



Asset Management | Civil Engineering | Environmental Services | GIS & Spatial Intelligence | Waste Management

# Review of Delivery Against Road Design and Construction Guideline Standards

Final Report



Prepared for Shire of York

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## Approval for Release

Name	Position	File Reference
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**Signature**

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# Executive Summary

The Shire of York (the Shire) is preparing to undertake a major strategic review of its Integrated Planning and Reporting (IPR) documents. As an input to that review the Shire has commissioned Talis Consultants (Talis) to review the standards to be used for the management of its road infrastructure. This study has tested the actual practice of the Shire against the stated standards for selected road maintenance and reconstruction works undertaken over the 5 years period 2011 to February 2016.

The scope of the study has been to investigate and report on the following:

1. An outline of the current standards found in relevant Shire documents, the links between them and their on-going relevance;
2. Work practices used by the Shire;
3. The extent to which appropriate works practices have been used to achieve stated guideline standards and the extent to which the guideline standards have actually been achieved;
4. An assessment of safety risks (if any) to road users; and
5. An assessment of impacts on asset maintenance and renewal requirements in the long term from current practices and implications (if any) for the normal expected life of the assets.

The following are the key findings of the review:

## 1. Current Standards in Relevant Shire documents

The key current document for guiding the Shire's road management practices is the Roads and Bridges Asset Management Plan (AMP). This makes broad reference to complying with Austroads Guides and the Sealed Local Roads Manual (ARRB), and the Unsealed Roads Manual (ARRB).

The Ausroads documents are the principal technical documents guiding road management practices in Australia, however, they were developed for the state road authorities. The ARRB documents have been developed to provide guidance to local governments in applying the Austroads guideline in an appropriate way for local roads. The Shire's practices should be primarily based on these two documents.

The AMP provides a sound basis upon which appropriate standards for the Shire can be developed. In addition to referring to the above standards it provides a number of technical levels of service for the road assets, but is, by its own admission, incomplete in some important areas.

Recommendations are given on the priority issues needed to improve the current value of the AMP to the Shire.

## 2. Current Work Practices

A number of key deficiencies were found to exist in the current practices of the Shire. These relate to:

- Funding allocations which are well below a sustainable level;
- A lack of systems to address the risks associated with the funding shortfall;

- The AMP is not complete and not being applied;
- There are deficiencies relating to the design, construction and maintenance of roads that need to be addressed; and
- The reported high turnover of people in the position of Manager Works and Services is likely to be a major contributor to a number of these deficiencies.

### **3. Extent to which Standards have been achieved**

The study has found that there is little evidence that the key policy document for the management of the road network, the AMP, is being consciously and systematically implemented by the Shire.

### **4. Assessment of Risks to Road Users**

The failures to implement appropriate road management practices, particularly given the shortfall in required funding, has the potential to pose risks to road users associated with the failure to use detailed design when necessary, appropriate construction methods and a risk based maintenance strategy to make best use of the available funds. The risks to road users relate to the potential for increased crashes and increased vehicle operating costs associated with lower levels of service from the road system.

### **5. Impact of Long Term use of Current Practices on Asset Expected Life**

Continuation of the current road management practices is expected to have a significant negative impact on the expected life of the road assets.

The Shire faces significant difficulties in funding its existing network of roads and bridges at a sustainable level. It is therefore most important that every effort is made to ensure that maximum benefit is made from the funds that are available. The AMP should be reviewed and updated, to adopt a risk based approach to maintenance and construction methods and project prioritisation. Levels of service should be clearly identified and work priorities and methods developed that reflect existing funding constraints and achieve maximum whole of life value for money.

A key contributing factor to the current situation is the high level of staff turnover in key positions, such as the Works Manager. A risk based approach to managing the road system will require application of appropriate skills and good record keeping. These will be best achieved if staff retention is improved and use is made of appropriate skills, using external assistance when required.

Staff training should be implemented to ensure that the new management methods, when adopted, are well understood and implemented.



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## 1 Introduction

As part of the Shire of York's (the Shire) preparation to undertake a Major Strategic Review of its integrated Planning and Reporting (IPR) documents, Talis Consultants (Talis) was appointed to provide a review of the standards to be used for the management of its road infrastructure. This study has tested the actual practice of the Shire against the stated standards for selected road maintenance and reconstruction works undertaken over the 5 years period 2011 to February 2016.

### 1.1 Review Scope

The scope of the study has been to investigate and report on the following:

1. An outline of the current standards found in relevant Shire documents, the links between them and their on-going relevance;
2. Work practices used by the Shire;
3. The extent to which appropriate works practices have been used on the following roads (selected by the Shire) to achieve stated guideline standards and the extent to which the guideline standards have actually been achieved:
  - a. Sealed Roads**
    - i. Spencer Brook – York Road;
    - ii. Mokine Road;
    - iii. Talbot West Road; and
    - iv. Quellington Road.
  - b. Unsealed Gravel Roads**
    - i. Allen Road;
    - ii. Boyercutty Road;
    - iii. Gwambygine East Road; and
    - iv. Hammersley Siding Road.
4. An assessment of safety risks (if any) to road users; and
5. An assessment of impacts on asset maintenance and renewal requirements in the long term from current practices and implications (if any) for the normal expected life of the assets.

The scope of the review is described under Requirements of the Review in the Shire's Request for Quotation (RFQ) dated 8 February 2016, which is attached as Appendix A.



## 2 Methodology

The methodology adopted by Talis included the following:

### 2.1 PHASE 1: Project Initiation Meeting and Site Visit

A project initiation meeting was held with the Shire on 2 March 2016 at the Shire offices. Present at the meeting were:

- Mark Dacombe (Acting CEO) – attended for the initial part of the meeting;
- Gael Ferguson (Acting Policy Officer) – attended for the initial part of the meeting;
- Allan Rourke (Manager Works & Services);
- Peter Murray (Works Supervisor);
- John King (Talis); and
- Lisa Barbosa (Talis).

The objectives of the review were reiterated at the meeting, together with the proposed methodology for the study and the key inputs required from the Shire. Further discussions were then held with Allan Rourke and Peter Murray regarding the current road work practices of the Shire, and a joint inspection was undertaken of the roads selected for review.

The following matters were discussed during the meetings and site inspections.

- According to the Shire, the Austroads standards are sometimes not applicable to York rural roads, hence the roads are built for purpose;
- The Shire makes use of contractors for a number of its Works related tasks;
- The method of widening roads are as follows:
  - The Shire workforce will box out the area of widening to subgrade level, compact subgrade, import gravel and spread it to approximate levels, to achieve a compacted depth of 200mm. The Shire will then compact the gravel, and if there are issues with the gravel, they call in a contractor to stabilise the gravel. The Shire grader operator then does the final trim of the pavement;
  - Compaction of the pavement is based on prescribed rolling method requirement, and 'impact' testing using a mallet handle;
  - If there are concerns about the level of compaction achieved due to the nature of the gravel used, then the contractor does water binding with a Bomag blender (with or without stabilisation with lime or cement). The contractor will recommend applying cement or lime if needed. The Shire has identified that this arrangement seems to work well;
  - Compaction testing, using recognised testing methods, of the pavement and road formation is not normally undertaken;
- Level control for widening is left to the Shire grader operator. Currently the practise is pegging out the widening from the road centreline with a 1 metre straight offset from the edge of pavement. The grader operator attempts to apply a 3% crossfall for sealed roads (unsealed roads about 5%) by eye. A sealing Contractor designs and applies a seal to the widened portion of the pavement;
- A second seal coat is then applied to the full seal width of the road, usually in the following year;
- If the condition of the existing sealed pavement is poor (determined from visual assessment), then the existing pavement is reconstructed in conjunction with the widening. The work

practice is as described above for straight widening, but in this case the existing sealed pavement is overlaid with imported gravel and the Bomag blender is used to mix the new and existing pavement materials to create a new pavement. This leads to a surplus of pavement material which is spread into the formation and drains of the road, rather than removed from site.

