proposals (see Section 4.2). Most jurisdictions have well-developed procedures for private sector participation in the delivery of public infrastructure services and for assessing unsolicited



proposals that may or may not require additional government funding. These procedures also provide guidance for financial assessment by government of proposals submitted on a solicited or unsolicited basis by the private sector.

#### 4.1.4 Political process

Ministers have the final say over the composition of transport programs funded by their jurisdictions. The inclusion of specific initiatives at the direction of ministers reflects a range of considerations.

In some cases, priority proposals will be identified through, for example, policy commitments made as part of an election platform. Initiatives may also be proposed if the objectives identified in Phase 1 are not specified in sufficient detail to reflect all of the government's objectives and priorities. Objectives and priorities may sometimes change so rapidly (e.g. following a change of government) that they initially outpace the adjustment of the system planning process.

Other areas of the political system may generate transport proposals. For example, local government may identify initiatives that reflect the perspectives of the local community. In addition, parliamentary committees examining transport or other issues (e.g. regional development, defence) may recommend particular transport initiatives. Finally, ministers may receive transport proposals from other stakeholders as they interact directly with the community.

## 4.2 Unsolicited private sector proposals

Private sector proposals that are unsolicited<sup>14</sup> should go through an initial government review process. Such a process may be applied when a private sector proponent is seeking government funds to build and/or operate infrastructure or when government approval is required for an initiative that will be self-funded on a commercial basis (e.g. a tollway).

An open environment for private finance initiatives (PFIs) and public private partnership (PPP) proposals carries potential risks that should be mitigated through a structured process. Some of the questions to address are:

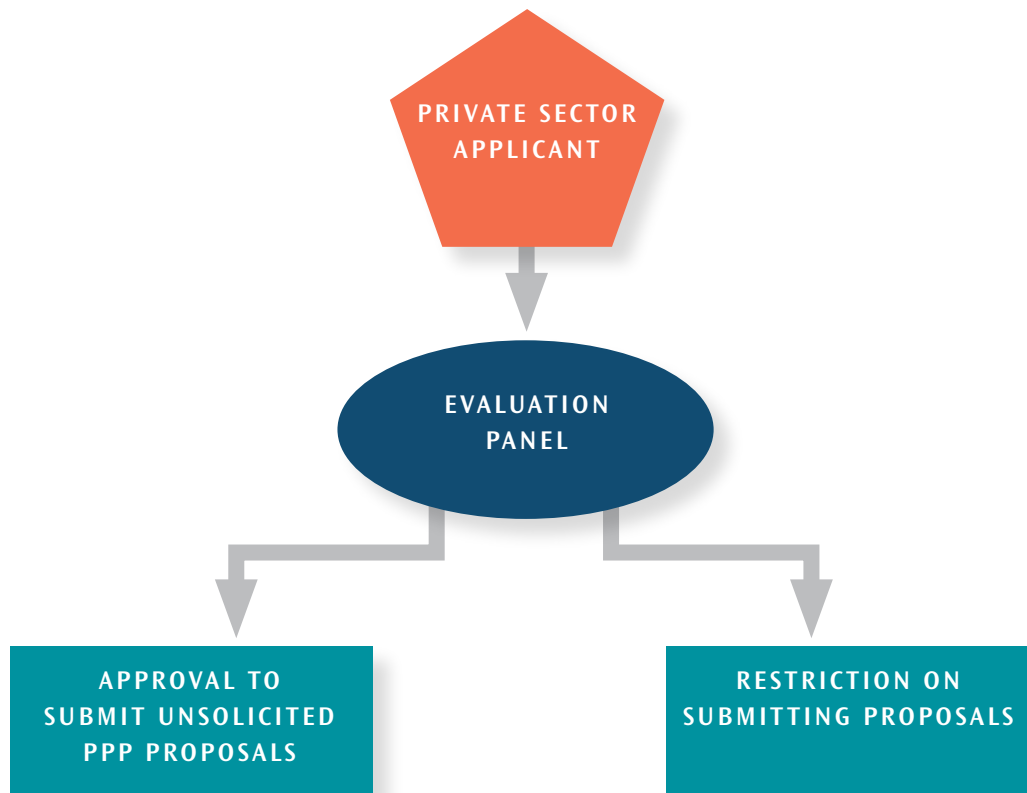
- › What guidelines should apply to the submission of an unsolicited proposal?
- › Should there be pre-qualification for the submission of proposals?
- › How should the intellectual property be managed?
- › What process should be followed for unsolicited proposals compared to a PPP expression of interest or request for tender process?
- › What probity framework needs to be in place to ensure transparency and ethical conduct?

These are complex questions that need to be addressed before an effective policy and procedural framework for unsolicited private sector proposals can be implemented. They involve examination of the entities that propose to submit proposals and assessment of any subsequent proposals.

A possible approval process for private sector applicants is illustrated in Figure 4.1. Under this process, an entity would submit a pre-qualification application to an evaluation panel. Pre-qualification approval would enable the applicant to become a registered entity for the purpose of submitting unsolicited proposals. Restriction would have the broad impact of disqualifying the applicant from involvement with the supply or management of transport infrastructure for a period of time.

<sup>14</sup> A *solicited* proposal is a private sector response to an invitation from government. In contrast, an *unsolicited* proposal originates within the private sector without any specific invitation from government.

Figure 4.1: Possible approval process for private sector applicants



The evaluation panel would need a set of criteria on which to base evaluation of the applicants. Suggested evaluation criteria are:

- › history of ethical conduct with government
- › understanding and accepting best practice in partnering with government
- › track record in delivering transport infrastructure
- › demonstrated capacity for innovation
- › commercial ability to contract, and
- › attractiveness of relationship plan and approach to unsolicited proposals.

It is likely that many proposals would be submitted by consortia rather than individual proponents. The pre-qualification rule would apply to consortia in the following way:

- › the key (largest) equity participant requires pre-qualification
- › a majority of participants, by equity, require pre-qualification
- › all equity participants with an equity participation of 25 per cent or more require pre-qualification.

Table 4.1 illustrates application of these conditions.

It should be noted that jurisdictions may also have guidance material for assessing unsolicited proposals.

**Table 4.1: Illustration of application of approval conditions**

CONSORTIUM	1	2	3	4	5	6	7	8
	30%							30%
Pre-qualified	30%	40%	60%	75%	50%	60%	40%	30%
Not pre-qualified	40%	30%	40%	25%	50%	20%	20%	20%
		30%				20%	20%	20%
							20%	
	100%	100%	100%	100%	100%	100%	100%	100%
Acceptable	No	No	No	Yes	No	Yes	No	Yes
Reason	largest equity participant not qualified	equity majority not qualified	>25%	OK	no majority	OK	equity majority not qualified	OK

## 4.3 Initiative specification and inter-relationships

The features of individual initiatives and the relationships between initiatives can significantly affect the appraisal process (Phase 5) and its results. Before appraisal commences, initiatives should be clearly specified, and key relationships between individual initiatives should be identified. Initiatives can be independent, complementary or substitutable.

### 4.3.1 Independence

Two initiatives are classified as independent when the implementation of one has no effect on the benefits or costs of the other. Physical separation (e.g. an initiative in an urban area and an initiative in a rural area) is often (but not always) a good indicator of independence.

Initiatives are frequently treated as independent in the system planning process if relationships with other initiatives are weak. This is a reasonable approach because the degree of dependence may be impossible to estimate accurately or estimation may require excessive resources.

Despite physical separation, apparently unrelated parts of the transport system may be dependent. For example, proposed initiatives at two widely separated ports may be related if they involve the same traffic (i.e. movements between the two ports) or the same commodity (e.g. export grain).

Dependence between initiatives can involve complementarity or substitutability.

### 4.3.2 Complementarity

Complementarity exists when implementing one initiative increases the benefits or reduces the costs of another initiative. In other words, implementation of one initiative will increase the need for the other initiative. This can occur where one initiative is upstream or downstream of the other.

Complementary relationships are common in transport. For example, a highway upgrade that generates new traffic may increase traffic along other sections of the same highway, increasing the benefits of subsequent upgrading on those sections. Similarly, upgrading a rail line may result in greater truck traffic along roads leading to rail terminals, increasing the benefits from initiatives to upgrade feeder roads. There can also be complementarity between regulation and infrastructure provision (e.g. increases in gross vehicle mass limits and associated requirements for bridge strengthening).

The most extreme cases of complementary relationships occur when the benefits from one initiative are zero unless a complementary initiative is implemented. For example, an initiative to raise bridge clearances on a route will provide benefits to rail traffic only if the clearances are raised on all bridges on the route. Similarly, all passing loops on a rail route must be lengthened for the benefits to be achieved. In these circumstances, it is often preferable to bundle the initiatives together and treat them as a single initiative.

### **4.3.3 Substitutability**

Substitutability exists when implementing one initiative reduces the benefits or increases the costs of another initiative. In other words, the existence of one initiative reduces the need for the other initiative.

This can occur if one initiative is on an alternative route or involves an alternative mode. For example, a railway upgrade that causes freight to shift from road to rail will reduce the benefits of, and delay the need for, upgrading of the road.

Non-infrastructure proposals that reduce the demand for transport reduce the benefits for upstream and downstream infrastructure initiatives. However, they may increase the benefits of other initiatives when freight is diverted to alternative routes or modes, which may then require upgrading.

### **4.3.4 Identifying the relationships**

It is important to have a structured approach to identifying significant relationships between initiatives.

Take the Sydney–Brisbane corridor as an example. This corridor has two road routes, the Pacific Highway and the New England Highway, and one rail route, the interstate mainline. A corridor study identifies a series of investment and demand management initiatives for both modes along the corridor. Options can be identified via deficiency analysis, with reference to network objectives and from consultation with stakeholders.

On the demand side, there is a requirement for information about the corridor users and their origins and destinations. Ideally, data would be obtained for origin–destination matrixes for cars and different types of freight. Demand equations could be derived, or inferred, incorporating assumptions about how much traffic would shift from one route or mode to another in response to changes in costs, trip times, reliability and other indicators of service quality<sup>15</sup>. Sensitivity analysis should then be undertaken to determine the combination of proposals, and their timing sequence, that would best achieve objectives within long-term funding constraints.

<sup>15</sup> See Volume 5 for details of how to estimate demand shifts between modes.

## PHASE

# 5

# Appraisal and Business Case

### At a glance

Phase 5 focuses on appraisal of identified transport initiatives, in three stages:

- › *Strategic Merit Test (SMT)* providing a first-order determination of the 'strategic fit' of a proposed initiative with transport system objectives, policies and strategies
- › *rapid appraisal* involving a broad-brush quantitative assessment aimed at eliminating proposals that are unlikely to pass a detailed appraisal, and
- › *detailed appraisal* comprising a comprehensive analysis of the impacts and overall merit of a proposed initiative.

BCA plays a key role in the Framework. Other aspects of appraisal (usually undertaken at the detailed appraisal stage) include financial analysis, environmental impact analysis and social impact assessment.

Perceived limitations of BCA have led to the development of other approaches:

- › complementary techniques, which facilitate better analysis and presentation of non-monetised information (e.g. the Appraisal Summary Table), and
- › adjusted BCA, a new optional technique that extends conventional BCA by incorporating predetermined weights for objectives.

The findings of the appraisal process are presented in a comprehensive Business Case. This document should be in an accessible format and contain all of the information that the decision-maker requires for a fully informed decision.

## 5.1 A three-stage approach to appraisal

In Phase 4 of the Framework, potential initiatives are identified from four sources. Phase 5 involves the appraisal of these initiatives and developing a Business Case for each initiative. Volume 3 of the Guidelines provides a comprehensive guide to these processes.

Before undertaking an appraisal, the transport practitioner should be aware of transport system objectives, policies and strategies in order to prepare the analysis on an informed basis.

