

Guide to Project Delivery Part 2

Planning and Control



Guide to Project Delivery Part 2: Planning and Control

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The title of this Part of the Guide has been shortened to 'Planning and Control'.

The Part has also been revised to align with the joint Austrroads/APCC *Building and Construction Procurement Guide – Principles and Options* (Austrroads & Australasian Procurement and Construction Council 2014) – particularly Section 4, which has been renamed 'Procurement Strategy' and expanded to provides further detail on delivery model options and procurement strategy development considerations.

Additionally, a number of minor edits have been made throughout the Part – including deletion of areas of repetition and re-numbering of sections where appropriate – to improve the overall flow and ensure consistent use of terminology.

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Project management, planning, risk management, procurement strategy, cost, supply, budget, personnel, public participation, performance, contract, scheduling, monitoring

Abstract

The Austrroads *Guide to Project Delivery* consists of four Parts.

Part 2 gives guidance to project delivery practitioners on a number of concepts relating to planning and control of the delivery phase, as opposed to the preceding initiation phase and subsequent operational phase of a project.

It covers a range of topics at a 'principles and considerations' level, leaving the details to be sourced from the preferred practice of the jurisdiction for which the project is intended. Key among these topics are risk, procurement strategy, change control, performance monitoring and community engagement. The appendices give valuable information and examples to assist practitioners in achieving quality outcomes on the projects they deliver.

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Guide to Project Delivery Part 2: Planning and Control



Austrroads

Sydney 2014

Summary

The three phases of a project are 'initiation', 'delivery', and 'operation and asset management'. The second phase (delivery) may, in a general sense, be described as the process by which the aim or goal of a project is realised or achieved.

Part 2 of the *Guide to Project Delivery* gives guidance to project delivery practitioners on a number of concepts relating to planning and control of the delivery phase as opposed to the preceding initiation phase and subsequent operational phase of a project. It covers a range of topics at a 'principles and considerations' level, leaving the details to be sourced from the preferred practice of the jurisdiction for which the project is intended.

One of the key elements of project management required for project delivery is risk management, including the use of 'Risk Management Plans' to keep track of risks which have been identified, as well as decisions taken about offsetting or countering them. Developing an effective procurement strategy, resourcing, and programming the delivery of the project are also core requirements for timely and cost-compliant delivery. Change control, performance monitoring, community engagement and quality are all factors which need to be addressed if project delivery is to be considered successful, as are project completion and handover.

In addition to these general discussions a number of Appendices provide more detailed information on some of the topics covered in this Part.

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1. Introduction

1.1 Purpose of Part 2

Projects can be considered as having three phases: 'initiation', 'delivery', and 'operation and asset management'.

Part 1 of the *Guide to Project Delivery* ('Guide') comprises the general introduction and overview of the project delivery phase from both an asset management perspective, and within the broader project management framework. The purpose of this Part 2 is to cover in more detail the 'management' of the delivery phase.

Project management entails taking the project from initiation, through delivery, to completion and final handover for ongoing operations and/or asset management. To do this effectively and efficiently, project management processes are developed by agencies to cover the various steps and activities required.

This Part 2 of the Guide emphasises the planning and controls necessary to successfully deliver a project to meet the owner's/client's requirements. It covers a range of topics at a 'principles and considerations' level, leaving the details to be sourced from the preferred practice of the jurisdiction for which the project is intended.

In this Part, project inputs are considered, such as the project management processes of scheduling; cost estimation and control of time, cost, and scope rather than discussion of outputs such as design. One should note that the scope is set in the project brief by the client and not by the project team.

While the outputs of the process are of course important, their quality and appropriateness will be determined by the processes used and the adequacy of the planning and control.

1.2 Planning and Control

It is essential to recognise the importance of proper planning, monitoring of performance and control mechanisms to ensure that the project is delivered as intended. If there is inadequate planning and monitoring, there cannot be proper control of the project. The role of each project participant including the project team and senior management must be clearly and unambiguously defined. This would normally be done as part of the project brief and in accordance with the governance arrangements, which specify the designated delegations of the agencies and individuals involved in the delivery of the project. Each project participant will have an important part to play in the planning, execution and control of the project.

1.2.1 Project Manager's Role

The project manager plays the key role in leading and motivating the project team. The core capabilities of a project manager are to lead, motivate, communicate, negotiate and solve problems as well as plan, control and delegate. Regardless of how many roles a project manager may be required to perform, especially in smaller projects, they require a balance of technical and business processes as well as 'softer' qualities of intuition based on experience and relationship management skills to guide the project team towards required outcomes. Commonsense and decisiveness are essential skills for a project manager.

Project managers require a general understanding of specialist functions including technical disciplines but do not need to be experts in all areas. They do need to know when specialists are required and how to engage in dialogue with them.

1.2.2 Role of Senior Management

Senior management within an agency or portfolio fulfils the roles of the client and client representative for project purposes. Management may represent the road agency alone in a publicly funded project or a combination of public and private interest where external financing is utilised. The client, who may be represented by a project sponsor, is the project initiator and provides overall development, coordination and funding. Approval of budget, scope, and any changes in scope, is given by the client.

The client representative, where this role exists within an agency, provides the link between the client and the project team. The representative manages the project development and prepares the project brief based on the relevant legislative, environmental, and community requirements, and would oversee governance of the project and represent the client's interests through to the end of the project.

1.3 Governance

Project governance has been generally overviewed in Part 1, Section 3.1. 2. The following, however, are additional matters which should be considered in the management and delivery of any project, to ensure good governance can be demonstrated:

- Ensure agency and government requirements for infrastructure projects are met.
- Ensure public accountability and transparency, including a high level of probity and ethics in project delivery. This may involve provision of independent scrutiny of projects.
- Follow agency procedures for:
 - project management, including delegations of authority for approvals and authorisations e.g. expenditure
 - risk management
 - procurement
 - management of funds and budgets
 - community engagement including stakeholder alignment.
- Ensure a clear brief is available for the project, stating the project objectives, delivery goals, and any specific project requirements.

Drive accountability for project performance. It is vital that adequate planning, monitoring and control of the project be undertaken by the project manager in accordance with agency procedures. After all, the project manager is accountable for the performance of the project to senior management and/or a project board.

Good governance of projects also requires regular communications and review meetings that:

- Address project and program performance, systems integrity, process probity, risk assessment, management plans, and processes.

Keeping appropriate people informed is vital. This means establishing a process for project reviews at all levels of the organisation. The project manager should also alert senior management to any potential issues (community, risk, financial etc.) at the earliest possible time. Project reporting (formally) and health checks play an important part in this process.

The project manager should also alert senior management to any delays or potential blockages to project progress, so management can take action at the appropriate level to ensure smooth on-time project delivery and to mitigate the exposure of all parties.

- Provide guidance and direction to project managers.

Project managers should not be backward in asking for advice from peers or senior managers if they are not sure of procedures or technical issues. Coaching and mentoring are important tools for the development of less experienced project managers.

- Streamline decision-making and enhance the quality of project decisions.

It is important that decisions are well-founded and are made in a timely manner, by both the project manager (and team) and senior management to ensure that unnecessary delays do not occur to the project.

- Unblock impediments to project progress.
- Assess the corporate implications of risk management strategies.

A sample Governance Plan is located in Appendix A.

1.4 Project Delivery Plan

As outlined in Part 1, Section 3.4 of the Guide, the project brief should be confirmed early on as part of the planning process. See Part 1, Section 3.1 for further information regarding the types of matters typically covered in a project brief.

The project delivery plan is a detailed response to the requirements of the brief and is a document setting out the scope or extent of the project and how it will be delivered, i.e. how the project management processes will be undertaken to ensure the project's successful delivery. Project delivery plans are generally developed by project managers and their teams

The contents of a project delivery plan would typically include:

- a description of the project, and its objectives
- a summary of important issues to be addressed in the delivery phase
- governance of the project
- scope management and change control
- risk management
- issues management
- procurement strategy
- resourcing, including project team roles
- program and key milestones, including the project schedule
- cost and budget management, including
 - estimate of cost summary
 - budget requirements
- performance monitoring and management review
- community engagement
- quality management and audit
- finalisation, including
 - handover and operations/maintenance requirements
 - transfer of learnings and knowledge.

The above items are covered in more detail in this Part of the Guide.

1.5 Project Changes

A project is a dynamic entity subject to change. Some changes will have an impact on cost, time, quality or physical scope, while others may not e.g. changing the method of delivering part of the project. In order to effectively manage both planned and unplanned changes there has to be an approval process, which is known as change control.

This is an integral part of governance, but is so important in the control process it is dealt with in more detail in Section 8.

2. Risk

2.1 Risk Management

An understanding of risk (or uncertainty), and how to manage it, is fundamental to project management. Risk management procedures have traditionally focused on threats and should be applied to all activities that have an element of uncertainty in their outcome. All project delivery personnel should be acquainted with the sources and types of risk and how they are apportioned in projects, particularly where a number of parties are involved in client and delivery roles.

A risk may be regarded as any chance of an adverse consequence which could affect a project. There is a broad range of risks which influence project delivery such as inadequate work health and safety (WHS), scope changes and physical events. Minimising the impact of risks will ensure successful project delivery as the consequences can be severe. Generally speaking, the consequences of risks may include delays, liability disputes, cost overruns, damage to the organisation's reputation, and failure of the contract or delivery of an unsatisfactory product.

Successful project delivery requires a strategy for the management of risks. In this context risk management is not a stand-alone process; it is a tool for identifying and optimising effective and efficient project management and delivery. The aim of project risk management is to maximise the results of positive events and to minimise the consequences of adverse events. A risk management approach should be taken on all projects with particular attention given to those risks which could cause a significant problem if they go wrong. The risk management process should raise awareness of threats and opportunities and minimise risks, for example:

- delays – project over-run in cost or time
- failure to meet technical standards
- use of incorrect standards
- potential threats to health and safety
- community and road/public transport user concern
- environmental damage
- litigation
- changes in policy.

Risk management describes the processes concerned with identifying, analysing and responding to project risk. It consists of risk identification, risk analysis, risk evaluation and risk treatment. The processes are iterative throughout the life of the project and should be built into the project management activities. All projects require a degree of risk management, but the effort expended will depend on the size and complexity of the project. Larger projects involving significant investment and/or major outcomes should require formal and detailed risk management activities on an ongoing basis.

In particular, risk management is concerned with appropriate decision-making, reducing the likelihood of problems and being prepared if and when things go wrong. It may well be that a number of uncertainties when handled effectively can also present opportunities. Further, an understanding of risk will assist in determining which procurement strategy is to be adopted and how risk is allocated in the contract documents.

AS/NZS ISO 31000:2009 (Standards Australia 2009) presents a clear definition of basic risk assessment including:

- a risk management process overview
- principles of risk allocation
- tables of risks and ownership threats and consequences (typical and specific risks and guidance on aspects to consider).

Issues management and risk management are closely linked, as some issues may become risks (see Section 3).

2.2 Risk Management Plan

A 'Risk Management Plan' should be prepared which covers:

- the process for identification, analysis, evaluation, and treatment of risks, initially and throughout the life of the project
- how often the 'Risk Register' will be reviewed, the process for review, and who will be involved
- how risk status will be reported and to whom
- responsibility for the various aspects of risk management
- a Risk Register included as an appendix.

A Risk Register is a useful tool for outlining all the risks identified before and during the project, for keeping a record of their grading in terms of likelihood and seriousness and a record of the proposed mitigation strategies. It is also useful in regular risk monitoring and review.

Appendix B provides more detailed information on risk management and Risk Registers.

3. Issues Management

An issue can be defined as a concern that may impede the progress of the project if not resolved. Issues management is one of the skills that all project managers must master. If issues are not addressed they may become a risk to the project.

Issues management involves identifying, monitoring, reviewing and addressing issues or concerns as they arise through the life of a project. Issues can be raised by anyone involved with the project including the client, senior management, the project manager, project team members, the community and stakeholders.

For smaller projects, a brief scan and ongoing monitoring may be all that is required. In larger projects, it is advisable to log issues in an 'Issues Register'. A typical register would contain comments about the issue, current status and resolution, appropriate links to the project filing system, details of who is responsible for addressing the issue, a target close-out date, and the date the issue was closed out. The register should be used to monitor and report regularly on outstanding issues.

