

Road Maintenance Task Force

Review of road maintenance regime



New Zealand Government



ROAD MAINTENANCE TASK FORCE 2012 – REVIEW OF ROAD MAINTENANCE REGIME

Road Maintenance Task Force
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ROAD MAINTENANCE TASK FORCE 2012 REVIEW OF ROAD MAINTENANCE REGIME

SUMMARY

In 2011 the Government established the Road Maintenance Task Force to identify opportunities to increase the effectiveness of road maintenance.

The Task Force reviewed significant costs to the sector and existing business practice. In particular, they reviewed asset management, risk management and procurement methods.

The Task Force identified four general areas for improvement:

- Adapting the business models used to deliver maintenance, renewals and operations.
- Improved procurement practices, also in support of new business models.
- Improved prioritisation and optimisation through level of service¹ differentiation.
- Consistent introduction of enhanced asset management² practices.

The Task Force reviewed current business models used to deliver road maintenance. They noted that there is room for increased efficiency by having road controlling authorities take a 'one network' approach. Collaboration between local authorities and in some cases joint management of the network provides significant opportunities for improving efficiency. Such approaches would also drive greater network optimisation.

The Task Force also identified significant scope for improving procurement practices. In particular, they recognise that some alternative delivery models could reduce costs and enhance effectiveness. These delivery models are able to improve contractual relationships, reduce administrative costs and incentivise contractors to cut costs.

Prioritising roading investment is also seen by the Task Force as providing opportunities to reduce cost. Differentiating the road network to ensure each road is fit for purpose will help focus infrastructure improvements on parts of the network with high economic and social value.

The Task Force believes that planning and delivery should be improved to enable greater efficiency and effectiveness, and to better address risk. Asset management is seen as the key to improving capability and providing significant opportunities in this area.

Following its review the Task Force has made 17 specific recommendations that they believe will provide opportunities to improve the effectiveness of road maintenance. Key recommendations include the following:

- Establish a cross-sector Road Maintenance Task Force Implementation Group to champion the changes.
- Create a national asset management framework.

¹ In this report the term level of service is used to refer to what is commonly called the customer level of service – defined in the *International Infrastructure Management Manual* (2011) as the outputs or objectives that an organisation or activity intends to deliver to customers.

² In this report the term asset management has the broad meaning given in the *International Infrastructure Management Manual* (2011) namely the systematic and coordinated activities and practices of an organisation to optimally and sustainably deliver on its objectives through the cost effective lifecycle management of assets.

- Establish a national roading classification.
- Promote high-quality asset management.
- Communicate expectations that collaboration and clustering is investigated between road controlling authorities and incentivised to occur.
- Pursue improved procurement methods and delivery models where necessary.

An Interim Report was published in May 2012 and submissions invited from the sector. A series of Road Shows were held in nine locations from Whangarei to Dunedin to advise the sector of Task Force interim findings and obtain further feedback. This final report has been amended to account for that feedback and an assessment of written submissions that were received. A Summary of Submissions Received is included in this report (see Appendix 5).

PART ONE: INTRODUCTION

1.1 Road Maintenance Task Force 2012

The Task Force – Purpose

The Government established the Road Maintenance Task Force with a wide-ranging scope “to identify efficiencies and encourage their uptake through the country” (Ministry of Transport, 2011).

The purpose of the Road Maintenance Task Force was two-fold:

- To identify opportunities for efficiencies and increased effectiveness in the delivery of operations, road maintenance and renewals, including through innovative services, products and methods of procurement.
- To use the process, findings and recommendations of the Task Force to encourage the consistent uptake of opportunities throughout the country.

The stated expectation was that the Task Force findings will encourage better practices and inform decision-making in ways that will achieve value for money.

The specific Task Force objectives set out in the Terms of Reference (Appendix 1) relate to identifying sustainable opportunities for efficiency gains and improved effectiveness through better understanding and identifying opportunities in:

1. the cost drivers of maintenance and renewal activity and their relative importance
2. planning and delivery of maintenance, operations and renewals
3. innovative services, products and methods of procurement
4. the cost implications of risk transfer between road controlling authorities³ (RCAs) and contractors
5. good practice standards and guidelines, including standardised and harmonised contract documentation, and risk identification, management and allocation.

The Task Force – Findings Uptake

The specific Task Force objectives set out in the Terms of Reference (Appendix 1) that relate to implementation of the Task Force recommendations are to:

1. promulgate the uptake of the Task Force findings

³ The term road controlling authority (RCA) is used in this report to refer to all enterprises which control public roads and partner with the NZTA to fund their maintenance, operations and renewals, etc. All territorial local authorities are therefore included plus the Department of Conservation and the Waitangi Trust. It also includes the NZTA as the controlling authority for the state highways.

2. consider the benefits of continuing the Task Force approach, with the aim of fostering best practice and collaboration in the sector.

The Task Force – People

The Task Force was representative of the transport sector. The Governance Group comprised representatives from the organisations shown in Table 1.

Table 1: Task Force Organisations

Organisation	Governance Group Representative
NZ Transport Agency (NZTA)	Jim Harland (Convenor)
Local Government NZ (LGNZ)	Geoff Swainson
Road Controlling Authority (Rural)	David Adamson (Southland District Council)
Road Controlling Authority (Urban)	Murray Noone (Auckland Transport)
Road Controlling Authority (Provincial)	David Fraser (Hastings District Council)
NZTA Highways and Network Operations Group	Mark Kinvig
Association of Consulting Engineers NZ (ACENZ)	Tony Porter (Opus International Consultants)
New Zealand Contractors' Federation (NZCF)	Jeremy Sole
Roading New Zealand (RNZ)	Cos Bruyn (Downer NZ)

In this report reference to the 'sector' should be read as a reference to all those who are directly involved in planning, funding and delivering road maintenance, operations and renewal – namely: the NZTA, as both a partial funder and as an RCA; RCAs, which includes local authorities, the Department of Conservation and the NZTA; and contractors and professional services consulting firms.

Links with other work

Work is under way or proposed in a number of other areas that are related to the current review, such as:

- The Road Information Management Steering (RIMS) Group's current projects include *High speed data collection guidelines*, *Traffic counting ... best practice*, *Risk management ... on road networks* and *Status of best practices for roading asset management*. Planned completion dates for these projects are September 2012, late 2012, September 2012 and early 2013 respectively. RIMS is a committee of Ingenium established in conjunction with Ingenium by the NZTA's predecessors to provide leadership and strategic advice to the New Zealand road management industry on good practice, asset management systems and tools for roads.
- The National Asset Management Steering (NAMS) Group's manuals are the accepted source of best practice guidance for asset management in New Zealand. NAMS is a committee that Ingenium formed to develop and promote infrastructure asset management practices, policies and systems in New Zealand, develop asset management best practice publications, knowledge and services, and provide training. Publications include the *International Infrastructure Management Manual* (2011).
- The Road Controlling Authorities Forum (RCA Forum) is a regular gathering of RCA asset managers and programme managers that collectively commissions and shares research.
- IDS Ltd was established by Ingenium to help asset owners optimise the performance of infrastructure assets. IDS develops New Zealand-specific asset deterioration models and is the distributor of the dTIMS software in New Zealand.
- Standards New Zealand is reviewing NZS3910 *General Conditions of Contract for Building and Civil Engineering Construction* (Standards New Zealand, 2003) to ensure it continues to meet the needs of the building and construction sector. The draft amended standard was submitted for public comment in September 2012.

- The Department of Internal Affairs is leading the development of Local Government Act 2002 mandatory performance measures rules. Consultation with each local authority on proposed measures is expected to begin in the last quarter of 2012.
- The NZTA Transport Planning Review, established with the objective of improving the effectiveness and efficiency of integrated planning to enable investment in the right transport solutions was completed in June. The NZTA has since begun a business improvement project which will implement the changes identified by this review and the related Project Development Review.
- The NZTA Highways and Network Operations (HNO) Group is reviewing the maintenance, operations and renewal of state highways. Options for improving efficiencies and outcomes are being consulted on.⁴

A number of recommendations from the Task Force review refer to the work of others. In implementing the Task Force recommendations the related work of others will need to be considered in the context of the Task Force Terms of Reference.

Road maintenance – international perspectives

A literature review was undertaken as part of the Task Force's work. This confirmed that achieving greater efficiency in road maintenance is also a high priority in many other countries, with governments facing growing budget constraints and needing to obtain better value for money from their expenditure (Audit Commission 2012). While work is underway to identify opportunities for improvement, for example the United Kingdom Highways Maintenance Efficiency Programme, proposed solutions suggested to date are either already in practice or known in New Zealand.

1.2 Review Structure and Recommendations

Review structure

The findings and recommendations are presented with a focus on achieving sustainable improvements in the efficiency and effectiveness of the areas concerned. The findings are presented against seven objectives. The first five objectives presented in the Terms of Reference have been disaggregated to provide for a stronger analysis. Under each of these modified objectives, the Task Force has sought to achieve the following:

1. *Cost drivers* [ToR 1] – understand the primary drivers of the cost of maintenance, operations and renewals of the network. This understanding can be used to identify ways to manage and where possible reduce future costs.
2. *Asset management planning* [ToR 2, part] – understand the planning and priority-setting processes undertaken by Road Controlling Authorities.
3. *Risk management* [ToR 5] – provide a specific focus on risk identification, management and allocation by asset managers; and understand the cost and long-term value for money implications of each.
4. *Delivery of maintenance, operations and renewals* [ToR 2] – provide a specific focus on how roading infrastructure is operated and how the road network is maintained. Specific mention is made of how Road Controlling Authorities use contractors, consultants, and their own resources to carry out this work.

⁴ Feedback on the State Highway Maintenance and Operations Review is being considered. Report back is expected by the end of October 2012.

5. *Innovative procurement methods* [ToR 3] – provide a specific focus on how Road Controlling Authorities relate to suppliers through their procurement methods and the forms of contract they use, and how those practices impact the cost to suppliers and the management and allocation of risk between purchasers and suppliers.
6. *Innovative services and products* [ToR 3] – provide a specific focus on options for services and products that reduce cost.
7. *Good practice guidance and tools* [ToR 4 and ToR 5] – identify opportunities for wider use of tools and guidelines that support common understanding and good practice.

Summary of Task Force findings

This report identifies opportunities for improvement. Overall New Zealand manages its road networks well and compares favourably with international standards. Notwithstanding this, there are clear opportunities to increase the efficiency and effectiveness of maintenance, operations and renewal of the road network.

The Task Force has identified four general areas for improvement:

- Adapting the business models used to deliver maintenance, renewals and operations.
- Improving procurement practices, also in support of new business models.
- Improving prioritisation and optimisation through level of service differentiation.
- Consistently introducing enhanced asset management practices.

Comments on these areas follow, with recommendations to implement these findings set out in the next section.

Adapting Business Models

There is a historical trend towards a lesser number of contracts through aggregation and bundling of works and services and by using longer contract terms. Research commissioned for the Task Force (PricewaterhouseCoopers, 2012) concludes that there is scope for further aggregation and bundling to more effectively and efficiently deliver outcomes. Larger contracts do not always deliver better value for money. The research report also acknowledges that there is a risk that further aggregation and bundling may reduce competition and ‘hollow out’ the structure of the industry. Care needs to be taken to manage the risks to healthy competition in the market. There is also significant scope to employ better delivery models to improve contractual relationships and incentive structures. Efficiency improvements include greater use of standard form contract documents and more discipline around the modification of standard documents to both reduce the cost of supplier selection processes and make for better contractual relationships.

Many of the Task Force members hold the view that ‘smart buyer’ capability among RCAs is variable and that many procurement practice issues could be addressed by correcting the current thin and uneven spread of capability.

There is some limited New Zealand experience in collaboration amongst RCAs however the majority operate independently with limited collaboration with their neighbours.

In order to lift efficiency and increase value for money, the most promising opportunity is for RCAs to strongly collaborate and where appropriate jointly manage, plan, and deliver maintenance, operations and renewal works.

The Task Force technical team charged with identifying opportunities to improve efficiency and effectiveness through collaboration and clustering has estimated that such 'joining up' may yield efficiency gains of up to 20% depending on the model chosen. Where such 'one network' approaches are taken there is likely to be further benefits, such as greater network optimisation.

A prescriptive approach to this is unlikely to work. However, the Task Force believes the following criteria, which emerged during the course of the research, could be applied to identify possible groupings that could then be considered in terms of their practicality, political acceptability and ultimate savings. The possible criteria include:

- the length of the network, taking into account density and operational response times from contractors' depots,
- the geographical compatibility and practicality of placing appropriate depots in relation to available materials, equipment and labour plus accessibility/remoteness,
- the competency and attractiveness of the area to retain skilled asset management staff and provide appropriate links back to funders,
- willingness of partners to enter into collaborative arrangements, including political support,
- impact of 'buy local' policies,
- maintaining competitive supplier markets.

The Task Force believes these opportunities for collaboration and clustering should be explored, and the lack of legal impediments provides the opportunity to quickly enhance efficiency. A model has been put forward by Task Force researchers to identify different stages or models of collaboration. Possible benefits from the different models include:

- the ability to retain experienced staff with a greater level of knowledge of the whole network (eg Rotorua District Council)
- enhanced decision-making ability of staff to make the right decisions at the right time for the network, which can result in cost savings (eg Marlborough Roads)
- the ability to attract suitably qualified staff as the environment created by shared services agreement allows greater career progression for staff (eg Manawatu/Rangitikei District Councils)
- the ability to adopt long term performance based contracts which have the potential to deliver significant savings (eg Western Bay of Plenty District Council).

Improved Procurement Practices

There is also significant scope to employ better delivery models to improve contractual relationships and incentive structures between all parties. Efficiency improvements include greater use of standard form contract documents and more disciplined processes and make for better contractual relationships.

Improved Prioritisation of Investment

There is a significant opportunity to further differentiate levels of service on each part of the total road network. Such differentiation must be linked to a classification system that recognises the economic and social value of component parts.

Road classification is acknowledged as a cornerstone of any network strategy. The NZTA's state highways classification system has recently been revised. For example, Southland District Council is currently revising its classification system and plans to set service levels in relation to the economic and social value generated by different parts of the district's extensive, and generally low-volume, road network – refer to *Economic Network Plan: Prioritising Investment and Value Mapping Road Infrastructure* (Bourque & Maughan, 2012).

A National Road Classification System (NRCS) is currently being developed by a working group representing all RCAs. The purpose of the NRCS project is to “to develop a classification system for the New Zealand road network that is understood by all users and assists:

- transport and land use integration
- network access management and optimisation
- road maintenance
- public safety and
- benchmarking of service levels that deliver investment outcomes”.

The Working Group’s interim findings will be consulted on later this year.

Leadership and Improved Asset Management

The Task Force believes that planning and delivery could be improved to enable greater efficiency and effectiveness, and better address risk. This will require the alignment of levels of service and the economic value of different parts of the network with maintenance, renewals and operational expenditure. The economic analysis must also recognise the cultural and social aspects of the road network. Enhanced Asset Management is seen as the key to improving this.

The critical issue irrespective of the number of asset management organisations is the importance of the RCAs to identify the level of service they wish assets to perform to. They will then need to relate this to the amount of money that needs to be spent on maintenance and operations and renewals over the life of the asset. These decisions are determined in part by the discount rate that is used which is resulting in shorter-life designs, methods or materials that cost less under the current arrangements.

There are opportunities to improve the collective asset management practices of the sector. In a 2008 review of RCA capability in asset management, 28% scored poorly, 47% moderate and 25% good. While acknowledging that many RCAs will have made significant improvement since 2008 the Task Force believes that improving asset management capability will require a step change if good or excellent levels are to be achieved. For example instances of sub-optimal programming of works and re-work are relatively common. There are also opportunities to improve the way we share best practice and drive business improvement.

One of the related opportunities is for a New Zealand-wide ‘asset management group’. This could involve sharing professional services, staff and funding contracts through to forming jointly owned council controlled organisations (CCOs). There is an opportunity to strengthen the link between transport planning, project development and maintenance and operations by adopting strategies that enable more effective whole-of-life cost decision-making to occur over the long term.

The key challenge is therefore to effectively incentivise RCAs to ‘opt in’ and adopt these recommended approaches. In other words, given that there has been much talk about better asset management, collaboration and integration in the last decade or so, what would it take to make it happen *now* in order to meet the value for money challenge ahead?

