

A FRAMEWORK FOR ASSESSING ASSET MANAGEMENT PERFORMANCE IN AUSTRALIA

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In the last fifteen years road agencies have adopted, changed and expanded the concept of asset management. The traditional view of asset management as the function of building and maintaining roads has been broadened to include linking outcomes to stakeholder requirements and development of investment plans to achieve desired outcomes, using tools such as asset registers, monitoring of asset condition and use, prediction of deterioration, asset valuation, life cycle economic analysis and others.

Nowadays, in Australia and New Zealand, road network asset management is used to describe a holistic and structured approach to the management of road assets over their whole life, for the efficient delivery of community services.

As more and more road agencies are embarking on this path, there is a need to develop a model that will enable road agencies to track and rate their performance in adopting an asset management process. This paper presents a self-diagnosis kit that covers the main elements of a generic asset management planning process. Self-assessment has the advantage of enabling a fair and open assessment by removing the tendency of agencies to over- or under-rate themselves when being compared with similar agencies. The self-assessment kit can be also used to assist in developing an asset management planning process.

The self-assessment kit is structured around the generic asset management planning framework developed in Australia by Austroads in 1999-2000, and was developed with the view that the asset management planning process should be an integral part of a road agency quality culture. The concept of the kit is in line with the Australian Business Excellence Framework, Baldrige Award and the 2000 ISO 9000 series.

The self-assessment kit consists of a list of 50 questions addressing seven key elements of asset management:

1. Agency Objectives and Stakeholder Requirements
2. Strategy and Planning Process
3. Data, Information and Knowledge
4. Business Results
5. People
6. Leadership
7. Audit and Review.

A short description of these elements follows:

Agency Objectives and Stakeholder Requirements

The focus in asset management is on the purpose of the asset as part of the road network. In turn, the purpose of the road network is seen to facilitate delivery of community benefits such as accessibility, mobility, economic development and social equity.

From this perspective, stakeholder consultation becomes an integral part of the planning and decision making process. Effective stakeholder consultation helps identify potential issues, social impacts, opportunities, alternatives and solutions to problems. It gives decision-makers the best information available and allows for the best possible decisions.

Stakeholder requirements should be reflected in the Agency's Key result areas (KRAs) and corporate objectives, and clear targets and performance indicators should be developed for monitoring the progress towards achieving these objectives.

Strategy and Planning Process

Corporate objectives are translated into a works program by developing a set of asset strategies that define the organisation's approach towards road safety, traffic management, travel demand management, road maintenance, freight efficiency, cycling and pedestrians needs, road network development.

Asset strategies and a defined Level of Service and Intervention Standards define the required condition and configuration of the assets. The current condition and configuration of the assets, when assessed against the Intervention Standards, determine gaps in network performance that must be addressed by maintenance and enhancement activities.

Funding constraints rarely allow all required road needs to be completed, so a process of prioritising investment is utilised to decide which activities are most critical in regard to the corporate objectives. In a generic sense, the option that minimises the Agency and Road User Costs, in a whole of life cycle context, is considered to be optimal. Prioritisation addresses financial, economic, community interest and risk management issues.

As a result of the prioritisation process, some activities are not funded and infrastructure gaps will not be addressed. This may necessitate changes to the asset strategies and/or to the Intervention Standards.

Risk management strategies may need to be developed to address the potential consequences of inadequate funding.

The outcome of the prioritisation process is a recommended Investment Plan that is a key input to the Works Program. The Works Program incorporates infrastructure projects as well as non-built initiatives, eg national monitoring programs for road safety.

Data, Information and Knowledge

The implementation of the asset management process requires a significant amount of information and data that is accurate and up to date. As a minimum, this should contain road inventory information, condition information, road use data, financial information, An asset information system is required to enable the storage, update and use of this data. The asset information system may include added functionality such as gap analysis tools, project evaluation models, performance management tools.

A control framework for the data collection, storage and update, as well as for the Level of Service and Intervention Standards is crucial for the successful implementation of the asset management planning process. Another element of success is the documentation of the process and its wide dissemination within the organisation. The documentation should include a clear timetable of the process, and identify milestones and responsibilities for the process.

Business Results

Key Performance indicators (KPIs) should be developed and used to measure the quality of the service the Agency provides, its efficiency and cost effectiveness. KPIs should measure the effect of the asset management planning process in each KRA.

The methodology for calculating KPIs should be documented and should include data collection requirements, timeframe, responsibility area.

Except for changes generated by technology development or operational improvements, the KPIs calculation should be consistently employed over a period of several years to allow the identification of trends in network performance.

People

The successful implementation of the asset management planning process depend on how well the people involved in the process understand and support the process, and on their wiliness to contribute to and improve the process.

