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Mr J Kobelke, MLA
Chairman
Public Accounts Committee
Parliament House
PERTH WA 6000



ATTENTION: PRINCIPLE RESEARCH OFFICER

Dear Mr Kobelke

In June 2009 you wrote to me advising that your Committee had resolved to follow up agencies subject to examination by the Office of the Auditor General, requesting them to provide details as to what actions have been taken to implement the Auditor General's recommendations.

The Auditor General's report No. 6 – June 2009, "Maintaining the State's Road Network" identified ten recommendations for Main Roads to address. The attached report provides a detailed submission as to the actions my agency has taken in responding to each of these recommendations.

I am confident that Main Roads has demonstrated its commitment to ensuring that we are taking every opportunity to continuously improve our management of the State's road network.

If you or your committee members require any further information please contact Alan Colegate on 9323 4594.

Yours sincerely

Menno Henneveld
MANAGING DIRECTOR OF MAIN ROADS

15 JUN 2010

Enc



MAINTAINING THE STATE ROAD NETWORK

**A STATUS REPORT FROM
MAIN ROADS WESTERN AUSTRALIA
TO THE PUBLIC ACCOUNTS COMMITTEE**

JUNE 2010

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EXECUTIVE SUMMARY

As the Auditor General acknowledged in his overview “The community and industry rely on the road network every day. Roads are a key asset in economic activity, and are a significant proportion of the State’s overall asset base. Managing this asset is a crucial role and a considerable challenge.”

It is important to recognise that the vast majority of Western Australia’s road network is only now reaching the end of its theoretical design life. Much of the network was constructed during the 1960s and 70s and road management practitioners are continually increasing their understanding of the behaviour of what is one of the most geographically spread road networks in the world. The road network is a unique community asset and the effective life-cycle management of this asset is of fundamental importance to Main Roads. During 2008-09 Main Road’s maintenance practices were the subject of two independent reviews.

The first review was commissioned by Main Roads to determine the condition that the State’s road network should be in; assess the actual condition of the State’s road network; address what Main Roads is doing to address any differences and determine the level of funding required to address the deficiencies. This independent review was undertaken by the ARRB Group Ltd. The findings from that review showed that Main Roads was doing well in monitoring, assessing and managing its network in comparison with its peers. In terms of best practice, in some cases Main Roads ranked amongst the best in Australia. The review identified a number of improvements that would assist in lifting performance to an even higher level including establishing a network vision, greater engagement with stakeholders and better recognition of safety and asset risks. The findings from this first review have provided useful input into the development of new maintenance arrangements and are being actively incorporated.

In June 2009, the Office of the Auditor General completed a review of maintenance on Western Australia’s State road network and tabled a report in State Parliament. The focus of the review was to determine the condition of the State’s roads; effectiveness of delivery of maintenance and prioritising safety related maintenance and minor works. As part of the review the audit team also considered work done by Main Roads on addressing the lessons learnt from the current method of delivering maintenance through the private sector, known as Term Network Contracts.

The outcomes of these two reviews confirmed earlier findings by Main Roads’ and the recommendations of the Office of Auditor General’s report have been extremely useful in the development of the strategy for maintenance delivery under the new Integrated Services Arrangements which will supersede the Term Network Contracts.

This report focuses on the progress which has been made in addressing the recommendations identified by the Auditor General. One of the major findings in the Auditor General’s report was the extent of overdue maintenance. The actual value of deferred maintenance confirmed Main Roads earlier determination and assessed this as:

- resurfacing (or resealing of pavement) \$230 million
- rebuilding (or rehabilitation of roads) \$250 million
- other categories of maintenance activities \$250 million
- bridge maintenance \$84 million

In addition \$160 million of bridge rebuilding and improvement needs were identified in order to meet current bridge standards in terms of load capacity for “as of right” vehicle’s.

Main Roads acknowledges that there will always be a level of acceptable deferred maintenance needs, and continues to focus on ensuring that systems and processes are in place that assists asset managers in capturing a picture of the needs of the network as accurate as possible. The focus is an informed risk based approach with available funds being directed to minimise the impact of the most significant risks identified and maximise the return from the available funding. Predictive models continue to evolve and coupled with the deployment of a sound Maintenance Management Information System means that Main Roads is well positioned to address those risks.

Despite the very high dollar values of these overdue maintenance activities, Main Roads is committed to, and remains focussed on achieving its purpose of providing “safe and efficient road access that will enhance community lifestyles and promote economic prosperity”. It will continue to use its considerable capability to achieve this purpose through the delivery of professional, innovative and creative maintenance services.

Main Roads is actively involved in Australian and International networks for sharing lessons learnt and seeking leading edge thinking and techniques to predict the behavioural characteristics of the State’s road and bridge network. This ongoing process of continual improvement extends to identifying new maintenance activities and techniques as greater pressure is placed on the network in terms of the expectations of users and increasing traffic mass and volumes. Main Roads does this work within the context of the State’s approach to Strategic Asset Management.

Unfortunately, there are no “off the shelf” solutions and in many cases international findings need to be supplemented with local research and development given the unique construction techniques and materials used in developing the State’s road network. This reality makes the importance of knowledge management, resulting in increasing the skills and competencies of our road industry, a key outcome that is being sought by Main Roads.

The direction that is being taken with the deployment of the new Integrated Service Arrangements once again puts Main Roads at the forefront of innovative service delivery. This new approach will see operational asset management return to being under the direct control of Main Roads. The delivery of these services will be achieved through shared objectives and by collectively providing strategic leadership with our private sector partners.

In submitting this report I am confident that Main Roads has demonstrated its commitment to ensuring that we are taking every opportunity to continuously improve our management of the State’s road network.

