Roads Management Strategy

Adopted: 15 August 2011

Dungog Shire
Life as it should be...

CONTENTS

Section 1 - Introduction

Dungog Shire Council owns and maintains in excess of 700 km of public roads throughout the shire. These roads are sealed and unsealed roads and are constructed to various widths and standards. There are also hundreds of kilometres of unformed public roads throughout the shire. Clearly it is not possible for Council to maintain all of this road network and as such this strategy has been developed to ensure that Council has a clear direction in matters such as maintenance lengths, responsibilities of property owners in regards to maintenance and construction standards to be adopted when new roads are constructed or existing roads are rehabilitated.

The primary legislation governing the management of roads in NSW is the Roads Act 1993.

The object of the Act is:

- to set out the rights of members of the public to pass along public roads, and
- to set out the rights of persons who own land adjoining a public road to have access to the public road, and
- to establish the procedures for the opening and closing of a public road, and
- to provide for the classification of roads, and
- to provide for the declaration of the RTA and other public authorities as roads authorities for both classified and unclassified roads, and
- to confer certain functions (in particular, the function of carrying out road work) on the RTA and on other roads authorities, and
- to provide for the distribution of the functions conferred by this Act between the RTA and other roads authorities, and
- to regulate the carrying out of various activities on public roads.

Dungog Shire Council is a 'Roads Authority' under the definitions in the Act.

1.1 Duty of Care

Each land parcel or property is required to have a frontage to a road or right-of-way for the purpose of access. Historically, access was provided by Crown Roads and over the years some of these were dedicated as Public Roads and transferred to Council control based on demand. Over a period of many years, construction standards for these Public Roads have continually improved to meet the demands of increasing traffic and payloads.

Many of Council's sealed roads have exceeded their nominal life of approximately 30 years and must be given a high priority for reconstruction because they require excessive and uneconomic levels of maintenance. Council's rate revenue base is not keeping pace with deterioration of the existing road network and until this situation improves, Council cannot extend the level of service provided.

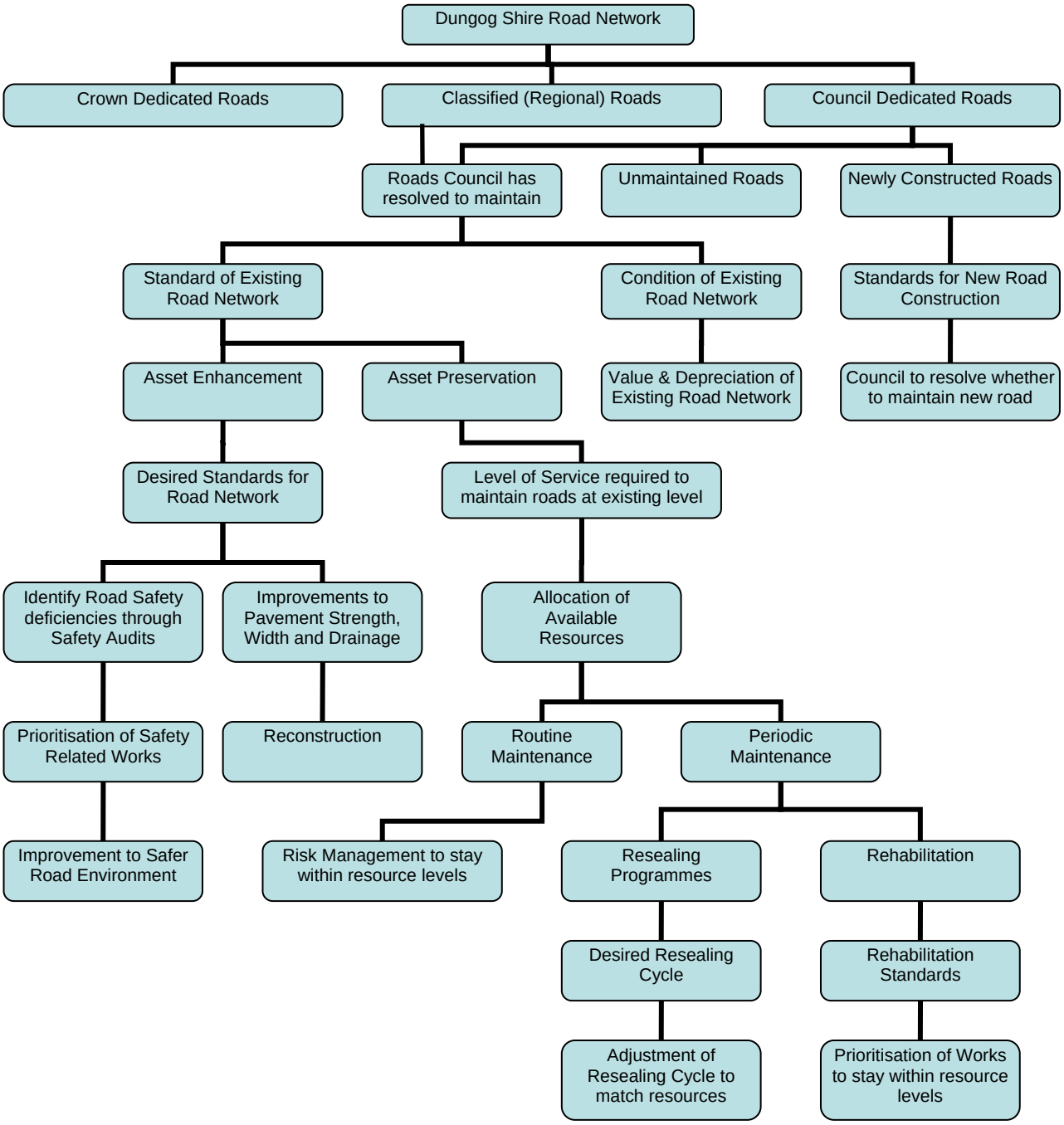
Council has a duty of care to satisfactorily construct and maintain all roads that Council has resolved to maintain to enhance the safety of all users. It is also imperative that Council put in place planning measures to ensure that the current and future needs of our community are adequately addressed and that the statutory reporting requirements of Council are met.

It is also important to note recent developments in the perception of "Duty of Care". Council's "Duty of Care" for roads and the tests that this strategy will be judged against in a Court of Law can be summarised as follows:

- Councils have the right to develop their own standards.
- These standards must reflect accurately the position of Council.
- Councils must be able to demonstrate the logic behind the development of the standard.
- Council will be measured on their performance against their standard.

There are a number of issues related to roads which are left to the individual roads authority and hence not addressed by the Act. The purpose of this strategy is to address the predominant issues and set a framework for Council staff, the community and developers to work within.

1.2 The Overall Process



1.3 Aims

To provide a strategic plan that:

- Provides a road network that as far as fiscally possible is well maintained, meets the current and future needs of the community, enhances the safety of all users, is aesthetically pleasing, maintains mobility and access;
- Aids the operation of business in general by enabling improved access to businesses, providing sufficient parking to potential customers;
- Minimises delays for motorists passing through the Council area;
- Enables Council to meet statutory reporting requirements;
- Assists with the programming of repair or replacement works, thereby enabling Council to direct the limited funds to the areas of most need;
- Establishes minimum design standards for roads under the control and care of Council;
- Promotes consistency for different road classes and minimises construction and maintenance costs by setting differing standards for roads of varying strategic importance.

1.4 Development

In the past, subdivision/development of land in remote areas of the Shire has occurred without developers being made responsible for providing adequate standards of road access. As a consequence, Council is continuously requested by landholders to improve road conditions to their properties, despite the fact that such demands are clearly beyond the resources of Council. A self help approach is required of landholders in remote areas.

The EP&A Act requires Council to consider the question of access before granting development consent *(ie granting development consent and leaving access via crown roads)*. Hence it is now mandatory that any works required by Council on Crown Roads will see that section of Crown Road automatically transferred from the State Government to Council. However, Council will only consider dedication of a Crown Road where it is constructed to the standards required by this policy document. Implementation of these standards will not necessarily change the extent of the Council's adopted road maintenance areas.

