

An Agenda for Advancing Victoria's Infrastructure

The Institution of Engineers, Victoria Division

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1. Executive Summary and Recommendations

Over the past year the Institution of Engineers, Australia in Victoria has undertaken, as part of its *Finding Solutions* initiative, an intensive examination of current practices and policies relating to major infrastructure projects. We have consulted with many stakeholders, including senior personnel from construction companies and engineering firms, representatives of the banking and legal sectors, government officers, academics and a number of professional and industry associations.

These consultations revealed a number of common concerns:

- Victoria currently lacks a sound, long-term infrastructure strategy.
- Planning is done, on the one hand, by departmental and agency staff whose brief is to take a micro view, and, on the other hand, by an Infrastructure Planning Council that has a broad brief, and most of whose members in any case lack the necessary expertise and skills to undertake the development of strategy at a more detailed level.
- There is an urgent need to address the run-down state of much of the state's existing infrastructure.
- The choice of method of project delivery is sometimes dictated by political or purely financial considerations rather than by logical analysis of the defining attributes of the project.
- Project risk analysis is often done inadequately or not at all, with consequent negative impact on projects and ultimately on the community.
- Risk management is often considered to be finalised with the allocation of risk, whereas the risk remains still to be managed at the point of allocation.
- The practice of choosing bids only on the basis of lowest cost can lead to poor outcomes for the community, including unsatisfactory design and construction, lack of amenity and substantial cost overruns.
- Technical specifications often do not provide enough information on required outcomes and performance standards to allow optimal bids and accurate costing.
- The cost of tendering is becoming increasingly prohibitive.
- The current approach to many forms of project delivery tends to create adversarial relationships between parties, with consequent astronomical legal costs and unnecessarily long contract negotiations.

The Institution proposes two initiatives to address these key areas of concern:

- The establishment of an independent, expert Infrastructure Advisory Council;
- The development of a standard project assessment model, including a risk identification and risk management process, for application in all major government infrastructure projects.

These initiatives will lead to better outcomes for all of Victoria's major infrastructure over the long term and taking account of all relevant factors. The proposals that follow are designed to improve the application of the *Partnerships Victoria* policy where it applies, particularly in relation to capital works, although the principles proposed may also be applicable to service delivery.

(1) An Expert Central Advisory Body

The Institution believes that an expert, independently appointed body should be responsible for providing advice on Victoria's infrastructure.

This new body is necessary to ensure that Victoria benefits from a more informed approach to infrastructure decision-making. The Victorian Infrastructure Planning Council has taken the first steps toward a long-term and state-wide approach to infrastructure, but a group made up of experts in the field is needed to progress the strategic planning process.

The proposed Victorian Infrastructure Advisory Council (VIAC) would have three functions: *policy advice*, *strategic planning* and *independent oversight of significant aspects of infrastructure implementation*. It would comprise independent, external nominees from industry bodies representing engineering, planning, construction and other relevant areas, along with Ministerial appointees if appropriate.

The VIAC would provide high level advice on infrastructure policy, including funding and community interest issues and infrastructure priorities. It would advise on strategic infrastructure planning leading to the development of long-term plans, which would incorporate major project implementation and include not only project delivery but also continuing maintenance and renewal provisions.

The VIAC would also be in a position to oversee and advise on the arrangements proposed at 3.2 and summarised at Item 2, below, for management of specific high-risk aspects of major projects.

The terms of reference proposed for the VIAC include the projection of the state's infrastructure needs for up to 50 years, an audit of existing infrastructure that requires urgent remedial work and the examination of a range of infrastructure funding options.

To provide informed, independent data to support the advisory board's processes it will be essential to resource and maintain a multi-disciplinary research facility, such as that recently established at Melbourne University Private.

(2) A Mechanism for Ensuring Optimal Project Delivery and Risk Management

The choice of method of project delivery and the identification and management of project risks should be based on a logical analysis of the defining attributes of the project, recognising that no one method is suitable for all projects.

The Institution recognises that some form of risk assessment will be part of any infrastructure project and the *Partnerships Victoria* documentation includes a substantial segment on risk allocation. The Institution notes, however, that risk identification and risk management is often performed inadequately, and the approach often taken is that risk transfer equates to risk management, which is far from the truth.

The Institution believes that a profound improvement on current approaches to project planning and implementation would be achieved if a thorough, independently authenticated all-risks analysis were to be undertaken as part of an initial project assessment of all major state infrastructure projects, with a view to achieving best practice risk management from the client's (that is, the community's) viewpoint.