Clear guidelines and responsibilities for the process should be developed based on feedback from employees in order to ensure their ownership of the process.

The organisation should identify core competencies for the asset management planning process and implement a training program addressing these requirements.

Leadership

The asset management planning process cannot be implemented without full support from the Agency Executives, and an adequate functional structure to support the process.

The asset management planning process should be recognised as a core process of the Road Agency, and its interface with other core processes should be defined and documented to ensure successful integration.

Audit and Review

Periodic audits and reviews of the process ensure the process is clearly and properly documented and implemented, and delivers the Agency's corporate objectives.

A number of feedback loops should be used to give the asset management planning process its cyclic and continual nature. These reviews should be done after the implementation of the Works Program, with the purpose of cross checking if the implementation of the program has satisfied agency's objectives. The road network performance after the implementation of the Works Program is assessed against the road network performance expected to be delivered by the approved Investment Plan and Works Program. The outcomes of the review may determine changes to Asset Strategies, Levels of Service or to prioritisation methodology.

The implementation of the Works Program may affect stakeholder perceptions and thus their requirements and expectations. This feedback process highlights the necessity to gauge stakeholder requirements on an on-going basis.

Self Assessment Scoring System

The self assessment kit containing a list of questions for each key element of the asset management process and a scoring system are presented in Attachment 1.

Each question has a score between 0 and 5. A score of 5 is achieved when the question describes an action that reflects current practice across the assessed Road Agency, which has been reviewed and improved over several planning cycles. A question scores 4 when describes an action that is current practice and has been implemented across all areas but only recently. A score of 3 is obtained if the question describes an action reflecting current practice, but implemented only in some areas, and/or not to the full extent expressed in the question. A score of 2 is achieved when the question describes an action that reflects the Agency intent, but does not represent current practice (it may, however, be implemented as a pilot). A score of 1 is obtained if the question reflects the Agency approach/intent, however not to the extent expressed in the questions (eg there are some conceptual attempts to address the issue). A question scores 0 points when the action described does not reflect in any way the Agency's approach, intent or actions.

An overall maximum score of 200-250 is an indication of best practice in asset management, the Agency has a well established asset management process in place that is periodically audited, reviewed and improved.

A total score of 150-199 defines competence in asset management, a good process is in place, but audits and reviews are required to identify areas for improvement.

A total score of 100-149 represents a systematic approach to asset management, the Agency is in the process of developing the process and there are several good initiatives, however not fully deployed.

A total score of 50-99 represents an Agency in the early phase of development of asset management, with several concepts being developed, however not yet deployed.

A total score of 25-49 indicates basic understanding of the process, with some initiatives at the conceptual level being developed.

A score below 25 represents a state of 'innocence' and lack of understanding of the process.

It is recommended that the self assessment be undertaken by a person in a senior position in the organisation who has a good understanding of the organisation processes, from the strategic, conceptual/intent approach, through deployment, review and improvements.

REFERENCES

Australian Business Excellence Framework, Australian Quality Council, 2001.

Benchmark Asset Management Decision Processes (Draft), Austroads 2001.

Guidelines for Community Input in Setting Level of Service and Intervention Standards for Road Networks (Draft), Austroads 2001.

Integrated Asset Management Framework (Draft), Austroads 2001.

Road Network Asset Management as a Business Process, F. Mihai, N. Binning, L. Dowling, REAAA Conference , Tokyo 2000.

Strategy for Improving Asset Management Practice, Austroads, 1997.

