

Guide to Successful Project and Asset Delivery: **Getting it Right Up Front**



Strategic Forum
for the Australasian Building
and Construction Industry



Guide to Successful Project and Asset Delivery – Getting it Right Up Front

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The purpose of the information contained in this guide is to provide owner personnel and project procurers with an outline of potential procurement practices, processes and steps which might be followed in developing effective procurement strategies for implementation of the Guide to Successful Project & Asset Delivery – Getting it right Up Front on specific projects within the built environment.

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About ACIF

The Australian Construction Industry Forum (ACIF) is the meeting place for leaders of the construction industry in Australia. ACIF facilitates and supports an active dialogue between the key players in residential and non-residential building, engineering construction, other industry groups, and government agencies.

Our members are the most significant Associations in the industry, spanning the entire asset creation process from feasibility through design, cost planning, construction, building and management.

ACIF also provides a number of resources for the industry, including twice yearly release of the ACIF Forecasts, the industry's 'compass' to the demand for work over the next decade.

ACIF is focused on creating a competitive construction and property industry that is a leader in building Australia's prosperity. As well as facilitating communication between the different interests that make up the construction sector, ACIF provides governments and other agencies with a central and efficient industry liaison point.

ACIF harnesses the energies of its members to provide leadership and facilitate change within the industry, to increase productivity, efficiency, research and innovation. ACIF is governed by a Board of Directors comprising senior practitioners and chief executives of its member organisations. A secretariat supports the Board and the working groups tasked with developing policies and productivity tools.

ACIF seeks to develop a successful, strong and sustainable construction industry in Australia.

For more information about ACIF, visit www.acif.com.au

About APCC

The Australasian Procurement and Construction Council Inc (APCC) is the peak council whose members are responsible for procurement, construction and asset management policy for Australian State and Territory Governments. Papua New Guinea is an associate member. The APCC is made up of 11 member agencies.

Over the past 48 years, the APCC has established itself as a leader in government procurement, construction and asset management strategies and practice. The work of the APCC is committed to procurement innovation, solutions and efficiencies designed to create savings and maximise service delivery to the communities of Australia, New Zealand and Papua New Guinea.

The APCC promotes a cohesive government procurement environment and manages national projects for the Council of Australian Governments. It harnesses the benefits of nationally consistent approaches for its members.

The APCC Council of Chief Executive Officers leads the direction of the APCC, while the Leadership Group drives the overall work program.

The projects within the APCC are multi-faceted and collaborative. Each project has a dedicated Working Group, which progresses the aims, with support from the Directorate. The Working Groups meet regularly by teleconference, face-to-face and online.

The APCC community is made up of individuals with a wealth of skills and expertise. Collectively, it represents the hub for procurement excellence. Experts from each member jurisdiction collaborate on projects, creating a knowledge network.

For more information about APCC, visit www.apcc.gov.au

Strategic Forum for the Australasian Building and Construction Industry

An ACIF and APCC initiative

The Strategic Forum for Construction is a unique body that brings together key stakeholders in the Australasian construction industry. The Forum acts as an entry point and significant interface between government and the construction sector. It facilitates positive change and encourages greater productivity.

Above all, it acts as a national forum to network and discuss issues that affect the industry. This Forum is an entry point to facilitate joint pathways for improving building and construction industry productivity in Australasia. By working together to do this, we engender and encourage trust between the government and industry sectors.

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Construction & Building Industry Super

Foreword

This Guide provides a snapshot of the processes involved in planning, designing and constructing capital works assets and includes existing complementary resources produced by ACIF and APCC available to inform those processes.

It is not intended to be, and is not, exhaustive. Rather, it seeks to provide those who may be unfamiliar with how those assets are created with an introduction and links to further information.

Readers will find that the nomenclature in this Guide is not always consistent. This is due to the fact that the resources utilised in this Guide and listed in the Introduction, sometimes use different terminology to describe similar processes, positions and stages of project and asset delivery. We encourage readers to refer to each of the resources when utilising this Guide.

In particular, readers should note that the term 'project sponsors' is used separately from 'owner' or client. Project sponsors are the client, financiers and end users who individually or jointly, determine the risk allocations and terms of the head contract offered to the head contractor.

Whilst during design and construction there will usually be only one organisation acting as the client under a contract with a head contractor, its ability to determine all relevant commercial and technical conditions may have been influenced or even controlled by providers of finance or the requirements of end users.

Where appropriate, 'owner' or 'client' is used interchangeably to describe the singular role or responsibility of that party, separate from the roles or responsibilities of other project sponsors.

Construction is an important sector of the Australian economy. It employs around one million people, and contributes around 9% to GDP. More to the point, the assets it produces for other sectors of the economy are critical inputs to all economic and social activity.

The construction industry customarily separates the work it does and the assets it creates in to the following three sectors. This Guide and the resources referenced apply to and may be used in all three sectors and the listed assets.

Table 1: Construction Industry Sectors and Assets

| Residential Building | Non Residential Building | Engineering Construction |
|---------------------------|------------------------------|---------------------------------|
| New houses | Offices | Roads |
| Units and apartments | Retail and wholesale trade | Railways, bridges, harbours |
| Alterations and additions | Industrial | Electricity, pipelines |
| | Accommodation | Water, sewerage |
| | Education | Telecommunications |
| | Entertainment and recreation | Heavy industry including mining |
| | Health and aged care | Recreation and other |

Source: ACIF

These assets are created and managed to deliver services. In the public sector the primary focus is on economic and social infrastructure. The private sector may also create assets for that purpose, but will also create them to meet a market need and generate profit. On other occasions public sector agencies and private sector firms collaborate to deliver economic or social infrastructure using private sector finance.

This Guide has a considerable focus on collaborative working, and the integration of project teams. In common with most developed countries, our construction industry is project based and relies heavily on bringing dozens and sometimes hundreds of separate organisations together to deliver an asset.

Selection of team members (whether designers, builders, trade contractors or suppliers) is competitive. When the virtual project organisation created to deliver an asset has done its work, it is disbanded. Whilst the competitive approach delivers value for money outcomes to clients and end users, it creates challenges for project teams.

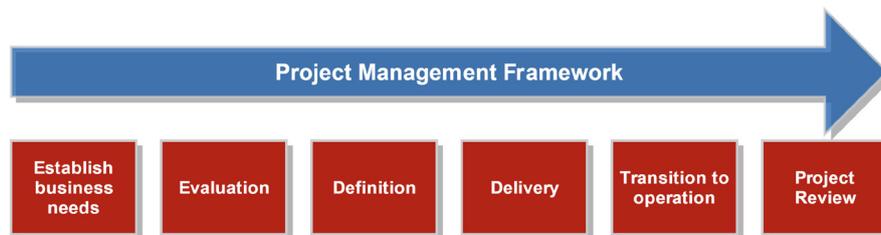
That is where the focus on collaboration comes in. The best projects deliver what end users want, and are happy places for team members to work. Good relations within project teams like any organisation need to be planned for, worked at and managed. They encourage collaboration and respect within teams for the skills and capabilities that team members bring to the project.

Following the processes for project initiation, team selection, project planning and the resources suggested in this Guide, will go a long way to ensuring that your project will deliver what you expected, in the time expected, within budget and on time and for the price you expected to pay.

Introduction

This is a concise Guide to the existing leading practice resources available to assist project sponsors and project team members achieve successful project and asset service delivery.

At the outset, it is important to stress that the decision to develop an asset is part of asset management planning. The decision to do so will be taken to deliver a service or benefit to the organisation or its stakeholders. This includes users of services delivered by a publicly owned asset or for the shareholders of a private sector owner.



The focus of this guide is the front end of projects – project initiation, project delivery planning, delivery team procurement, and project delivery. It does not deal in detail with the full span of project management techniques or practices.

The management of the completed asset and the services or benefits it is to deliver should be considered as part of the decision whether to create an asset or not. The overall needs of facility management including maintenance planning and management should be inputs to the design of the asset.

Once a decision is taken to create an asset, project sponsors may use the following five part test of whether a project has been successful.

1. End users expectations should be met or exceeded.
2. The project sponsors' strategic and financial objectives should be met.
3. Project team members should achieve their financial objectives.
4. The project delivery team should enjoy working together, and want to work together again.
5. Community and stakeholder expectations of the project in terms of safety, design, environmental outcomes, and social objectives, should be met or exceeded.

The principal resources referred to and adopted in this Guide are the following.

- *Guide to Project Initiation for Project Sponsors, Clients, and Owners*: APCC and ACIF, 2nd edition, 2010. ("Project Initiation Guide")
- *Guide to Leading Practice for Dispute Avoidance and Resolution*: Cooperative Research Centre for Construction Innovation, 2009. ("DAR Guide")
- *The Case for Project Team Integration*: ACIF and APCC, 2014. ("Case for PTI")
- *The Project Team Integration Workbook*: ACIF and APCC, 2014. ("PTI Workbook")
- *Building and Construction Procurement Guide – Principles and Options*: APCC and Austroads, 2014. ("Procurement Guide")
- *Guide to Integrated Strategic Asset Management*: Australian Asset Management Collaborative Group, 2012. ("the Asset Management Guide")
- *The PTI and BIM Framework*: ACIF and APCC, 2014. ("the Framework")
- *The NATSPEC National BIM Guide*: NATSPEC. ("NATSPEC National BIM Guide")

-
- *Procurement of Construction Products – A Guide to Achieving Compliance*: APCC, 2014 (“the Product Quality Guide”)
 - *Building and Construction Procurement Guide: Project Team Integration and Building Information Modelling (BIM)*: ACIF and APCC, 2015

These resources have been developed by or for the industry and government clients.

Other resources address similar or related areas, and are referred to in the Resources sections of this Guide.

This guide does not replace existing Government requirements or industry guidelines, and should only be used in conjunction with the statutory requirements for construction procurement of the relevant jurisdiction.