Section 2 - Information System

2.1 Data Collection

Relevant data on asset information and condition will be collected and maintained to enable required management plans, works programmes and statutory reporting to be undertaken.

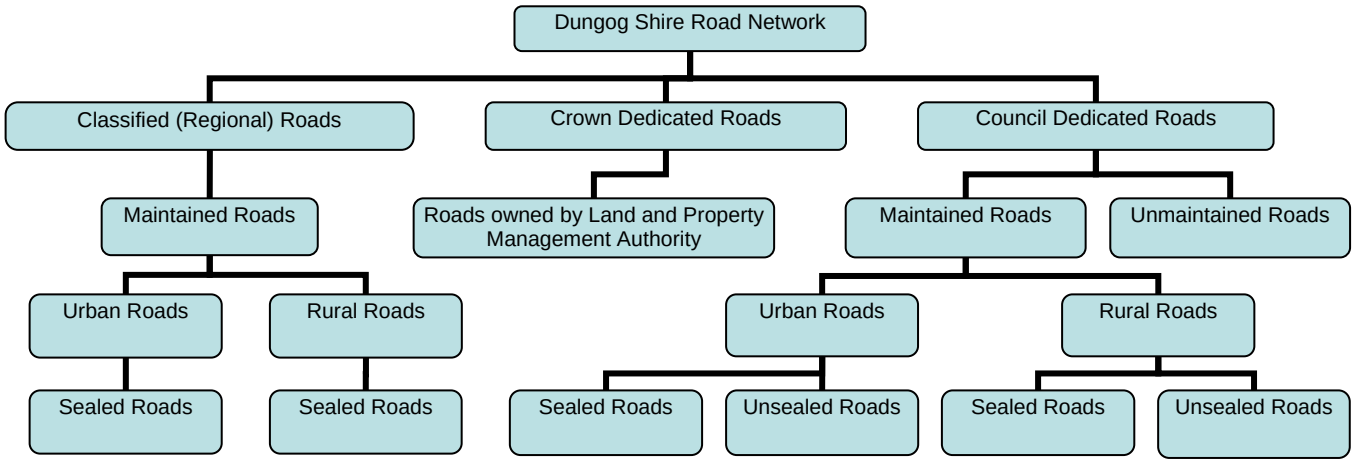
2.2 Road Register

Council will maintain a register of those roads which Council has resolved to maintain. This register will also be made available on Council's website.

Section 3 - Standards

3.1 The Road Network

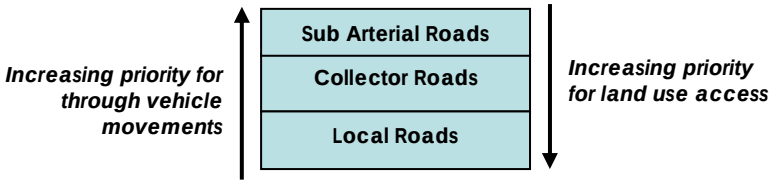
The road network is basically broken up into the components shown below:



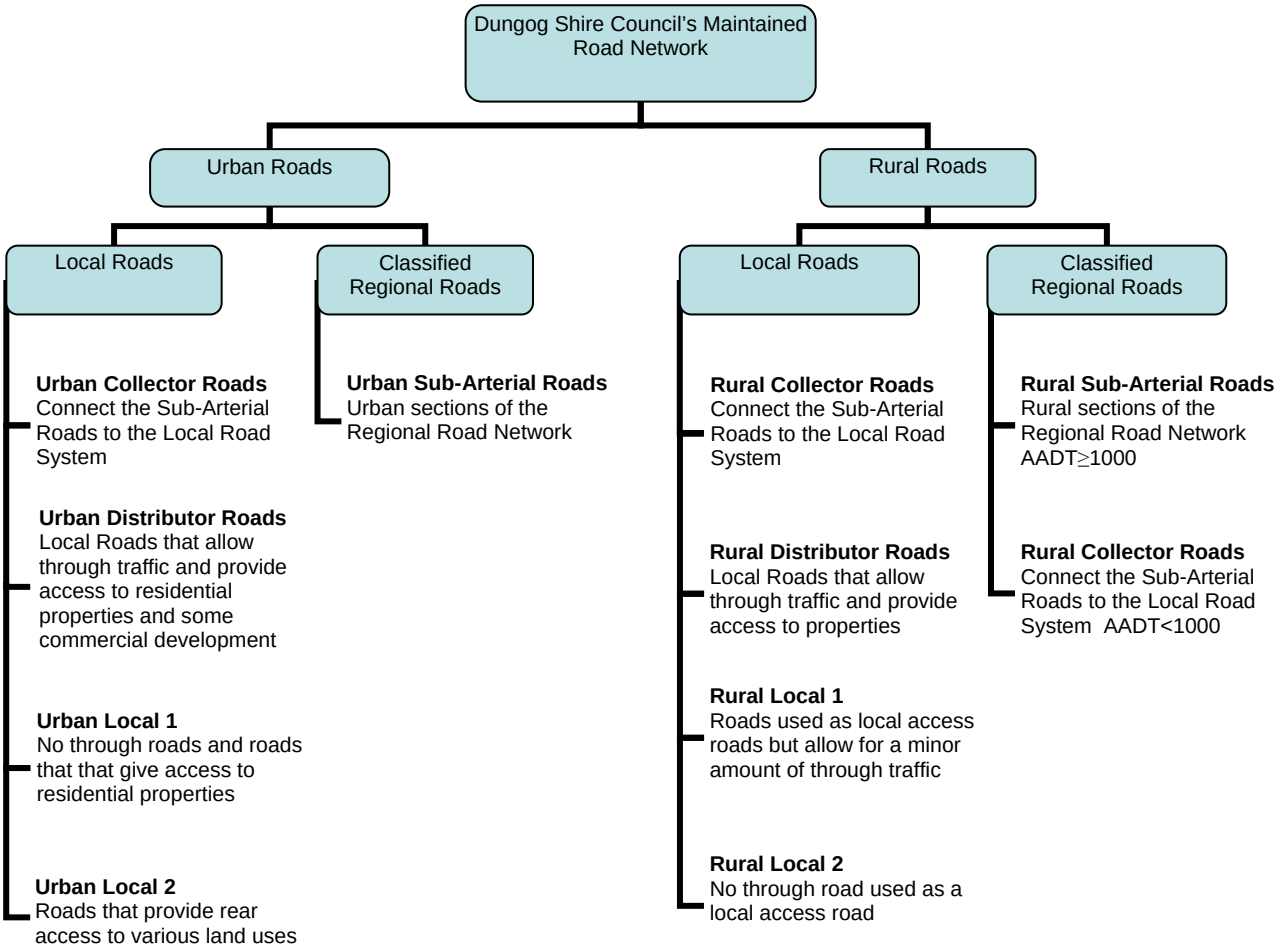
Note:- Council receives a contribution from the Roads and Traffic Authority (RTA) towards maintenance works on the Classified Regional Road Network. Funding is also available on a 50% RTA, 50% Council basis for rehabilitation programmes such as the REPAIR programme. Care, control and maintenance responsibilities remain with Council.

