

GIVING COMMUNITIES BETTER LONG-TERM VALUE IN INFRASTRUCTURE INVESTMENTS: MANAGING ECONOMIC, SOCIAL AND ENVIRONMENTAL VALUES

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Foreword

“In order to make wise decisions you must first have the wisdom to make them.”¹⁾

Communities throughout the world, not just Asia, want their governments to give them wise leadership and management of their scarce resources. Communities are concerned about the future and that includes the condition of their physical as well as social environment. Infrastructure²⁾ is a vital component in the future wellbeing of communities.

¹⁾ **Wisdom** – Defined in the Macquarie Dictionary as “The quality or state of being wise; knowledge of what is true or right coupled with just judgement as to action; sagacity, prudence or common sense.”

²⁾ **Infrastructure** – Defined in The American Heritage® Dictionary of the English Language, Third Edition as “An underlying base or foundation especially for an organization or a system. The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.”

Unfortunately the experience of many is not good. Too much emphasis is given to matters of urgency rather than matters of long-term importance when it comes to making decisions about infrastructure. Too many examples exist of where infrastructure decisions have been made based solely on development objectives and costs – ignoring important environmental and social implications as well as the long-term costs of maintaining or replacing the infrastructure. There is frequent distortion in investment in infrastructure in favour of newer developments at the expense of existing communities with ageing assets and limited incomes to maintain or fund new works.

Equally many decisions about infrastructure ignore the views of the community by limiting their opportunities to contribute to the planning and decision making process. In the end the communities get only limited short-term benefits but face higher long-term costs and poorer quality of services.

Local Governments usually do not have the resources required to meet the needs of their communities in the way that they would like to. Limited resources may well mean that services must be limited – but this doesn't automatically mean that they can't represent better long-term value. People are interested in more than just the cost of something. Their environment, health and safety, economic situation and prospects for example are some of the important factors they take into account in judging how they value things – infrastructure included.

It is possible to achieve a better blend of social, economic and environmental values by involving the community in planning and decision making at the Local Government as well as State or National level. The Australian Centre for Value Management has worked with a variety of Governments - National, State and Local - to help in critical planning and decision making through involvement of the community and other government agencies and the private sector.

This paper will take you through the principles and explain some ways in which it can be made to work, particularly at the Local Government level.

This paper focuses on infrastructure investment although most is relevant to other asset management planning and decision-making. I have limited

examples to Australian Projects for the purposes of illustrating the principles being examined.

Introduction

Making decisions is in itself quite an easy thing to do. But how do you know it is the right decision or a good decision? Who will it be right for? The decision maker? The owner? The user? The community? What is it that constitutes a good decision?

Making decisions on behalf of a community brings with it important responsibilities:-

- ☑ To have a clear rationale for making the decision i.e. being purposeful about meeting community needs;
- ☑ To make the decision based on appropriate information and analysis i. e. being wise;
- ☑ To understand the consequences of the decision for all 'stakeholders' i. e. being considerate and managing risks;
- ☑ To act as custodian to the community's assets and interests i.e. being principled;

Where and how do we get it right or wrong?

We tend to get it wrong or make poor decisions when we:-

- ☒ Fail to properly define the problem that needs to be addressed before adopting a solution;
- ☒ Don't secure collective ownership of the problem and the objectives that need to be achieved;
- ☒ Fail to identify and get agreement to the values and priorities that are used to guide the decision;
- ☒ Don't obtain or ignore appropriate information and criteria upon which to base the decision;

- ☒ Fail to look at whole-of-life cycle costs and benefits;
- ☒ Don't look at all of the realistic alternatives to achieving the objectives;
- ☒ Fail to assess the risks and consequences as well as the costs and benefits;
- ☒ Fail to plan and manage the implementation;
- ☒ Act corruptly.

Conversely we tend to make good decisions when we:-

- ☑ Properly define the problem before deciding on a solution;
- ☑ Obtain stakeholder ownership to the problem and objectives;
- ☑ Are guided by agreed shared values and priorities;
- ☑ Establish appropriate criteria and information;
- ☑ Analyse whole-of-life cycle costs both procurement, maintenance and operation as well as renewal or disposal;
- ☑ Assess and manage risks as well as the costs and benefits;
- ☑ Look for and evaluate the alternatives;
- ☑ Act honestly and openly.

How can we go about getting it more right more consistently in future infrastructure investments?

Defining the Problem

What is it that needs to be addressed? What needs to be done? Why do we need to do it? How are the needs expected to change into the future? Who has an interest in this? Who needs to be involved in helping to better define the problem? How do you avoid being forced to fit the problem to a solution that's been offered?

In terms of community infrastructure the likely most significant challenges during this century will focus on water supply and waste management, food production, access to markets and other services (health, education etc.). A

key aspect that will be expected to consume significant community resources is the maintenance, refurbishment, renewal or safe decommissioning of existing infrastructure.

The important distinction I want to make here is what I mean by “the problem”. Its about what the infrastructure (asset) is intended to do and the context within which this must happen (e. g. givens, constraints, planning assumptions). A key principle being that an asset only exists to support the services that the organisation (or for example local government) seeks to provide or supply. Its about understanding why there is a need for the asset. Its also about understanding how well the asset is needed to perform in order that the services that it is intended to support can be delivered. But these services must be to some appropriate level of performance as well - e.g. they might have to achieve certain levels of safety, how they should be provided and by whom, when and where they are needed and so on. They may have to meet certain cost or affordability parameters and be accessible or available to those who need them.

The principal sorts of problems that I could envisage might range across:-

- ❖ Ageing or rapidly deteriorating assets - in the face of rising levels of usage or need;
- ❖ Inadequate funding to do proper maintenance to the assets - reducing service capability and economic life of the asset;
- ❖ Expanding urban settlements - straining the capacity of the existing infrastructure and accelerating its obsolescence as well as increasing pressure for increased investment in the expanding areas;
- ❖ Technical obsolescence - creating difficulties and higher costs to maintain or replace;
- ❖ Environmental degradation - increasing risks to human health and the environment;
- ❖ Political or industry pressures associated with particular proposals - e.g. to develop new urban, industrial, retail and tourism areas - where current infrastructure is lacking; or inadequate to meet the projected demand and creating tensions in competing priorities for limited

resources;

- ❖ Destruction or damage to assets caused by disasters - where there is no capacity to fund immediate replacement or repairs - thus reducing service capability and disrupting investment programs with social and economic as well as environmental consequences;
- ❖ Obtaining adequate funding (from all sources) - where generally the communities are unable to meet the full cost of providing, maintaining and operating the infrastructure.