Applying the project assessment tool early in project planning would establish all key parameters of risk management, not just those relating to financial considerations. Such parameters might be: the optimal project delivery mode, the most appropriate design and construction options, long-term operation and maintenance requirements, and requirements for different kinds of technical expertise and whether this should be in-house or independent¹.

Finally, importantly, at this level, high-risk 'hazard and critical control points' or risk 'hot spots' associated with the project, whether financial, technical, environmental, industrial, etc., could be identified. Management of those risks could be commenced at this stage.

Once identified, risks may be managed in a number of ways, with an overriding obligation on the government to ensure greatest community benefit.

A significant outcome of applying the process described will be an acceptance that adequate management of risks, combined with a necessarily precise definition of outcomes, may lead to higher costs. The common practice of awarding tenders for public infrastructure projects using lowest price as the sole or most critical assessment factor does not necessarily result in the lowest overall or whole-of-life cost or in a best value for money outcome for the community.²

Many risks cannot be seen in purely financial terms. Although the law may allocate them to another party, the public still sees these risks as the government's responsibility. Therefore the government must retain an active management role in relation to such risks throughout a project, including construction, operation and at 'handover' and beyond in the case of long-term public-private partnership projects.

¹ Appendix 4 addresses the need to review the government's current capability to be an informed procurer of infrastructure.

² An alternative method for tender evaluation is described in Appendix 3.

Recommendations

Recommendation 1:

That an advisory body made up of members with the appropriate range and level of professional expertise, nominated by relevant industry, professional or community bodies, be established to advise on effective long-term and state-wide policy and planning for Victoria's infrastructure, and to oversee the planning and quality control of specific major projects.

Recommendation 2:

That a detailed project assessment and risk analysis model be developed and that it be applied as a standard tool in planning for all major infrastructure projects in Victoria.

2. Introduction

The Institution of Engineers, Australia (IEAust) is a professional association representing over 69,000 professional engineers and technologists Australia wide and over 14,000 in Victoria. IEAust has the unique ability to convene members from a wide variety of engineering disciplines and to call upon the experience of these members to improve the processes used to identify, define, bid for and construct infrastructure in Victoria.

In recent years, a major impact on infrastructure development has been the increasing importance of private financing of public infrastructure.

Private investment in public infrastructure is not just a partnership between government and big business.

The IEAust supports private sector investment in public infrastructure, where it is appropriate. However, while the private sector can provide a significant amount of infrastructure investment, the public infrastructure planning agenda cannot be driven purely by the availability of finance.

It is a partnership between government, business and the community.

It is also important to recognise that private sector financing is not suitable for all projects and, regardless of the source of finance, it is incumbent on the client government to ensure the maximum possible attention to aspects of quality and public good. This implies that the government, as client, may need to be more closely involved in the details of how a project will be implemented than would be the case for private clients.

On the one hand, the government may need to ensure that project scoping and specifications are as detailed as possible, with outcomes and quality standards clearly defined. On the other hand, it may need to ensure that independent verification of agreed risk management approaches has been undertaken at key risk points.

Private investment in public infrastructure is not just a partnership between government and big business. It is a partnership between government, business and the community.

Over the past year the Institution in Victoria has undertaken, as part of its *Finding Solutions* initiative, an intensive examination of current practices and policies relating to major infrastructure projects. We have consulted with many stakeholders, including senior personnel from construction companies and engineering firms, representatives of the banking and legal sectors, government officers, academics and a number of professional and industry associations.

These consultations revealed a number of common concerns.

The agenda which follows sets out two initiatives by which the Victorian government might address these concerns and fulfil its responsibility to the community to ensure that major public infrastructure provides maximum long-term, integrated and sustainable benefit.

3. The Agenda – Two Key Initiatives

3.1 An Expert Central Advisory Body

Recommendation

That an advisory body made up of members with the appropriate range and level of professional expertise, nominated by relevant industry, professional or community bodies, be established to advise on effective long-term and state-wide policy and planning for Victoria’s infrastructure, and to oversee the planning and quality control of specific major projects.

It is the Institution’s view that an expert, independently appointed body should be responsible for providing advice on Victoria’s infrastructure.

The New South Wales Infrastructure Advisory Council provides a model that is worth assessing. The Council includes 12 senior executives drawn from construction, engineering, planning and other related areas, nominated by the relevant professional body.

While it is recognised that the Victorian Infrastructure Planning Council has taken important steps to commence a long-term and state-wide approach to infrastructure, a change of composition is required in order to implement a more technically informed approach to implementation.