3.2 Road Hierarchy

A road hierarchy matches the class of a road to its use, enhances the amenity of the community by separating through and local traffic and provides a mechanism by which Council can construct and maintain roads more cost effectively. Dungog Shire Council's road hierarchy reflects the following principle:



The Roads within the Dungog Shire Council, which are maintained by Council, are further divided into Road Hierarchy categories. These categories and an explanation of their application are as follows:

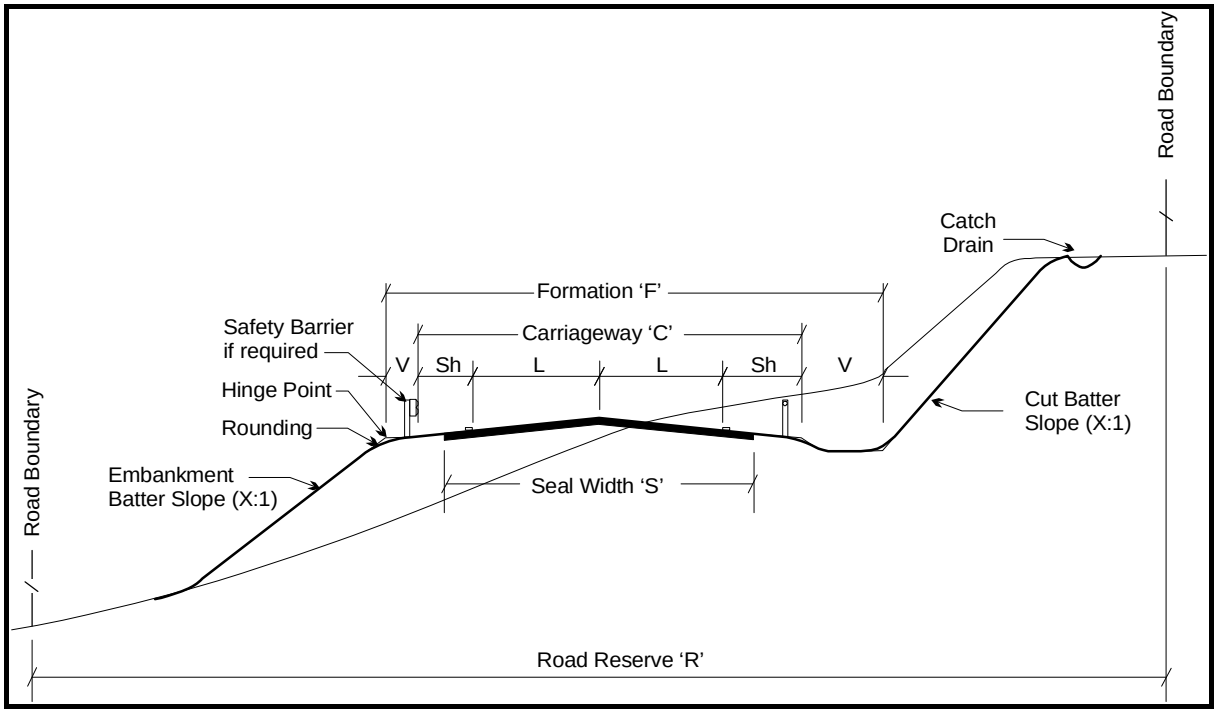


Prior to selecting which classification should apply to a road, the following parameters should be considered:-

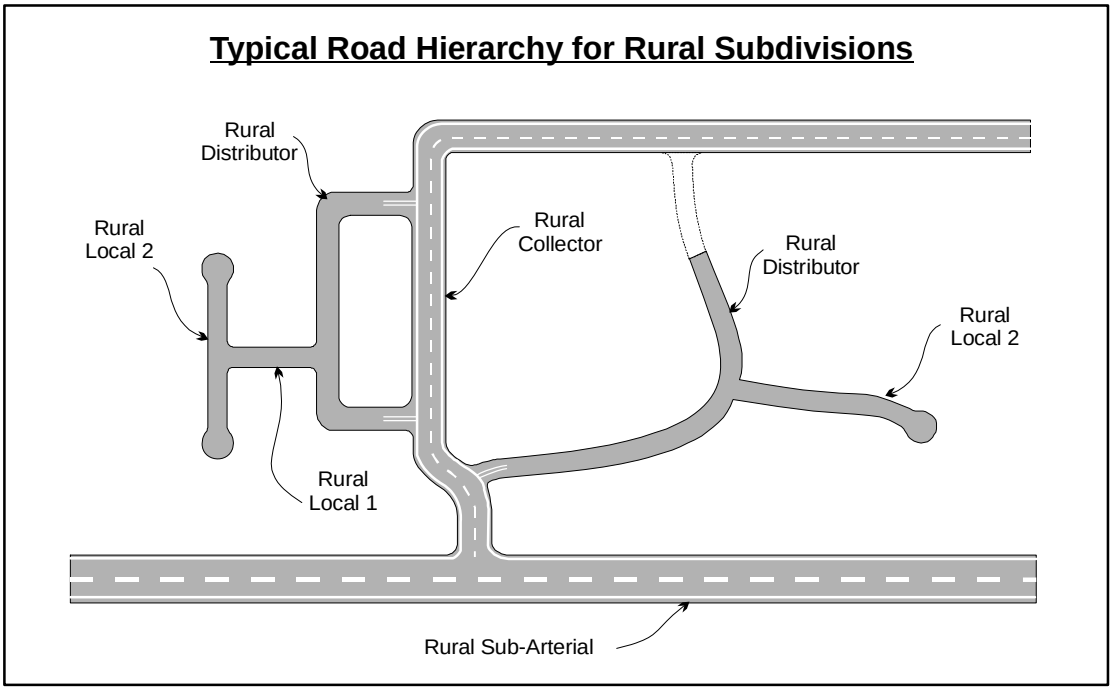
- Projected traffic volume at the end of the design life of the road;
- The potential for the use of the road to alter with future development; and
- The possibility that the road may connect to an existing road in the future, thereby becoming a through road.

3.3 Road Design Standards

The minimum design and construction standards for each category are shown on the following sheets. These standards apply to the construction of new roads and reconstruction of existing roads. They do not apply to rehabilitation of existing roads. Dimensions for Rural Roads are as per the following diagram:-



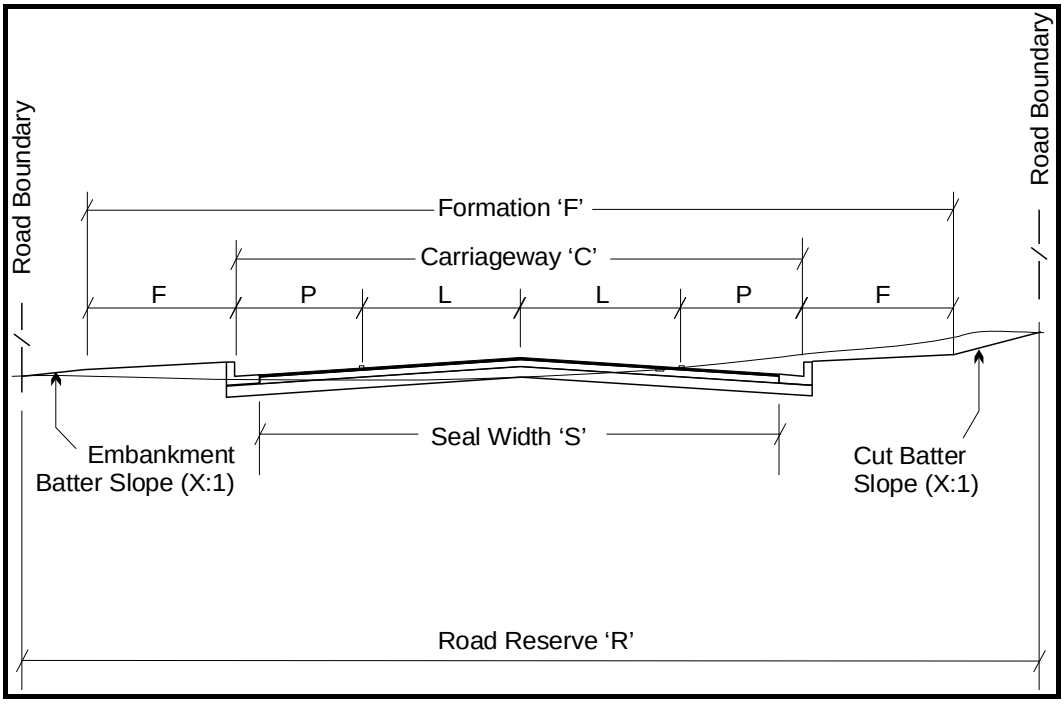
The diagram below demonstrates the basic Road Hierarchy as would apply to new Urban Subdivisions:-



