

**PART 5**

*Assessment  
and  
evaluation*



# Assessment and evaluation

## 5.1 Purpose

### 5.1.1 Purpose of Part 5

The purpose of this Part is to provide information on:

- how to undertake an assessment;
- evaluation and decision-making; and
- monitoring and review after completion.

### 5.1.2 Content

The activities of assessment and evaluation should be considered separately.

Assessment is a technical activity to demonstrate what is likely to be the outcome of a proposal. Evaluation is the activity to determine whether the expected outcome is desirable, or acceptable, and must involve those with an interest in the result. Both assessment and evaluation are needed to establish whether the objectives will be or, in the case of a completed project, have been met.

It is often possible to satisfy objectives in different ways, but the costs and benefits may not be the same. Thus, there is a need to assess the likely consequences of each proposal, to compare the different proposals in terms of advantages and disadvantages, and to evaluate which proposal offers the best value for money.

It is also necessary to ensure that the RTA Guidelines for Traffic Management Plans are observed and the schemes comply with

the technical standards which have been set.

There are different techniques for evaluation.

Assessment and evaluation can be used for comparing alternative proposals and selecting the preferred solution. Performance indicators are the principal tool in this process. Performance indicators can also be used for monitoring the performance of a project after completion and for determining whether it has been successful.

Projects can be assessed with varying degrees of detail. In this Part, information will be provided on the general approach towards assessment and evaluation of projects for environmental adaptation. More detailed information is set out in Appendix B.

## 5.2 Process

### 5.2.1 Three stages of assessment and evaluation

There usually are three stages of assessment and evaluation (Figure 5.1).

- The *first stage* is part of a 'Needs Study'. The purpose of assessment and evaluation is to establish whether a Council wants to proceed with a Feasibility Study.

There is no need for a detailed examination, but sufficient information is required to determine whether there is a case for proceeding to the next stage of

investigation. Consultation with the stakeholders is important at this early stage. Details on how to undertake a Needs Study are contained in the companion document *Guidelines for Demonstration Projects*.

- The *second stage* is part of a 'Feasibility Study'. The purpose of the assessment is to compare alternative proposals with the 'do nothing' alternative. The

evaluation starts with this assessment and concludes with a preferred solution.

The criteria for assessment follow from the objectives to be achieved and are defined at the beginning of the feasibility study. The evaluation involves a cost-effectiveness or a benefit/cost study and consultation with interested groups. Funding sources and staging aspects must also be included.

The information should be presented in a format to enable the Council or other funding body to make its own assessment and evaluation for the purpose of deciding whether financial assistance can be provided. Details on how to undertake a feasibility study are contained in the companion document *Guidelines for Demonstration Projects*. For major or potentially controversial projects, there may be a need for a more detailed assessment (see Appendix B).

There will be several phases during this second stage which all require assessment and evaluation (eg. planning, design concept, traffic management plan, and detailed design).

- The *third stage* occurs after the project has been implemented. The purpose is to determine the extent to which the objectives have been achieved. It is a key component in the case of a demonstration project. Information on the process and timing of undertaking this assessment is provided in ‘*Monitoring and Review*’, later in this Part.

At each evaluation stage, there is an opportunity for value management. It includes considering whether the desired outcomes are achievable with available funds and whether there are ancillary or mitigating actions which should be taken.