- The Shire has only recently introduced alignment control for the edges of road widenings, but does not use level control to ensure that appropriate cross fall on the new pavement is achieved;
- Historically, road designs have rarely been used in the Shire;
- An example of this can be seen in the Quellington /Mannavale Roads intersection upgrade, which was originally to be a simple T junction, and to be done without a design. It was not possible to proceed with the original intersection layout, as required land acquisition had not occurred in time – due to staff turnover. As a result the intersection became significantly more complicated, so a design was prepared by a contracted surveyor and was built accordingly. Due to the very tight constraints of the revised layout, the intersection layout is suboptimal and does not comply with the Austroads guide for intersection designs.;
- Clearing of road side vegetation has been neglected over recent years and is now being undertaken. An efficient method is being used by a contractor who serves a number of the shires in the region, using forestry trimming methods. While this is having a positive impact on clearing the road verges and drainage areas, there is evidence of the machinery used causing damage to the road seal;
- Gravel supply is a problem with good gravel now quite scarce and having to be hauled distances up to approximately 50km. No testing is undertaken of the quality of the gravel taken from the various gravel pits used by the Shire;;
- Water for gravel laying is rarely available from farmers – therefore the Shire uses dry sheeting and most of the work is completed in the winter months. Attempts have been made to push up gravel during the preceding winter ahead of gravel resheeting projects to provide more moisture in the gravel suitable for paying and compacting into the spring and summer months. Historically this has proven difficult due to limited funding being made available in preceding budgets to fund this activity;
- The Shire’s works program finalized by April each year, with Regional Road Group (RRG) funded projects identified one year in advance;
- Roads to Recovery Program has a 5 year allocation, but is update each year;
- Limited policies and records are available;
- The York town drainage system is recognised as having a number of weaknesses that need to be addressed.

### Site Visit

The following were areas were visited with the Shire Works & Services Manager, and Works Supervisor:

#### Sealed

- Spencer Brook - York Road
- Mokine Road
- Talbot West Road
- Quellington Road

#### Unsealed

- Allen Road

- Boyercutty Road
- Gwambygine East Road
- Hammersley Siding Road

### Main Issues

The following issues were discovered on the site visits:

- Examples of substandard road cross fall on recently widened sealed roads and regraded unsealed roads;
- Evidence of inadequate compaction of pavements, particularly in areas of sealed pavement widenings, new shoulders and for road embankments;
- Difficulties with availability and quality of suitable gravel for road pavements;
- Damage to road seals from vegetation trimming
- Poor roadside drainage systems impacting on adjoining road pavements;
- Lack of detailed design when required such as the new Quellington/Mannavale Roads intersection, and the proposed Quellington Road widening through a section of complex horizontal and vertical alignment.

### Additional Items Addressed

During the discussion with the Shire staff, the external stakeholders to be interviewed during the study were identified.

Available documents relating to design and construction of roads were provided by the Shire. These documents included:

- Design drawings;
- Seal spray records; and
- Traffic volumes.

## 2.2 PHASE 2: Review of Shire Policies, Plans and Standards

The second phase of the study was to undertake a review of the following policies, plans and standards that were provided by the Shire and are applicable to the scope of the study. This included the following:

- Shire of York Roads and Bridges Asset Management Plan (version 2.0, March 2014);
- Shire of York: York Roadscape Plan (Adopted March 2005);
- Shire of York: Road Development Standards 2005-2015 (Adopted July 2005); and
- Shire of York: Rural Functional Road Hierarchy (Not adopted).

Available designs and construction information were reviewed and assessed against the relevant Austroads guidelines. A review was to be undertaken for each of the 8 roads nominated for investigation based on available data relating to:

- Subgrade strength;
- Pavement design;
- Seal design;
- Materials; and
- Construction factors as so far as can be reasonably established.

The lack of available records limited the ability to make these assessments. Most reliance was made on a visual assessment of the roads inspected.

## 2.3 PHASE 3: External Stakeholder Consultation

Contact was made with the following external stakeholders nominated by the Shire:

- Meeting with Michael Gill, York Based consulting engineer.
- Meeting with Gordon Marwick, York farmer, school bus operator and member of the York Regional Roads Advisory Group (RRAG).
- Teleconference with Craig Manton, Regional Manager, Main Roads WA, Northam.
- Sergeant Mark Gubanyi, Officer in Charge, WA Police, York.

The key items discussed during this consultation phase as described in the following sections.

### 2.3.1 Michael Gill

In summary, Michael Gill raised a number of road issues relating to the following:

- Lack of survey control resulting in failure to control centre line and to establish correct geometry;
- Failure to widen culverts appropriately during road widening projects;
- Failure to control compaction on embankments/shoulders;
- Failure to design and implement drainage resulting in ponding;
- Failure to use final trim grader;
- Lack of road design drawings or cost estimates;
- Lack of testing of gravel prior to use or on-site testing;
- Failure to implement infrastructure management policy;
- Lack of reseal programs;
- Lack of bridge maintenance programs;
- Lack of culvert cleaning or maintenance programs;
- Lack of appropriate safety barriers or signage around road works sites;
- Lack of appropriate level control for road widening resulting in road shoulders draining back to road pavement;
- Some unsealed roads were flat bladed or built with inverted crowns using the road as a drain;
- Incorrect tree pruning resulting in damaged road seals and vegetation; and
- Six Works Managers have been employed since 2011.

Michael also made a written submission for consideration in the study. (See Appendix A)

### 2.3.2 Gordon Marwick

Gordon Marwick is a local member of the public, farmer, owns 2 school buses and is a member of the Regional Roads Advisory Group (RRAG). He has also previously been a councillor of the Shire.

The RRAG is a community based group of road users and currently meets with the Manager of Works and Services 3-4 times a year.

Gordon stated that modern trucks are damaging the Shire's road network. In the past, there was an estimated 20,000 registered grain growers, however, over the years this number has reduced to approximately 5,000. In light of the reduction of grain growers, farmers have obtained larger holdings and farming equipment (eg trucks) which makes it difficult to maneuver on the narrow roads and

bridges. Additionally, the large farm machinery often gets entangled with the overgrown vegetation along the verges by the roads, causing damage to the equipment.

Gordon owns two school buses and also raised concerns that the school bus routes are sometimes unsafe for road users and would like to work with the Council to address these concerns.

Gordon stated that if transport logistics for gravel is now beyond the Shire's smaller equipment, then the Shire could consider employing the local farmers who have the machinery to move material rather than employing the big local contractors.

Gordon states that some of the biggest issues that the Shire needs to deal with are:

- Staff – employ skilled staff or train unskilled staff;
- Financing – spend money where required;
- Commitment from council – wards are non-existent and majority of the councillors live in the town of York and may not understand the rural road system outside the town area;
- Funding is required for widening of Bridges and Culverts and clearing vegetation from verges; and
- Staging of Resealing Program – prioritize roads based on stated criteria.

Gordon provided a paper prepared by the RRAG and submitted to the Shire in 2010/11. (See **Appendix B**)

### **2.3.3 Craig Manton, Regional Manager, Main Roads WA, Northam**

Craig Manton is the Regional Manager of Main Roads WA, Northam and his comments on the Shire's Road management strategies are as follows:

- Funding restrictions necessitate a risk based approach to complying with Austroad guides or MRWA standards. However, the success of a risk based approach depends on the:
  - Skill set of staff making the assessments; and
  - Stability of staff.
- With high staff turnover of key Shire staff, it is critical to have a culture of good record keeping to retain knowledge of why decisions were made.
- Examples of risk based approach to design and construction activities include:
  - Use detailed design if the horizontal or vertical alignments are to change, but not for road widening where the centreline is unchanged;
  - Do structural design of existing pavement and widening section when widening the seal;
  - Developed a revised maintenance strategy that prioritises tasks in light of funding cuts, to ensure that the most critical issues are addressed to preserve the assets and minimise whole of life costs; and
  - Make sure the Shire road practices and strategies do not conflict with RRG project selection criteria as failure to do so may result in the Shire losing road funds.