Menno Henneveld
MANAGING DIRECTOR OF MAIN ROADS

June 2010

SUMMARY OF RECOMMENDATIONS AND RESPONSES

The following is a summary of some of the highlights from the report against each of the ten recommendations:

1. *Accurately determine levels of overdue resurfacing and rebuilding maintenance, including a review of bridge maintenance estimates:*

Main Roads has validated its estimates of overdue maintenance needs using visual assessments of the network to corroborate the results identified through modelling practices. The results validated that the data modelling provided to the Auditor General were within an acceptable range of 15% accuracy for pavements. The results show overdue maintenance needs are resurfacing \$230m, rebuilding \$250 m and bridge \$84m.

2. *Improve and validate predictive modelling for further and planned maintenance needs*

Much of the State's road network is only now reaching the end of its theoretical design life and our engineers are continuing to develop and understanding of the characteristics including the expected life of the road network. Progress is being made in all areas associated with improving and validating modelling capability. However, there will always be a need for this to be underpinned and calibrated by skilled practitioners.

3. *Fully cost the value of actual works of overdue maintenance and construct a plan on how the work will be done:*

It is acknowledged that there will always be a level of acceptable deferred maintenance needs. Main Roads focus is an informed risk based approach with available funds being directed to minimise the impact of the most significant risks identified and maximise the return from available funding. Deployment of a sound Maintenance Management Information System means that Main Roads is well positioned to address those risks. In addition to the costing shown at 1 above a further \$250m in other overdue maintenance activities was identified.

4. *Determine when to do planned maintenance to minimise costs over the life of the road network (the "Tipping Point"):*

Main Roads has made significant inroads to ensure that its staff and partners will have the right data, analysis, skills, systems and resources to ensure that planned maintenance is carried out to minimise whole of life costs over the entire road network. These include creating a Community of Practitioners that will be expanded to include private industry partners and local government in the delivery of maintenance services.

5. *Ensure effective management of its road asset through the identification, prioritisation and planning of maintenance works:*

Much of this recommendation is addressed through the actions taken in 1 to 4 above. The development of new systems, practices and the underlying principles that are the foundation of the new Integrated Services Arrangements ensures this will be achieved.

6. *Improve and update technical knowledge and skills to enable better road management:*

The creation of Communities of Practitioners in key areas of Main Roads business supported by existing corporate activities that includes training, mentoring, workshops, conferences and lessons learnt forums will achieve improved technical knowledge and skills that will benefit the entire road industry.

7. *Improve Maintenance Management Systems and Integrate them with Contractor's systems:*

This recommendation is supported by Main Roads' own findings from its Lessons Learnt process. A decision has been made to adopt a single system for use by Main Roads and its ISA partners.

8. *Apply Lessons Learned when developing and managing the new contracts:*

The application of a Lessons Learnt process has been the backbone of the development of the new maintenance delivery arrangements. The findings from that process have been invaluable in informing the processes and structures that underpin the new arrangements. In fact the results from that review led to improvements being implemented to a number of the existing Term Network Contracts to better align them with achieving the outcomes being sought from their original contracts developed in 1999.

9. *Develop and implement a comprehensive strategy to improve skid resistance across the network:*

For specific areas across the network Main Roads is well equipped to measure, monitor and action skid resistance at a Project Level. The collection of data at a network wide level is heavily influenced by weather conditions. The same issues are being experienced in Queensland and other international locations such as Israel. A policy is under development that will include a management plan, data collection guidelines and a communications and training plan appropriate for Western Australian conditions. These documents will work as an integrated system to identify the network level of skid resistance.

10. *Standardise monitoring and evaluation of road maintenance works identified during fatal road crash investigations:*

Main Roads has responded by putting in place new practices to ensure that maintenance work identified during fatal road crash investigations is being carried out. The adoption of the Maintenance Management Information System will strengthen and integrate this process further as it focuses on prioritising and managing the entire maintenance work program with safety related maintenance works being highlighted within the new system.

For a full outline of the actions being taken please refer to the relevant sections within this report.

INTRODUCTION

During 2009 the Office of the Auditor General carried out a Performance Review on Main Roads maintenance of the road network concentrating on the:

- Condition of the State road network
- Delivery of maintenance on the network
- Link between maintenance and safety related issues

The examination considered whether Main Roads management of road maintenance has been effective focusing on four key questions:

1. Does Main Roads have clear goals, policies and strategies for road maintenance?
2. Does Main Roads have appropriate information on the condition of the State road network?
3. Is Main Roads successful in maintaining the State road network including planning and processes, deferred road maintenance, contract management costs?
4. Does Main Roads prioritise and monitor safety related road maintenance?

The findings culminated in the tabling in State Parliament of *Report 6 – Maintaining the State Road Network* in June 2009. The report identified a range of key findings and 10 recommendations which were supported by Main Roads.

In responding to the report Main Roads noted that the findings were consistent with its own research including results from an independent review commissioned by Main Roads in 2008¹. The findings also strongly supported the outcomes of a very thorough “lessons learnt”² analysis carried out on the current long term road maintenance contracts (TNCs) as part of the transition to a new generation of delivering maintenance services.

THIS REPORT

This report identifies the actions that Main Roads has taken or will take in addressing each of the Auditor General's recommendations. The response has been structured to reflect each of the chapters identified in the Auditor General's report and:

- Identifies the key findings
- Lists the Auditor General's recommendations
- Provides a status report as to current actions being taken by Main Roads for each recommendation.