Minimum Design and Construction Standards - Rural Roads																				
Road Class	**No. of Traffic Lanes**	**Traffic Lane width 'L'**	**Shoulder Width 'Sh'**	**Bitumen Surfacing Required[3]**	**Width of Seal On Shoulder**	**Carriageway Width 'C'**	**Min Width of Seal 'S'**	**Min Road Reserve Width 'R'**	**Longitudinal Linemarking**	**Vehicles per Day For Development Purposes (VPD)[8]**	**Design Speed**		**Max Longitudinal Grades**	**Pavement Design ESA[1]**	**Pavement Depth (mm) [1]↓**	**Width of Verge 'V'**		**Waterway Annual Recurrence Interval**		**Eligible for Consideration for Council Maintenance**
											Minimum	**Desirable**				**Fill**	**Cut**	**Major[6] (Perennial)**	**Minor (Intermittent)**	
Rural Sub-Arterial (RSA)	2	3.5	1.5	Yes	1.0	10.0	9.0	30.0	Yes	NA	80	100	12%	5×10^6	400	0.5	2.0	100	20	Yes
Rural Collector (RC)	2	3.5	1.0	Yes	0.5	9.0	8.0	20.0	Yes	>500	80	100	12%	1×10^6	350	0.5	2.0	50	10	Yes
Rural Distributor (RD)	2	3.25	0.75	Yes	0.25	8.0	7.0	20.0	Yes[2]	>350	60	80	12%	5×10^5	350	0.5	2.0	20	5	Yes
Rural Local 1 (RL1)	2	3.0	0.5	Yes	0.25	7.0	6.5	20.0	No	>200	60	80	15%	1×10^5	300	0.5	2.0	10	2	Yes
Rural Local 2 (RL2)	2	3.0	0	Yes	0	6.0	6.0	20.0[4]	No	50 - 200	40	60	15%	1×10^5	300	0.5	1.5	5	2	Yes
Rural Local Unsealed 1 (RLU1)	2	3.0	N/A	No	N/A	6.0	N/A	20.0	No	50 - 100	60	80	12%[7]	1×10^5	300	0.5	2.0	10	2	Yes
Rural Local Unsealed 2 (RLU2)	2	2.0	N/A	No	N/A	4.0	N/A	20.0[4]	No	<50	40	60	12%[7]	5×10^4	300	0.5	1.5	5	2	Yes
Right Of Way (ROW)	1	3.0	1.0	No	0.25	4.0	3.5	10.0[4]	No	<20	20	40	16%	5×10^4	250	0.5	0.5	5	2	No

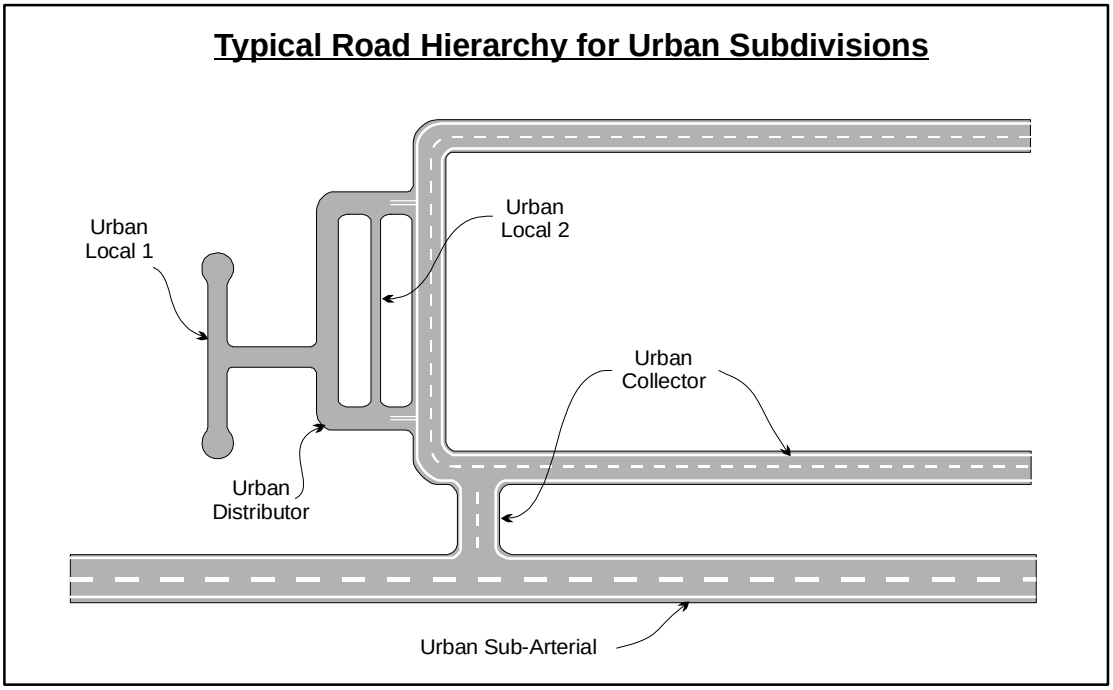
1. *It is Council's preference that an AUSTROAD pavement design is to be carried out on all new roads or road reconstructions. Where this has not been undertaken, Council may allow the minimum pavement depth listed to be adopted. Pavements are to be designed on the basis of a **30 year design life**.*
2. *Intersection Linemarking only.*
3. *The requirements for whether a road should be sealed or unsealed apply to new and reconstructed roads only.*
4. *Width may need to be increased at the end of the new road to allow for the construction of adequate turning areas.*
5. *Community Title Roads are to meet the above standards but are not eligible for consideration for Council maintenance.*
6. *All Major waterway structures over classified rivers must meet ARI of 100. The standard for major waterway structures on all other roads is minimum ARI of 50.*
7. *Grades up to 15% will be allowed in these areas but these sections of road must be sealed.*
8. *The traffic volume qualification (VPD) is to be calculated using 9 vehicular movements per day per dwelling. Prior to selecting which classification should apply to a road, the following parameters should be considered:-*
   - *Projected traffic volume at the end of the design life of the road;*
   - *The potential for the use of the road to alter with future development; and*
   - *The possibility that the road may connect to an existing road in the future, thereby becoming a through road.*
9. *All dimensions are in metres unless otherwise stated.*

Dimensions for Urban Roads are as per the following diagram:-



Council may also accept Water Sensitive Urban Design (WSUD) techniques on a case by case basis.

The diagram below demonstrates the basic Road Hierarchy as would apply to new Rural Subdivisions:-