The Task Force believes that fiscal constraints will, in themselves, lead to the increased adoption of such value for money practices. However, given the size of the challenge the Task Force believes such value for money approaches should be further incentivised by adjusting the NZTA’s Investment and Revenue Strategy (eg the effectiveness rating) and/or by adjusting the co-investment arrangements (eg funding assistance rates) as required. These and other options will be explored as part of the 2015–18 National Land Transport Programme.

Successful implementation is likely to require an innovation-driven transformation in how professional services teams operate and perform within RCAs. The Task Force believes that a cross-sector implementation group should be established, with the NZTA playing a key leadership and support role to take these and other recommendations forward.

The key to achieving least whole-of-life cost for the network, in addition to having sound long term strategies, is strong asset management practice, which includes enabling the use of innovative services, products and methods of procurement. This requires:

- effective planning and delivery to achieve value for money objectives, eg early tendering opportunities, awareness of the annual programme and better timing of works
- improved knowledge sharing
- a consistent road classification system and levels of service across the whole network
- greater collaboration between asset owners.

There are opportunities to improve the collective performance of the industry. However, we need to develop a strategy for improving performance measurement and management in order to gain a better understanding of the effectiveness of any changes made.

There is also an increasing concern around people and capability. This relates especially to an ageing workforce, training and the number of people entering the industry, which is limiting the ability of RCAs to obtain value for money. To build capability, careers in the maintenance and operations area need to seem more attractive.

While a large quantity of data is collected on assets and their management there are consistency and quality issues. This means the data is not always able to inform future decisions and asset management practices. Moreover it does not permit objective benchmarking of good practice performance. A step change in performance measurement and management and data collection is required to obtain best value for money and help ensure that levels of service and funding are appropriate. The Task Force recommends that the NZTA convene a user group or an established group (eg a National Strategic Asset Management Group), drawn from across the sector to develop requirements for improved data input, transformation of the data into useful, repeatable and meaningful information, dissemination, and effectiveness in the use of data, focusing on areas such as:

- requirements for data, data-based systems (eg RAMM – Road Assessment Maintenance Management database), dTIMS (Deighton’s Total Infrastructure Management System) and technology platforms
- measurements to assess the effectiveness of different road maintenance projects and new materials
- measures of asset consumption and its causes
- measurement to enable better timing of interventions
- road classification.

Recommendations

Through its review the Task Force identified a number of areas where improvements can be made and has made 17 recommendations for action to help achieve improvements. The following recommendations are drawn from each of the objectives discussion in Part Two.

The Task Force recommends that the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to achieve the following.

Cost drivers

1. Establish a Road Maintenance Task Force Implementation Group with cross-sector representation tasked with:
 - establishing a national asset management framework
 - implementing consistent and enhanced asset management
 - supporting clustering of RCAs and the NZTA where appropriate
 - standardising data.

Who: RCAs led / supported by the NZTA

When: October 2012

2. Consider and endorse after consultation the Local Road Classification System proposed by the National Road Classification Working Group which:
 - accommodates the State Highway Classification System
 - identifies the level of service, function and road use (including economic, social and cultural aspects) of local road networks
 - is a key component of the national asset management system
 - aligns level of service and maintenance standards.

Who: RCAs led by the NZTA

When: January 2013 to formally adopt

3. Communicate expectations that RCAs will improve their annual and longer-term programming and planning of works and give early advice of work programmes to suppliers, with the aim of creating opportunities for more efficient delivery and establish a measurement and reporting regime that is designed to aid continuous improvement in programming and planning.

Who: RCAs and the Road Maintenance Task Force implementation group

When: October 2012 and ongoing

4. Use existing tools and guidance to support sound investment decision-making that balances whole-of-life cost, level of service and risk, as an element of the national asset management framework. New tools and guidance may need to be developed where appropriate.

Who: RCAs, RIMS, RCA Forum

When: July 2013 and ongoing

Asset management planning

5. Challenge and build on existing integrated planning (including financial planning) approaches, as an element of the national asset management framework.

Who: RCAs led by the proposed Road Maintenance Task Force Implementation Group

When: July 2014 and ongoing

6. Provide and promote ongoing access for all RCAs to high-quality asset management advice and mechanisms for continuously improving practice.

Who: RCAs, RIMS, RCA Forum led by the proposed Road Maintenance Task Force Implementation Group

When: October 2012 and ongoing

7. Develop and communicate expectations, incentives and guidance that minimise practices that emphasise short-term over whole-of-life costs, eg changing the incentive, the FAR rate and/ or the discount rate.

Who: the NZTA supported by the proposed Road Maintenance Task Force Implementation Group
When: completed in time to be an input into the 2015–2018 NLTP

8. Review existing data acquisition methods and standards and compile a nationally consistent data acquisition, performance measurement, benchmarking and management framework that will support enhanced road asset management and sound investment decision-making, monitoring of outcomes and continuous improvement, as an element of the national asset management framework.

Who: the NZTA led by the proposed Road Maintenance Task Force Implementation Group
When: December 2012

9. Review the RCA monitoring and auditing role as currently performed by the NZTA, including the way in which NZTA audit and monitoring findings, conclusions and recommendation are reported and acted on, and make recommendations for change as appropriate.

Who: Road Maintenance Task Force Implementation Group
When: March 2013

Risk management

10. Define and communicate expectations of RCAs in relation to the uptake of training and development opportunities for their asset management staff so that they continually build or refresh their knowledge and experience as asset managers including as ‘smart buyers’ of works and services.

Who: RCAs / the NZTA led by the proposed Road Maintenance Task Force Implementation Group
When: December 2012 and ongoing

11. a. Review the availability of specific asset management training (including ‘smart buyer’ training) and other related opportunities and develop a catalogue of same.
b. Develop options to support training, particularly in asset management (including ‘smart buyer’) practices, in the event that there are significant capability gaps, including possibilities for direct provision.

Who: the NZTA led by the proposed Road Maintenance Task Force Implementation Group
When: December 2012

Delivery of maintenance, operations and renewals

12. Undertake further analysis to identify procurement issues that hinder the achievement of obtaining value for money, and consider options for resolving those issues through regular meetings of sector participants.

Who: RCA Forum, the NZTA led by the proposed Road Maintenance Task Force Implementation Group
When: December 2012

13. Communicate expectations that RCAs will consider and, where the benefits are proven, adopt different forms of collaboration and clustering arrangements, aimed at increasing efficiency, as well as quality and effectiveness of asset management practices.

*Who: Proposed Road Maintenance Task Force Implementation Group
When: October 2012 and ongoing*

14. Develop and use guidelines and tools to support and strengthen RCA considerations in appraising the governance, management, technical and value for money implications of the full range of options for collaboration and clustering.

*Who: RCAs, RIMS, RCA Forum, the NZTA, proposed Road Maintenance Task Force Implementation Group
When: December 2012 and ongoing*

15. Monitor the success, failure and learning points of any new collaboration or clustering arrangements plus use of alternative contract / delivery models or changes in the degree of aggregation or bundling of works or services in order to strengthen the guidance and increase the opportunity for success.

*Who: the NZTA, proposed Road Maintenance Task Force Implementation Group
When: ongoing*

Innovative procurement methods

16. Amend the NZTA's procurement framework to mandate requirements for RCAs to:
 - a. use standard form documentation where available, including specifications for processes and materials
 - b. justify changes or amendments to standard forms for individual contracts against named criteria, including whether it is best value for money to do so
 - c. be transparent within the documentation about any changes or amendments to standard forms for individual contracts.

*Who: the NZTA
When: commence October 2012 completed as soon as possible*

Innovative services and products

17. Pursue the use of new materials, technology and methods where appropriate, including alternative procurement methods and delivery models.

*Who: RCAs led by the proposed Road Maintenance Task Force Implementation Group
When: October 2012 and ongoing*

Support for Recommendations

The feedback received from submissions and workshops hosted around the country were generally supportive of the recommendations. However, there was a feeling that the 'devil is in the detail' and there were many specific comments made on the recommendations. The Task Force has used this feedback to modify the recommendations and as a result added in an extra recommendation (recommendation 9), to review the RCA monitoring and auditing role as currently performed by the NZTA. The final recommendations remain closely aligned to those presented in the Task Force Interim Report.

Much of the comment received raised matters which the Task Force expects to be addressed in implementing the recommendations. Comments of this nature have not been specifically reflected in this final report, because their value will be realised in the implementation phase. Reflecting

suggestions made in the submissions, where appropriate case studies and additional research will be undertaken to support implementation.

In summary, the Task Force conclusions and recommendations reflect the majority of views expressed by the sector when asked – how can we more efficiently maintain an effective, fit for purpose road network for New Zealanders.

Implementing the Road Maintenance Task Force Recommendations

In order to implement the recommendations the Task Force has identified several work streams and their leadership. These work streams will require resources from NZTA and RCAs, and advice from the industry sector where appropriate. A high level proposal giving effect to this structure is set out in Figure 1 based on the following principles:

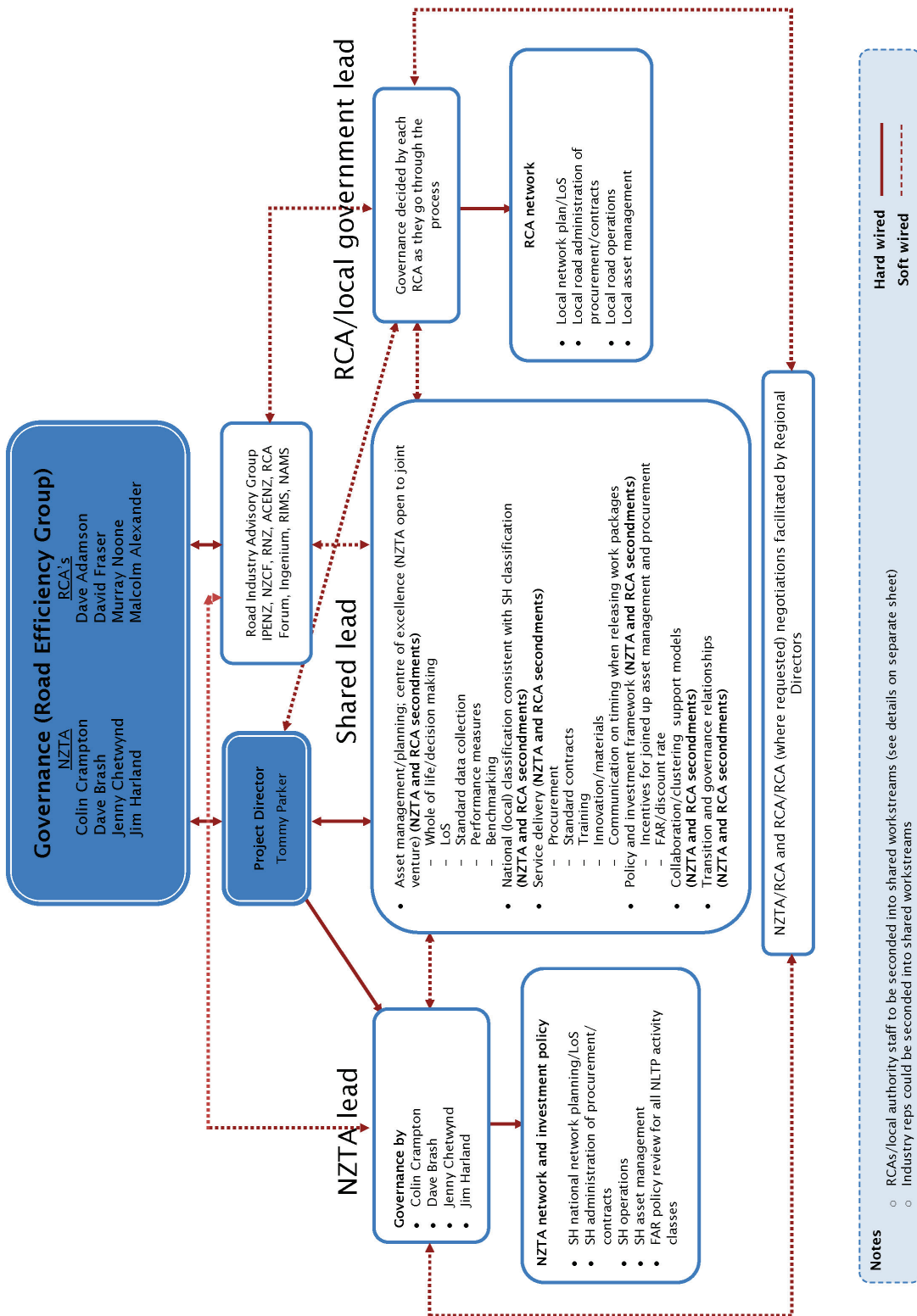
- Local government and the NZTA (as owners of the nation's road network) need to work closely together to ensure that the best long term outcome for the whole network is achieved. An implementation governance group with equal representation from both the NZTA and RCA/local government⁵ managers (representing metropolitan, provincial and rural authorities) has been formed to be known as the Road Efficiency Group (REG).
- Industry, including contractors and consultants, need to be consulted regularly. A formal channel to ensure that the views of industry are sought on all relevant issues is being established.
- A number of working groups reporting to REG, to continue the work begun by both the Task Force and the NZTA Maintenance and Operations Review are being established.

The work streams are based on three distinct leadership responsibilities:

1. **NZTA Led Work** implementing its internal Maintenance and Operations Review. To ensure this work is aligned to the REG work as far as possible, the NZTA Governance Group for its ongoing Maintenance and Operations work will also sit on the REG.
2. **Shared Work** around the core recommendations of the Road Maintenance Task Force.
3. **RCA/Local Government Led Work**, especially around collaboration and clustering, and network opportunities based on procurement.

⁵ The Department of Conservation and the Waitangi Trust Board, who also own public roads, will need to be consulted by this group as their work progresses.

Figure 1: Road Efficiency Group



PART TWO: REVIEW FINDINGS

2.1 Cost drivers

Under this objective, the Task Force has sought to understand the primary drivers of the cost of maintenance, operations and renewals of the network. This understanding can be used to identify ways to manage and where possible reduce future costs.

Costs of maintenance, operations and renewals

The cost of maintaining and renewing New Zealand’s roads has continued to rise. Over the last 10 years the annual average growth in expenditure has been 4.4% (Figure 2). More recently this growth rate has begun to slow. The annual average change for the last three years has dropped to 1.3%.

Figure 2: New Zealand maintenance, operations and renewal costs and performance



Key to Figure 2

- LR – local road
- SH – state highway
- All RCA expenditure – total expenditure on all roads (both LR and SHs) including expenditure from the National Land Transport Fund (NLTF) and funds raised locally by local authorities
- PII – pavement integrity index – a weighted measure of the total amount of various types of fault (eg wheel rutting) in road pavements
- CI – condition index – a weighted measure of the total amount of various types of fault (eg surface cracking) in sealed road surfaces
- STE – smooth travel exposure – a measure of the proportion of all vehicle travel that occurs on roads that are classified as ‘smooth’ by having a measured surface roughness which is better than a threshold value defined by the NZTA

A number of factors have been driving cost increases. Some of the more significant contributing factors are:

- rising input costs – including bitumen and fuel costs
- increasing traffic demand – including rising heavy traffic volumes
- a network which is becoming increasingly sophisticated and increasingly more expensive to operate and maintain.

Figure 2 shows how costs over the last 10 years have risen faster than the rate of inflation while at the same time NZTA measures of pavement and surface condition have remained relatively steady, and in some instances may even be showing a small overall improvement.

At first sight this suggests that nationally, or on average, current practices and levels of expenditure over recent years have delivered a road network with stable pavement and surface condition. However, known shortcomings with the measures used, their narrow focus and the fact that they are overall average values needs to be acknowledged. There will be a many individual roads which are, when considered against these measures, deteriorating and other measures which would show a different pattern of either improvement or deterioration.

Rising input costs

Inflation is a major factor in the rise of increasing costs. Inflation as measured by the NZTA maintenance index has averaged 3.9% per year for the last 10 years. The NZTA maintenance index probably runs ahead of the Consumer Price Index (CPI), which was 2.8% per year over the same period, because of a greater emphasis on oil-based products.

Inflation has therefore been a very significant contributor to the growth in expenditure by RCAs on road maintenance operations and renewals. As stated above the average increase in expenditure has been 4.4% per year over the last 10 years but has dropped to 1.3% per year for the last three years.

The following individual cost components have been subject to higher rates of inflation.