¹ ARRB Group Ltd Report WC72991-4 November 2007

² Main Roads WA Internal Report – Term Network Contracts Lessons Learnt Note: this report contains commercially confidential information and is NOT a public document

LEVELS OF MAINTENANCE HAVE BEEN INADEQUATE TO MAINTAIN THE CONDITION OF THE ROADS AND HAVE INCREASED COSTS

ISSUES IDENTIFIED

- Falling levels of long-term planned maintenance have resulted in a deterioration in the condition of the roads:
 - Levels of planned maintenance have declined over the last 10 years – resurfacing by 30 per cent and rebuilding by 80 per cent.
 - Over 25 per cent of roads have not been resurfaced on time and are at risk of needing expensive rebuilding maintenance.
 - Nearly a third of the road network is simultaneously reaching the end of its design life and Main Roads does not know how much longer these roads will last.
- Main Roads lacks some information to optimally target the work needed to address the deterioration in the condition of the roads:
 - Main Roads does not have reliable road cracking data to identify and prioritise planned maintenance across the network because they do not use a consistent collection method.
 - Data on the strength of the roads can not be used to identify where roads may fail.
 - The roads are generally smooth but this alone is not a good indicator of overall road condition.
- The estimated cost of eliminating overdue maintenance is significant:
 - Main Roads estimates the cost to eliminate overdue resurfacing work at \$270 million.
 - A preliminary estimate in 2006 put the cost of overdue road rebuilding at \$300 million.
 - Bridges are deteriorating and some are closed to heavy traffic; fixing all bridges will cost an estimated \$250 million.

RECOMMENDATION 1 – ACCURATELY DETERMINE LEVELS OF OVERDUE RESURFACING AND REBUILDING MAINTENANCE, INCLUDING A REVIEW OF BRIDGE MAINTENANCE ESTIMATES

ROAD NEEDS

In 2008 Main Roads data showed 4 252 kilometres of road surfaces were over 15 years old and beyond the target date for resurfacing, the estimated cost of which was around \$270 million. In 2006 Main Roads modelling predicted up to 1 400 kilometres of roads required rebuilding at an estimated cost of almost \$300 million.

These values were based on modelling undertaken by Main Roads. This modelling is based on pavement age and road condition data that is collected as part of an annual program, along with a range of other assumptions. Whilst the Auditor General acknowledged that the existing values of overdue resurfacing and rebuilding are based on predictive modelling a more accurate analysis was required to validate the values identified by the modelling.

To more accurately determine the value of overdue maintenance in these areas, information has been collated for each Region by experienced practitioners using a combination of visual field assessment and validation of modelling outputs. The visual field assessments were used as a mechanism to validate the outputs from the predictive modelling.

The results show that in 2010 the levels of overdue maintenance have reduced slightly in each case to:

- resurfacing is \$230 million, 15 percent lower than the \$270 million identified in 2008
- rebuilding is \$250 million, 16 percent lower than the \$300 million identified in 2006

Comparison of Overdue Maintenance (incl rebuilding)

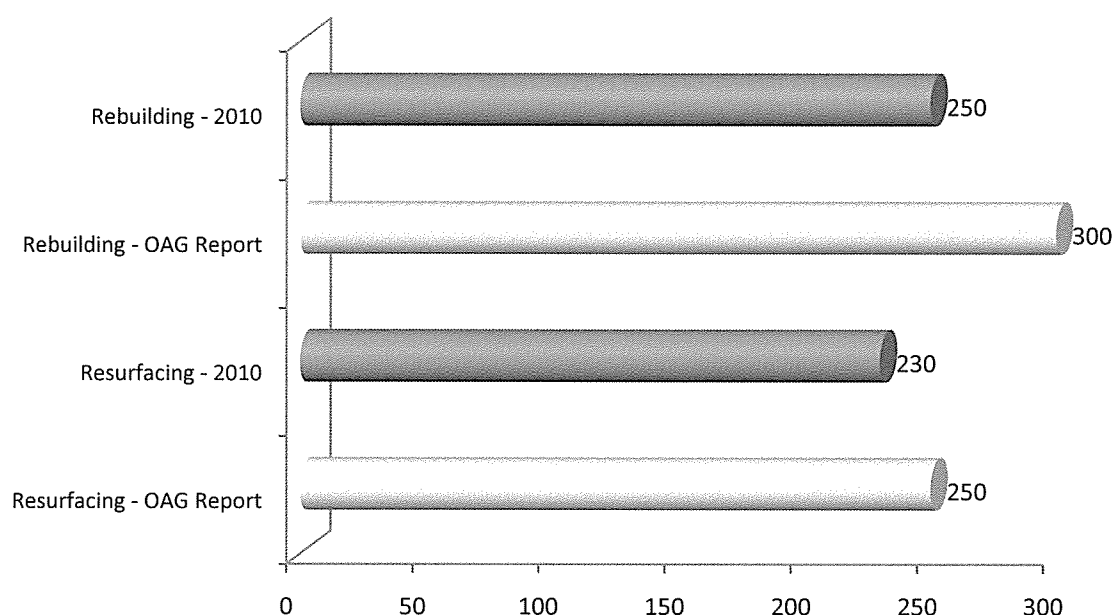


Figure 1 – Value of overdue maintenance needs comparing results from the Auditor General’s report against results from visual field assessments

These variations reflect that in some cases resurfacing and rebuilding work has been undertaken on the network subsequent to the values given to the Auditor General. They also reflect that roads do not behave homogenously and that there are many factors which influence the actual life of a road.

BRIDGE NEEDS

In determining the value of \$250 million over four years for bridge needs, it includes overdue maintenance and improvement and replacement costs aimed at maintaining the existing level of service of bridge assets. Similar to the validation of overdue road maintenance needs, skilled bridge asset managers conducted visual field assessments in accurately determining bridge needs. As part of this validation the cost of upgrading all bridges on the road network to comply with current bridge standards in terms of load capacity for “as of right” vehicle’s was also determined. The results show:

- Overdue bridge maintenance needs of \$84 million
- Rebuilding and improvement needs of \$160 million

Many of the bridge assets are relatively “young” in bridge terms, up until now the non timber bridge component did not need a lot of maintenance because of its age. However, these structures are now reaching a time when they are reaching an age of 30, 40 and 50 years and the specific maintenance needs will continue to rise.