### 5.3 Assessment

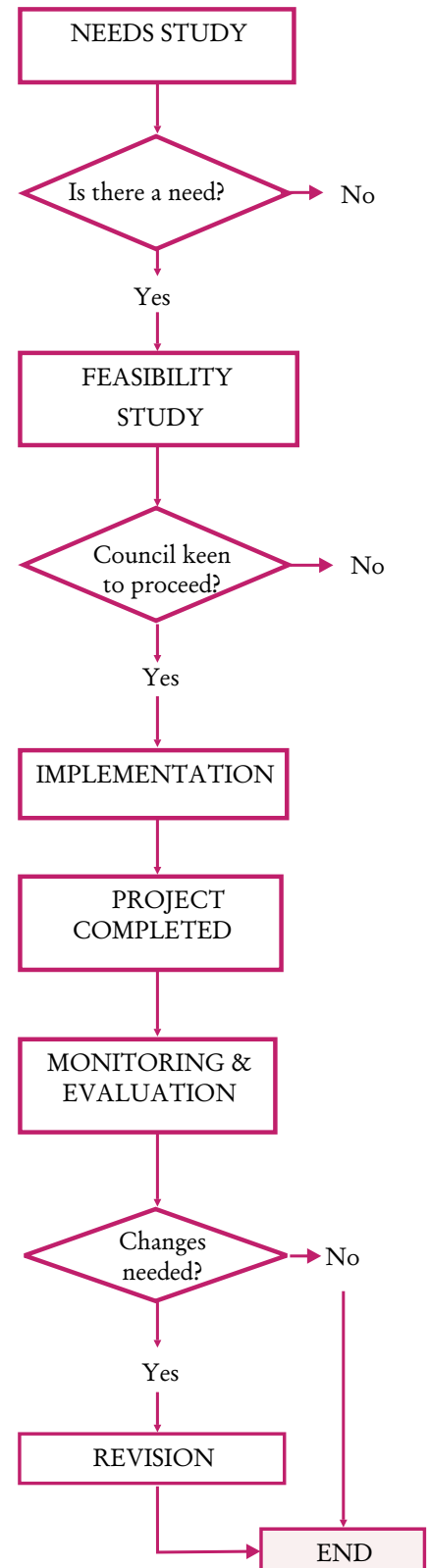


Fig. 5.1 Stages

#### 5.3.1 Performance indicators

Assessment is the process of examining the likely or actual consequences of a particular project for a range of different criteria or ‘performance indicators’. The outcomes are compared with the ‘do nothing’ situation. Assessment does not entail making judgements about the merits of the project - that is part of the evaluation process.

Performance indicators are a central feature of assessment. A performance indicator in the context of this Guide is not a specification, but a parameter which shows how a system or a project performs.

Examples of such parameters are: vehicle speed, ability for pedestrians to cross safely, accidents, parking turnover, and changes in the type of business along the frontage.

Performance indicators are derived from the project’s objectives.

For instance, if one of the objectives is to reduce the conflict between pedestrians and vehicles, then performance indicators could be accidents, pedestrian crossability (measured in delay, convenience and perceived safety), vehicle speed, traffic volumes and number of heavy vehicles at times of pedestrian activity.

Performance indicators can be used to:

- measure the overall performance of the existing situation, using a number of parameters;
- predict or estimate the likely performance of the proposed situation; and
- measure the actual performance of the new situation after the project has been implemented.

### 5.3.2 Types of performance indicators

#### Objective and subjective aspects

A distinction can be made between objective and subjective performance indicators. Objective indicators are those which can be observed and quantified, such as the number of traffic accidents. Subjective indicators are criteria of perception - for instance, how people feel about safety or the quality of the road environment.

Both types of indicators can be measured, but the subjective indicators require opinion surveys and usually yield a spread of perceptions. The likely objective performance of a project can generally be predicted, but this is much more difficult in the case of subjective indicators. It is important, therefore, to assist people in making their judgement about alternative proposals by providing illustrative material to which they can relate (see 4.5.1 Part 4).

#### Monetary and non-monetary items

There is also a distinction between items which can or cannot be expressed in monetary terms.

There will be a range of items in proposals for environmental adaptation where costs and benefits cannot be determined in this way. Furthermore, some benefits may occur in the short term, while others may only occur in the long term. Yet it is important that all costs and benefits be identified in any assessment. This can be done by using an 'Assessment Balance Chart' (Appendix B).

#### Indicators related to stakeholders

There are advantages in listing indicators according to the groups affected.

This can help to clarify how the costs and benefits (including non-monetary items) of a project are distributed amongst the different stakeholders and can assist in making decisions at the evaluation stage.