Whilst they can all be seen as being part of a continuum there are important different consequences for each of these and accordingly the strategies that might need to be implemented will be expected to have significant areas of difference. Where assets are not well maintained or of a poor quality there will be an earlier and much higher cost to replace, repair or enhance the performance of the asset to ensure the necessary functions that it is there to support are able to be effectively delivered.

Where there are clear gaps in the capacity of the assets to meet future needs and this can't be achieved with the existing assets then there will be a need to procure new asset capacity. Here the choices in the approach taken can be quite varied. Each has a different range of risks that can adversely affect efficiency and effectiveness in the use of limited resources.

Having a clearer understanding of what has to be achieved enables a clearer choice to be made about how best to do it.

Some Case Studies to Note # 1

Title of Project:

New Norfolk Mental Hospital - Tasmania

Brief Description:

The large complex of facilities (some of heritage significance) no longer appropriate to meet the needs - new clinical service models wanting to be put into practice, significantly lower numbers of patients. The local community and the government wanted to do something to better use the facilities for the benefit of the community and to free up part of the site for redevelopment. There was a high level of distrust between the

various patient interest groups and the local and state governments.

The Outcomes Achieved: Local community, patient interest groups, the health department, the hospital staff and the State Government endorsed a strategy. Patients long term needs considered and acted on. Community development needs addressed.

Success & Failure Factors: A process that was independently facilitated helped them to better define the problem(s) that they wanted to see addressed - especially social and environmental - not just the initial economic dimension. Willingness of the government to go through the process and take up its outcomes and follow the recommendations from the participants.

Title of Project: **Sydney Olympics Velodrome**

Brief Description: The Master Planning provided for a velodrome within the Sydney Olympic Park. Modelled on earlier ones built in other States. An urgent decision was needed to enable the construction program to be kept on time.

The Outcomes Achieved: More accurate scoping of what the facility needed to make it function effectively, especially in Olympics mode. External impacts - both in training regimes and in equipment storage for the participating national teams were identified. Recognition of the sort of infrastructure required and the selection of a more appropriate site elsewhere.

Success & Failure Factors: A facilitated process that involved both the sporting body, velodrome operators and the planning and design team, together with Olympics organisers. Conducting it early enough to allow the alternative solution to be implemented. However the delay in finding the other site meant missed staging of major international events prior to the Olympics.

Title of Project: **Hat Head Sewerage Scheme**

Brief Description: Small coastal village reliant on septic and the discharge of untreated effluent into the ocean. Government objective to achieve improved environmental outcomes. Area subject to heavy cyclical demand during holiday periods creating health risks. Draft schema too expensive for the Government and the community. Possible decade delay in getting improvements and hence restrictions on further developments.

The Outcomes Achieved:	A revised set of environmental performance targets was able to be agreed that allowed a lower cost scheme to be developed up. Agreement on technical solutions that would assure environmental outcomes and improved health measures. The significant cost reduction making it affordable and therefore able to proceed.
Success & Failure Factors:	A process that was independently facilitated helped them to get a better shared understanding of what the scheme had to do and what the technical possibilities were. Having the right stakeholders with the knowledge and those with authority to set the environmental parameters and those responsible for the funding together. Willingness to abide by the process outcomes.

Values and Priorities

What is meant by the term 'value'? How do we demonstrate 'value-for-money'? How do you identify and begin to understand what it is that people value in human habitat and the way it is developed, maintained, conserved, restored and managed etc.? How do you get an understanding of values across many stakeholders and large numbers of people in a community? How do you 'balance' local values to State or National ones? How do you determine what's more important in making the decision? How do you avoid misunderstandings about purpose and intent?

What is Value?

A definition:-

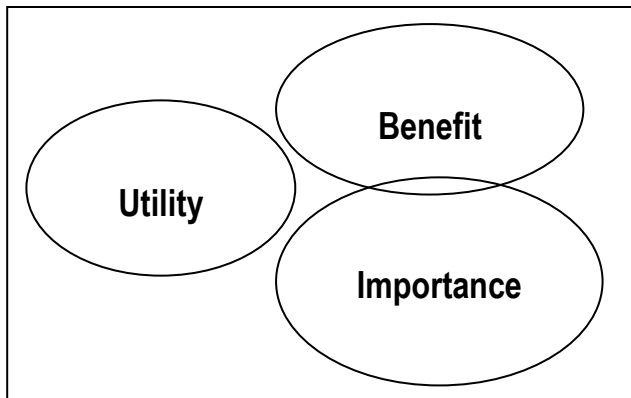
"That property of a thing that is esteemed, desirable or useful. Or the degree that this property possesses in terms of worth, merit or importance."
(Macquarie Dictionary)

"An amount, as of goods, services, or money, considered to be a fair and suitable equivalent for something else; a fair price or return. Monetary or material worth. Worth in usefulness or importance to the possessor; utility or

merit. A principle, standard, or quality considered worthwhile or desirable.”
(The American Heritage Dictionary of the English Language, Third Edition)

i. e. value is not just able to be expressed in monetary terms!

Figure 1. Principal Elements of Value



How We Determine Value

The way each of us looks at value is, quite naturally different. This is because we will put different emphasis on certain aspects compared to others. There is a basic utility - what something actually does that we value. In addition there are the benefits that we believe we get from it as well. For example feeling good about it, being enriched by it, saving energy and so on. Another dimension that is often overlooked though is the level of importance we attach to it - the more important then the higher its value to us.³⁾

In the case of infrastructure, such as a sewerage scheme, you might expect the local community to value it if it works and does what it is intended to do (i. e. capture, transport, treat the sewage and dispose of the effluent). They may see many benefits in terms of improved health, reduced pollution and so

³⁾ Of course these are not always fixed, they will change both with time and our outlook or the context in which it (the infrastructure) and the people exist.

on. However it may not be as or more important to them than say having a safe community. They might not see much benefit if they can't really afford to pay for it. Therefore its important to note that other stakeholders may value the infrastructure or project differently, not because its basic utility is any different to them but because they see a different set of benefits and attach a different level of importance to these. These aspects need to be identified and understood so that the solution is able to demonstrate the most value to the community – not as a bunch of individuals but as a collective.