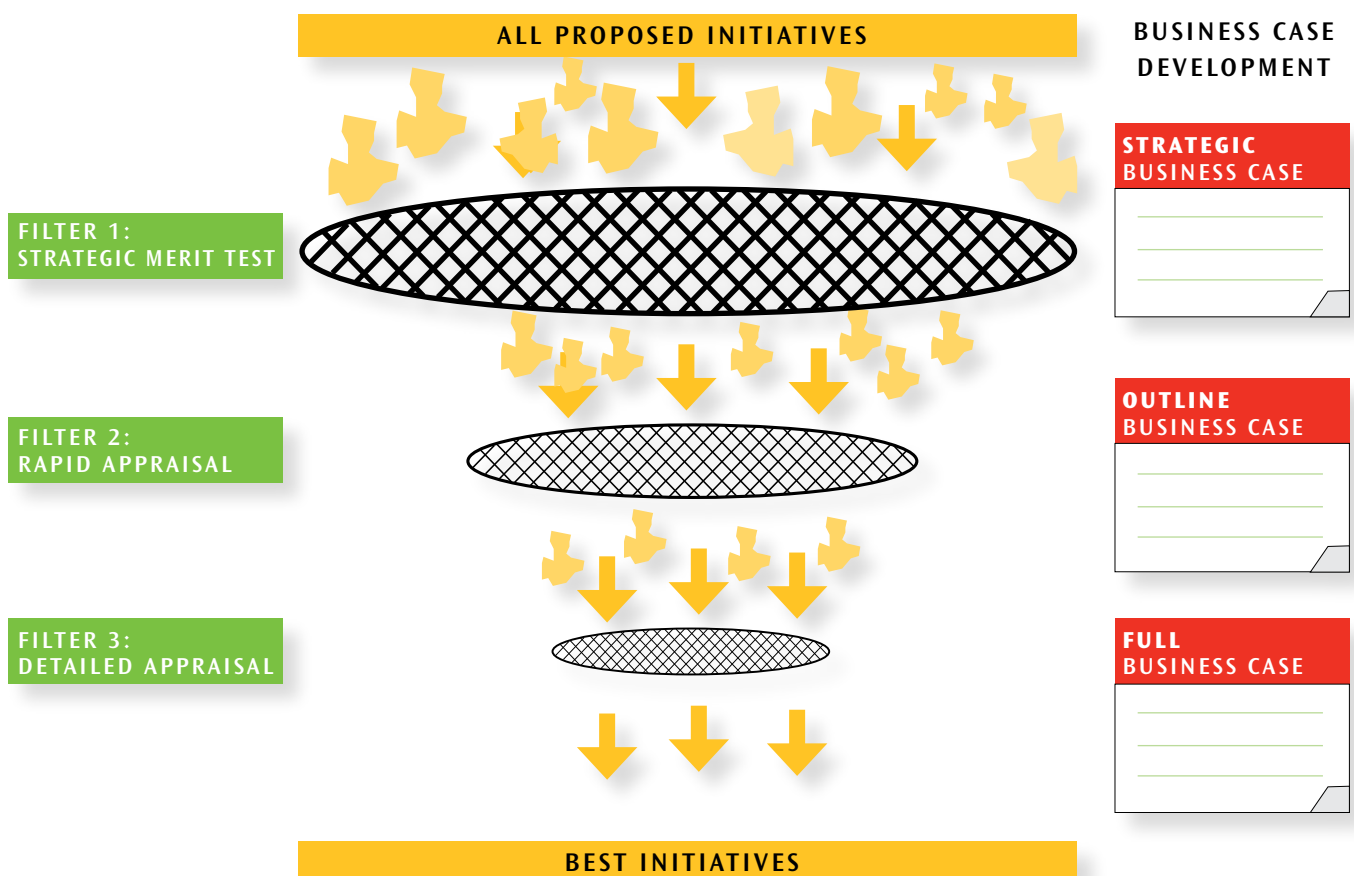
The Guidelines are designed to guide and complement existing jurisdictional procedures. There is a close alignment between the Guidelines and existing procedures, which should facilitate a relatively smooth transition to the Guidelines by jurisdictions.<sup>16</sup>

The appraisal process in Phase 5 of the Framework incorporates three stages:

- › a Strategic Merit Test (SMT)
- › rapid appraisal, and
- › detailed appraisal.

Figure 5.1 indicates that the process can be viewed as a series of filters (coarse, medium, fine). Proposed initiatives are fed in at the top. Each filter removes some initiatives; an increasing number of initiatives being rejected as the process progresses. The 'best' initiatives are those that pass through all filters—they demonstrate strategic merit or fit and perform well in detailed appraisal.

Figure 5.1: Three-stage appraisal process



16 The COAG decision of February 2006 requires the Guidelines to be adopted nationally for the evaluation of all new road and rail infrastructure projects by December 2006.

This approach promotes efficient use of scarce appraisal resources. The level of resources applied to appraisal, and the expected merit of an initiative, increase as an initiative progresses through the process.

Initiatives should generally be subjected to the same appraisal process. The level of detail will vary with the size and complexity of each initiative—smaller, less complex proposals often will not proceed to detailed appraisal. The process may also vary between infrastructure and non-infrastructure initiatives.

## 5.2 Stages in the appraisal process

The SMT, rapid appraisal and detailed appraisal incorporate a range of techniques and practical issues.

### 5.2.1 *Strategic Merit Test (SMT)*

The SMT incorporates a series of questions for each proposed initiative. The questions identify:

- ▶ how well the initiative is expected to contribute to transport system objectives, policies and strategies
- ▶ any barriers to the initiative (e.g. risk, dependence on other initiatives), and
- ▶ whether proper consideration has been given to alternative solutions or options and to the broader context of the initiative.

The SMT identifies proposals that should proceed to the next stage of appraisal, proposals that require further scoping, and proposals that should be abandoned because they are inconsistent with transport system objectives, policies and strategies. It provides a largely qualitative, first-order determination of the ‘strategic fit’ of each proposal.

The SMT is a useful mechanism because it:

- ▶ requires proponents to clearly define an initiative and outline how it will meet higher-level objectives
- ▶ provides an efficient means to filter proposals before considerable resources are spent on development, including providing an early view on an initiative’s likely effectiveness in meeting transport system objectives, and
- ▶ highlights where information may be required to substantiate a benefit or cost in preparing a Business Case.

Proposals arising from strategic planning (Phases 1 to 3) will reflect jurisdictional objectives, policies and strategies. They should therefore readily pass the SMT. The SMT is particularly valuable when applied to proposals that originate from outside the strategic planning process.

An SMT template is provided in Volume 3 of the Guidelines.

### 5.2.2 *Rapid appraisal*

Rapid appraisal, using a technique such as rapid BCA, screens out initiatives that have passed the SMT but are unlikely to pass more detailed assessment. It incorporates an indicative assessment of the main benefits and costs, without a high level of accuracy.

This stage of the appraisal process complements, and can occur in parallel with, the SMT. It also helps to identify the information required for the detailed appraisal stage.

Proposals that pass rapid appraisal should then be subjected to detailed appraisal.

### 5.2.3 *Detailed appraisal*

Detailed appraisal comprises a comprehensive analysis of the impacts and overall merit of a proposed initiative.

All jurisdictions have formal guidelines for detailed appraisals. They generally involve detailed BCA complemented by detailed financial assessments, and specific impact analyses and statements (e.g. environmental, social, regional, employment, equity). The results of these assessments should be summarised in a Business Case (see Section 5.5).

## 5.3 Appraisal tools and methodologies

BCA plays a key role in the Framework. Other techniques provide complementary information or extend conventional BCA.

### 5.3.1 *Benefit–cost analysis (BCA)*

BCA is an appraisal technique that considers, using money as the primary measure of value, whether a proposed initiative is likely to deliver a ‘net benefit’ to society—i.e. an increase in economic efficiency. The decision-maker should still complement the BCA with information about impacts that are not expressed in monetary terms (i.e. non-monetised impacts).

BCA is a primary component of the appraisal guidelines used by transport agencies and central agencies in all Australian jurisdictions. It is a long-established approach that continues to be widely used around the world.

At the same time, it is important to acknowledge that BCA is also perceived to have some limitations.

BCA does not provide information about the distribution of benefits and costs and therefore about impacts on equity. This does not mean that efficiency and equity are necessarily competing objectives. In theory, it is possible to create win–win situations if economic efficiency gains are used to improve social equity. This usually requires complementary policies and initiatives.

There can also be concerns about the way BCA determines the relative importance of different objectives. The benefit and cost elements are directly linked to transport system objectives—they each contribute to one or more of these objectives. The relative importance (or weighting) in BCA of each element, and hence transport system objectives, is implicitly determined by the dollar value assigned to each element. However, dollar values may not fully reflect government’s views on the relative importance of each element and individual transport system objectives.

Appendix B of this volume provides a more detailed discussion of BCA and objectives (particularly economic efficiency, environment, safety and equity).

### 5.3.2 *Other approaches*

The perception that BCA has some limitations has led to the development of a range of other appraisal approaches over many decades. These approaches can be considered in terms of complementary techniques and adjusted BCA.

Although other approaches have some advantages, a trade-off is involved as there can be some loss of economic efficiency compared with initiative selection based purely on standard BCA. Accordingly, the results of other appraisal techniques should always be presented alongside the results of a standard BCA.



## Complementary techniques

These techniques are generally used to facilitate better analysis and presentation of non-monetised information in the appraisal process. In some cases, they abandon the use of dollar values and introduce other metrics. Complementary techniques include approaches such as multi-objective analysis, multi-criteria analysis, the planning balance sheet and the goal achievement matrix.

Jurisdictions use, and might continue to use, different combinations of BCA and these complementary techniques. The Guidelines acknowledge this and add value by:

- ▮ proposing a consistent and transparent overall Framework within which appraisals can be undertaken, and
- ▮ highlighting the recent development of the Appraisal Summary Table concept.

The Appraisal Summary Table is a presentation format developed and used by the UK Department for Transport (2004). It addresses the same question as BCA—is an initiative likely to produce a net benefit in terms of an increase in net worth? However, in contrast to BCA, the Appraisal Summary Table considers both monetised and non-monetised impacts, with a qualitative assessment of the scale of non-monetised impacts. The Appraisal Summary Table also presents, on an equal footing, a summary of all relevant information (monetised/non-monetised, quantitative/qualitative) about the merits of a proposal—side-by-side, on a single page, in a user-friendly format.

The Appraisal Summary Table is recommended for use in the Guidelines. A template for its use can be found in Appendix B of Part 1 of Volume 3 of the Guidelines.

## Adjusted BCA

The Guidelines provide a new optional appraisal technique, adjusted BCA, for use by jurisdictions in settings where it is considered appropriate. This technique was introduced for optional use in AusLink (Australian Government 2004, p. 98).

Adjusted BCA incorporates the concept of applying weights to benefits and costs (and hence objectives) to reflect their relative importance. It is a hybrid of BCA (retaining the monetary measuring rod) and the versions of multi-criteria analysis that use scores or weights.

Adjusted BCA is therefore a tool for multiple-objective decision-making based on traditional BCA. It extends conventional BCA by:

- ▮ allowing government to use a set of weights it prefers, rather than the implicit weights underlying the monetary values used in conventional BCA, and
- ▮ reflecting equity considerations (through different weights for benefits to different groups), something that is ignored altogether by conventional BCA.

Since the same weights and adjustments are applied to all initiatives, adjusted BCA offers a transparent and consistent way to test the extent to which initiatives align with transport system objectives and government priorities.

Adjusted BCA is not an essential component of appraisal in the Guidelines. It has been included as an option for governments that wish to appraise initiatives according to predetermined weights for objectives. If adjusted BCA is not used, equity must still be addressed; for example, by setting minimum standards and specifying funding shares for specific categories of initiatives (see Phase 2). Equity should be explicitly addressed in the SMT and the Business Case.

Using adjusted BCA still requires complementary information about non-monetised impacts.

Issues associated with the application of BCA and adjusted BCA (e.g. selection of weights, hurdle rates, impact of private sector participation, risk analysis) are examined in detail in Volume 3 of the Guidelines.

## 5.4 Risk analysis

Risk should be explicitly considered in the appraisal process. It comprises *downside risk*, arising from optimism bias in forecasts, and *pure risk*, the variation remaining around the mean after removing downside biases. Pure risk is further divided into *idiosyncratic risk* or random variation and *systematic risk*; that is, variation correlated with the level of general economic activity.

Downside risk includes failure to consider what can go wrong with an initiative. Political–institutional factors can also encourage proponents to overstate positives and understate negatives. Risk assessment can help to counter this optimism bias.

As long as the benefits of individual initiatives are spread widely over a large number of individuals and there are numerous initiatives, idiosyncratic risk should, largely, be diversified away. In practice, pure risk can reasonably be ignored for most initiatives—except when a single initiative has potentially large impacts on the welfare of a small number of individuals.

Alternative risk management strategies can be compared using the state-contingent approach to find the strategy that yields the highest expected net present value (NPV).

Aspects of risk analysis are discussed in Section 2.11 of Volumes 3 and 5 of the Guidelines.

## 5.5 Business Case

The Business Case is the centrepiece for presenting information about proposed initiatives to decision-makers. It should show the merit of an initiative by bringing together the results of the assessments undertaken during the appraisal process.

The aim is to present all the information required for a fully informed decision. The Business Case should:

- ▶ include all information needed to support the decision-maker and to secure necessary approvals from relevant government agencies
- ▶ be a self-contained document so that all information is in one place, with each initiative usually requiring its own Business Case, and
- ▶ be supported by detailed documents that address specific issues (e.g. environmental impact assessment, detailed BCA).

In order to facilitate fully informed decisions, information for the appraisal process must reflect the full range of impacts, address government objectives and priorities, and be appropriately rigorous. At the same time, the information must be well-presented and easily understood. The Business Case should expand and become more detailed as the initiative moves through the process.

It is critical that the Business Case, as the key and final mechanism for communicating a proposal's merits to the decision-maker, contains all relevant information, both monetised and non-monetised, quantitative and qualitative.

If an Appraisal Summary Table is used in a Business Case, care should be taken in specifying the objectives to ensure balanced coverage of all impacts. The 'triple bottom line' approach (economic, environmental and social) may be appropriate for objectives at the highest level.

## 5.6 Links to financial appraisal

A government may decide, for social or other reasons, to provide financial support to an unprofitable initiative involving a commercial organisation. Such an initiative might pass the SMT and the BCA but fail the financial appraisal, or fail all of these tests.

If the government wants the initiative to proceed for other reasons, it will need to contribute at least the minimum amount necessary for the commercial operator to receive an acceptable return on the investment. Potential forms of support include a one-off capital contribution, tax concessions, contributions of assets and subsidies.

Where a government contributes financially to such an initiative, robust financial and economic (cost–benefit) appraisals are required. Governments accept the need for commercial investors to make a fair and reasonable return on funds, commensurate with the level of risk. However, they do not support investors making excessive returns at the expense of taxpayers or the paying users of transport infrastructure.

There are several reasons why a government may wish to support an initiative that is not financially viable. They include the existence of externalities, distortionary effects of taxation, the impact of consumers' surplus and/or the cost of meeting government objectives.