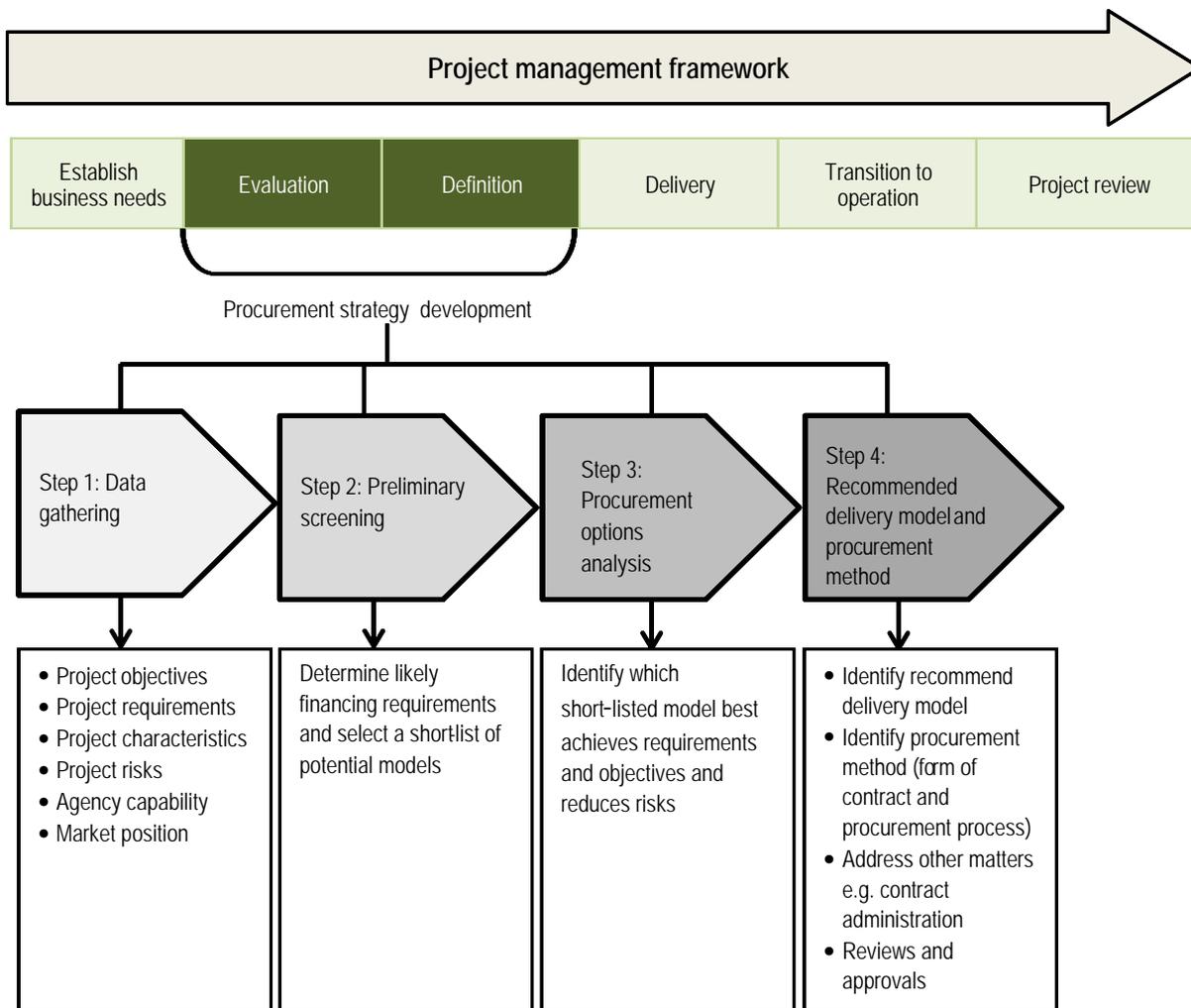
4. Procurement Strategy

4.1 Procurement Strategy Development

The *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014), which was developed in consultation with industry, provides information about options available for the procurement of civil (road and bridge) and non-residential building construction works or services, and contains useful information to guide users through the process of preparing tailored procurement strategies for individual projects.

This guide includes a recommended four-step process for the development of procurement strategies, as depicted in Figure 4.1.

Figure 4.1: Key steps in procurement strategy development process



Source: Austroads & Australasian Procurement and Construction Council (2014).

4.2 Data Gathering

Step 1 of the procurement strategy development process requires the development of a comprehensive project profile based on all available data about the project and its circumstances. In undertaking this step, consideration should be given to the types of matters detailed below and in the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014).

Note: This is not intended to be an exhaustive list of potential considerations. Readers should therefore ensure that any matters pertinent to the project which are not mentioned here or in the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014) are appropriately taken into account.

Project characteristics

Including:

- the nature of the project to be delivered e.g. a complex large project would generally be delivered by a different strategy compared to a small routine project
- staging arrangements e.g. open northbound carriageway between A and B first
- whether it would be beneficial for the project to be delivered by a single contract or by a number of contracts concurrently or sequentially (e.g. earthworks and drainage, then pavement and furniture)
- availability of finance within the agency's current and forward program may influence the choice of single or multiple contracts for delivery
- community impact and commitments to the community
- traffic requirements
- property access needs
- public utility adjustments – these may dictate some of the staging requirements
- method of financing e.g. if financing was private, then a public private partnership (PPP) delivery method may be appropriate.

Project risks

In particular:

- Outcomes of the risk assessment – see Section 2.

Generally, risk should be allocated to the party that is best able to manage it i.e. the owner or the builder (contractor). Putting the risk onto the contractor may give more certainty of price, but the price could be higher. That is, the owner may pay more for a certainty of price, despite a competitive contract market. There may also be claims from the contractor concerning the risk, despite the contract allocating the risk to the contractor. Accordingly, allocation of risk in the construction stage needs to be carefully considered.

- Cost risks.

Often the starting price of a contract is not the finished price due to variations and claims by the contractor. Different delivery models will have different cost implications e.g. design and construct (D&C) delivery models often have little change in cost, due to the nature of the contractual arrangement.

Agency capability

Including:

- Skill and experience of agency staff – agencies can lose skilled and experienced staff through retirement, promotion or simply staff leaving the organisation. It is important for agencies to maintain adequate levels of skill and experience to enable them to undertake contracting in an effective manner.
- The range of delivery strategies an agency normally uses – while there are a large number of delivery models available for use, each agency would tend to use only a few, as they have found that these best suit local conditions and government philosophy.

Market position

For example:

- Availability of contractors – this may depend on market conditions, or the location of the project e.g. in rural areas there may be limited contractors available, and then only suited to smaller projects.
- Skill level of contractors – this would depend on the maturity of the contract market, as well as the location. Even in a mature urban market, there may be limited contract skills available due to the large number of contracts currently being undertaken. It may then be desirable to adopt a different delivery model, or defer delivery of the work until a more appropriate time.

4.3 Delivery Models

Once sufficient data regarding the project has been gathered and compiled, the project profile can be assessed against the various available procurement options to determine which option(s) provide the best 'fit'.

4.3.1 Preliminary Screening

To determine which delivery model is best suited to a particular project, the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014) recommends first performing a preliminary screening to determine the likely financing requirements and identify a short-list of potential delivery models (see Step 2 in Figure 4.1).

Of the range of delivery models available for consideration under Steps 2 and 3, the most common from a road agency perspective are:

- Direct managed – Used where in-house agency resources have the capability to undertake particular types of work e.g. small construction, rehabilitation or maintenance (see Part 4 of this Guide for detailed information regarding direct managed delivery).
- Construct only – This is a commonly used model for many road agencies. This model is used when the project is well-defined and the design can be produced either in-house or by consultants. This model has the flexibility to allow the design to be completed first, with construction to be undertaken when funding is available. The advantage is that the initial budget only has to be sufficient to cover design, and the construction budget can then be based on more accurate information. The downside is that the design may need to be modified if there is too much of a delay before going to contract. A 'Design Report' to the requirements of the organisation should always form part of the design.
- D&C – This model allows for better integration of the design with construction by allowing the construction contractor to have input into the design and in particular to its constructability. This model also allows for innovation by the contractor. The downside is that many contractors do not have design management skills and simply leave the design up to their consultant, thus negating some of the benefits of the model. A Design Report to the requirements of the organisation should always form part of the design.
- Design, construct and maintain (DCM) – This is a variant of the D&C model, but requires a large enough project to make the inclusion of the maintenance task feasible. The major benefit of including a maintenance component is that the contractor is responsible for maintenance, for say up to 10 years, which helps to ensure that a quality product is delivered.
- Early contractor involvement (ECI) – A two-stage relationship-style delivery model, generally structured to resemble a project alliance model during the first stage and a D&C model during the second. This delivery model is specifically designed to achieve good relationship, cost and constructability outcomes by fostering the involvement of construction contractors during the design and development of the project works.

- Alliance – This delivery model is generally used when the project is harder to define from the outset, there is high degree of uncertainty, the risks are not fully known or delivery is required within challenging timeframes. It is a partnership in the true sense between the owner, designers, and the constructor. There are built-in performance incentives to minimise cost, time and maximise outcomes e.g. environmental, community and so on. Conversely there are penalties if performance is below an agreed level. The main benefit is that all parties work together to obtain the optimum result (i.e. there is no ‘them and us’, and a philosophy of ‘no disputes’). Another benefit is that the price of the project is defined early on in the process and there is a reasonable likelihood that it would not be greatly exceeded, unlike under some other delivery models. The negative is that there is a need for heavy management input from the owner, but this is offset by the ‘no disputes’ philosophy and the ability to work closely with the other project participants and understand how they deliver their work. This delivery model is normally used for projects > \$100m, but has been used successfully for smaller complex projects where the level of unknowns is high.
- PPP – Used when there is commercial, private sector funding. There are a number of different variants of PPP, but they typically include a period of operation (including maintenance) by the consortium, and tolls may be collected (or paid by government as shadow tolls). The project would then be handed back to government at the end of the concession period, if this applies. This type of delivery model is used for large projects where government does not wish to (or cannot) finance the projects.

Each of the delivery models has its own advantages and disadvantages – a detailed description of which is presented in the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014). Additionally, project managers considering the use of an alliance or ECI model should seek further guidance from the *National Alliance Contracting Policy and Guidelines* (Department of Infrastructure and Transport 2011) and for PPP models, the *National Public Private Partnership Policy and Guidelines* (Infrastructure Australia 2008).

Generally, the more prescriptive, specification-based delivery models are favoured for smaller, repetitive type projects of a relatively short duration. Such models often do not have sufficient flexibility for larger multi-faceted projects but are more easily controlled. This is a consideration when using smaller or less experienced contractors or delivery teams. A project manager may have responsibility for delivering a number of such projects as well as responsibility for one or more larger, more complex projects.

With increasing size, scope and risk, the more complex but less prescriptive outcome-focused models are generally preferred. Such projects are more suited to delivery models such as D&C, ECI, alliance or PPPs where there is an option for delivery to be more innovative in terms of design, financing and technology, over longer periods of time.

4.3.2 Procurement Options Analysis

Government procurement policy and local agency preferences will usually have a major influence on the range of delivery models able to be considered for particular types of projects. While there are a large number of delivery models available, each agency would tend to use only those that are considered to best suit local conditions and government philosophy on desired risk allocation.

Notwithstanding this, it is good practice before adopting a particular model to think carefully about all the risks and issues pertinent to the particular project i.e. think ‘outside the square’, to ensure that the most appropriate model is chosen. Some agencies may require a business case if the chosen delivery model is not a commonly used one. The business case would include the justification for using a different delivery model and cover matters such as risk allocation, resourcing, time and cost and other implications

The purpose of the procurement options analysis is to work through the different delivery models short-listed as part of the ‘preliminary screening’ undertaken in Step 2 to identify a recommended model. This requires an analysis of the data compiled in Step 1, the development of a range of bespoke assessment criteria specific to the project, and an evaluation of each of the short-listed delivery models against these criteria, paying particular attention to any significant risk criteria that could not be effectively managed under each of the short-listed delivery models. The assessment criteria should be specifically designed to test the short-listed delivery models’ sensitivity to different project conditions or risks, taking into account lessons learned from previous projects where relevant. In other words, the criteria must be tailored to reflect the key project

profile elements identified during Step 1 (Austroads & Australasian Procurement and Construction Council 2014).