If the only criteria used to make the decision is 'cost' then it will always be an inadequate solution. Such poor solutions attract criticism and create cynicism in the community. People value more than just financial outcomes. Our experience shows that by focusing on the aspects of importance it is possible to quickly build a set of shared values that can guide a project.

The utility aspect will be pretty straight forward and clear to all. The benefits are also fairly easy to identify, however, this needs to be done with the full range of stakeholders to more accurately define the benefits and dis-benefits. At concept stage these will be stated as intended or desirable outcomes, which can be verified once the preferred solution is known and then proven with implementation.

Something that needs to be remembered is that sometimes projects bring a range of dis-benefits as well as benefits. These need to be recognised and appropriate objectives and strategies developed so as to minimise the effects of these. They will form part of people's considerations as to what is valued about the project or infrastructure.

Establishing a shared set of values can only be achieved by some sort of group process otherwise all you have is a collection of individual values that remain untested by the group (i. e. community). No 'consultant' can be expected to accurately reflect what a number of stakeholders would value because of the risks of misinterpretation and misrepresentation.

Building-up the list of importance factors as a group, rather than individually, accelerates understandings and the recognition of the common ground. It also fosters dialogue on the 'uncommon' values. It can be used to drive better project definition, stimulate solution options and more effective

implementation strategies. This needs a facilitated process of some sort where perspectives can be shared, evaluated and agreed with, disagreed with, modified or added to. Without some shared values there won't be a community perspective.

The 'balancing' of local community, State or National values and priorities should be part of the same process. Where these are undertaken separately then they cannot be taken as shared - notwithstanding that there may be some evident common ground. This is because of the importance of group interaction in building understanding and respect for each other's perspectives and moving towards a common direction.

Priorities

What may be pretty clear in terms of needs, appropriate solution and importance to a particular community does not ensure that sufficient resources will follow to implement it. No matter how worthy it may be. Rather at a Local, State or National level there will be competing priorities. Competing in relation to securing adequate funding from the available resources. This competition is not just within a particular portfolio or Ministry. It has to be seen across the whole-of-government as well. For example: Is this water treatment facility going to proceed ahead of extensions to the health clinic in some other community?

Invariably there is not enough resources to enable all worthy infrastructure projects to proceed at the same time. A choice has to be made - which ones take precedence in getting scarce funding? When looked at as a 'rationing' process its easy to recognise that governments (local, state and national) need some basis, some relevant criteria to help choose where the resources should flow. This is clearly a political issue and I would not presume to suggest that there is a simple way to determine these priorities. In particular something that is objective as to the merits of individual projects.

However, I am prepared to suggest that unless at the base or individual project level there is widely accepted criteria that demonstrates the possible

service or community outcomes then politicians will continue to direct resources in less effective ways - at least in so far as achievement of economic, social and environmental service delivery outcomes.

The same will apply within a Local Government area, at a State level as well as Nationally. Whatever the outcomes that the community (with government leadership) must achieve or sets out to achieve there will be changing priorities and capability to respond and so choices must be made.

Long-term resource efficiency is dependent on a consistently robust and objective focus on service delivery needs and priorities. The task of getting wide endorsement to these priorities is a core part of the normal political process rather than being seen as something unique or special to infrastructure projects.

One aspect that we see as a key risk in deciding priorities for resource allocation relates to existing infrastructure. Its there and requires large resource commitments to maintain it to an appropriate level of performance. However it doesn't get the focus, passion, recognition or resource commitment that it not so much deserves as really needs to give the community good value form both its original, current and future investments in the infrastructure. What already exists is usually more than 85% to 95% of the community's asset or infrastructure resources. If it's neglected then service capacity, capability, safety will deteriorate and long-term costs for the services as well as the infrastructure will increase.

So it's suggested strongly that what already exists should be first priority in allocating resources.

Some Case Studies to Note # 2

Title of Project:

West Wyalong Hospital

Brief Description:

Small rural community with a hospital needed refurbishment. A major economic factor for the community. Changing health needs reducing the required scale of the facility. Issues of equity of access and affordability of the facility and services was of concern. Significant disagreement between the community and the health system was

evident with strong local agitation for more modern facilities and with no reduction in scale or health functions.

The Outcomes Achieved: An affordable solution that would achieve equity outcomes. An agreed scaled down facility and operations support strategy to enable effective delivery of future health services. Alternative specialist clinical visitation strategies and access to nursing home facilities for the aged.

Success & Failure Factors: A process that was independently facilitated helped them to get a better shared understanding of the forecast health needs and of the alternatives and their implications to both health outcomes and costs. Requiring all of the participants to avoid defensive responses or comments. Willingness of the community participants to explain their perspectives and to listen to the clinicians and health planners. A non-defensive approach fostered genuine understanding.

Title of Project:

Pacific Motorway Extension

Brief Description: Proposed new motorway through environmentally and politically sensitive area affecting commercial, agricultural, residential and the area's sensitive and rare habitat. The need to agree on a route so detailed engineering plans could be advanced and costed. Also to enable the requirements of the Environmental Impact Statement to be completed. Communities with different expectations and priorities – the north seeking development with the south preferring no new road. Agricultural areas concerned with flood control, soil and water quality and retention of high yield land.

The Outcomes Achieved: An agreed route. Recognition of environmental values in the technical solution. Clearer appreciation of the effects on the community and individuals. Clarity of shared values and appreciation of the perspectives of others.

Success & Failure Factors: A process that was independently facilitated helped them to better understand and appreciate different perspectives and values. Getting all of the values on the table and demonstrating that they were not being ignored in the final solution. Requiring the road designers and engineers to limit their comments to clarification of things and not to be defensive in their responses to questions or comments. The government acknowledging that this road section needed a more expensive solution to achieve the environmental as well as economic and social outcomes.

Title of Project:

Bankstown Civic Precinct

Brief Description: Sydney suburban council where an administrative building had been

destroyed by fire. To rebuild it or do something different. Contra views within the Council and across the community. Site provided an option to 'open up' the central civic precinct with a park. Some planning options had been prepared. Economic evaluation established there was no real need to rebuild the office facilities as forecast needs were able to be met for the next decade.