Phases in Construction Project and Asset Delivery

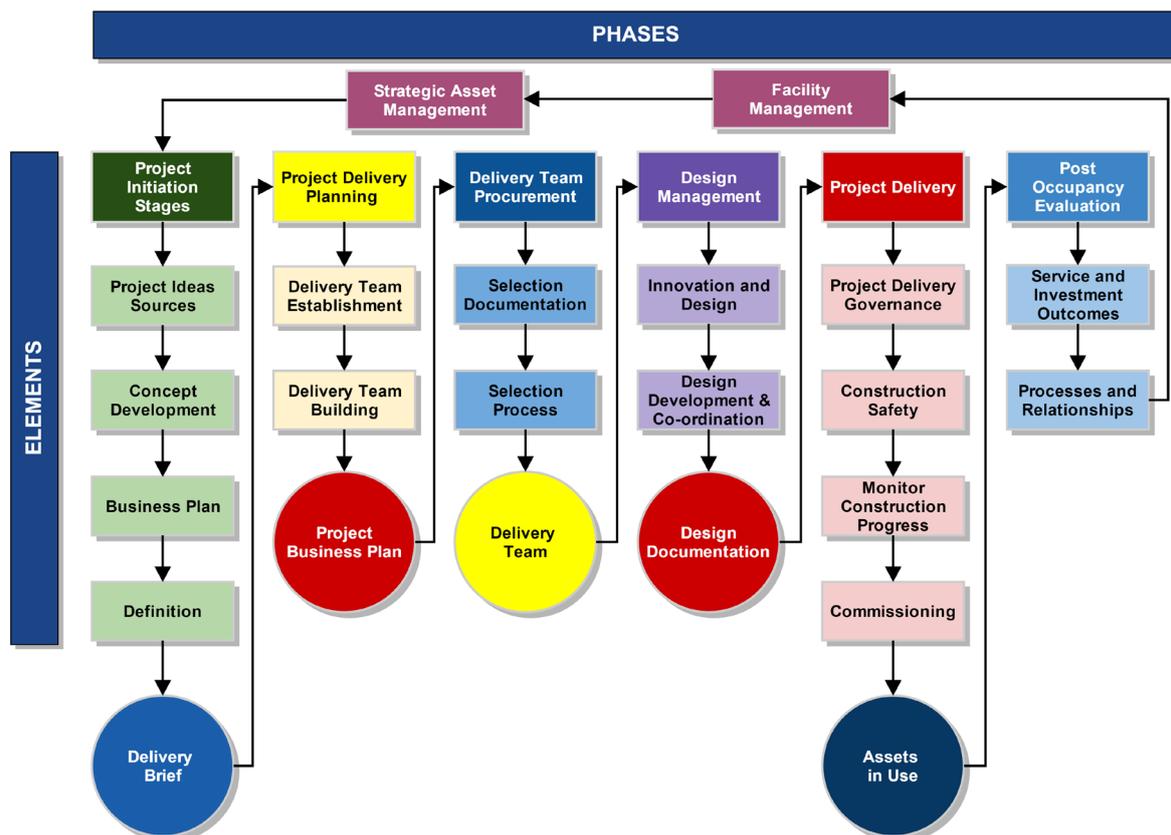
The construction of every capital asset involves unique design, procurement and construction challenges. Different location and site conditions, construction methods, equipment and materials, and the assembly and management of a project team to design, procure and construct each asset invariably mean the construction process is one of creating a prototype.

By its very nature, the delivery of a prototype is a dynamic process, requiring members of the project team to work together to continually fine-tune and adjust the detailed project requirements, designs and construction methods, sequence, resources and logistics.

Projects teams are created anew for each project. People from different disciplines, and organisations, are engaged to design and construct different elements of each project. Problem solving is an integral part of managing construction projects to foster innovation, reduce rework, avoid waste, and reduce risks including those issues escalating to become disputes requiring arbitration or litigation to resolve.

Regardless of the end use, those assets are created using the same or very similar phases and elements of development. The phases and elements are summarised in Figure 1.

Figure 1 Typical Asset Delivery Phases and Elements



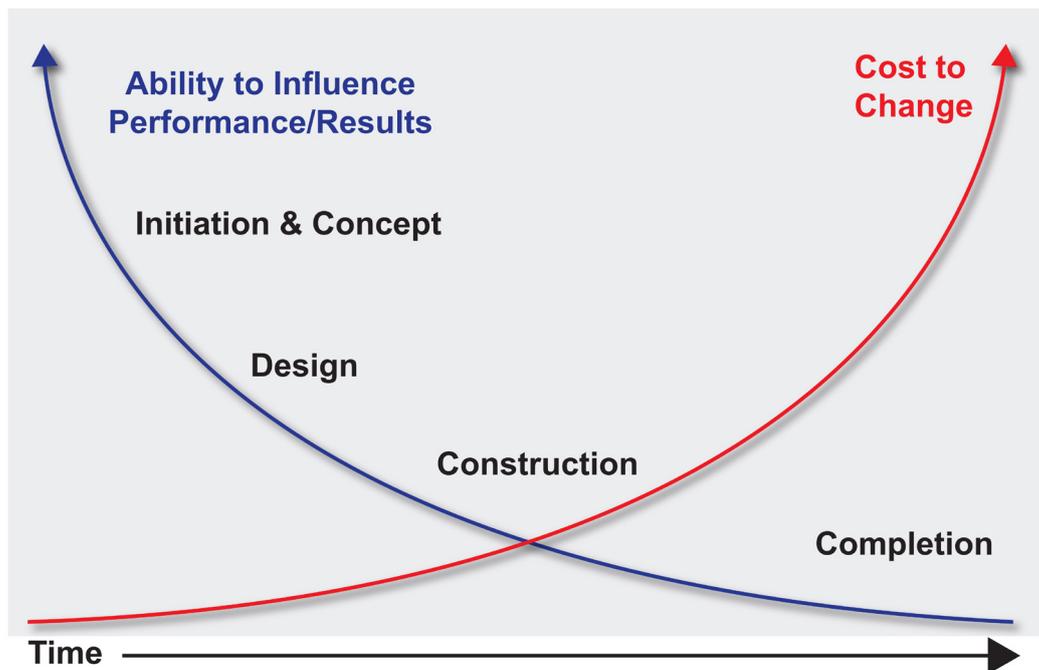
Source: P Barda (ACIF) and J Montgomery – Hribar (APCC)

This Guide points to the key importance of each of the phases and elements, provides a snapshot of the tools and techniques use in each, and the people and skills required to undertake them.

Most importantly, the skill and rigour with which the early phase of project initiation is undertaken has the greatest influence on the long term performance of the asset. Industry leading practice emphasises the need to “hasten slowly” in the early phase of construction projects, because the costs of making changes grows markedly the later changes are made.

Figure 2 shows how time and resources spent early in the process of delivering an asset will benefit asset owners and end users. The fairly recent adoption of Building Information Modelling (BIM) by the construction industry encourages the early identification of opportunities to optimise asset functionality, deliver best cost outcomes, and plan for how the asset is best constructed, commissioned, and managed to deliver required services.

Figure 2 Ability to Influence Performance and or Results over Project Life



Source: *Value of project definition, Bas & Mayhew, 1994*

A common theme running through many of the source documents for this Guide is the proposition that the more effectively a team is integrated, the better it can perform. There is a continuum of levels of integration commonly seen within the industry, with varying levels of matching collaboration and cooperation amongst members of the project team. It is suggested that the higher the level of integration of team members at the early design stages, the greater the opportunities to gain maximum benefit from project team collaboration and cooperation.

To avoid confusion this Guide distinguishes between the *process* of Project Team Integration and the range of possible end states of that integration including Integrated Project Delivery or IPD. The USA construction industry has developed its thinking along similar lines, and has taken it a step further in advocating for a delivery strategy built around IPD.

This Guide stops short of advocating the creation of a full and formal IPD. It does so recognising that there are commercial, policy or legislative issues that will determine the appropriate degree of integration for a particular construction project. The more important challenge is how to increase the degree to which teams are integrated, and adopt the appropriate delivery strategy for the selected level of integration.

All project sponsors must decide how much integration or collaboration is appropriate or desired on their projects. There are straightforward approaches that can be used to enhance collaboration amongst project team members, and identify issues to be addressed to increase effective team integration.

Value Management

Throughout this Guide, and the other documents it refers to, there are references to Value Management and the use of facilitated workshops. The Australian Standard for Value Management AS 4183-2007 provides guidelines for the application of Value Management to products, processes, services, systems and organisations. The Standard defines terms, establishes the essential elements of Value Management and clarifies roles and responsibilities.

Value Management is a structured and analytical process in which a prescribed Work Plan is followed to achieve best value and, where appropriate, best value for money in products, processes, services, systems and organisations. The process may be applied to management decision-making at any level of an organisation and is equally appropriate for public and private sector applications.

While Value Management can be applied in project and general management within any organisation to achieve best value or best value for money, it is also a powerful process that may be used to develop agreement, understanding and commitment when applied to the resolution or optimisation of particular issues and situations.

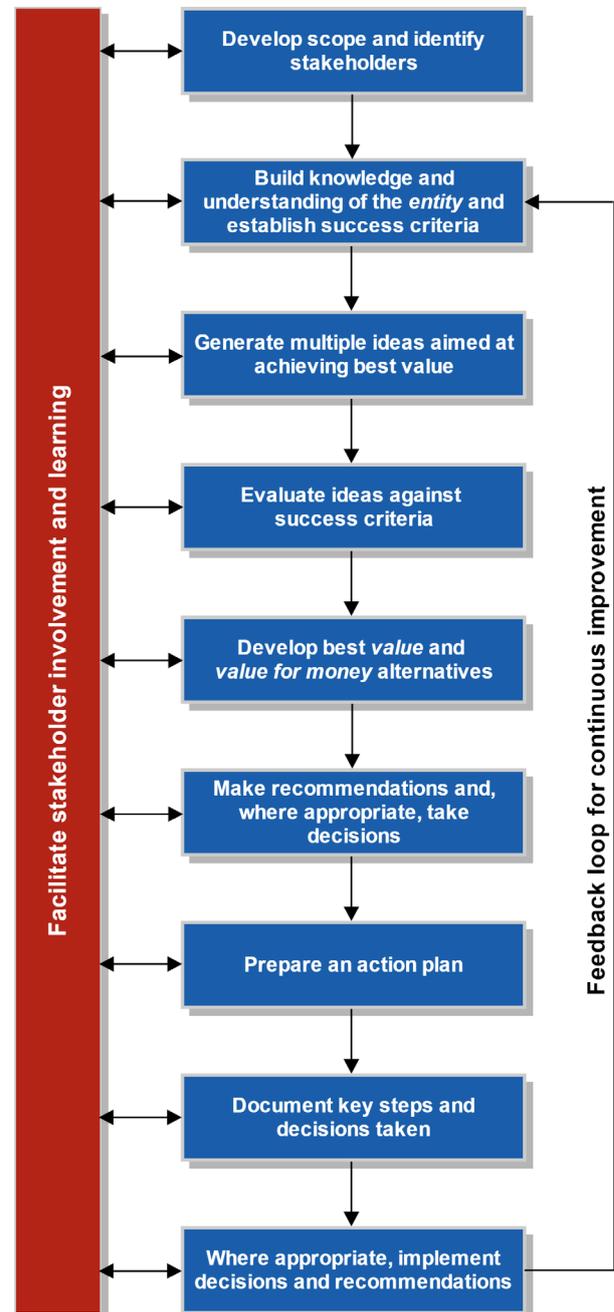
Value Management may be applied at any point in the life of a product, process, service, system or organisation but the maximum benefit is usually obtained by applying it as early as possible. Often, a number of discrete Value Management Studies are carried out at different points in the life cycle.