Some of the key areas to be considered in developing the criteria to be applied in the procurement options analysis process are the market environment at that point in time (and over the longer-term) and the agency's desired risk profile, as further described below.

Market environment

The choice of delivery model needs to take into account market conditions. There may be many contracts being put to the market at a particular time across a number of government/non-government bodies. This could result in an over-heated market with scarcity of resources, less competition and an increase in contract prices, thus reducing value for money. Conversely, a lack of contract work may lead to a very competitive market.

From an industry perspective, it is desirable for the road agency to plan project delivery to provide a regular stream of contract work to the market. This prevents the highs and lows allowing better resource management and development by the private sector. The road agency should also be conscious of the need to maintain a competitive market differentiated by appropriate size of contractors and locations. The need to foster contract capability is important in maintaining an efficient and effective on-going contract industry.

In an over-heated market, where numerous projects are all competing for the same limited resource base, consideration should be given to using the (D&C) or DCM delivery models. These models facilitate emphasis on efficient and effective use of time, skill sets and equipment. Projects that can be completed ahead of program, or to a tight program, allow the next project to come on line without delay.

In a less heated market environment where resources outnumber projects, consideration should be given to construct only delivery models where the competitive nature of the market determines the cost of the project.

In both scenarios, it is important to assess the extent of industry utilisation. D&C delivery models tend to attract larger contractors. Smaller-to-medium-sized contractors may then be under-utilised if several large projects are running concurrently. Bundling or unbundling of works is a key outcome of understanding the market environment.

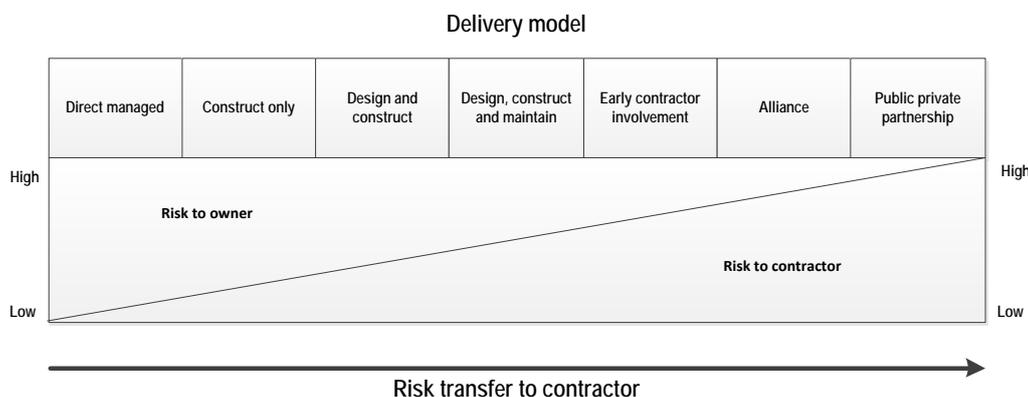
Risk profiles

There is a range of risk transference associated with the different delivery models, as is illustrated in Figure 4.2.

In deciding on risk-related criteria for the procurement options analysis, the level of risk the road agency wishes to assume will need to be factored in as this will help identify which delivery models align better the agency's desired risk profile for the project.

The general principle around risk is that it should be allocated to the party best able to manage it.

Figure 4.2: General relationship between delivery models and risk allocation



4.4 Procurement Methods

Once a recommended delivery model has been identified, the next step is to determine an appropriate procurement method (see Step 4 in Figure 4.1). The procurement method comprises:

- the form of contract
- other factors e.g. packaging and sizing, contract administration requirements or bundling/unbundling
- the procurement process.

Some of the main elements to be considered when deciding on a procurement method are described below.

4.4.1 Contractual Relationships

The forms of contract to be used, and the contractual relationship between the parties, will vary depending upon the different delivery model(s) (e.g. alliance D&C etc.) that are selected (see Figure 4.3). For example, some road agencies use AS 2124-1992 as their standard general conditions of contract for straightforward infrastructure construction projects, with AS 4300-1995 being one of the most commonly used contract forms for D&C projects.

Whatever the form of contract used, readers of this Guide should refer to the 'Contracting Principles' in the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014), which have been agreed by all Australian state and territory Austroads members, and ensure that the provisions in the selected form of contract complies with those principles.

It is important to note, however, that the contractual relationship will not necessarily be solely determined by the form of contract.

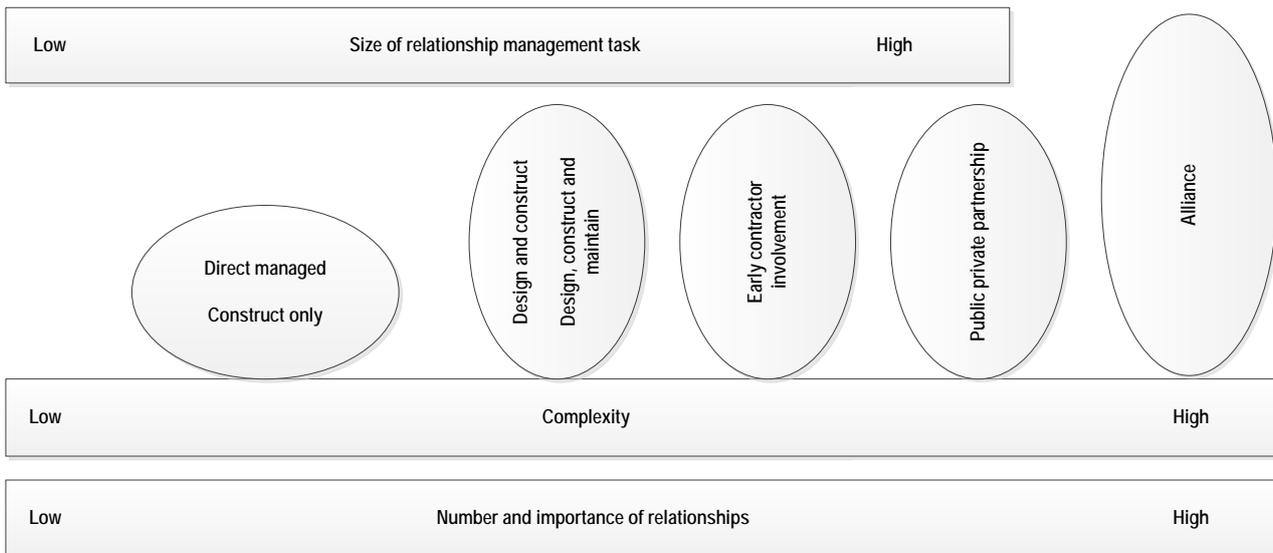
Partnering is the development of relationships between the parties in the contract and is usually undertaken outside the contract, which would contain normal dispute resolution procedures. Mutual objectives (including relationship objectives) are established and monitored regularly. Partnering can be of great benefit in contracting and many agencies incorporate it into their contract arrangements. However, if a contractor starts losing money and claims start to flow, relationships can tend to sour and increased effort is required to maintain good working relationships.

An alternative to partnering, developed by some agencies, is to incorporate a requirement for cooperative contracting into the contract. This uses some aspects of partnering covering relationships along with requirements for early notification of issues, a proactive approach to the contract from all parties often with a collective focus on project objectives and outcomes.

The increased need for collaboration and good relationships has been a driver in the development of the alliance delivery model. This delivery model is generally used in highly complex projects with a high degree of unknown issues and where early delivery is required, and a feature of this model is an enhanced emphasis on improvements on issues such as product quality, WHS, environmental performance and community engagement.

Successful relationship management is important to the success of the project and in fact such success can be measured or reported as one of the project health key performance indicators. It is unavoidable that sometimes things will go wrong in project delivery relationships, either internal or external. Disputes are best resolved on a one-to-one basis. Where this may not be possible then any escalation and associated dispute issues should be addressed in accordance with the contract documentation.

Figure 4.3: Example of relative importance of the relationship management process



4.4.2 Packaging and Sizing

The value of contracts to be let as part of a project’s procurement strategy can range from tens of thousands to hundreds of millions of dollars. Often, these can be either packaged (if small) or subdivided (if large) and delivered by one project team based at a dedicated field or regional office.

The size of such packaging is often influenced by local policy. In more populated areas it is likely that a larger pool of skilled contractors is available and hence economies of scale can be achieved by letting larger contract packages. Offsetting this, however, may be the desire to maintain expertise in the small-mid-size contractor sector, in which case a project could be separated into a number of smaller contract packages. However, the interface issues will need to be managed between neighbouring contracts.

In more remote areas the availability of a pool of larger scale skilled contractors is less likely. The need for local sustainability and the industry capability to respond may be of greater importance than say, lowest price or cost competitiveness. In order to encourage those smaller contractors that are prepared to commit to operate in these areas over the longer term, consideration could be given to allowing a criterion relating to the ‘contribution of the contractor in developing local industry’ to be given an appropriate weighting in the assessment/selection process. Such contractors could also be encouraged to combine resources by packaging or through the use of an alliance delivery model.

4.4.3 Procurement Process

The most appropriate procurement process for any particular project is one that complements the delivery model and form of contract and is most likely to identify a preferred tenderer/respondent that has the financial capacity, technical capability and other attributes required to deliver the particular works or services (Austroads & Australasian Procurement and Construction Council 2014).

Some delivery models are best supported by particular types of procurement processes, e.g. for high value procurements, including under PPP delivery models and relationship-based delivery models such as alliance or ECI, interactive tendering processes are typically used.

Individual agencies will have their own procedures and practices for the procurement of contracts. This may include use of a state-based or national prequalification scheme, contractor panels, open market tenders, expressions/registrations of interest and other short-listing processes and options for single invitation (usually in special cases). There is normally agency delegation of authority for procurement – e.g. who can invite/call tenders, accept a tender etc.

Whatever procurement process is used, readers of this Guide should refer to the ‘Tendering Principles’ in the *Building and Construction Procurement Guide – Principles and Options* (Austroads & Australasian Procurement and Construction Council 2014), which have been agreed by all Australian state and territory Austroads members, and ensure that any tendering process complies with those fundamental principles.

5. Resources

5.1 Project Teams

The project manager should obtain (in consultation with the appropriate manager) suitably qualified and experienced personnel to participate in the project team. They may be part-time or full-time, depending on the size and complexity of the project. In many cases specialist resources may not report directly to the project manager. A specialist may be working on more than one project at any one time. However, they are accountable to the project manager for their outputs. The members of the project team would normally fill specialist positions/functions such as – design manager, materials engineer, property acquisitions, community engagement, traffic engineer, contract/construction manager. The project manager may well undertake some of these functions as well as the project management role. The skills mix and competency levels will be closely related to the procurement strategy developed for the project. They relate not to individuals but to what the project team requires as a whole. Some individuals may be required to have a number of the necessary skills, particularly in smaller scale projects where there are less human resources available. Conversely, on very large projects, there may be a need for a larger number of individuals with specific skills.

In establishing the team, the project manager will seek to ensure that a well balanced mix of expertise in technical, administrative and human relationship skills is achieved. Project teams need to establish an appropriate balance of skills, roles and responsibilities in order to deliver the required project outcomes. This will vary from project to project. Organisations need the flexibility to furnish appropriately skilled teams in a variety of situations.

In general, the project management function will require human resources. It is the project manager's responsibility to manage, lead, motivate and monitor the required resources, and delegate and follow-up as required. Milestone targets for project team members would be set in consultation with team members. It is usual to hold regular project team meetings to coordinate the various project management processes, and review progress and deadlines (milestones). It is good meeting practice to have formal agenda and minutes (with follow-up actions required). Ultimately the project manager is accountable for what the project team achieves. In other words the manager has to 'drive' the project in accordance with the program for the project. How this is done, to achieve the best from available resources, is the 'art' of project management. Thus relationship management is a vital skill.

Positive team dynamics will invariably contribute to a successful project outcome. The importance of building relationships and respect between team members, including client and contractors, cannot be over-emphasised. Often team-building workshops involving all parties will allow any potential issues to be raised and discussed and to a great extent resolved in a cooperative environment. It is important to maintain the focus of the team. For example, regular project progress reports and meetings provide a forum for discussing project issues.