Bitumen and fuel costs

The cost of petroleum-based products has been increasing more rapidly than other road maintenance, operations and renewals inputs.

Over the 10 years to June 2011 the cost of bitumen (measured by the NZTA bitumen index) has increased at an annual average rate of 10.1% but costs have also fluctuated more than for most other inputs. For example over the 10 years the annual rate of change has fluctuated between +50.5% and –22.3%. The cost of fuel (measured using the Statistics NZ all farm fuel and oil index) has grown at a similar average rate (10.0%) and has also been subject to large fluctuations.

The total cost of bitumen supply for use on roads in New Zealand is a significant proportion of the total spent on maintenance, operations and renewals. Approximately 160,000 tonnes of bitumen is used on New Zealand roads each year. The total cost of bitumen is approximately \$200 million, representing 30% of the cost of maintaining and renewing pavements.

Diesel also represents a significant cost. Limited data is available on the cost of diesel as a proportion of the total cost of maintenance, operations and renewal but, like bitumen, the cost can fluctuate significantly.

Alternative approaches to bitumen supply (such as direct purchase by RCAs) have been considered in the past but not acted on. Provided there is real competition for the supply of bitumen and the risks to all parties in the supply chain are managed in an appropriate way then a change in the current structure is not likely to make a significant difference to the cost to RCAs.

Rising costs from providing high levels of service

RCAs together 'own' the public road network in New Zealand. They are responsible for acquiring the necessary funding and investing to maintain, operate, renew, improve and expand their individual networks. They work with road users to establish the levels of service that the network is to provide, plan and programme the works and services required to deliver the agreed levels of service, and procure them.

Rising pavement and seal costs

The maintenance and renewal of pavements and sealed surfaces is a major component (56%) of the cost of maintaining New Zealand's roads.

Expenditure on pavements and sealed surfaces has also been growing at a high rate. The annual average increase for the last 10 years has been 4.2% per year, which is higher than both the NZTA maintenance index increase (3.9%) and the CPI (2.8%). Recent trends may be showing a decline in these rates of growth. At the same time, measures of pavement and surface condition (including surface roughness) have been either holding or improving slowly (refer to Figure 1).

It is the view of the Task Force that there is probably room to reduce national expenditure on pavements and seal. There would, however, come a point where road condition would begin to deteriorate. Eventually that deterioration would lead to an increase in long-term whole-of-life cost by missing the opportunity to apply 'a stitch in time' and the reduction in maintenance and renewal activity would become unsustainable. Note that there is insufficient information at this time to predict at a national level either when reduced maintenance and renewal activity would deliver a measurable reduction in overall condition or when the situation would become unsustainable. However, individual RCAs, in particular those who employ well developed asset management systems and deterioration models, are able to make reasonable predictions of the lowest sustainable level of maintenance and renewal activity.

Changing traffic demand particularly heavy vehicles

Changes in the volume and pattern of traffic, especially heavy vehicle traffic, tend to add to the annual cost of road maintenance and renewals. Heavy commercial vehicle traffic is known to be the single biggest factor in pavement deterioration

Changes in land use which are accompanied by changes in heavy traffic can have a significant impact on local road networks in particular. For example, dairy industry changes including farm conversions and the building of new processing facilities can sometimes bring about rapid pavement deterioration that has to be addressed. The pavements on parts of some routes where the recently introduced high productivity motor vehicles (HPMVs) will operate may need to be renewed earlier than would otherwise have been the case.

Heavy traffic volumes have grown nationally at an average rate of 1.2% per year for the last 5 years. Total traffic has grown at 1.8% per year on average over the last 10 years but at a lower rate (1.1% per year) over the last 4 years.

As traffic volumes increase, changes in the approach to maintenance and renewal works are required to limit disruption to road users, eg by working at night.

As traffic increases so does the safety risk, creating demand for improvement projects and for installation of traffic services which all add to the future cost of maintenance.

An increasingly sophisticated and expensive network to maintain and operate

The total length of the network is steadily increasing (0.22% per year of average growth over the 9 years to 30 June 2011) and extra lanes are being added to existing roads. The proportion of roads that are sealed has also grown (from 63.4% to 66.2%) over the same period.

More significantly the network is becoming more sophisticated. Road signs, markings, traffic signals and carriageway lighting have increased in number and complexity to meet growing demand and modern standards. For example, variable message signs, remote traffic monitoring and motorway ramp metering have been introduced to improve capacity and traffic flow on existing roads. Congestion times are reduced and road safety is improved. Given these large benefits the Task Force considers that it may not be appropriate to reduce the level of service in these areas.

Nevertheless, action is already being taken to reduce costs in some of these areas. Application of the temporary traffic management code of practice (COPTTM) is being reviewed by the NZTA's state highways team and a number of local authorities. The standard of roadside vegetation maintenance is also being reviewed.

The impact of 'flatlined' GPS funding

The Government Policy Statement on Land Transport Funding (GPS) (Ministry of Transport, 2011) has all but 'flatlined' the NLTF funding allocations for maintenance, operations and renewals from 1 July 2012. In real terms this means that the GPS allocations will reduce over time.

Projecting expenditure growth trends of recent years and comparing these to the upper bound of GPS allocations for maintenance and renewals for the next three years (1 July 2012 to 30 June 2015) shows that all RCAs will need to be prudent and some will need to reduce real expenditure. However, beyond 2015 staying within the flatlined allocations will become increasingly challenging and will require year-on-year reductions in real expenditure.

As stated above it is the view of the Task Force that nationally we can probably reduce expenditure in some areas. Individual RCAs will continue to improve their asset management practice to reduce real cost as opportunities are identified and similarly will find situations where increased maintenance and renewal activity are needed to ensure least whole of life cost delivery of services to road users. However, at this time we do not know what impact the reduced real GPS funding levels will have nationally on service delivery. The Task Force implementation process (including monitoring of outcomes) will allow us to assess the impact over the next few years.

Reducing waste by improved planning and programming practice

The Task Force has recognised that the level (and therefore cost) of service currently provided on some roads is higher than can be justified on the basis of their use and contribution to the economy. The Task Force recognises the need for all parties to work together to ensure an appropriate level of service is provided to each part of the network. To this end the Task Force recommends that a nationally agreed road hierarchy and levels of service be established which are based on an optimal balance between cost, level of service and risk.

The Task Force also recognises that the timing of investment in pavement and surfacing renewals could be improved by some RCAs. Some renewals could be delayed by one or more years to extend the life of pavements and surfacing after accounting for cost, risk and any impact on road users. The Task Force-commissioned report *Better Asset Management, Planning and Delivery* (Waugh & Holland, 2012) suggests that RCAs need to be incentivised to develop and consider options, including the option of delaying a renewal.

Traditional annual budget practices, which do not readily accommodate significant change from year to year, up or down, militate against optimal timing of interventions. This is especially so in a smaller local authority.

The recommendations that are listed at the end of this section also address the acknowledged need to generally raise the standard of planning (both short and long term), programming and smart buyer capability.

Whole-of-life costing and economic evaluation

The ageing nature of our network raises interesting questions about how we can account for the whole-of-life costs of our network.

Existing NZTA investment policies, when applied to the initial construction or renewal of a particular road asset, aim to achieve the optimal balance between the immediate, or build, investment cost and all necessary future investments, including in maintenance and further renewal. However, the Task Force has observed that these policies, which demand whole-of-life costing and more generally the application of value for money principles are not always well understood. Furthermore the Task Force has noted that decision-makers do not always routinely consider the affordability of future costs. Affordability of future costs is particularly relevant where infrastructure with high operating costs is built, eg a tunnel.

The Task Force report *Better Asset Management, Planning and Delivery* (Waugh & Holland, 2012) discusses better asset management practices including better investment decision-making. The report concludes that advisors to decision-makers tend to advance a single 'solution' to a problem, rather than a range of options. Further the report concludes that decision-making would be improved if a culture of proposing a range of investment options for discussion was developed. This would allow RCAs to more readily strike an economically optimal balance between cost, level of service and risk. The report refers to the concept of the 'Budget – level of service – Risk Triangle of decision making'. To deliver value for money, investors must strike the best balance between budget (both initial and future cost), level of service (benefit) and risk – including the risk of early failure of a new infrastructure component or a renewal and risk associated with an innovative solution. It would be beneficial if these value for money investment decision making processes, which underpin established NZTA policy, were better understood and applied.

It is the view of the Task Force technical team charged with identifying opportunities to improve both efficiency and effectiveness in the planning of maintenance, operations and renewals that significant savings could be achieved if the recommended changes are made to achieve a better balance between cost, level of service and risk. Savings through improved planning, or other improvements, are unlikely to be realised in the short term.

Use of a discount rate in investment decision-making

The NZTA's *Economic Evaluation Manual* (2010) helps investors to evaluate the economic efficiency of activities by setting out how cost-benefit analysis is to be undertaken. It requires that the 'time value of money' be recognised by discounting future costs and benefits.

The discount rate used by the NZTA is currently 8%. This rate is higher than in many overseas jurisdictions. The European Union, the United States, Canada and Australia all use lower rates than New Zealand. A higher rate gives greater value to the 'time value of money' and thus favours delaying expenditure. Higher discount rates therefore typically lead to low initial cost investments and higher future costs, including higher maintenance and renewal costs.

A research report entitled *The Implications of Discount Rate Reductions on Transport Investments and Sustainable Transport Futures* (Parker, 2009) addresses many of the issues around the current high rate. This work was further developed in the report commissioned for the Task Force entitled *Road Maintenance Task Force: Economic Issues Paper* (Parker, 2012).

The high discount rate used has kept the initial cost of many investments low but is contributing to the current high spend on maintenance, operations and renewal. However, lowering the discount rate will tend to increase the cost of the next renewal of an asset and therefore does not offer either a short-term or medium-term way to lower the annual cost of operations, maintenance and renewals.

The Task Force has questioned the manner in which the NZTA's economic evaluation policies are applied to an annual programme of maintenance and works and asked whether the approach applied to decisions on a single project are fully applicable to an ongoing programme of work across a network.

The recommendations that are listed below include implementing a national asset management framework which would be built on existing NZTA policies plus the work of the NAMS Group and others. The framework would address many of the investment decision-making issues referred to above, including establishing well-founded levels of service by extending, in discussion with local authorities, the national State Highway Classification System so that all roads follow a national standard road classification system which includes levels of service.

Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

1. Establish a Road Maintenance Task Force Implementation Group with cross-sector representation tasked with:
 - establishing a national asset management framework
 - implementing consistent and enhanced asset management
 - supporting clustering of RCAs and the NZTA where appropriate
 - standardising data.
2. Consider and endorse after consultation the Local Road Classification System proposed by the National Road Classification Working Group which:
 - accommodates the State Highway Classification System
 - identifies the level of service, function and road use (including economic, social and cultural aspects) of local road networks
 - is a key component of the national asset management system

- aligns level of service and maintenance standards.
3. Communicate expectations that RCAs will improve their annual and longer-term programming and planning of works and give early advice of work programmes to suppliers, with the aim of creating opportunities for more efficient delivery and establish a measurement and reporting regime that is designed to aid continuous improvement in programming and planning.
 4. Use existing tools and guidance to support sound investment decision-making that balances whole-of-life cost, level of service and risk, as an element of the national asset management framework. New tools and guidance may need to be developed where appropriate.

2.2 Asset management planning

Under this objective, the Task Force has sought to: understand the planning and priority-setting processes undertaken by RCAs, particularly in relation to local network assets, and including the NZTA in its role as the state highways operator responsible for the maintenance, operation and renewal of road network assets.

Legislative and policy requirements

The Government expects that the managers of crown assets will have ‘sound asset management practices to reduce fiscal and service delivery risks’ and that agencies ‘are expected to manage their infrastructure assets effectively over the whole of their lifespan’ (Audit NZ, 2010).

Asset management plans are a key component of enhanced asset management. As part of their responsibilities under the Local Government Act 2002 local authorities must prepare a long-term plan of which a key input is an asset management plan. This long-term plan includes a statement of intended service provision plus performance measures and targets. The Office of the Controller and Auditor-General audits all local authorities against these requirements and therefore plays a key role in setting the standard of asset management.

The importance of levels of service

Infrastructure asset owners need firstly to understand and define what services infrastructure assets should deliver including the required levels of service and performance. Enhanced asset management practice will help match levels of service with what customers want and are willing to pay for help establish appropriate maintenance standards. The goal of all road network asset management teams is to deliver agreed levels of service for the least long-term cost.

Levels of service are the fundamental building blocks of asset management. Once established, non-financial performance measures and targets are used to demonstrate how the organisation is achieving the levels of service and how financial measures are to be used to monitor efficiency, etc.

One of the Task Force recommendations (recommendation 2) proposes the creation of a national road classification system, as part of a ‘national asset management system’, which will establish for each class of road an acceptable level of service and maintenance standard. The majority of submissions received on the Task Force Interim Report supported the proposed national classification system. Some, however, were concerned about the possible impact of such a system, particularly if this interfered with a local authority’s role in setting levels of service. A national classification system would not impact on that local authority role. Submitters also referred to the possible implications of a national classification system on the funding partnership between the NZTA and local authorities. Consideration of future co-funding arrangements are outside the Task Force scope, however, the principle that the NZTA can (and does) set standards which then influence the level of co-funding that it will provide for an activity is well established within NZTA policies and within the Land Transport Management Act 2003.

Network management planning

Planning is needed to efficiently manage the road network, including the way the network is used and how the road infrastructure assets are managed. Infrastructure asset management provides a robust decision-making framework that establishes sound business processes for the optimal management of assets. To achieve the goal of delivering agreed levels of service for the least long-term cost, the best practitioners of asset management:

- facilitate the trade-off between asset lifecycle cost and level of service provided and risk
- optimise the long-term effectiveness and efficiency of asset operation, maintenance and renewal
- address forecast and actual demand
- identify and implement opportunities for improvement
- demonstrate the value for money obtained from investments
- integrate their programmes with others (eg other utility providers) to minimise total cost to the community.

When road asset management is done well, it delivers effective and efficient management of network infrastructure. Previous reviews of asset management planning and practice indicate that it is highly variable (GHD, 2008) and there is scope for improvement (Audit NZ, 2010). A survey of asset managers by the Task Force showed a range in levels of practice, and that overall, organisations meet minimum legislative and organisational requirements for financial planning and reporting (Waugh & Holland, 2012). The Task Force agrees that, while there is much good asset management and good practice, there is also room for improvement. In a 2008 review of RCA capability in asset management, 28% scored poorly, 47% moderate and 25% good.

Performance measurement is critical for enhanced asset management

To support good asset management and planning, good performance measures are needed. Research undertaken on behalf of the Task Force on the roles and limits of performance measures (Gill & Zuccollo, 2012) indicates that while a lot of data is collected, the quality, type, and analysis of data is inconsistent. Further, the right measures are not always available, or are not always used to inform decision-making.

The Task Force considers that both national and local performance measurement and management frameworks should be reviewed. Performance measurement must support systematic and consistent measurement of the condition of assets and their rate of deterioration through a comprehensive set of measures to be applied by all parts of the sector, where relevant. Standards for each measure would be developed with variations for different road categories, and specific tolerances determined for each measure and road category.

Performance measurement development will need to be coordinated with other measurement requirements (including statutory requirements) and in particular with the work being led by the Department of Internal Affairs to develop uniform mandatory performance measures for local authorities which are intended, amongst other things, to allow for performance comparison / benchmarking.

The Task Force recommends that a nationally consistent data acquisition, performance measurement, benchmarking and management framework be established, and that the NZTA review its RCA monitoring and auditing role to assist in providing feedback on how this is working in practise.

We need a better asset management framework

To achieve better value for money through better asset management in New Zealand, the Task Force considers that some key frameworks need to be developed and implemented. Comprehensive and cohesive frameworks encompassing asset management, levels of service, performance measures, and competencies for asset managers would enable an integrated approach to asset management, supporting practices that are more consistent, efficient and effective. Such a comprehensive framework would need to be developed progressively. The Task Force views the following proposed

initiatives as individually sound and that together they will improve the management and planning of infrastructure investments. Specific initiatives proposed are the development of:

- a transport-specific national asset management framework that provides specific asset management guidance appropriate to the sector
- a national framework for 'levels of service' that provides a single classification system for road categories and a common set of services
- a framework for measuring, monitoring and comparing network consumption trends
- a competency framework for RCA transport asset management personnel to help ensure adequate capability.