Value Management Studies are centred upon a participatory workshop involving a multidisciplinary, representative group of people who work together and follow a prescribed work plan to achieve best value or, where appropriate, best value for money. Five essential elements in Value Management Studies have been identified and addressed in the Standard.

These elements comprise:

- a prescribed Work Plan;
- an appropriate mix and commitment of group members;
- management of Value Management Studies;
- senior management commitment and support; and
- effective facilitation.

The figure (included in AS 4183-2007) provides a simplified framework for applying Value Management.



Strategic Asset Management

Asset management is the process of organising, planning, designing and controlling the acquisition, care, refurbishment, and disposal of physical assets to support the delivery of services. It is a systematic, structured process covering the whole life of physical assets.

The objective of asset management is to optimise the service delivery potential of assets and to minimise related risks and costs and ensure positive enhancement of natural and social capital over an asset life cycle. Good governance and the intelligent deployment of business systems, processes and human resources are key aspects of this endeavour.

Integrated Strategic Asset Management (ISAM) brings together economics, engineering, information technology, sustainability and human elements to form a holistic approach to the delivery of built assets.

This approach recognises the combination of these elements into a greater whole as well as their interrelationships and interdependencies. It focuses on the long term direction for overall management of infrastructure and engineering assets, while considering the immediate operational matters. The Asset Management Guide provides a basis for decision-making and implementation of asset management.

The *Guide to Integrated Strategic Asset Management* (“the Asset Management Guide”) published in 2011 by the Australian Asset Management Collaborative Group of which the APCC is a member, focuses on an integrated approach to managing built assets. It takes into account the built form and considers human and ecological elements. It also highlights that organisations can work together to deliver maximum outcomes. It provides a basis for decision making and implementation of asset management.

The following principles guide how Strategic Asset Management integrates with broader government and organisational planning:

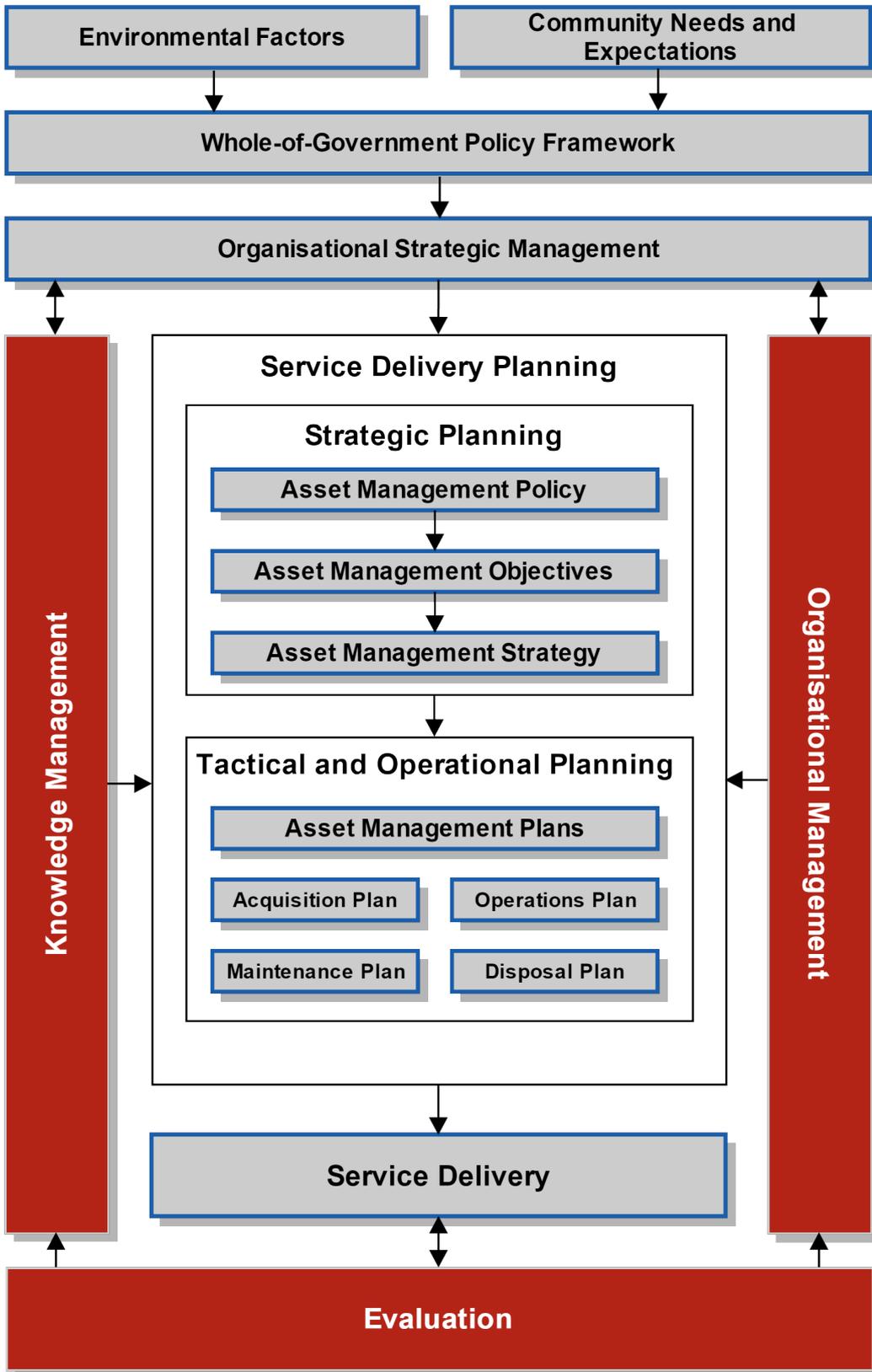
- Assets exist to support service delivery. Therefore non-asset solutions should be considered.
- Government agencies should manage assets consistent with whole-of-government policy frameworks.
- Private and public sector owners should take into account whole of life costing, future service demands and, balance between capital expenditure and maintenance requirements.
- Asset management should be integrated with the owner’s strategic and corporate planning.
- Asset management decisions should holistically consider sustainability outcomes: environmental, social, economic and governance.

Governance arrangements should clearly establish responsibility for functional performance of and accountability for, the asset and service delivery.

The framework at Figure 3 reflects the increasingly complex and interconnected processes which government and its agencies need to take into account when delivering services. The framework demonstrates that ISAM is cumulative and each component is interdependent. A logical progression through each component is required for maximum service delivery outcomes.

Whilst this ISAM framework focuses on the public sector, it is equally applicable to any organisation or sector. The *Asset Management Guide* explains each part of the framework in more detail.

Figure 3: Integrated Strategic Asset Management Framework



Source: *The Guide to Integrated Strategic Asset Management ("the Asset Management Guide") 2011*, the Australian Asset Management Collaborative Group

Project Initiation

The use of rigorous information analysis at the beginning of a project has the greatest potential to significantly improve the whole project. The *Guide to Project Initiation for Project Sponsors, Clients, and Owners*: ACIF and APCC, 2nd edition, 2010. ("Project Initiation Guide") sets out a framework of leading practice methods for achieving those improvements.

Ideally, all project initiation should include:

- recognition of the idea or opportunity;
- effective client sponsorship of the methods and outcomes to achieve efficient project implementation;
- use of good team processes to ensure clear and shared objectives are achieved;
- formulation of service and functional needs and objectives;
- option evaluation to identify a robust concept;
- proper definition of the concept;
- effective construction planning during design, and;
- identifying a clear project implementation and procurement plan including clear project stages with defined outcomes.

Attention to these issues has the potential to greatly improve project delivery and achieve:

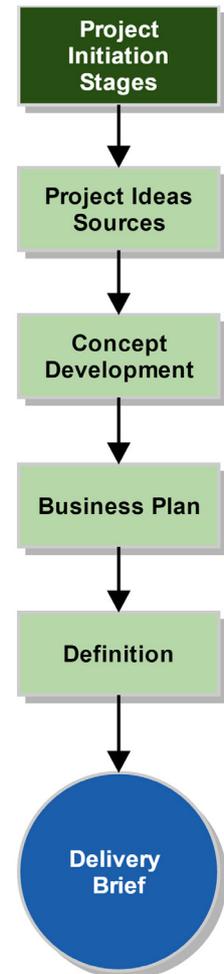
- better value for money¹;
- the establishment and maintenance of good working relationships;
- better functional design and environmental outcomes;
- improved time and whole-of-life cost performance;
- fewer variations;
- reduced complexity; and
- project success for all parties involved in the project.

Apart from being complex and unique in nature, as a system, construction projects are dynamic, passing through several discrete phases of initiation, documentation and delivery. In addition, most projects are sufficiently unique to have many of the characteristics of a prototype.

With the exception of projects involving repetitive processes (eg. small scale pipelines, roadwork's), building and construction projects are not like a manufactured item. The users and the owners do not have the benefit of extensive testing and refinement of the product.