It is assumed that a Victorian Infrastructure Advisory Council (VIAC) would have an advisory role to the relevant Minister and that there might be Ministerial appointees, but the presence of external nominees from industry bodies would provide invaluable professional expertise as well as ensuring that the body would be seen as appropriately ‘arms-length’.

Obviously, the Council would work closely with the Department of Infrastructure, but it is envisaged that an appropriately independent viewpoint would be of most value to departmental operations.

The proposed VIAC would have three functions: *policy advice, strategic planning* and the *independent oversight of significant aspects of infrastructure implementation*.

3.1.1 Policy Advice

The VIAC would provide high level advice on policy in relation to infrastructure, including:

- the balance between cost considerations and other matters of community interest, e.g. sustainability;
- how to fund major projects, whether through public or private funding, through taxes or tolls etc.; and
- how issues of priority between different community infrastructure needs might be decided.

While it is recognised that the Victorian Infrastructure Planning Council has taken important steps to commence a long-term and state-wide approach to infrastructure, a change of composition is required in order to implement a more technically informed approach to implementation.

3.1.2 Strategic Planning

The VIAC would advise on strategic infrastructure planning with a view to:

- promoting the development of long-term plans, which incorporate not just project delivery but continuing maintenance and renewal costs;
- advising government on prioritising of major projects in order to maximise the long-term good of the state and communities within it; and
- ensuring financial and other resources are allocated efficiently on a long-term and statewide basis.

A range of planning activities is required for Victoria. The Institution does not assume that the proposed advisory body will undertake the planning itself, as it is recognised that the planning capability exists within the Department of Infrastructure.

However, in order to provide informed, independent data to support the planning process it will also be essential to resource and maintain a multi-disciplinary research facility. Such a facility would be a first for Australia and would place Victoria in the lead in this regard.

The VIAC could have terms of reference covering the following tasks:

- The development of a short and medium term infrastructure development plan based on the needs identified by the Infrastructure Planning Council;
- The projection of infrastructure needs for up to 50 years under different demographic variables, likely technological advances and changed environmental conditions;
- An audit of existing infrastructure that requires urgent remedial work within 5-10 years before its deterioration becomes so significant that replacement will be required, as well as prioritising of such remedial work;³
- The examination of a range of infrastructure funding options in addition to public-private partnerships;
- The efficacy of the planning, tendering and project management processes within government.

See *Appendix 1* for Proposed Principles of the Infrastructure Planning Process.

³ In relation to existing infrastructure, a survey has already been undertaken of the nation's infrastructure (IEAust : *Infrastructure Report Card 2001*), and an indicative result for Victoria shows that its infrastructure is urgently in need of upgrading and ongoing maintenance in order to achieve acceptable standards. The same applies to other states. It is the Institution's view that an audit and remedial plan for the short term (ten years) should be instituted in relation to existing infrastructure, as a matter of urgency.

3.1.3 Oversight of Implementation

An expert advisory body would be in a position to oversee the arrangements for risk management of specific high-risk aspects of major projects. It is proposed, at 3.2, that a thorough and sophisticated risk analysis be done at an early stage of each project. Members of the advisory body (or an ‘audit’ sub-committee) could be provided with the initial outcomes of this process and with progress reports throughout the project.

3.2 A Mechanism for Ensuring Optimal Project Delivery and Risk Management

Recommendation

That a detailed project assessment and risk analysis model be developed and that it be applied as a standard tool in planning for all major infrastructure projects in Victoria.

The choice of method of project delivery and the identification and management of project risks should be based on a logical analysis of the defining attributes of the project, recognising that no one method is suitable for all projects.

The choice of an appropriate project delivery strategy depends on factors such as the nature of the project, the nature of project risks, service delivery requirements, potential for innovation, likely community benefits, availability of an income stream, the required lifespan, maintenance requirements, cost of tendering, and so on.

Effective risk management is essential to ensuring value for money outcomes. This is recognised in the Victorian government's risk management policy guidance, such as that included in *Partnerships Victoria*. However, the supporting documents and actual risk management methodologies need improvement if desired policy outcomes are to be achieved. Further, the emphasis in *Partnerships Victoria* is essentially on transfer of financial risk, rather than on a comprehensive approach to risk management. The desirable approach would involve an assessment of all kinds of risk then allocation to the party best able to manage the risk, followed up by a documented risk management plan the implementation of which can be verified independently.