### 5.6.1 Externalities

The inclusion of non-priced impacts such as externalities in a BCA is one reason why an initiative might pass a BCA test, but fail a financial test. For example, if a rail initiative results in a transfer of freight from road to rail, there may be a net saving in externality costs. However, this net saving would typically not accrue to the rail operator, and hence would be excluded from the operator's financial appraisal.

### 5.6.2 Taxation

Taxation makes it more difficult for an initiative to pass a financial appraisal compared with a BCA. Financial analysis takes account of the effects of corporate income tax, while taxes from non-labour inputs are deducted from prices in a BCA.

### 5.6.3 Consumers' surplus

BCAs include gains in consumers' surplus, which can make a significant difference where an initiative involves a new transport service or generates new demand. The effect can be particularly pronounced where there is lumpiness in investment. With a downward-sloping demand curve, the larger the initiative, the lower the price that must be charged to ensure that capacity is fully used.

For example, in the case of a new railway line, the smallest scale of investment is the cheapest possible track. If the price that ensures near-full utilisation of the line is too low to cover capital costs, it is still possible that the value to users is greater than the total cost of providing the service. This is because the value to users in a BCA is estimated on the basis of willingness to pay, which exceeds the amount actually paid (the difference being called consumers' surplus).

Railway operators may capture part of the consumers' surplus by using market power to set different prices for different tasks and customers (price discrimination). However, in most cases, competition from other modes severely limits the market power of railways. Another means is to purchase land close to proposed stations or terminals to capture increases in land values resulting from the railway initiative.<sup>17</sup>

<sup>17</sup> The AusLink White Paper states 'AusLink ... will encourage a focus on identifying and capturing increases in value from land transport investments ... (Australian Government 2004, p. 26).

#### **5.6.4 *Costs to meet a government objective***

Government contributions to private sector initiatives may be justified where the government, through legislation or negotiation, requires the private investors to modify initiatives to meet government objectives. Without a government contribution, the cost is borne by investors or users.

## PHASE

# 6

# Prioritisation and program development

### At a glance

Phase 6 involves prioritising proposals appraised in Phase 5 to develop a forward program of preferred initiatives. The key steps are to:

- › determine the priorities consistent with transport system objectives, policies and strategies identified in Phases 1 to 3
- › prioritise candidate initiatives into a potential program of preferred initiatives that can be funded within the resources available, and
- › finalise a forward program through a formal approval process.

An initial broad prioritisation of proposed initiatives is recommended to assist the decision-maker. This process is likely to incorporate several categories of priorities (e.g. A, B and C) rather than detailed priorities of individual initiatives from best to worst. If jurisdictions wish to undertake more detailed prioritisation, the process should be guided by decision-makers based on their subjective interpretation of appraisal information and any political considerations.

Program development should be guided, from the outset, by government policy choices on funding. Timing and bundling are also important considerations.

If a government intends to contribute financially to private sector initiatives, there should be a process for assessing the suitability of unsolicited proposals. Development of the forward program is usually an iterative process. Ministers have the final say over the content of the program.

## 6.1 Prioritisation

After the initiatives identified in Phase 4 are appraised in Phase 5, they need to be prioritised and developed into an actual program of initiatives. Prioritisation<sup>18</sup> is the first step—it determines the relative priority of individual appraised initiatives. Prioritisation enables decision-makers to identify and fund the most beneficial initiatives first; funding limitations mean that not all proposals can be undertaken.

The following discussion relates to prioritisation of appraised initiatives leading to program development. The related concept of setting priorities also plays an important role in earlier phases

<sup>18</sup> Prioritisation leads to a short-list of highest priority initiatives.

of the Framework. In making policy choices (Phase 2), government may also choose to specify the relative importance, or priority, of individual policy matters. In system planning, strategy development may include specification of the highest-priority challenges—a key focus, for example, of AusLink corridor strategy development.

Government may also choose to state a preference, or priority, for some types of measures relative to others. For example, non-infrastructure solutions may be preferred to infrastructure solutions in some circumstances. There is some connection between the concepts of priorities and options analysis—priority, or preference, statements are one of the key outputs of options analysis.

The level of rigour and the detail of assessment (including options analysis) to determine priorities increase as the process moves from earlier to later phases of the Framework.

### **6.1.1 Information requirements**

The aim of the Framework is to ensure that decision-makers have all the information required to make fully informed decisions. This is also an important aspect of prioritisation.

There must also be a high level of consistency between the information that guides appraisal and the information that guides prioritisation. Both monetised and non-monetised information therefore play a key role in prioritisation. The prioritisation process should allow the decision-maker to compare proposed initiatives and identify the more important benefits and costs. Non-monetised impacts may be just as important as monetised impacts, depending on the relative importance that government assigns to different objectives.

Prioritisation should therefore facilitate a comparison of the expected impacts of proposals. Incorporating both monetised and non-monetised information means this process is not straightforward. There will inevitably be an element of subjectivity, making it difficult to ‘objectively’ list proposals in detailed order of priority (i.e. from best to worst).

### **6.1.2 Broad prioritisation**

Due to this complexity, an initial broad prioritisation of initiatives is recommended to assist decision-makers. This is likely to involve several categories (e.g. priorities A, B and C), with prioritisation based on:

- ▮ the potential contribution of an initiative to jurisdictional objectives, and policies, from the SMT (from Phase 5)<sup>19</sup>
- ▮ outputs of BCA (from Phase 5)
- ▮ outputs of any non-monetised assessments (from Phase 5)<sup>20</sup>
- ▮ government policy choices on funding (Phase 2), and
- ▮ government statements on priorities.

### **6.1.3 More detailed prioritisation**

Some jurisdictions may undertake more detailed prioritisation of initiatives. This should be guided by decision-makers based on their subjective interpretation of the appraisal information and political considerations.

Several analytical approaches can be used to assist decision-makers with more detailed prioritisation. They include ranking by benefit–cost ratio (BCR) or by BCR plus the degree of ‘pass’ of the SMT (see discussion in Appendix C of this volume). Adjusted BCR (from adjusted BCA discussed in Phase 5) is another alternative method, reflecting more explicitly the relative importance government may place on different objectives. Both these techniques still require manual adjustment of rankings to incorporate non-monetised impacts.

<sup>19</sup> Prioritisation of small initiatives is likely to involve only the SMT.

<sup>20</sup> Without double-counting the BCA outputs.

Other detailed prioritisation techniques include numerically scoring impacts and weighting criteria, and conversion into either multiple scores or a single overall score reflecting the merit of an initiative. Note, however, that multi-criteria techniques have received some criticism (BTE 1999).

Detailed prioritisation also incorporates other information such as staging options, interactions between initiatives, borrowing options and the possibility of private sector contributions.

## 6.2 Program development

Following prioritisation, an actual program is developed from the list of prioritised initiatives. A program comprises a suite of appraised initiatives (from the four sources discussed in Phase 4) to be delivered within a specified timeframe and sequence. The content of the first years of the program is firm, and the content of later years is indicative. Individual initiatives may be scheduled in either earlier or later years of the program, depending on perceived urgency and other aspects of the program development process. Ministers have the final say over the initiatives that are included in the program.

Program development is a complex process that links the development of initiatives with a budget. It must be transparent, founded on sound economic and business investment principles that can accommodate the many and varied practical considerations that characterise transport initiatives.

### 6.2.1 *Level and structure of funding*

Program development should be guided from the outset by government policy choices on funding. Relevant funding policy choices from Phase 2 may include:

- ▮ establishing pools of funds by purpose, category or program
- ▮ providing priority funding for particular corridors, areas, regions or outcomes (e.g. safety)
- ▮ specifying minimum funding levels for jurisdictions to address equity issues
- ▮ specifying minimum funding levels for maintenance activities, and
- ▮ providing specific funding for certain initiatives (e.g. road widening, bridges, landscaping, rest areas and noise barriers).

The level of available funding is a major factor in choosing the initiatives to be included in a program. Total forecast funding is, however, only part of the information required to allocate funds to particular initiatives. The highest level of commitment, and the first call on funding, is funds to complete existing initiatives with a contractual commitment (e.g. works in progress, a signed contract involving a non-government entity).

The next level of commitment is for initiatives that have had funds allocated in agreed budgets or forward estimates, but for which no construction contract has been signed. While it would no doubt cause problems if these initiatives did not proceed in accordance with previously agreed timetables, they could nevertheless be cancelled or deferred by agreement between agencies if absolutely necessary for policy or other high-level reasons.

Alternative funding scenarios should also be considered. Negotiations between proponents and the funding agency regarding annual cash-flow allocations for initiatives could lead to consideration of funding scenarios not covered in original submissions. For example, prevailing weather conditions on a site may enable construction to be organised under a single contract, but spread across two financial years for funding purposes. Alternatively, it may be practical to adjust the cash flow of one or more initiatives to iron out peaks that occur in years when the requirements of multiple large initiatives overlap.

The level of discretionary funding becomes clear only when all of these considerations have been taken into account.

### **6.2.2 Timing and corridor and network considerations**

A detailed, preferred strategy for the timing of delivering initiatives should be prepared for a corridor and preferably, over time, for the whole network. Such a strategy provides some certainty to stakeholders, delivery agencies and contractors. It also allows orderly planning by all parties, including identifying relationships between corridor strategies. Where possible, programs should be developed with the aim of providing this certainty.

Corridor and area strategies will largely determine the preferred delivery strategy for maintenance and improvements to road and rail assets within a corridor or area. These strategies may include plans for systematic, incremental improvement. They identify individual initiatives and their needs, which in turn facilitate the creation of discrete packages of works, where appropriate, to progressively upgrade relevant parts of the corridor or area. Program development should consider the impact of alternative funding allocation scenarios on corridor or area strategies.

### **6.2.3 Bundling opportunities**

Preferred delivery strategies can highlight relationships between individual initiatives and help to identify potential opportunities for bundling initiatives.

For example, improving the weight-carrying capacity or width of a bridge may appear to improve a route's freight capacity. However, other works such as road widening or pavement strengthening may also need to be addressed before the whole route can be opened up to heavier freight vehicles. While the initiatives are not strictly interdependent, they are related and the relationships need to be considered as part of an overall program to improve the route.<sup>21</sup>

It may not be possible to fund a whole bundle of works in a single budget period. Nevertheless, it should be acknowledged that committing funds to one or more initiatives in a bundle requires the completion of the other works in as short a time frame as possible, to maximise the return on the initial investment.

Bundling can also be an appropriate method to implement transport system strategies in a more cost-effective manner. Implementing individual initiatives may create scattered activities without any perceptible improvement in the overall performance of any single corridor, area or route.

Furthermore, bundling initiatives for delivery as a single, large-scale package has the potential to provide cost savings from economies of scale and community benefits from earlier delivery of some initiatives. These savings need to be balanced against the likely delay caused to initiatives elsewhere, due to funding the larger package of works. Detailed program development should investigate bundling opportunities.

In rare circumstances, cost savings may be obtained by bundling like-type initiatives for different corridors or areas in a particular region to reduce mobilisation costs. In these instances, the strategies for each corridor or area need to be taken into consideration.

An initiative's BCR can be affected by assumptions made about the status of other initiatives (see Section 4.3 for discussion of interrelationships between initiatives). In extreme cases of interdependence, one initiative is worthless in the absence of another. In this situation, initiatives should be bundled together and treated as a single initiative. Corridor and area studies provide opportunities to explore relationships by testing 'what-if' scenarios.

BCAs may include sensitivity testing, guided by the findings of corridor and area studies, to show the effects of changed assumptions about the status of related initiatives. Different combinations of related initiatives should be tested to find the best combination.

<sup>21</sup> Provided both initiatives have merit, which should be the situation if they have reached the program development stage.



## 6.3 Considering private sector initiatives

Government may provide financial support to private sector initiatives where the initiatives are desirable on economic or social grounds, but unprofitable for the private sector (see discussion in Phase 5). Other reasons for government to support private sector initiatives include risk transfer, use of entrepreneurial skills and innovation. Private sector participation may also offer a means to increase the funding for transport initiatives.

### 6.3.1 *Evaluating proposals for public funding*

If a government intends to contribute financially to private sector initiatives, the proposals should be included in the prioritisation process and program development. This will help to optimise network planning and to ensure funding is directed to the most worthwhile initiatives.

To ensure consistent treatment of proposals, a process for assessing and prioritising each unsolicited proposal should be developed (see discussion in Phase 4). The process should consider evaluation criteria such as:

- ▮ *Originality*: Does the proposal represent a fresh idea or a fresh approach?
- ▮ *Depth*: How extensive is the research supporting the proposal? Have financial models and forecasts been prepared?
- ▮ *Innovation*: Are new engineering, financial, environmental or other techniques being put forward in this proposal?
- ▮ *Benefit*: What is the actual and perceived benefit to the relevant governments, the travelling public and the proponent?
- ▮ *Finance*: How are returns to the government achieved? When does the asset revert to the state? How will refinancing gains be dealt with?
- ▮ *Viability*: How have the commercial and economic risks been dealt with? What are the implications for the initiative of financial failure in operation (i.e. bondholders and stakeholders overall—relevant governments)?

These criteria could be converted into a numerical score such as those shown in Table 4.1. The extent to which the criteria are satisfied can be used to identify possible actions and outcomes for the unsolicited proposals. For instance, consider a situation where a way of converting the criteria to numerical scores has been devised. If 80–100 per cent of the criteria are met, a request for tender can be issued or an untendered contract can be negotiated with the unsolicited proponent. If the proposal meets only 40–60 per cent of the criteria, the relevant government agency can offer to buy the intellectual property embedded in the proposal. If less than 40 per cent of the criteria are met, the proposal is declined altogether.