The Outcomes

Achieved:

Agreed set of values to guide the planning and design of the precinct. A civic park as the preferred solution. Recognition of shared values and respect for each other's views.

Success & Failure

Factors:

A process that was independently facilitated. Attended by the public, interest groups and the local Council (Mayor, Councillors and officers). Capturing what was important from the group - creating the list publicly and having them highlight the 'most' important and only after this was done to then take them through the options. Willingness of Council to go through the process and open up the decision making to community input. Requiring the technical professionals to present and offer clarifications not defensive responses to questions.

Ownership & Commitment

On whom and what is the ultimate success and community acceptance dependent? Who has an interest in this? Are the stakeholders⁴⁾ only local or are there other regional or national interests that need to participate? Who might be in a position to frustrate achievement of the objectives? Who can impact on cost and time and quality? How they can be engaged in the process? How can you create a shared direction and willingness to make it happen?

We need to recognise that stakeholders are not just those with authority to make or influence decisions. They are those who will be affected by it as much as those who will pay for it or build it.

⁴⁾ Stakeholder(s) - Defined in the Macquaire Dictionary as "Someone who has an interest in something; with a personal concern, interest or involvement; a group of persons having a common interest; someone affected by something of advantage or detriment."

Its in their community; they may directly benefit from having or using it; they might have to pay for it; they might have to maintain it; it may affect their way of life or livelihood; it may come at the expense of something else they needed or were hoping for; it may create additional problems for them now or in the future; it might affect their heritage and cultural values, etc.

The decision makers need to embrace the perspectives of stakeholders prior to making a decision (especially if it affects the progress and intended outcomes of the project/ asset infrastructure).

Projects that are not 'owned' by the community will not be successful. Stakeholders who do not see their needs or ideas or interest responded to will not support it. Imposed solutions are usually resisted, whether actively or passively.

When stakeholders are included in the process if they want it to happen they will help to find the ways to make it happen.

The importance of this ownership being achieved is manifest in the implementation phase - the early buy-in fosters them as active problem solvers, blockage removers, relationships managers and project sponsors.

But this support is directly dependent on their needs, values and contributions being actively and genuinely sought, respected and responded to. This is achieved by involving them at concept stage - when they can help to define the problem to be addressed, help to define the values, principles and parameters that will guide the project.

It means involving them in developing up the options that are considered - so that the thinking continues to focus on what they value in terms of intended benefits and outcomes. It means involving them in the selection of the preferred solution - where they will have contributed to and/ or endorsed the criteria used to make the decision/ selection.

It also means the decision makers being willing to participate in a more open process and to working with its outcomes.

Some Case Studies to Note # 3

Title of Project:

New Sydney Showground - Olympic Park

Brief Description: The showground for staging the annual Royal Easter Show was being relocated to the new Olympic Park. The project was at schematic design stage, with three design consortia handling major segments. The cost plan showed potential costs up to 30% over budget. The project had a tight timetable to enable pre-Olympics activities and would be used extensively for Olympics activities.

The Outcomes Achieved: Agreed significant variations to elements whilst retaining full functionality for the Showground and Olympics and design features and alignment of the budget and cost plan. Clearer understanding about what needed to be done and how so that the project would be ready on-time for planned major events. (Actually delivered on schedule and within budget.)

Success & Failure Factors: Direct involvement of the key stakeholders and authority to make agreements and decisions during the process. Taking time to allow detailed outline of essential operational, architectural and engineering information. Willingness to participate in the process. Well prepared technical team able to present a lot of information in an understandable form. Independent facilitation and reporting.

Title of Project:

Resources Transition Program

Brief Description:

The re-configuration and refurbishment of health services to some 30% of the Sydney population. Involving some 30 facilities - from major hospitals to community health clinics. The program would be implemented over 7 years and result in significant lower costs of services - funding that was to be redirected to other areas of growth.

The Outcomes

Achieved:

A design and sequence of activities that would enable effective implementation of new models of health care. Clinical areas with greater flexibility of use and hence lower operating costs. Protection of heritage values in important facilities. Executive management and staff co-operation in the changes.

Success & Failure

Factors:

The involvement of clinical staff (and others) in the value management studies - their working through the process and being able to contribute their ideas and values and seeing these shared by others. Government commitment to fund the investment program but an equal commitment of the health service to make the intended savings and manage the change process. Independent facilitation.

Title of Project:

Willoughby City Council

Brief Description:

An elected body due to face an election in 18 months time and wanting to get better focus on what they wanted to achieve as a

Council. All Councillors independent - no factions - no apparent teamwork - frustration in trying to progress anything - management team keen for clear direction and willing to support the Councillors. A two-day workshop, involving both the elected Councillors and the Management Team, was held to agree on the priorities that they as a whole Council would pursue.

The Outcomes

Achieved:

Shared awareness of each other's perspectives and priorities. Recognition of shared values and objectives. An agreed Action Plan to progress issues. A fundamentally more co-operative and less antagonistic approach.

Success & Failure

Factors:

Generous commitment by the Mayor and General Manager to overtly support the facilitated process and its outcomes together with willingness to lead discussions on sensitive issues. Active engagement of all of the participants and maintenance of a non-adversarial approach. Management Team focused on clarifying what they do and how they can support what the Councillors must or wanted to achieve. Commitment to implementing the action plan. Trust in the facilitation team.

Exploring Alternatives

What other ways are there to achieve our objectives and delivery of the functions? What options should we invest resources and time to develop up? How do we sort out the ridiculous from the realistic? How can we expect the stakeholders to be innovative? How do we choose between the alternatives? How many options is it appropriate to consider?

Its too tempting to take the first solution offered - usually because its being pushed by someone with a vested interest. Invariably though the first solution offered will not be appropriate. As it will fail to take into account all needs and priorities. This is because all stakeholder perspectives will not have been considered and certainly not collectively. . If there has been no genuine attempt to explore alternatives then you may well be implementing a sub-optimal solution that may increase long-term costs to the community. These additional costs are likely to come from misalignment between the capability of the asset/ infrastructure and community needs, reduced economic life, earlier replacement of the asset, environmental impacts that incur additional

costs for the community, higher operating costs impacting on the cost of service delivery and so on.