A recent study by the UK National Audit Office identifies a number of major barriers to improving construction performance in the UK context, including 'a tendency by the client to pass risk on rather than to identify it, allocate it appropriately and manage it.'⁴

High-level risk identification and allocation is generally done well for Victorian major projects. However, detailed quantitative risk analysis, including probabilistic analysis, consequence analysis and risk mitigation, is in some cases poorly done or not done at all, especially in relation to crucial technical elements of site preparation, design specifications and construction. Probabilities and consequences need to be assigned against individual risks and items in project planning, not just against risk categories. Nor is adding a rough contingency estimate to total costs an acceptable approach.

⁴ *Modernising Construction*. Report by the Comptroller & Auditor General, HC 87 session 2000-2001: 11 January 2001, UK National Audit Office, p 22.

The Australian Risk Management Standard ⁵ shows that the four possible treatments of identified risks are:

- reduce the likelihood of the risk occurring;
- reduce the consequences if it does occur;
- avoid the risk completely; or
- transfer part or whole of the risk.

Many risks cannot be seen in purely financial terms (e.g. risks relating to public safety, environment or to heritage) and although allocated in law to another party by the government as client, are still perceived by the public to be the government's responsibility.

As is obvious, the last course is different in substance from the other three, in that the risk remains potential until the transferee undertakes risk management, which will consist of reducing either the likelihood or the consequences of the risk. If the transferee opts to simply accept the risk (that is, do nothing to mitigate the risk, or simply take out insurance) the government, as client, will inevitably be held accountable either in terms of public perception or possibly financially, if the other party attempted neither to manage the risk nor provide sufficient financial surety against it.

The Institution believes that the analysis of risk ought to be extended and intensified at a macro level at an early (concept and planning) stage of each project. The results can then be reinforced through an independent verification process during tendering and project implementation. This approach would address pre-emptive *management* of all risks rather than mere transfer of risks. It is also essential to ensure that risk is allocated to the party best able to *manage* the risk as well as bear the risk in a financial sense. ⁶

Many risks cannot be seen in purely financial terms (e.g. risks relating to public safety, environment or to heritage) and although allocated in law to another party by the government as client, are still perceived by the public to be the government's responsibility. Therefore the government must actively manage such risks throughout a project, including construction, operation and at 'handover' and beyond in the case of long-term public-private partnership projects. ⁷

⁵ AS/NZS 4360:1999, Standards Australia 1999

⁶ We note that the risks itemised in the Risk Matrix in *Partnerships Victoria* are presented as solely financial or 'time lost' risks. For example, the risk of offsite pollution to adjacent land (*Partnerships Victoria: Risk Allocation & Contractual Issues*, (p 179) is described in terms of whether it occurs before or after 'financial close', and the sole consequence is described as 'cleanup liability'. Many consequences could in fact arise from such an event, including serious damage to the environment, danger to public health and so on, and consequent public outrage. Transfer of the risk liability to, in this case, the private party, does not of itself constitute mitigation of the risk.

⁷ Obviously, not all risks can be identified at an early stage, especially in relation to projects that involve service delivery over a period of decades. However, the process described, which is well-suited to capital works delivery, does not exclude other approaches to other stages of projects. For example, the 'material adverse effect' model may be the best approach to long-term risk management of legislative or financial risks in long-term project delivery.

3.2.1 Proposed Project Assessment Matrix

For all major projects, once a project has been chosen and the desired outcomes of the project have been defined, an independent project assessment should be undertaken, including a detailed all-risks analysis. The model would also include assessment of ‘non-risk’ elements of a project, such as opportunities for innovation, identification of possible synergies with other projects, and so on. To ensure the process is suitably objective an expert independent panel could be appointed for each project (the appointment could be the responsibility of the VIAC described in 3.1. above), or the assessment and risk analysis could be done by staff within the relevant agency and overseen by representatives of the expert body.

The project assessment mechanism would be a specially developed tool (based on Risk Management Standard AS/NZ: 4360) that would be a robust and sophisticated means of predicting all risks associated with a specific kind of project. From this initial analysis the most appropriate means of managing the identified risks could be developed for each project.

The risk analysis process would operate as follows:

1. Once a project has been chosen and its desired outcomes have been defined, an independent project risk analysis, based on a standard model developed for the purpose should be undertaken as part of an initial assessment process.
2. The risk analysis methodology would recognise that every project is different and the model would be tailored accordingly to be a robust and sophisticated means of predicting all risks associated with the particular project.
3. An independent advisor could authenticate the risk matrix, and the advisory body described above could oversee its application.