### 6.3.2 *Involvement through PFIs and PPPs*

There has been increasing private sector participation in the financing and operation of transport infrastructure initiatives in Australia. This participation has often involved joint arrangements between the public and private sectors—private finance initiatives (PFIs) and public private partnerships (PPPs).

Private sector involvement through PFIs and PPPs should be considered by government if such involvement is consistent with specified principles. General principles to consider are presented in Box 6.1.

In order to make informed decisions, stakeholders are encouraged to review reference material on private sector involvement in infrastructure. Suggested Australian references are Public Accounts Committee (1993) and Department of Treasury and Finance (2001, 2003). References from the

United Kingdom include House of Commons Select Committee on Public Accounts (1999), Office of Government Commerce (2001) and National Audit Office (2004).

It should be noted that jurisdictions may also have PPP policies and guidelines for considering private sector initiatives.

## 6.4 Finalisation of the program

Developing a forward program is usually an iterative process. The scope and timing of initiatives may be adjusted several times before there is agreement on a final program that is affordable within available funding.

Before an initiative is included in the program, its scope, timing and cost must be refined to a high degree of confidence. This refinement requires development of the initiative to move through concept, planning, design and implementation stages (involving some overlap of phases). At each stage of the development of an initiative, there will be a re-assessment of priorities and financial commitments, including scope, cost and benefits.

Risk assessment is an essential component of program development. It is important not to overlook an agency's and local contracting industry's capacity to deliver if a number of large initiatives are funded over a short period, in a single market place. Are there likely to be any cost increases or time delays arising from a lack of competition due to the amount of work on offer if all of these initiatives are funded?

The draft program will usually require ministerial approval before it is finalised. The final program may be tabled in parliament. Consultation with key stakeholders may be required so that people understand investment priorities and the rationale underlying those priorities.

As a final step in the program development process, a reasonableness test should be applied to ensure the initiatives chosen for funding are consistent with government transport policies and strategies.

Unsuccessful proponents should be advised as early as possible of the reasons their proposals were not included in the forward program.

### **Box 6.1: Principles for considering PFI and PPP proposals**

- › Cost-effectiveness for provision of infrastructure or other initiatives.
- › Consistency with government service delivery and capital investment strategic plans.
- › Potential infrastructure to be delivered is of a standard beyond what could be delivered by the government alone.
- › Infrastructure can be supported with guaranteed services to ensure its continued usefulness, efficiency and longevity.
- › Benefits from innovation and technology.
- › Sufficient demand.
- › Tendering and evaluation processes that enable best value for money.
- › Capacity for the private sector to achieve a reasonable return on its investment.
- › Optimal risk allocation where the parties take responsibility for risks they are best able to manage.
- › Capacity of the private sector to absorb and manage risks for which it is responsible.
- › Structuring of initiatives to best allocate the risk between the parties.
- › Governments, through their sovereign debt rating, are able to borrow funds at rates below those prevailing in commercial markets.
- › Protection of intellectual property rights.
- › Subject to extensive review and scrutiny by parliaments, auditor-generals and treasuries.
- › Assessment against 'Public Sector Comparator' to determine whole-of-life cost of delivering the proposed infrastructure and ancillary services entirely by the public sector.
- › Ability to meet government policy and guidelines for the procurement of goods and services.
- › Experience of the private sector in providing infrastructure services.
- › Ensuring government project teams are resourced with the required skills and experience to assess and negotiate these contracts.
- › Capacity of the market to provide a number of competitive tenderers.
- › Transaction costs such as legal advice, due diligence, tendering and evaluation should not erode the value of the benefits to be delivered.
- › End-of-term arrangements for infrastructure.
- › Performance of parties and remedies for underperformance.
- › Complexity of arrangements.
- › Taxation implications for governments and the private sector.



## PHASE

# 7

## Program delivery

### At a glance

Phase 7 involves the delivery of initiatives contained in the forward program. The Guidelines do not provide any specific details on this phase, but some general comments can be made.

Individual initiatives are delivered by both government agencies (state, territory, local) and the private sector. Major activities include detailed planning and design, construction and commissioning, risk management and final delivery.

Program delivery involves the management of the planned program and its overall budget. Primary responsibility often rests with state or territory governments. There is also liaison between program deliverers and agencies of the funding government.

The private sector has shown increasing interest in participating in transport activities that were previously the domain of the public sector. Private sector operators can facilitate and improve the delivery of transport initiatives through contributions in areas such as funding, risk transfer, entrepreneurial skills and innovation.

### 7.1 Major activities

Phase 7 involves delivery of the approved initiatives contained in the forward program. It incorporates processes for delivering individual initiatives and managing the overall program.

The focus of Phase 7 should be a three-to five-year time frame, within which the most practical one- to three-year considerations play a key role. Normal project management principles and documentation practices apply.

Delivery of individual initiatives is undertaken by government agencies and by the private sector. The major activities include:

- › detailed project planning
- › design of approved and funded initiatives
- › construction and commissioning
- › risk management, and
- › delivery on time, within budget and to quality specifications.

Program delivery provides the context for implementing individual initiatives. A program comprises a suite of initiatives grouped to provide a total outcome. The major activities in program delivery are:

- › management of overall funding and associated financial arrangements
- › monitoring of progress on individual initiatives
- › assessment of interrelationships between initiatives
- › monitoring of contractor performance
- › reallocation of resources between initiatives required to deliver the program
- › management of delivery risk, and
- › ongoing management and operation of the network.

There is a dynamic element, with program details being modified in response to changing circumstances during the budget period.

Funding and associated financial arrangements are particularly important aspects of program delivery. For example, a delay in one initiative will reduce the immediate cash-flow requirements. This may provide an opportunity to expedite other initiatives within the program while meeting fiscal targets such as budget allocations and short-term borrowing limits.

With effective management, the program can continue to be delivered with benefits accruing to the community. Over time, all programmed initiatives should be delivered.

## 7.2 Delivery methods

Implementation arrangements typically differ significantly at the program and initiative levels. The Guidelines do not provide specific guidance on these arrangements, but some general comments can be made.

The Australian Government provides substantial funding for transport programs and initiatives (e.g. through AusLink). It has primary responsibility for program delivery, but little direct involvement in the delivery of individual initiatives. Initiatives may be implemented by government agencies (state, territory, local) or the private sector. Australian Government and state and territory agencies have substantial expertise in transport planning and coordination.

Effective delivery of Australian Government transport programs requires close liaison with state and territory agencies that have responsibility for implementing individual initiatives. The responsibilities of the states and territories particularly involve managing and operating the National Land Transport Network.

State and territory governments are now required to make a funding contribution to some national transport initiatives. In addition, they provide substantial funding for programs and initiatives on non-national transport networks, particularly arterial roads. State and territory agencies also manage the delivery of these programs and initiatives, which are undertaken either directly or through the private sector.

## 7.3 Private sector participation

The private sector is increasingly participating in the operational side of transport (e.g. private bus routes in urban areas, rail freight) as well as being directly involved in the financing and operation of transport infrastructure initiatives (e.g. toll roads).

Private sector participation is common through private finance initiatives (PFIs) and public private partnerships (PPPs). These terms are used to describe the procurement of public infrastructure and ancillary services through a joint arrangement between the public and private sectors. PFIs and PPPs are a process for delivering infrastructure, not just a source of additional funding.

The opportunity for public private partnerships in the delivery of road infrastructure initiatives has already been demonstrated in several Australian jurisdictions. Private sector funding has been used to build toll roads such as the Sydney Harbour Tunnel, M2 Motorway, M4 Motorway, M5 Motorway and Eastern Distributor in Sydney, and Melbourne CityLink.

Governments are increasingly looking to public private partnership models to redevelop existing rail infrastructure. Contributions to rail infrastructure by government business enterprises or the private sector are becoming common where they can facilitate the achievement of governments' broader transport objectives.





## PHASE

# 8

## Performance review

### At a glance

Phase 8 of the Framework covers performance review, based on post-completion evaluation. The evaluation process covers:

- › actual versus desired outcomes
- › effectiveness of initiatives in achieving performance targets, and
- › effectiveness of the entire Transport System Management Framework.

It is important to assess the actual contribution of individual initiatives to achieving transport system objectives. This should be complemented by a progressive review of linked objectives (e.g. at link, route, corridor/area and network levels) to assess contributions at each level.

Post-completion evaluation should consider questions such as:

- › Was the correct strategy chosen and did the defined network contain the most appropriate corridors or areas?
- › Were the best initiatives selected for the program?
- › Were the initiatives correctly implemented?

Post-completion evaluation can identify significant factors that have contributed to differences between actual and desired outcomes. Where these factors reflect the underlying methodology, the Guidelines should be reviewed.

Regular review of the Guidelines and associated methodologies will provide a basis for continuous improvement and development. Any reviews should be undertaken in close consultation with users of the Guidelines.

### 8.1 Post-completion evaluation

Following the delivery of the initiatives selected using the Guidelines, it is important to undertake a review process to assess and, where appropriate, improve the Transport System Management Framework. The process covers:

- › *Actual versus desired outcomes:* What were the actual transport system outcomes that eventuated, and how do they compare with the ex-ante stated, desired transport system performance targets?

- › *Effectiveness of initiatives*: Have the initiatives, programs, strategies and policies helped or hindered the process of pursuing agreed performance targets? Were they well-delivered?
- › *Effectiveness of the Transport System Management Framework*: Did the phases of the Framework outlined in the Guidelines contribute to the desired outcomes? Were transport system objectives met? What revisions to the Framework should be made to improve decision-making?

Figure 8.1 provides an overview of the post-completion evaluation process.

## 8.2 Review of transport system performance

The Framework starts with stating the transport system objectives and performance targets. These are the desired outcomes to which specific initiatives are expected to contribute.

The first review step is to assess system performance against each objective (e.g. efficiency, safety, security, environment, equity) and its performance targets. This requires the measurement of actual outcomes and comparing them with the stated, desired outcomes. For example, consider the reduction of fatalities as an objective. Any reduction in fatalities is clearly desirable. However, if a safety performance target of a 20 per cent reduction in the number of recorded fatalities over a ten-year period has been set, it is necessary to determine whether or not the initiative delivered against this target.

Once performance against each objective has been assessed, the review should assess the causes of any under- or over-performance.

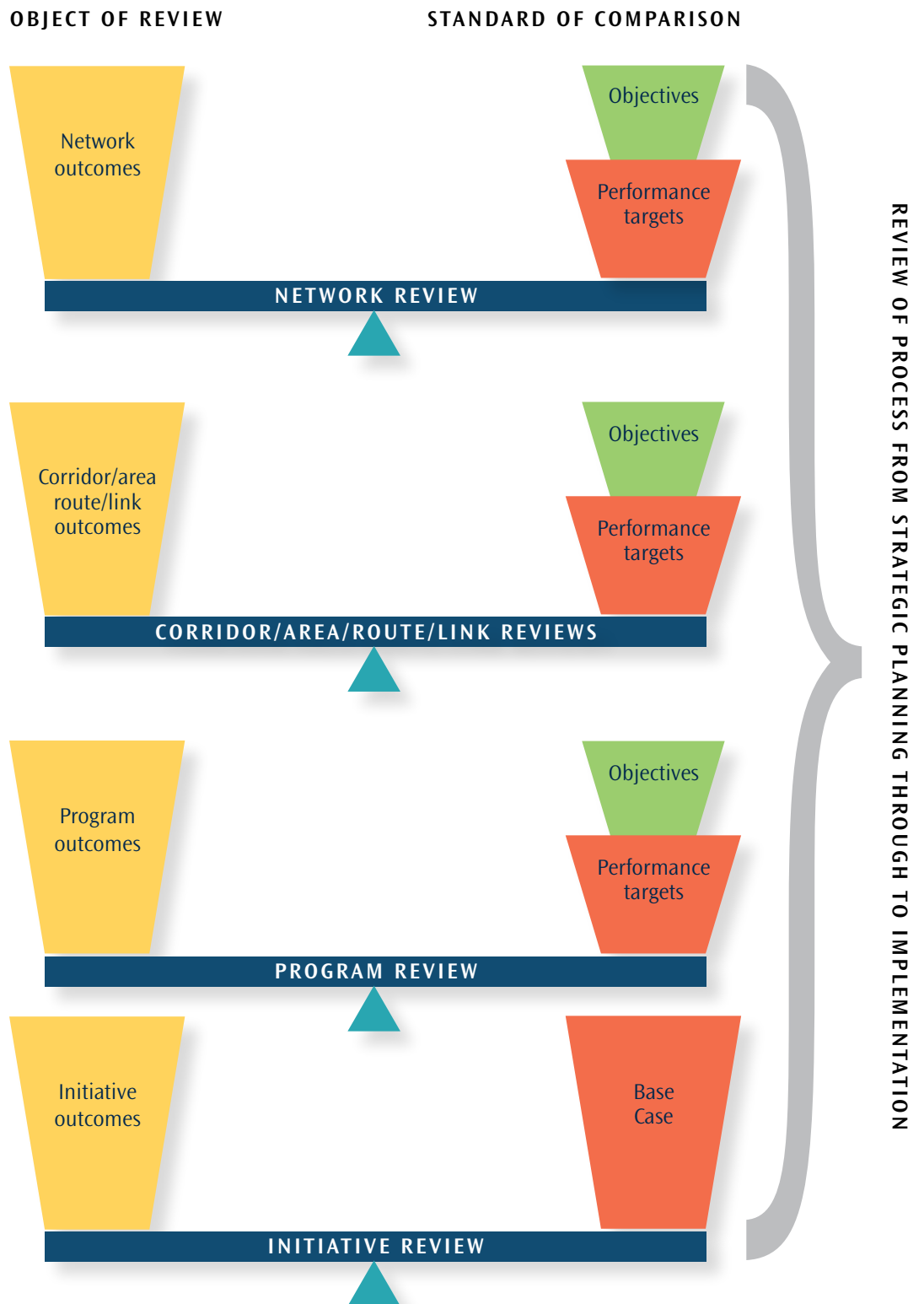
The collection of linked objectives (see Table 1.1) provides an effective mechanism for reviewing the success of programs and their components. A review should progress through these objectives in reverse order from bottom to top—i.e. from initiatives to the network (see Figure 8.1).