This 'one-off' nature of the construction industry increases the importance of correct initiation. It also explains, in part, the reluctance to expend the sort of effort expected on a more repetitive project because all of the up-front costs have to be allocated to the one project.

Although each project is unique, a leading practice initiation process is generic in nature and can be applied to any project.



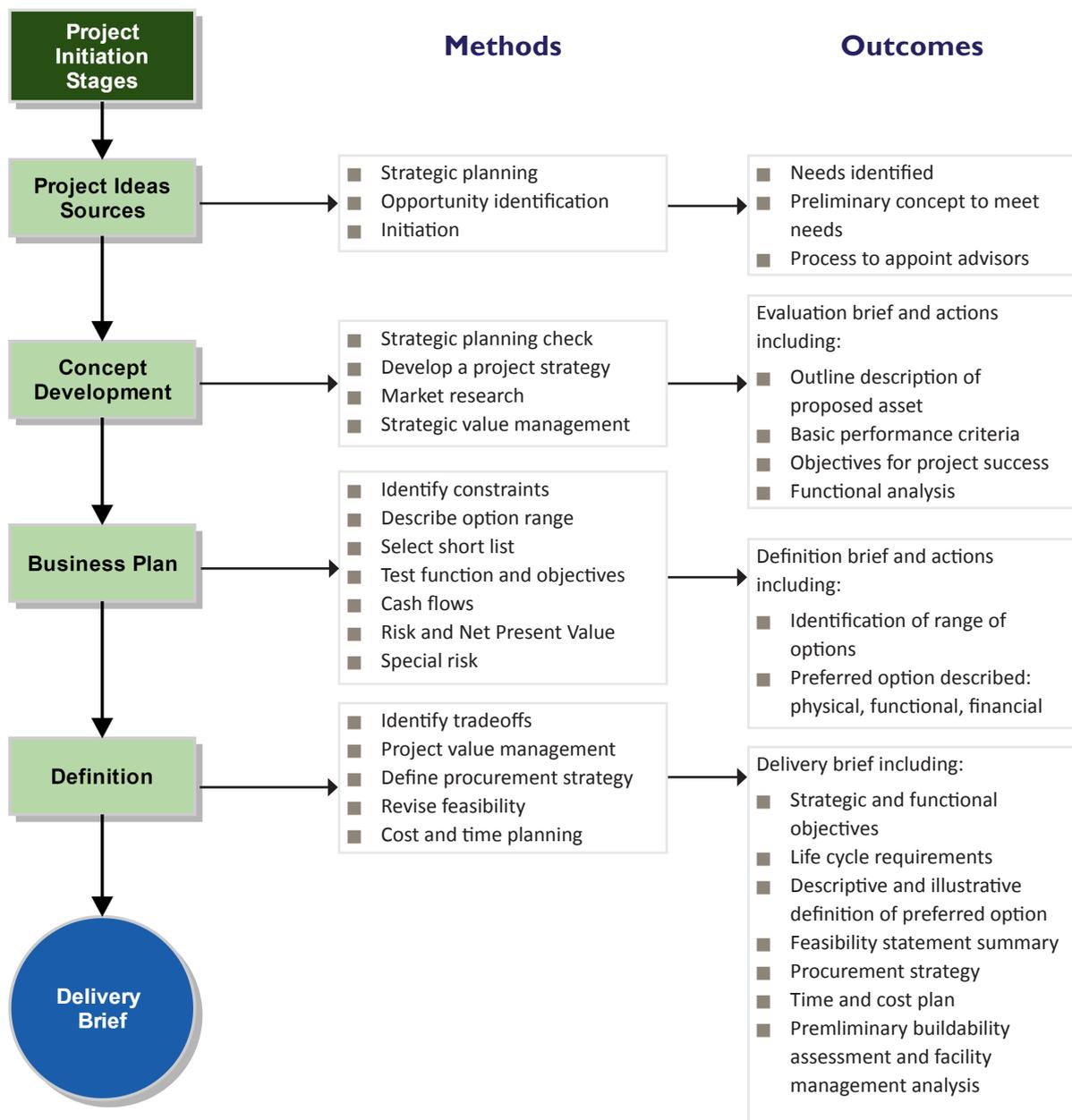
¹ Value for money in this context requires the project sponsor's standards of quality and performance to be delivered at lowest total cost.

There are four key steps that have been identified:

1. Project idea sources;
2. Concept development;
3. Evaluation; and
4. Definition.

Each of them, with their inputs and outputs, are depicted in Figure 4.

Figure 4 The Project Initiation Process



Project Initiation

Element 1. Project Idea Sources

| | |
|-------------------------------------|---|
| <p>Importance and method</p> | <p>In making a decision to spend money on capital works projects, project sponsors have to select a project delivery strategy that best meets their needs. Their common desire is to gain the benefit of a service or a benefit delivered from the completed asset.</p> <p>Critical evaluation of growth or serious questioning of service need is essential – for example, can education be delivered without the need to construct additional facilities?</p> <p>Needs analysis involves asking:</p> <ul style="list-style-type: none"> ■ what are the objectives for project success? ■ what is the state of the market (in terms of price/demand etc.) and, in particular, what are the expectations and plans of likely users and customers? ■ which business or service needs are met by the project and how well? ■ key performance indicators – how will success be measured? <p>It is important in economic appraisals as required by government Departments of Treasury and Investment committees in business to establish what the proposed investment will be compared with. Therefore it is useful to establish a base case to test different investment options, including a no build option. Rarely does the base case require zero investment. Frequently input will be required by the planning team to help define and quantify the base case.</p> <p>Project sponsors, clients, and owners having seen an opportunity or “need”, should develop a project concept to a stage that would allow for evaluation against a strategic, service or business plan. This concept development should include a range of reasonable alternative options, including a no-build option.</p> <p>At this stage it is likely that design and construction skills may not yet be required. If the identified needs may involve capital works spending then it is appropriate to bring those skills in to the next phase, to develop and test concepts to meet the needs. These advisers customarily include cost consultants and designers, but may also include people who bring constructor and trade skills to the development and testing of concepts in the next phase. The latter are usefully involved at this phase to optimise opportunities for collaborative working.</p> <p>The team of people brought in at this stage to assist with project initiation are referred to in this Guide as the “planning team”. Members of the planning team are engaged as consultants and their brief will include all succeeding phases of project initiation, including preparation of the delivery brief, and then preparation of documentation to select the designers and constructors who will deliver the complete project.</p> <p>The team of people who are appointed, once project initiation is complete, to finalise design and complete construction, are referred to in this Guide as the “delivery team”.</p> <p>Some or all members of the planning team may also be part of the delivery team, depending on the procurement strategy adopted for the project.</p> |
| <p>Resources</p> | <p><i>Project Initiation Guide; Procurement Guide</i></p> |
| <p>People</p> | <p>Project sponsors; Internal and external financial and functional advisers.</p> |
| <p>Outputs</p> | <p>Needs identified and preliminary concept for an asset to meet the needs. Process to appoint design and construction advisers.</p> |

Project Initiation

Element 2: Concept Development

| | |
|-------------------------------------|--|
| <p>Importance and method</p> | <p>Concept identification should ensure that a project concept is consistent with the client’s strategic, business or service planning. To satisfy the requirements of this stage, the client should develop the concept detail to a level that enables the project to be compared with the organisation’s strategic direction. This assumes that strategic planning for the business is completed down to a level where measurable service objectives are used.</p> <p>Construction solutions should support these quantified objectives. This process will include the preparation of a cost plan, within the broad strategic direction of the organisation’s business plan.</p> <p>Techniques used to test the concepts at this stage include market research, strategic value management, and strategic planning workshops.</p> <p>The strategic planning workshops described in the PTI Workbook at this stage can test the capacity of project sponsors to create a project environment conducive to a high level of project team integration and collaborative working. That capacity is the product of six project decision “crossroads”:</p> <ol style="list-style-type: none"> 1. Environment and culture 2. Trusting relationships 3. Project leadership 4. Client risk tolerance 5. Financial management 6. Project delivery strategy options <p>Particularly, with more complex projects, greater certainty of cost and constructability is achieved when the client engages a constructor and key subcontractors to work with engineers, architects and other advisers on option development and early design and planning work. Members of this planning team are engaged as consultants and their brief will include all succeeding phases of project initiation, including preparation of the delivery brief, and then preparation of documentation to select the designers and constructors who will make up the delivery team.</p> <p>If project sponsors are likely to require BIM to be used for design and asset management, then it is important that key structure and services trades are involved in preliminary design and testing of concepts.</p> |
| <p>Resources</p> | <p><i>Project Initiation Guide; PTI Workbook; Procurement Guide</i></p> |
| <p>People</p> | <ul style="list-style-type: none"> ■ Client project director appointed to be the senior officer responsible for overseeing the delivery of an asset to meet identified needs. ■ Internal and external financial and functional advisers. ■ Design and construction advisers (the planning team). |
| <p>Outputs</p> | <p>The outcome of this phase is an Evaluation Brief, that includes:</p> <ul style="list-style-type: none"> ■ a concept outline of the asset proposed; ■ basic performance criteria that the asset must meet; ■ objectives for project success – time, cost and functionality; ■ functional analysis that identifies the key features that the asset must deliver. <p>If a strategic planning workshop has been conducted, it will identify the actions needed to achieve a project environment conducive to collaborative working.</p> |