Figure 2. Cost Impact of Making Changes Over Time

Figure 2 shows the relationship between potential for value improvements in a project and the stage of its life cycle.

The earlier in the process that critical thinking and analysis is applied then there should be less significant changes later on. Where changes have to be made to the solution, to get a better outcome, the earlier these are made then the cost of making the change is lowest and the improvement in value greatest. Once the project gets into design though the cost of making changes will generally exceed the potential benefit or gain.

If the solution looks like being the wrong one then it should not proceed. Even up to the consideration of tenders. If an inadequate solution were to proceed then its long-term impacts could be considerable, particularly as the harm goes on for a long time.

What do we mean by 'alternatives'. It's simply how else can we achieve our stated objectives. In terms of an infrastructure project this will include finding out the realistically possible ways of performing the functions that the infrastructure must do. I say realistic because whatever it is it must be able to be implemented. This doesn't exclude opportunities for significant innovation. Quite the contrary, thinking about alternatives stimulates a group to offer many ideas that can provide the basis and content of great solutions. For example in relation to say sewerage infrastructure the sorts of alternatives may start with:-

Reticulated vs other systems; where a treatment plant is needed or located; the types of treatment and levels of water quality that is to be achieved; who owns it and maintains it; what processes will be included for treatment; where and how the effluent is disposed of; the extent of coverage and scale of the plant; and its design life.

A perhaps surprising learning is that non-technical/professional people can help create better technical solutions - provided the process is in place to facilitate this group creativity. Their articulating what should be achieved and asking 'Why?' or "Why not?" enables the technicians and professionals to focus on how to - the options and best ways to do it.

A group needs to be given an opportunity and an environment in which it can explore, suggest or assess alternatives. It's important in this context that a

particular preferred solution is not 'pushed' onto the participants. Where it is evident that there is no willingness to seriously consider realistic alternatives they simply won't emerge. The natural desire of proponents to 'champion' a solution has to be prevented if alternative ideas are to be successfully elicited. "Champions' defending their proposed solution have to be prevented if adequate understanding or rationale and objectives is to lead to other options being identified.

Initiating a group's thinking about alternatives starts with asking some very simple questions. But the answers will depend on what has gone before in terms of information sharing and the process into which their ideas are able to be put.

A critical aspect is suspending judgement (and sometimes reality) until the group's offerings in terms of ideas are 'exhausted'. Too quick a process may result in too shallow a level of thinking and therefore ideas. Too brief a period A free flow on many ideas helps to establish the elements from which a comprehensive solution can emerge. It's the cross stimulation amongst the group that helps add depth to the range of ideas.

At some point though decisions have to be made. However, in selecting what's worth pursuing and what should be discarded, there are two aspects to consider:-

- 1 - the criteria for deciding what's worthy and what's not;
- 2 - getting the group of stakeholders to do the evaluation and make a joint decision (where possible)

The principal criteria that can be used in this evaluation will centre on the earlier defined "what's important", project objectives and intended outcomes (or benefits).

Appendix 1 provides an example from a recent project demonstrating how "What's Important" to stakeholders can be used to guide the design and selection of a more appropriate solution.

A two-pass run through the ideas with a group is a good method. On the first review they will note the realistic ones (realistic may include ability to win approvals, technically feasible, likely to be supported by the community and so on). Realistic options may be immediate or remote. Then on the second

pass to establish its merit in further consideration or development up of the preferred solution. These tactics help establish a robustness in the ideas as the group has opportunity to reflect and further discuss them and thus acquire sufficient understanding to make a decision in favour or against.

Appendix 2 provides an example of group creativity in identifying alternative ideas to address an infrastructure need.

Some Case Studies to Note # 4

Title of Project:	Rio Tinto - Major Resource Tender Opportunity
Brief Description:	Major resources project of potential strategic significance. Challenge to decide the best value solution to win the resource and get it to market and hence agree on the tender approach. A stepped process to evaluate and make a final decision on whether to invest and if so how to proceed. A requirement to identify 3 or 4 key options that were then developed in more detail, their costs and benefits and overall value to the company then evaluated and the best strategy put to the Board.
The Outcomes Achieved	Agreed principal options to be further developed and readied for evaluation.
Success & Failure Factors:	Assembly of a team with the requisite knowledge of the resource, latest and most appropriate techniques for extracting and processing into marketable products, infrastructure design and development and operation, optimising the value of the products, successful sale and transport to customers. Commitment to invest time and resources to look for alternatives and genuinely and objectively test them before making any decision. Avoidance of owning a solution or strategy until it emerges from robust analysis.
Title of Project:	Rail Access Corporation - Weighbridges
Brief Description:	Need to replace weighbridges to protect both track integrity and revenues as well as optimise train paths on the network. Importance of a prompt decision. A preferred strategy using existing technology had already been advanced and was ready to proceed however management sought an evaluation of the alternatives.
The Outcomes Achieved:	A revised strategy with more weighbridges in more strategic locations but using a more reliable lower cost technology. A weighbridges network more adaptable to future systems growth and able to deliver higher train speeds and hence overall network efficiency.

Success & Failure Factors: Management willingness to see alternatives explored and evaluated. Combining economic and technical knowledge and risk in a Value Management study. Effective sharing of knowledge and ideas. Risk recognition and management as part of the strategy.

Title of Project: **Herston Hospitals Complex**

Brief Description: Major hospitals redevelopment project in schematic design stage. Difficult site constraints and the need to maintain operations during the redevelopment. A Value Management Study was convened to test the robustness and appropriateness of the proposed solution.

The Outcomes Achieved: Revised building positioning, additional floors to Stage 1 building. Government agreement to provide additional capital funding in light of significant recurrent cost savings that the solution enabled. Revised more efficient and adaptable engineering services and revised occupation sequencing. Good ward design initiatives with wider industry application.

Success & Failure Factors: Getting clarification of the intended clinical models of care that the hospitals would deliver. Appreciation of its role within a health network and opportunities to eliminate duplication and inefficiencies. Design team initial resistance to ideas that would change the solution as detailed design had already commenced. Focus on the recurrent costs that would be incurred by the proposed design and staging of works and occupation. (Hospital recurrent costs exceed the capital cost within a couple of years so it is extremely important to overall viability.) Recognition of worthwhile initiatives in ward design by clinical staff and willingness to adopt revised practices.