### **2.3.4 Sargent Mark Gubanyi, Western Australian Police York**

Mark Gabanyi is the senior Officer at the York police station and has been in York for approximately 4 years. His comments relating to the Shire's road system are as follows:

- The condition of the local road system in the Shire have not contributed to major crashes in his time in York;
- Road users tend to travel to the road conditions, which can be affected, for example, by heavy vehicle traffic and storms;
- The unsealed roads can become rough at times, but the Shire has always been willing to grade the roads when requested to do so by the Police;

There has been a significant reduction in road crashes in the Shire over the past 4 years. This has resulted from improved driver education, including using electronic media, and improved enforcement with a no tolerance approach being adopted together with targeted patrolling, using available traffic data.

## 3 Current Standards in Relevant Shire Documents

The following policies, plans and standards were provided by the Shire:

### 3.1 Shire of York: Roads and Bridges Asset Management Plan (2014)

The Roads and Bridges Asset Management Plan (AMP) has been developed based on the template from the International Infrastructure Management Manual (IPWEA, 2006). It addresses the Shire's road network in some detail, but details of bridges assets are not being measured and their management is not addressed.

The issues addressed by the AMP are outlined in the following sections.

#### 3.1.1 Goals and Objectives of Asset Management

In recognising that the Shire exists to provide community services, mostly through the provision and management of assets, the Shire's goal is to meet required levels of service in the most cost effective manner. Key elements in achieving this goal are stated in the AMP as being:

- Taking a life cycle approach,
- Developing cost-effective management strategies for the long term,
- Providing a defined level of service and monitoring performance,
- Understanding and meeting the demands of growth through demand management and infrastructure investment,
- Managing risks associated with asset failures,
- Sustainable use of physical resources,
- Continuous improvement in asset management practices.

The goals of the AMP are to:

- Document the services/service levels to be provided and the costs of providing the service,
- Communicate the consequences for service levels and risk, where desired funding is not available, and
- Provide information to assist decision makers in trading off service levels, costs and risks to provide services in a financially sustainable manner.

#### 3.1.2 Levels of Service

Levels of Services (LoS) provided by the Roads and Bridges assets of the Shire are described in terms of:

- Legislative Requirements – details of the legislation and a summary of their requirements are provided;
- Community levels of service, measured in terms of quality, function and safety;
- Technical levels of services, measured in terms of Operations - such as cleaning, mowing; Maintenance – activities needed to retain the assets as close as practical to their original condition; Renewal – activities that return the service capability of the assets to its original; and Upgrade – activities that provide higher levels of service or new services.

Current Community and Technical LoS have been discussed in the following groupings: Sealed Roads, Unsealed Roads and Bridges.

Details of the Current LoS for sealed roads are detailed in **Table 1** which is taken from Table 3.3A of the AMP.

**Table 1: Current Service Levels – Sealed Roads Key Performance**

Key Performance Measure	LoS Objective	Performance Measure Process	Desired LoS	Current (2012) LoS
<b>Community Levels of Service</b>				
<b>Quality</b>	Provide a smooth ride.	Customer service requests.	To be determined.	Not currently measured.
<b>Function</b>	Ensure that the road meets the user requirements for travel time and availability.	Customer service requests.	To be determined.	Not currently measured.
<b>Safety</b>	Provide safe suitable roads, free from hazards.	<ul style="list-style-type: none"> <li>▪ Customer reported accidents.</li> <li>▪ Customer requests for curve realignments and safety signage.</li> </ul>	To be determined.	Not currently measured.
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Operations</b>	Urban sealed roads are clean.	Street sweeping frequency.	3 times per annum.	Not currently measured.
<b>Maintenance</b>	Transport network is suitable for purpose.	<ul style="list-style-type: none"> <li>▪ Average maintenance cost per km of road.</li> <li>▪ Pothole patching frequency.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Less than 10% variation between actual and 4 Year average maintenance cost.</li> <li>▪ Potholes do not exceed 150mm in diameter.</li> </ul>	Not currently measured.
		Cost effectiveness.	\$3,000/km	Not currently measured
		Budget.	\$151,2507	\$122,600
<b>Renewal</b>	Ensure roads are replaced/renewed so that roads continue to be fit for purpose.	<ul style="list-style-type: none"> <li>▪ No of renewals identified in Renewal Plan (reseals) completed per year.</li> <li>▪ Useful life of Infrastructure Assets</li> </ul>	<ul style="list-style-type: none"> <li>▪ 70% of renewals identified in first generation Renewal Plan completed per annum.</li> <li>▪ Sealed surfaces 20 years.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Not currently measured.</li> <li>▪ Sealed surfaces 30-35 years.</li> </ul>



		Condition of seals.	Less than 5% of roads with sections that have a condition rating of 4 or 5.	6.7% of Roads with sections that have a condition rating of 4 or 5.
<b>Upgrade/New</b>	Ensure roads are upgraded to meet current standards and modern needs.	No of upgrades identified in Upgrade Plan completed per annum.	80% of upgrades identified in first generation Upgrade Plan completed per annum.	Not currently measured.

Details of the Current LoS for unsealed roads are detailed in **Table 2** which is taken from Table 3.3B of the AMP.

**Table 2: Current Service Levels – Unsealed Roads Key Performance**

Key Performance Measure	LoS Objective	Performance Measure Process	Desired LoS	Current LoS (2012)
<b>Community Levels of Service</b>				
<b>Quality</b>	<ul style="list-style-type: none"> <li>Provide a smooth ride.</li> <li>Road does not have excessive loose material or dust.</li> </ul>	Customer service requests.	To be determined.	Not currently measured.
<b>Function</b>	Ensure that the road meets the user requirements for travel time and availability.	Customer service requests relating to travel time & availability.	To be determined.	Not currently measured.
<b>Safety</b>	Provide safe suitable roads, free from hazards.	<ul style="list-style-type: none"> <li>Customer reported accidents.</li> <li>Customer requests for curve realignments and safety signage.</li> </ul>	To be determined.	Not currently measured.
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Operations</b>	Nil	NA	Nil	NA
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>Maintain transport network in an efficient and cost effective manner.</li> <li>Conduct routine maintenance grading as per service level standards.</li> </ul>	<ul style="list-style-type: none"> <li>Average maintenance cost per km of road.</li> <li>No of times each road is graded, according to Hierarchy.</li> </ul>	<ul style="list-style-type: none"> <li>Less than 10% variation between actual and 4 Year average maintenance cost.</li> <li>Grading –                             <ul style="list-style-type: none"> <li>o Regional – 4/yr</li> <li>o Local – 2/yr</li> <li>o Bus routes – 2/yr</li> <li>o Access roads – 1/yr</li> </ul> </li> </ul>	Not currently measured.

		Budget	\$604,990	\$490,400
<b>Renewal</b>	Ensure roads are replaced/renewed so that roads continue to be fit for purpose.	No of renewals identified in Renewal Plan (resheets) completed per year.	70% of renewals identified in first generation Renewal Plan completed per annum.	<ul style="list-style-type: none"> <li>Not currently measured.</li> <li>Sealed surfaces 30-35 years.</li> </ul>
		Condition of paved and formed roads, including unsealed shape.	Less than 5% of roads with sections that have a condition rating of 4 or 5.	6.7% of Roads with sections that have a condition rating of 4 or 5.
<b>Upgrade/New</b>	Ensure roads are upgraded to meet current standards and modern needs.	No of upgrades identified in Upgrade Plan completed per annum.	80% of upgrades identified in first generation Upgrade Plan completed per annum.	Not currently measured.

Details of the Current LoS for bridges are detailed in **Table 3** which is taken from Table 3.3C of the AMP.