Project Initiation

Element 3: Business Plan

| | |
|-------------------------------------|---|
| <p>Importance and method</p> | <p>There are at least two critical issues in project evaluation. Firstly, the analytical processes of project evaluation are not easily understood and are not easily accessible to people who must make decisions about projects. Secondly, the area of project evaluation and initiation requires specialist skills. These are in short supply and are not always well enough applied to building and construction projects in either the private or public sectors.</p> <p>Given the long term nature of uses for building and construction projects and the relatively high costs of ownership and operation, project sponsors must ensure careful evaluation of each project.</p> <p>Project implementation is improved by the introduction of documented objectives which define the success criteria for the project. This results in a more focused project and higher chances of achieving the goals which are set. The owner also achieves a better business outcome simply because the business goals are clearly linked to the project and properly thought out.</p> <p>Tools or techniques used in evaluation include:</p> <ul style="list-style-type: none"> ■ identification of physical, financial, planning, temporal or other constraints; ■ description of the range of options available to convert concept to asset; ■ a prioritised short list of those options; ■ articulation of the functions and objectives for options; ■ modelling of finance options and cash flows; ■ assesment of risks and Net Present Value (NPV). <p>Value management studies are often used to assist evaluation, including assigning weightings to help prioritise functions, objectives, and selection criteria. Other techniques, including design charrettes, are also useful in testing concepts.</p> |
| <p>Resources</p> | <p><i>Project Initiation Guide; PTI Workbook; Procurement Guide</i></p> |
| <p>People</p> | <ul style="list-style-type: none"> ■ Client project director. ■ Internal and external financial and functional advisers. ■ Design and construction advisers (the planning team). |
| <p>Outputs</p> | <p>The outcome of this phase is a Definition Brief that includes identification of a range of options to convert concept to asset, and detailed description of a preferred option including its physical, functional, and financial characteristics.</p> |

Project Initiation

Element 4: Definition

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| Importance and method | <p>During the Definition phase, the preferred option is developed as a design to bring the project plan, cost plan and time schedule to a point where the owner or sponsor can make a decision to proceed. Ideally this should include a service plan, functional plan and operations plan.</p> <p>As part of this decision to proceed, the value management process should be formally re-run with the defined project to confirm the functions and objectives of the project and their connection to the service and business planning for the project. It is also imperative to have achieved planning approval by the end of this stage.</p> <p>When the concept development and evaluation phases are not completed in the ways recommended in the <i>Project Initiation Guide</i>, the design process often absorbs the need to make decisions which should have been made prior to commencing this definition phase. The consequences of this are spelt out in that Guide.</p> <p>The Project Definition phase has three stages:</p> <ul style="list-style-type: none">■ schematic design;■ testing and feedback, and;■ development of the delivery brief. <p>This developed schematic design for the project is then used for a value management study which confirms the strategic value management but also tackles the specifics of value for money with the chosen design. This VM should involve constructor and structure and services trade skills. This process is used to ensure the money is being spent to deliver the function required and to eliminate high cost/low function elements of the design.</p> <p>The developed cost plan and the value management study will result in ranked trade-offs in the design process and make the choices on these visible to the owner or sponsor. Involvement of a constructor and trade contractors at this stage assists also with buildability, commissioning, and development of an overall project plan. Involvement of the likely facility manager, or a person with appropriate facility management skills, will optimise maintenance and management issues post-commissioning.</p> <p>Selection of an appropriate procurement strategy will involve consideration of the alternative delivery methods available, and the extent to which the project team is able to be integrated.</p> <p>Project delivery strategies are chosen by project sponsors on the basis of:</p> <ol style="list-style-type: none">1. their appetite for risk and ability to assume risk;2. the requirements of their project finance providers;3. the speed with which they wish to design and build;4. their previous experience of constructing assets. <p>The tools and techniques used include:</p> <ul style="list-style-type: none">■ project value management;■ preliminary design, including a BIM model where appropriate;■ selection of a procurement strategy;■ revision of the feasibility;■ cost and time planning, including life cycle costing;■ consideration of sustainability ratings. |
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Project Initiation

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| Resources | <i>Project Initiation Guide; PTI Workbook; Procurement Guide</i> |
| People | Client project director. Internal and external financial and functional advisers. Design and construction advisers (the planning team). |
| Outputs | <p>The outcome of this phase is a Delivery Brief that includes:</p> <ul style="list-style-type: none"> ■ the project sponsor’s strategic objectives for the project; ■ the functional objectives for the project – what it must do; ■ life cycle requirements – what is important to the owner post construction; ■ a first draft of the sustainability rating tool outcome for the project; ■ the financial constraints and objectives; ■ a summary of the conclusions from the feasibility and risk analysis; ■ details of planning approvals; ■ the project implementation plan, actions and schedules; ■ a procurement plan; ■ a cost plan; ■ service plan, functional plan and operations plan; ■ the project schematic design, description and illustrative definition, that may include a preliminary model; ■ preliminary buildability assessment; and ■ preliminary facility management analysis. |

Project Delivery Planning

The critical challenge for project sponsors and project team leaders is to understand and address the cultural and behavioural change needed to do things differently. The Cooperative Research Centre for Construction Innovation in its *Guide to Leading Practice for Dispute Avoidance and Resolution*¹ identified the key challenge for both avoidance of disputes and achievement of outstanding project outcomes. They are:

Recognition that each construction project involves the creation of a new group of people with diverse interests. There is thus the need to create a culture within the group which is project oriented but which recognises the financial and social requirements of each participant, and facilitates the building of trust between them.

- In selecting project participants, significant weight should be given to the attitude of a participant, as well as its capacity and pricing.
- The early involvement of head contractors, specialist subcontractors and designers with the client and other project sponsors.
- Sensible risk allocation.
- Appropriate delegation of authority, including financial authority, to problem solve rapidly.
- Selecting a project delivery mechanism and contractual framework that reflects the matters above.

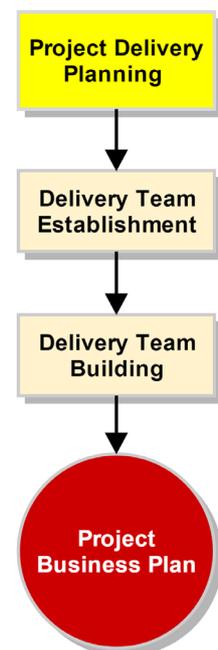
The imperative is clear – collaboration is driven by teamwork, in turn achieved by integrating otherwise disparate organisations and people, and these are key to achieving outstanding project outcomes.

In a project-based industry, every project creates and is dependent on a unique team of people. The work involved is undertaken by a mix of project sponsors' staff, contractors, and consultants. Teamwork is harder to achieve than in a conventional business setting, because of the following challenges:

- the team is assembled for one project, and is then disbanded;
- it is made up of multiple organisations and managers;
- on site staff owe primary allegiances/responsibilities to their managers, not the project;
- contractors and consultants join the team when they have tasks to perform, and then leave it;
- teams are selected afresh for each project without regard to whether individual team members have worked together before;
- by and large, teams are selected with more regard to price than the ability of individual team members to work collaboratively.

The aim is to create a common set of objectives for the project, that everyone is committed to achieving. How to do this? The procurement strategy chosen by the project sponsor can be a key enabler together with selecting the 'right' project team members. It is important to involve project team members in setting the objectives, and the strategies and actions that are included in the project management plans that describe them e.g. quality management, and safety plans, material handling protocols, communication plans.

This initial involvement is critical to all member of the team feeling that they own those plans. Why? - Because involvement is necessary to achieve ownership. Ownership leads to commitment and achievement of the common project objectives.



¹ *Guide to Leading Practice for Dispute Avoidance and Resolution*, Cooperative Research Centre for Construction Innovation, 2009, p7

Project Delivery Planning

Element 1: Team establishment

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| <p>Importance and method</p> | <p>Working on a project team should be creative, satisfying and enjoyable, and project processes and behavioural cultures should be structured to achieve these objectives. To achieve this, key project team leaders need to commit to cooperative and collaborative work practices based on trust, honesty, valued relationships and effective communication.</p> <p>Whilst the on-site project team members carry significant responsibility for this element in asset delivery, it is important that senior off-site management (the owners or senior executives) of the firms engaged on the project are engaged in and supportive of the work and process needed to achieve a collaborative environment. The PTI Workbook suggests this starts with Level 1 briefings of those people, to introduce them to project sponsor objectives, and actions needed to achieve them.</p> <p>They are briefed on how the project is to be managed, and how the desired levels of integration are to be achieved. The briefing is given by senior management of the project sponsors involved in day to day management of the project.</p> <p>Following those briefings, the project team leaders' work in facilitated Level 2 workshops to introduce them to project sponsor objectives, and actions needed to achieve them. In the course of these sessions, the project team leaders develop high level project team protocols – communication, issue resolution, risk and opportunity management.</p> |
| <p>Resources</p> | <p><i>DAR Guide; PTI Workbook</i></p> |
| <p>People</p> | <p>Client project director.</p> <p>Constructor senior executives, construction and project managers.</p> <p>Designer and trades principals and or senior executives.</p> |
| <p>Outputs</p> | <p>Project sponsor objectives understood.</p> <p>Project team objectives adopted.</p> <p>High level project team protocols established.</p> |

Project Delivery Planning

Element 2: Team building

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| <p>Importance and method</p> | <p>The <i>PTI Workbook</i> describes how level 2 briefings and workshops are used to agree on actions required to achieve target outcomes, and formulate the delivery mechanisms. The delivery mechanisms include the tools needed to plan for and manage all aspects of the project.</p> <p>The participants for briefings and workshops will vary from project to project. Importantly all those who could influence the outcomes need to participate. They include all senior site staff of the main contractor, designers, and trade contractors.</p> <p>The <i>PTI Workbook</i> assigns possible outcomes ranging from “Red” or business-as-usual to “Blue” leading practice for each of twelve project delivery decisions.</p> <p>Each of the project delivery decisions involves determining:</p> <ul style="list-style-type: none"> ■ which of the possible outcomes (from red to blue) is likely to be achieved on this project; ■ what is the target outcome that could be achieved; ■ what actions are needed to enable the target outcome to be achieved; ■ how progress towards achieving the target outcome will be measured. <p>At level 3, the on-site job captains, foremen and supervisors, develop detailed tactics to deliver the target outcomes.</p> <p>The level 2 and 3 workshops are also the vehicle for developing a Project Business Plan (PBP) for the project, that includes the key objectives for the project and the project delivery actions needed to achieve them. The DAR Guide identifies the contents of a PBP common to most projects.</p> <p>The <i>PTI Workbook</i> includes a score sheet that gives a snapshot of the overall assessment of likely and target outcomes.</p> |
| <p>Resources</p> | <p><i>DAR Guide, PTI Workbook</i></p> |
| <p>People</p> | <p>Constructor project manager.</p> <p>Designer job captains.</p> <p>Trades project managers and leading hands, foremen.</p> |
| <p>Outputs</p> | <p>Project business plan; including:</p> <ul style="list-style-type: none"> ■ process tools (management plans, programs, etc), for determining how the project team will perform; ■ process choices available to minimise inefficiency, repetition and waste; ■ roles and responsibilities for team members; and ■ potential risks to integration and collaborative behaviour. |

Delivery Team Procurement

Ideally the documentation required to select the designers and constructors who will deliver an asset (the delivery team) will be prepared by the planning team including design consultants and cost planners, head contractor, and key specialist subcontractors, who has been engaged in the project initiation phase to develop the delivery brief.