### 5.3.3 What is an Assessment Balance Chart?

An assessment balance chart is a table which presents information to assist in the evaluation of the results. It estimates the costs and benefits for the performance indicators for each project alternative. Where they cannot be computed in monetary terms, information is provided in non-monetary quantitative terms, estimates are made, or the results are listed as unknown or ranked.

The important feature of the approach is that the performance indicators are listed separately for different stakeholders and that impacts are shown for each performance indicator.

The different stakeholders for a project involving environmental adaptation could be grouped as follows:

- road users directly affected
- road and non-road users directly affected
- non-road users directly affected
- those concerned with the quality of the environment
- public authorities.

Details on the construction and content of an assessment balance chart, and on techniques for using performance indicators, are provided in Appendix B.

**5.3.4 How much detail is required for assessment?**

The preparation of an Assessment Balance Chart can be demanding. Data collection can be costly and a careful judgement must be made about the selection of performance indicators.

There are different levels of detail ranging from the more thorough and quantitative assessment of the ‘Assessment Balance Chart’ to simple and non-quantitative assessments. The general dictum of ‘horses for courses’ equally applies to the assessment of projects for environmental adaptation.

**Comparing alternative proposals**

The information needs for comparing alternative proposals are different from those for comparing before and after situations. Here, the assessment is undertaken to predict and compare likely outcomes.

There are techniques to predict the probable consequences of some individual measures, such as the effect of a particular type and design of speed hump on vehicle speed. However, it is more difficult to predict the consequences of a range of measures designed to achieve a number of different objectives. Given the current state of knowledge of environmentally adapted roads, estimates for many performance indicators may have to be made and a simple ranking for comparison may be sufficient.

Experience shows that there usually is no need to construct a detailed planning balance chart. Comparative assessment can be confined to those aspects where the concept options vary. This simplification also makes it easier for stakeholders to evaluate the options.

**Table 5-1 Example of a simple comparative assessment\***

Assessment Criteria	Option			
	1	2	3	4
Pedestrian space (1)	3	5	4	3
Business activity (2)	3+	5	4	3+
Site access (3)	3	4	3	3
Pedestrian crossability (4)	4	4	4	5
Parking spaces overall (5a)	4	4	4	5
Parking spaces central (5b)	3+	4-	5-	5
Vehicle safety (6)	4	4	4	4
Vehicle speed (7)	4+	4	4+	4+
Bus stops (8)	3	5	4	3
Intersection treatment (9)	3	3	2	3
Urban design potential (10)	3+	4	5	2
Costs (11)	1	2-	1	2+

An illustration of a simple comparative assessment is given in Table 5-1.

\* EXPLANATION In comparing the options, a ranking scale of 1 to 5 was used for each of the relevant criteria. A value of 3 represents no change with the present situation - the *base case*. Where the option

is an improvement on the base case, a value of 4 (better) or 5 (much better) was selected. Where the option in respect of a relevant criterion is worse than the present, a level of 2 (worse) or 1 (much worse) was selected.

For the costs criteria, 1 represents considerable expenditure, 2 moderate expenditure, 3 no change and 4 a modest saving. As there is always a problem with a classification, a + or - is used where a simple number does not give a sufficient picture. A plus (+) signifies a slightly higher ranking and a minus (-) a slightly lower ranking.

In order to keep the presentation simple, only those items where there are significant differences between the options are highlighted.

### Comparing before and after situations

It is important for all projects to ascertain whether the objectives of environmental adaptation have been achieved. Table 5-2 illustrates the result of a simple before and after assessment. Sufficient and identical information should be collected before and after a project is implemented so that an effective comparison can be made.

The amount of detail collected for assessment should depend on the objectives which the project aims to achieve. This may not be practicable when resources are scarce and there are conflicting priorities. However, it is often possible to limit data analysis to a few key indicators.

Data collection is more critical in the case of demonstration projects, because of the intention to use the results as a resource for future projects. The data should increase the ability to predict consequences of similar projects proposed in other communities.

In the longer term, such a data base may also form the springboard for developing a computer-based expert system to help designers with the environmental adaptation of roads in urban areas, as well as in country towns.