NZTA policies and processes would need to be aligned with this asset management framework.

Asset management practice needs to improve in some areas

Previous reviews of asset management plans have concluded that the rate of progress to embrace better asset management has slowed (Audit NZ, 2010; GHD, 2008), leading to inconsistencies in the progress being made to improve the delivery of infrastructural services. Systematic asset management is well understood and described in New Zealand, yet research has concluded that good practice in asset management is not being consistently applied.

The Task Force technical team charged with identifying opportunities to improve both efficiency and effectiveness in the planning of maintenance, operations and renewals considers that this slowing of progress is symptomatic of a systemic failure shown through:

- disconnected strategic and tactical direction across the many delivery chains in the sector
- operational practices and systems that work adequately but with development could deliver a significant improvement in outcomes
- a wide disparity in programme results (in terms of value for money and service delivered) at regional and national levels for both state highways and local roads
- diversity of performance monitoring approaches throughout the asset management cycle
- insufficient incentive for improved practice or insufficient consequence for poor practice at all levels
- limited use of available sector expertise through mechanisms such as collaboration, shared services, or clustering of RCA asset management resources
- resources being diverted from essential planning to management of reactive operational issues.

The recommendations made in this report are intended to address these issues principally through the application of a national asset management framework.

While the Task Force makes recommendations intended to improve planning and asset management practice it recognises that there are already many examples of good practice throughout New Zealand. It also recognises that New Zealand has a reputation for leading in this area. There are several agencies who have worked for many years to improve practice and provide practitioners with the advice, tools and skills necessary. Those who will act on the Task Force recommendations to lift poorer practice to the required level will need to work with the agencies already involved.

As noted above it is the view of the Task Force technical team charged with identifying opportunities to improve both efficiency and effectiveness in the planning of maintenance, operations and renewals considers that significant savings can be achieved.

Better asset management through collaboration

Certain RCA asset management capability and capacity issues can be addressed through greater collaboration between RCAs including through shared services arrangements. Better business models and delivery models including shared services models are discussed in more detail in section 2.4.

An opportunity, being considered in the NZTA's State Highways Maintenance and Operations (M&O) review, is for a national state highway 'strategic asset management group'. Such a group could drive consistency in levels of service and performance measurement, across both the state highway and local road networks.

Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

5. Challenge and build on existing integrated planning (including financial planning) approaches, as an element of the national asset management framework.
6. Provide and promote ongoing access for all RCAs to high-quality asset management advice and mechanisms for continuously improving practice.
7. Develop and communicate expectations, incentives and guidance that minimise practices that emphasise short-term over whole-of-life costs, eg changing the incentive, the FAR rate and/ or the discount rate.
8. Review existing data acquisition methods and standards and compile a nationally consistent data acquisition, performance measurement, benchmarking and management framework that will support enhanced road asset management and sound investment decision-making, monitoring of outcomes and continuous improvement, as an element of the national asset management framework.
9. Review the RCA monitoring and auditing role as currently performed by the NZTA, including the way in which NZTA audit and monitoring findings, conclusions and recommendation are reported and acted on, and make recommendations for change as appropriate.

2.3 Risk management

Under this objective, the Task Force has sought to: provide a specific focus on risk identification, management and allocation by asset managers; and understand the cost and long-term value for money implications of each, including the implications of different approaches to risk sharing between RCAs and their suppliers.

Current risk management practice

While the Task Force agrees that there are many examples of good practice around risk management, this is not always the case. Previous reviews have found that risk management in local authorities is consistently weak in relation to the whole lifecycle of risk (Audit NZ, 2010). The report observes that:

Where risk management was formally documented in planning, it tended to be at either corporate or service level. Few considered risks at both levels. The better organisations made the link between levels of service and risk, rather than just focusing on natural disasters or health and safety.

The Task Force believes there are many opportunities to better manage risk and thus deliver better value for money through investments in road maintenance, operations and renewals.

The Task Force notes that RCAs are often strongly motivated to be risk averse. In some instances the best approach to managing risk will require an RCA to be more risk embracing. Contractors, in particular, advise that there are many instances where risk is passed to a supplier in a way that contravenes the principle that risk should be managed by the party best able to manage it. Risks that no party can control are best retained by the RCA.

Better risk management requires asset managers to apply good risk practice

Successful risk management requires that asset managers understand and competently apply good risk practice. The Task Force has accordingly focused on capability and capacity of asset managers within the sector. Raising the capability of RCA staff in particular would not only reduce supplier selection process costs, but more importantly it would have a positive impact on the whole-of-life costs of road asset provision.

The Task Force-commissioned report *Better Asset Management, Planning and Delivery* (Vaugh & Holland, 2012) pays particular attention to risk and makes a number of recommendations that would impact on risk management practice. The report states that 'asset managers will need to be incentivised to provide honest and realistic communication of issues and the associated risks, rather than build up a robust single position for funding'. To this end the Task Force recommends that asset managers use existing tools and guidance and consider the possible trade-offs between cost, level of service, innovation and risk and make good investment decisions. Better asset management may involve more 'risk taking' by RCAs accompanied by careful monitoring of the whole of life cost impact of decisions.

Managing design risk

The Task Force considers that consultants are sometimes put in a position where they are motivated to be strongly risk averse and therefore less likely to propose designs that strike the right balance between cost, level of service and risk, particularly risk of premature pavement failure.

The following description of the current situation was provided in response to a list of specific 'questions for discussion' posed to suppliers:

A key area of unfair risk allocation that impacts on value for money is that of design risk. Often design risk is carried by design consultants. As design costs are a relatively small proportion of the job but the costs of failure are relatively large, design consultants carrying design risk will naturally take a conservative approach. They get none of the financial gains from a more risky design that substantially reduces build costs but are liable for costs many times their fee in the event of failure. (Roading NZ)

A smart buyer of professional services is more likely to understand risk-related issues like this and work with a consultant to achieve the right balance. A smart buyer will also choose a sound delivery model; for example, there are instances where issues around design risk are better addressed by using a design and build delivery model.

Different delivery models approach risk differently

The different delivery models approach risk, including design risk, in different ways. One of the main distinguishing features is the way in which each model allocates risk amongst the contracted parties. Input-based models typically allocate most risk to the asset owner. In a typical alliance contractual arrangement all parties will win or lose together in accordance with how they jointly manage risk.

Performance-based contracts for asset maintenance, operations and renewals are similarly characterised by their approach to risk with many risks being passed to the contractor. Design risk and the risk of early failure of a treatment lies with the contractor, who employs the designer.

Many risks remain with the purchaser when the 'staged' (often referred to as 'traditional') delivery model is used.

The Task Force-commissioned report *Review of delivery models for works and services* (Opus, 2012) includes a model selection matrix which considers models against a number of selection criteria including transfer of client risk (see Appendix 3).

Regardless of the delivery model chosen, the way in which the parties choose to work together on a day-to-day basis will also have a significant influence on how risk is mitigated or avoided and on the cost consequences. In the longer term many of the consequences, good or bad, of risk-related decisions made under a contract will fall back on the asset owner.

Risk allocation in New Zealand's standard general conditions of contract (NZS3910)

The Task Force has noted the risk consequences of modifications to standard form contract documents made by RCAs, which have been cited as a source of significant unnecessary cost to the sector.

The following description of the current situation was provided in response to a list of specific 'questions for discussion' posed to suppliers:

Risk is generally apportioned fairly under the standard form of contract conditions, NZS3910 to the party best able to manage the risk... Some RCAs tamper with the standard conditions in an attempt to transfer the risk to the contractor. The consequence is that if the risk transfer is identified at the time of tender the contractor will price accordingly or where not identified the contractor's business will struggle to accept the risk if it eventuates and in some rare instances

the business will fail. The result is that the client will inevitably pay more, receiving reduced value for money. (New Zealand Contractors' Federation)

Again, to address practice issues of this nature, we need all asset owners to have access to adequate smart buyer capability and to understand the consequences of their decisions.

Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

10. Define and communicate expectations of RCAs in relation to uptake of training and development opportunities for their asset management staff so that they continually build or refresh their knowledge and experience as asset managers, including as 'smart buyers' of works and services
11.
 - a. Review the availability of specific asset management training (including 'smart buyer' training) and other related opportunities and develop a catalogue of same.
 - b. Develop options to support training, particularly in asset management (including 'smart buyer') practices, in the event that there are significant gaps, including possibilities for direct provision.

2.4 Delivery of maintenance, operations and renewals

Under this objective, the Task Force has sought to: provide a specific focus on how road infrastructure is operated, eg to manage traffic demand and deliver lighting services; how the assets are maintained, eg repairing potholes; and how RCAs respond to issues that arise from the deterioration of road infrastructure, including how they employ contractors, consultants, and their own and other resources as they work to minimise the long-term costs of delivering the required level of service to users.

The RCA's delivery role

The Land Transport Management Act 2003 gives RCAs a great deal of flexibility as to how they obtain the works and services required to deliver road maintenance, operations and renewals. The way in which an RCA procures services is an important determinant of the value for money achieved.

Professional and administrative support services can be obtained in-house or outsourced and can be procured alone or jointly with other RCAs. These decisions are up to each RCA.

All 'physical works' must be procured through an NZTA-approved procurement procedure. All work must be outsourced, with only a few exceptions in place. The Land Transport Management Act and the NZTA's procurement policies give RCAs wide scope for establishing partnerships with the private sector to deliver works and services. Again they can procure alone or jointly with other RCAs, including the NZTA.

Contract/delivery models

Beginning with the legislative reforms of the late 1980s and the progressive outsourcing of nearly all roading physical works activity, the public roads sector has seen a steady change in the capability, capacity and structure of the supplier community. The supplier community has evolved to meet the changing needs of RCAs and can reasonably be expected to continue to evolve.

The relationship between RCAs as purchasers and the suppliers of works and services (recognised formally as 'delivery models') has also evolved. This evolution has tended towards a more collaborative nature. Broadly the Task Force agreed that a collaborative relationship between the contracted parties is beneficial.

The Task Force noted that a number of formal delivery models are available and has come up with broad advice on delivery models:

- Models that give a short-term focus should be avoided.
- As a default position physical works should be lump sum contractual arrangements. However, there are many circumstances where care is needed with lump sum arrangements⁶.
- The evidence for claimed efficiency gains through the use of outcome-based models is limited⁷.

The use of an outcome focus and a lump sum price mechanism clearly provides the incentives required for the supplier to become more efficient. For an RCA to be able to use an outcome-based model effectively it will have to be able to specify the outcome required. This demands a high level of

⁶ For example, without a suitable maintenance period or warranty, lump sum design and build can result in short asset lives.

⁷ Often because other things also change, eg service levels.

knowledge of the current state of network assets from the beginning of the contract. A sound comprehensive performance measurement regime is therefore essential for supporting and enabling an outcome-based approach. Outcome-based models typically pay more attention to addressing risk and will typically be associated with enhanced 'joined up' asset management.

Whether RCAs adopt suitable delivery models and whether suppliers are able to operate successfully under the models selected is in part a capability issue.

Contract size and term

NZTA competition monitoring data shows that contract size has grown over time. There has been a trend towards more aggregation and bundling of work within single contracts. Many sector participants believe that larger contracts often bring efficiency gains through economies of scale.

There has also been a trend towards longer contract terms. In the early 1990s, the standard term service contract had a maximum of three years, which was later increased to five years. The NZTA has also granted approvals for a number of 10-year contracts and Auckland Transport proposes to transition to eight-year maximum term contracts for network maintenance.

The supplier market

Balanced against the desire to establish contract sizes that are both fiscally and economically efficient is the need for competition across suppliers to remain strong. The market must remain able to sustain a sufficient number of willing and able suppliers.

The maintenance, operations and renewals physical works market is divided amongst a large number of suppliers, with the two largest suppliers winning over half of the total value of work. However, it appears competition for contracts is strong with most contracts attracting more than one tenderer. The average number of tenders received remains relatively constant, generally between 3 and 5, although recently it has been towards the high end of the range. Less information is available on professional services contracts. A subset of this market, focused on state highways, again shows two dominant players who together share more than half of the market.

The conclusion from research commissioned for the Task Force (PricewaterhouseCoopers, 2012), based in part on market share information, is that the markets for both physical works and professional services are currently healthy. Further, this report concludes that there is scope for further aggregation and bundling to more effectively and efficiently deliver outcomes. The report authors believe that this will not significantly reduce competitive forces in the market, but note that this is a risk.

These conclusions are supported by the majority of Task Force members. However, the New Zealand Contractors' Federation does not agree with the PricewaterhouseCoopers report finding that the current market situation is healthy and in particular takes issue with the use of market share and number of tenders received as the primary indicators of same. The Federation argues that the market would be healthier and better value for money would be achieved if the current trend towards larger and longer-term contracts were to slow.

In acknowledging the risk that further aggregation and bundling may reduce competition and 'hollow out' the structure of the industry the PricewaterhouseCoopers (2012) report notes that:

To ensure healthy competition in the sector is maintained, consideration should be given to the scale of aggregation and bundling, maintaining a desirable mix of contract lengths, and the number of capable tenderers.

Task Force Interim Report submitters, from across the sector, have stated that in their view further aggregation and bundling poses a risk to the health of competition, particular at the local level. Local supplier issues are commonly affected by contract size and scope and need to be considered.

A sound procurement strategy which takes account of the local procurement environment is essential. Before an RCA amends its procurement strategy it must engage with those who would be affected. This allows for a discussion about the detail of any proposed changes including any changes to the level of aggregation and bundling. The Task Force believes that such a process is useful for all parties involved.

RCAs also need to be mindful of the risk that large contracts may become inefficient and lose customer focus.

Collaboration and clustering

The Task Force agrees that there are efficiency and effectiveness gains to be had through RCAs working together to a greater degree than they do currently.

In order to lift efficiency and increase value for money the most promising opportunity is for RCAs (including the NZTA, local authorities and the Department of Conservation) to strongly collaborate and, where appropriate, jointly manage, plan and deliver maintenance, operations and renewal works.

Following such a process could lead to efficiency gains as large as 20% in some locations (Rationale Ltd, 2012). Where a 'one network' approach is also adopted further benefits are possible, such as greater network optimisation.

Opportunities for collaboration and clustering will vary across the nation. The Task force expects that any proposal to collaborate or cluster will be thoroughly investigated and that no proposal will proceed until the benefits are proven.

Options for collaboration and clustering

The Task Force has considered a wide range of ways in which RCAs could work together to increase efficiency and effectiveness in the delivery of maintenance, operations and renewals. They range from relatively simple forms of 'collaboration' between two or more RCAs to what is being referred to as 'clustering' in which two or more RCAs establish a single 'unit' which provides asset management planning and delivery services to all the RCAs involved. Collaborative procurement arrangements may or may not be part of an arrangement between RCAs.

Options for collaboration and clustering are listed below:

- **Local collaboration** – in which adjacent RCAs choose to work together on matters of common interest.
- **Regional or national collaboration** – in which a wider group of RCAs work together on matters of common interest. Where only local authorities are involved such collaboration is often facilitated by Local Government New Zealand. The RCA Forum is an example of national

collaboration. Convened by the NZTA, the Forum involves the NZTA plus all local authority RCAs and the Department of Conservation.

- **Collaborative procurement** – in which two or more RCAs aggregate or bundle works or services into a larger package and let one contract. There are a number of examples of this.
- **Shared services arrangements** – in which two or more RCAs work together to deliver a service. Manawatu and Rangitikei Districts have such an arrangement where a single road asset management planning team services both local authorities.
- **Clustering** – Future clustering models may use a council controlled organisation as the asset management planning organisation for two or more RCAs. Auckland Transport is akin to such an arrangement in that it is a council controlled organisation managing assets for one local authority, Auckland Council.

Possible benefits of collaboration and clustering

Benefits variously arising from the different options include:

- the ability to retain experienced staff with a greater level of knowledge of the whole network
- enhanced decision-making ability of staff to make the right decisions at the right time for the network, which can result in cost savings
- the ability to attract suitably qualified staff, as the environment created by a shared services agreement allows greater career progression for staff.