This section of the Guide deals with the generic steps involved in selecting the members of a project team to deliver an asset. It refers to the appropriate parts of the *DAR Guide*, the *Procurement Guide*, the *Case for PTI*, and the *PTI Workbook*. It is not an exhaustive guide to the many alternative approaches to selecting design consultants, constructors or trade contractors.

It suggests, in keeping with the thinking of the *DAR Guide*, the *Case for PTI*, and the *PTI Workbook*, that close attention needs to be paid in this phase of asset delivery to the behavioural and cultural aspects of team creation and management. The ability and willingness of team members to work collaboratively, to understand client objectives, and to meet those objectives as if they were their own, are of equal importance to the capacity to complete a project within the budget and time frame required by project sponsors.

The *DAR Guide* identifies the six factors that are critical to minimisation and avoidance of disputes and, by extension, to achieving very successful project outcomes.

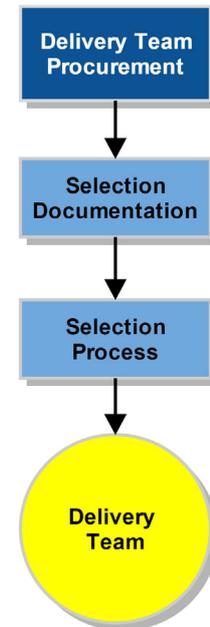
Recognition that each construction project involves the creation of a new group of people with diverse interests. There is thus the need to create a culture within the group which is project oriented but which recognises the financial and social requirements of each participant, and facilitates the building of trust between them.

1. In selecting project participants, significant weight should be given to the attitude of a participant, as well as its capacity and pricing.
2. The early involvement of head contractors, specialist subcontractors and designers with the client and other project sponsors.
3. Sensible risk allocation.
4. Appropriate delegation of authority, including financial authority, to problem solve rapidly.
5. Selecting a project delivery mechanism and contractual framework that reflects the matters above.

Without the cultural change inherent in adopting the concepts above, the Australian economy will continue to suffer wastage from disputes in the construction industry estimated at approximately \$7 billion per annum.

Key members of the design and construction teams should be selected not only for their technical skill and experience but also for their behavioural flexibility and their cooperative, alternative, innovative “can-do” attitude, people skills, and an overriding commitment to communicate effectively with each other. This is particularly important given the dynamic nature of project teams, with people from different disciplines joining and leaving the team throughout the course of the design and construction phases.

Collaboration by project team members creates a common set of objectives for the project, that everyone is committed to achieving. This is done by involving project team members in activities that encourage cooperation and trust. The *PTI Workbook* provides a framework for project sponsors and leaders of project teams to plan for the creation of project environment that recognises the importance of those factors, and to manage the maintenance of that environment.



Delivery Team Procurement

Element 1: Selection documentation

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| <p>Importance and method</p> | <p>The extent and detail included in design documentation prepared to select delivery team members should be appropriate to the delivery strategy, and the level of risk the client expects designers and contractors to take. As a general rule, the more design detail and information about the site of the project made available to potential head contractors and subcontractors, the lower the risk to them.</p> <p>The selection documentation will also include the commercial conditions required by the client which also will be determined by the chosen delivery strategy.</p> <p>When BIM has been utilised to develop a preliminary model, project sponsors can expect better clarity in relation to cost, scheduling and quality far earlier in the process. If the use of BIM is to be required as condition of appointment, the preferred implementation strategy should be specified including the type of software preferred by the project sponsors, particularly where a model is to be used for facility management.</p> <p>The selection documentation should test the ability of key people from different organisations to work well together to solve problems, avoid wasted effort, and eliminate disputes, before construction commences.</p> <p>It should foreshadow to potential project team members that their capacity to work collaboratively with other team members and with project sponsors will be tested in the process of establishing project management and people management protocols.</p> |
| <p>Resources</p> | <p><i>DAR Guide; Case for PTI; PTI Workbook; Procurement Guide; Building and Construction Procurement Guide: PTI and BIM.</i></p> |
| <p>People</p> | <p>Client project director.</p> <p>Design and construction advisers (the planning team).</p> |
| <p>Outputs</p> | <p>Selection documentation complete for pricing – design documentation, commercial documents, selection criteria.</p> <p>May include requirement for a 3D or 4D model and or BIM management plan to be produced during the design documentation phase.</p> <p>Shortlisted candidates.</p> |

Delivery Team Procurement

Element 2: Selection process

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| <p>Importance and method</p> | <p>The selection process will be determined by the delivery strategy 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 asset.</p> <p>It is important that the selection process results in:</p> <ul style="list-style-type: none"> ■ minimising misunderstandings arising from the project owner’s documentation and project requirements; ■ improving the documentation (where necessary) prior to finalising the contract documents; ■ fostering a more open, transparent and collaborative project culture; and ■ improving time and cost outcomes, including through the minimisation of contingency amounts in the tender price to cover unknown factors and risk. ■ The <i>Procurement Guide</i> stresses the importance of tailoring the procurement process to meet the project requirements. <p><i>In particular, given the unique characteristics of the various delivery models and contract forms, a ‘one size fits all’ approach to procurement is simply impractical. As explained by Bremen (2002):</i></p> <p><i>The traditional tendering process is designed to produce a set of circumstances to enable price competition followed by direct comparison. A valuation based solely on price (although a natural and ‘safe’ tendency) does not necessarily deliver project value nor provide the necessary information to enable an owner to properly evaluate a whole of life project cost.</i></p> <p>The selection process may involve several stages that include an RFT (Request for Tenders) stage, sometimes preceded by an EOI (Expression of Interest) stage. Good practice demands that these steps are conducted according to clear communication and probity protocols.</p> <p>For some delivery strategies (including alliance or ECI (Early Contractor Involvement)), interactive tendering processes are often used. These processes use a series of structured interviews and/or workshops held through the tender period to clarify the contract scope and documents and assess the performance of tenderers.</p> <p>These interactive and collaborative procurement processes enable prospective tenderers to interrogate project owners regarding the design and documentation and obtain feedback on their proposed approaches with respect to their alignment with the project owner’s requirements.</p> |
| <p>Resources</p> | <p><i>PTI Workbook; Procurement Guide</i></p> |
| <p>People</p> | <p>Client project director.</p> <p>Design and construction advisers (the planning team), that may include specialist BIM adviser.</p> |
| <p>Outputs</p> | <p>Delivery team members selected.</p> |

Design Management

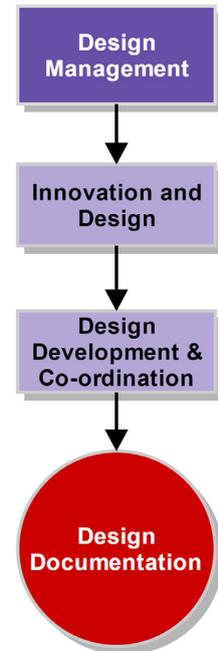
Design management involves the design team and the construction team working together to satisfy the client's specified project requirements. The process will often identify opportunities to fine tune the requirements to provide time, cost and/or quality benefits for the project. On a project using a hard dollar procurement strategy, this fine-tuning opportunity would typically involve using the variation process set out in the relevant project contracts.

All members of the project team must be encouraged to use their initiative to look for ideas and opportunities and to openly discuss their thoughts without fearing criticism.

In order to capture these opportunities, the project team needs to be able to respond in a timely and decisive manner. The parties may jointly review an opportunity, and make a prompt decision whether to proceed or not with a variation. Alternatively, circumstances may dictate that there is insufficient time to agree a precise time and cost valuation of a variation prior to implementing it. The option remains for the parties to agree that the time and cost valuation of the variation will be dealt with on a reasonable time and cost basis.

It is appropriate that the client should have an incentive in such circumstances to direct variations to the client's specified requirements by sharing (usually equally) any cost savings arising out of the variation.

A key factor relevant to a successful initiative and innovation strategy is that the key members of the project team have the technical skill, experience, can-do attitude, behavioural flexibility and delegated authority and empowerment to use their initiative to identify, analyse and implement a good idea promptly (and, within certain boundaries, make mistakes), without excessive formality and without intellectual property constraints. Trust and cooperation are also key ingredients to the successful implementation of an alternative initiative and innovation strategy.