(See also flow chart at 3.2.2)

Applying the risk analysis tool pre-tender ideally would establish:

- most appropriate project delivery approaches (e.g. construct only, design and construct, alliancing, public private partnership, public finance and delivery); (See *Appendix 2* for a matrix of project delivery systems, showing comparative levels of client involvement.)
- project outcomes defined in a manner designed to aid the management of identified risks;
- most appropriate project management approach;
- most appropriate design options;
- detailed technical specifications and performance standards expressed to aid the management of identified risks;
- long-term operation and maintenance requirements;
- desirable levels of inter-operability in relation to other infrastructure; and
- requirements for technical expertise, in terms of the level of expertise, the degree of involvement required and the points at which specialist expertise should be called in.

Finally, importantly, at this level, high-risk ‘hazard and critical control points’ or risk ‘hot spots’ associated with the project, whether financial, technical, environmental, industrial, etc., could be identified, and management of those risks could be commenced at this stage.⁸

For example, analysis at this stage might reveal that a project carries with it:

1. a specific kind of environmental risk that if not managed properly would lead to long-term environmental damage and consequent public outrage;
2. a site peculiarity that would dictate that only one approach to design would be appropriate;
3. a variety of risks associated with the management of a contract covering operation and maintenance for, say, 30 years; and
4. risks relating to quality and viability of infrastructure handed back to the government after a period of 20 or 30 years.

Once identified, these risks could be managed in a number of ways, with an overriding obligation on the government to ensure greatest community benefit. Management could commence at tender stage, for example, by limiting those invited to tender to firms which have experience in dealing with the specific risk identified, or by noting that the tender assessment should be based on selection of the specified design approach.

Implicit in this process is that client specifications must be detailed and specific to the extent that they direct tenderers towards best practice solutions for design and construction risks. Alternatively, in some cases, the decision could be that the best way to manage the design risk would be to invite tenders on the basis of detailed designs provided by the client.

In the worst case, the risk analysis might lead to a project being completely reconceptualised, if some risks seem to be impossible to manage in a cost-effective way, taking into account community benefits.⁹

A significant outcome of the application of the process described will be an acceptance that adequate management of risks combined with a necessarily precise definition of outcomes may lead to higher costs. Appendix 3 describes a structured approach to assessing tenders on factors other than cost and ensuring best value for money.

When allocating risks, the government as client may specify the highest risks, the management of which must be the subject of independent verification. Verification may be a simple audit of some processes or, for major projects, a more complex process such as that carried out by the Independent Reviewer assigned to the Melbourne City Link Project. The verifier in some cases might act on behalf of the client or might be independent of either party and be appointed by mutual agreement.

A significant outcome of the application of the process described will be an acceptance that adequate management of risks combined with a necessarily precise definition of outcomes may lead to higher costs.

⁸ Hazard and Critical Control Point Analysis (HACCP) is a system developed for control of hazards, originally developed by NASA and first applied in the food industry. Its use is now being extended into other fields. A *critical control point* is defined as any point or procedure where loss of control may result in an unacceptable risk.

⁹ An essential resource for this process will be access to a fully-maintained, active research and data base facility that can supply not just the theoretical basis for technical approaches but also historical and current evidence of technical successes and failures.

The benefits of using the project assessment process as described would include:












- The process would indicate an optimal method of project delivery, which would have a variety of benefits for the community, and would lead not just to the best risk profile but to the identification of opportunities associated with the project.¹⁰
- In some cases, cost of tenders would be reduced, as technical specifications would provide more information than often happens now, or full tenders would be invited from a shortlist of firms.
- Cost overruns would be reduced because technical specifications and project outcomes would be more precise as a result of the risk assessment and management process.¹¹
- Taking all aspects of the project into account would lead to a tender assessment process that would allow for factors other than price to be taken into account. (See *Appendix 3*.)
- An analysis of key risk points would indicate the kind of expertise and the level of expertise required to manage the risks identified and whether appropriately qualified personnel ought to be employed independently or by the client.¹²

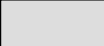
¹⁰ For example, an increasingly popular form of project delivery, Alliancing, not only brings the benefits of a less adversarial approach to project agreements than traditional delivery methods, (thus reducing legal costs), but could also provide the opportunity for other long-term community benefits. A recent study links higher levels of innovation to this form of delivery: PriceWaterhouseCoopers. *Innovation in the Australian Building & Construction Industry*. March 2002. p 27.