Possible criteria for examining collaboration or clustering options

The Task Force concludes that the following criteria could be applied to identify possible collaboration or clustering groupings which could then be considered in terms of their practicality, political acceptability and ultimate savings. The possible criteria include:

- the total length and shape of the network, taking into account density and response times from contractor depots
- the geographic compatibility and practicality of placing appropriate depots in relation to materials, equipment and labour plus accessibility/remoteness
- the competency and attractiveness of the area to retain skilled asset management staff and appropriately link back to funders
- the impact of 'buy local' policies
- the ability to maintain competitive markets
- the willingness of partners to enter into collaboration arrangements, including political support.

All but the last of the above criteria are not only relevant when considering proposals involving two or more RCAs but are equally applicable to any proposal to change procurement arrangements through a change in aggregation or bundling.

Encouraging RCAs to consider clustering

Though the Task Force agrees that working together is ultimately a good thing, specific recommendations cannot be made as actual arrangements will be location specific. The Task Force also recognises that local authorities procure more than simply roads. They deliver other utilities which can impact on their ability to cluster and collaborate.

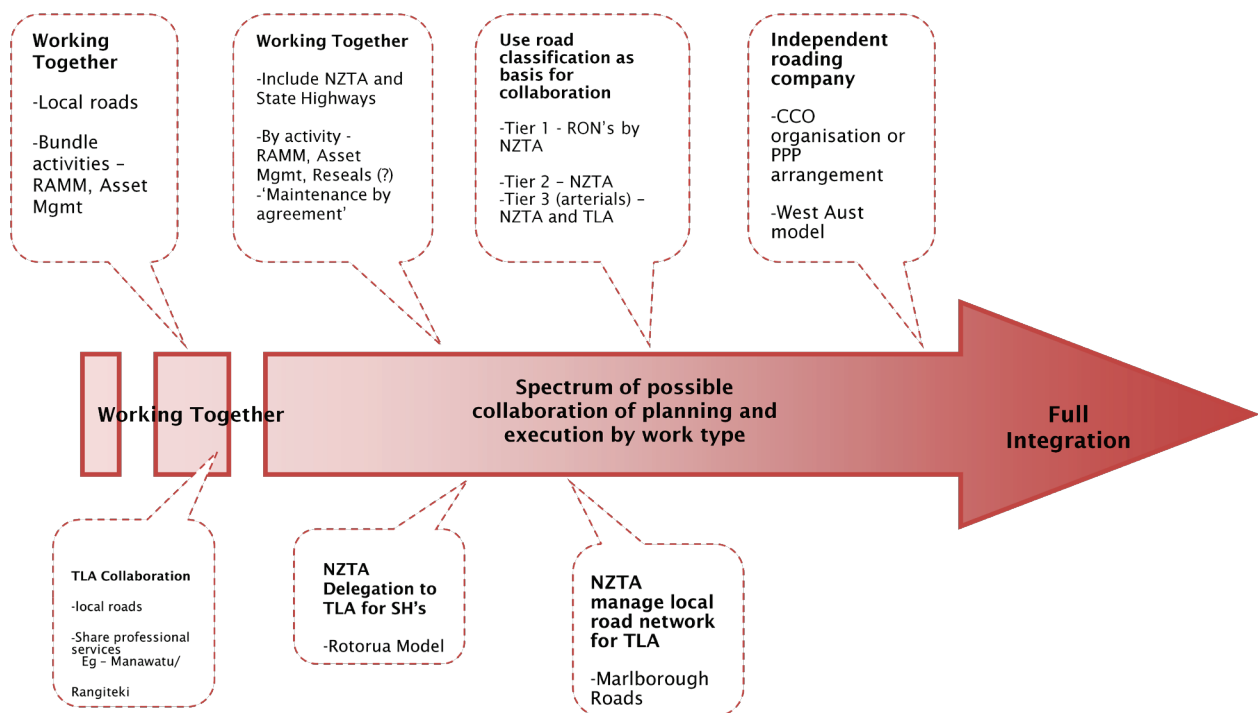
The Task Force agrees that a prescriptive approach is unlikely to work. To this end the Task Force believes it should only incentivise the consideration of collaboration or clustering and encourage its adoption where appropriate. This could include calling for the amendment of the NZTA's Investment

and Revenue Strategy or adjustment of the co-investment arrangements. These and other options could be explored by the sector as part of the Investment Strategy and FAR reviews for the 2015–18 NLTP.

Submissions received on the Task Force Interim Report indicated that any incentive proposal from the NZTA that would impact on co-investment arrangements with local authority funding partners would need to be subject to careful scrutiny and consultation. The details of any incentive mechanism would need to be carefully worked through with funding partners.

Figure 3 below (Rationale Ltd, 2012) shows the range of opportunities for collaboration and clustering, from working together to establishing a fully independent roading company to serve more than one RCA.

Figure 3: Opportunities for collaboration and clustering



Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

12. Undertake further analysis to identify procurement issues that hinder the achievement of obtaining value for money, and consider options for resolving those issues through regular meetings of sector participants.
13. Communicate expectations that RCAs will consider and, where the benefits are proven, adopt different forms of collaboration and clustering arrangements, aimed at increasing efficiency, as well as quality and effectiveness of asset management practices.
14. Develop and use guidelines and tools to support and strengthen RCA considerations in appraising the governance, management, technical and value for money implications of the full range of options for collaboration and clustering.
15. Monitor the success, failure and learning points of any new collaboration or clustering arrangements plus use of alternative contract / delivery models or changes in the degree of

aggregation or bundling of works or services in order to strengthen the guidance and increase the opportunity for success.

2.5 Innovative procurement methods

Under this objective, the Task Force has sought to: provide a specific focus on how RCAs relate to suppliers through their procurement methods and the forms of contract they use, and how those practices impact on the cost to suppliers and the management and allocation of risk between purchasers and suppliers.

Supplier selection process and contract improvements

The Task Force attempted to ascertain the cost of the supplier selection process through surveys of both suppliers and RCAs. Contractors estimate that the annual cost to them of participating in tender processes is in the order of \$90 million. RCAs estimate that the cost to them is in the order of \$20 million. These figures are only estimates, although the Task Force believes efforts to reduce these costs are worthy of consideration.

The Task Force particularly focused on the potential cost savings to be made by simplifying supplier selection process or contractual relationships. The Task Force believes that greater use of unmodified standard documents would make both the supplier selection process and contractual relationships more efficient. A proposal to make changes to NZTA policies to bring this about is described under section 2.7. The Task Force reviewed a number of other specific proposals, but noted that further investigation was required to reach a definitive view.

The Task Force strongly agreed that care was required to ensure the standardisation of documentation does not stifle innovation. Striking the right balance demands the skills of a 'smart buyer'.

The need for 'smarter buyers'

A theme that underpins a number of the conclusions of this review is that RCAs must be both efficient and effective managers of their road assets and smart buyers of the services they require. These issues strongly relate to the concept of 'smart procurement' with a balanced focus across 'the three Es':

1. economy – through securing (or supporting) the provision of products, materials and expertise at the quality, in the volumes and at the times and locations required, at the lowest price
2. efficiency – through the processes used, including standard documentation and contracting forms selected for achieving best cost / quality and outcomes; and knowledge of the product / materials and supplier market applied
3. effectiveness – taking opportunities for changing from traditional products and materials by maintaining support for innovation in the nature and characteristics of products and materials, and for a strong supplier market.

The impact of raising the capability of RCAs would include reduced supplier selection process costs, better management of risk and more objective assessment of performance for use in future supplier selection processes.

The contracting industry has provided the following useful analysis of the characteristics of a smart buyer:

Some RCAs are smart buyers but this is believed to be the exception.

Smart buyers have:

- *An improved understanding of costs that better inform their decision making process*

- *An understanding of the impact delivery models and supplier selection criteria can have on the value of contracts*
- *Robust forward work programmes that are communicated to the industry and supported by budgets that allows the work to be completed*
- *Knowledge of the network to determine treatments required based on physical evidence and supported by knowledge of the costs involved*
- *In house expertise that aids the decision making process and allows acceptance of innovative solutions possibly with or without the involvement of consultants*
- *A clear understanding of risk and how it is allocated and managed*
- *An understanding that lowest price will not always deliver desirable outcomes*
- *An understanding that being prepared to pay more may result in enhanced whole of life value for money.*

Not so smart buyers:

- *Award contracts predominately based on price – with little appreciation of any risk to best value for money*
- *Outsource work to the detriment of asset knowledge*
- *Choose contract forms that are fashionable, not well understood and poorly managed*
- *Lack technical and contractual management skills*
- *Lack asset management skills that prevent the development of robust forward work programmes*
- *Do not support forward work programmes with appropriate budgets.*

Task Force members debated the nuances around individual items in these lists but believe that they provide a platform on which to build a list of the characteristics that would be exhibited by an RCA that has the capability and the capacity to be a smart buyer.

One Task Force member described a smart buyer in the following terms:

A 'smart buyer' RCA ensures its staff are up-to-date, regularly shares best practice experiences with colleagues from other agencies, and supports and resources their teams appropriately in the recognition that getting the strategic direction right is a very small cost compared to the consequence of getting it wrong. This requires staff to be involved in regular training, attendance and participation in sector gatherings, and involvement in NZTA investigating teams and the like. Ironically in the interests of 'cost-saving' many agencies are limiting staff involvement in these activities. A smart buyer does not ask the question – what if I train my staff and they leave? – but rather asks the question – what if I don't train my staff and they stay?

Smart purchasing through collaboration

Certain RCA smart buyer (and asset management) capability and capacity issues can be addressed through greater collaboration between RCAs, including through shared services arrangements.

Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

16. Amend the NZTA's procurement framework to mandate requirements for RCAs to:
 - a. use standard form documentation where available, including specifications for processes and materials
 - b. justify changes or amendments to standard forms for individual contracts against named criteria, including whether it is best value for money to do so
 - c. be transparent within the documentation about any changes or amendments to standard forms for individual contracts.

2.6 Innovative services and products

Under this objective, the Task Force has sought to: provide a specific focus on options for services and products that are different from those commonly used on the basis that they provide opportunities for lower investment costs and/or lower whole-of-life cost, by either reducing maintenance costs or increasing average economic life.

Innovative products

There is nothing preventing innovation around products, materials and methods of delivery of works and services. The degree to which innovation actually occurs, however, greatly depends on a large number of factors including the practices of individual RCAs and the delivery models and contractual arrangement employed. 'Smarter buyers' will generally create an environment that is more open to reasonable innovation.

Although there has been some discussion through the current review of a number of specific proposals, further investigation is required.

The contracting industry has provided the following specific examples of innovative materials or methods that could be used to deliver better value for money but are difficult to introduce:

- *Lower quality aggregates. There is no mechanism to obtain approval of these.*
- *The use of recycled products for non-structural base course or pavements.*
- *Innovative stabilization techniques and materials for basecourse construction or rehabilitation.*
- *Polymer modified asphalts – not uniformly accepted across RCAs.*
- *Use of Emulsion to extend the sealing season, improve safety, reduce cost of sprayers and capital investment.*
- *Warm mix asphalt that reduces energy costs.*
- *Develop specific performance criteria for treatments that may allow the use of innovative materials or methods.*

These specific proposals need to be further investigated – including investigating what barriers exist to their introduction and wide adoption and what action the sector may need to take, both in relation to specific examples and at a policy level, to ensure that opportunities to deliver better value for money are pursued.

More effective ways to encourage and trial innovative products and services, and share findings, need to be investigated.

Road lighting case study

Research commissioned for the current review on *Strategic Road Lighting Opportunities for New Zealand* (Bridger, 2012) focused on opportunities and barriers to achieving better value for money through investment in road lighting. The research suggests that there is an opportunity to reduce expenditure and improve outcomes through a strategic approach involving the use of a public-private partnership contract model. The research concluded that if appropriate delivery models are employed substantial annual savings along with safety and other benefits could be achieved. Electricity supply is one of several issues that warrant further investigation.

A number of local authorities (including two with significant road lighting needs) are currently investigating innovative approaches to road lighting service delivery and drawing on this research.

The Task Force believes this case study and others have highlighted potential barriers to commercial development of innovative products that warrant further investigation.

Recommendations

That the sector works together to develop policies, guidelines, processes, management and governance structures, and incentive mechanisms as necessary to:

17. Pursue the use of new materials, technology and methods where appropriate, including alternative procurement methods and delivery models.

2.7 Good practice guidance and tools

Under this objective, the Task Force has sought to: identify opportunities for wider use of tools and guidelines that support common understanding and application of any policies, procedures and frameworks (classifications, measures, standards, etc); and promulgate tools and guidelines, such as standardised and harmonised contract documentation, examples of good practice risk identification, management and allocation, and so on.

Standard form contract documents

There is a significant amount of anecdotal evidence that the practice of making unnecessary and sometimes confusing changes to standard form contract documents is relatively common. There is also a consensus that greater use of unmodified standard documents (agreed by industry) would add efficiency to both the supplier selection process and contractual relationships. The Task Force notes that existing powers under the Land Transport Management Act 2003 are sufficient to allow the NZTA to develop more explicit requirements in this area.

Principles to be considered for guiding the use of standard documents include:

- **minimising variations** – standard documents should not be modified unless there is a very good reason for doing so
- **visibility** – any modifications must be made clearly visible
- **risk awareness** – the risk sharing implications of any change must be clear
- **rationale** – the purchaser must be able to clearly justify a change.

Whatever changes are made in requirements and procedures aimed at minimising inefficiencies through modifying standard documentation, those changes must not stifle reasonable innovation.

The Task Force agrees that the NZTA should amend its procurement manual to bring the above changes about. Any procurement manual rule changes would be enforced as all current procurement rules are: namely through NZTA audits, by responding to complaints, and then using existing powers if necessary to take action.

Greater use of standard specifications and other contract documents

A range of standard documents are currently used by the sector, and could be more widely used immediately or drawn on in developing new documents and procedures.

The Task Force agrees that the NZTA should continue to work with the sector to identify and implement opportunities for greater use of standard documents. Ensuring that RCAs make good use of standard documents, guidelines and tools is in part a smart buyer issue and the recommendations are addressed elsewhere in this report.

A framework for network management planning

To achieve better asset management in New Zealand, the Task Force believes some key frameworks need to be developed and implemented. Comprehensive and cohesive frameworks encompassing asset management, levels of service, performance measures and staff competencies would enable an integrated approach to asset management, supporting practices that are more consistent, efficient and effective.

Initiatives (listed above in section 2.2) to develop these frameworks would require the development and adoption of various standards, guidelines and tools.

Recommendations

There are no specific recommendations for this section. The previous recommendations adequately encompass guidance regarding good practice and tools.

APPENDIX 1 – ROAD MAINTENANCE TASK FORCE TERMS OF REFERENCE

Purpose

The purpose of this Task Force is to identify opportunities for efficiencies in delivery of operations, road maintenance and renewals, including innovative services, products and methods of procurement, and to encourage their consistent uptake through the country.

Background

Funding from the National Land Transport Programme is allocated for the operation, maintenance and renewal of both local roads and state highways. The levels of funding for these activities are set with the aim of ensuring the asset condition is maintained to achieve target levels of service, while at the same time providing funding pressure to realise efficiency gains. Anecdotal evidence suggests there are opportunities to create greater efficiencies, for example by fostering an environment that supports using innovative products, alternative methods of procurement, sharing best practice and standardising contract documentation.

Task Force objectives

The Task Force objectives are to:

1. understand the cost drivers of maintenance and renewal activity and their relative importance
2. identify opportunities to improve both efficiency and effectiveness in the planning and delivery of operations, maintenance and renewals, that achieve least whole-of-life cost for the network and enhance community well-being
3. identify innovative services, products and methods of procurement to achieve value for money and a safe network
4. identify examples of best practice standards and guidelines, including standardised and harmonised contract documentation, that could be implemented
5. better understand the cost implications of risk transfer associated with planning and delivery of operations, maintenance and renewals and identify examples of good practice in risk identification, management and allocation to deliver better value for money across the Industry
6. promulgate the uptake of the Task Force findings
7. consider the benefits of continuing the Task Force approach, with the aim of fostering best practice and collaboration in the sector.

Task Force membership

The Task Force Governance Group will comprise representatives from the following organisations:

- NZ Transport Agency
- Local government representatives from the rural, provincial and urban sectors
- Local Government NZ
- NZ Contractor's Federation
- Roothing New Zealand
- Association of Consulting Engineers NZ

Timeframes

The Task Force work will be undertaken in three stages:

Stage 1 (July – August 2011)

Establish scope and plan.

Stage 2 (March 2012)

Undertake investigation/research.

Develop and publish findings.