The skills and team composition will often require a range of personality traits. For example, good interpersonal skills are important for some project delivery functions such as those involved with community consultation or in situations such as alliance projects where personality traits enhancing cooperation between parties are most important. A person with evident communication skills would be more suited to this type of function whereas a person with an eye for detail may be more suited to design checking and audit functions. It is appropriate to consider available skills and competencies as part of the procurement options analysis described in Section 4.3.2. Those experienced in local project-specific cultural and environmental matters may be required if a project has sensitive issues in these areas. Other team specialists may be required to carry out either ongoing long term or specific short term activities e.g. traffic management for various stages of the works, or one-off functions such as overseeing the installation of electronic control equipment for an automated messaging system.

Finally, team planning is a key consideration in project delivery. The project management organisation will want its reputation enhanced. Project management success is very dependent upon the project manager and the project team. The people involved with the project will also see success reflected in their personal satisfaction.

Other major inputs to the project are physical things like the design and (contract) documents, geotechnical investigations, survey, estimate of cost, and so on. These 'services' are often supplied by consultants (in-house or external to the agency). However, it is vital that these services be effectively managed by members of the project team, or the project manager, to ensure the final product (e.g. design) meets the project and agency quality, scope and time requirements. The project team needs to accept responsibility for the outputs (e.g. design) as if they were their own.

5.2 In-house and External Human Resources

An organisation's internal capacity and capability depend upon its size, location and funding, as well as strategic importance. Most road agencies seek to maintain core competencies in key technical areas particularly if the private sector is weak in these areas. Some have a policy of remaining an informed purchaser and maintain a number of experts and specialists even in areas which have been largely outsourced. In larger populated areas it is clear that there will be a much greater range of expertise available from the private sector than in remote, more sparsely populated areas.

5.3 Resource Levelling

Resource levelling is often done on major projects using scheduling tools (see Section 6) to optimise the resource requirements. Resources are generally used as and when required, but it is important for these people (project team members) to be kept informed about the project even though they may not be involved at particular times in the project life cycle.

6. Programming and Scheduling (Time)

The project program or schedule is a plan of how the project is to be undertaken. It not only involves the time to be taken for various activities, but how the activities are to be undertaken. There could be several ways of doing an activity, each involving different time durations and costs. Thus careful consideration needs to be given to using scheduling tools to come up with an effective time and cost plan. Often a shorter duration will involve a higher cost (as the activity is 'crashed') but not always. There is a link between time and cost, and the preparation of a program must be part of the input into preparing the project estimate of cost. Time, cost and quality in project delivery are key items used in the monitoring of performance (see Section 9). The establishment and maintenance of a project program is therefore of the highest importance.

When preparing a project program, the following should be taken into account:

- The program should cover all project phases and not just delivery.

It is a common mistake not to program the initiation phase and all of the sub-phases of the delivery phase of a project. This often means that the delivery program needs to be unnecessarily crashed in order to meet the agreed project completion and opening dates. Thus it is important to schedule all project activities e.g. corridor studies, conceptual development, specific and ongoing community engagement tasks etc. to ensure adequate time is allowed for activities and project completion and opening dates are set/achievable. This, of course, then provides for the appropriate monitoring and control of the whole project, and not just the delivery phase.

- The schedule should include all tasks that have to be done in reasonable detail.

Key milestones should be included e.g. inviting tenders for construction, letting a contract.

- There are various types of scheduling tools e.g. simple (Gantt) charts, computer-based critical path networks.

It is important to select the one with sufficient detail appropriate to the size and type of project, and to allow for adequate monitoring and control. There are many standard text books detailing scheduling techniques, and these should be referred to for more detail in preparing a program.

- Adequate allowances should be made for risks and unknowns (contingencies) in the program, together with a list of the assumptions made.

This should come out of the risk assessment referred to in Section 2.

- Programs should be reviewed regularly (usually monthly, with a detailed review every three months), and kept up-to-date, taking into account current progress.

The target completion date should be kept, unless there is a change of scope approval to alter this. At each monthly review a progress line should be drawn to indicate the achievement of the various activities. If the line is to the left of target, the activity is running behind schedule. Particular attention should be paid to critical activities, as if these run late, the project will run late.

- The program should be a key tool to drive the project. In other words, it is important to ensure the individual activities are undertaken in accordance with the program, and not left to slip without good reason. If an activity on the critical path does slip, then every endeavour should be made to catch up time. There is often an advantage to catch up time on non-critical path items e.g. doing them sooner/quicker in case wet weather affects them. A cost-effectiveness test needs to be applied to such activities.
- A simple control mechanism showing key milestones can be produced each month by plotting the anticipated date for completion of a significant milestone against the target date for completion.

This is a powerful visual tool for senior management review.

- Finally, the program should be kept as simple as possible, but appropriate to the complexity of the project and the need for adequate control.

If the program is too complicated, it will be hard to keep it up-to-date and it will tend to be neglected. Conversely, if the program is too simple, it will be inadequate for control. Either way, the program will not be effective. Getting the program right is one of the 'arts' of project management. Accordingly, it is worthwhile discussing this aspect with experienced project managers.

7. Cost/Financial Considerations

7.1 Estimate of Cost

During the initiation phase and early part of the delivery phase, a detailed cost estimate should be developed that reflects the resources required to complete the project's activities and tasks. This process should include the following matters:

- The total project cost should be comprehensive and cover all phases of the project, including project management, community engagement, overheads etc. The depth of detail in an estimate will depend on the stage, size and complexity of the project.
- The estimate should ideally be an iteration of the program. That is, an estimate of the cost contains more uncertainty if it is not known how the project will be done. (Note: estimates prepared early in the initiation and delivery phases will often contain a larger contingency to allow for such uncertainty). The estimate of cost and the program go hand-in-hand and may go through a number of cycles. The estimate of cost is usually expressed in dollars related to its year of preparation e.g. \$134m (2020). The estimate of cost can also be expressed in out-turn dollars i.e. the estimate of cost summed up over a number of years, for the work proposed to be done in each financial year expressed in dollars of that year e.g. \$146m (OT). This allows for the cost increases which are expected to occur each financial year due to inflation.
- It is vital that the estimate of cost be reviewed regularly during all project phases to ensure that costs are controlled. It is important to guard against scope creep (see Section 8 as this will increase costs. It is important to cost the design which meets the desired scope and quality of the project at the appropriate technical standard. If the cost exceeds the budget, consideration may need to be given to modifying the scope, the level of service or the budget in conjunction with the client before proceeding.
- Another consideration sometimes employed is to 'design to a cost' i.e. maintain the project budget limits (rather than cost the design, when one might find that the cost of building the design is far greater than originally estimated). During the delivery phase it is usual to review estimates monthly, with detailed reviews every three months. Again it depends on what stage the project is at, and the rate of its progress.
- Independent checks of the initial estimate (by an experienced estimator not associated with the project) are worthwhile to ensure the full scope has been included, the appropriateness of quantities and unit rates, as well as the adequacy of the allowances made for risk and unknowns (contingencies).
- It is good practice to document the assumptions made and the associated dollars involved, in the preparation of the estimate, including allowances for risk and contingencies. This is helpful during the regular estimate reviews, as the details of the assumptions and reasons are often forgotten.

There are many resources and tools available (computer databases and estimating software) for preparation of cost estimates. Individual agencies may prefer particular software and would have established databases of costs and unit rates from completed projects. However, caution is needed when considering the appropriateness of information in these databases, and how the project may be different to past projects.

7.2 Budgets

Once the detailed costing and programming has been carried out, the overall project budget may be developed, bearing in mind that:

- The project budget is the total funds required to deliver the project.

This is not the same as the estimate of cost if the project spans more than one financial year. It is the estimate of cost expressed in out-turn dollars. Funds may come from several sources (e.g. local, state or regional or national), and so may require different management controls to meet the funders' accountability requirements.

- The annual budget is the funds required in a particular financial year.

The program determines the rate of progress of the project. Thus the annual budget (or funds required in a financial year) is determined from both the program and the estimate of cost. The budget requirements may vary throughout the year, as the program is updated i.e. the project may be ahead of or behind planned time due to weather, and thus more or less funds are required to support this rate of progress. This would then change the budgets required in subsequent years.

- Cash flow is different to budget fund requirements.

It is the cash required to meet payments generated by the project. If accrual accounting is used, then work done is brought to account as part of the expenditure of funds. However, cash payments for this work may occur in the following month or financial year.

- Control of a project budget is important as problems with one project may have an adverse effect on the budget for another project or the program or the agency's overall budget.

8. Change Control

The project delivery plan should include the scope of the project (project boundaries). These boundaries are approved by senior management and would include:

- time – when the project is to be opened to traffic, completed (for handover), and when key stages of the project should be opened, e.g. a new bridge, say to meet government requirements
- cost – the estimate of cost for the project
- quality – of the project outputs
- scope – the physical aspects and descriptors of the project such as start and finish points, number of carriageways and lanes, pavement widths and type etc.; the physical scope is often described by way of the approved concept plan and report.

From time to time, changes may occur to a project. These may be:

- planned, e.g. project staging may be intentionally accelerated
- unplanned, e.g. the project is delayed by wet weather, which in turn may increase costs.

There is always a risk of scope creep. This can occur when the community or stakeholders request that additional or changed elements be made to the defined project – such as a pedestrian overbridge or traffic lights. A conscious decision needs to be made by the client regarding such changes which may then have an impact on time and cost. This emphasises the importance of early consultation and understanding of community issues.

Irrespective of the reason a change is brought about, it is necessary to have formal approval to changes that materially affect the project boundaries which are already 'locked in' (approved). Thus there needs to be a process put in place to seek a change of scope (for time, cost, quality, and physical works) from the client. In submitting such a change for approval, a business case would generally be required outlining the benefits of the change and its impact on the approved project (time, cost and budget, quality, and scope). If approval is given, the revised cost (for example) becomes locked in as the target for control and performance monitoring purposes.

For efficient project management it is important that changes be submitted promptly for approval and that senior management decides on these changes quickly. It is good practice to log all changes and approvals and how these affect time, cost, quality and physical scope. This provides a clear audit trail.

9. Performance Monitoring

This section discusses the general philosophy of control of the project, by monitoring project performance and taking appropriate actions. The section also covers the importance of adequate and regular reporting and associated project reviews, as well as the need to undertake project health checks.

- Performance should cover:
 - project management processes i.e. were the correct processes followed, and how well?
 - all project key result areas (KRAs) e.g. time, cost (expenditure), quality (of process and product), scope, safety, environment, traffic management etc.
- Project plans and project management processes are the benchmarks against which performance is measured.
- Performance indicators (PIs) should be established for all KRAs, and any other element considered critical to the project e.g. community engagement. PIs can also be used to monitor the accuracy of time and expenditure forecasts, so that forecasts can be continuously improved. PIs should be included in the standard monthly 'Project Report'. Appendix C gives examples of performance measures and PIs.
- Monitoring and reporting:
 - Monthly project reviews should be undertaken by the project manager to assess progress against the project delivery plan (time, cost, quality, scope etc.), as well as the health of the project. Other matters such as risk, WHS, environmental management as well as broader project issues should be considered.
 - The output of the project manager's review should be a report. The report would cover the status of a project, as well as reporting progress against the plan (see above), together with comments/reasons for variance, and any actions proposed to bring the project back on schedule. The report could also indicate trends over time with key indicators such as time and cost. An excellent way of showing these is by graphs, which very readily show areas of concern. A typical project report is located in Appendix D. Appendix F illustrates a typical monthly management cycle for project control and forecasting.
 - The project manager's manager should undertake a monthly review of the project with the project manager, using the report as a basis. There could be several management reviews (e.g. with project manager's manager, program manager etc.). A copy of a typical agenda for such a meeting is in Appendix E.
 - Risk reviews (monthly) look at not only new risks that might need to be assessed, but progress with managing identified risks, as outlined in the Risk Management Plan.
 - In a similar manner to risks, identified project issues need to be reviewed regularly to ensure they are being managed appropriately and do not escalate to become a threat to the project. An example of an issue might be a potential community concern about an aspect of the project. If this is not managed, it could get out of hand, and even escalate to government level with subsequent change and/or delay to the project. The Issues Register should be reviewed regularly and used in reporting.
 - Project health checks are often undertaken as an audit on groups of projects to give assurance that the project is 'healthy' and not in 'trouble' e.g. constantly falling behind program or major cost overruns are likely. Any forewarning of a project falling behind schedule or incurring a cost overrun is vital as it is very difficult to rescue a project back to good health once a problem develops. Health checks would cover such items as project time, cost, quality, scope, WHS issues, community concerns, number of project difficulties, environmental management, risk and issues management etc.
- Contingency management:
 - Allowances made for time and cost contingencies should be monitored to ensure they are not exceeded. The graphing of contingency usage against time is an effective way of monitoring.