¹¹ A current worst-case example of the consequences of inadequate or incomplete specifications is the Federation Square project: 'Two of the key drivers of cost increases included the adoption of a 'fast-track' approach to construction, whereby construction moved ahead of the detailed design work, and the adoption of a complex and unique architectural design. One impact...has been to generate many variation and prolongation claims from contractors.' Victorian Auditor-General: Report on Public Sector Agencies, June 2002, s 4.21.

¹² See *Appendix 4* for issues relating to the need for the government to be an informed procurer of infrastructure.

3.2.2 Application of the proposed project assessment matrix

Project Definition & Planning Phase 	Tender Phase 	Contract Negotiation 	PROJECT IMPLEMENTATION
<p>Inception, feasibility Develop concept</p> <p>Establish desired outcomes</p> <p style="text-align: center;"></p> <p>Establish broad specifications</p> <p style="text-align: center;"></p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0; width: fit-content; margin: 10px auto;"> Implement project assessment and independent all-risks assessment & establish recommended risk management strategies¹³ </div> <p style="text-align: center;"></p> <p>Outcomes:</p> <ul style="list-style-type: none"> ▪ Recommended approach to public benefit aspects of project ▪ Recommended financing mode ▪ Recommended project delivery mode ▪ Guidance on tender process ▪ Recommended technical specifications and/or quality standards based on risks identified 	<p>Tender documents prepared and issued – include itemisation of risks, and preferred risk allocation, as well as specifications based on risk analysis</p> <p style="text-align: center;"></p> <p>Tenders received and evaluated, against all parameters, including risk assessments</p> <p style="text-align: center;"></p> <p>Preferred bidder selected</p>	<p>Negotiation (in major projects) includes:</p> <ul style="list-style-type: none"> ▪ Agreement on allocation of risks ▪ Agreed approach to management of risks identified ▪ Identification of extent of independent oversight of ‘hot spot’ (hazard & critical control points) risk management activity/client sign off <p style="text-align: center;"></p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0; width: fit-content; margin: 10px auto;"> Report Back </div>	<p>Design finalisation</p> <p style="text-align: center;"></p> <p>Project implementation</p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0; width: fit-content; margin: 10px auto;"> Ongoing independent verification as per agreement, and sign-off on hazard & critical control points </div> <p style="text-align: center;"></p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0; width: fit-content; margin: 10px auto;"> Report Back </div>

 Shaded box indicates oversight by independent advisory body.

¹³ Transfer of risk is not considered management, i.e. the optimal management strategy is decided, regardless of ultimate responsibility for managing the risk.

4. Conclusion

Private sector investment in infrastructure is becoming increasingly important as a mode of delivery both locally and internationally. However, it does not remove the need for governments to retain the appropriate degree of client control at all stages of a project.

To achieve value for money outcomes using public or private sector investment, expert, informed, long-term infrastructure planning is required, which allocates resources based on a comprehensive view of economic, technical and community needs. Along with this approach is a need to ensure public infrastructure is maintained in good order for the whole of its working life.

Sophisticated and meaningful risk management must be practised by both industry and government agencies. There will be significantly enhanced outcomes for the community if there is a detailed and informed methodology for identifying, allocating and managing risk as a standardised and crucial part of project planning and delivery.

The Institution of Engineers is one of the professional bodies ideally placed to provide ongoing access to independent, expert technical advice on major infrastructure. The Victoria Division of the Institution proposes the implementation of the two initiatives in this agenda as a practical and achievable means of procuring the best infrastructure for the Victorian community in the future.