Decision Criteria & Analysis

What information is appropriate to support making the best possible decision? Where is it? How do we obtain it? How should it be presented? How important is it? What criteria will we use to select between the options/alternatives? Who needs to be involved? What sort of analysis is needed to ensure a robust testing of the quality, reliability of the information? What tools should we use to help gather and evaluate the information and the intended solution/decision so we make a good decision? How do we identify the potential risks - what can go wrong and how bad can it get? What are the

likely consequences in our decision/solution? How will we manage these? What techniques will help us do this? When should it be done? What resources do we need to do this?

Good planning is, amongst other things, about asking pertinent questions and analysing the responses. The above gives some samples of the sorts of questions that will assist in selecting the most appropriate support tools and people to elicit the best possible information upon which decisions can be based.

Appendix 3 provides possible decision hierarchy as a guide in asset decision making. It simply attempts to set out a range of critical questions that should be considered. Each one will require some internal or external information very little of which will be 'certain'. Any attempt to 'predict' or model the future will have great uncertainty. Therefore we must work with many assumptions. Some key criteria will help to focus thinking and analysis on asset solutions that will achieve the intended service outcomes. The sort of criteria that should be considered will best come from what's important about this project (See **Appendix 1**).

Its fairly simple – to make a decision you need some information. But if you are wanting to make a good decision that has significant long-term implications you need a bit more than just some information. You will need pertinent information and you will need it in a timely way. Knowing what is needed is an essential start. But its also important to know what decision support tools are appropriate and how to make best use of them.

For example the period of time for which we are planning or to which we see the decision relating. Generally for asset infrastructure, planning periods of from 10 to 100 years will be involved. But to effectively plan and operate the infrastructure one must also be able to forecast future services needs – i.e. what the infrastructure is there to support. What services do we have to provide to the community in the future (say 5 years from now, 10 years, 15 years, 20 years, 30 years or even 50+ years)?

Can this existing infrastructure meet that future need? What do we need to invest in this infrastructure to enable it to meet the need? What other alternatives are there that will enable us to meet the need?

Figure 3. Cumulative Percentage of Life Cycle Costs

Figure 3 shows that by the time the project concept has been determined or validated and design commenced around 80% of the total life-cycle costs that the asset will incur have been effectively determined. What emerges from the detailed design process will only have a marginal effect on the future costs of the asset.

So the best time to influence life-cycle costs is in creating the solution - not building it.

In order to focus on and demonstrate value for money we need to assess all costs, benefits and risks over the life cycle of the program, project or assets.

Value for money is an often misunderstood term. Too many take it to be the lowest cost solution. However each project will have other important objectives and values that must be reflected in the design solution. For example environmental outcomes, visual appeal, operational performance characteristics, easy to maintain and so on. Whilst all of these can be 'costed' this is not how they will be valued by the stakeholders. (See **Appendix 1**)

So the planning and decision making process must gather, analyse and present data. The level of detail that is gone into will depend on the complexity, scale and importance of the project. There are a variety of analytical and helpful tools that can be considered. These range from simple techniques to quite intensive processes depending on the complexity, value and dimensions of the infrastructure. e. g.

Feasibility Studies; Financial Analysis; Cost-Benefit Analysis; Economic Appraisal; Risk Management; Life Cycle Costing/ Planning; Condition Assessment; Serviceability Analysis; Value Management; Post Completion Reviews; Post Occupancy Evaluations; Demand Analysis/Management; Least Cost Analysis; Sensitivity Analysis. Other tools and practices that can provide important input to infrastructure decision making include:- Energy Management; Waste Management; Ecological Sustainability; Heritage Management; Occupational Health & Safety Management; Business & Operational Planning; Performance Management and Benchmarking.

Applying the Tools

A word of caution. These tools and techniques are not infallible and are easily manipulated. They all involve a range of assumptions that would be expected to change over the period of planning and decision making. From a practical standpoint its important to note that these are not mutually exclusive tools, they don't have to be applied in sequence, some are better to be combined, some are inappropriate for particular projects (e.g. depending on asset life cycle). There is no one tool or group of tools that can be said to be consistently more superior than others. However, active consideration is needed as to which should be applied to each infrastructure project or program.

Knowing when to use these tools is important to getting the best result form their use. For example in conducting an Economic Appraisal. This can be done on the service delivery modeling or options, including the analysis of possible non-asset solutions.

Economic Appraisals are undertaken to help select between several options. It can also be used in later stages in the development, operation or even disposal planning of the asset or infrastructure. This is shown in **Figure 4**.

In addition it is worth noting that these tools are not limited to just new capital works projects. They are just as effective in addressing maintenance or asset refurbishment strategies. They can apply at the individual project level or program level.

Figure 4. Application of Economic Appraisal

Similar comments would apply in respect to Risk Management.

Risk assessment can be done at the earliest concept stage, in informing the selection of options to be subject to more detailed analysis.

In deciding between the options the nature of the perceived risks and how these will best be managed and their implications to the infrastructure will be important criteria.

But risk is not a static thing. The profile of risks to an infrastructure asset or project will change constantly. If the risks are not monitored and strategies adjusted accordingly then the potential harm to the asset, the community or

the environment could be very significant and if realised would represent a loss of value.

Particular analysis tools are not intended to be used in isolation from one another. In fact there are significant advantages in combining them in the way they are used. For example the combination of Economic Appraisal, Risk Management and Value Management (See **Appendix 4**).

Figure 5 shows how these three principal tools can be used together on an asset project.

**Figure 5. Integrating Risk Management, Economic Appraisal
and Value Management**

Summary Points

The purpose of this paper was to suggest ways in which communities can achieve better long-term value in infrastructure investments. In particular in how introducing the many non-financial aspects that are important to the community's overall valuation of its infrastructure can be managed.

It suggests that better long-term value is critically dependent on achieving better or 'wiser' decisions from government processes.

It provides some examples and methods by which the community and other stakeholders can become engaged in these processes for better overall outcomes.

I have tried to make the point that opening up these processes to the community is not something to fear either by the decision makers or the proponents of infrastructure projects.

But this involvement does need to be well managed.

In addition I have offered some pointers to the sort of key questions that need to be asked and answered as part of the asset or infrastructure planning and decision making process.