- Where individual contingencies have not been fully used, they should be released e.g. unused budget contingency can be re-allocated to another project by means of budget revisions from one project to another (this is the responsibility of the program manager). Alternatively, additional funds may be required if contingency is exceeded. This may need to be progressed via a 'Change Control Business Case'.
- Scope control:
 - The project should be constantly monitored to ensure it lies within the approved scope, and that the scope has not crept by subtle inclusion of additional work which has not been approved. See Section 8: Change Control.

9.1 Project Under-performance

The major causes of project under-performance are (not in priority order):

- unclear project objectives and inadequate scope definition
- failure to set and manage expectations
- failure to comply with technical standards
- risks not identified and no action plan in place
- inadequate planning and coordination
- poor leadership at all levels
- ineffective project organisation – insufficient training or experience, unclear responsibilities
- poor team communication, and poor communication with management (client/owner), and stakeholders
- inappropriate performance monitoring and control systems
- poor estimate of time and cost
- poor scope management
- insufficient involvement with community and stakeholders
- no authority to overcome impediments, or indecision.

10. Community Engagement

10.1 Basic Principles

Effective community engagement is a fundamental requirement which needs to be integrated with other project management processes. Community engagement in the delivery phase is a continuation of the engagement started in the project initiation phase. The transition from initiation to delivery should be seen to be seamless in the eyes of the community. The best way of achieving this is for the key project team members undertaking community engagement to move with the project from one phase to the next. Otherwise it is important (but quite difficult) to hand over community information and concerns from the project initiation phase to the project team in the delivery phase. Activities associated with community engagement include developing a strategy, planning, and particular communication activities such as advertising, meetings, public displays, websites, information lines, newsletters and media releases. Specialist advice from experts in communication is generally required, particularly where community engagement is critical and the project is sensitive to the government and/or community.

The main reasons for engaging and involving the community are:

- gaining community insights in developing and delivering the project
- raising the awareness of the project with the community
- achieving project outcomes which are responsive to community needs
- developing constructive relationships with the community and stakeholders
- ensuring that project managers understand and where possible respond to community priorities and issues
- minimising negative impacts on the community
- managing changing needs throughout the life of the project
- avoiding surprises.

Ongoing support for project initiatives will be assured through careful management of the project community and the political environment. Basic principles therefore include:

- Engage the community from the start of the project and continue regularly (ongoing).
- Establish community engagement processes. It is important to make boundaries clear to the community i.e. what areas are open to negotiation/discussion, and what matters have already been 'locked in' e.g. the route, following an environmental impact assessment.
- Provide consistent communications to these groups. Be open and honest to develop trust.
- Consider the needs of people from non-English speaking backgrounds and different cultures. See Section 10.2 for more details regarding who is the community.
- Use various techniques e.g. public meetings, public displays, focus groups, newsletters, websites, social media, feedback forms, advertisements etc. It is important to use the appropriate technique for each situation.
- Provide regular information and updates to the community in an efficient and effective manner (websites and email distribution allow for timely and targeted notifications).
- Improve and gain positive media coverage, including local newspapers.
- Involve the community in aspects of the project to engender a sense of ownership.
- Use different relationship strategies with different stakeholders. The form of engagement will often vary depending upon the social or business culture of the stakeholder in question. There will be a need to decide upon appropriate protocols in presenting the 'message'.

- The process of community engagement is also important, compared with the product (i.e. the physical project). The community should be satisfied with the engagement process even though it may not agree with all aspects of the (physical) project.
- Encourage the local community to provide feedback on the project and raise issues confidently and directly to the project staff. Differing means to provide feedback should be offered e.g. phone, email, mail etc. Feedback is worthwhile and is to be encouraged as a means to review process and outcomes.
- Effectively manage customer feedback and complaints.

10.2 Who is the Community?

The community and stakeholders are all those who have an interest, for whatever reason, in the project. They may include:

- people physically affected by the project e.g. by acquisition of all or part of their property e.g. by adjustments to their property (driveways etc.); by noise, dust etc. during the project; by noise, access restrictions after opening etc.
- people living adjacent to or near to the project e.g. residents, businesses, schools, hospitals etc.
- users of the project, such as car and truck drivers, bus operators, public transport users, cyclists, pedestrians etc.
- stakeholders such as Members of Parliament, government organisations, local councils, community groups, transport associations etc.

It is important to take into account the languages used by the community and the various cultures. If communication is poor or there are misunderstandings due to language or culture, then this can easily affect smooth project delivery and outcomes. It can also unnecessarily cause concern within the community.

10.3 Community Engagement Techniques and Activities

These activities can be considered under the following headings, bearing in mind that activities may fall under more than one heading. (Note: individual agencies may have developed manuals and other resources covering community engagement which cover these techniques in more detail):

- Media – paid form of non-personal communication to reach a mass audience at the one time, such as:
 - regular columns to provide updates and information about the project, generally during construction
 - advertisements to provide a specific message about the project.
- Community messaging and outreach – activities to develop a relationship with the community, make the project part of the community, and communicate directly with target audiences. Such activities could include:
 - open days for the general community, businesses and industry, school students etc.
 - letters to residents to advise of activities like property adjustments, disruptions etc.
 - websites, email distribution lists, social media, community blogs etc.
 - newsletters to advise locals of project activities or specific project information such as noise wall design, environmental features etc.
 - project brochures giving general information about the extent of the project and its various benefits and features – generally a professionally designed publication, which may be updated several times during the project
 - participation at community festivals and events, by having staffed stalls to allow the community to discuss the project and obtain information
 - community advisory groups, often established on larger projects to represent areas of the community or specific interests

- site tours can be beneficial in showing interested groups what is happening, and giving them a better understanding of what is involved with the project
- community evenings to provide the public with an opportunity to view the project design, find out about project progress and to talk to staff
- presentations can be made to local community and service groups.
- **Publicity and promotion** – activities and materials that assist in raising the awareness of the project, and communicating project messages. These could include:
 - flyers to promote activities such as open days, community evenings etc. which are distributed to shops, household letter boxes and other suitable locations
 - project brochures and other publications
 - project information sheets e.g. project facts and figures, noise wall designs, landscaping details etc.
 - display material, photographs and videos – these could be used in various displays, presentations and meetings etc.
 - project web sites established by the road agency
 - features in newspapers, and interviews on (local) radio.
- **Public relations** – organisation and distribution of planned information to gain public understanding and acceptance of the project, such as:
 - articles in trade journals, local papers etc. to give positive messages about the project
 - media releases from the road agency or government minister, to promote or release information about the project such as key milestone achievements, major changes to traffic, road or bridge opening etc.
 - government events including photo opportunities for the minister/premier, as well as project progress inspections.

10.4 Community Engagement Plan

It is important to develop a 'Community Engagement Plan' for each project, and to regularly review it. A smaller project could utilise a generic plan, with some modifications. The plan would normally include the following aspects:

- **Objectives** – List the objectives of community engagement for the project (this is useful when reviewing the effectiveness of the outcomes).
- **Community insights and mapping** – This can be a list of the community and stakeholders involved with the project, together with the likely concerns or issues that each might have. As the community engagement evolves, the map needs to be updated to show the concerns and issues that are apparent or perceived. It is also important to identify and map the key influencers in the community and how they link up with others. Thus it is vital to work with those key influencers to ensure the community engagement does not fail.
- **Issues** – List the evolving key issues from the mapping process.
- **Techniques** – The means of engagement need to be planned to address the concerns, issues and key influencers.
- **Planned actions** – Develop a schedule of appropriate activities month by month to cover the identified issues, indicating target audiences (e.g. key influencers, residents, businesses etc.).

- Communication management – It is important to record and effectively manage communications on the project with the community, stakeholders and other interested parties. This would include:
 - maintaining details of history of engagement with individual stakeholders, for example, property owners, subject to appropriate privacy safeguards
 - managing community feedback and a complaints database
 - managing media enquiries and responses.
- Plan review – As part of the quality management process, the plan should be reviewed and refined on a regular basis. It should also be assessed for its effectiveness. This could involve surveying the community. It is important to improve the way engagement is undertaken, and to learn lessons from what has been undertaken.

11. Quality and Audit

The purpose of the quality management and audit process is to ensure that the project outputs are delivered 'fit for purpose'. Quality management involves establishing processes for the various project management functions, and then undertaking regular audits to ensure the processes are being followed. Sometimes corrective action may be required, and it may be necessary to modify a process to improve it as a result of the experience in using that process. Project management procedures should be established to monitor both the project management processes required and the product quality (e.g. reports, community engagement outcomes, project quality through construction specifications). Agencies generally have a variety of project management processes, often embodied in an overall project management system that is used for the delivery of projects.

It is important to undertake training of staff in the processes and systems that they need to use, so that they fully understand what has to be done, how and why. Ongoing coaching of staff is a good strategy to ensure processes are used in the proper manner.

It is also essential to carry out product audits on a regular basis e.g. review quality of reports ('is the information sufficient and accurate?' compared with 'whether the report has been purely done as required by the procedure but the information is suspect'). During the construction of a project it is very important to undertake audits of the physical product by means such as parallel testing (e.g. earthwork densities). This is to provide additional assurance that the specification requirements are being met. A poor quality product can greatly reduce service life and thus reduce value for money. Quality of construction is covered further in Part 3 of the Guide.

It is also important to monitor the 'health' of a project on a regular basis. It is very difficult to get a project back on track after it has slipped behind schedule or incurred a cost overrun. Thus health checks are a good way of getting early warning of a project about to experience difficulties. The areas covered in a health check would normally include all the KRAs, such as time, cost, quality, scope, WHS, environment, traffic management etc. It is worthwhile publishing health checks on the project, rather than restricting access to them. This may generate more pride in the project or spur the project manager to perform to a higher level.

12. Project Completion and Handover

12.1 Project Completion

The project should be finalised at the earliest possible time after it has been completed, and not allowed to gradually wind down, as costs tend to continue to accrue.

Finalisation involves the following:

- closure of the project cost accounts
- early engagement with the operator, maintainer and/or owner
- transfer of project documents to operator, maintainer and/or owner for future use e.g. as-constructed drawings, project files
- review of lessons learned from initiation and delivery phases
 - identify lessons which could be adapted to future projects
 - modify and improve procedures
 - hold debriefing or 'learning workshops' with all parties involved to promulgate learnings and improve project management and outcomes of future projects
- disbanding and reassigning of the project team, after completion of all tasks.

12.2 Handover

The 'Handover Report' issued at or immediately prior to opening, is a fundamental requirement of the project delivery phase. It is the formal instrument detailing the means by which the project delivery sign-off process has been achieved, as well as highlighting achievements, problems and any major scope changes. It should also describe any ongoing obligations for the asset manager. (Note: handover may be required to multiple parties including the road agency, local government and public utility organisations.)

Successful project delivery is achieved when a project is concluded in accordance with the project brief, client agreement and criteria defined in the project delivery plan. It is also satisfying the client's expectations, even though some of these will not be explicitly stated in the project brief. This may relate to how well the project manager communicated with the client, how well the client was kept informed and how smoothly and trouble free the process was for the client.

The project delivery plan may contain progress checklists which may be completed as each of the project milestones are achieved. In this way outstanding issues can be identified and tagged helping to ensure that they are dealt with and closed out in a systematic manner to ensure project success. For small projects a standardised checklist may be suitable whereas a more formal report would be expected for larger projects. Situations may arise in larger scale contracts where separable portions may be signed off for approval individually and within each portion there may be a 'defects list' where the approval is subject to sign-off with respect to rectification of the defects.

At handover all checklists should have been completed and any remaining outstanding items or issues detailed in the Handover Report, thus enabling a smooth sign-off. The handover process may consist of two separate steps – an operational report when the road is opened to traffic and a final handover when all details have been finalised. This may for example occur at the end of the initial defects liability period when responsibility for maintenance is handed over to the ultimate asset manager.

Appendix G lists items that could be included in a Handover Report.

References

Austrroads & Australasian Procurement and Construction Council 2014, *Building and construction procurement guide: principles and options*, AP-G92-14, Austrroads, Sydney, NSW.