It is well understood by Main Roads and has been acknowledged in the Auditor General's report that the closure of bridges to heavy vehicles can have a significant impact on the productivity and efficiency of the Nation and a serious impact on communities throughout the State. The State Budget Forward Estimates include \$60 million for Safer Roads and Bridge Improvements to improve network capacity.

SUMMARY

Main Roads has validated its estimates of overdue maintenance needs. The review included visual assessments of the network by experienced practitioners that corroborated the modelling results using an alternative method to determine an accurate picture of overdue maintenance needs. The results validated the modelled data provided to the Auditor General within an acceptable range of 15% accuracy for pavements and confirmed overdue maintenance on bridges at \$84 million.

The information gathered is used by Asset Managers to prioritise the maintenance task ensuring available funds are allocated on a risk assessment basis. This approach is in accordance with existing practices used to determine the allocation of funds on an annual basis.

The results show overdue maintenance needs are:

- resurfacing \$230 million
- rebuilding \$250 million
- bridge \$84 million

In addition \$160 million of bridge rebuilding and improvement needs were identified as being required in order to meet current bridge standards in terms of load capacity for "as of right" vehicle's.

RECOMMENDATION 2 – IMPROVE AND VALIDATE PREDICTIVE MODELLING FOR FUTURE PLANNED MAINTENANCE NEEDS

Modelling of road behaviour is an evolving field that is being continually addressed and improved by road agencies around the world. Roads and associated assets do not behave in a homogenous and consistent manner as many factors ranging from the properties of road building materials, vast fluctuations in climactic conditions, variations in the quantity and mass of daily traffic volumes plus the timely delivery of many maintenance activities all playing their part in influencing the life of a road. In addition, the road building techniques and practices that have been very successful in Western Australia are quite different to those used elsewhere in Australia and almost all other countries.

Over the last 80 years Main Roads has been able to build relatively inexpensive roads using available natural materials throughout the State. The unique properties of Western Australia's naturally occurring materials lead to the adoption of innovative economical practices not used elsewhere in Australia or the world. During the 1960's and 70's there was a period of unprecedented vast expansion of the State's network meaning that now much of the road network is starting to reach the end of its theoretical design life. This means that in many cases Main Roads predictive modelling is constantly being recalibrated to reflect the actual behaviour of the State's road network.

The importance of accurate modelling is an essential component of asset management and Main Roads continues to calibrate its models and is also working on a number of projects ranging from attempting to develop a more strategic risk based approach to resurfacing through to improving guidelines for the visual assessment of surface conditions. The following outlines specific initiatives that are underway:

- Development of a strategic risk based model for resurfacing needs bringing together community expectations and good road engineering practice. Work on the new scenario modelling is progressing well and is currently subject to peer review by national colleagues.
- As part of preparing for the next generation of maintenance delivery contracts Main Roads has been working with potential partners to develop a Maintenance Management Information System. This system will provide detailed raw maintenance data for analysis and feedback to pavement performance models and whole of life cycle analysis. This significant initiative brings together the skills of engineering practitioners, financial and economic specialists along with information and communication technologists from both Main Roads and its private sector partners.
- Main Roads continues to develop and build improvements to systems and processes to manage the State's bridges. A high priority is the development of a Corporate Bridge Management System (BMS). The BMS will improve capability to manage the State's bridges cost effectively. The system will capture the cost of works and in the longer term, provide for predictive modelling of future maintenance needs. A long standing process of periodic detailed condition bridge inspections on all structures managed by Main Roads will be integrated with the new system enabling review and scenario modelling practices to be deployed.
- Improvements to the guidelines for conducting visual assessment of surfacing conditions are almost complete. These guidelines are an important knowledge management initiative that will result in capturing and sharing the long held knowledge of very experienced long serving staff within Main Roads.

SUMMARY

The road asset life cycle is dynamic and a great deal of research and validation is being done throughout Australia and the developed world to better understand these variables and to develop algorithms to reflect that changing reality. As noted above much of the State's network is only now reaching the end of its theoretical design life and Western Australia's engineers are continuing to develop an understanding of the characteristics including the expected life of the road network.

Main Roads is progressing in all areas associated with improving and validating its predictive modelling capability and capacity. However, there is always a need for definitive modelling to be underpinned and validated by skilled practitioners.

RECOMMENDATION 3 – FULLY COST THE VALUE OF ACTUAL LEVELS OF OVERDUE MAINTENANCE AND CONSTRUCT A PLAN ON HOW THE WORK WILL BE DONE.

The update to Recommendation 1 largely addresses this issue in the context of the actual value of overdue maintenance for bridges, resurfacing and rebuilding. However, it is worth noting that resurfacing and rebuilding works are only two areas of maintenance that contribute to maximising

the lowest whole of life cost cycle and ensuring that Main Roads continues to provide a safe road network for all users. The modelling that Main Roads undertakes to determine the extent of overdue maintenance concentrates on pavement rebuilding and resurfacing needs.