**Table 5-2 Example of a simple before-and-after assessment**

Objective	Performance Indicator	Level of achievement of project		
		Before	After	Comment
Reduction in conflict between pedestrians and vehicles	Accidents (veh/ped)	3	na	Needs 3year+ period
	Vehicle speed in core	45	30	
	Jay runners/walkers (%)	11	3	
	Perceived safety			Greatly improved
Reduction of impact on frontage	Noise (facade)	70 dB(A)	66 dB(A)	
	Business activity			Increased
Improvement in quality of the environment	Footpath width (m)	4	5.5	Average
	Weather protection	0.7	0.7	No change, needs time
	Urban design		Improved	Descriptive
Maintain circulation	Site access			Unchanged
	On-street parking (core)	200	180	60 new spaces provided adjacent
	Adjoining areas		Side street closure	
Affordability	Capital expenditure		\$1 million	
	Maintenance cost (annual)	\$50,000	\$70,000	

### 5.4.1 Criteria for evaluation

*Evaluation* is the process of giving weight to the different consequences.

For example, measures to increase pedestrian safety involve a reduction in vehicle speed and an increase in travelling time. Different stakeholders will have different priorities on the relative weight of the consequences and will have different views on the type of measures used.

Evaluation usually addresses questions such as whether a proposal represents value for money and whether the advantages outweigh any disadvantages.

The criteria for evaluating alternative proposals are similar to those for evaluating the success of a project which has been implemented. They include the extent to which the objectives are likely to be achieved or have been achieved, whether

they represent value for money and how the stakeholders perceive the balance of advantages and disadvantages.

The issue about value for money involves an economic evaluation, whereas the perception about the balance of advantages and disadvantages requires consultation, communication and political judgement.

While a number of formal procedures for evaluation are available and used by some authorities, their rigorous use has not been widely adopted in the past. In many cases, the decision on programmes and projects has been based on a balance of formal procedures and political judgement and this is likely to continue.

## 5.4 Evaluation

### 5.4.2 Economic evaluation

With increasing demands upon the resources of local and State Governments, there is the need to justify the often large expenditure involved in projects. Formal economic evaluation methods may be required to demonstrate the economic benefit of the selected proposal.

It is fundamental in an economic evaluation that all of the benefits and disbenefits of each scheme be identified and weighed against each other and against the

defined objectives. Compromises and balancing trade-offs can then be made to arrive at the preferred scheme.

The traditional methods of economic evaluation which may be used in ranking various proposals and developing a preferred programme of works are:

- Benefit Cost Analysis (BCA); and
- Cost-effectiveness Analysis (CEA)

### 5.4.3 Benefit Cost Analysis (BCA)

This method is often used in making a selection from a range of options as well as valuing the economic worth of an overall programme.

The Benefit Cost Ratio is calculated by dividing the net present benefit (NPB) by the net present cost (NPC):

$$\text{BCR} = \text{NPB}/\text{NPC}$$

In an environmental adaptation project, assumptions must be made to obtain the NPB. They can be based on the savings in such things as accident costs, reduced noise

and vehicle emissions, and increased business activity. The NPC will of course include the cost of the works, but should also consider the direct costs that can occur in a variety of items, including usually negative benefits, such as relocation of some businesses.

Some costs and benefits may be realised in the short-term, but others may occur in the longer term. The costs and benefits are therefore discounted by converting them to present-day dollar values.

#### 5.4.4 Cost-effectiveness Analysis (CEA)

There will be many performance indicators where it is not practicable to assign monetary values. In addition, costs and benefits may not affect sections of the community equally. Cost-effectiveness analysis can be used when it is difficult to quantify the benefits (RTA, 1992).

A cost-effectiveness analysis aims to identify the least cost option with costs defined and discounted in the same way as in a BCA. Benefits are not ignored even if they cannot be quantified or captured in dollar values. For example, CEA can be used when the objective is to reduce vehicle speed in a shared Main Street. The reduction can be measured, but is not subject to valuation in monetary terms. However, the benefits arising from speed reduction need to be identified and assessed in relation to quantified benefits and costs.