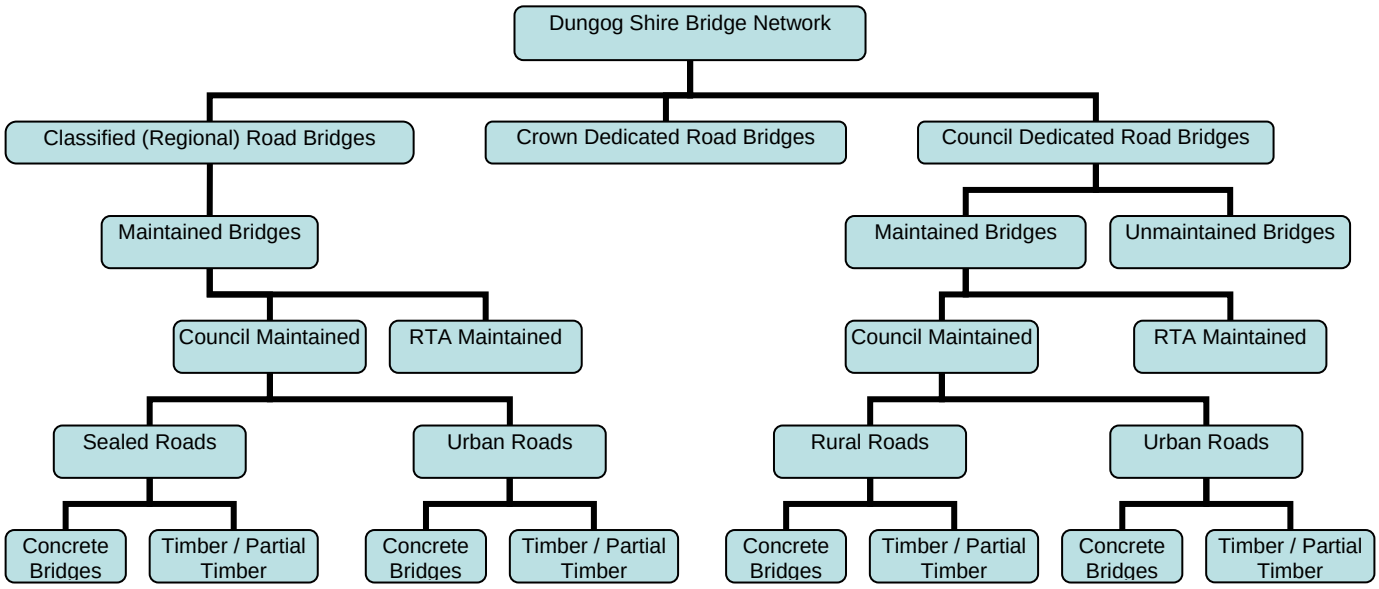


Minimum Design and Construction Standards - Urban Roads																				
Road Class	**Min No. of traffic Lanes**	**Min traffic lane width 'L'**	**Surface Requirement[3]**	**Minimum Parking Lane Widths 'P'**	**Min Carriageway Width 'C'**	**Min Width of Seal 'S'**	**Min Road Reserve Width 'R'**	**Kerb and Gutter [2] ↑**	**Longitudinal Linemarking**	**Vehicles per Day For Development Purposes (VPD)[8]**	**Design Speed**		**Max Longitudinal Grades**	**Pavement Design ESA (Min)[1]**	**Pavement Depth (mm)[1] ↓**	**Min Width of Footpath 'F'**		**Waterway Annual Recurrence Interval**		**Eligible for Consideration for Council maintenance**
											Minimum	**Desirable**				**Fill**	**Cut**	**Major[5] (Perennial)**	**Minor (Intermittent)**	
Urban Sub-Arterial (USA)	2	3.5	AC	2 x 3.5m	14.0	14.0	22.0	SA	Yes	NA	50	60	10%	1×10^7	450	4.0	4.0	50	10	Yes
Urban Collector (UC)	2	3.5	AC	2 x 2.5m	12.0	12.0	20.0	RT or SA	Yes	>500	50	60	12%	3×10^6	400	3.5	3.5	20	10	Yes
Urban Distributor (UD)	2	3.25	AC	2 x 2.0m	10.5	10.5	18.5	RT or SA	Yes[3]	>300	40	50	12%	1×10^6	350	3.0	3.0	20	5	Yes
Urban Local 1 (UL1)	2	4.5	AC	0	9.0	9.0	17.0[4]	RT or SA	Yes[3]	>100	40	50	16%	5×10^5	300	2.5	2.5	10	5	Yes
Urban Local 2 (UL2)	2	2.0	2 Coat Seal	0	4.0	4.0	10.0[4]	RT or SM	Yes[3]	<100	25	40	16%	1×10^5	250	2.0	2.0	5	2	Yes
Urban Commercial Industrial	2	3.5	AC	2 x 3.0m	13.0	13.0	21.0[4]	SA	Yes	NA	50	60	10%	1×10^7	450	4.0	4.0	50	10	Yes

1. *It is Council's preference that an AUSTROAD pavement design is to be carried out on all new roads or road reconstructions. Where this has not been undertaken, Council may allow the minimum pavement depth listed to be adopted. Pavements are to be designed on the basis of a **30 year design life**.*
2. *Abbreviations - RT is Roll back kerb, SA is square back kerb, SM is concrete edge strip (flush with road surface)*
3. *Intersection Linemarking only*
4. *Width may need to be increased at the end of the new road to allow for the construction of adequate turning areas.*
5. *All Major waterway structures over classified rivers must meet ARI of 100.*

3.4 The Bridge Network

Similar to the Road Network, the bridge network is basically broken up into the following categories:-



3.5 RTA Maintained Bridges

There are five (5) bridges within the Dungog Local Government Area that are owned and maintained by the RTA. These bridges are Cooreei Bridge and Gostwyck Bridge on Regional Road 101, Vacy Bridge on Regional Road 7778, Clarence Town Bridge on Limeburners Creek Road and the Paterson River Bridge on Woodville Road.

3.6 Bridge Design Standards

Whilst the bridge network has not been given a hierarchy as such, the level of service required from a bridge or large drainage structure will adhere to the standards as defined in the road design standards. The minimum bridge design standards for waterway ARI is given in the Road Design Standards in Section 3.3. Bridges over defined rivers shall meet a minimum 100 year ARI. The minimum construction standards for all new bridges and major waterway structures are as follows:-

Road Class	Live Loading Standard	Min No. of traffic Lanes	Footway Requirement	Min No. of Footways	Min Bridge Guardrail Requirement[1]	Min Approach Guardrail Requirement	Min Trafficable Width[2]	Minimum Waterway Capacity ARI
Rural Sub-Arterial (RSA)	SM1600	2	No	NA	Thriebeam	G4 - 16m	9.0 m	100
Rural Collector (RC)	SM1600	2	No	NA	Thriebeam	G4 - 12m	7.2 m	50
Rural Distributor (RD)	SM1600	2	No	NA	Thriebeam	G4 - 12m	7.2m	50
Rural Local 1 (RL1)	SM1600	1	No	NA	Thriebeam	G4 - 12m	4.2 m	50
Rural Local 2 (RL2)	SM1600	1	No	NA	Thriebeam	G4 - 12m	4.2 m	50
Rural Local Unsealed 1 (RLU1)	SM1600	1	No	NA	Thriebeam	G4 - 12m	4.2 m	50
Rural Local Unsealed 2 (RLU2)	SM1600	1	No	NA	Thriebeam	G4 - 12m	4.2 m	50
Right Of Way (ROW)	SM1600	1	No	NA	Thriebeam	G4 - 12m	4.2 m	NA
Urban Sub-Arterial (USA)	SM1600	2	Yes	2	Thriebeam + Handrail	G4 - 16m	9.0 m	100
Urban Collector (UC)	SM1600	2	Yes	1	Thriebeam + Handrail	G4 - 12m	7.2 m	50
Urban Distributor (UD)	SM1600	2	Yes	1	Thriebeam + Handrail	G4 - 12m	7.2 m	50
Urban Local 1 (UL1)	SM1600	2	Yes	1	Thriebeam + Handrail	G4 - 12m	7.2 m	50
Urban Local 2 (UL2)	SM1600	2	No	NA	Thriebeam + Handrail	G4 - 12m	7.2 m	50
Urban Commercial Industrial	SM1600	2	Yes	1	Thriebeam + Handrail	G4 - 12m	7.2 m	50

1. *Thriebeam Guardrail is the minimum standard. Handrails will also be put in place on bridges with walkway structures attached.*
2. *Minimum Trafficable width is from face of guardrail to face of guardrail.*

Section 4. Existing Infrastructure

4.1 Council Public Roads

4.1.1 Policy

It is Councils current 'rule of thumb' that Council maintain to the second last occupied dwelling on the public road network. This does not hold true in the field with a number of roads with single dwellings being maintained whilst others with two or more dwellings not currently maintained. It is therefore recommended that the policy be amended to only consider maintenance of roads that are:-