ATTACHMENT 1

A FRAMEWORK FOR ASSESSING ASSET MANAGEMENT PERFORMANCE IN AUSTRALIA

KEY ELEMENTS OF THE ASSET MANAGEMENT PLANNING PROCESS		ASSESSMENT SCORE: 1 - 5
1	AGENCY OBJECTIVES AND STAKEHOLDER REQUIREMENTS	
1,1	Stakeholder consultation is fundamental to effective asset management. Community consultation improves the decision making process and facilitates the responsiveness to the needs of road users. Agency has developed, endorsed and implemented corporate guidelines for community consultation.	5
1,2	Agency conducts stakeholder consultation on a regular basis and on a formal and consistent manner, according to corporate guidelines, in order to identify stakeholders requirements.	5
1,3	Agency uses a range of stakeholder consultation techniques such as surveys, reference groups, media releases, newsletters, telephone hotline, newsletters, etc.	5
1,4	Key Result Areas (KRAs) are areas that have been identified to be of importance to Agency stakeholders, and hence, areas in which the performance of the asset management process is to be measured. These KRAs can be, for instance, safety, economic, environment, social equity etc. Agency has identified its corporate objectives in regard to each KRA and set targets for each objective.	5
1,5	Agency recognises that stakeholder requirements may not always be complementary (eg freight development and environmental). Through its corporate objectives, the Agency endeavours to balance these requirements within the the asset management planning framework.	5
1,6	Corporate objectives and targets are communicated within and outside Agency.	5
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2	STRATEGY AND PLANNING PROCESS	
2,1	Agency uses a consistent and systematic process for identifying asset requirements and developing an investment plan. This process includes all, or some of the following phases: Use of community consultation for defining organisational objectives, Development of asset strategies and plans, Identification of asset requirements, Development of an investment plan and works program, and Audit and review of the process.	5
2,2	Agency has developed a set of Asset Strategies defining the organisation's approach towards road safety, traffic management, travel demand management, freight efficiency, road maintenance, cycling and pedestrian needs, transport equity, heritage conservation etc.	5
2,3	Agency has a clear, systematic and consistent process in place for identifying road network development (eg new links, roads, bypasses) requirements.	5
2,4	Level of Service is a term used to describe the quality of services provided by the asset under consideration. Agency recognises a Level of Service hierarchy for each asset category that is used to determine network needs. The Level of Service hierarchy may be based on road usage (eg traffic volume and tonnage), or other criteria (eg road function).	5
2,5	For each Level of Service a set of Intervention Standards are identified in terms of road configuration (eg seal width, formation width) condition (eg roughness, rutting, strength), or other attributes. The Level of Service and the associated Intervention Standards provide tangible measurements to determine road configuration and condition requirements in terms of capital investment and the upgrading of the existing road infrastructure. This approach recognises the fact that roads with high traffic volume and percentage of heavy vehicles require a higher level of service than the ones with low traffic volumes, and therefore a higher cost to maintain. Agency employs a similar approach for determining at what level of service the road network should be maintained, upgraded and developed.	5
2,6	Intervention Standards are developed based on the principle of optimising the total transportation cost (road user costs and agency costs), also on best practice and engineering experience and consider the costs over the whole life of the asset.	5
2,7	The Level of Service hierarchy and the Intervention Standards are reviewed every year at the beginning of the asset management planning process to ensure it reflects any changes in road usage and stakeholder and Agency objectives.	5
2,8	Agency has developed a Road Asset Plan containing relevant Government policies and initiatives, trends in state demographics, freight developments etc, and how they are reflected in the Agency corporate objectives and Asset Strategies.	5
2,9	Agency identifies 'gaps' in network performance and projects to fill the gaps by comparing the actual and future (predicted) configuration and condition with the target condition/configuration.	5
2,10	The gap analysis is at the core of the asset management planning process and is applied over a period of time ranging from 5 to 10 years.	5

2,11	<p>The result of the gap analysis is a list of projects addressing network requirements over the analysis period. It is expected that due to resource constraints, only a portion of these projects will receive funding. To ensure an equitable allocation of resources and to achieve its objectives, the Agency uses a prioritisation methodology. This methodology may be via a value for money ranking incorporating economic benefits including optimisation to minimise Life Cycle Cost (LCC), Road User Costs and other Agency costs, and an adjustment for factors such as economic, environmental, safety and social, eg. a Multi-Criteria Analysis.</p>	5
2,12	<p>The list of prioritised projects within the budget constraint constitutes the Works Program. The Investment Plan is a corporate document used by the Agency to obtain funding from the Government. The Investment Plan identifies the Agency's corporate objectives and targets and presents how the Works Program supports these targets.</p>	5
2,13	<p>The development of an Investment Plan and a Works Program is an iterative process that takes into account existing commitments (eg projects that have been signed or are under construction), project flow requirements, regional development issues, intermodal funding considerations, community and government feedback, and should represent the optimal match between available funding, road investment and business resources.</p>	5
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3	DATA, INFORMATION AND KNOWLEDGE	
3,1	The implementation of the asset management framework requires a significant amount of information and data that is accurate and up to date. Agency has a corporate road data information system that stores, as a minimum, road asset inventory information, road condition, road usage information and financial information.	5
3,2	The corporate road data information system is based on an unique reference system that enables the identification and location of individual components on the road network.	5
3,3	The corporate road information data is annually updated in order to reflect changes in network configuration (as per the Works program implemented in current year) and pavement condition (as per condition surveyed periodically).	5
3,4	Agency conducts pavement condition surveys (eg to monitor pavement condition such as roughness/evenness, rutting, texture, strength, skid resistance), at network level, periodically (at least every three years).	5
3,5	Road use data is fundamental to the asset management planning process . Agency has developed a corporate policy for monitoring road use data. The policy identifies what road use data is required (eg volume, by vehicle class, tonnage, growth rate etc), how data is collected (permanent and short term count sites), and defines the rationale for site location.	5
3,6	Agency has a standard costing framework, that determine the cost per unit of work for all works type including capital, operations, maintenance and improvement works, across all regional areas and road types.	5
3,7	Agency has a pavement management system that enables network modelling of the road asset condition and configuration, the identification of gaps in network performance, projects to fill the gaps and the prioritisation of projects within the budget constraints.	5
3,8	The asset management system contains pavement condition deterioration models that may be consistent to international deterioration models such as HDM models, and are customised to reflect specific network network conditions (eg climatic, soil type, road usage).	5
3,9	The asset management planning process is documented and implemented consistently across Agency.	5
3,10	The asset management planning process guidelines, as well as the Level of Service framework and Intervention Standards are controlled documents and are available to all staff (eg on line documents).	5
3,11	The asset management planning process is a cyclic and continual process. Agency has identified milestones in the process (eg review of stakeholder requirements, Level of Service and Intervention Standards, development of asset strategies and plans, network performance analysis, development of the works program, implementation of works program, review and audit of the process), and these milestones are communicated across the organisation.	5
3,12	The Level of Service framework, Intervention Standards and the Standard Costing framework are endorsed by Agency Executives and any changes are subject to their approval.	5
3,13	Agency has a Risk Assessment framework that is used in the process of identifying and prioritising projects to address network deficiencies within the budget constraints.	5
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4	BUSINESS RESULTS	
4,1	Key Performance Indicators (KPIs) are the measures of the quality of service, efficiency, productivity or cost efficiency of an activity. Agency has developed quantitative and qualitative KPIs relevant for its corporate objectives.	5
4,2	Agency has identified targets for KPIs. Targets are set using estimates of current measures, assessing trends where possible, and reflect stakeholder requirements.	5
4,3	Agency has documented and endorsed a methodology for the calculation of KPIs, inclusive of data collection requirements, responsibility area, timeframe.	5
4,4	Some KPIs are consistent to international performance indicators (eg International Roughness Index) which enables the Agency to benchmark its performance.	5
4,5	Except for changes generated by technology development or operational improvements, the KPIs calculation methodology has been consistently employed over the last few years, in order to monitor trends in performance.	5
4,6	Agency undertakes road asset valuations annually. Asset valuations are performed and reported in accordance with national standards (eg Accounting Standards and Government Audit Office requirements)	5
		30