The review should consider whether the objectives of the initiative were met. Post-completion evaluation of individual initiatives may consist of a review of how the decision was made, how the initiative was delivered (timeliness, within budget, within scope), how well the initiative achieved its objectives or the extent to which forecasts in the BCA were realised (e.g. construction costs, operating costs, demand levels, accident rates, other benefits). It is also important to assess the extent to which the initiative has contributed to the higher-level transport system objectives.

The post-completion evaluation may extend to a full ex-post BCA with assessments of environmental, social and regional impacts. If the actual outcomes are markedly different from the desired outcomes, the evaluation should explore factors contributing to the variation.

Post-completion evaluation of individual initiatives is discussed further in Section 2.20 of Volume 3.

Figure 8.1: Post-completion evaluation



Comparisons of actual outcomes with desired outcomes should be conducted within consistent timeframes. It is unreasonable, for example, to compare desired outcomes for an initiative running over 15 years with actual outcomes after five years. Actual outcomes after five years should be compared with stated desired outcomes after five years.

After reviews at the initiative and program levels are completed, reviews for other levels of linked objectives should be undertaken—i.e. link, route, corridor and area.

For example, at the corridor or area level, the first step in the review should be to assess whether the corridor or area objectives have been achieved. This analysis should be undertaken on a corridor-by-corridor or area-by-area basis, and consider all the initiatives implemented within each corridor or area, i.e.

$$\sum_{i=1}^n (P_i) = C_t$$

where there are  $n$  initiatives,  $P_i$  represents the outcomes resulting from initiative  $i$ , and  $C_t$  represents the aggregated realised outcomes for corridor or area  $t$ .

For each corridor or area, actual outcomes should be measured and compared with the desired outcomes reflected in the corridor or area objectives or targets. Where there is under- or over-performance, contributing factors should be considered in terms such as:

- » Did the assumptions reflect ultimate reality?
- » Was the analysis based on suitable and reliable data?
- » What were the within-corridor or within-area impacts?
- » What were the off-corridor or out-of-area impacts?
- » Did off-corridor or out-of-area developments have an unexpected impact on the scheduling of initiatives under the corridor or area strategy?
- » Was the scheduling of initiatives appropriate?
- » What were the cross-modal impacts?

A similar review process should also be undertaken at the network level through comparing actual network performance with desired outcomes as stated in network targets, and through exploration for causes of under- or over-performance. This requires consideration of all actual outcomes across all corridors and areas, i.e.

$$\sum_{j=1}^m (C_j) = N_a$$

where there are  $m$  corridors or areas,  $C_j$  represents the outcomes resulting from corridor or area  $j$ , and  $N_a$  represents aggregated realised outcomes for network  $a$ .

If actual network performance does not meet the network targets, and hence does not contribute to meeting transport system objectives, several questions should be asked:

- » Were sufficient corridor or area options identified and assessed?
- » Was the best set of corridors or areas included in the program—i.e. did they contain the right routes?
- » Was this the best network?
- » Is there a need to review the policy or program (e.g. in the case of national land transport, review of the entire AusLink initiative)?
- » Is the set of transport system objectives appropriate?

A final step in the review process may be to assess whether individual transport system objectives were conflicting and, if so, how that affected actual outcomes. Transport system objectives are often interrelated—achieving one objective may influence the degree to which another objective can be achieved.

Over time, as governments change or the emphasis of government objectives and priorities varies, there will need to be a review of transport system objectives, policy directions and strategies. This will be particularly important if there are gaps emerging in long-term strategic policy.

Review of the overall performance of the transport system aims to assess whether ‘we are doing things right’ (a technical or process efficiency question) and whether ‘we are doing the right things’ (an effectiveness question) to achieve the agreed, desired objectives and outcomes.

Together with ongoing stakeholder engagement and the evaluation of changing funding scenarios, the review process should guide the refinement of all phases of transport system management—from objective setting through to program delivery. The entire process relies on the presence of strong feedback loops between the phases as well as two-way dialogue between agencies and their governments, communities and stakeholders.

## 8.3 Review of the Guidelines

Evaluation of the overall policies and programs should provide valuable insights into differences between actual and desired outcomes, and factors contributing to differences at each stage of the review process.

As indicated above, many factors may contribute to those differences. They include cost estimates, projected benefits, timing of impacts and unintended impacts (positive or negative). However, where the differences are attributable to the underlying methodology in the Transport System Management Framework, the Guidelines should be independently reviewed.

Hence, it is important to have continuous improvement and development of the Guidelines and associated methodologies. The second edition of the Guidelines represents the state of play at the end of 2006. The Guidelines are a living document. They will continue to be updated, improved and extended in close consultation with users.



## APPENDIX

# A

# Interpreting the elements of the transport system

Figure 2 and Box 2 define the transport system and its elements (network, corridor, area, route, link) for the purposes of the Framework. This appendix provides a more detailed interpretation of these elements in various settings.

## Non-urban setting

The non-urban setting can be considered in terms of the interstate case and the intrastate case.

### *Interstate case*

The interstate case may involve a connection between two capital cities (e.g. Melbourne and Sydney) or between a capital city and a regional centre on the National Land Transport Network (e.g. Melbourne and Albury).

Figure A.1 shows an interstate corridor that runs between capital cities A and B (e.g. Melbourne and Sydney). Regional city R lies along the corridor between the capital cities. The corridor between A and B contains two uni-modal routes:

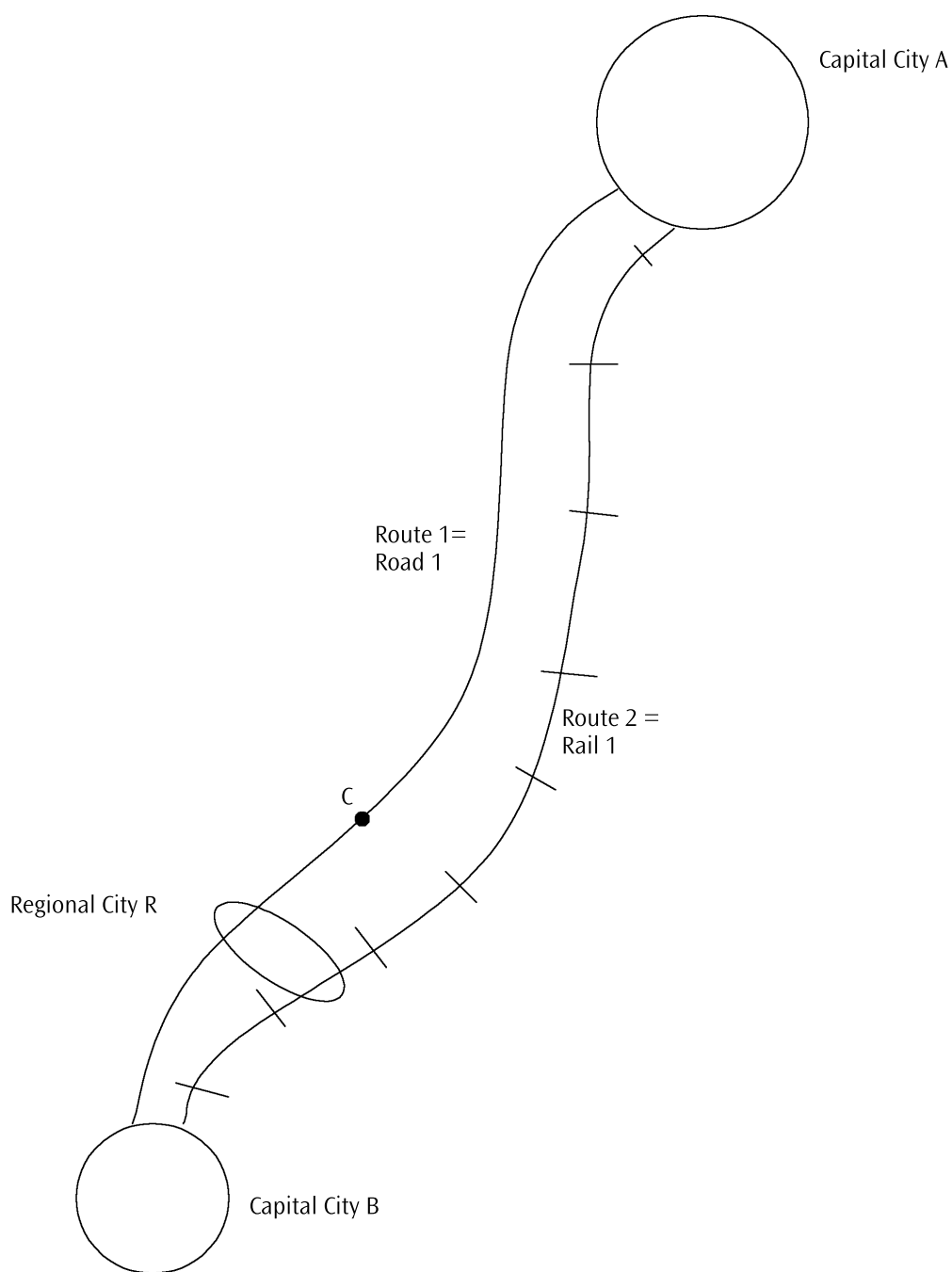
- › Route 1—Road 1 (between A and B)
- › Route 2—Rail 1 (between A and B).

AusLink network planning would have determined that these two routes are part of the National Land Transport Network. In most interstate corridors, a substantial proportion of the total transport task originates at, or moves to, centres along the corridor rather than end-to-end.

Corridor planning is a multi-modal exercise (see Phase 3 discussion) resulting in a corridor strategy. The strategy for the corridor between A and B sets the context for further, more detailed route and link planning.

The next step is route planning undertaken for Route 1 and Route 2, in the context of the multi-modal corridor strategy. Route planning can involve an entire route or segments of a route (see discussion of link planning below).

Figure A.1: Interstate setting



Where a new route is required, route planning considers alignment options, including detailed planning for the preferred alignment. This leads to purchasing land for future development of the new route.

Link planning is then undertaken for each link, with Priority Links usually nominated for attention first, in light of funding limitations. A link is a homogenous segment of a route and is therefore smaller than a route. A route will contain a collection of links—e.g. in Figure A.1, the segment of Route 1 between R and C might be defined as ‘Link RC’.

Route and link planning are not addressed in any detail in the Guidelines (see Phase 3 for a brief discussion). It is expected that bodies such as Austroads will address this more specialist, detailed type of planning in the future.



### *Intrastate case*

The approach used in the interstate case above can easily be applied to the intrastate setting. Instead of A and B being capital cities, they may be regional cities or centres within a state or territory, or a capital city and a regional centre within a state or territory. Routes 1 and 2 are a primary state or territory arterial road and a rail line, neither of which are on the National Land Transport Network.

Many intrastate settings will not involve multiple modes in a corridor. For example, they may incorporate transport to more remote parts of a state or territory that are generally served only by road. The corridor would then be uni-modal, possibly with parallel competing road routes.

## Urban setting

Corridors are most commonly used for non-urban settings because the transport routes between major centres of population and activity are usually long and continuous. Corridors are typically long and thin, with most movements occurring along a single axis (e.g. north–south).

In urban settings, considering an area, rather than a corridor, is more appropriate as population and activities are spread out in all directions. As a result, ‘areas’ contain highly dispersed travel origins and destinations, with intersecting routes. The degree of complexity and interaction is therefore greater than in non-urban settings. Concentrating on areas allows complex interactions to be best considered in an integrated and interrelated manner.

The complexities of transport patterns in urban areas also mean that detailed urban travel demand and transport analysis models are required in urban policy and planning. The models are usually much more complex than those used for non-urban transport policy and planning.

Figure A.2 presents a stylised sketch of a capital city. For the metropolitan area (Area U), policy and planning work would consist of:

- ▮ classification of infrastructure hierarchies—e.g. freeway versus arterial versus local roads, collector roads versus non-collector local roads, freight versus passenger rail lines, and
- ▮ policy issues such as the role of land use planning and travel demand management.

Planning should then occur for urban sub-areas. Figure A.2 shows some of the sub-areas in the urban area. Figure A.3 then shows Sub-Area 1 in more detail. This sub-area has two urban corridors that intersect (Corridor NS and Corridor EW), with each corridor consisting of several routes (see Table A.1).

Area planning occurs for Sub-Area 1 in the context of complex interactions occurring within the sub-area and the broader metropolitan area. Route planning should be undertaken for each route, with activities for new routes involving the consideration of alignment options and identification of the preferred alignment.

Each route can be broken into links—e.g. Road 1 has Link ab and Link bc. Some links may be nominated as Priority Links (as noted in the discussion of the non-urban setting). A Link Plan is produced for each link.

The same process is then repeated for all other sub-areas and the elements within them.

## Regional setting

Referring back to Figure A.1, planning is also required for regional city R. This requires area planning, in the context of the national corridor AB. The concept of routes and links will apply equally in this setting.