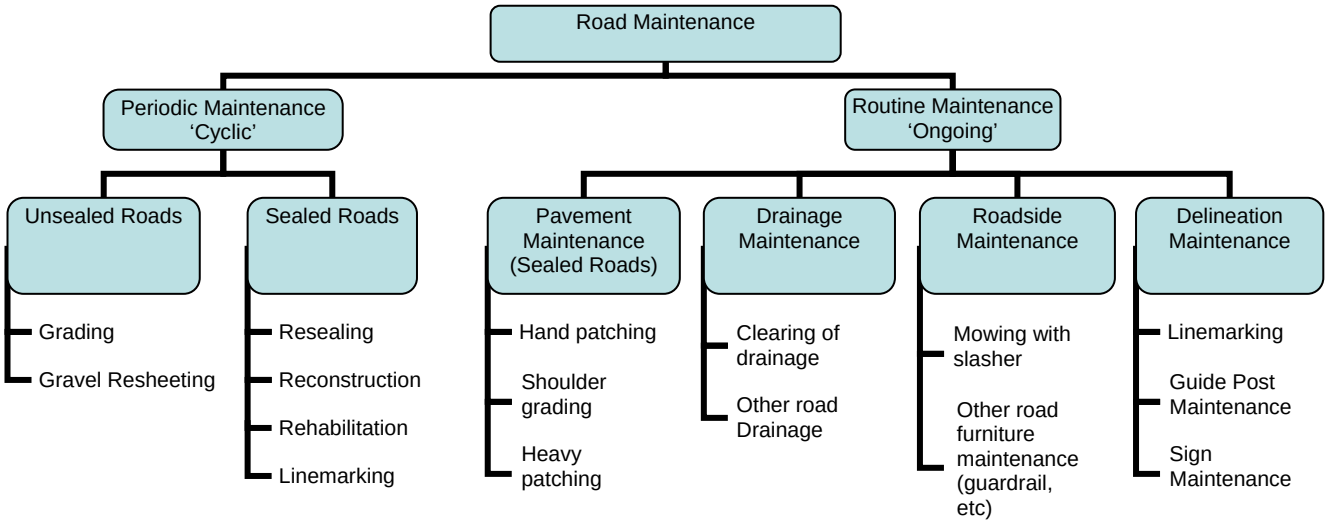
- Council Dedicated Roads; and
- That serve a minimum of 2 occupied residences (maintenance to the second last property); and
- Are currently constructed to Council's standard.

Appendix 2 contains the current maintained road listing for Regional, Rural and Urban Roads.

Section 5. Road Maintenance

5.1 Types of Road Maintenance

There are basically two types of road maintenance, namely "Routine Maintenance" and "Periodic Maintenance". These comprise the following elements:



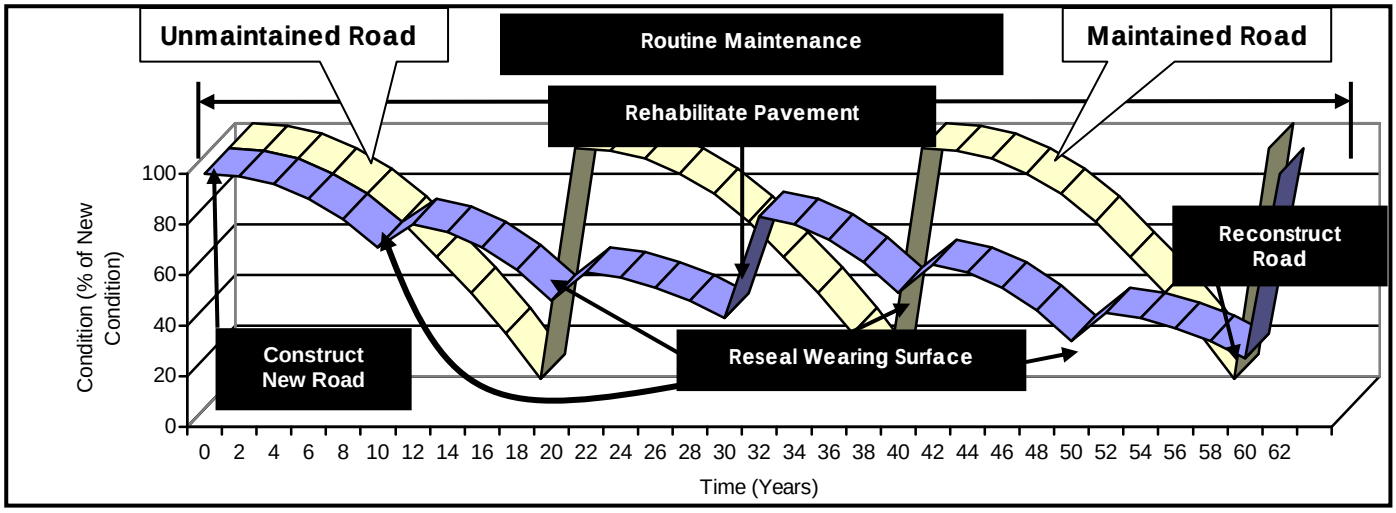
5.2 The Need for Appropriate Road Maintenance

5.2.1 Community Needs and Expectations

Generally, a relatively poor road network leads to driver frustration and community dissatisfaction and subsequently, detracts from Council's image to the general public. Rough, poorly maintained roads create extra noise, reduce residential amenity, can be unsafe to users, reduce driver comfort, place extra wear and tear on vehicles, increase travelling times, increase motoring costs and can significantly distract from the aesthetics of the local environment.

5.2.2 Financial Burden on Future Generations

For some time this Council has been deferring road maintenance works to meet the allocated budget. This has been achieved by utilising the majority of available resources on the more strategically important roads and using less resources on the lesser important roads and deferring or reducing routine and periodic maintenance (ie. reseal programmes, etc). The effects of these practices are minimal in the short term and seem to benefit Council in terms of cost savings. However, the long-term affects on future generations can be significant. This is best displayed by a simple "Life Cycle Cost" analysis on 1km of an average rural road. The deterioration of a maintained and unmaintained road pavement is shown graphically in the figure below.



This figure shows that by undertaking periodic maintenance (reseal every 10 years and rehabilitate every 30 years) the actual life of a road pavement can be extended from its design life of 30 years to about 60 years. Using this graph as a guide, the difference in yearly costs associated with carrying out periodic maintenance and not carrying out periodic maintenance on a road is outlined in the table below.

1km of Average Rural Road with a Spray Seal, Granular Pavement & 30 year Design Life			
Periodic Maintenance not Carried Out (estimated physical life of 20 years)		**Periodic Maintenance Carried Out (estimated physical life of 60 years)**	
Initial Construction Cost	$420,000	Initial Construction Cost	$420,000
Total Routine Maintenance Cost ($3,000pa)	$60,000	Total Routine Maintenance Cost ($2,000pa)	$120,000
Reconstruction Cost at year 20	$270,000	Total Resealing Cost (every 10 yrs - $40,000 x 4)	$160,000
		Total Rehabilitation Cost (every 30 yrs - $270,000)	$270,000
		Reconstruction Cost at year 60	$270,000
Total Cost over physical life (20 years)	$750,000	Total Cost over physical life (60 years)	$1,240,000
Cost per year	**$37,500**	**Cost per year**	**$20,667**

In summary, the above table shows:

- That by using periodic maintenance practices (resealing and rehabilitation) it is possible over time to reduce maintenance costs by in excess of 40%;
- Periodic maintenance will also improve the average condition (ride quality, surface condition, etc) of the road network;
- Routine maintenance costs will reduce when adequate resealing programmes are implemented;
- That not maintaining the road adequately may result in Council needing to fully reconstruct (replace) the road and pavement every 20 years. This could place a huge financial burden on future generations.

Section 6. Risk Management

6.1 Introduction

Council Policy C3.33 formalises Council's approach to Risk Management as regards Road Maintenance. The condition of road infrastructure is maintained and improved through capital works and routine maintenance works. Whilst capital works are eventually required, routine maintenance must keep the road network essentially safe. To achieve this, assessment, monitoring and rectification of hazards and their potential consequences are required.

Within available resources, Council will:

- Provide safe roads for use by road users;
- Identify areas that require maintenance;
- Establish a priority system for carrying out maintenance on Council maintained roads;
- Provide information to assist council in allocating resources where they are required; and
- To allow council to schedule maintenance where required.

6.2 Inspections

Dungog Shire Council conducts road inspections upon request from the community and from staff members.