Design Management

Element 1: Innovation and design

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| <p>Importance and method</p> | <p>The delivery strategy adopted for each project will determine when design documentation sufficient for contractors to price is prepared, and determine the extent to which contractors and trade contractors are involved in design. Traditional lump sum contracts are generally based on fully developed design documentation from architects and engineers being used for pricing. Design and construct delivery on the other hand will involve minimal design from the client’s design team, with contractors engaging their own designers to prepare detailed designs for construction.</p> <p>Because of the range of options, it is not practical in this Guide to be prescriptive about when and how design development takes place. Generally speaking design development involves the design team and the construction team working together to satisfy the client’s specified project requirements. The process will often identify opportunities to fine tune the requirements to provide time, cost and or quality benefits for the project.</p> <p>One thing that is common to all delivery strategies is the need to be clear about product quality, and the standards expected by the client and end users. Designers and constructors need to be straightforward in giving advice to clients on options for sourcing products and elements of structures, including advice on whole of life costs. The <i>Product Quality Guide</i> gives invaluable guidance on ensuring products are fit for purpose.</p> <p>Value management is often used to achieve this, and is most helpful when all members of the project team are involved and encouraged to use their initiative to look for ideas and opportunities and to openly discuss their thoughts without fearing criticism.</p> <p>Value management also encourages trust and cooperation as key ingredients to the successful implementation of an innovation strategy.</p> <p>Many contracts include provisions for the client to own the intellectual property of any innovation proposed by the contractor. In such circumstances a contractor (or its subcontractors) would be reluctant to develop innovative concepts and ideas for the project that may have general application for future projects.</p> |
| <p>Resources</p> | <p><i>DAR Guide; Product Quality Guide</i></p> |
| <p>People</p> | <p>Designer job captains.</p> <p>Constructor project manager.</p> <p>Trades project managers and leading hands, foremen.</p> |
| <p>Outputs</p> | <p>Measures of performance against business plan objectives.</p> <p>Improved time, cost or functionality.</p> |

Design Management

Element 2: Design development and coordination

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| <p>Importance and method</p> | <p>Good designs comprise effective, efficient and economical solutions that satisfy the requirements of the project brief and other relevant requirements including, the requirements of all relevant legislation, authority requirements, relevant codes and standards and the requirements for safer construction.</p> <p>Preparing structured design reports at each stage in the design process imposes a discipline on the design team to think through and articulate the underlying assumptions used to prepare a design. A design report will often identify potential design problems at an early stage in the design process and thereby avoid or minimise delay, disruption and rework.</p> <p>Effective design documents will clearly communicate the design and (where relevant) construction requirements for the project. All stages of the design and documentation should be monitored by an effective QA process, including, where appropriate and or required by the client, independent proof checking of the design and documentation.</p> <p>One of the greatest sources of wasted effort during design is found in ineffective, time consuming project management and administrative requirements in design commission documentation, as well as convoluted, complex and time consuming arms-length processes for the preparation and review of design and documentation.</p> <p>A more efficient alternative to these contract processes is open, effective communication and interaction between the client team, design team and construction team during the design and construction planning phase to:</p> <ul style="list-style-type: none"> ■ enable the design team and the construction team to progressively optimise the design, construction planning, project resources and logistics ■ keep the client informed regarding how the design and construction planning is developing and whether there are any emerging issues that will need to be resolved ■ provide the opportunity for the client to comment if the design team or the construction team have overlooked a specified project requirement ■ give the client the opportunity to fine-tune its non-core specified project requirements in circumstances where this would provide a win-win, best for project outcome for all parties. <p>Similarly, the use of BIM can reduce wasted time and effort as the design and buildability is tested and fine-tuned as necessary before the design team progresses too far into the detailed design and documentation phase.</p> |
| <p>Resources</p> | <p><i>DAR Guide</i></p> |
| <p>People</p> | <p>Constructor project manager and design manager.</p> <p>Designer job captains, cost consultant job captains.</p> <p>Trades project managers and leading hands, foremen.</p> |
| <p>Outputs</p> | <p>Measures of performance against business plan objectives.</p> <p>Improved time, cost or functionality.</p> |

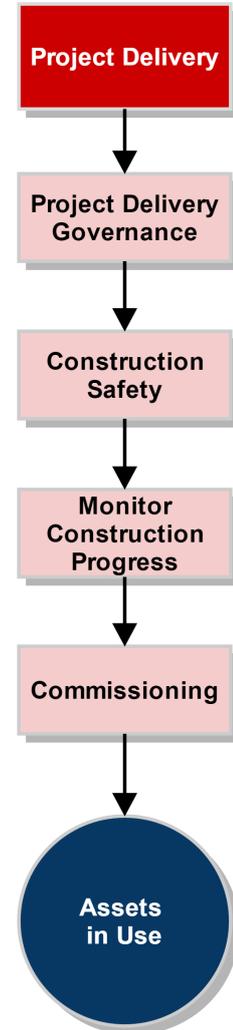
Project Delivery

It is beyond the scope of this Guide to provide a comprehensive overview of the breadth of tasks, skills and competencies involved in the actual delivery of an asset. Rather it points to resources available that address the key elements of monitoring performance and commissioning.

A key part of successful project business planning is regular monitoring against agreed outcomes or desired benefits. In particular, it is vital that the quality of team relationships and the project culture continues to be as positive as it was when the plan was agreed, and that objective measures for those outcomes are regularly applied and reviewed by the leadership of the project team.

For example, many people who enjoy working in a stimulating and ever-changing environment can be particularly focussed and single minded. Such people may be good at quickly identifying a solution to an issue and at driving the project to implement that solution.

Whilst such drive and initiative are to be encouraged and are overwhelmingly to the benefit of the project, care has to be taken to ensure that the issues and the solutions to those issues are properly communicated to the other members of the project team. The action taken to implement the solution should not have unintended adverse impacts on one or more members of the project team. The project leadership needs to have mechanisms in place to ensure that the issues and solutions are being properly communicated, and the impact on other members of the project team is being properly considered and actioned.



Project Delivery

Element 1: Project Delivery Governance

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| Importance and method | <p>Experience in asset delivery through capital investment projects varies greatly, from organisations that routinely deliver complex programmes to those that may deliver one project. However, a common factor that unites them is that capital projects represent a strategic investment for the client, typically form part of a long term strategic plan to increase shareholder return, serve socioeconomic need, take market share, enter new markets or gain competitive advantage.</p> <p>Clients will have a hierarchy of needs when it comes to capital project investment, which include knowing that:</p> <ul style="list-style-type: none">■ capital is being deployed effectively;■ risks are being managed and appropriate delegations made;■ returns are being optimised and commercial viability regularly tested;■ business benefits will be delivered and aligned with end user requirements;■ informed strategic decisions are taken at Executive level/Government agency and project level; and■ reporting is accurate, timely and can be relied upon by stakeholders. <p>To ensure those needs are met project organisation and behaviour require the following to be in place:</p> <ul style="list-style-type: none">■ clear project structure, roles and responsibilities and project management methodologies;■ explicit control procedures and application guidance;■ use of supporting tools so that project controls are practical to apply; and■ learning and sharing as built and operational knowledge. <p>Governance policy and procedures will focus on key risks, controls, monitoring and evaluation. Each of these has its own critical elements:</p> <p>Key risks:</p> <ul style="list-style-type: none">■ each project has its own risk profile;■ top down and bottom up assessment;■ prioritised project risk register;■ mandated mitigation standards and objectives for key risks; and■ project plan including mitigation protocols. <p>Controls:</p> <ul style="list-style-type: none">■ project success factors a basis for overall control objectives;■ control environment designed specifically for each project;■ mandatory mitigation standards and metrics for key risks; and■ good practice project controls. <p>Monitoring and evaluation</p> <ul style="list-style-type: none">■ active monitoring;■ regular self-assessment, challenge and independent confirmation;■ exception based reports;■ visibility of corrective action; and■ clear escalation criteria. <p>All these elements may be addressed, and governance procedures developed, using the Level 1 and 2 workshops and briefings outlined in the <i>PTI Workbook</i>.</p> |
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Project Delivery

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| Resources | <i>Establishing a Basis for Effective Project Control</i> , Price Waterhouse Coopers <i>PTI Workbook</i> |
| People | Members of different decision making bodies. |
| Outputs | Projects deliver expected return on investment. Minimal if any project delays or cost blow outs. Reliable and timely project status information – issues identified early allowing managed intervention. Executive level and stakeholders informed, with realistic expectations, able to intervene quickly if needed. |

Project Delivery

Element 2: Construction Safety

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| <p>Importance and method</p> | <p>All persons involved in construction projects need to understand the important roles that they each have in ensuring safer workplaces and safety should transcend the pursuance of industrial relations objectives by any stakeholder. In particular, workplace health and safety needs to have a greater profile across all levels of management.</p> <p>Workplace culture and the “human” factor are critical issues that must be addressed if the industry is to achieve a further reduction in workplace injuries and generally lower workplace risk.</p> <p>Safety consciousness should be incorporated as a central component of any project by all team members (consultants, contractors, workers, suppliers and clients).</p> <p>Safety in design is a key issue in eliminating workplace hazards and risk and must be incorporated as a central component of any project.</p> <p>Employers need to identify the required leadership capabilities and competencies appropriate for supervisors, managers and company boards and provide relevant training for these individuals.</p> <p>Consistent communication of safety principles and systems across worksites is essential to achieving a lowering of injury and fatality rates. Communication systems and training and educational programs should have regard to the ethnicity of the workforce and be practical and easily understood by all workers and visitors to worksites.</p> |
| <p>Resources</p> | <p><i>ACIF Workplace Health and Safety Policy, 2014</i> <i>Australian Constructors Association Safety Initiative 2014,</i> <i>and accompanying guides</i></p> |
| <p>People</p> | <p>Every on-site worker and manager. Senior managers of all organisations engaged on a project.</p> |
| <p>Outputs</p> | <p>Comprehensive safety procedures. Minimal injuries or accidents.</p> |

Project Delivery

Element 3: Monitor Construction Progress

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| <p>Importance and method</p> | <p>The outcomes of level 1 and 2 workshops described in the <i>PTI Workbook</i> provide an opportunity to drive the elimination or minimisation of the “Red” outcomes and achievement of “Green” and “Blue” outcomes. For this to happen it is vital that progress against each of those outcomes is regularly monitored.</p> <p>It is important also that as project team members are added to undertake a part of the work they are introduced to the project objectives and the Project Business Plan and its metrics.</p> <p>Monitoring may include:</p> <ul style="list-style-type: none"> ■ regular short site meetings focused only on assessing performance against target outcomes; ■ posting results of the assessments in site sheds; ■ regular conversations between a neutral assessor and projects team site leaders; and ■ checking the volume, content, and tone of formal project communications (RFIs, emails, correspondence). <p>Given that sound project governance policy and procedures are in place, the monitoring approach described in the <i>PTI Workbook</i> offers a relatively simple and visible way to ensure that project objectives are being achieved. Ideally, monitoring will involve a measure of independent validation of internal project monitoring by an experienced assessor.</p> |
| <p>Resources</p> | <p><i>DAR Guide; PTI Workbook</i></p> |
| <p>People</p> | <p>Constructor project manager. Designer job captains. Trades project managers and leading hands, foremen. Independent assessor</p> |
| <p>Outputs</p> | <p>Measures of performance against business plan objectives, including:</p> <ul style="list-style-type: none"> ■ active monitoring; ■ regular self-assessment, challenge and independent confirmation; ■ exception based reports; ■ visibility of corrective action; and ■ clear escalation criteria. |