Another example of area planning is planning for a region (e.g. the integrated region planning that has occurred for South-East Queensland).

## Inter-modal

Inter-modal interchanges will occur at various points throughout the network, where people or freight switch from one mode to another during the journey.

## Local setting

The above approach may also be applicable at the local government level, with some modification.

Figure A.2: Urban setting

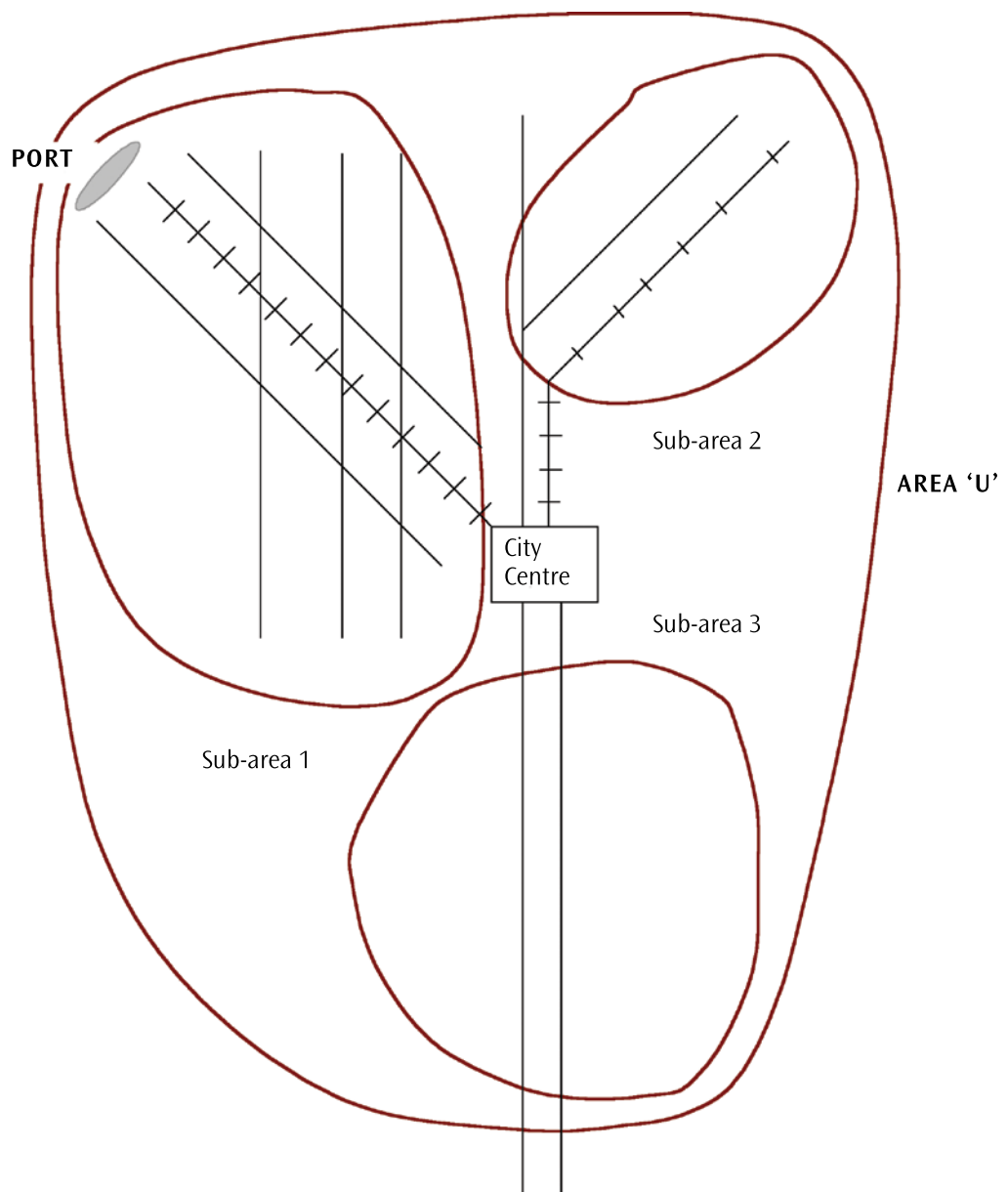


Figure A.3: Sub-area 1

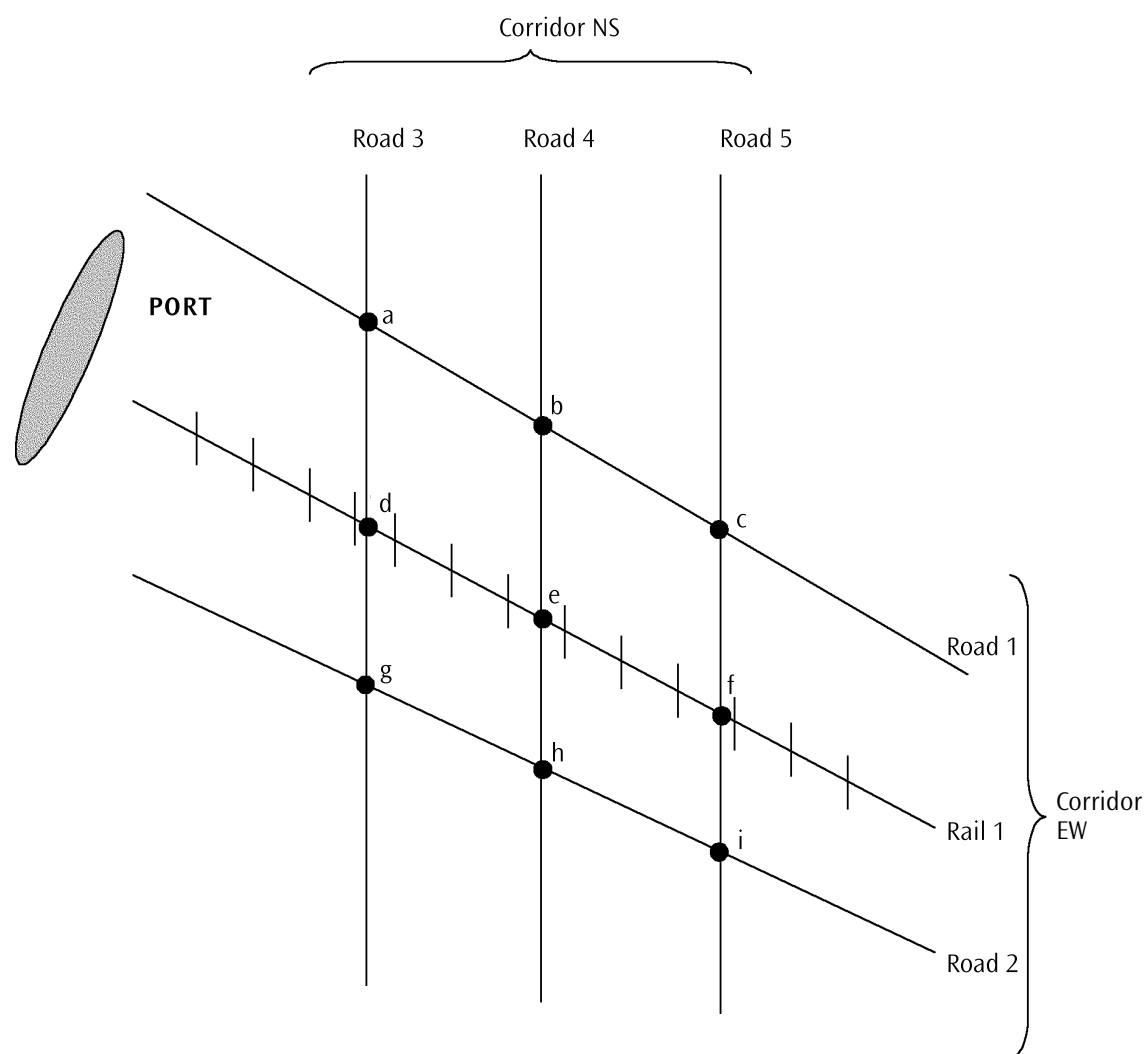


Table A.1: Routes in Corridor NS and Corridor EW

ROUTE TYPE	CORRIDOR NS	CORRIDOR EW
Road routes	Road 3, Road 4, Road 5	Road 1, Road 2
Rail routes		Rail 1



## APPENDIX

# B

## Benefit–cost analysis and objectives

Benefit–cost analysis (BCA) provides guidance on how to pursue the economic efficiency objective. By definition, a change (e.g. a transport initiative) improves economic efficiency (i.e. provides a net benefit to society) if the gainers from the change could potentially use their gains to compensate the losers and still have something left over (the ‘Kaldor–Hicks’ criterion). This compensation is measured in monetary terms based on the values people place on the gains and losses.

The economic efficiency objective subsumes environmental and safety objectives to a certain extent. However, it does not cater at all for the equity objective.

### Environmental and safety objectives

In BCA, improvements in the environment and safety are counted as gains to the extent they are valued by the beneficiaries. Considerable research has been undertaken into ways to measure the value of these improvements in monetary terms. If the resultant values are used in BCAs, then pursuing the economic efficiency objective results in environmental and safety objectives being promoted in line with community values.

In practice, however, environmental and safety objectives are often pursued in their own right. There are three reasons for this:

- 1** The concept of economic efficiency is based on a value judgement of consumers’ sovereignty. Governments and interest groups may wish to reject this value judgment in some cases. Environmentalists may argue that the public undervalues the environment, while developers may take the opposite view. Justifications for rejecting consumers’ sovereignty include the view that people have insufficient knowledge of the issues to make informed judgments, that they do not give adequate weight to the interests of future generations or even their own futures, and that consumers’ monetary valuations are affected by income levels. For example, poorer people and societies tend to place less weight on safety and the environment.
- 2** It may be impossible to arrive at a reliable estimate of people’s monetary valuations of environmental and safety effects. Significant progress has been made in recent years in developing statistical and survey techniques to elicit people’s valuations of environmental effects (contingent valuation methods, conjoint analysis). However, these techniques are far from perfect and are expensive to apply.
- 3** Transparency may provide a reason for separating out environmental and safety objectives. Governments want to make it clear that they are giving these concerns proper consideration.

## Equity objective

The economic efficiency objective does not cater at all for the equity objective, which considers who gains and who loses from a change. As a way of conceptualising the distinction, economic efficiency is concerned with the size of the pie while equity is concerned with how the pie is divided up. In practice, the two concepts cannot be kept separate in this way. No initiative increases the size of the pie without also changing the way it is divided up—there are always gainers and losers.

The equity implications of proposed initiatives must always be considered alongside efficiency implications. In doing so, trade-offs between the objectives may need to be made—i.e. one objective must be sacrificed to some extent in order to increase the extent to which the other objective is achieved. Decisions about the relative importance of individual objectives rest on value judgements. In public sector decisions, the value judgments are specifically those of the elected government.

A value judgment is a statement that implies a recommendation. Given the right data and model, a computer can estimate the economic efficiency implications of a proposed initiative. However, regardless of the result, it requires a value judgment to say whether or not the initiative is desirable. A value judgment is inevitably subjective.

Whether the distributional implications of an initiative are equitable or inequitable can only be determined by making a value judgment.

Where economically inefficient initiatives are identified as a way to further an equity objective (e.g. upgrading a low-trafficked road in a remote area), government should also consider whether there are more economically efficient ways to achieve that objective. For example, the funds for a road upgrade might be more effectively spent on health or education in the area (i.e. the community may value the latter more highly).

The subjective basis of the assessment process is not an excuse for an ad hoc approach. Government's value judgments should be applied in a consistent, rigorous and transparent way across a large number of potential initiatives to identify and select the set of initiatives that best meets the government's objectives within budget constraints.

## APPENDIX



# Ranking by benefit–cost ratio

The discussion in Phase 6 proposed a broad prioritisation of initiatives (e.g. priorities A, B and C) for program development. It also pointed to several possible approaches that could assist jurisdictions if they choose to undertake more detailed prioritisation. Ranking by benefit–cost ratio (BCR) was one of those techniques. BCR is the ratio of economic benefit to economic cost of a proposed initiative.

If the BCR accounts for all benefits and costs, economic efficiency (i.e. net economic benefit to society) is maximised by undertaking initiatives in descending order of BCR until the budget is exhausted. This approach identifies the package of initiatives that yields the maximum combined net present value out of all the possible packages of initiatives that fit within the budget constraint. Objectives other than economic efficiency will be advanced if they are consistent with economic efficiency.

This appendix discusses some issues related to ranking initiatives by BCR.

## Combinations of initiatives

Ranking by BCR is not guaranteed to give the best economic efficiency outcome if initiatives are large relative to the budget constraint and, after funding the last initiative that can be afforded, there are still some funds left over. To demonstrate this, say, after funding higher-BCR initiatives, there is \$100 million left in the budget. The next three proposals in the BCR order of merit are A (cost \$50 million, BCR 4.0), B (cost \$100 million, BCR 3.5) and C (cost \$50 million, BCR 2.0).

After funding initiative A, the remaining \$50 million is insufficient to pay for initiative B. Initiative C, however, could be included. The total benefits from implementing initiatives A and C together would be  $[\$50\text{m} \times 4.0] + [\$50\text{ million} \times 2.0] = \$300\text{ million}$ . However, if the \$100 million were used instead to fund initiative B, the total benefits would be  $\$100 \times 3.5 = \$350\text{ million}$ . Different combinations may have to be tested to find the best (maximum net present value) combination out of all possible combinations that fit within the budget constraint.