Stage 3 (April 2012)

Promulgate findings of the Task Force.

Roles and responsibilities

Convenor (NZ Transport Agency)

- To organise and chair the meetings of the Task Force Governance Group
- To draft and circulate minutes of the Task Force.

Members

- To attend and actively participate in the meetings of the Task Force.

In order to facilitate the work of the Task Force, the Task Force Convenor will chair the Governance Group. Technical working groups will be established which will provide the Task Force with analysis and advice. The Task Force Convenor will also form a small Secretariat that will provide logistical support to both the Task Force and the Working Group.

Resources

Each organisation will make a commitment to ensure Task Force members are given the responsibility and time to fully commit to the group. Participating members will be expected to meet any costs arising. The NZ Transport Agency will meet the costs of attending meetings of the Task Force and technical working group members, such as the additional cost of travel.

The administrative costs for establishing and supporting the Task Force will be met by the NZ Transport Agency.

Communication

For Task Force communication, the Convenor will be the first point of contact.

Expectations

The Task Force findings may encourage better practices and inform decision making to ensure value for money. The NZ Transport Agency will present the findings of the Task Force to the Minister of Transport.

APPENDIX 2 – ROAD MAINTENANCE TASK FORCE: RESEARCH SCOPES (OUTLINES)

Title	Better Asset Management, Planning and Delivery
Hypothesis	If ... we (the sector) ensure that all road network management units are making sound road asset management decisions then this will lead to an improvement in efficiency, effectiveness and whole of life value for money in delivery of road maintenance operations and renewals.
Problem definition statement	Currently there is a perception that there is an asset management capacity and capability gap within the sector so sub-optimal programmes are being delivered.
Scope – included	<ol style="list-style-type: none"> 1. An analysis of current road network asset management practice to understand how the sector is structured and resourced with respect to the levels of capability and capacity. 2. An estimate of how much can be gained from fit for purpose asset management practice in New Zealand. 3. The characteristics of best practice (economically optimal / best value for money) decision making around investments in asset maintenance, operations and renewals – with particular focus on optimal decision making around renewals investment – both in terms of technical detail of what to invest in (the determinants of cost and durability) and the timing of the investment. 4. The characteristics of best practice risk identification and management, identifying risk adverse behaviours that result in a premium in costs for our investment in maintenance operations and renewals. 5. Are the sectors’ current indicators the right indicators, measured at the right frequency, for predicating future maintenance and renewal requirements and for benchmarking - and if not what indicators should be used? 6. What perverse behaviours are driven by the Road Controlling Authorities (RCAs) performance measurement regime? For example do some performance measures (or targets) encourage wasteful investment? 7. What innovative approaches (including international) to performance measurement and monitoring are there which could used to help RCAs improve performance in maintenance and renewal? 8. Any legislative or government policy issues which will hinder adoption of changes recommended by this research (eg s5.10 of the Local Government Act 2002) 9. The potential costs and the benefits (short medium and long term) of the recommended changes 10. The skills needed across the sector to deliver the improvements in asset management planning and delivery that are envisaged by the recommendations. 11. Whether clusters of asset management expertise amongst RCAs could result in better outcomes.
Scope – excluded	<ol style="list-style-type: none"> 1. Examination of current practice needs to be no more extensive than is needed to establish what is seen as good practice in New Zealand and in any other jurisdictions that are seen to be leading in the asset management field. 2. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project and with the work to the NZTA’s state highways Maintenance and Operations Review to avoid duplication of effort.

Title	Collaboration and clustering amongst road controlling authorities
Hypothesis	<p>If ... we (the sector) assist road controlling authorities (RCAs) to collaborate (and cluster if necessary) with other RCAs (both TAs and SHs) to ensure that the scale of road networks (managed as one unit) is optimal and the delivery of activities is optimal then this will lead to an improvement in efficiency, effectiveness and whole of life value for money in delivery of road maintenance operations and renewals.</p>
Research purpose	<p>The purpose of the research is to review the current extent of collaboration and clustering amongst RCAs (including between local authorities and the NZTA as state highway operator) and investigate the optimum application of both in New Zealand.</p>
Scope – included	<ol style="list-style-type: none"> 1. Identify and investigate how collaborative models operate across NZ and overseas, and draw some conclusions on the most appropriate forms or aspects of each model, which are likely to deliver more effective and efficient network management. Investigation should cover existing examples plus the emerging thinking on arrangements now being considered. <ul style="list-style-type: none"> • Marlborough Roads (existing) • Rotorua District Council (existing) • Manawatu and Rangitikei District Councils (existing) • Western Bay of Plenty District and the NZTA (existing) • Napier/Gisborne State Highway Network (existing) • Southland, Queenstown Lakes (Central Otago) SHs and LRs plus Northland (emerging) 2. Identify the factors that should be considered when determining the size and shape of a network business based on intelligence from current practice considering the impact on supply chains through matters which could include, road length, annual spend, annual variation in spend, variability of road type, geographical 'density', etc. 3. Identify any governance and funding issues that would have to be addressed to ensure the success of a cluster. 4. Identify the success (implementation) factors that will ensure a politically acceptable, workable, efficient, effective, etc cluster arrangement. 5. Estimate the potential dollar savings to NZ, which could be achieved through the optimal level of collaboration and clustering. 6. Review the legislative and policy frameworks around collaborative working and clustering and identify any constraints/opportunities.
Scope – excluded	<ol style="list-style-type: none"> 1. Examination of current arrangements need be no more extensive than is needed to establish the approximate scope and extent of current collaborative arrangements. 2. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project and with the work to the NZTA's state highways Maintenance and Operations Review to avoid duplication of effort.

Title	Cost drivers for road maintenance operations and renewals
Hypothesis	If ... we (the sector) improve our understanding of the current drivers of cost and identify opportunities to reduce costs then this will lead to an improvement in efficiency, effectiveness and whole life of value for money in delivery of road maintenance operations and renewals.
Research purpose	The purpose of the research is to analyse costs, to gain a full understanding of what drives current costs and to identify opportunities to reduce whole of life costs.
Scope – included	<ol style="list-style-type: none"> 1. Establish the delivery costs for a sample of RCA networks and activity types. 2. Identify the cost drivers for maintenance, operations and renewals during the past decade and any opportunities to reduce waste in the delivery system in the short, medium and long term (specific level of service examples identified as potential areas for savings include vegetation control and traffic management). 3. Review current requirements and expectations placed on RCAs and service providers (by the NZTA, by legislation and others) around whole of life costing and obtaining value for money including requirements related to the use economic evaluation techniques and the discounting of future costs and benefits. 4. Future opportunities to be identified to reduce cost/improve output (including alternative methods and materials) 5. Reallocation of risk to the most appropriate party. 6. Any legislative or government policy issues which will hinder adoption of changes recommended by this research. 7. The potential costs and the benefits (short medium and long term) of the recommended changes.
Scope – excluded	<ol style="list-style-type: none"> 1. Examination of current practice needs to be no more extensive than is needed to establish what is seen as good practice in New Zealand around managing costs. 2. This area of research is strongly related to the asset management capability and capacity area. 3. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project and with the work to the NZTA's state highways Maintenance and Operations Review to avoid duplication of effort.

The following three research topics will be managed together by one cross sector team

- Standard documentation
- Procurement delivery models for works and services
- Healthy markets for the supply of outputs

Title	Standard documentation
Hypothesis	If ... we (the sector) ensure that the practice of altering standard contract documents is significantly reduced and made transparent then this will lead to an improvement in efficiency, effectiveness and whole life value for money in delivery of road maintenance operations and renewals – and in particular consistency of documentation and understanding of where risk lies resulting in lower administration and tendering costs and quicker delivery of documents to the market.

Research purpose	To identify smart buyer best practice in contract documentation
Scope – included	<ol style="list-style-type: none">1. Current practice around the use of the standard documents (including NZS3910, CCCS, SOMAC, 'C' series specifications) and in particular the frequency and extent of modification and the transparency (visibility) and cost of the modifications made in legal reviews, consultants reviews and by the principal to the contract. Cost should include the cost to the purchaser, the suppliers or the other tenderers and cover both the immediate and real costs associated with modifying a standard document and the 'risk premium' cost associated with the uncertainty created by a non-standard document.2. Opportunities to coordinate with the SNZ review of NZS3910.3. The NZTA's HNO documentation procedures.4. The rationale for modifying standard documents.5. How to reduce unjustified alteration to standard documents and ensure that any alterations are clear to readers - without unreasonably stifling innovation and the use of alternative documentation.6. Opportunities to reduce documentation compliance costs by moving to standard documents.7. Any legislative or government policy issues which will hinder adoption of changes recommended by this research.8. The potential costs and the benefits (short medium and long term) of the recommended changes.
Scope – excluded	<ol style="list-style-type: none">1. Examination of current practice needs to be no more extensive than is needed to obtain a rough estimate of the extent (and the cost) of modification and the extent of any lack of visibility of modification.2. Intervention levels and levels of service.3. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project and with the work to the NZTA's state highways Maintenance and Operations Review to avoid duplication of effort.

Title	Procurement delivery models for works and services
Hypothesis	<p>If ... we (the sector) improve our understanding of the characteristics of the delivery models currently employed in New Zealand and in other jurisdictions and disseminate that understanding throughout the sector then this will lead to an improvement in efficiency, effectiveness and whole life value for money in delivery of road maintenance operations and renewals – and in particular inclusive procurement processes that deliver appropriate quality and facilitate cost savings without increasing barriers to market entry on suppliers.</p>
Research purpose	<p>The purpose of the research is to determine the advantages and disadvantages of the various procurement delivery models available for the delivery of best value for money road maintenance operations and renewals, determine what is required to make each successful and make recommendations to ensure that RCAs choose the best model for their purposes.</p>
Scope – included	<ol style="list-style-type: none"> 1. Establish what is best practice in existing models of procurement and delivery: <ul style="list-style-type: none"> • their advantages / disadvantages (cost and benefits) considering the total system - the complete supply chain • the roles played by both consultants and contractors and the capability and capacity required of suppliers • the capability and capacity required by an RCA to employ each model • the way in which each identifies, manages and shares risk amongst the parties involved • the degree to which each encourages / discourages innovation. 2. Review current processes for judging / deciding between models and the level of support required by RCAs. 3. Explore scope for supply contracts for materials including bitumen and aggregate. 4. Estimate how much could be saved (and how much value could be added) through wider use of good practice delivery models. 5. Any legislative or government policy issues which will hinder adoption of changes recommended by this research.
Scope – excluded	<ol style="list-style-type: none"> 1. Examination of current practice needs to be no more extensive than is needed to establish what is seen as good practice in New Zealand and in any other jurisdictions that are seen to be leading in the asset management field. 2. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project and with the work to the NZTA’s state highways Maintenance and Operations Review to avoid duplication of effort.

Title	Healthy markets for the supply of outputs
Hypothesis	If ... we (the sector) improve our understanding of the health (including the competitiveness) of relevant markets (supply chains), identify issues that will adversely impact the sustainability of markets, their competitiveness and their efficiency and act to address any issues then this will lead to improvement in efficiency, effectiveness and whole life value for money in delivery of road maintenance operations and renewals.
Research purpose	The purpose of the research is to identify issues and propose solutions that will ensure a healthy supply chain that maintains, operates and renews road assets while obtaining value for money.
Scope – included	<ol style="list-style-type: none"> 1. An analysis of RCA procurement strategies and strategic practice including advice of future works and services (programmes) and coordination amongst adjacent RCAs - including coordination of tendering of works and services. 2. Identification of any issues around the ease with which suppliers can enter (or exit) markets and in maintaining healthy levels of competition. 3. Identification of any issues around the involvement of smaller firms (SMEs) in service delivery including any issues when those firms act as subcontractors. 4. Identification of any issues around the size and scope of contracts (though aggregation and bundling). 5. Identification of any issues with supplier selection practices including establishing where there are opportunities to reduce the total cost of supplier selection and opportunities to encourage innovation. 6. Identification of any issues including the impact of an aging workforce around service delivery capability and capacity. 7. Describe current practices around bonds, retentions and insurances and identify the total costs of same and opportunities to reduce current cost and any risks or other issues associated with change. 8. Do current NZTA's policy requirements (and expectations) create any issues? 9. Are there any RCA 'smart buyer' capability or capacity issues that are adversely affecting the health of the supplier industry? 10. What are the minimum smart buyer capabilities, what are the options available to obtain them (insourcing / outsourcing) and what are the benefits of smart buyer capability and capacity. 11. Is risk allocation through contracts appropriate? 12. Are we using short listing, supplier panels and prequalification systems (ways to reduce the cost of the supplier selection process) well? 13. Review the use of PACE and other supplier performance monitoring schemes. 14. Is practice (and NZTA rules) around the term of a term service contracts appropriate? 15. Any legislative or government policy issues which will hinder adoption of changes recommended by this research. 16. The potential costs and the benefits (short medium and long term) of the recommended changes. <p>Note: The research needs to recognise that the consultant and contractor markets are essentially separate markets and distinguish between perception and reality.</p>
Scope – excluded	<ol style="list-style-type: none"> 1. Work under this research topic will need to be coordinated with the other areas of research for the Road Maintenance Task Force project (to avoid overlaps) with other areas – including work under the topics cost drivers and asset management capability and capacity and with the work to the NZTA's state highways Maintenance and Operations Review.

APPENDIX 3 – DELIVERY MODEL SELECTION MATRIX

The following delivery model selection matrix is taken from the Task Force-commissioned report *Review of delivery models for works and services* (Opus, 2012).

Selection Criteria	Day Works	Traditional	Hybrid	PSMC/ PBC	Alliance
Scale	<\$1m	<\$15m	<\$15m	>\$15m	>\$15m
Network Size & Shape	<100km	<500km	>500km	>500km	>500km
	Accessible	Accessible	Accessible	Accessible	Accessible
Network Complexity	Simple	Moderate	Moderate	Complex	Complex
	Very basic data	Good data available	Good data available	Excellent data available	Good data available
	Rural	Rural/urban	Rural/urban	Rural/urban	Rural/urban
Supplier Market Conditions	Excellent	Very good	Good	Limited suppliers	Limited suppliers
Level of Client Involvement	High	Medium	Medium	Low	High
Flexibility to Deal with Change	High	High	Medium	Low	High
Innovation Potential	Low	Medium	Medium	High	High
Transfer of Client Risk	Low	Medium	Medium	High	High
Stakeholder and Customer Requirements	Low	Medium	Medium	Medium	High
Focus on Non-cost Areas	Low	Medium	Medium	Low	High

APPENDIX 4 – REFERENCES AND BACKGROUND MATERIAL

References

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Road Maintenance Task Force – Papers and Reports

General

Road Maintenance Task Force (2011) *Road Maintenance Task Force: Research Scopes (Outlines)*, Road Maintenance Task Force, Wellington.

Road Maintenance Task Force (2011) *Road Maintenance Task Force: Terms of Reference*, Road Maintenance Task Force, Wellington.

Research Reports

Bridger, G. (2012) *Strategic Road Lighting Opportunities for New Zealand*, NZ Transport Agency Research Report, NZTA Wellington.

This report was commissioned to identify opportunities for efficiencies in delivery of road lighting, “including innovative services, products and methods of procurement, and to encourage their consistent uptake through the country” as required by the Road Maintenance Task Force.

The report’s conclusion is that New Zealand should upgrade its road lighting in order to: a) save lives and reduce the annual \$1.2 billion cost of accidents during dark time through increased use of modern white street lighting;

b) halve the annual \$55 million operating and capital costs of lighting NZ roads;

c) use private capital to fund the upgrade;

d) provide these benefits as soon as possible to Canterbury where infrastructure needs to be re-built after the earthquakes, and

e) provide significant economic growth opportunities in a global market where a LED lighting revolution is just starting and thus commercial openings exist for NZ to lead in niche high value services and manufacturing.

The report is organised around the three Government Transport priorities: safety, value for money and economic development.

From a safety perspective there appears to be little evidence of recognition that NZ road lighting could be improved to reduce road accidents in hours of darkness by between 30% and 65% - as both NZ and international research suggests is possible.

Of the 14,388 road accidents (including deaths) that cost an estimated \$3.8 billion in 2010, 31.3% of them occurred in relative darkness which suggests a cost of about \$1.2 billion per year. This justifies a separate road lighting strategy to reduce these numbers.