In identifying the actual maintenance needs, Main Roads quantified the extent of a range of other road maintenance needs that were not available during the Auditor General's review. This resulted in clarifying a range of other overdue maintenance tasks valued at \$250 million that will need to be addressed in order to achieve the lowest whole of life cycle cost of the road network. The consequence of not addressing these "other" maintenance activities varies depending upon the activity and the location on the network of that activity. The following graph provides a breakdown of the \$250 million of other overdue maintenance categories with a value greater than \$4million:

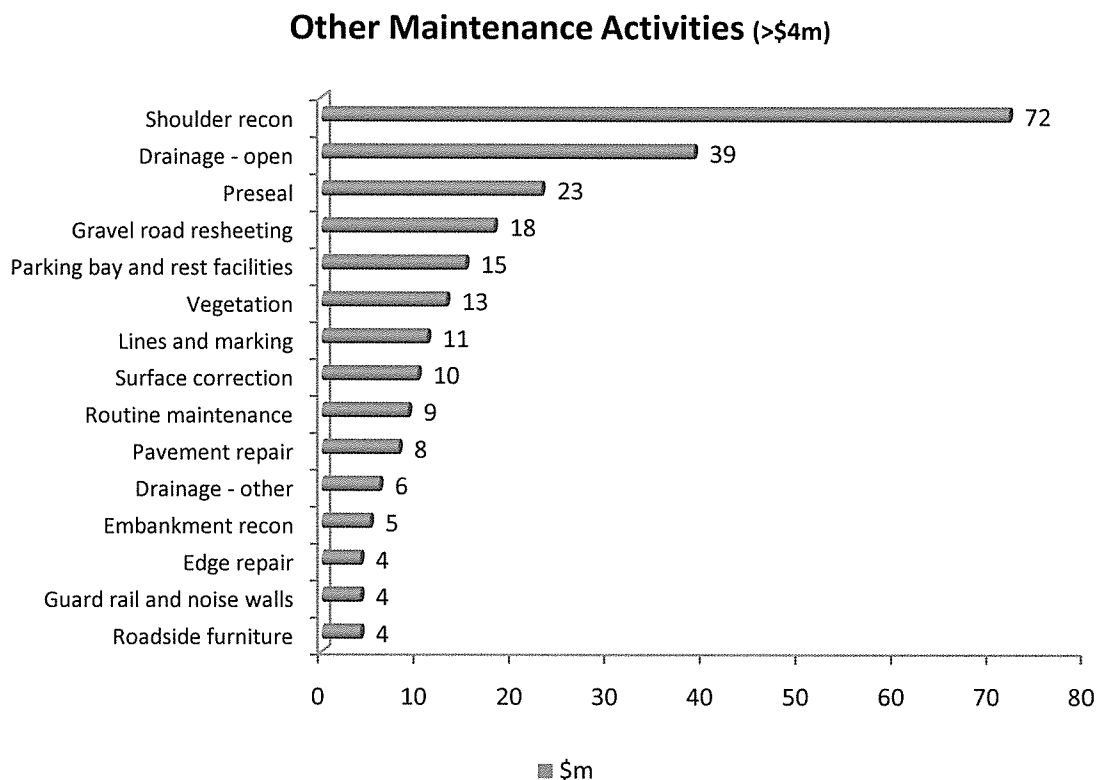


Figure 1 – Other overdue maintenance activities by category greater than \$4 million

What this information demonstrates is that there are a range of outstanding funding needs in all areas of maintenance not only in the core tasks of resurfacing and rebuilding. Many of these elements are increasing in costs due to a lack of funds and heightening standards and community expectations

Main Roads accepts and operates on the premise that there will always be a level of unmet maintenance needs. Determining how large that unmet need should be is based upon a risk assessment of the consequences and identifying interim works to minimise the impact of those consequences in terms of road user safety and preservation of the State's asset. Any plan to address the overdue maintenance issues in a significant manner is entirely subject to additional funding being made available through the State budget process.

Whilst minor advances may be able to be made using existing funding it will be at the expense of other forms of maintenance work including those identified as overdue at Figure 2.

The plan for addressing these needs includes Main Roads taking a more hands on role in deciding where to spend the available funds to obtain the maximum benefit from those funds. This key outcome will be achieved through the move from the existing long term maintenance contracts to the Integrated Service Arrangements.

The plan also involves Main Roads developing Business Cases for consideration by the Department of Treasury and Finance and the Economic Expenditure Review Committee as part of the State budgetary process.

These business cases include a range of funding scenarios. Scenario planning is an emerging area for Main Roads and will be adopted to provide Government with a range of levels of service, whole of life cycle cost and other outcomes that may arise depending upon the funding option selected.

SUMMARY

Main Roads acknowledges that there will always be a level of acceptable deferred maintenance needs and continues to focus on ensuring that systems and processes are in place that assists asset managers in capturing a picture of the needs of the network as accurate as possible.

The focus is an informed risk based approach with available funds being directed to minimise the impact of the most significant risks identified and maximise the return from the available funding. Predictive models continue to evolve and coupled with the deployment of a sound Maintenance Management Information System means that Main Roads is well positioned to address those risks. The following identifies the full cost of addressing overdue maintenance:

- resurfacing \$230 million
- rebuilding \$250 million
- other categories \$250 million
- bridge \$84 million

RECOMMENDATION 4 – DETERMINE WHEN TO DO PLANNED MAINTENANCE TO MINIMISE COSTS OVER THE LIFE OF THE ROAD NETWORK (THE ‘TIPPING POINT’).

The extent to which Main Roads is able to manage the risks associated with deferred maintenance will determine the associated costs to road users and the community and whether longer term costs can be prevented. A significant course of action being taken is to focus on improving and advancing the skills, competencies and tools available to operational asset management staff enabling them to optimise decision making. This will include the application and deployment of new systems including the Maintenance Management Information System already described in this report and putting in place a range of knowledge management initiatives.

These initiatives are aimed at ensuring the capture of competencies in existing highly experienced employees and sharing that knowledge in an appropriate way to ensure that Main Roads increases the skill sets of younger employees. It is important to have in place the systems to train new and developing employees who join Main Roads or its partners in the future.