The outcome of a CEA for a comparison of alternatives or of a before and after

situation of the type of project covered by the Guide could, for instance, include:

- Decrease in accidents, injuries and fatalities per dollar of capital investment;
- Decrease in vehicle speed per dollar of capital investment;
- Number of visitors on the footpath enjoying their new urban space per dollar of capital investment; and
- Level of community satisfaction per dollar of capital investment.

An assessment balance chart provides a basis for evaluating the economic and social costs and benefits against the expected (or actual) performance in items that can not be expressed in dollar terms.

#### 5.4.5 Impact analyses

Experience in the assessment of Sharing the Main Street projects has shown that there are three useful analytical tools.

They are: traffic impact studies, parking impact studies and business impact studies.

##### ■ Traffic impact studies

Traffic impact studies cover such matters as the consequences for the road hierarchy, supplementary actions for intersections nearby, cycleways, and vehicle speed management. These studies would accompany a Traffic Management Plan, required by the RTA (see Section 1.6.2).

##### ■ Parking impact studies

Parking is always a critical issue. If some on-street parking space are lost, they need to be replaced with spaces nearby, sign-posted and made accessible from the project area.

##### ■ Business impact studies

In some projects, business impact studies have been initiated by the local Chamber of Commerce to assess the possible consequences of the scheme for the traders affected.

#### 5.4.6 Safety and access audits

Safety audits are normal practice in highway engineering. Austroads have established five stages at which audits can be undertaken:

- Preliminary design;
- Draft design;
- Detailed design;

##### ■ Pre-opening; and

##### ■ Existing roads.

There are guidelines for undertaking safety audits for highways and rural roads, but no guidelines for low speed road environments, in which measures are used deliberately to induce a change in driver behaviour. A different

approach is needed to assess the safety of all road users.

Important aspects in a low speed environment are:

- all design elements to be consistent with required driver behaviour in a low speed environment;
- the visibility of pedestrians by drivers under all kinds of conditions;
- the visibility of vehicles by pedestrian, also under all kinds of conditions;
- the visibility of measures at night, when there are few pedestrians;
- the need for a transition zone with appropriate measures, alerting drivers of changed conditions ahead;
- unambiguity in measures to indicate whether drivers or pedestrians have right of way; and
- warning signs during the transition period, when a scheme has been completed, and drivers and pedestrians have not yet adapted to the new conditions.

Access audits are needed to check access for people with impairment. Access Advisory Groups should be consulted.

### 5.5.1 Consultation

The importance of involving the stakeholders was stressed in section 1.6. Consultation is important throughout the process, but essential during the evaluation stage.

The alternatives considered should be made available, together with information on what they are expected to achieve and a comparative assessment of the advantages and disadvantages. Different groups will give different weight to the advantages and disadvantages of the options and these need to be understood and reviewed. With community and business consultation, the areas of agreement, disagreement, and compromise can be identified.

Efforts should be made to establish the views of the 'silent' groups in the community. Care should also be taken that the most vocal groups within the community are not over-represented in community participation programs.

The form of presentation should be clear and understandable. A Planning Balance Chart is too complex for normal use in consultation. A simple statement of the significant differences, advantages and disadvantages is much more effective.

- There are different techniques for consultation during the evaluation stage.

- Public meetings, discussion groups, seminars or workshops with key players and resident groups;
- Meetings with selected groups who have a direct interest in the project;
- Local press releases;
- Information brochures with provision for comment;
- Opinion surveys;
- Public displays of the options and their assessments with provision for comment from the community; and
- An information or contact centre.

## 5.5 Consultation and decision-making

*Fig 5.2 A critical issue is whether the needs and aspirations of the community are met.*



Consultation is not a substitute for decision-making. The Council must ultimately decide which option to implement as it has to allocate the necessary funds. In making such a decision, compromises will often have to be made.

*It should be emphasised that any program of community involvement requires commitment, resources and expertise.* There is a need for a person (or persons) who can confidently give information and allay fears.