Department of Infrastructure and Transport 2011, *National alliance contracting policy and guidelines*, Department of Infrastructure and Transport, Canberra, ACT, viewed 9 October 2011, <<http://www.infrastructure.gov.au/infrastructure/nacg/index.aspx>>

Infrastructure Australia 2008, *National public private partnership policy and guidelines*, Department of Infrastructure and Transport, Canberra, ACT, viewed , viewed 9 October 2011, <http://www.infrastructureaustralia.gov.au/public_private/ppp_policy_guidelines.aspx>

Standards Australia

AS 2124-1992, *General conditions of contract*.

AS 4300-1995, *General conditions of contract for design and construct*.

AS/NZS ISO 31000:2009, *Risk management: principles and guidelines*.

Appendix A Sample Governance Plan

Project:.....

Governance Plan

Objectives

1. To ensure the objectives of the project are achieved.
2. To ensure the project is successful in delivering the required outcomes for the benefit of the community and all stakeholders.
3. To protect the agency's and the government's interests.

Prepared:.....

Version no:.....

Issue	Procedure	Responsibility	Comments	Status at <i>date</i>	Closed out
Changes and variations	Changes within approved scope Changes as per agreement - if appropriate, recommend - if initiated by agency: issue by director	PM PM - XYZ - Director			Ongoing
Monthly payments	Claim prepared Reviewed Voucher certified Voucher verified Payment	PM Independent auditor ABC Financial services manager Admin office			Ongoing
Reporting (formal)	Fortnightly Monthly Review reports Forward to regional manager Regional manager to keep senior executive informed as appropriate Review reports and take appropriate action	PM PM XYZ XYZ Regional Manager Review board	Fortnightly/monthly reports include: - status and time - cost (and budget), other issues - government opportunities	Reports reviewed prior to alliance leadership team (ALT) meetings Regional manager has reported at CEOs operations meetings and senior management meetings of client branch	Ongoing Ongoing Ongoing Ongoing Ongoing

Issue	Procedure	Responsibility	Comments	Status at <i>date</i>	Closed out
Issues management	Keep client management informed Issues requiring CEO involvement/resolution	See 'reporting' above XYZ		IMR arranged meeting on 18 May xx, incl appropriate agency experts, to resolve durability issue	Ongoing Yes
Time	Alliance management team (AMT) prepares updates and program Program approved and reviewed regularly If time later than pre-determined date, prepare submission to government	XYZ XYZ Director			Yes

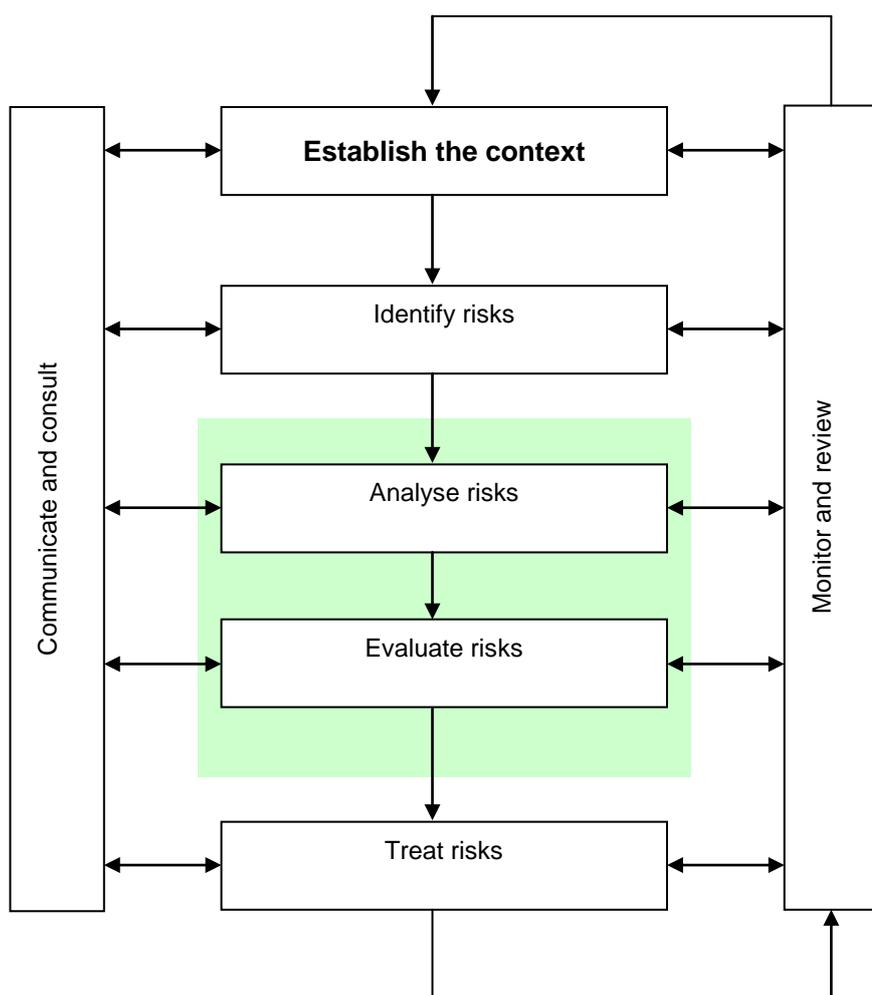
Appendix B Risk Management

This section is included for illustrative purpose only. The project risks should be assessed in accordance with the organisation's own risk management procedures.

B.1 Main Elements of Risk Management

The main elements of the risk management process, as described in AS/NZS ISO 31000:2009, *Risk Management: Principles and Guidelines* are shown below.

Figure B 1: The elements of the risk management process



Source: Based on AS/NZS ISO 31000 (2009).

B.1.1 Establishing the Context

The context for the risk management process is the environment in which the project is being implemented and includes political, organisational and physical contexts.

B.1.2 Risk Identification

Before risks can be properly managed, they need to be identified. Brainstorming sessions to identify and clarify the main issues and considerations which may prevent the project achieving its stated outcomes, are a good way of identifying risks.

Risks can also be categorised, to ensure all relevant risks are identified, for example, geotechnical, community etc. Once all risks have been identified, a filtering process should be used to determine which identified risks:

- are best left, as the likelihood and seriousness would be so low that mitigation strategies are not required
- need monitoring, but no proactive mitigation strategies required at this stage
- are avoided by changing the scope of the project
- are moved to a third party by outsourcing etc. (because they are better placed to manage them)
- need planned mitigation strategies as detailed in the Risk Register.

The results of this exercise should be documented in a Risk Register for the project.

B.1.3 Risk Analysis and Evaluation

Risk analysis involves monitoring and understanding the factors that can reduce project success.

Risks can result in four types of consequences:

- delayed or reduced benefits
- extended timeframes
- increased costs
- reduced output quality (fitness-for-purpose).

Risks are classified whether there is a low, medium or high likelihood they will occur, and according to whether their level of seriousness/impact will be low, medium, high, or extreme if they happen. From this, a priority listing for action can be developed.

Each risk can be easily graded using a risk matrix similar in form to that shown below.

Table B 1: Typical risk matrix

Grade: Combined effect of likelihood/seriousness					
		Seriousness			
		Low	Medium	High	Extreme
Likelihood	Low	E	D	C	A
	Medium	D	C	B	A
	High	C	B	A	A

The resulting grades of risk help the project team to focus on treating the most important risks e.g. A, B, etc.

The type of actions that could be used in relation to each grade of risk is as follows:

Table B 1: Sample definitions of risk grades

Recommended actions for grades of risk	
Grade	Risk mitigation actions
A	Mitigation actions to reduce the likelihood and seriousness to be identified and implemented as soon as the project commences.
B	Mitigation actions to reduce the likelihood and seriousness to be identified and appropriate actions implemented during project execution.
C	Mitigation actions to reduce the likelihood and seriousness to be identified and costed for possible action if funds permit.
D	To be noted – no action is needed unless grading increases over time. Should be monitored.
E	To be noted – no action is needed unless grading increases over time. Should be monitored.

B.1.4 Risk Mitigation/Treatment

There are two broad types of risk mitigation or treatment activities:

- Preventative – planned actions to reduce the likelihood a risk will occur and the seriousness if it does occur. In other words, what should be done now?
- Contingency – planned actions to reduce the seriousness of the risk, if it does occur. In other words, what should be done if?

Risk mitigation or treatment actions should be cost-efficient and effective. Conscious decisions need to be made regarding the acceptance of certain risks as opposed to the costs of mitigation. Mitigation strategies to reduce the likelihood and seriousness of risks should be built into the estimate of cost and schedule of the project program.

B.1.5 Monitor and Review

Risk management is not a one-off activity. Risks should be monitored throughout the project as their likelihood or impact ratings may change or new risks may emerge. Reviews should be undertaken monthly, but the frequency will depend on the size, complexity and project progress. An outcome of this process may be adjusting the program and estimate of cost for certain risks.

B.1.6 Communicate and Consult

Since clients and stakeholders can have a significant impact on decisions made, it is important that their perceptions of risk be identified and documented. Communication and consultation with all key stakeholders should be an ongoing process.

B.2 What is a Risk Register?

The Risk Register records details of all the risks identified at the beginning and during the life of the project, their grading in terms of likelihood of occurring and seriousness of impact on the project, initial plans for mitigating each high level risk and subsequent results.

It usually includes:

- a unique identifier for each risk
- a description of each risk and how it will affect the project
- an assessment of the likelihood it will occur and the possible seriousness/impact if it does occur (low, medium, high)
- a grading of each risk according to a risk assessment table
- a decision on who is responsible for managing the risk
- an outline of proposed mitigation actions (preventative and contingency)
- in larger projects, costings for each mitigation strategy.

This register should be maintained throughout the project and will change regularly as existing risks are re-graded in the light of the effectiveness of the mitigation strategy, and new risks are identified. In smaller projects, the Risk Register is often used as the Risk Management Plan.

How to use the Risk Register template (see page 36)

The template consists of headings and a table that reflect the nature of the information that is to be addressed.

The completed Risk Register should be brief and to the point, so it quickly conveys the essential information. It should be updated on a regular basis, at least monthly.

The description of the risk should include the associated consequences where these are not obvious. These consequences can be useful in identifying appropriate mitigation actions. In larger more complex projects, a separate column may be required.

Mitigation actions should include actions such as:

- Preventative actions – planned actions to reduce the likelihood a risk will occur and/or reduce the seriousness should it occur. (*What should be done now?*)
- Contingency actions – planned actions to reduce the immediate seriousness of the risk when it does occur. (*What should be done when?*)
- Recovery actions – planned actions taken once a risk has occurred to allow the project to move on. (*What should be done after?*)

A number of different text styles have been used within the template, as follows:

- Text in *italics* is intended to provide a guide as to the kind of information that can be included in a section and to what types of projects it might be applicable.
- Text in normal font is intended as examples.
- Text enclosed in <angle brackets> is intended to be replaced by whatever it is describing.

B.2.1 Sample of Risk Register

<PROJECT TITLE> File No.: <xxxxxxx>					
Risk Register as at <Date>					
<i>Report for: (Optional) e.g. <Project Name></i>					
<i>Project manager: <Name></i>					
Project scope: A brief description of the scope of the project					
Grade: Combined effect of likelihood/seriousness					
	Seriousness				
Likelihood		Low	Medium	High	Extreme
	Low	E	D	C	A
	Medium	D	C	B	A
	High	C	B	A	A
Recommended actions for grades of risk					
Grade	Risk mitigation actions				
A	Mitigation actions to reduce the likelihood and seriousness to be identified and implemented as soon as the project commences.				
B	Mitigation actions to reduce the likelihood and seriousness to be identified and appropriate actions implemented during project execution.				
C	Mitigation actions to reduce the likelihood and seriousness to be identified and costed for possible action if funds permit.				
D	To be noted – no action is needed unless grading increases over time.				
E	To be noted – no action is needed unless grading increases over time.				
Change to grade since last assessment					
NEW	New risk	↓	Grading decreased		
—	No change to grade	↑	Grading increased		

Risk Register continued:

Id.	Description of risk Identify consequences¹	Likelihood	Seriousness	Grade	Change	Mitigation actions	Rating – post mitigation	Responsible officer	Cost
1.1	Inadequate funding to complete the project	Medium	Medium	B	NEW	Re-scope project, focusing on time and resourcing		Project manager	NA
1.2	Lack of technical skills in client unit	High	High	A	↑	Develop training plan		Consultant	\$2000

¹ In larger projects, the consequences of the threat may not be evident, and noting them under each risk, or in a separate column can be useful in identifying appropriate mitigation actions.