## Borrowed funds and marginal BCR

Under a budget-constrained approach, government agencies should seek to shift funds through time by borrowing or lending at the discount rate to fund projects where the BCR for the marginal initiative (or the cut-off point) is consistent over time.

To demonstrate this, say that the marginal BCR is 2.0 this year and will be 3.0 next year. If \$1 of capital spending was shifted from this year's budget to next year's budget, society would forgo \$2 in benefits. The \$1 could be invested elsewhere for the year so it would be worth  $\$1 \times (1 + r)$  next year, where  $r$  is the discount rate. The benefit from investing this amount in next year's initiatives would be  $\$3 \times (1 + r)$ , which is worth \$3 when discounted back to this year. The net gain to society is \$1 in benefit in present value terms. As more funds are shifted from this year to next year, the marginal BCR this year will rise and the marginal BCR next year will fall. When the point is reached at which the marginal BCRs are equal, no further gains can be made by shifting funds through time.

The implication for governments is that investment budgets should be expanded in times when there is a strong demand for funds (expressed in greater numbers of initiatives with high BCRs) and contracted in times when demand is weak, with a view to maintaining a fairly constant cut-off BCR over the long term.

## Incremental BCR and staged initiatives

A further source of complexity is staged initiatives. There may be a choice to delay a stage or stages of an initiative until a later period. For ranking in the present period, subsequent stages of the initiative may be treated as separate initiatives with the incremental BCR used for ranking.

## Combining BCR and SMT results

A government might give a more (or less) strategically meritorious initiative a higher (or lower) score (or ranking) than the initiative would receive from consideration of the BCR alone. Such decisions might be facilitated by having multiple levels of pass for the SMT. For example, there could be a 'high pass' and a 'low pass'. An initiative with a 'high pass' on the SMT could be accorded preference over an initiative with a higher BCR but a 'low pass' on the SMT. For proposals where non-monetised factors are likely to play a greater role in decision-making, having multiple levels of pass for the SMT is a useful method.

The advantage of multiple levels of pass for the SMT is that this approach can be used to highlight initiatives that score particularly well on achieving government objectives. Examples include small initiatives or initiatives in less-populous areas that cannot be accepted on the basis of the BCA alone. Multiple levels of pass for the SMT can also increase the transparency and consistency of the assessment process.

An enhancement is to link SMT pass levels with BCR hurdle rates. However, if the number of levels of SMT pass is set far above 2, the assessment process may become overly complicated, with considerable subjectivity introduced in determining ratings of initiatives.



## BCR hurdle rates

The use of hurdle rates for BCRs is optional. A decision has to be made about whether to employ a hurdle rate and, if so, whether initiatives with a BCR below the hurdle rate should be rejected.

When hurdle rates are used, a rate of 1.0 implies that uneconomic initiatives (i.e. initiatives with negative net present value) should be rejected. When funds are scarce relative to the supply of initiatives with BCRs above 1.0, the hurdle rate should be set well above 1.0 if it is to be an economically efficient rationing mechanism.

It is important to decide whether the assessment process should include the flexibility to accept initiatives that are assessed to be poor on economic efficiency grounds, whether in absolute terms (that is,  $BCR < 1.0$ ) or relative to other initiatives. Presumably, those initiatives would be attractive on other grounds if they were to be accepted. The trade-off of greater flexibility to accept less efficient initiatives is that the program will be tilted in a way that gives less weight to the economic efficiency objective. Hurdle rates provide a safeguard against this.

There are several ways to use a hurdle rate, with at least five options being available:

- ▮ **Hurdle BCR**—A hurdle BCR is specified and any proposal that falls below the hurdle is rejected outright. It might be decided to set a higher hurdle rate for the rapid BCA than for the detailed BCA, because of the greater likelihood of optimism bias in projections of costs and benefits for the rapid BCA. A lower hurdle rate might be set for off-network initiatives in low-demand regional areas.
- ▮ **Hurdle BCR = 1.0**—No uneconomic initiatives will be accepted.
- ▮ **Multiple hurdle rates**—This option is linked with the idea of having multiple levels of pass for the SMT. For example, under a two-tier system, there would be a lower hurdle rate for initiatives that achieve a high pass on the SMT, and a higher rate for initiatives with a low pass. Table C.1 illustrates the concept.
- ▮ **No hurdle rate**—Governments may accept low-BCR initiatives, including uneconomic initiatives, in preference to high-BCR initiatives where they are considered to have high strategic merit or perform well on the adjusted BCA or are particularly effective in meeting certain objectives favoured by the decision-maker.
- ▮ **Quota system**—An upper limit could be imposed on the percentage of funds applied to initiatives with BCRs below the hurdle rate (1.0 if the quota is to prevent economically inefficient initiatives). Some jurisdictions impose a percentage target (e.g. 95 per cent) for funds spent on economically justified initiatives (hurdle rate above 1.0).

Some of these options allow equity considerations to be injected into the decision-making process.

**Table C.1: Two-tier Strategic Merit Test pass—hurdle rate system**

BCR	SMT		
	FAIL	LOW PASS	HIGH PASS
Below lower hurdle rate	Reject	Reject	Reject
Between lower and upper hurdle rates	Reject	Reject	Accept
Above upper hurdle rate	Reject	Accept	Accept



## APPENDIX

# D

## Abbreviations

AADT	Annual average daily traffic
ALGA	Australian Local Government Association
ARTC	Australian Rail Track Corporation
ATC	Australian Transport Council
BCA	Benefit–cost analysis
BCR	Benefit–cost ratio
BTCE	Bureau of Transport and Communications Economics
BTE	Bureau of Transport Economics
BTRE	Bureau of Transport and Regional Economics
COAG	Council of Australian Governments
DIER	Department of Infrastructure, Energy and Resources
DOTARS	Department of Transport and Regional Services
GIC	Guidelines Implementation Committee
NPV	Net present value
NTDF	National Transport Data Framework
PFI	Private finance initiative
PPP	Public private partnership
SCOT	Standing Committee on Transport
SMT	Strategic Merit Test
UK	United Kingdom



## APPENDIX

# E

## Glossary

Appraisal	Process of determining impacts and overall merit of a proposed initiative, including the presentation of relevant information for consideration by the decision-maker. Undertaken in Phase 5.
Area	Defined geographic space and all the transport routes within it. Incorporates the pathways that enable the movement of people and freight between the diverse and multi-directional set of origins and destinations within the area. Most relevant in urban settings.
Assessment	Generic term referring to quantitative and qualitative analysis of data to produce information to aid decision-making.
AusLink	Australian Government initiative designed to achieve better national land transport planning, funding and decision-making.
Australian Local Government Association	National association that represents the interests of local government at the national level.
Average Annual Daily Traffic (AADT)	Total number of vehicles passing a point on a road in a year divided by 365 (or 366 for a leap year).
Benefit–cost analysis (BCA)	Analysis of the benefits and costs to society of a proposed initiative. Aims to value benefits and costs in monetary terms and provide a summary indication of the net benefit. Mainly undertaken in Phase 5 of the Framework.
Benefit–cost ratio (BCR)	Ratio of the present value of economic benefits to the present value of economic costs of a proposed initiative. Indicator of the economic merit of a proposed initiative presented at the completion of benefit–cost analysis. Commonly used to aid comparison of initiatives competing for limited funds.
Business Case	A document that brings together the results of all the assessments and analyses undertaken of a proposal for an initiative. 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 with the proposal and to secure necessary approvals from the relevant government agency.

Challenge	Reason for action that results from a gap between actual and desired outcomes. In this document, used as a generic term that covers related terms such as problem, issue, deficiency, opportunity and need.
Corridor	The parallel or competing modal routes between two locations (e.g. road and rail routes between two capital cities). A corridor is multi-modal where more than one mode operates, and uni-modal where only a single mode operates (e.g. in many rural areas).
Corridor/area strategy	A cooperative long-term plan that identifies the transport challenges within a corridor or area and the potential initiatives and priorities to meet those challenges. Mainly developed in Phase 3.
Corridor/area study	Assessment of a single corridor or area using data collection and analysis. Provides information to support development of a corridor or area strategy. Undertaken in Phase 3.
Deficiency assessment	Comparison of the network and its components with specified benchmarks. May compare transport system performance or physical infrastructure with benchmarks. Undertaken in Phase 3.
Demand forecasting	Estimating transport demand in a particular year or over a particular period. Undertaken in Phases 3 and 5.
Economic warrant	Identified initiative is warranted on economic grounds if the present value of benefits exceeds present value of costs and first-year rate of return exceeds discount rate. These values and rates are calculated as part of an economic or benefit–cost analysis.
Evaluation	Specific process of reviewing the outcomes and performance of an initiative after it has been implemented. Undertaken in Phase 8.
Hurdle BCR	Minimum acceptable benefit–cost ratio that a proposed initiative must attain before it can be considered for funding.
Infrastructure	Civil engineering structures that have been built to facilitate the movement of people and/or goods for various social and business reasons.
Infrastructure targets	Quantity and standard of infrastructure that is desired at some future time.
Initiative	Any action to address a transport challenge. It could consist of an infrastructure or non-infrastructure intervention. The term ‘project’ is often used for such actions but it is limited by a perceived association with infrastructure.
Intelligent transport systems	Integrated application of modern computer and communications technologies to transport systems to improve transport safety, use of infrastructure, transport operations and the environment.
Inter-modal	Involving transfer of passengers and/or freight between transport modes (e.g. road to rail).
Jurisdiction	Australian Government, state or territory government, local government, or a combination.
Link	Homogeneous segment of a route. Includes an inter-modal facility.

Maintenance	Incremental work to restore infrastructure to an earlier condition or to slow the rate of deterioration. Distinct from construction and upgrading.
Multi-modal	Has several meanings. Can refer to passenger or freight movements that use more than one transport mode (e.g. road and rail). A ‘multi-modal’ focus means an approach to addressing transport challenges that considers the full range of potential solutions across all modes.
National Land Transport Network	Single integrated network of land transport linkages of strategic national importance. Based on national and inter-regional transport corridors (including connections through urban areas), connections to ports and airports, and other rail/road inter-modal connections that together are of critical importance to national and regional economic growth, development and connectivity.
Network	Collection of routes that provide interconnected pathways between multiple locations for similar traffics. Can be multi-modal (typically comprising several uni-modal networks) or uni-modal.
Network assessment	Assessment of a whole network using data collection and analysis. Provides information to support development of network and corridor or area strategies. Undertaken in Phase 3.
Objective	Statement of a desired outcome that has not yet been attained.
Off-network	Initiatives located off the designated national network.
On-network	Initiatives located on the designated national network.
Option	Alternative possible solution to a challenge.
Outcome	State, or condition, of a system or sub-system (e.g. degree of safety on a road or level of climate change).
Performance indicator	Measure that enables monitoring of performance in terms of progress towards a specific defined objective. Usually based on a transport attribute that is relevant to transport users (e.g. travel time, safety, reliability) or to the community in general (e.g. sustainability). Should be expressed in neutral terms so that there is no in-built bias as to how desired performance might be achieved.
Performance target	Level of performance that is sought for a specific defined performance indicator and hence objective.
Post-completion evaluation	Review of a completed set of actions to determine whether the desired or forecast ends have been realised, and to explain the reasons for the outcomes. Aim is to discover lessons for the future. Undertaken in Phase 8.
Program	Suite of appraised initiatives to be delivered within a specified time frame and sequence.
Route	Physical pathway connecting two locations for a particular mode. In land transport, consists of a continuous length of infrastructure (road, rail line). In shipping and aviation, delineated by operating or regulatory or administrative practices (shipping lane, air route).
Strategic merit/ strategic fit	Extent to which objectives of a proposed initiative align with objectives and policies of the government as set out in strategy and other documents.