Project Delivery

Element 4: Commissioning

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| <p>Importance and method</p> | <p>Commissioning is the process of verifying, in new construction, all (or some, depending on scope) of the subsystems for mechanical, plumbing, electrical, fire/life safety, building envelopes, interior systems (example laboratory units), cogeneration, utility plants, sustainable systems, lighting, wastewater, controls, and building security to achieve the owner’s project requirements as intended by the building owner and as designed by the building architects and engineers.</p> <p>Building commissioning is a quality-focused process necessary for both non-complex and complex modern construction projects. The commissioning process main goal is to improve a project from the design phase through post construction and occupancy.</p> <p>Commissioning planning should commence in design development, with the client and or end user of the asset specifying detailed commissioning requirements and acceptance criteria for achieving design intent, and for transferring the information to the construction contractor for the development of a commissioning and handover plan.</p> <p>While the contents will vary from owner to owner and project to project, a comprehensive commissioning and handover plan will involve development of most if not all of the following processes:</p> <ul style="list-style-type: none"> ■ the Owner’s Project Requirements (OPR); ■ commissioning scope and plan, including benchmarks for success; ■ review of design documents and checklists for achieving the OPR; ■ development of checklists and verifying a sample of construction checklists and submittals, developing training needs and evaluating training delivered by the contractors; ■ witnessing and verifying construction phase tests, and periodic site observations during the construction phase; and ■ performing commissioning functional testing as the project nears completion. |
| <p>Resources</p> | <p>Department of Defence.</p> |
| <p>People</p> | <p>Head contractor commissioning staff. Services contractors commissioning staff.</p> |
| <p>Outputs</p> | <p>Services operating to schedule and without defects. End users satisfied with asset performance. Efficient and safe commissioning.</p> |

Post Occupancy Evaluation

Post Occupancy Evaluation (POE) is the systematic evaluation of buildings in use, from the perspective of the people who use them after sufficient time has elapsed for them to experience and adjust to the building. It:

- assesses how well buildings match users' needs, and identifies ways to improve building design, performance and fitness for purpose;
- assesses the degree to which the building supports service delivery objectives;
- assists continuous improvement in the planning process, by identifying positive and negative aspects of the building; and by incorporating this information into the planning and design of future facilities

In POE stakeholders are defined as all people with an interest in a building — including staff, managers, customers or clients, visitors, owners, design and maintenance teams, and particular interest groups such as the disabled. POE offers a range of benefits.

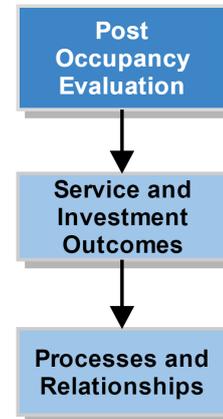
Fine tuning new buildings: By understanding how buildings support and or frustrate activities, they can be fine-tuned and management practices adjusted. Very often, slight adjustments to buildings and the ways they are used offer significant benefits for users.

Improving design for future buildings: By designing new facilities with an understanding of how similar buildings perform in use, mistakes can be avoided and successful design features capitalised upon.

Accountability: Post Occupancy Evaluation is a valuable tool for assessing building quality — essential when organisations are required to demonstrate that building programmes are being responsibly managed.

Cost savings: Post Occupancy Evaluation identifies ways people can use buildings and equipment more efficiently and more cost-effectively. Dysfunctional or seldom-used building features can be eliminated or replaced.

Staff and/or customer relations: Post Occupancy Evaluation involves building users in defining how buildings work for them. This participation engenders greater commitment to solutions, and more willingness to accept shortcomings.



Project Evaluation

Element 1: Analysis of service and investment outcomes

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| <p>Importance and method</p> | <p>A Post Occupancy Evaluation (POE) is a structured approach to the collection and analysis of data in relation to building performance and the translation of these findings into action plans. There are three phases of the POE process (pre-evaluation, evaluation and post evaluation).</p> <p>1. Pre-evaluation</p> <p>The scope of the POE should be identified early and it should be designed to focus on the outcomes of the specific project including functional performance, technical and environmental performance, economic performance and the aesthetic and image characteristics of the building.</p> <p>Stakeholders need to be identified, usually including building users (staff and clients), the building design team and the building manager.</p> <p>A framework for the management of the POE should be established which contains a clear definition of the scope and level of the POE and the roles and responsibilities of the evaluation team.</p> <p>The selection and appointment of resources to undertake the evaluation should be based on the scope, level and complexity of the POE to determine the type of expertise required.</p> <p>2. Evaluation</p> <p>The study should address the following activities:</p> <ul style="list-style-type: none"> ■ communication with stakeholders (individuals or groups who may affect or be affected by the POE e.g. the building owner, the building manager and building users); ■ determining an appropriate data collection methodology, including the selection of data collection instrument/s and preparation of a review plan; ■ conducting the study, analysing the results and developing an action plan; and ■ writing the POE report. <p>3. Post evaluation</p> <p>This phase entails:</p> <ul style="list-style-type: none"> ■ seeking approval of the recommendations and action plans; ■ addressing recommendations and action plans; and ■ reviewing the effectiveness of these actions. |
| <p>Resources</p> | <p><i>Post Occupancy Evaluation Guideline</i>, Department of Housing and Public Works, QLD</p> |
| <p>People</p> | <p>Asset and facility managers. Evaluation team.</p> |
| <p>Outputs</p> | <p>Information to improve design, performance and fitness for purpose in future buildings.</p> <p>Information to improve fitness for purpose and management of building being evaluated.</p> |

Project Evaluation

Element 2: Analysis of project processes and relationships

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| <p>Importance and method</p> | <p>In addition to evaluating the utility and fitness for purpose of the completed asset, it is useful to review the effectiveness of the project governance arrangements and the associated delivery strategy adopted for the project.</p> <p>A similar approach to conventional POE studies can be undertaken, based on interviews with those involved in the design, construction, commissioning and operation of the asset. The benchmark for how well the processes and relationships worked, and whether the project delivered an outstanding outcome, is found in the five elements to achieving project success described in the Project Initiation Guide:</p> <ul style="list-style-type: none"> ■ End users expectations should be met or exceeded; ■ The project sponsors’ strategic and financial objectives should be met; ■ Project team members should achieve their financial objectives; ■ The project delivery team should enjoy working together, and want to work together again; and ■ Community and stakeholder expectations of the project in terms of safety, design, environmental outcomes, and social objectives, should be met or exceeded. <p>Ideally, an independent assessment team will interview key members of the designers, head contractor, structural and services trade contractors, client, and end users after the project is complete, this should be commenced before long post occupation, to enable recollections of the design and construction phase, in being fresh and unclouded. This holistic approach allows for constructive review of the project initiation underpinning the process, the effectiveness of the project governance policy and procedures, and the effectiveness of the project monitoring procedures.</p> <p>This approach was taken in the study to identify the driver’s common to successful projects for the Property Council of Australia.</p> |
| <p>Resources</p> | <p><i>Project Initiation Guide</i></p> <p><i>Projects as Wealth Creators: Drivers of Project Excellence</i>, Property Council of Australia, 2001</p> |
| <p>People</p> | <p>External assessment team.</p> |
| <p>Outputs</p> | <p>Information on holistic success of the project.</p> |

Facility Management

Facilities management professionals and organisations are responsible for the effective operational management of the buildings and precincts which form the majority of Australia's built environment.

Facilities managers organise, control and coordinate the strategic and operational management of buildings and facilities in public and private organisations to ensure the proper and efficient operation of all physical aspects, creating and sustaining safe and productive environments for occupants.

The performance of assets and their management is integral to service delivery, particularly in the public sector. Sound facilities management contributes to optimising the useful life of assets and the achievement of service delivery needs and performance standards.

When facilities management professionals become integral participants in the design and planning of all assets, they ensure:

- design principles are mindful of, and do not adversely affect the practicalities inherent to ongoing building operations;
- optimum data is collated and available at handover as part of the transition from the construction phase to the operational phase of the asset; and
- there is a framework for the ongoing collection of information critical to minimising overall operational lifecycle costs of the facility, currently in the order of 70%.

BIM is one tool increasingly being utilised in the design of facilities and components within facilities. Its ability to identify and target cost efficiencies through the standardisation of asset and component records is starting to deliver tangible benefits that will continue throughout the entire lifecycle of a facility.

The aspiration is to create a dimension perfect model that is handed over with a full asset register. This will allow the facilities management professional to strategically plan works, understand the interoperability of the building components and to better manage all aspects of the facility to meet occupant objectives and designer intent.

A facility that has BIM at the core of the operations will reduce the cost of management, improve asset life, deliver more strategic and proactive maintenance regimes and facilitate replacement of fixtures and fittings proactively.

The Last Word

Productivity in the construction industry is critical to Australia and New Zealand's growth and the economy. It is widely acknowledged that the construction of every capital asset involves unique design, procurement and construction challenges. The industry and government are committed to delivering assets efficiently, with required levels of quality and performance.

This concise Guide is intended to provide readers with a basic understanding of the front end of projects - project initiation, project delivery planning, delivery team procurement, and project delivery. It does not deal in detail with the full span of project management techniques or practices.

It provides direction to the existing leading practice resources available to assist project sponsors and project team members achieve successful project and asset service delivery.

Members of both the Australian Construction Industry Forum (ACIF) and the Australasian Procurement and Construction Council (APCC) recommend the Guide to those who may be unfamiliar with how capital assets are created and encourage readers to refer to each of the resources when utilising this guide.

Members of ACIF and APCC



Australian Construction Industry Forum Members

Air Conditioning and Mechanical Contractors' Association of Australia

Australian Constructors Association

Association of Consulting Architects Australia

Australian Institute of Architects

Australian Institute of Building

Australian Institute of Building Surveyors

Australian Institute of Quantity Surveyors

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Housing Industry Association

Insulated Panel Council Australasia

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Western Australia

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South Australia

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Victoria

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Queensland

Department of Housing and Public Works

Northern Territory

Department of Business

Department of Infrastructure

Australian Capital Territory

Treasury and Economic Development Directorate

Papua New Guinea

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Strategic Forum for the Australasian Building and Construction Industry

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Bringing the Public and Private Sectors Together**