**Table 3: Current Service Levels – Bridges**

Key Performance Measure	LoS Objective	Performance Measure Process	Desired LoS	Current (2012) LoS
<b>Community Levels of Service</b>				
<b>Quality</b>	Ensure bridges provide a smooth ride.	Customer service requests.	To be determined.	Not currently measured.
<b>Function</b>	Ensure bridges meet road users' needs for accessibility, weight and availability.	Customer service requests relating to availability	To be determined.	Not currently measured.
<b>Safety</b>	Provide safe suitable bridges for vehicular traffic.	<ul style="list-style-type: none"> <li>Customer reported accidents.</li> </ul>	To be determined.	Not currently measured.
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Operations</b>	Nil	NA	Nil	NA
<b>Maintenance</b>	Ensure bridges are maintained in working condition.	<ul style="list-style-type: none"> <li>Inspections conducted annually.</li> <li>No of defects outstanding.</li> <li>Average maintenance costs per annum.</li> </ul>	<ul style="list-style-type: none"> <li>One inspection conducted per annum.</li> <li>Less than 3 defect items per inspection.</li> <li>Less than 10% variation between actual and 4 Year average maintenance costs.</li> </ul>	Not currently measured.
		Budget	\$119,600	

<b>Renewal</b>	Ensure bridges are replaced/renewed so that they continue to be fit for purpose.	No of renewals identified in Renewal Plan (overlays) completed per year.	70% of renewals identified in first generation Renewal Plan completed per annum.	Not currently measured.
<b>Upgrade/New</b>	Ensure bridges are upgraded/constructed to meet current standards and modern needs.	No of upgrades identified in Upgrade Plan completed per annum.	80% of upgrades identified in first generation Upgrade Plan completed per annum.	Not currently measured.

Desired Community LoS have not been determined, and therefore the current LoS being achieved are not being measured for any of the asset groups. Desired Technical LoS have been defined for each of the asset groups, but the current LoS being achieved are not being measured.

### 3.1.3 Future Demand

The following factors have been identified as impacting on the future demand for roads related services:

1. Population – 59% increase over the next decade;
2. Demographics – an aging population;
3. Climate Change – increased storms and flooding; and
4. Agricultural practices – larger farm holdings and larger farm equipment needing greater mobility between holdings.

Technology changes relating to larger heavy vehicles using the roads, increased recycling of pavement materials with less reliance on virgin materials and improved pavement preservation techniques are also expected to affect the future management of the roads system.

### 3.1.4 Lifecycle Management Plan

The importance of maintaining good data associated with the road system inventory and condition is highlighted.

The Shire’s road network currently comprises:

- Urban Roads consisting of:
  - Sealed roads – 38.25kms
  - Paved roads - 1.55kms
  - Formed roads - 0.87kms
  - Unformed roads - 0.35kms
- Rural Roads consisting of:
  - Sealed roads – 253.50kms
  - Paved roads – 239.49kms
  - Formed roads – 228.73kms
  - Unformed roads - 6.95kms
- Kerbing – 70.25kms
- Bridges – Details not available

A Road Hierarchy system is detailed in the AMP, based on the Main Roads WA Road Hierarchy for WA however individual roads have not been allocated to road categories in the hierarchy. It is proposed that the hierarchy be used to prioritise expenditure allocations, but the method for so doing has not yet been defined.

Lifecycle management is proposed to incorporate the following Plans:

1. Risk Management Plan;
2. Routine Maintenance Plan;
3. Renewal/Replacement Plan;
4. Creation/Acquisition Plan; and
5. Disposal Plan.

The AMP notes that the Shire is currently renewing assets at 71.8% of the rate they are being consumed and increasing its asset stock by 15.8% each year.

To provide services in a financially sustainable manner, the Shire will need to ensure that it is renewing assets at the rate they are being consumed over the medium-long term and funding the life cycle costs for all new assets and services in its long term financial plan.

There are risks associated with providing the service and not being able to complete all identified activities and projects. Major risks have been identified as:

- Poor condition of asset causing vehicle damage;
- Poor condition of asset causing injury to road users;
- Flooding causing damage to asset;
- Damage to assets caused by natural disaster;
- Downgrading of LoS due to lack of funding; and
- A current lack of inspection and maintenance systems.

The AMP proposes that the Shire endeavours to manage these risks within available funding by:

- Establishing routine inspection regimes;
- Evaluating appropriate designs for flood prone areas;
- Monitoring weather forecasting and general preparedness.
- Establishing criteria to determine renewal and new/upgrade priorities; and
- Ensuring appropriate resources are allocated to maintain systems.

The AMP notes that the Shire's lifecycle management practices are carried out in accordance with the following Standards and Specifications:

- Internal practices;
- IPWEA standards;
- Sealed Local Roads Manual, ARRB July 2005;
- Unsealed Roads Manual, ARRB April 2009;
- Occupational Health and Safety Standards;
- Australian Asphalt Pavement Association Standards; and
- Acceptable Industry Standards.

### 3.1.5 Financial Summary

These infrastructure assets have a replacement value of \$73,752,358.

The projected cost to provide the services covered by the AMP includes operations, maintenance, renewal and upgrade of existing assets over the 10 year planning period is \$45,726,000 or \$4,573,000 per year.

Current maintenance expenditure levels are stated to be based on historical data to meet the basic level of service, and are considered to be inadequate to meet required service levels. There is a future requirement to amend the AMP to include linking required maintenance expenditures with required service levels.

Assessment and prioritisation of reactive maintenance is currently undertaken by operational staff using experience and judgement.

The AMP provides future projections of required operations and maintenance expenditure. However these projections are based on current levels escalated in line with increases in the value of the asset stock. This means that the required maintenance expenditure levels may be currently understated in the AMP.

The projected renewal costs in the AMP, which are based on data from the ROMAN road management system, are expected to be more reliable than the maintenance expenditure projections. However, improvement to work practices and introduction of "low-cost" renewal methods may result in savings.

**The Shire's estimated available funding for road management tasks for this period is \$16,883,000 or \$1,688,000 per year. This is a funding shortfall of \$2,884,000 per year, resulting in a funding level that is 37% of the cost to provide the service.**

The Shire's present funding levels are insufficient to continue to provide existing services at current levels in the medium term.

This is illustrated by modelling that has found that the following projected renewal works have not been funded in the Long Term Financial Plan over the next 10 years:

- \$16.7million of reseal works;
- \$1.6million of gravel sheeting works;
- \$600,000 of asphalt overlay works;
- \$2.1million in reconstruction works;
- \$5.6million in rehabilitation works.

### 3.1.6 Asset Management Practices

The Shire manages its road system using the ROMAN road management system and associated operating procedures, linked to the asset register in the SynergySoft system. This in turn is linked to the finance system. External service providers are used to input data into the ROMAN system.

### 3.1.7 Plan Improvements and Monitoring

The actions proposed in the AMP are:

- Assess first years costs against actual.
- Prepare ranking system for renewals.
- Review maintenance practices and align with service level requirements.

- Review latest road building technologies and practices and train staff in contemporary techniques.
- Ongoing, rolling program of data collection and recording.
- Community consultation on service level provision.

### 3.2 Shire of York: York Roadscape Plan (2005)

The York Roadscape Plan was developed in 2005 and so is largely superseded by the AMP. The following provides an outline of the Shire's Roadscape Plan.