Strategic Merit Test (SMT)	Largely qualitative series of questions that provides a first-order determination of the ‘strategic merit or fit’ of an identified initiative. Identifies proposals that should proceed to the next stage of appraisal, proposals that require further scoping, and proposals that should be abandoned because they lack strategic fit. Also includes checks to ensure that the initiative has been properly formulated and is feasible.
Strategic planning	High-level planning involving fundamental direction-setting decisions. Narrows down the types of options that will be pursued. Involves consideration of present and future environments. Asks questions such as: ‘Are we doing the right thing?’ ‘What are the most important issues to respond to?’ and ‘How should we respond?’ Balances many competing considerations including value judgements, subjective assessments and political considerations. Involves iteration, stakeholder consultation and analysis.
Transport system	<p>For a particular jurisdiction (or a multi-jurisdictional setting), comprises the following elements:</p> <ul style="list-style-type: none"> <li>› relevant transport networks—sets of routes that provide interconnected pathways between multiple locations for similar traffics</li> <li>› transport user sub-system—people, goods and vehicles/wagons/etc using the network</li> <li>› regulatory and management sub-system—regulatory regime and systems for managing the traffic that uses the network (including access arrangements, registration and licensing, traffic management centres and intelligent transport systems)</li> <li>› transport operating environment—e.g. land use development patterns that generate traffic on the transport network</li> <li>› physical environment—e.g. geographic features, climate, air quality, and</li> <li>› social environment—e.g. accessibility, amenity, liveability.</li> </ul>



## APPENDIX

# F

## References

- ARTC 2001, *Interstate Rail Network Audit—Audit of ATC Performance Targets*, April, Appendix B. Available at [http://www.artc.com.au/library/appendix\\_b.pdf](http://www.artc.com.au/library/appendix_b.pdf)
- ATC 2004a, *National Guidelines for Transport System Management in Australia*, Australian Transport Council, Canberra.  
— 2004b, *National Transport Data Framework*, Australian Transport Council, Canberra.  
— 2005, *About the Australian Transport Council*, Australian Transport Council, Canberra. Available at [http://www.atcouncil.gov.au/about\\_us/about\\_us.aspx](http://www.atcouncil.gov.au/about_us/about_us.aspx).
- Australian Government 2004, *AusLink White Paper*, Department of Transport and Regional Services, Canberra. Available at <http://www.auslink.gov.au/policy/overview/background/whitepaper/index.aspx>.
- BTE 1999, *Facts and Furphies in Benefit-Cost Analysis: Transport*, Report 100, Bureau of Transport Economics, Canberra.
- Department for Transport (UK) 2004, *Transport Analysis Guidance Website*. Available at <http://www.webtag.org.uk>.
- Department of Treasury and Finance 2001, *Partnerships Victoria: Overview*, Melbourne.  
—2003, *Partnerships Victoria: Overview*, Melbourne.
- Harvey, M. 1995, 'Assessing the adequacy of national transport infrastructure: A methodology', *Road and Transport Research*, 4(1), pp: 58–67.
- House of Commons Select Committee on Public Accounts 1999, *Getting better value for money from the Private Finance Initiative: 23rd Report of the House of Commons Select Committee on Public Accounts*, London.
- Industry Canada 2003, *The Public Sector Comparator: A Canadian Best Practice Guide*. Available at [http://strategis.ic.gc.ca/epic/internet/inpupr-bdpr.nsf/en/h\\_qz01557e.html](http://strategis.ic.gc.ca/epic/internet/inpupr-bdpr.nsf/en/h_qz01557e.html).
- Meyrick and Associates 2004, 'National Transport Data Framework: Core Consultation Record', prepared for the National Transport Data Working Group, *National Transport Data Framework*, Commonwealth of Australia, Canberra.
- National Audit Office 2004, *London Underground PPP: Were they good deals? Report to the Comptroller and Auditor General*, HC 645 Session 2003-2004: 17 June.
- Office of Government Commerce 2001, *Draft guidelines on managing risk*, London.
- Partnerships Victoria 2001, *Guidance material: Public Sector Comparator: a technical note*. Available at <http://www.partnerships.vic.gov.au>.

Partnerships Victoria 2003, *Guidance material: Public Sector Comparator: Supplementary Technical Note*. Available at <http://www.partnerships.vic.gov.au>.

Public Accounts Committee 1993, *Infrastructure Management and Financing in New South Wales Volume 1: From Concept to Contract—Management of Infrastructure Projects—Report No. 73*, Sydney.

Queensland Government 2003, *Integrated Transport Planning Framework*, Brisbane, September.

SCOT 2003, *Report of a Working Group on Assessment Methodology*, Standing Committee on Transport, Canberra.

# Index

## A

- accessibility indices, 44
- adjusted BCA, 20, 56, 57, 62, 89
- affordability trade-off triangle, 20–21
- appraisal (Framework Phase 5), 12, 16, 53–60
  - definition of, 7
  - links to financial appraisal, 59–60
  - three-stage approach, 54–55
    - detailed appraisal, 56
    - rapid appraisal, 55
    - Strategic Merit Test, 55
  - tools and methodologies, 56–57
    - adjusted BCA, 57
    - benefit-cost analysis, 56
    - complementary techniques, 57
- Appraisal Summary Table, 19, 53, 57, 58
- area
  - definition of, 15
  - planning, 35–39, 41
  - strategy, 42
  - study, 42–46
- assessment
  - definition of, 7
  - network, 16, 36–39, 42–46, 95
- ATC
  - see* Australian Transport Council
- Auslink, 10, 11, 14, 15, 38, 57, 59, 62, 70, 76, 79, 93
- Australian Transport Council (ATC), 7, 10, 11, 20, 26, 27, 30, 44, 45

## B

- BCR
  - see* benefit-cost ratio
- benchmarks, 38, 39–40, 44
- benefit-cost analysis (BCA), 20, 44–48, 53, 56–59, 62, 64, 74, 88
  - adjusted, 57
  - detailed BCA, 56, 58, 89
  - objectives
    - environmental, 85
    - equity, 86
    - safety, 85
  - rapid benefit-cost analysis, 55

- benefit-cost ratio (BCR), 46, 62, 64, 87–89
  - and borrowed funds, 88
  - and budget, 87
  - combinations of initiatives, 87
  - combining with SMT results, 88
  - and hurdle rates, 57, 88, 89
  - and incremental BCR, 88
  - and marginal BCR, 88
  - ranking by, 87–89
  - and staged initiatives, 88
- bundling opportunities, 64
- Business Case, 53–60
  - development, 58
  - full, 54
  - outline, 54
  - see also* Framework Phase 5
  - strategic, 54

## C

- challenges, 17
- COAG
  - see* Council of Australian Governments
- consultation, 18, 30, 52, 66, 73, 77
  - see also* stakeholder engagement
- consumers' surplus, 59
- corridor
  - definition of, 15
  - planning, 12, 14, 35–39, 37, 41
  - strategy, 35–36, 39
  - study, 42–46
- Council of Australian Governments, 7, 11

## D

- data requirements, 43
  - see also* information support
- deficiency assessment, 37, 44–46, 48, 52, 94
- demand analysis, 37, 43–44
- detailed appraisal (also detailed BCA), 54, 56
- detailed BCA
  - see* detailed appraisal

## E

economic assessment, 45–46  
    *see also* benefit-cost analysis  
economic efficiency, 31, 56, 85–89  
economic objectives, 24–25  
environmental objectives, 25–26, 85  
equity effects, 31, 57, 74, 86  
equity objectives, 86  
evaluation  
    criteria (private sector proposals), 50, 65  
    definition of, 7  
    post-completion, 16, 73–77  
evaluation panel, 49–50, 65  
externalities, 59

## F

feedback, 7, 12, 21  
financial appraisal  
    links to, 59–60  
forecasting, 43–44  
Framework  
    and affordability, 20–21  
    and feedback, 21  
    and improvement, 21  
    and information support, 18–19  
    and learning, 21  
    levels of planning, 14  
    objectives, outcomes, challenges, options,  
        solutions, 17  
    overview, 16  
    phases of, 9, 11, 12 (Figure 1), 16 (Table 1)  
    and role of data and analysis, 20  
    and role of strategic planning, 17–18  
    and stakeholder engagement, 19  
    and timeframes, 20  
    and transport system elements, 15  
    underlying principles, 13  
Framework phases  
    Phase 1, 23–28  
    Phase 2, 29–34  
    Phase 3, 35–46  
    Phase 4, 47–52  
    Phase 5, 53–60  
    Phase 6, 61–67  
    Phase 7, 69–71  
    Phase 8, 73–77  
funding, 20–21, 38, 40, 57, 61, 63, 70, 87

## G

GIC  
    *see* Guidelines Implementation Committee  
goal achievement matrix, 20, 57  
government direction setting, 29–31  
Guidelines  
    aims, 10  
    background to, 10  
    endorsement, 7  
    first edition, 10–11  
    and further development, 21  
    review of, 77  
    second edition, 11  
    underlying principles, 13  
    users of, 7

Guidelines Assessment Methodology Working  
Group, 10

Guidelines Implementation Committee, 8, 11

## H

hurdle BCR, 89, 94  
hurdle rates, 57, 88, 89

## I

incremental benefit-cost ratio, 88  
information support, 18–19  
initiatives  
    appraisal, 53–60  
    bundling opportunities, 64  
    combinations of, 87  
    definition of, 15 (footnote 10)  
    delivery of, 69–70  
    identification of (Framework Phase 4), 12, 16,  
        47–52  
    inter-relationship between, 43, 47, 51–52, 64  
    private sector, 48–50, 54  
        *see also* private sector initiatives  
    sources of proposals, 47–51  
    specification, 51–52  
        complementarity, 51–52  
        identifying relationships, 52  
        independence, 51  
        substitutability, 52  
    staged, 88  
intervention benchmarks, 39–40  
    examples of, 40  
Intrastate Transport Network, 15

## L

link  
    definition of, 15  
    planning, 42  
linked objectives, 27–28  
    examples of, 28

## M

marginal benefit-cost ratio, 88  
monetised and non-monetised information, 19  
    (footnote 5)  
multi-criteria analysis, 20, 57  
multi-modal network planning, 36–40  
    functions, 38  
    and intervention benchmarks, 39–40  
    networks, 38  
    objectives, 38–39  
    overview, 37  
    performance indicators and targets, 38–39  
    steps, 37–40  
    strategy development, 39  
multi-objective analysis, 20, 57

## N

National Guidelines for Transport System Management in Australia  
see Guidelines

National Land Transport Network, 14, 15, 38, 70, 79, 81

National Transport Data Framework, 20, 97

national transport objectives, 27

network  
definition of, 15

network assessments  
and corridor/area studies, 42–46  
data requirements, 43  
deficiency assessment, 44–45  
demand forecasting and analysis, 43–44  
and economic assessment, 45–46  
nature of, 42–43

network planning, 14  
multi-modal, 36–40

NTDF  
see National Transport Data Framework

## O

objective setting (Framework Phase 1), 12, 16, 23–28

objectives, 17  
economic, 24  
environmental, 25  
and the Framework, 24  
linked, 27–28  
national transport, 27  
and outcomes, 25  
social, 25  
societal and whole-of-government, 23  
transport system, 26–27  
triple bottom line, 25

objectives-led strategic planning  
see Framework Phases 1-3

options analysis, 17, 18 (Figure 3), 19 (Box 3), 31–33, 62  
road transport example, 33

Options List, 17, 19

## P

performance indicators and targets, 18, 28, 34, 37–42, 75

performance review (Framework Phase 8), 12, 16, 73–77  
and post-completion evaluation, 73–74  
and review of the Guidelines, 77  
and transport system performance, 74–77

PFI  
see private finance initiatives

planning  
area, 41  
corridor, 41  
levels, 14  
link, 42  
network, 14  
multi-modal, 36–40  
route, 42

planning balance sheet, 20, 57

policy choices (Framework Phase 2), 12, 16, 29–34  
communication and implementation, 30–31  
definition of, 29–30  
efficiency and equity impacts, 31  
and government direction setting, 29–31  
and options analysis, 31–33  
and transport system indicators and targets, 34

post-completion evaluation, 16, 73–77

PPP  
see public private partnerships

prioritisation (Framework Phase 6), 12, 16, 61–67  
broad prioritisation, 62  
detailed prioritisation, 62–63  
information requirements, 62  
small initiatives, 62 (footnote 19), 88

private finance initiatives (PFIs), 65–66, 71  
principles for considering, 67

private sector  
initiatives  
evaluating for public funding, 65  
private finance initiatives and public private partnerships, 65–66

participation in program delivery, 71

proposals, 48–51  
evaluation criteria, 50, 65  
evaluation panel, 49–50  
illustration of approval conditions, 51  
possible approval process, 50  
unsolicited, 49–51  
see also public private partnerships and private finance initiatives

program delivery (Framework Phase 7), 12, 16, 69–71  
delivery methods, 70  
major activities, 69–70  
private sector participation, 71

program development (Framework Phase 6), 12–16, 61–67  
and bundling opportunities, 64  
finalisation, 66  
level and structure of funding, 63  
and network considerations, 64  
timing, 64

proposals  
private sector  
prioritisation, 61–63  
sources of, 47–49  
objectives-led strategic planning, 48  
other areas of government agencies, 48  
political process, 49  
private sector, 48–49

public private partnerships (PPP), 65–66, 71  
principles for considering, 67  
see also private sector and private finance initiatives

## R

rapid appraisal (also rapid BCA), 54–55

risk analysis, 58

route  
definition of, 15

route and link planning, 42  
overview, 37

## S

- scenario analysis, 20, 43–44
- SCOT
  - see* Standing Committee on Transport
- SMT
  - see* Strategic Merit Test
- social objectives, 25
- societal and whole-of-government objectives, 23–25
- solutions, 17–18, 42 (footnote 7)
- staged initiatives, 88
- stakeholder engagement, 12–13, 19, 30, 37, 41–42, 77
  - see also* consultation
- Standing Committee on Transport, 7, 10
- Strategic Merit Test, 54, 55, 57, 59, 62, 89
  - combining with BCR results, 88
- strategic planning
  - drivers of, 18
  - objectives-led, 11, 17, 35, 47–48
  - role of, 17–18
- system planning (Framework Phase 3), 12, 16, 18, 35–46
  - and corridor and area planning, 41
  - and multi-modal network planning, 36–40
  - and network assessments and corridor/area studies, 42–46
  - overview of, 35–36
  - planning levels, 14
  - and route and link planning, 42
  - steps in, 37–41

## T

- taxation, 59
- time frames, 20
- tools, 20
- transport planning, 9–11, 19 (footnote 5), 31–32
- Transport Planning Data Working Group, 10
- transport system
  - definition of, 15
  - elements, 14–15, 79–83, 96
    - inter-modal, 45, 82, 94
    - interpretation, 79–83
    - local setting, 82
    - non-urban setting, 79–81
    - regional setting, 81
    - urban setting, 81
  - indicators and targets, 34
  - objectives, 11–12, 16–17, 23–28
    - examples of, 26
    - and performance review, 73–77
    - see also* objectives-led strategic planning
  - performance
    - review of, 74–77
  - planning levels, 14
- Transport System Management Framework
  - see* Framework
- transport system objectives
  - examples of, 26–27
  - scope and relative importance of, 26
  - see also* objectives and objectives-led strategic planning (Framework Phase 1), 23–28
- triple bottom line, 10, 25, 58

## U

- unsolicited proposals, 49–50
- Urban Transport Network, 15





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