6.2.1 Service Requests from the Community

Service requests from the community are a valuable source of knowledge about the state of the road network.

Requests are registered with Council's Administration Section and recorded using a Customer Request Management form. Each request is then assigned to a staff member who will then investigate by way of making a physical inspection of the site and recording the details of the inspection.

6.2.2 Service Requests from Staff

Council staff regularly travel the road network on the way to and returning from work locations at various points throughout the LGA. During this travel Council staff are encouraged to inspect and report any defects encountered using Council's Customer Request System. Once a Customer Request is logged it is handled as any other request.

6.3 Assessment

Upon inspection a Council Officer establishes the Risk Rating for that section of road. The risk posed to the community is calculated by considering the location of the defect, the amount of road usage and the hazard type and severity.

A risk rating table has been developed for this purpose and is not included as part of the policy due to the need to remain flexible with this particular rating method.

This Road Risk Rating allows Council to prioritise the corrective action it intends to take and allows control measures to be scheduled.

6.4 Controls

Control of risk exposure requires control measures to be implemented. Some of the control measures that Council will be able to use to lessen our exposure to risk are as follows:

- Use of warning signs and lights to alert road users of the potential hazard that exists ahead.
- Erection of temporary barriers or barricades and lights around the area until it can be repaired;
- Effecting repair of the damaged area, or
- Planning and allocating resources for the long-term replacement of the road surface.

6.5 Repair Procedures

Repair procedures are defined as follows:

6.5.1 Control

- Work order is issued.
- During work Council ensures the area is safe by the erection of temporary barriers or barricades. Temporary repairs may also be put into place to secure the area while awaiting further work.
- On work completion the site is inspected. If work does not satisfy specification a work order is reissued.
- Once satisfied the job is signed off.

6.5.2 Monitoring

- Work will be reinspected as part of the regular inspection program at the pre-determined intervals. Council records this information to ensure that the standard of maintenance, repair or replacement complies with its standards.
- If the work does not satisfy specification a work order is reissued.

All works are completed under supervision to ensure that the Councils standards are upheld.

6.6 Budget

The appropriate Council Manager responsible for the function shall seek an annual budget allocation from Council for the urgent repair of high priority road hazards that cannot be repaired under the normal maintenance budget.

Council will work to allocate human and financial resources to the point of Council's budget constraints in order to conduct inspections and assessments for the implementation of this policy.

Section 7. Maintenance Budget Considerations

7.1 Introduction

The costs outlined in this section identify the current Council allocation for the maintenance of the current Council Dedicated Public Roads, which Council has resolved to maintain in their existing condition.

A typical annual breakdown of funding applied to Road and Bridge maintenance is given in the following table:

Road Class	Routine Maintenance		Periodic Maintenance				Capital	
	M & R	SRV	Reseals	SRV	Grading & Resheeting	Unsealed Upgrades	Rehabilitation & Reconstruction	
Regional Roads	$756,000		$170,000				$800,000	R2R / REPAIR / Council
Sealed Rural Roads	$515,910	$83,660	$285,130				$380,000	FAG
Unsealed Rural Roads	$37,090	$85,660			$330,000	$58,150		
Urban Roads	$159,220	$40,000	$63,510	$50,000			$80,000	FAG
Bridges - Rural	$216,370						$180,000	FAG
Bridges - Urban	$6,440							
Ancillaries	$145,640	$62,955						

Notes on Abbreviations:-

1. M&R - Maintenance & Repair 2. SRV - Special Rate Variation 3. R2R - Roads to Recovery Program 4. FAG - Federal Assistance Grant

7.2 Routine Maintenance Budget

The previous table outlines the levels of funding allocated to each road area. Some interesting points to note about the funding levels are:

Regional Roads Maintenance - $926,000 equates to $7,460/km or approx $1.10/m²

Sealed Rural Roads Maintenance - $884,700 equates to $3,150/km or approx $0.60/m²

Urban Roads Maintenance - $312,730 equates to $7,200/km or approx $0.80/m²

Unsealed Rural Roads Maintenance - $510,900 equates to $1,900/km or approx $0.45/m²

7.3 Periodic Maintenance

7.3.1 Retarding the Deterioration Process

One of the main causes of deterioration of a pavement is the infiltration of excessive moisture.

Sealed Roads

The primary purpose of bituminous seals is to:

- Prevent water from entering the road pavement;
- Provide a wearing surface and skid resistance for vehicular traffic; and
- Allow drainage across the road surface.

However, when the seal becomes oxidised and/or cracked water can once again enter the underlying pavement, thereby significantly increasing the rate of deterioration. Hence, if fiscally possible, regular resealing must be carried out to ensure that the pavement reaches its full design life. Research carried out by the ARRB has found that:

- Two layer spray reseals do not have a longer life than single layer reseals,
- In NSW a 10mm spray reseal applied on local roads has an average life of 10 years;
- In NSW a 7mm spray reseal applied on local roads has an average life of 8 years; and
- In NSW a 14mm spray reseal applied on local roads has an average life of 11 years.

Therefore, as single layer spray reseals cost less than 2 layer reseals and have similar effective life spans, it is Council's practice to apply single layer spray reseals. Generally, existing urban roads in this Council area are designed with an expected pavement life of 30 years and existing rural roads with an expected pavement life of 20 years. Therefore, the following outlines the number of reseals required in the pavements design life on urban and rural sealed roads using different aggregate size spray reseals:

- 7mm Urban roads = 3 times
  Rural roads = 2 times
- 10mm Urban roads = 2 times
  Rural roads = 1 time
- 14mm Urban roads = 2 times
  Rural roads = 1 time

As 14mm spray reseals cost more than 10mm spray reseals and provide less driver comfort and skid resistance than 10mm reseals, it is Council's practice to apply 10mm reseals in most cases.

It is also paramount that once water has left the pavement surface, that it drains away as quickly as possible to table drains and away from the road pavement. It is for this reason that the Special Rate Variation funds have been directed to both shoulder grading and drainage works.

Unsealed Roads

Short of bituminous sealing the pavement there is no satisfactory way of preventing moisture from entering an unsealed road pavement. This therefore limits the opportunity for retarding the deterioration of the pavement. The best that can be achieved is to ensure that water leaves the road surface as quickly as possible. The best method to meet this goal is by grading the road to provide sufficient crossfall that allows the water to drain off the pavement as quickly as possible. The frequency of grading an unsealed road is dependent upon the level of usage of the road. Higher traffic volumes and speeds result in a higher rate of deterioration of the road.

In 2005, Council adopted an Unsealed Rural Road Maintenance Programme detailing grading frequencies for the Unsealed Road network. This programme, when coupled with the Special Rate Variations for resheeting and drainage works, has generally delivered an overall improvement to this part of the network.

7.3.2 Pavement Restoration.

Sealed Roads

As a pavement nears the end of its design life it becomes necessary to restore its condition. Once a road is constructed, there are basically three (3) main methods of pavement restoration. These are:

- **Reconstruction** - This method is used where stabilisation of existing pavement is not viable or where changes need to be made to widths or alignments. The process involves:
  - New pavement being added to the existing formation;
  - Significant pavement widenings;
  - Significant vertical alignment changes; and
  - Application of bituminous surfacing.
- **Rehabilitation** - This method is used where alignments and widths are deemed adequate for the nominated section of road. The process involves:-
  - New pavement being added to the existing formation and/or stabilisation of the existing pavement;
  - Only minor pavement widenings;
  - Only minor vertical alignment changes;
  - Application of bituminous surfacing.
- **Resealing** - This involves minor pavement rectification (heavy patching) and application of bituminous surfacing.

The main focus of Council's programme for the restoration of the sealed road network will be to primarily focus on rehabilitation and resealing works.

Unsealed Roads

The only plausible method of restoring the pavement on unsealed roads is to add a new layer of gravel, bind the new layer with the existing pavement and shape the new layer to maximise drainage of the pavement.