The primary focus of the ‘tipping points’, in this context, is around resurfacing and overlays or minor rebuilding works and bridges. With the transition from the existing Term Network Contracts to the Integrated Service Arrangements, Main Roads will be resuming the control of the programming of maintenance activities.

This will be underpinned with the new Maintenance Management Information System (MMIS) which will show more accurately where treatments are required for sustainable practice. The MMIS will enable asset managers to identify maintenance “hot spots” based on analysis, visual inspection and customer feedback.

As part of developing the next generation of maintenance delivery arrangements a concerted effort has been placed on building in a mechanism that identifies and promotes maintenance best practice that can be shared State-wide between Main Roads employees and its contractors. This approach will ensure a common view of practices and priorities is developed taking into account local variations. The focal point for achieving this will be through a newly formed Community of Practitioners which was established in September 2009.

Currently the Community of Practitioners involves only Main Roads employees and is regarded as being highly successful as the organisation positions itself for a significant change in the way that maintenance services are delivered. Over time, and in accordance with the principles of the new Integrated Service Arrangements, this Community will be expanded to include Main Roads partners in the delivery of maintenance services and potentially Local Government personnel. The outcome will be improved capacity and knowledge throughout the road industry in Western Australia, including Local Government

SUMMARY

Main Roads has made significant inroads to ensure that its staff and partners will have the right data, analysis, skills, systems and resources to ensure that planned maintenance is carried out to minimise whole of life costs over the entire road network.

THE EXPECTED OUTCOMES AND BENEFITS FROM CONTRACTING OUT ROAD MAINTENANCE HAVE NOT BEEN ACHIEVED DUE TO WEAKNESSES IN THE CONTRACTS

ISSUES IDENTIFIED

- Main Roads relied on outcome based contracts to keep the roads in good condition and reduce costs.
- Maintenance contracts cost more than expected and have not delivered the required outcomes:
 - expenditure under the 10-year contracts is likely to be \$467 million (59 per cent) greater than estimated in 1999. The major reason for this is the increase in global oil prices
 - the level of resources needed to manage the contracts has been higher than planned, increasing contract management costs
 - the road condition measures used in the contracts have failed to ensure adequate levels of planned maintenance.
- Weaknesses in the contracts have meant that Main Roads could not adequately ensure the contractors met all agreed outcomes:
 - contract dispute resolution provisions are inadequate
 - there are limited financial rewards and penalties for contractors and payments are not related to work undertaken.
- Responsibility for any deterioration in the road network was not transferred effectively to the contractors so there is a risk the state will bear the cost.
- Main Roads has limited information on maintenance done on the network; better information would improve their ability to successfully specify and manage new contracts.

- Main Roads is learning lessons from its current contracting arrangements:
 - some contracts were changed to resolve contract issues and seek improved outcomes
 - Main Roads is taking steps to improve staff technical knowledge to better assess and monitor road condition
 - lessons learned are being considered as Main Roads develops new maintenance contracts.

RECOMMENDATION 5 – ENSURE EFFECTIVE MANAGEMENT OF ITS ROAD ASSET THROUGH THE IDENTIFICATION, PRIORITISATION AND PLANNING OF MAINTENANCE WORKS.

Main Roads believes that this recommendation will be achieved through successfully achieving all of the actions that are being undertaken in response to Recommendations 1 to 4:

1. Accurately determining levels of overdue resurfacing and rebuilding maintenance including a review of bridge maintenance estimates
2. Improving and validating predictive modelling for future planned maintenance needs
3. Fully costing the value of actual levels of overdue maintenance and constructing plans on how the work will be done and
4. Determining when to do planned maintenance to minimise costs over the life of the road network (the 'tipping point')

As has already been stated in this report the outcomes being sought in Recommendations 1 to 4 ensures that effective management of the road network will be achieved through the identification, prioritisation and planning of maintenance works.

These actions are supported through an overarching Asset Management Accountability Framework that assists in both the identification of critical processes and accountability for all aspects of Asset Management.

Specifically, in the bridge area a priority coding system has been developed that ranks bridge maintenance needs from 1 – Not to be deferred through 4 – Can be deferred 5+ years. This framework is being used to ensure effective management and allocation of the available funds for bridge maintenance needs.

In addition the new practices being adopted through the move to Integrated Service Arrangements will provide a “centralised” state-wide whole of network overview that incorporates benchmarking, performance evaluation and activity cost monitoring to underpin future prioritisation and planning of maintenance works.

SUMMARY

The development of new systems, practices and the underlying principles that are the foundation of the new Integrated Service Arrangements ensure this recommendation will be achieved.

This is only strengthened further when the total approach being adopted is framed within the Asset Management Accountability Framework.

RECOMMENDATION 6 – IMPROVE AND UPDATE TECHNICAL KNOWLEDGE AND SKILLS TO ENABLE BETTER ROAD MANAGEMENT.

Recommendation 4 includes reference to the creation of a Community of Practitioners for Operational Asset Management. A similar Community of Practitioners has been established for Bridge Asset Management. Recognising the specialised and scarce skills required for management of the State's bridges, a regular structures asset management forum has also been created as a method of sharing the skills and knowledge more broadly to network management personnel. A similar forum already exists in the area of Pavements.

The creation of these Communities of Practitioners complements current Centres of Excellence that already exist in the organisation. Within Main Roads, Centres of Excellence tend to be more disciplined based e.g. Materials Engineering, Road Design or Surveying. Whereas Communities of Practitioners seek to draw together a wide range of participants from a variety of disciplines and focus on sharing knowledge and lessons learnt on the application of work practices.