#### 3.2.1 Objectives:

The objectives include the following that relate to road management:

- Provide a safe, efficient and effective road transport network
- Provide a visually appealing road landscape for the benefit of road users and the community

#### 3.2.2 Strategies:

The strategies include the following that relate to road management:

- **Land and Planning Requirements**
  - Designate and adopt a Shire of York Hierarchy, including the designation of regionally significant roads, major and minor roads, heavy haulage routes, conservation category roads, tourist routes, and other special roads ;
  - Plan for the development, extension, upgrading, and construction of new roads, as required to meet the needs of the community;
  - Achieve 40 metre wide (minimum) for all road reserves throughout the Shire to meet the sustainable requirements of flora corridors;
  - Obtain, as a condition of subdivision on all major developments, free of cost, a 10 metre road reserve widening and require a revegetation programme if it is cleared land;
  - To promote aesthetically pleasing vistas from roads, in order to promote tourism, environmental and social values;
  - Restrict or prohibit the taking of gravel, sand and other material from roadside borrow pits;
  - Adopt best financial planning, budgeting and management practice, including whole of life valuations, and best financial efficiency for management of all road infrastructure assets; and
  - Develop a sustainable plan for the ongoing management of all road infrastructure assets, including roadside vegetation.
- **Engineering Standards**
  - To design and construct roads and intersections in accordance with current Australian engineering standards as designated by Austroads;
  - To design and construct all structures in the road reserve in accordance with current Australian engineering standards (Austroads);
  - To design and construct all bridges and drains in accordance current Australian engineering standards (Austroads);

- To provide signs, line marking, crash barriers and guide posts to all roads in accordance with current Australian engineering standards (Austroads);
- To provide clear and safe directional signs;
- To provide and maintain school bus stop facilities throughout the Shire, in accordance with current Australian engineering standards (Austroads); and
- To liaise with Main Roads WA in relation to road improvements and vegetation management for intersections of local roads with state roads.
- **Road Maintenance**
  - To maintain all road pavements and shoulders in a safe and serviceable condition;
  - To maintain all drainage in a safe and serviceable condition;
  - To maintain all bridges and fords in a safe and serviceable condition;
  - To maintain all road structures in a safe and serviceable condition;
  - To maintain all signs, guide posts and line marking in accordance with current Australian Standards;
  - To prune, slash and maintain all roadside vegetation in accordance with adopted vegetation management plans and the provisions of the Wildlife Conservation Act;
  - To carry out annual inspections of all roads, bridges, fords, drains, paths, bridle trails, and structures in the road reserve;
  - Adopt sustainable and uniform road maintenance practices;
  - To comply with the Environmental Protection (Clearance of Native Vegetation) Regulations 2004 and the provisions of the Wildlife Conservation Act; and
  - To develop and implement vegetation management plans to compliment and support the Road Hierarchy
- **Construction and Maintenance**
  - Undertake appropriate training in vegetation management for the Shire of York staff and contractors;
  - Develop and implement construction and management standards and practices which meet all requirements and provisions of the Wildlife Conservation Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004; and
  - Undertake annual monitoring and inspection programmes of roadworks in liaison with the Roadside Conservation Committee to develop and deliver ongoing training to staff and contractors.

### 3.3 Shire of York: Road Development Standards 2005-2015

The Road Development Standards 2005-2015 was developed in 2005 and so is largely superseded by the AMP. The following sections provide an overview of the Road Development Standards.

#### 3.3.1 Rural Roads Widths

- A basic principle for road construction is for the pavement width (gravel or seal) to allow for the safe passing of standard vehicles travelling in opposite directions or to allow for overtaking for vehicles traveling in the same direction.
- Lane widths of 2.8 metres would be the minimum standard with 3.2 metre lanes being the preferred standard.

- In addition to the lane widths a specific shoulder width is necessary for road safety. A minimum shoulder width of 1 metre is proposed;
- Drainage requirements would be determined by terrain, soil types, grades and other factors and up to 2 metres on either side of the road is normally required;
- Standards apply to roads based on annual average daily traffic, as per the following table.

**Table 4: Typical Cross Section for Roads Based on Annual Average Daily Traffic**

Traffic Volume (Vehicles Per Day- VPD)	Seal Width (m)	Shoulder Width each side(m)	Drainage Width Up to Total (m)	Total Width (m)
0 – 100 VPD (Unsealed)	0	8.4	4.0	12.4
0 – 100 VPD	6.4	2.0	4.0	12.4
100 – 250 VPD	7.0	2.0	4.0	13.0
250 – 500 VPD	8.0	2.0	4.0	14.0
501 upwards VPD	9.0	2.0	4.0	15.0

- Specific individual standards may need to be developed and adopted where there is extensive use of a road or a section of road by heavy haulage / permit vehicles to cater for extra mass, over width, over length, over height vehicles.

### 3.3.2 Environmental Standards

- While it is very restrictive to combine traffic needs and environmental needs in a constrained road reserve width (normally 20 metres on local roads) the environmental values must be included;
- Based on the standards for traffic use vegetation widths of a maximum of 7 metres may be maintained in road reserves. Unfortunately historic road construction is generally in the centre of the road reserve resulting in narrow verges either side of the pavement, which may be unsustainable in the long term.

## 3.4 Shire of York: Rural Functional Road Hierarchy

A road hierarchy has been established for the Shire. A major requirement of the Road Hierarchy Plan is to establish targets that are equitable and sustainable, having regards to the community needs and aspirations, and Shire’s and the communities’ ability to fund such standards. Individual roads have not been allocated to categories in the hierarchy.

### 3.4.1 Design and Construction Parameters:

- Based on national, state, and local government documentation, appropriate traffic land widths and resultant pavement widths and depths will be developed to form the proposed design and construction parameters for the local road network;
- In accessing the design and construction parameters required for rural roads the following parameters are recommended to meet the particular needs of the community and Shire:
  - The Shire will maintain the road network, as adopted, to the current level of service to all existing permanently occupied dwellings unless specifically determined by the Shire;
  - Extensions to the bitumen sealed surface network may be considered provided there is at least a significant contribution by others and a life cycle analysis has been undertaken to determine the benefits of extending the sealed network;



- In addition to the regular maintenance targets, the Shire will consider the development and maintenance of a network of roads for the movement of agricultural, industrial or tourist traffic in such areas and times as defined.

### 3.5 Comments on Current Standards

The principal standard provided by the Shire for review in this study is the AMP. This is a recently created standard (2014) and essentially supersedes the other documents provided. The AMP makes broad reference to complying with Austroad Guides and the Sealed Local Roads Manual (ARRB), and the Unsealed Roads Manual (ARRB).

The Ausroads Guides are a series of documents which cover the design, construction, maintenance and operation of the road network in Australia and New Zealand. They were developed for and have been adopted by all of the road agencies (State, Federal and NZ) in Australasia. They cover a broad range of issues associated with the technical aspects of managing roads, ranging from asset management, bridge technology, pavement technology, road design, road safety, traffic management.

While they are recognised as the principal technical documents guiding road management practices in Australia, they are not always appropriate for low traffic roads, such as those managed by local governments.

The ARRB documents have been developed in response to this recognition to provide guidance to local governments in applying the Ausroads guideline in an appropriate way for local roads. The Shire's practices should be primarily based on these two documents.

The AMP provides a sound basis upon which appropriate standards for the Shire can be developed. In addition to referring to the above standards it provides a number of technical levels of service for the road assets, but is, by its own admission, incomplete in some important areas. It is critical that the AMP is reviewed and amended where necessary to reflect appropriate technical standards and levels of service compatible with local conditions and the shortfall in available road funding.

## 4 Road Management Practices

### 4.1 Current Road Management Practices

The following comments are made as a result of the investigations undertaken during this study, based on the information made available by the Shire, discussions with Shire staff, site visits and information provided by external stakeholders. There was a strong consistency in the outcomes from these aspects of the study and are presented in the following sections, structured to reflect the AMP.