Appendices

Appendix 1: Proposed Principles of the Infrastructure Planning Process

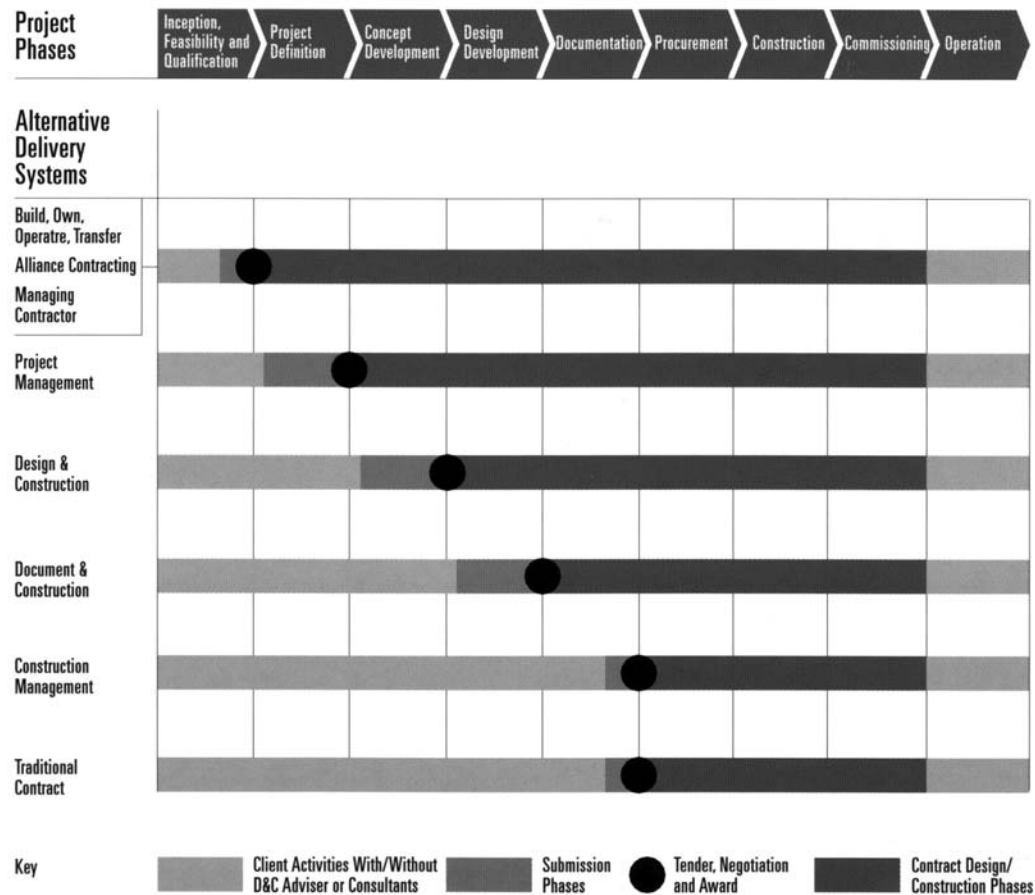
The following principles should guide infrastructure planning:

- All infrastructure planning should incorporate a triple bottom line assessment. This involves analysing the economic, social and environmental impacts of infrastructure. Economic impacts include the infrastructure's productivity impact, return on investment, maintenance needs, and whole of life costs. Environmental impacts include the likely environmental consequences of the infrastructure's construction, maintenance and use. Social impacts include the distribution of infrastructure, equitable provision of infrastructure, the levels of customer service obligations, employment opportunities and customer safety.
- All planning must incorporate the infrastructure's life cycle, not just the initial infrastructure delivery. The life cycle of infrastructure consists of planning, design, acquisition, operations, maintenance, rehabilitation and disposal.
- Planning must cover the *short, medium and long term*:
- *Short-term* planning is required to identify projects that could be initiated to smooth the economic cycle. Major infrastructure projects can stabilise an economy if initiated when the economic cycle starts to decline. Given that major projects can take five years or more before they are at a point where construction is ready to start, preparation of these plans should start when the economy is robust.
- *Medium-term* planning covers the period from 5 to 15 years. These projects are those that are likely to occur based on existing trends and to which current governments can realistically commit.
- *Long-term* planning covers the period 15 years or more and may range to more than 50 years. These plans should consider demographic trends, likely developments in technology and environmental issues. There is no expectation that long-term planning will be completely accurate but it will provide sufficient guidance for major decisions such as the establishment of future transport corridors, airports and ports.

Appendix 2: Project Delivery Systems – comparative levels of client involvement.

(From *Relationship Contracting – Optimising Project Outcomes*. Australian Construction Association Ltd. 1999. Reproduced with permission.)

Diagram 4: Alternative Project Delivery Systems



Appendix 3: Getting Best Value for Money

It is the Institution's view that policy, planning and delivery of infrastructure must be based on a long-term and broad view of the best interests of all parties, including the community at large.

Best value for money is the recognised aim of all government procurement. This is achieved when all costs, benefits and risks associated with the purchase and use of a product or service are considered. The tendered price is just one aspect which should be considered when evaluating an offer. Purchasing decisions should therefore not be made on price alone.

“ ‘Lowest price’ tenders may well contain no margin of profit for the contractor, whose commercial response is then to try to claw back the margin which was not in the tender through variations, claims and ‘Dutch auctioning’ of subcontractors and suppliers.”¹⁴

A Possible Alternative Approach to Tender Evaluation: Two Envelope Tender Assessment System

To ensure that the public receives the best value for money in public infrastructure it is important to have a method of assessment of tenders that includes many other considerations besides price. In the UK and the USA a ‘two envelope’ system for tender submission and evaluation is often adopted.