5	PEOPLE	
5,1	Guidelines for the asset management planning process are developed, endorsed by the Executives and implemented across the organisation. In order to ensure employee ownership, they incorporate feed back from all levels in the organisation. The Guidelines provide employees with a clear, step by step description of the process, ensuring consistence in the decision making process and establishing clear responsibilities and accountabilities in the process.	5
5,2	Agency has developed and implemented a Calendar for the asset management planning process detailing process milestones, as well as the officers responsible for each milestone.	5
5,3	Agency has identified core competencies required for the successful implementation of the asset management planning process and has implemented a training program that enable the employees to acquire these competencies.	5
5,4	Agency encourages a learning climate by organising periodically seminars on asset management, participation to conferences, inter-agency partnerships etc.	5
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6	LEADERSHIP	
6,1	Agency has identified asset management as one of its core processes with full support from the Executives.	5
6,2	Agency functional structure supports the asset management process by having designated an area/directorate as the owner of the process, with full responsibility for process development, documentation, deployment, improvement and audit and review, and a supporting structure at regional level (eg asset managers in each regional office)	5
6,3	Agency corporate objectives are reflected at all levels in the organisation through the Business Plans for the Directorates, Sections, and at the individual level through performance agreements.	5
6,4	Agency has identified and documented the interface between the asset management planning process and other corporate processes (eg delivery process) to ensure efficient and effective integration of its corporate processes.	5
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7	AUDIT AND REVIEW	
7,1	Audit of the asset management planning process consists in identifying if the asset management planning process is clearly documented and if the implementation reflects the process guidelines. Agency conducts periodic audits of the process, according to an audit plan endorsed by the Executives.	5
7,2	Audit of the asset management planning process is integrated into the Agency quality assurance system.	5
7,3	The asset management planning process should continue beyond the implementation of the Works Program. Agency uses a number of feedback loops to ensure the cyclical nature of the process. For example, road network performance after the implementation of the Works Program is assessed against the performance expected to be delivered by the Works Program. The outcomes of the review may determine changes to asset strategies, intervention standards and/or prioritisation methodology.	5
7,4	Agency undertakes periodic reviews of its functional structure and employee competencies in order to ensure full support for the asset management planning process.	5
		20
		250

		OVERALL SCORE
Best practice, continuous improvement phase	Excellence	200-250
A good system in place but can be improved	Competence	150-199
Undergoing development with knowledge of the correct process	Systematic Approach	100-149
Still developing	Development	50-99
Basic understanding only	Awareness	25-49
Lack of understanding of the process	Innocence	0-24