On an equivalent lighting power basis (measured in lumens) white light provides more lighting than does yellow light due to the eye’s lower sensitivity to yellow light in night time conditions. This advantage is even greater when comparing the electrical energy input (measured in Watts) used to provide using significantly more efficient white Light Emitting Diodes (LEDs).

It is estimated that 76% of New Zealand’s road lighting is yellow – a characteristic of NZ’s High Pressure Sodium (HPS) lighting technology originally developed by General Electric (now called GE) in 1964.

White light is also better for recognition of coloured objects (measured by Colour Rendering Indexes, CRI) and thus also improves security (eg people recognition) and other amenity values such as tourism. The higher the CRI, the greater the ability to detect colours. Yellow HPS lights typically have a CRI of 20 and white LEDs are typically greater than 70.

Research has also shown that peripheral recognition and reaction times are improved by white light. It is likely but not confirmed by this study that replacing yellow lighting with white lighting could therefore lead to reduced accident rates during twilight and darkness. This is an important question

to research and it is recommended that the relevant Ministries facilitate this especially as LEDs lighting provides so many other benefits.

The new LEDs represent what international consultancy McKinsey & Company calls a revolution in lighting technology. This is because they can last more than three times longer than HPS lighting, use about 50% of the energy, allow IT systems to control them to further reduce energy by adapting lighting levels to usage resulting in further energy savings of 20-40%, turn on instantly and are not susceptible to vibration from wind.

At a December 2011 UN Climate conference Philips, probably the largest lighting manufacturer in the world staked its reputation by announcing that LED technology is mature enough for it to be used in all applications.

Many trials have been conducted both in New Zealand as well as internationally, but cities overseas have been converting to LEDs in earnest. In 2009 Los Angeles embarked on a replacement programme of 140,000 HPS lamps (equal to approximately 42% of NZ's total street lighting) and by July 2011 had replaced 54,000 HPS lamps with LEDs. Los Angeles reported exceeding most of their targets for savings and public acceptance (including 59% energy saving). Other cities doing the same include Boston and Birmingham.

No LED installations of equivalent scale exist in NZ although installations of between 100 and 250 lamps exist, including the very impressive state-of-art Eden Park. If all current road lighting luminaires were replaced at a speculatively estimated \$231 million investment, an overall 50% saving on the estimated \$55 million annual total road lighting costs (electricity, maintenance and replacement) would translate into an annual saving of \$27 million. However, if new centralised control systems were also applied the savings would be greater.

If Public Private Partnerships were utilised these greater savings would be shared without the need for the public sector to fund the capital expense. PPPs for road lighting have been put together commonly in UK where the reliability of the revenue stream for lighting is literally as sure as night follows day. However, the revolutionary performance advantages of LEDs make the PPP even more attractive for each of the partners – more attractive than PPPs are for roads, schools, and bridges etc where the business margins available to partners to keep them motivated are much smaller than they are for road lighting.

Based on the modelling done on Hamilton City Council this study hypothesises that the profits available to a PPP are more than enough to offset the transaction costs of setting up a PPP. This is in contrast to the position taken by the National Infrastructure Unit of Treasury which does not support PPPs for road lighting due to the high transaction costs and smallness of the potential projects. In UK there are 19 street lighting PPPs ranging in size from £8.5 to £225 million.

The model used in this study used publicly available information from Hamilton City Council based on a 10,000 luminaire replacement programme. Incorporating a large number of assumptions the payback occurred in 13 years. On an even more speculative basis this was extrapolated to New Zealand for 330,000 luminaires.

The 15 year accumulated savings using a PPP to take virtually all the risk was \$345 million.

The PPPs pay for the \$231 million capex required to upgrade new generation lighting systems and then the PPP operator is contractually bound to deliver lighting performance to pre-agreed levels. But if the PPP operator fails to meet these performance standards, they do not get paid and further indemnities may be invoked.

Road lighting PPP advisers in NZ who have gained their experience in the mature UK PPP market include Ernst & Young, HRL Morrison & Co, and Kensington Swann. An initial overall view expressed by them is that infrastructure investment funds are available for road lighting PPPs.

McKinsey and Company predict that general LED lighting sales growth will be 35% *per year* compounding until 2016 when they will have reached a market share of 43% from the 7% it was in 2010. LED lighting is at the start of a major uptrend and it represents an opportunity for New Zealand to upgrade its fragmented road lighting infrastructure. Earthquake damaged Christchurch is

another opportunity to invest in the new technology at an early stage and leverage Christchurch's upgrade for NZ's overall benefit.

NZTA funds about 45-50% of all road lighting costs with 76 Councils paying for the balance, operating the lighting and making most of the Capex and Opex decisions. Recent decisions by NZTA to use HPS lighting for large projects are puzzling in the face of overseas experience and studies. For NZTA it appears that the high 8% discount factor is a disincentive for long term savings and an NZIER study commissioned to the Road Maintenance Task Force suggest that such a rate is inappropriate. Further investigation is required because there are other factors at play.

In the case of Councils, their lack of any commitment to LED lighting is based on several factors including the unfounded belief that the technology has yet to be proven, lack of financial incentives including electricity charges that are too fixed, inadequate standards, lack of capital, lack of leadership by NZTA, and the expectation that prices for LED luminaires will drop rapidly.

For the last concern, the Clinton Foundation, a philanthropic organisation founded by President Bill Clinton and responsible for many internationally recognised climate initiatives, has concluded that prices of LED road lighting would need to drop by 15% per year before waiting was economic. However the foregone yearly greenhouse gas benefits would be lost, as would all the other benefits of LED road lighting – including for example the safety benefits and the ability to leverage foreign exchange earning economic development opportunities.

The final opportunity for NZ if it embarks on a road lighting strategy to improve road lighting with LEDs is to leverage this across to NZ's innovation strategy. The April 2011 "Powering Innovation" report to stimulate the High Value Manufacturing and Services sector identified that one of the challenges faced was to identify a niche where innovation could be turned into economic development. Several examples are identified in this study for innovation in the road lighting sector. Note that LED manufacturing is not considered to be an opportunity for NZ as massive international investment has already taken place, but the surrounding hardware, software and systems are most certainly available for NZ to take a niche leadership position in a new and rapidly evolving market.

One of the most challenging aspects to commercialising innovation is to find a customer willing to purchase early phase products or services. NZTA, MSI and NZTE might share the risks to assist innovation in this new and burgeoning area. By doing so, safety, value for money, and economic development goals are met as well making progress on four of the Government's six policy drivers.

Several areas of investigation are required to complete this study. They include a deeper understanding of how road lighting assets are managed, what they cost, how electricity energy and distribution companies relate to the introduction of advanced metering and other economic, social and environmental factors.

For example, another potentially important issue is to manage the change-over to new white light technologies in a way that maximises the benefits for NZ. It would not be desirable for New Zealand to be a haphazard patchwork of frequent highly visible transitions between new white and old yellow lighting technologies. This is likely to have a negative consequence for the valuable tourism sector.

This report recommends that NZTA:

- a) invests further resources into validating this report's findings;
- b) initiates a road lighting strategy to
 - i) reduce the 4,567 injuries (31.7% of total accidents) occurring in relative dark;
 - ii) save \$27 million pa by halving the annual \$55 million road lighting cost through replacement of HPS lighting by advanced technology lighting;
 - iii) utilise private capital to avoid more debt on public balance sheets and reduce performance risk;
 - iv) rapidly upgrade road lighting infrastructure with advanced technologies in Christchurch; and

- v) identify areas for innovation and economic development that advance the road lighting strategy and provide opportunities to leverage NZ innovation strategies for economic growth;
- c) provide incentives to Councils to form innovative procurement practices such as PPPs through --- for example --- foregoing NZTA's share of energy and operating savings from the new LED lighting for the first five or ten Councils that upgrade;
- d) investigate other more far reaching possibilities like limiting the number of PPPs covering the whole of NZ to say three to five, and centralising road lighting strategy and policy functions including equipment procurement into a secretariat that is appropriately governed and funded;
- e) address the electricity charging disincentives for investment in the beneficial new technologies.

Gill, D. & Zuccollo, J. (2012) *Roles and Limits of Performance Measures*, NZ Transport Agency Research Report, NZTA Wellington.

The Road Maintenance Task Force is charged with improving the whole-of-life value of road maintenance operations and renewals. It sought some independent advice from NZIER based on a survey of the literature and interviews and workshops with practitioners on ways to improve the performance measurement system.

What is the imperative?

New Zealand was a world leading innovator in the 1990s and early 2000s in both asset management and performance measurement in roading maintenance. Since then progress has levelled off at a time when information technology and data analysis techniques have continued to develop rapidly.

There is an imperative for change because of the flat lining of maintenance budgets at a time when the network is still expanding and the cost of maintenance expenditure is increasing. New Zealand has the opportunity to achieve a cultural shift that would allow performance information to shape decision-making on roading maintenance. The road transport sector has been a pioneer in the past and it has both the hard systems required (the data and capability) and the soft systems (a history of collaboration) to be so again. This report sets out the strategies required to regain the position of pioneering world leader.

What did we find?

The research identified a number of common themes including the need for:

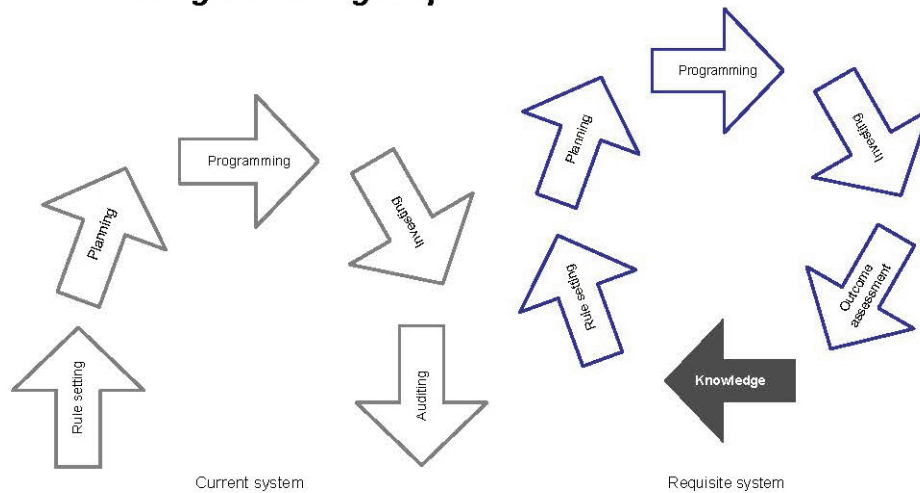
- a common national performance framework including
 - common data protocols
 - enhanced measures
 - common standards on levels of service
 - improved data infrastructure to enhance data input and user access
- focus upon measuring the effectiveness of road maintenance interventions
- learning through communities of practice
- enhancing the capability of people to work in a different way
- support by leadership, engagement, focus and commitment.

How do the formal regime and real in use system operate?

We have identified two major problems with the formal measurement regime applying to road maintenance. The first problem is that there is no cycle of performance measurement as shown on the left hand side of Figure 1. Rather there is an open loop with limited direct and indirect feedback from the monitoring and measurement subsystem to the design of programmes and policies. As shown on the right hand side of Figure 1, this lack of a closed loop is impeding performance improvements being identified and implemented. The lack of measurement of the effectiveness of

interventions, such as pavement treatments, inhibits learning and the development of asset management expertise.

Figure 1 Creating a learning loop



Source: NZIER

The second problem is a disconnect between the data supplied and the presently unmet demand for different data and more measures. While there is a formal process, this is very shallow and focuses on a few core, objective measures such as roughness, that do not adequately capture overall performance. There is unmet demand both from Roadway Control Authorities (RCAs) and NZTA for a wider range of better measures—partly to enable more effective investment allocation—but also to improve learning about effectiveness.

The practice in the sector is to work around the disconnect using systems based on informal collaboration: RCAs that use the RAMM database software allow NZTA to access their raw data and use it to construct measures. However, each RCA has discretion over their data collection, measures used and standards of service so RCAs’ practices vary greatly. That makes the data collected through informal collaboration difficult to use for research and comparison purposes.

This leaves gaps not remedied by the informal practises such as data not stored in RAMM, information on the effectiveness of treatments, data on gravel roads, bridges etc. The lack of a national framework covering what should be measured (standards and associated measures), and how it should be measured (data protocols), inhibits learning.

What are the features of well-designed measurement regimes?

The current system of performance measurement practiced in the road maintenance sector has a number of positive characteristics including:

- the high agreement that pavement condition is amenable to measurement
- there is a coherent and well-embedded culture of data collection and use of measurement accepted across the sector
- integration of measurement into planning, budgeting, programming and contracting systems
- a tradition of collaboration which allows sufficient scale of operations to spread the costs of designing and operating the measurement system.

Achieving a high performing road maintenance measurement system requires addressing a number of the weaknesses identified in our research. The recommendations identify the need for a common national performance framework for road maintenance and to enhance the capability of the people working in the system. In addition to **what** needs to be done, **how** that work is undertaken is critically important with:

- greater emphasis on engagement so key stake-holders buy-in to the development of measurement frameworks
- a culture of use of performance measures to learn about effectiveness
- leadership that encourages dialogue over what the evidence is saying.

So what is to be done?

On improving performance measurement and management:

- get some quick wins using existing data and analysis platforms to review the effectiveness of road maintenance treatment projects.

Develop a common national performance framework for road maintenance including:

- protocols for how road maintenance data needs to be defined, collected and stored
- a suite of performance measures to support oversight of investment in roading maintenance
- a system of national standards for levels of service required for road maintenance
- improvement in the platforms for data input and data access.

Require all future roading maintenance applications to the NLTP to identify the strategy for learning about the effectiveness of the proposed maintenance investment.

On identifying the limits of performance measurement and reducing the risk of perverse behaviours:

- design systems collaboratively with managers and professionals in the RCAs and the industry to promote broader ownership, support, trust and utility
- use performance measurement to support learning so performance information can be used as a part of an intelligence system. There should be limited use of league tables while targets should be avoided completely.

On identifying and improving the take up of innovative practices:

- review the lessons learned from RIMs (along with comparable models in other sectors and jurisdictions) to develop new models of collaborative learning
- apply the collaborative ways of working to better facilitate the sharing of lessons learnt about building people capability.

Merrifield Associates Ltd (2012) *Investment Monitoring Intelligence Review*, NZ Transport Agency Research Report, NZTA, Wellington.

The review identifies findings from technical reviews, theme audits, procedural reviews, and any other available sources that are pertinent to the work of the Road Maintenance Task Force.

Parker, C. (2012) *Road Maintenance Task Force: Economic Issues Paper*, NZ Transport Agency Research Report, NZTA, Wellington.

NZIER reviewed potential issues with how maintenance is appraised

The NZIER has been commissioned by the Road Maintenance Taskforce (the Taskforce) to review possible issues with the economic appraisal of maintenance-related works. The Taskforce is concerned with how to improve the value for money of road maintenance initiatives from a 'whole of lifetime' perspective.

The NZIER has considered:

1. problems accounting for different length lives appropriately (e.g. comparing on a fair basis pavements with a 25 year life against long-life pavements of 40+ years)

2. if maintenance appraisals can better accommodate benefits and costs to road users and other people affected (e.g. disruption and environmental externalities)
3. the appropriateness and the effect of the social discount rate on capital and operating expenditure appraisals.

Appraisals can be improved to account for the risk of early pavement failure

Alternative options need to be compared over the same discounting period so they have the same opportunity to accumulate costs and benefits. This is important for roads, as a common question is whether building them stronger to last longer is value for money.

Various factors can increase the risk of early pavement failure, such as poor site investigation, design, treatment selection, and/or construction; spikes in road use (say from forestry traffic); and from excessively heavy vehicles (say, from non-compliance to road rules).

To account for pavement costs with different length lives we derived a general formula that applies to a probabilistic setting. We demonstrate that the shorter a pavement's life may be, the larger its whole of life cost relative to a more durable pavement.

Incorporating these features into pavement appraisals will support more informed decision making.

The BCR formula can be adjusted to be more generally applicable to maintenance-related works

At times economic appraisals may have too heavy a focus on cost-savings to road controlling authorities rather than considering costs and benefits generally. Quirks in the BCR formula may drive some of this. We propose an alternative BCR formula for projects that have a material maintenance component that is consistent with the existing BCR formula.

Advantages of the alternative BCR are that it is not prone to exaggerating results, and helps to ensure an appropriate comparison of benefits to costs when funding is scarce.