#### 4.1.1 Levels of Service

- Desired levels of service (LoS) are not provided for community LoS
- The current levels of service are not measured
- Evidence is not provided that stated LoS are being used to influence management practices and outcomes

#### 4.1.2 Risk Management Plan

- Not fully developed or used

#### 4.1.3 Routine Maintenance Plan

- Not fully developed, used or recorded

#### 4.1.4 Renewal/Replacement Plan

- Future 5 year schedules exist. They are being partly followed, but significantly underfunded
- Work practices are not in accordance with specified standards

#### 4.1.5 Creation/Acquisition Plan

- Not developed or Implemented
- Not a high priority

#### 4.1.6 Disposal Plan

- Not developed or Implemented
- Not a high priority

#### 4.1.7 Work practices

##### 4.1.7.1 Concerns relating to construction of pavements:

- Compaction
- Levels (cross fall and roughness)
- Drainage

##### 4.1.7.2 Lack of Design

Situations arise where design input is required but not undertaken (external service required). This was noted to occur with the upgrading of an intersection (Quellington / Mannavale Roads Intersection) and on the widening of a section of Quellington Road with complex horizontal and vertical, requiring the road centreline to be moved.

#### 4.1.7.3 Maintenance practices

- Unsealed road grading is often deficient;
- Dry re-sheeting of gravel roads
- Drainage systems are not being maintained, which is impacting pavement performance
- Verge side vegetation maintenance – a trimming strategy is required due to vegetation impacting large machinery and vehicles on road. This activity should not damage the seals of the roads.
- There is a lack of testing of pavement material suitability which is needed for moisture control and to determine the requirement for stabilisation;
- Additionally, design and testing of pavement compaction and pavement depth are required at an appropriate level.

#### 4.2 Extent to which Standards have been achieved

- The study has found that there is little evidence that the key policy document for the management of the road network, the AMP, is being consciously and systematically implemented by the Shire
- There is a general reference to complying with guide documents (ARRB and Austroads), however standards are not clearly defined in a practical way in the current version of the AMP.
- Therefore there is limited evidence to confirm the achievement of standards
- Referenced standards are appropriate but the AMP should focus practices of the Shire on the “Sealed Local Roads Manual” and “Unsealed Roads Manual”.

## 5 Recommended Improvements to Practices

The existing AMP is a sound basis upon which the Shire can develop significantly improved road management practices. For this to occur, it is important for the Shire to review and complete, and then implement the AMP taking into consideration the following:

### 5.1 Levels of Services

- Set desired LoS for community LoS for all asset groups (sealed roads, unsealed roads and bridges)
- Develop and implement processes to measure current LoS's in all categories
- Review all desired LoS's following a period (for example, 2 years) of measuring actual LoS

### 5.2 Life Cycle Management Plan

#### 5.2.1 Road Hierarchy

- Allocate all roads to categories in road hierarchy
- Develop method for using road hierarchy to help prioritise road funding allocation

#### 5.2.2 Risk Management

- Implement risk based approach to management of system including as a priority:
  - Routine Inspections (documented, monitored)
  - Evaluating designs for flood prone areas
  - Evaluation designs for substandard sections of road alignment, or when the road centreline is to be moved;
  - Establish criteria to determine renewal and upgrade new priorities
  - Ensure appropriately resourced maintenance systems

#### 5.2.3 Routine Maintenance Plan

- Prepare, implement, monitor and review plans
- First Priority:
  - Renewal/Replacement Plan
- Second Priority:
  - Creation/Acquisition Plan
  - Disposal Plan

#### 5.2.4 Develop and Undertake Work Practices in Accordance with:

- Sealed Local Roads Manual 2005
- Unsealed Roads Manual 2009

### 5.3 System to Address the Following:

#### 5.3.1 Design input into projects

Use detailed design for road projects that involve:

- Changes to existing or new intersection layouts, or

- Realignments of road centreline, including resulting from road widenings

### 5.3.2 Material Testing

- Undertake testing of gravel sources to gain a good understanding of quality and availability of applicable materials:
  - Complete mechanical tests (ie particle size distribution, Atterberg Limits);
- Undertake the following testing of a sample of new pavements located in the new shoulder, near the junction of existing and new pavements in widened seal area, and at the centreline:
  - Mechanical tests of base section of pavement; and
  - Dynamic Cone Penetrator of subgrade to get CBR;
- Review 'standard' pavement design, in terms of pavement depth and when actual design of pavement is required for a project;
- Develop a practice for testing fill and pavement compaction on project.

### 5.3.3 Set Out Construction Works

- Use survey set out for pavement outer edge alignments and for levels for road crossfalls.

### 5.3.4 Quality of Work

- Undertake a skills audit of the Shire's workforce and train staff as required to optimise quality of work. In particular, review pavement and roadside drainage construction and maintenance skills.

### 5.3.5 Roadside Vegetation

- Review roadside vegetation maintenance to minimize pavement damage commensurate with value for money vegetation maintenance

## 5.4 Staff Stability

- The high level of senior staff turnover has impacted services;
- Introduce measures to retain staff;
- Provide support for high technical requirements (eg more complex projects and issues);
- Provide external mentoring for inexperienced senior staff;
- Provide regular and structured training on key issues and areas of improvement.

## 5.5 Funding Levels and Allocations

- Use AMP to develop evidence of required levels of funding and areas that will provide best risk based return;
- Introduce road hierarchy criteria and risk base for funding allocation between maintenance, renewal, and expansion and between projects.

## 5.6 Bridges

- Develop the AMP for bridges.

## 6 Summary of Findings

The following are the key findings of the review:

### 1. Current Standards in Relevant Shire documents

The key current document for guiding the Shire's road management practices is the Roads and Bridges Asset Management Plan (AMP). This makes broad reference to complying with Austroad Guides and the Sealed Local Roads Manual (ARRB), and the Unsealed Roads Manual (ARRB).

The Ausroads documents are the principal technical documents guiding road management practices in Australia, however, they were developed for the state road authorities. The ARRB documents have been developed to provide guidance to local governments in applying the Ausroads guideline in an appropriate way for local roads. The Shire's practices should be primarily based on these two documents.

The AMP provides a sound basis upon which appropriate standards for the Shire can be developed. In addition to referring to the above standards it provides a number of technical levels of service for the road assets, but is, by its own admission, incomplete in some important areas.

Recommendations are given on the priority issues needed to improve the current value of the AMP to the Shire.

### 2. Current Work Practices

A number of key deficiencies were found to exist in the current practices of the Shire. These relate to:

- Funding allocations which are well below a sustainable level;
- A lack of systems to address the risks associated with the funding shortfall;
- The AMP is not complete and not being applied;
- There are deficiencies relating to the design, construction and maintenance of roads that need to be addressed; and
- The reported high turnover of people in the position of Manager Works and Services is likely to be a major contributor to a number of these deficiencies.

### 3. Extent to which Standards have been achieved

The study has found that there is little evidence that the key policy document for the management of the road network, the AMP, is being consciously and systematically implemented by the Shire.

### 4. Assessment of Risks to Road Users

The failures to implement appropriate road management practices, particularly given the shortfall in required funding, has the potential to pose risks to road users associated with the failure to use detailed design when necessary, appropriate construction methods and a risk based maintenance strategy to make best use of the available funds. The risks to road users relate to the potential for increased crashes and increased vehicle operating costs associated with lower levels of service from the road system.

### 5. Impact of Long Term use of Current Practices on Asset Expected Life

Continuation of the current road management practices is expected to have a significant negative impact on the expected life of the road assets.

The Shire faces significant difficulties in funding its existing network of roads and bridges at a sustainable level in the future. It is therefore most important that every effort is made to ensure that maximum benefit is obtained from the funds that are available. The AMP should be reviewed and updated, to adopt a risk based approach to maintenance and construction methods and project prioritisation. Levels of service should be clearly identified and work priorities and methods developed that reflect existing funding constraints and achieve maximum whole of life value for money.

A key contributing factor to the current situation is the high level of staff turnover in key positions, such as the Manager Works and Services. A risk based approach to managing the road system will require application of appropriate skills and good record keeping to increase the benefits from past experience. These will be best achieved if staff retention is improved and use is made of appropriate skills, using external assistance when required.

Staff training should be implemented to ensure that the new management methods, when adopted, are well understood and implemented.