In 2009 Main Roads initiated a development program offering staff training in a Graduate Certificate in Physical Asset Management through Chifley University. Fifteen staff undertook this course and future training opportunities are being investigated. This program complements existing technical development opportunities through organisations such as the ARRB Group, Austroads and the Planning and Transport Research Centre (PaTREC).

The approach taken by Main Roads in improving and updating technical knowledge and skills is driven corporately through its Strategic Plan, 2k12, and specifically, actions associated with "Creating our workforce of the future". This 2k12 supporting strategy is underpinned by the corporate Knowledge Management Strategy and its Workforce Planning activities.

In addition as stated earlier in this report the underlying principles that are the foundation of the new Integrated Service Arrangements only serve to strengthen this outcome being achieved.

SUMMARY

The creation of Communities of Practitioners in key areas of Main Roads business supported by existing corporate direction which includes training, mentoring, workshops, conferences and lessons learnt forums will achieve improved technical knowledge and skills that will benefit the entire road industry.

RECOMMENDATION 7 – IMPROVE MAINTENANCE MANAGEMENT SYSTEMS AND INTEGRATE THEM WITH CONTRACTORS' SYSTEMS.

The development of the new Maintenance Management Information System (MMIS) and the benefits this will bring to Main Roads has been clearly outlined throughout this report.

The Business Case to develop this system was approved within Main Roads in December 2009 and a working group established that brings together operational asset management, asset network inventory and information management practitioners. A conceptual framework developed by the ARRB Group Ltd and used by other road agencies has been adopted as a guide to the functionality required from the MMIS.

The final choice as to the operating system to be adopted will be determined by Main Roads. However, proponents for the Integrated Service Arrangements have been invited to identify appropriate systems that represent good industry practice. These systems will be compared against those identified by Main Roads and evaluated to determine their useability, benefits, costs and ranking in terms of meeting identified needs.

SUMMARY

This recommendation is supported by Main Roads own findings from its Lessons Learnt process. The decision to adopt a single MMIS for use by Main Roads and its ISA partners will mean there is no need for integration as all participants will be utilising the one common system.

RECOMMENDATION 8 - APPLY LESSONS LEARNED WHEN DEVELOPING AND MANAGING THE NEW CONTRACTS.

In 2006 Main Roads had already started to prepare itself to develop the next generation of maintenance and operational asset management delivery arrangements ready for deployment at the expiration of the Term Network Contracts. This new direction was recognised within Main Roads Strategic Plan, 2k12, and specifically through actions associated with “Providing the Right Roads” supporting strategy. This 2k12 action resulted in a transition plan with the following phases:

Phase	Outcomes sought	Status
1. Assess	Undertake detailed and comprehensive research using a Lessons Learnt process of the Term Network Contracts including an extensive review of methods used to deliver similar services by road and other infrastructure agencies within Australia and Internationally.	Complete
2. Select	Develop Position Paper 1 identifying a preferred strategy for consideration by Main Roads Corporate Executive	Complete
3. Develop	Finalise the scope, structure and procurement approach outlined in Position Paper 2	Current phase
4. Implement	Implement the introduction of the Integrated Service Arrangements	
5. Close out	Evaluate the success of the deployment of the Strategy including an assessment of achievement of goals and targets and identifying Lessons Learnt	

Figure 3 – Transition Strategy Status – updates available at www.mainroads.wa.gov.au

SUMMARY

The application of a Lessons Learnt process has been the backbone of the development of the new maintenance delivery arrangements. The findings from that process have been invaluable in informing the processes and structures that underpin the new arrangements.

In fact the results from that review led to improvements being implemented to a number of the existing Term Network Contracts to better align them with achieving the outcomes being sought from their original contracts developed in 1999.

THE APPROACH TO IDENTIFYING AND PRIORITISING SAFETY RELATED MAINTENANCE COULD BE IMPROVED

ISSUES IDENTIFIED

- The road environment is critical to safety and is a factor in almost one-third of road crashes.
- Main Roads considers road safety when prioritising road maintenance and minor works but some areas could be improved:
 - The extent and cost of some safety related road improvements are yet to be determined.
 - Main Roads does not know which roads have low skid resistance, limiting their ability to identify which roads require improvement.
 - Urgent road maintenance which should occur after a fatal crash is not followed up to ensure it has happened.

RECOMMENDATION 9 – DEVELOP AND IMPLEMENT A COMPREHENSIVE STRATEGY TO IMPROVE SKID RESISTANCE ACROSS THE NETWORK

Main Roads has unsuccessfully attempted to conduct network wide skid resistance measurement using methodologies and practices that are used in New Zealand and parts of Europe. As noted by the Auditor General, Main Roads ceased doing network wide assessments when it was found that it was not possible to replicate results leading to concerns as to the use of the data collected. The process was halted and options were identified in an attempt to determine an appropriate methodology to conduct network wide skid resistance measurement.

Further investigation of the issues determined that the collection of the data is heavily influenced by weather conditions, with the most accurate results being captured in wet or moist environments. Given the remoteness of much of the State network coupled with the very high cost and practical difficulties of creating the right measuring environment a new approach is being sought. This issue has also been identified in Queensland which has similar conditions to Western Australia.

Main Roads acknowledges the importance of this issue and a project has been established to prepare a Strategy for managing skid resistance across the entire network. A multi discipline working group has been established bringing together economists, data specialists, materials science practitioners and operational asset managers. A detailed brief has been prepared and ARRB has been approached to assist in the development of the Main Roads strategy. In recent years ARRB has worked with a range of jurisdictions within Australia, including Queensland, as well as Israel to develop skid resistance management plans and policies.

It should be noted that for specific areas across the network Main Roads is well equipped to measure, monitor and action skid resistance issues at a Project level.