The alternative BCR can be used in conjunction with the rolling over method proposed, to better represent the risk of maintenance disruption from less durable pavements.

New Zealand's 8% social discount rate is arguably too high, and it has a particularly large effect on any decisions relating to maintenance

New Zealand's social discount rate is high compared to values used in many countries overseas. The economic basis of the 8% used in New Zealand is based on what the private sector is deemed to earn. Whilst basing the social discount rate on this basis is superficially plausible, we argue that it does not stand up to scrutiny.

Too high a discount rate leads to the wrong mix of projects being done from a given budget, causing higher maintenance costs on future generations with correspondingly larger road user charges and fuel excise duties. No research has been done to estimate the social cost from using a discount rate that is excessively high.

Opus (2012) *Review of delivery models for works and service*, NZ Transport Agency Research Report, NZTA, Wellington.

The Road Maintenance Task Force has been charged with improving the whole-of-life value of road maintenance operations and renewals. It sought some independent advice from Opus International Consultants (Opus) based their experience with delivery models for Works and Services within the roading industry.

One of the Task Forces objectives is to identify innovative services, products and methods of contract to achieve value for money and a safe network. This report has been prepared to assist with achieving this objective. That is to review the existing maintenance delivery models currently being used in the road maintenance industry.

To help understand the asset management process and the various delivery models in use, the asset management value chain is used. The value chain reveals that it can be used to identify the three distinct roles required for integrated roading asset management:

Implementation, Management, and Governance. Typically, there are three parties engaged in the management of the roading networks: the road agency, the professional services consultant and the contractor undertaking the physical work.

In generic terms there are various forms of contract being employed these are: input driven; output based and outcome based delivery models. Over the last 20 years New Zealand has adopted a number of delivery models five distinct models, though others containing some elements of more than one of these exist. The contract models are: Day-works, Traditional, Hybrid, Performance Specified Maintenance (PSMC/ PBC) and Alliance Contracts.

Given all of the information and experience available we can draw conclusions around Payment Mechanisms; Size of Network; Shape of Networks; Performance Measures; Residual Life; Service Level Creep; Measuring Compliance; Delivery Model Selection; Risk; Culture and Duration of the Contract.

Each form of service delivery model has its strong proponents and detractors but there is wide agreement that the common success factor is having the right people involved to extract the best from the model and find ways to address and issues/ opportunities as they arise.

PricewaterhouseCoopers (2012) Evaluating different approaches to maintenance and operations procurement, NZ Transport Agency Research Report, NZTA, Wellington.

The purpose of this project is to better understand the implications of a range of potential contracting approaches towards maintenance, renewal and operations (MR&O) for local roads and the state highway network.

We focus on three dimensions:

- MR&O (and not on new roading);
- Highway and local road spending; and
- Physical works and professional services.

We look at the advantages and disadvantages of different **approaches** to procurement (the status quo, greater aggregation and bundling, and the opposite), rather than the (in)efficiencies that may be associated with **running** a procurement process. These (in)efficiencies are likely the result of award decisions, or how the evaluation criteria were weighted, rather than the approach to procurement.

Principles for a healthy MR&O procurement market

A healthy MR&O procurement market should:

- Improve fiscal efficiency through reducing administrative, evaluation and transaction costs for Road Controlling Authorities (RCAs);
- Improve economic efficiency through encouraging competition and innovation, and ensuring value for money for government;
- Sustain contractor profitability (in the industry-wide sense) by creating certainty for the contractor and accepting a fair price;
- Be publicly and politically acceptable; and
- Be predictable and transparent, with clear evaluation criteria and weightings giving certainty of outcome to tenderers.

Today's MR&O market

Over the last ten years, the average size of physical works contracts at the highways and local roads level has grown at a rate significantly faster than can be explained by price inflation. In other words, average contract size has grown strongly in real terms. These changes appear to have benefitted the mid-tier firms most of all, with their share of the market growing.

In professional services, contract size has grown more sedately, and industry players outside the top 10 have been making inroads into the market, accounting for around 30% of contract value in 2010, up from less than 10% in 2006, and up from around 22% over the decade.

Over the last few years, there has been an average of approximately 220 active highways physical works contracts, 100 active highways professional services contracts, and 450 active local roading physical works contracts in any given year.

MR&O is more important for large businesses in the physical works space than in professional services. Around 20% to 30% of revenues at the largest MR&O physical works contractors are from MR&O projects, compared with around 10% for professional services. This means a change in procurement approach may affect physical works players more than professional services firms.

The status quo

The status quo satisfies most principles for a healthy MR&O procurement market. There is competition (shown by changes in market share and number of tenderers), the process is publicly acceptable, and it sustains a number of contractors.

Transparency and predictability of process receive mixed feedback from stakeholders. Clear, measurable evaluation criteria and weightings are critical to ensuring that even an incumbent must submit the best value tender, and does not rely on an existing relationship for success, although a more general track record should be a major determiner of who wins large contracts.

Bundling and aggregation

There are administrative fiscal efficiency advantages to this approach. However, there are limits on how far one can go without reducing competition and 'hollowing out' the structure of the industry through a small number of major players and then a large number of small sub-contractors. In other words, due consideration would need to be given to the scale of aggregation and bundling, maintaining a desirable mix of contract lengths, and the number of capable tenderers.

Disaggregation and localisation

This option would have inverse effects to bundling and aggregation. Competition would be increased at the expense of administrative financial efficiency. Returns to contractors may be reduced as they spend more time on tendering, but a wider range of contractors would have a legitimate chance of winning a particular contract directly. With reduced capital intensity, the market is likely to lose economies of scale advantages.

Links between collaboration and aggregation/bundling

An issue beyond the scope of this work, but with direct relevance, is the possibility of greater collaboration between RCAs. Collaboration is neutral on the aggregation/bundling question, as it is possible without a change in the number of contracts issued. However, it offers demonstrable cost savings through providing access to a greater pool of skills, experience, and best practice processes, and may be a first step to some reduction in the number of contracts.

Where to from here?

Given the more homogenous nature of needs of the highways networks, one possibility may be to reduce the number of highways contracts sharply, to under 50 (and perhaps as low as 15–20), as long as at least 150–200 contracts are maintained at the local roading RCA level, to allow a mix of contracts.

Questions that warrant further examination include:

- How might a model to share purchasing functions across RCAs work in practical terms?
- How might the NZTA and Councils work together to bundle or aggregate contracts at a local level, such as in Wellington or Auckland?
- Is the option of aggregation across smaller local Councils feasible?

Rationale Ltd (2012) *Research Support for Collaboration and Clustering*, NZ Transport Agency Research Report, NZTA, Wellington.

A road maintenance task force was established in late 2011 to understand opportunities for increasing the efficiency, effectiveness and whole of life value for money in delivery of road maintenance. Five research topic teams were established to better understand a number of opportunities. One of these opportunities was to optimise the scale of the networks and delivery of services by better understanding opportunities for **collaboration and clustering amongst road controlling authorities**.

The Road Maintenance Task Force Objectives are:

In order to achieve our purpose the Task Force has identified seven objectives which we will report back on:

- 1) understand the cost drivers of maintenance and renewal activity and their relative importance*
- 2) identify opportunities to improve both efficiency and effectiveness in the planning and delivery of operations, maintenance and renewals, that achieve least whole-of-life cost for the network and enhance community well-being*
- 3) identify innovative services, products and methods of procurement to achieve value for money and a safe network*
- 4) identify examples of best practice standards and guidelines, including standardised and harmonised contract documentation, that could be implemented*
- 5) better understand the cost implications of risk transfer associated with planning and delivery of operations, maintenance and renewals and identify examples of good practice in risk identification, management and allocation to deliver better value for money across the Industry*
- 6) promulgate the uptake of the Task Force findings*
- 7) consider the benefits of continuing the Task Force approach, with the aim of fostering best practice and collaboration in the sector.*

*Jim Harland
Convenor
Road Maintenance Task Force*

The research support has provided input to objectives 1) to 5).

Rationale Ltd was commissioned to provide research support, data and analysis to the team. The analysis was used by the team to formulate recommendations. Rationale have not provided any recommendations as part of this scope, but have provided analysis that has been used by others to make recommendations. The research team have also used other data sources, experience and analysis in making recommendations, so as such this report should not be viewed as the recommendations of the task group.

The purpose of this report is to document the analysis that Rationale Ltd completed, should it be required for future work.

Waugh, R. & Holland, G. (Waugh Infrastructure Management Ltd) (2012) *Better Asset Management, Planning and Deliver*, NZ Transport Agency Research Report, NZTA, Wellington.

PROJECT SCOPE AND EXECUTIVE SUMMARY

This report provides a summary of research investigation and Technical Working Group consideration of the Road Maintenance Task Force: Better Asset Management, Planning and Delivery.

The Road Maintenance Task Force's challenge is to consider the hypothesis:

“If... we (the sector) ensure that all road network management units are making sound road asset management decisions then the above action will lead to an improvement in efficiency, effectiveness and whole of life value for money in delivery of road maintenance operations and renewals”

The problem definition statement: Currently there is a perception that there is an asset management capacity and capability gap within the sector so sub-optimal programmes are being delivered.

This research report, incorporating results of the 2011/12 NZ Road Maintenance Task Force Stakeholder Survey, and feedback from the Technical Working Group, seeks to address the hypothesis and problem definition statement.

KEY FINDINGS

The key findings of the research report illustrate the opportunities for improvement that have been identified throughout the report, they relate to:

1. Current Practice
2. Target Practice
3. Performance Management
4. Policy Implications
5. Gains and Benefits
6. Asset Management Skills

RECOMMENDATIONS

Asset Management Practice provides a process for determine ‘what is required, how it will be provided, and how it will be funded’. Over time AM practice has improved to analyse these issues thoroughly. AM practice in New Zealand is well-developed and generally adequate to support organisation’s long term plans.

Asset Management can further provide benefits and service delivery optimisation as greater savings are sought if the appropriate environment for improvement is established.

The key findings indicate the AM process should include a greater cognisance of the economic context that planning occurs within, that a wider range of scenarios should be considered and that greater direction is needed to produce integrated results.

In order to progress the actions proposed the following recommendations should be considered by the Research Topic Team and Technical Working Group.

Recommendation One: Prepare guidance documentation to direct and integrate Regional Planning and RCA AM Practice

This links with finding 2b

There is a need for joined-up planning which reflects Strategic-Tactical-Operational and National-Regional-Local continuums with impacts within the immediate planning horizon.

This recommendation is also associated with findings:

3b Integrated Performance management requires an alignment of objectives and horizons (immediate impact horizon)

4a AM practices need to acknowledge the capital expenditure context and need to integrate with longer term programmes (immediate impact horizon)

4b The three year GPS is ratified after Council LTPs are adopted, this creates disconnects for Council financial strategies and causes Elected Representatives to approve financial forecasts that contain a degree of uncertainty (medium impact horizon)

5e Asset Managers should acknowledge the long term fiscal tensions – there is no business-as-usual scenario (immediate impact horizon)

Recommendation Two: Incentivise the development of options and trade-offs through AM Practice

This links with finding 2d

There is a need to develop options and consider trade-offs as part of the AM process with impacts expected in the medium horizon

Recommendation Three: Encourage and provide leadership to enable study teams and technical working parties to identify and implement more efficient and effective maintenance practices

This links with finding 2l

A step change in maintenance is sought by Technical Working Group (re-thinking maintenance) as well as continuing incremental innovation', which is expected to impact in the medium horizon

Recommendation Four: Seek Improvements in AM Practice

This recommendation links with findings 6a, 6b and 6c as follows:

6a Asset Management Peer Audits could be used to improve the standard of AM Practice (medium impact horizon)

6b There is scope for Regional clusters, workshops for peer mentoring, shared services and greater skills transfer (immediate impact horizon)

6c Documentation of appropriate practice case studies will provide reinforcement for those performing well and guidance for others (immediate impact horizon)

APPENDIX 5: SUMMARY OF SUBMISSIONS

43 submissions were received from organisations and individuals.

General support for the Task Force recommendations

Overall there were high levels of support for the Task Force recommendations. This support was strongly tempered by the belief that in principle the recommendations were correct, but the way in which they are implemented will strongly influence how much value for money they will achieve. For example, some submissions noted the need for regional analysis before implementation and that any changes need to be staggered.

Collaboration and clustering

Most submissions supported the notion of clustering and collaboration. Moreover, almost all submitters noted disclaimers around this support including:

- that collaboration and clustering needs to be seen as a case by case context, and only implemented where appropriate and when it can obtain better value for money
- the context is important, for example having an understanding of the purchaser and supplier market, the need to be cognisant that changes need to maintain competition in the marketplace and the awareness that road maintenance may not be the only market for contractors
- that the support should be based on case studies and guidance rather than generic 'rules'
- the need to take into account other local government services that might be affected.

Some submitters also suggested that the Task Force look at additional areas for collaboration, including Queenstown Lakes District Council which noted:

QLDC agrees with the task force that adapting a collaborative approach will provide value for money. However, it is suggested that the task force goes further and considers the procurement of some services on a national basis, which each RCA then uses, to further provide value for money. In particular, auditing, surveying and some modelling requirements that are essentially homogenous and all road controlling authorities (RCAs) need, could be procured on a national basis to achieve savings. For instance, high speed road condition data will be required by all RCAs if more advanced asset management is to be applied across the country, and its procurement could therefore be undertaken nationally.

In particular concerns were particularly focused on the potential for collaboration reducing contractors in the market and leading to reduced competition, as is described by Clutha District Council:

In essence there are two major contractors and consultants who would be capable of handling large multi-year contracts and the sustainability of these could be questioned, as once it comes to re-tendering, initial cost savings could be lost due to the lack of competition.

Asset management

Most submitters were of the viewpoint that improved asset management practice was the area in which the greatest improvement in value for money could be made. All agreed that leadership in this space was important, but there were a number of differing viewpoints on the best way this could be achieved, including improving capability inside RCAs and distributing best practise guidelines. A subset of submitters was also in favour of national benchmarking, performance monitoring and national uniformity. A contrary viewpoint was held by some submitters who were concerned that improving asset management would focus on increased uniformity in a way which was inappropriate, for example Matamata-Piako District Council noted:

When talking about advanced asset management, this needs to be taken in context with the National Asset Management System Framework. There may be some aspects of the asset

management plan that will identify moving to an advanced status will provide benefits, e.g. sensitivity analysis around financial constraints and optimisation, but there will still be different levels for different Councils. One requirement does not fit all, and should also be in light of the asset being managed.

Prioritisation

Improving the prioritisation of investment was a much more contentious issue, mainly as the focus was around the implementation of a national road classification. Those in favour were generally of the view that any classification needed to take into account the social and cultural dimensions of the network, and not just focus on economic drivers and/or simple traffic volumes.

A number of submitters were deeply concerned or opposed to a national classification because it would:

- reduce the standard of rural roads
- reduce local input into the levels of service
- not support viable rural communities, and access to employment and education

This was described by Federated Farmers who said:

... Federated Farmers opposes the recommendation focussed around the development and implementation of a Local Road Classification System for the purposes of, or where the implications would be, any reduction in the ability for territorial authorities to establish their own levels of service in consultation with the specific communities affected.

More analysis

There were a number of submitters who suggested that the report by the Task Force needed to have a more detailed analysis, particularly with regard to the cost drivers. There was a call for:

- comparison with overseas countries
- separate analyses for the State Highway and local roads
- forecasting renewal & maintenance demands and associated network condition in the future
- not restricting the analysis simply to service delivery

This last point was noted by a number of submitters who thought the Task Force was focused too narrowly. They mentioned looking across the entire process of road funding, including administration, and suggested that the Task Force address the relative funding levels for local roads and the state highway. Nelson City Council succinctly described this as:

...last year the maintenance and operation of the state highway network by the New Zealand Transport Agency cost the Country on average \$27,538 per/km. In comparison, the cost of maintaining and operating local roads by local road authorities incurred an average cost of just \$3,141 per/km, realising further efficiencies for the local road network over the next three years is likely to come from declining levels of service rather than more prudent asset management.

Implementation challenges

By far the biggest issue that submitters believed would challenge the implementation of the recommendations is working closely with stakeholders. It was noted that there was a clash of cultures and attitudes amongst some of the parties and that implementation will take time. It was also suggested that regional implementation groups may provide a better balance between national and regional perspectives.