### 5.5.2 Making decisions

When the options have been evaluated by the groups affected and the results have been interpreted, a report should be prepared by the project officer which summarises the findings and provides the basis for a decision.

For ease of comparison, the alternative proposals, what they are expected to achieve, their impacts and how the advantages and disadvantages are rated by

different groups, can be best set out in a tabulated form.

The report should demonstrate that any short-listed options are feasible functionally, aesthetically, financially and economically, socially, politically and legally. It should also clearly identify areas of consensus and disagreement, so that informed judgements can be made by elected representatives.

## 5.6 Monitoring and review



*Fig. 5.3 Comparison between before and after adaptation. The top figure is an image of a section of the Main Street in Tamworth which was not adapted. The bottom figure shows what has been achieved in the adjoining core section with adaptation.*

### 5.6.1 Why monitoring is important

When a project has been implemented, it must be monitored. The questions which need to be answered are whether:

- the predicted consequences have in fact been realised;
- there are any unforeseen consequences;
- there are aspects which could have been done differently and better; and
- there is a need for further remedial action.

Monitoring of a project is always important as there is a need to establish

whether the completed project has achieved its objectives. In the case of a demonstration project, monitoring is essential because it is intended to serve as a model for other urban and rural communities.

The experience gained should be used in the development of future projects. For this reason, the details of assessment and evaluation should be worked out in consultation with the the Regional Office of the NSW Roads and Traffic Authority (or its equivalent).

### 5.6.2 What must be monitored?

Data should be obtained for all the performance indicators which were identified at the inception of the project as being significant. As mentioned earlier, the same kind of data should be collected and the same techniques should be used as was done before the project was implemented. However, as will be explained below, this does not mean that all the data should be collected at the same time.

- It is essential that proper records be kept of the initial data that were collected during the project development stage and that they can be retrieved when needed for comparison later. There may be a need for additional data if unforeseen consequences arise.

### 5.6.3 When should monitoring be undertaken?

Monitoring should commence as soon as a project is completed and can be undertaken on an on-going basis. There will be complaints and matters will be referred to and considered by the local traffic committee. However, there are two points at which the results should be assessed and evaluated formally. The first point occurs within three to six months; the second within a three to five year period after completion.

The reason for the two steps is that some aspects of a project may have short-term (and perhaps long-term) effects, while others require a much longer time frame.

Changes in the construction or management of the road space will generally have short-term effects (for example, changes in vehicle speed), but there may be longer-term effects too (for example, changes in accident rates). Changes in the control of frontage

development may take many years before there are observable results.

■ *First step: within about three to six months*

Assessment and evaluation of the short-term effects (such as changes in the construction or management of the road space), should be undertaken at a point in time when people have become familiar with the new situation and drivers and pedestrians have adjusted their behaviour.

■ *Second step: within a three to five year period*

Assessment and evaluation of the longer term impacts (such as the effect on accident rates and frontage adaptation), should be undertaken when sufficient time has elapsed for the major benefits and costs of environmental adaptation to have become apparent.

### 5.6.4 How are the results evaluated?

The results are evaluated on the same basis as was done for comparing alternative proposals. The assessment balance chart or a more simple version can be used for economic evaluation, the business community should be consulted and surveys should be carried out to measure community attitudes and changes in perception.

The evaluation is undertaken for each of the two steps (i.e. short and long term). The final interpretation should include a detailed discussion of the effects of the scheme. It should establish whether the objectives have been achieved and identify any issues which should be taken into account in the development and implementation of further projects in environmental adaptation.

### 5.6.5 Resources

Once a project has been completed, there usually are other priorities, and funds for a properly conducted assessment and evaluation have to compete with new projects.

- It is important, therefore, to allow for such an assessment and evaluation in the project budget.

However, when this cannot be achieved, there is merit in approaching a tertiary

institution for undertaking an assessment and evaluation as a research project.

*Fig 5.4 Monitoring is not a matter of traffic performance and safety alone. In the case of the Entrance (and many other projects), business has increased.*