Appendix C Performance Measures and Indicators

Performance measures and indicators should be established early in a project as a way of monitoring a project's performance. There would normally be a PI for each KRA. The following are typical measures/indicators:

C.1 Cost Performance

- Ratio of anticipated final cost to approved estimate. Should be < 1 , but if adequate level of contingencies incorporated in estimate, target should be < 0.95 .

C.2 Time Performance

- Ratio of 'duration from start to anticipated final completion' to 'duration originally planned', as per the project schedule. Can be calculated on a spreadsheet using the project start date.

C.3 Forecast Expenditure Performance (month)

- Ratio of year-to-date project expenditure to forecast project expenditure in the current financial year (target should be 1).
- Monthly expenditure rate variance: $\pm 5\%$.

C.4 Forecast Expenditure Performance (for year)

- Ratio of 30 June forecast to agreed target.

C.5 Community and Stakeholder Relations

- Satisfaction with the process, as measured by surveys.
- Number of valid community complaints (PI = 0).
- Timeliness of resolution of community issues.

C.6 Work Health and Safety

- Number of WHS audits undertaken.
- Number of lost time injuries (LTIs), accident frequency rate, near misses etc.
- Number of new issues raised during each audit.
- Near miss/close call identification.

C.7 Process Quality

- Number of audits undertaken.
- Number of 'Non-Conformance Reports' (NCRs) outstanding after one month, after two months.

C.8 Product Quality

- Number of parallel tests undertaken and number of failures.
- Number of NCRs outstanding after one month, after two months.
- No of NCRs with use-as-is dispositions.

C.9 Environmental Management

- Number of environmental audits undertaken.
- Number of NCRs outstanding after one month, after two months.

C.10 Traffic Management

- Length of queues exceeding ... metres.
- Maximum traffic delay for each working day (in minutes).

C.11 Project Management

- Client satisfaction with project management measured by surveys, or on a 'hassles index' scale. ('Hassles index' is the perception of a client as to the number of problems or issues that come to the client's attention.)

Appendix D Typical Project Report

This report is included by way of example. Each agency would have its own requirements for reporting, which should be followed.

Project Status Report Milestone and Forecast Expenditure Summary

Project Number: Region: Report Run Date:
 Brief Description: Expend. To End:
 Project Phase: Road Number:

PROJECT MILESTONES

Milestone	Approved Target	05/06 Expected or Actual	06/07 Expected	07/08 Expected
Invite Tenders	Jan-08			Jan-08
Award Contract	May-08			May-08
Start Construction	Jul-08			
Open Final Stage to Traffic	Jul-09			
Handover	Dec-09			

Milestone Notes:

Enter your milestone notes here

PROJECT ESTIMATE \$'000

Estimate Status:	Final Concept Est Appvd	Approved Estimate (EST)	IMS	Out-Turn
Current Announced Cost (Out-Turn):	-	Antic Final Cost (PJP)	17,101	17,866
			19,715	20,455

ANNUAL FORECAST EXPENDITURE \$'000

Phase	Previous Actuals	05/06 Plan	06/07 Plan	07/08 Plan	Remaining Years	Total
▷ Project Concept	68					68
▷ Project Detail Design	1,122					1,122
▷ Property Acquisitions	354					354
▷ Infrastructure	551	1,915	726	500	10,763	14,456
▷ Project Finalisation						
Contingency Cost Plan			34	160	3,520	3,714
TOTAL Forecast (PJP)	2,096	1,915	760	660	14,283	19,715

PM Predicted Range: Min Max Min Max

Fund Code	Approved (CPA)	Proposed (PGP)	Funds required (PJP)	2,096	1,915	760	660	14,400	14,283	19,456	19,546	19,715	Surplus Deficit
State Roads	Approved (CPA)	Proposed (PGP)	Funds required (PJP)	2,096	1,915	760	660	14,400	14,283	19,456	19,546	19,715	-258
													-168

Expenditure - Life to Period: **4,011**

MONTHLY EXPENDITURE AND FORECAST \$'000

	Jul Actual	Aug Actual	Sep Actual	Oct Actual	Nov Actual	Dec Actual	Jan Actual	Feb Actual	Mar Actual	Apr Actual	May Actual	Jun Actual
Actual or PJP	64	168	343	362	202	308	113	83	118	65	56	33
Cumulative	64	232	574	937	1,139	1,446	1,559	1,643	1,761	1,826	1,883	1,915

Cost Notes:

Enter your cost notes here

Current Responsible Person } PM Development: **SS10 Kali Gupta** of **Infrastructure Devt**
 PM Implementation: **SY12 David Tawadros** of **PMS - Sydney Team 1** RNI



Progress Update For Month Ending June 2006

(Items marked with -> have been updated)

1 BRIEF PROJECT DESCRIPTION:

. *Enter a brief description of the project scope*

*-> *Enter major commitments and/or significant funding provisions, if appropriate*

2 MILESTONE ACHIEVEMENTS:

Actual Date	Milestone Description
-------------	-----------------------

*-> *Enter any clarification on milestone achievements, if appropriate*

3 UPCOMING MILESTONES:

Expected Date	Milestone Description
---------------	-----------------------

*-> *Enter any clarification on upcoming milestone achievements, if appropriate*

4 ACTIVITIES IN PROGRESS:

. *Enter a brief list of activities in progress*

. *Enter a brief list of activities in progress*

5 PUBLIC ISSUES / MEDIA ACTIVITY:

. *Enter ministerial announcements, public/community issues, meetings, media releases, etc.*

. *Enter ministerial announcements, public/community issues, meetings, media releases, etc.*

6 GENERAL STATUS AND KEY ISSUES:

. *Enter progress of current project phase and funding status*

. *Enter key issues, if appropriate*

Contact:

Title:

Phone:

Detailed Project Status Report

Project Number:

Detailed Project Report to Client end of: **June 2006** (Calendar Year)

Length (km): **0.6**

Brief Description of Scope

Project Objectives

PROJECT ESTIMATE

Estimate Phase: **Final Concept Est Appvd**
 Core Client Acceptance Date: **25 May 2004**

Phase	Estimate (ver EST) in IMS			Estimate (ver EST) in \$'000 OT			Expenditure To Period	Forecast (ver PJP) in IMS			Forecast (ver PJP) in \$'000 OT		
	Base Estimate Current \$	Contingency Current \$	Total Current \$	Base Estimate	Contingency	Total		Revised Base Current \$	Revised Contingency Current \$	Anticipated Final Cost	Revised Base	Revised Contingency	Anticipated Final Cost
Overall Result	13,399	3,702	17,101	13,989	3,877	17,866	4,011	16,001	3,714	19,715	16,559	3,896	20,455
▷ Project Concept	3,541		3,541	3,672		3,672	72						
▷ Project Detail Design	648		648	659		659	1,890						
▷ Property Acquisitions	74		74	78		78	366						
▷ Infrastructure	9,011	3,702	12,712	9,448	3,877	13,325	1,684	16,001	3,714	19,715	16,559	3,896	20,455
▷ Project Finalisation	126		126	132		132							

PROJECT MANAGEMENT COSTS (as a % of total expenditure)

Development Mgt to Date: **1.38** %
 Project Mgt and Development Mgt to Date: **19.79** %

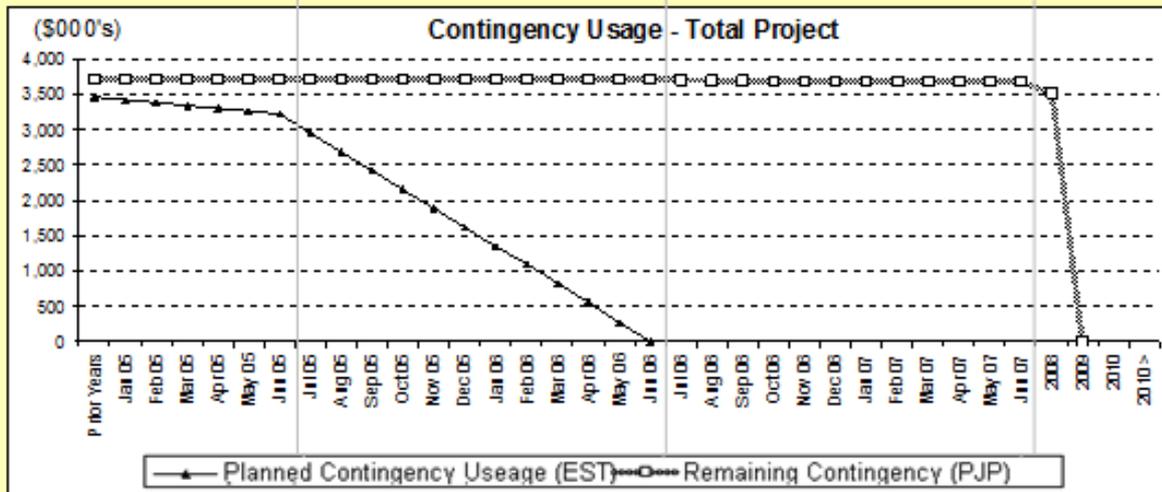
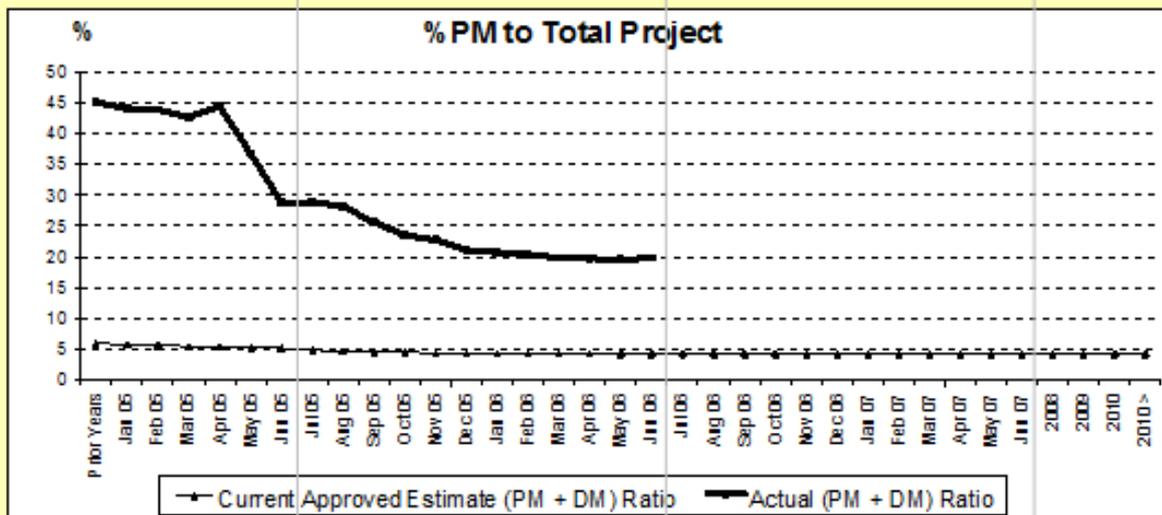
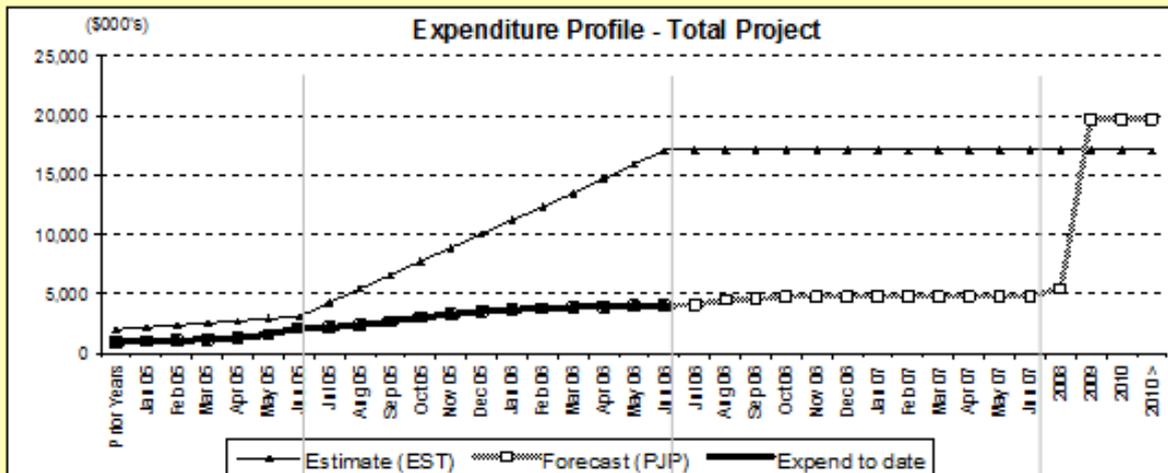
CURRENT CONTRACTS