The following is a brief outline of the process.

Tenderers are requested to submit their tender in two separate envelopes: one is called the ‘Quality Submission’ and the second the ‘Financial Submission’. The Quality Submission contains no financial information.

Assessment Criteria

The *Quality Submission* includes information from the tenderer on their intentions in relation to the technical, environmental and social issues expected on the project. Examples of some criteria that may apply to a project are listed below.

- i. General description of the approach to the contract and the methodology to be employed. This could include details of previous experience of similar works, type and availability of resources to be utilised, and any innovative ideas of significance to the timely and cost effective completion of the works.
- ii. General arrangement drawings showing the proposed works.
- iii. General description of the environmental proposals, including finished appearance, soft and hard landscaping.

¹⁴ *Modernising Construction*. Report by the Comptroller & Auditor General, HC 87 session 2000-2001: 11 January 2001, UK National Audit Office, p 1.

- iv. Contract Program and proposals for planning and execution of the works.
- v. Draft plan for elements of temporary works whose failure could affect the safe operation of the existing infrastructure.
- vi. Details of the management structure proposed for the Contract, together with names, disciplines, grades and CVs of key personnel.
- vii. Policy statements on Quality Management, Health and Safety and staff training.
- viii. Details of any subcontractors proposed, the criteria used in their selection and their experience in the type of work.
- ix. Proposals for customer care and liaison procedures with the Employer's Agent, the Employer, adjacent authorities, emergency services, Statutory Undertakers and other authorities.
- x. Social impact assessment and proposed approaches including noise, dust, access, amenity and other issues.

The assessment of the performance of all tenderers is undertaken by a group of people who have the necessary technical skill to perform the task. This could be done either within the government agency or by an independent consulting group.

The *Financial Submission* contains the commercial details of the tender. This is not made available to the Quality Submission assessment team.

At the time of tender a weighting between the Quality and Commercial criteria is established. For example, after an assessment of a proposed project it might be decided that 40% Quality : 60% Commercial is appropriate. The relative weightings of each of the Quality criteria are also determined.

This 'two envelope' system enables infrastructure owners to determine the non-commercial criteria that are important to them, and ultimately the broader public, in the assessment of tenders for work. It provides a rigorous, auditable system which clearly demonstrates value for money in the tender assessment process. The system is clear, fair, flexible and easily administered and is currently being used successfully in the UK and USA.

Appendix 4: Professional Expertise as a Critical Success Factor

The level of professional expertise available at all levels of infrastructure policy, planning and delivery should be sufficient to ensure efficient and effective delivery of all infrastructure on a long-term basis.

Informed buying requires two distinct skill sets: subject matter expertise and contracting expertise. For infrastructure, the subject matter knowledge includes engineering technical expertise.

Access to relevant professional expertise is becoming more of a critical issue for governments due to devolution of power, decentralisation of control, mega-contracts and increasing technological complexity. Lack of expertise leads to a significant increase in the financial loss that can result from uninformed decisions.¹⁵

Appropriate professional expertise is required to deliver meaningful policy that combines sophisticated understanding of the technical requirements of a project with an appreciation of the economic, social and aesthetic outcomes required of each major infrastructure project. The engineering and related professions and industries are obviously well-placed to provide such expertise.

The application of a project assessment process as described in *An Agenda for Advancing Victoria's Infrastructure*, incorporating a full task definition and skills needs analysis as well as an all-risks analysis in which high risk 'hot spots' are identified, will establish:

- the level of expertise required at different stages in the delivery of a project;
- the degree of independent expertise required to monitor the management of high risk 'hot spots' or 'hazard and critical control points';
- whether the expertise ought to be provided by the client, the project manager or contractors;
- whether aspects of the project require oversight by independent technical experts; and
- the level of expertise required to ensure appropriate maintenance and operational standards are met as the project proceeds

¹⁵ The Institution believes there is a pressing need to survey the effects of the 1990s downsizing of the Victorian public sector, with a view to establishing where loss of professional expertise and loss of corporate memory have impeded the ability of government departments to be truly 'informed buyers' when outsourcing major works and prevents these departments from being able to exercise informed oversight of outsourced projects. There is a need to conduct a skills analysis and needs analysis and to have a plan for a supply of graduates into government and a succession planning process that will provide a career path for skilled employees within government departments and instrumentalities.

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