# Appendix A: Submission by Michael Gill



## York Shire Road Infrastructure Issues:

Submitted by Michael Gill

### 1. New Roads Being Constructed Sub Standard

- 1.1. Lack of Survey Control resulting in failure to control centre line and establish correct geometry, no crossfall or superelevation controls. **(See Photo 1)**
- 1.2. Culverts not being widened correctly when roads upgraded resulting in road user risk. Example Spencers Brook Rd 2015. **(See Photo 2)**
- 1.3. Road grading is inadequate and results in a rough ride, destabilising truck loads. **(See Photo 3)**
- 1.4. Failure to compact embankments leading to scour and accelerated moisture ingress. **(See Photo 4a, 4b)**
- 1.5. Failure to design and implement functioning drainage resulting in widespread ponding on new roads. **(See Photo 3)**
- 1.6. Traditionally no Road Plan (drawing) or cost estimate was prepared. It is understood that cost estimates are now being prepared.
- 1.7. No testing of gravel prior to use, and no on site testing to ensure Optimum Moisture and Density is achieved.
- 1.8. New culvert on Knotts Road constructed sub standard, no construction standards specified or implemented. **(See Photo 5)**

Currently the main concerns are Spencers Brook York Rd (2014/15) and Mokine Rd (2015/16). Inverted crowns (ponding) and narrow shoulders on Spencers Brook Rd are an ongoing risk. **(See Photo 6a, Photo 6b)**

### 2. Failure to Maintain Road Infrastructure

- 2.1. For approximately 10 years prior to the 2014/15 budget there was little or no road maintenance. (2014 road inspection with Shire President identified issues, osmosis due to blocked drains wrecking roads)
- 2.2. Failure to maintain drainage on the network has accelerated the rate of decay. Roads built in past 5 years now failing due to this issue. Examples are Goldfields Rd and East Gwambygine Rd. Spencers Brook Rd time lapse photos document rate of decay. **(See Photo 7a, Photo 7b, Photo 7c, Photo 7 d)**
- 2.3. Failure to implement an infrastructure management policy. No 10 year plan or 5 year plan has been produced.
- 2.4. Failure to carry out Shoulder Grading or reconditioning. (Goldfields Rd example). **(See Photo 8a, Photo 8b)**
- 2.5. Reseal Programs are non-existent. Quellington Rd and Mannavale Rd are examples of roads desperately needing reseals.
- 2.6. It appears the Shire focus was on attracting external funds to absorb the wages and costs of machinery, with a reluctance to spend municipal funds on maintenance. Typically \$750 000 per annum spent on roads, majority

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on new road construction funded 2/3 to 1/3. Roads to Recovery, Regional Road Group funding.

- 2.7. Shire President has stated in public council meetings that York builds 4 times the amount of new road that it should, and that typically the Shire spends \$750 000 per annum on roads instead of \$2000 000.
- 2.8. In 2013 the York Shire was engaged by Main Roads to carry out road widening works on the York Quarading Rd. This affected the Shire's own construction programme. The road works failed and were rectified by the Shire, at its cost.
- 2.9. Why did the York Shire attempt to build a Main Road at the expense of carrying out the maintenance responsibilities that they carry as custodians of an asset that took 150 years and many generations to build? It has taken less than one generation to compromise the long term integrity of this hereditary asset.
- 2.10. Examples of new shire road works.
  - Goldfields Rd
  - West Talbot Rd
  - Mokine Rd
  - Spencers Brook Rd
  - Quellington Rd
  - Talbot Rd
  - Ashworth Rd
  - Green hills South Rd
  - Gwambygine East Rd

### 3. Failure to Maintain Bridge Infrastructure

- 3.1. No Bridge maintenance program existed prior to now.
- 3.2. No Culvert cleaning or maintenance program prior to now.
- 3.3. No routine Bridge maintenance what so ever in past 10 years, only the MRD 5 yearly inspections and the specific maintenance triggered. Huge backlog of work.
- 3.4. Failure to inspect Bridges until questions late last year regarding Risk assessments and the Rav 4 upgrades. ( I carried out the inspections in December 2015)
- 3.5. Culverts installed on Knotts Rd because bridge had failed as a result of deck drainage issues. Totally avoidable.
- 3.6. Culvert programmed for Talbot Hall Rd because maintenance grading created inverted crown and water damaged Bridge. Totally avoidable.
- 3.7. Culvert installed on Talbot West Rd, very little wrong with bridge other than g/rail

## 4. Shoulders that slope toward the centre of the road

- 4.1. Systemic issue, with shoulders sloping inward when doing road widening activities. Examples Quellington Rd, Goldfields Rd.
- 4.2. Photo's of washed out edges on Goldfields Rd highlight risks. Spencers Brook Rd 2015 widening works another recent example. (See Photo 8a, Photo 8b)
- 4.3. Failure to control importation of gravel on widening and new construction works results in large excess of gravel being bladed into drains and up back slopes, examples Goldfields Rd and Quellington Rd. (See Photo 9a, Photo 9b)

## 5. Gravel road maintenance grading sub standard.

- 5.1. Prior to joint site inspection with the Shire President and CEO in 2014 the maintenance grading techniques were sub standard. A directive from the President to address this issue was given.
- 5.2. Roads were being flat bladed or worse built with inverted crowns using the road as a drain. (See Photo 6a, Photo 6b)
- 5.3. Gravel bladed out and up back slopes to be lost now causing gravel shortage across network. No effort to recover lost gravel. (See Photo 9a, Photo 9b)
- 5.4. Recent attempts to improve techniques seem to be having an effect.
- 5.5. Drainage on gravel roads ignored until 2014.

## 6. Tree pruning Sub Standard

- 6.1. Following directive from the Shire President in 2014 road verge maintenance was funded and works carried out.
- 6.2. Sub contractor was engaged to carry out work using forestry machinery.
- 6.3. Steel tracked excavator is crushing and ripping road surfaces during works. Examples Knotts Rd, West Talbot Rd at Waverly Park, Mokine Rd. (See **Photo 10a, Photo 10b, Photo 10c**)
- 6.4. Oil leaks from mounted chainsaw on excavator leaving oil on road. (See **Photo 11**)
- 6.5. Incorrect pruning resulting in damaged vegetation. (See **Photo 12a, Photo 12b**)
- 6.6. A commitment given by the then CEO that an independent expert from the city would be engaged to confirm that this tree pruning practice is acceptable has not been honoured.

## 7. Employment of Works Managers

- 7.1. At least 6 works managers have come and gone over recent years. Some of these appointees appear not to have been adequately qualified or competent.

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- 7.2. The standard of construction of roads built over this period support this observation.
- 7.3. In 2011 Surveyors were requested to carry out the geometric design for the black spot funded works on Mokine Rd. These works were never carried out and the Black spot money was returned to Main Roads and road left in an unsafe condition to this day.
- 7.4. In 2014 Talbot Road was upgraded using R2R funds however the section of road upgraded was moved 500m West thus avoiding the difficult section for which the funding was intended. The result is now a high speed section of road that terminates each end at a narrow crest curve location. This is in contravention of the intent of the Austroads guidelines.
- 7.5. An accident has just occurred at the West end of these recently completed Talbot Rd works and highlights the risk created by varying the road standard abruptly.

### **8. Poor Safety Management**

- 8.1. Repeated documentation of safety incidents and petition by community members for an investigation into the OH&S practices of the Shire have been ignored by the Shire of York.
- 8.2. In 2012 Worksafe were called in to review the OH&S practices of the Shire, despite this no apparent improvement in practices has been noticed.
- 8.3. There is currently not a functioning OH&S Policy despite repeated requests from the Works Committee to do so.
- 8.4. Community concerns are emerging regarding the use of chemicals in the Shire by the Workforce despite there being no policy in place.
- 8.5. The Shire appears to not understand its responsibilities under the Civil Liabilities act of 2002 and the Duty of Care that is imposed upon the Shire to build and maintain roads. This is illustrated by the apparent failure to address the ponding of water on the recently completed Spencers Brook Rd.