(Exclusive of GST)

Vendor	Work	Contract Total	Expenditure to Period	Remaining Commitment
		1,145,280	795,254	350,026
		955,000	953,202	1,798
		410,126	410,126	
		147,882	15,313	132,569
		133,000	225,552	-92,552

ADDITIONAL COMMENTS

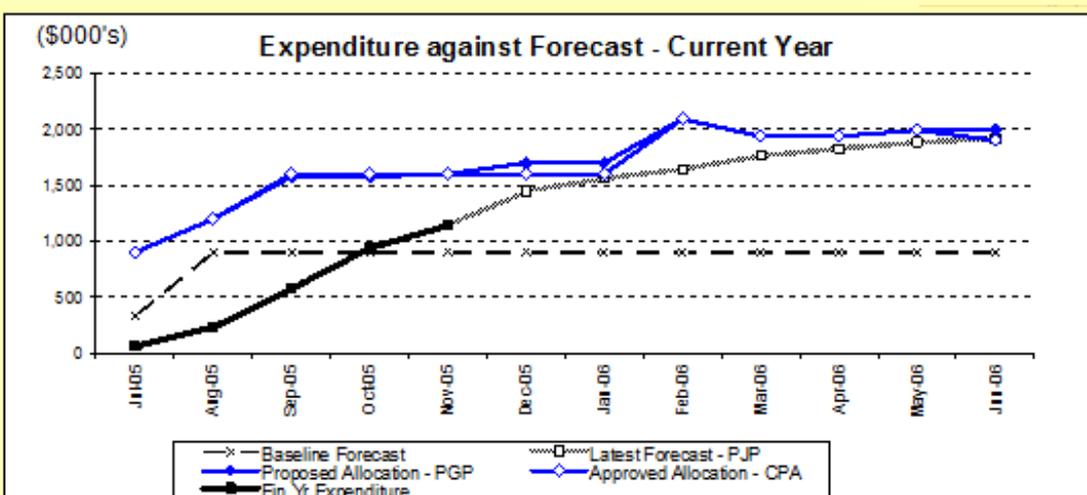
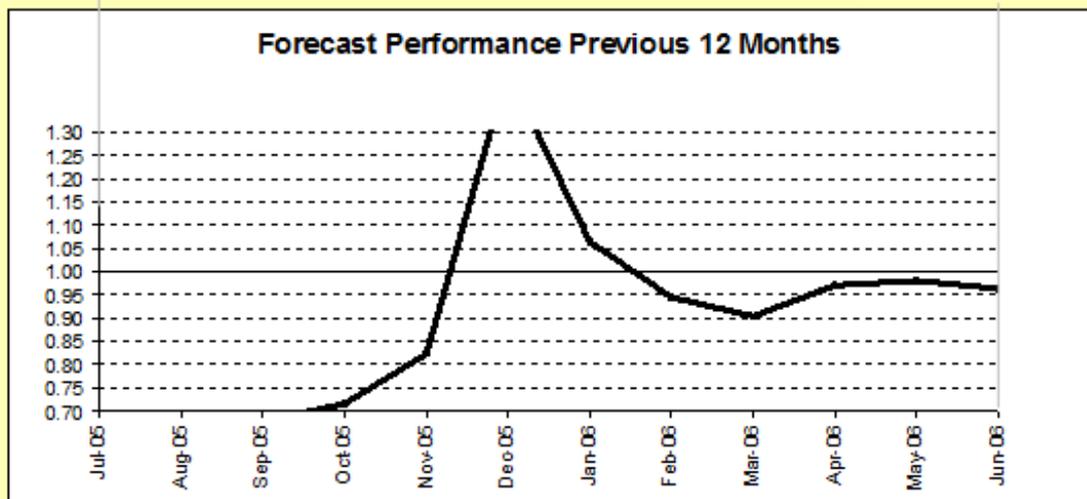
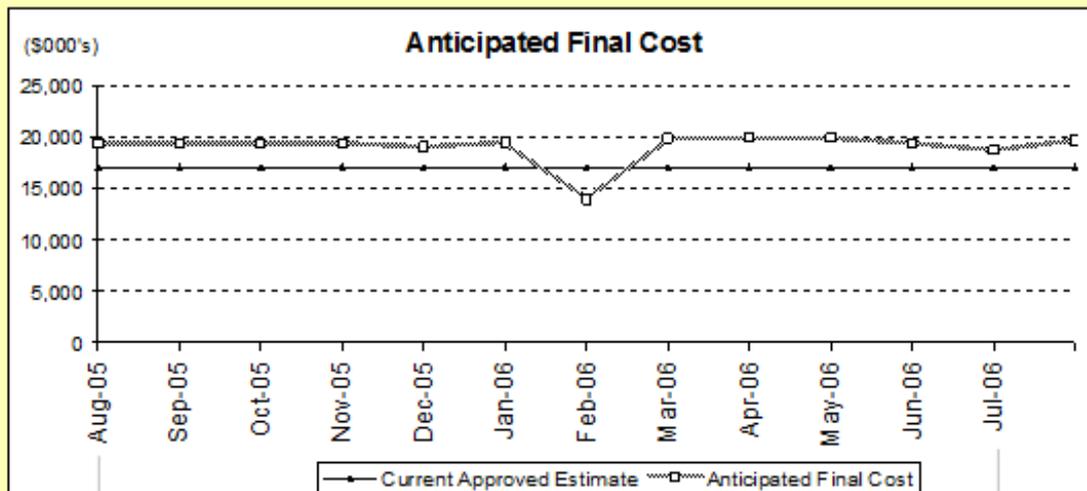
Project Number: D/00143
 Project Status Report for: June 2006



Prev 6 Mths | Current Fiscal Year | Next Fiscal Year | Following Yrs

Status of Data 11/7/2006 01:30:22

Project Number: D/00143
 Project Status Report for: June 2006



Status of Data: 11/7/2006 01:30:22

Project Milestone Report



GWH:LAWSON SECT 1B: BASS ST - HONOUR AVE

Project Number:	D/00143	Region:	Sydney OSD	Report Run Date:	11 Jul 2006
Brief Description:	Gwh:Lawson Sect 1B: Bass St - Honour Ave			Expend. To End:	June 2006
Project Phase:	Detail Design & Doc Phase			Road Number:	5

PROJECT MILESTONES

Standard Milestone	Milestone Details	Approved Target Date	Expected or Actual Date	Difference (days)
Invite tender for ma	Invite Tenders	07-Jan-08	07-Jan-08	0.0
Accept tender for ma	Award Contract	01-May-08	01-May-08	0.0
Handover infrastruct	Handover	01-Dec-09	01-Dec-09	0.0
Start construction	Start Construction	01-Jul-08	01-Jul-08	0.0
Open (final stage) t	Open Final Stage to Traffic	01-Jul-09	01-Jul-09	0.0

MILESTONE NOTES

Enter your milestone notes here (optional)

Appendix E Monthly Management Review for Projects

Project:	
Date of review	(monthly)
Present:	

AGENDA	
1.	Project delivery plan (and other plans?)
2.	Agree on level of detail required (at start of project) for: <ul style="list-style-type: none"> ▪ schedule and key milestones ▪ cost forecasting and contingency
3.	Project schedule, including time contingency, PIs
4.	Milestone targets (target, expected) and changes from last month
5.	Risk – Risk Management Plan
6.	Cost control spreadsheet and anticipated final cost vs approved estimated cost
7.	Cost forecasts and changes from last month, including PIs
8.	Contingency: <ul style="list-style-type: none"> ▪ used ▪ remaining ▪ release of part to client
9.	Scope changes: <ul style="list-style-type: none"> ▪ awaiting approval ▪ to be submitted ▪ implications for project, e.g. time, cost etc.
10.	Community engagement/stakeholder relations: <ul style="list-style-type: none"> ▪ complaints ▪ hot issues ▪ upcoming events ▪ strategies
11.	Environmental issues
12.	WHS
13.	Traffic management issues
14.	Quality management: <ul style="list-style-type: none"> ▪ quality assurance of processes ▪ quality of product
15.	Issues management (for issues not raised above)
16.	Site issues
17.	People issues

Appendix F Monthly Management of Cost and Time for Project Control and Forecasting

F.1 Monitor Cost and Time During the Month for Deviations from Plan

1. Review expenditure to end of last month against (approved) estimate of cost; transfer into cost control/forecasting spreadsheet.
 2. Review progress to end of last month; mark status on project schedule.
 3. Update project schedule on basis of progress, expected progress.
 4. Highlight critical milestones.
 5. Review contingencies (time and cost).
 6. Update:
 - (a) project cost control spreadsheet
 - (b) cost forecasting spreadsheet.
 7. Review anticipated final cost vs approved estimate of cost.
 8. Review project with manager and agree on project strategy, including time and cost plans.
 9. Review above with client representative (if in delivery phase).
 10. Finalise schedule, cost control spreadsheet, and cost forecast spreadsheet.
 11. Prepare monthly project report.
- Cycle repeats next month.

Appendix G User Checklist

G.1 Handover of Project Documents

The project manager and asset manager should use the following checklist as a guide to identify all relevant requirements for the handover of completed works to the asset manager. The document should comply with the organisation's own handover procedures.

Project information			
Project number		Road number	
Description			
Project manager (Delivery)			
Document	Required (Y/N)	Date required	
Primary group – might be of major significance to future maintenance			
Handover report (summary of maintenance issues)			
Design reports: <ul style="list-style-type: none"> ▪ Pavement ▪ Geotechnical (including slope stability) ▪ Road geometry ▪ Bridge (and bridge size culverts) ▪ Others as appropriate – for example, drainage, environmental, etc. 			
Centreline graphics (to include ramps, roundabouts, etc.) for incorporation into the Geographic Information System (GIS)			
Contract documents and/or list of applicable specifications			
Work as executed drawings			
EPA licence and certificate of compliance			
Schedule of works performed			
Asset inventory			
Bridge information details when applicable			
Maintenance schedule			
Manuals on all equipment installed (cameras, electro-mechanical devices, lighting, etc.)			
Information on vacant or surplus property or other asset			
Agreements with others who have taken responsibility for parts of new work or surplus assets			
Schedule of files (including all site management documentation)			
Schedule of geotechnical reports			
Schedule of special reports – for example: settlement, rideability, dilapidation etc.			

Document	Required (Y/N)	Date required
Copy of the contract 'Certificate of Practical Completion'		
Copy of the 'Final Certificate' – might be one-to-two years after handover		
Secondary group – of secondary significance to ongoing maintenance		
Project Delivery Plan		
Client and financial approvals		
Audit reports – quality, WHS, environment		
Contract construction reports		
Boundary plans		
NCR and CAR registers		
Verification surveys		
Geotechnical reports		
Environmental reports – for example, EPA audit		
WHS reports – for example, WorkCover audit		
Surveillance testing		
Inspection reports		
Product quality audits		
Photographs		
Video tapes		
Special reports – for example: settlement, rideability, dilapidation etc.		
Bridge design information		
Loading assumptions – DL, LL, braking, stream, earthquake, etc.		
Pile design		
Foundation pressures		
Grades of structural steel		
Mine subsidence parameters		
Maintenance requirement for bearings etc.		
Geotechnical information		
Shear strain limits of elastomeric bearings		

Austrroads' Guide to Project Delivery consists of four parts. **Guide to Project Delivery Part 2: Planning and Control** gives guidance on a number of concepts relating to planning and control of the delivery phase of a project. It covers a range principles and considerations, leaving the details to be sourced from the preferred practice of the jurisdiction for which the project is intended. Key among these issues are risk, procurement strategy, change control, performance monitoring and community engagement. The appendices give valuable information and examples to assist practitioners in delivering quality outcomes on the projects they deliver.

Guide to Project Delivery Part 2



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Austrroads is the association of Australasian road and transport agencies.

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