Other summary points worth noting include:-

- ☑ We can never know the future with certainty - but we can and must use our acquired knowledge, skills and experiences to anticipate it, influence it and plan for it. In other words being wise - not just clever!
- ☑ If you can get a better definition of the problem then you are most of the way towards finding a more appropriate solution.
- ☑ More efficient and effective allocation of resources is a way of getting more service outcomes within budget constraints.
- ☑ Involvement of the community and other stakeholders in infrastructure asset planning and decision making is both desirable and feasible with good facilitation.
- ☑ If you involve the stakeholders and value their input a more successful project can be anticipated.
- ☑ If appropriate analysis is undertaken of the alternatives then a more

robust solution is likely to emerge with overall greater long-term value to the community.

- ☑ Whole-of-life cycle analysis helps to draw into focus costs, risks and benefits that might otherwise be ignored and it emphasises the long term aspects of infrastructure planning and decision making.

Planning and decision support tools are vulnerable to manipulation and must be used cautiously. Notwithstanding their limitations they are helpful to developing more appropriate solutions.

Appendix 1 - Example of What's Important

Bankstown City Council Civic Precinct. At a community consultation workshop a list was developed on what the participants regarded as being important about the site. This set of things that are important helps to define the range of community values associated with the precinct and therefore provide a 'check list' around which the design concepts and detailed planning can be progressed.

Process Summary

Each participant was asked to make a personal list of what they saw as important about the future development of the precinct. They were then asked to form small groups with people immediately around them and to create consolidated lists. These were then collated by the facilitator with the whole group. The participants were then invited to select those off the list that were most important to them. Their selections were then recorded to establish the relative weightings shown in the table. The following table shows what is regarded as important to those stakeholders who participated in the community forum. They are shown in priority order as rated by the participants. The diamond symbol indicates the relative weighting of each aspect.

Appendix 2 – Example of Group Creativity

The following has been extracted from a study that addressed the development of a Strategic Facilities Plan for the Australian Capital Territory in July 2000. The workshop (held over 1.5 days) was attended by some 38 people from various sports organisations and members of the Council that advised the ACT Government on sport.

This table over the page is a sample from the total of 77 ideas created for developing as good a Strategic Facilities Plan as possible. These ideas are not listed in any priority order, simply as they emerged from the group.

The way to interpret the table is as follows:-

#	A reference number only for the idea.
Value	Initial rating. Those rated by the group as a realistic possibility are noted P1. Those rated P2 were considered a more remote (at best) possibility. There were no ideas discarded on this initial assessment.
Benefit	The second review was to assign a merit rating to the idea. What did they see as its potential benefit. In this instance the group rated them all as either Very High or High, which means they saw them all as being worthy of further consideration in developing strategies for their plan.
"Can We Question"	Participants are asked to create ideas but to word them in the form of a question beginning with the words "Can we...?" This is intended to establish a positive dimension to the ideas. The answer to any "Can we...?" question is - "Yes if...!"

Process Summary

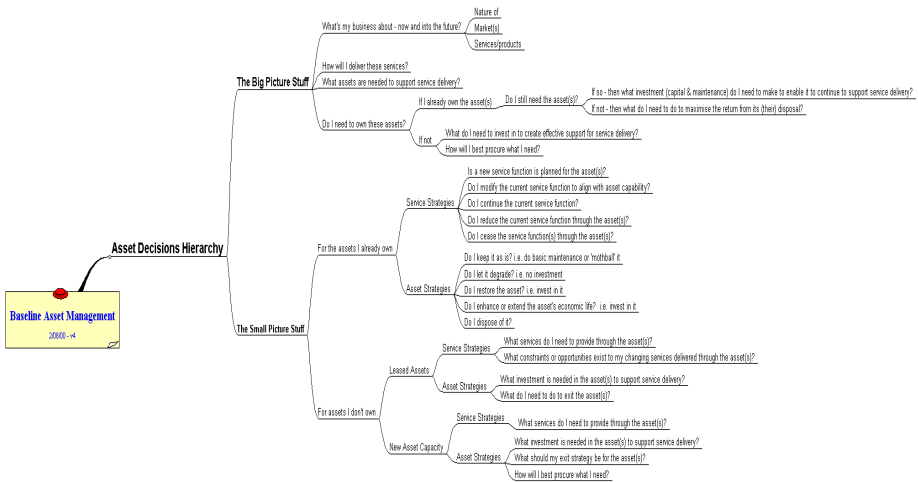
Step	Activity
1.	The workshop participants were organized into teams of from 4 to 6 people. Each was given a topic or theme to help focus their ideas creation. In this instance the topics were:- Facilities Performance; Research & Planning; Roles & Responsibilities; Stakeholders; Assigning Priorities; Levels of Services; Non-Government Sources. The participants were able to select the topic of most interest to them, but with an encouragement to spread numbers and skills.
2.	The groups were given time to create a list of ideas.
3.	The ideas from each of the small teams were then presented to the whole group. Opportunity was given to clarify or give explanations.
4.	The ideas were given an initial rating – Realistic? Remote? Discard?
5.	The ideas were then given a merit rating
6.	Additional ideas from the whole group were then added and rated by the whole group

#	Value	Benefit	<i>"Can We" Questions</i>
1.	P1	VH	Guide sporting and recreation organisations in the process of leasing and owning?
2.	P1	VH	Simplify process of getting land/facilities?
3.	P1	VH	Prepare a package of information about leasing?
4.	P1	H	Encourage longer term investments in sport and recreation facilities by more flexible lease/membership arrangements?
5.	P1/P2	VH	Get more money for maintenance?
6.	P1	H	Assist licensed clubs to free-up investments by lobbying Government - incentives (Fed/Territory)?
7.	P1	VH	Create/Grow events by developing existing facilities?
8.	P1	VH	Raise the political awareness of sport and recreation - importance - benefits of funding (maintenance)?
9.	P1	VH	Enhance communication between departments to form a shared vision for facilities and to enable the enhanced effectiveness of the facilities?
10.	P1	H	Accommodate progressive change of use by making lease-purpose clauses more flexible?
11.	P1	VH	Encourage licensed clubs to be more involved in facility development and management?
12.	P1	VH	Ditto- alliances with particular sports?
13.	P1	VH	Ask Fed and Territory Government to fully research sports lottery? Include internet gambling?
14.	P1	VH	Co-ordinate better use of facilities by getting "like groups" together?
15.	P1	H	Better understand future needs by supporting CBR-based research to discover trends?
16.	P1	H	Highlight sports in greater need of assistance? - to find ways to help them articulate their needs in the Strategic Facilities Plan?
17.	P1	VH	Get better maintenance and predict deterioration by getting more data and co-ordinating all existing data?
18.	P1	H	Improve facility management by learning from each other/govt. (transition scheme)?
19.	P1	VH	Highlight our successes?
20.	P1	VH	Highlight value of good maintenance?
21.	P1	VH	Link maintenance with safety/duty of care?
22.	P1	H	Identify the operational strengths of successful sports to improve the operation of those sports in need of assistance?
23.	P1	H	Get schools management more interested in broadening community access?