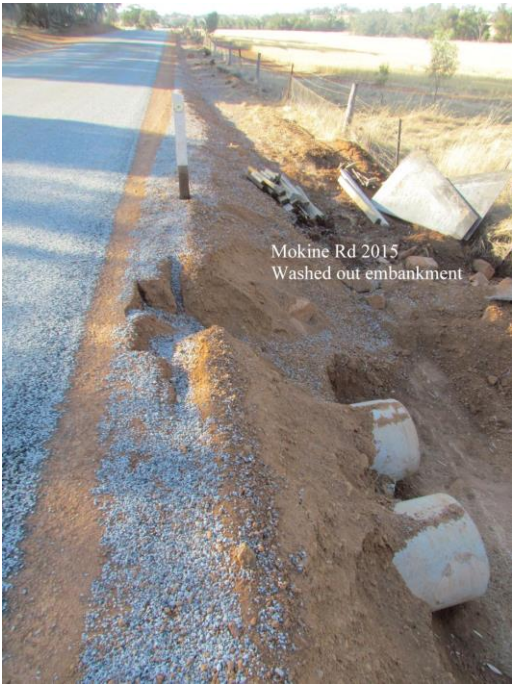
### **Photos**

Note : All supporting documentation including photographic records are the intellectual property of Avon Civil Engineering and may not be reproduced without the permission of the company Director.

# Abon Civil Engineering



**Photo 1**



**Photo 2**

# Abon Cibil Engineering



Photo 3

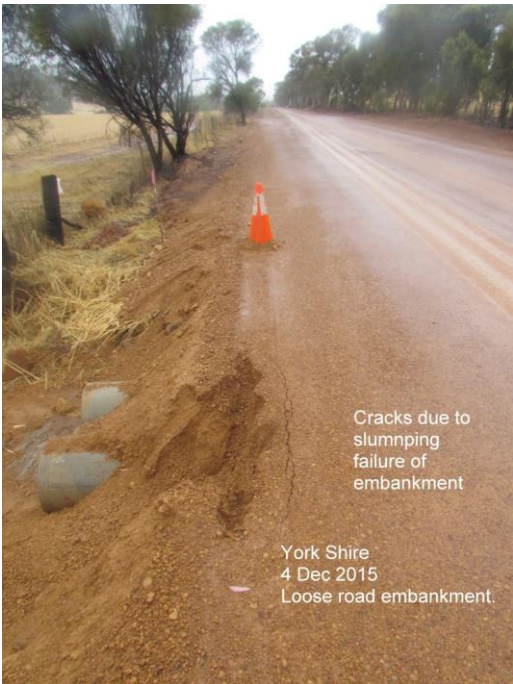


Photo 4a



**Photo 4b**



**Photo 5**



**Photo 6a**



**Photo 6b**





**7a**



**7b**



7c



7d



8a



8b



**9a**



**9b**



**10a**



**10b**



**10c**



**11**



**12a**



**12b**

# Appendix B: Submission by Gordon Marwick





# RURAL ROAD ADVISORY GROUP. (RRAG)

## GOALS OF THE RRAG.

**“ To prioritise the projected five year works and road programme to address risk areas such as School bus routes.”**

The “Rural Road Advisory Group” (RRAG) was formed by a group of road users that include heavy transport and school bus operators that have concerns regarding the York Shire Council’s five year rural road programme, this group has been set up with the support, and in consultation with the Council.

The aim of the RRAG is to assist Council in identifying problem areas and safety issues with rural roads within the York Shire. School bus routes and black spot sites are considered top priority projects within the RRAG and recommendations will be forwarded to the York Shire Council with the expectations that immediate action will follow where possible.

The RRAG are aware that there are road projects that are tied to Government grants and that other projects are funded by the Council’s own Municipal fund.

The RRAG recommend that some town projects that are included in budgets be put on hold, especially those projects that are considered low risk and are not identified as a road safety threat.

### PRIORITY ROADS

The RRAG have identified six high priority road projects that are in need of urgent attention. In an attempt to have a balance between East and West the group have nominated three projects from each side of the river to be considered and completed within a three year works programme.

These projects are all school bus routes and the recommended works vary from a total road rebuild, to gravel sheeting, verge clearing and widening to an acceptable standard that is considered safe for two vehicles to pass.

These roads are Quellington, Allen and Leeming roads in the East, and Mokine, Talbot and Wambryn roads in the West. These roads are identified as current and long term school bus routes and RRAG believe that they qualify for urgent upgrades to overcome the current unsafe conditions.

The RRAG believe that Quellington road should receive urgent and top priority in the upcoming Shire budget considerations. The works to include upgrading the entry and exit corner and replace the bridge near Hewitt’s hay shed, and believe that any outstanding monies on current 2010/2011 budget be redirected to Quellington road. The money allocated in the 2011/2012 budget for work on Greenhills South road be redirected to Quellington road and further major works (except bridge replacement) on Greenhills South road be suspended until further notice.

The \$100,000 identified in the draft 2011/2012 budget under "roads to recovery" for the re seal of Greenhills road, and \$50,000 from town footpaths be redirected and allocated to Quellington road and Mokine road upgrades.

### **COMPLETING ROAD PROJECTS.**

The RRAG would like to see road projects fully completed and not done piece by piece as has been the case in past years, and for Council to allocate sufficient funds to carry out the required work either from the Municipal fund or from the roads to recovery programme.

### **BLACK SPOT PROJECTS.**

The following list is considered priority for the black spot funding and we ask that they be included in the Council's list to be submitted to Main roads WA or funded from within the Council's own municipal fund.

Gwambygine East where it meets Great Southern Highway.

Ovens road East where it meets Great Southern Highway.

X Ovens road West where it meets Qualen road. (School bus route)

Burgess Siding road and Northam road. (East) (School bus route)

Mannavale and Quellington roads intersection. —

Quairading and Mt Hardy roads intersection. (School bus route)

Wambyn and Great Southern roads intersection. (School bus route)

Quellington road bridge near Hewitt's hay shed. (School bus route)

West Talbot/Qualen/Water Hatch roads intersection. (School bus route)

Talbot road bridge widening 2 km's past Lawrence house. (School bus route)

East Wallaby reserve corner. Realign and reconstruct. (School bus route)

Sees road and Lennard road intersection. (School bus route)

Badgin and Goldfields roads intersection. (School bus route)

Greenhills South road, bridge before Beverley boarder.

### **SCHOOL BUS ROUTES.**

The RRAG recommend that all school bus routes that are not sealed receive a maintenance grade at very least twice per school term.

### **GENERAL MAINTENANCE EXPENDITURE.**

The RRAG seeks a break down of this budget item and requests that we can have input into the 2011/2012 budget on this item as there is a significant amount of municipal funds directed to this programme.

*(BRIAN MURPHY  
Keep FOOT PATHS in Budget*

### **ROADS TO RECOVERY.**

Have all the projects in the "draft" budget 2011/2012 under "roads to recovery" been approved.

### **RAILWAY CROSSING LIGHTS.**

The RRAG will be making a submission to the York Shire Council and Main roads WA regarding the need to install flashing lights on Knotts road at the CBH bin. This is a school bus route and safety is of top priority to all road users.

### **RECENT ROAD WORKS.**

The RRAG wish to congratulate the York Shire Council and the staff for recent road works carried out within the Shire, these works are of the highest standards and we believe with all parties working as a team will continue to have our roads repaired to the highest level.

The roads that we recognise include, Avon Terrace, Goldfields road (2km's), West Talbot road (6km's) widening of Mokine and Mackie roads.

### **THANK YOU.**

The Rural Road Advisory Group thanks the York Shire Council for allowing it to make recommendations regarding road safety in our community, with the belief that our group can provide positive input to the safety of all road users in our District.