SUMMARY

The final suite of documents is expected to comprise a skid resistance policy, management plan, data collection guideline and a communications and training plan. These documents will work as an integrated system to identify the network level of skid resistance.

RECOMMENDATION 10 – STANDARDISE MONITORING AND EVALUATION OF ROAD MAINTENANCE WORK IDENTIFIED DURING FATAL ROAD CRASH INVESTIGATIONS

Main Roads has put in place a range of practices to improve the existing process based on the issue identified in the Auditor General's report. The focus has been on creating a systematic approach to monitoring urgent maintenance work highlighted during fatal crash investigations.

The improvements include improving the Crash Investigation Policy to clearly identify maintenance works identified during the investigation. Deployment and compliance of actions is now tracked through a corporate workflow system. This system electronically alerts asset managers as to the work required and requires the responsible officer to respond to the maintenance works including closing out the action. Road safety staff track the maintenance works through the workflow system to ensure they are being actioned and closed out. Where maintenance works are not actioned appropriately the system will generate reminders and regular reports are prepared by road safety staff to ensure compliance and follow up of outstanding actions.

The introduction of the Integrated Service Arrangements and the Maintenance Management Information System (MMIS) will ultimately supersede the current arrangements. The MMIS will incorporate an electronic workflow system dedicated to managing all network maintenance needs. Within the MMIS safety maintenance items will have a priority flag and be subject to regular monitoring, tracking and evaluation.

SUMMARY

Main Roads has responded by putting in place new practices to ensure that maintenance work identified during fatal road crash investigations is being carried out. The adoption of the MMIS will strengthen and integrate this process further as it focuses on prioritising and managing the entire maintenance work program with safety related maintenance works being highlighted within the new system.

CONCLUSION

As stated in Main Roads agency response incorporated within the Auditor General's Report the outcomes of this independent review have been carefully considered and as evidenced in this report action has been commenced on all of the recommendations made.

Despite the very high dollar values of outstanding maintenance activities Main Roads is committed to ensuring that it is always focussed on achieving its purpose of providing "safe and efficient road access that will enhance community lifestyles and promote economic prosperity".

It is important to recognise that the vast majority of Western Australia's road network is only now reaching the end of its theoretical design life. Much of the network was constructed during the 1960s and 70s and practitioners are continually increasing their understanding of the behaviour of what is one of the most geographically spread road networks in the world.

Main Roads is actively involved in Australian and International networks in sharing lessons learnt and seeking out leading edge thinking and techniques around predicting the behavioural characteristics of the State's road and bridge network.

This ongoing process of continual improvement extends to identifying new maintenance activities and techniques as more and more pressure is placed on the network in terms of the expectations of users and increasing traffic mass and volumes.

Unfortunately, there are no “off the shelf” solutions and in many cases international findings need to be supplemented with local research and development given the unique construction techniques and material used in developing our State’s road network.

The direction that is being taken with the deployment of the new Integrated Service Arrangements once again puts the organisation and its people at the forefront of innovative service delivery. This new approach will see operational asset management return to being under the direct control, management and responsibility of Main Roads. However, the delivery of those services will be achieved through shared objectives and by collectively providing strategic leadership with our private sector partners.

Progress has been made in addressing the concerns and findings identified by the Auditor General and Main Roads continues to look for new opportunities across Australia and internationally to ensure that it is managing the road network to achieve its vision of being “recognised for excellence in customer service and world class road access”.

APPENDIX 1 – WHAT IS AN INTEGRATED SERVICE ARRANGEMENT?

The concept involves Main Roads utilising an innovative relationship contracting arrangement in which the private sector and Main Roads work together in an integrated manner to deliver a range of services including:

- Operational Asset Management
- Maintenance Delivery
- Network Operations
- Capital Works Delivery
- Project and Contract Management

The ISAs are not another contract format to outsource services. They will be arrangements that procure a range of service providers in a fully integrated manner, akin to “in-sourcing”, to assist Main Roads to deliver its business effectively and efficiently over the long term. The ISAs will include many of the characteristics and benefits associated with alliances. However, they will also have many unique features that reflect their integrated service delivery nature and their potential long-term durations.



As the ISAs contain many new ideas, an extensive engagement process was undertaken with potential partners. Invitations were offered to private companies or intended consortia to attend workshops to consider the suggested components of the ISAs, 17 workshops were held. The workshops obtained the views of industry on the proposal and how it might be improved. The workshops were very successful and provided good feedback on the concept and their components

The ISAs will integrate a number of services that are now being delivered by a range of different methods, and will enable Main Roads to regain much more control and influence on when and how the services are delivered, particularly in regard to asset management for maintenance. They will also assist in building skills within the organisation that have been diluted during the time that the TNCs have been in operation.

The detail of each ISA network model will vary from network to network to accommodate local differences. The ISA approach will incorporate the beneficial features of outcome based maintenance contracting, such as outcome based performance measures, with a strong emphasis on value for money and on a transparent governance framework. There will be seven ISAs; one will cover the entire metropolitan region and the other six covering the rest of the State. The ISAs will have different details in the scope of services to accommodate the assets, available resources and characteristics of each network. Amongst other things, this will reflect the differing requirements across the Regions to accommodate the following:

- All on-road and off-road assets including structures
- All bridges on other public roads (as per Main Roads responsibilities)
- Regulatory signs and road markings on regional Local Government roads
- Nearly all traffic signs and road markings on metropolitan Local Government roads
- Dual Use Paths (Principal Shared Paths) under Main Roads control
- The Graham Farmer Freeway (GFF) Tunnel
- Electrical and Intelligent Transport System (ITS) assets

For more information visit:

<http://www.mainroads.wa.gov.au/BuildingRoads/ContractingToMainRoads/ISA/Pages/isa.aspx>