Legend

P1	Realistic Possibility – to be further considered during the workshop in developing a strategy to achieve it
P2	Remote possibility – can't be resolved or further developed during the workshop, but to be put into the action plan for later follow-up
VH	Very High merit rating – perceived very high benefits – a very worthy idea
H	High merit rating – perceived high benefits – a worthy idea

Appendix 3 - Asset Decision Hierarchy



Appendix 4 - Value Management Methodology

Introduction to the VM Concept

Value Management (VM) is about clarifying and satisfying customer needs (which may include the needs of the client, end-users, stakeholders or the wider community), including latent needs.

It is about creating ideas as to how a system can best “do its job” at appropriate levels of quality and performance.

It is about challenging assumptions and maximising value and returns on investment.

It is about participation by clients, end-users and stakeholders.

It is about seeing the purpose of the system, the system itself, and the activities which it accommodates as a “whole”.

It is about seeking the best valued solution to the customers’ or community’s needs - it is definitely not about seeking “cheap” solutions.

The Benefits

Value Management offers significant potential benefits to clients, their customers and designers. From the point of view of the client, value management studies have led to millions of dollars in life cycle cost savings and also to ‘holistic’ solutions to their particular needs. Project teams have benefited from the process through the clarity, focus and improved communication which value management studies provide, often if conducted early in the development cycle, resulting in considerable saving to design time. For end users, the benefits include a more user friendly, customer focussed and useful product or service.

Origins

Value Management evolved in the United States in the post World War 11 era when supply shortages compelled the manufacturing industry to use

alternatives or substitutes. In many cases it was noticed that the use of alternatives had both reduced costs and improved the performance of the product.

The use of Value Management in Australia has become widespread in recent years and follows State Government initiatives which require Value Management to be applied to major capital works projects.

Value Management Overview

Value Management is “ *a structured, facilitated, process in which decision-makers, stakeholders, technical specialists and others work collaboratively to bring about value-based outcomes in systems, processes, products and services*”.

Analysis of functions is a key part of any value management study. This involves clearly and succinctly identifying what things actually do (their purpose) rather than what they are (their components). The analysis also identifies why the functions are necessary and how the functions are accomplished.

The analysis of functions is not undertaken in isolation, but rather in the context of the whole scheme or system.

Value Management allows us to take a systemic view; to view the system as a whole and to see how a project (e.g. an intersection treatment) fits into that system.

These functions are identified to provide the basis for the suggestion of alternative ideas.

The value study group (the stakeholder participants) is seeking out other realistic ways in which the basic functions can best be provided. They are specifically looking for alternative ways in which functions can be performed. Can some be eliminated or combined? Can some be done elsewhere?

During a value study, many (sometimes hundreds) of ideas will be generated as to how those functions can be provided.

The process depends upon a multi-disciplinary representative group of people working in a structured workshop led by an independent facilitator.

The multi-disciplinary nature of the exercise (which will include client,

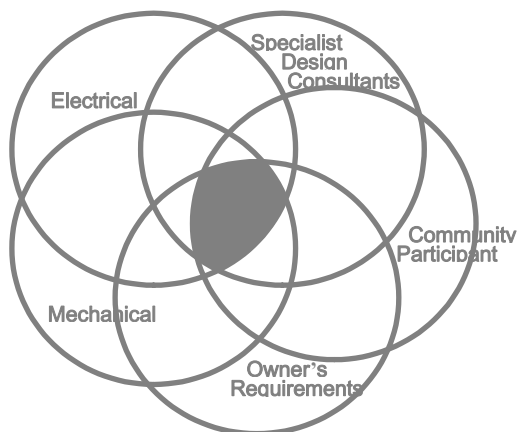
stakeholder and community representation) is a key factor in the success of Value Management.

The structure and atmosphere which the facilitator manages, capitalises on the potential “constructive overlap” of expertise and knowledge within the study group as depicted in **Figure 1**.

They are encouraged to ask questions and generate ideas about issues quite outside their specific area of expertise. Areas in which they may, however, overlap with others.

Traditional design processes take little or no account of this ‘overlap’ and rely upon specialists to work exclusively within their own areas of expertise or boundaries co-ordinated by a project manager.

Figure 1. Constructive Overlap within a VM Workshop



Value Management Timing

Based on the premise that there is always scope for improvement in a project, it is valid to suggest that a Value Management Study could take place at any stage in the development of a project.

Value Management Study is acknowledged for its potential for greater investment returns to be generated by application of the process at the very earliest stage. See Figure

Cost Impact of Making Changes Over Time

Figure 2. Cost impact of making changes overtime

Ideally, the application of Value Management should be planned on an integrated basis. For most projects best Value Management results are achieved by scheduling a Value Study for both the Concept Stage and early in the Design Development Stage (35% documentation).

The Value Management Process

There are many ways in which a Value Management Study may be undertaken but certain procedures should be incorporated into the methodology. The set of these procedures is commonly referred to as the Value Management Job Plan.

Standard Value Management methodology involves each of the following phases being considered in a structured, systematic format:

- ☑ information phase;

- ☑ analysis phase;
- ☑ creativity phase or generation of alternative ideas as to how those functions can be provided;
- ☑ judgement phase; selection of certain ideas for further consideration and evaluation of selected ideas;
- ☑ development of alternative value improvement proposals;
- ☑ presentation of alternative proposals to decision makers in a report;
- ☑ finally preparation of an implementation or action plan.