7.3.3 Management of Periodic Maintenance

In order to responsibly manage periodic road maintenance, the following data must be collected and decided upon:

- The extent of road and associated assets;
- The current condition and expected life of the asset; and
- The necessary levels of service acceptable to our residents and road users.

Road Assets

Before a periodic maintenance strategy can be developed the quantity of assets needing maintenance must be known. Example items to be included are:

- Pavement area, depth and type to be maintained,
- Surface area and type to be maintained,
- Kilometres of road to be graded,

Levels of Service

For each periodic maintenance activity, a level of service must be established. These levels establish how often a periodic maintenance activity is performed.

The level of service is the work necessary to achieve a predetermined condition. It is reasonable to assume that our residents and road users expect Council to be able to show that we are providing an acceptable level of service for an acceptable cost in the most efficient and effective manner.

How Council handles its expanding road asset base, the ageing problem and the associated risk is extremely important. It is the goal of this process to ultimately reduce Council's overall costs, whilst:

- Reducing road user and resident complaints,
- Increasing the safety of all road users (including pedestrians and cyclists),
- Enhancing the overall environment, and
- Improving amenity for the overall community.

Road Condition

In order to determine the appropriate levels of service it is vital that the condition of the road network be known. Council staff are currently undertaking a revaluation of the entire road network as part of the financial planning and reporting requirements for Council Assets. This data will be utilised as one input into prioritising those areas of the network that require restoration.

Section 8. Strategy to Improve Roads

8.1 Introduction

With current levels of funding, it is not financially possible for Council to upgrade and adequately maintain the existing road network. For example, as outlined in Section 5.2.2, the average cost to adequately construct and maintain a sealed rural road is approximately $13,367 per km per annum (based on adequate maintenance levels). When considered over the 280km of sealed rural roads, this equates to some $3.74M per annum. This is approximately triple the $1.26M currently allocated to this area.

Council must therefore look at a strategy, for at least the short to mid term, that dictates that when a section of road is funded for restoration works, then adequate funds are allocated to periodic maintenance to maintain that section of road to an acceptable standard. This will in effect increase the service life of the pavement threefold whilst reducing ongoing maintenance by half.

This of course will dictate that certain areas of the network achieve a much lower standard but it will provide for a gradual increase in road asset condition.

8.2 Road Reconstruction / Rehabilitation - Sealed Roads

Theoretically, total road reconstruction will only need to be carried out on all Council maintained roads about every 60 years.

Therefore, where pavement widths, depths and alignments are deemed adequate for purpose, Council's focus will be to rehabilitate the road surface to its current geometry. This will dictate that existing narrow pavements, of lesser dimensions than the Minimum Design and Construction Standards (Section 3.3), will be rehabilitated to their existing widths. An example of this is the recently completed rehabilitation works carried out on the first 1.3km of Fishers Hill Road. This section is a heavily tree lined, low traffic road with tree clearing alone for a 6.5m pavement being estimated at $80,000. By reducing the level of restoration from reconstruction to rehabilitation, the cost of the works reduced from $40 per square metre to $27 per square metre. The reduction in cost when coupled with the reduction in width will increase the length of road rehabilitated by approximately 50%.

8.3 Improvements to Road Geometry

Improvements to the horizontal alignment (ie, straightening sharp bends etc) and vertical alignment (ie, flattening crests etc) can only be carried out whilst undertaking road reconstruction works.

Only minor improvements will be made during road rehabilitation projects. However, where there is a significant accident history, isolated areas may be identified for realignment works within a rehabilitation project.

8.3 Pavement Depth

Council's method of rehabilitating a sealed road is to either overlay the existing road pavement, stabilise the existing road pavement or a combination of the two. This method both strengthens and deepens the road pavement. Hence, overtime, the approved minimum pavement depths will be achieved. Similarly, the practice of gravel resheeting unsealed roads also builds on the existing pavement, thereby also increasing pavement depths.

8.4 Road Width

Reconstruction projects also provide an opportunity to increase formation, pavement and seal widths.

Rehabilitation projects will utilise existing formations and will aim to provide similar or marginally improved alignments to the existing road.

8.5 Sealing Of Unsealed Roads

Sealing of unsealed roads is always a highly debated issue. Whilst sealed pavements, improve the rideability of these roads, reduce vehicle operating costs, reduce travelling time and enhance road user safety, the cost of undertaking the construction and ongoing maintenance is beyond the level of Council's existing financial capability and resources.

It should also be noted that an economic analysis used by the Australian Road Research Board compares savings in travelling time, accident costs and vehicle operating costs on a sealed pavement with the construction, increased maintenance and rehabilitation cost over the life of a sealed pavement to determine a cost benefit. The analysis indicates that it is not economically viable to seal a road if the traffic volume is less than 75 vehicles per day.

Section 9. Prioritisation of Works

9.1 Sealed Roads.

9.1.1 Resealing

ARRB and RTA research indicates that the appropriate intervention period for reseals is approximately every 10 years. Whilst this Road Management Strategy recommends similar intervention intervals, there are two issues that need to be addressed:-

- To reseal the entire Rural Road network every ten years would equate to resealing some 28km (145,600m²) at a cost of approximately $436,800. This figure does not include any preparatory works (heavy patching, etc);
- The condition of the majority of the network is beyond the point where resealing will provide a viable solution.

This further emphasises the need to adequately maintain those sections of the network that Council have already injected funds into rehabilitating. These roads should therefore receive the highest priority in the reseal programme.

9.1.2 Reconstruction and Rehabilitation Works

A transparent priority system needs to be developed for these types of works to ensure that available funds are allocated first to the roads in most need. The 4 aspects that are vital to a workable priority system are:

- An assessment of the level of use of the roads;
- A factor that takes into account the condition of the roads;
- Consideration of the improvements that the project will incur; and
- A factor that compares the cost of the works with the benefits incurred.

Road Usage

The aim of this factor is to give added weight to more strategically important roads. The best measures of this are traffic volume and heavy vehicle use.

Road Condition

The most important indicators of road condition when assessing the need for road works are:

- Pavement Condition - Factors such as Rutting (a measurement of the depth and extent of furrows in the wheel tracks on a road) and Cracking (a measurement of the width and extent of cracks in a wearing surface) are good indicators with respect to pavement depth and ability to repel water. At this stage, Council has relatively recent data on all sealed roads for surface defects.
- Roughness - Roughness counts are a measure of how many vertical movements a vehicle experiences per kilometre. Roughness is probably the most important measure of all from the perspective of the general public. The smoother the road (a low roughness count) the more likely it is that the motorists will be satisfied with its performance. Rougher roads lead to higher community dissatisfaction. The two main factors that lead to high roughness counts are:
  - A wearing surface that has been extensively hand patched, and
  - A deteriorated pavement.

  At present, Council has recent roughness data on all Regional Roads.

Road Improvements

Whilst reconstruction of a road is an opportunity to improve road deficiencies such as geometry (sharp corners and blind crests etc) and inadequate width, rehabilitation provides for similar pavement conditions and life at a reduced cost and is deemed the preferred approach, in most cases, at this time.

Cost / Benefit Analysis

With a limited amount of funds available for rehabilitation works, it is imperative that Council focuses this funding on projects that deliver the greatest amount of benefit for the dollars spent. Therefore, a factor that integrates the money to be spent for the benefits obtained should be included. This is best done by dividing the benefits obtained by the cost. However, this would almost certainly exclude larger projects that may have numerous benefits, simply because of cost. This problem can be overcome by dividing the benefits by the cost per square metre. Furthermore, this cost per square metre should not include drainage costs, as drainage is purely a factor of location and would unfairly exclude projects in more undulating localities. The higher the number after dividing the point score by the cost per square metre, the higher the priority.

Urban / Rural Roads

There is no equitable or fair method to compare rural roads with urban roads due to the increased cost of reconstructing or rehabilitating an urban road. This extra cost is due to:

- Greater proliferation of service cables such as Telstra or Electricity;
- Increased pavement width to cater for parking; and
- Level restrictions such as kerb and gutter and stormwater drainage.

Hence, separate budget allocations should be made for urban and rural rehabilitation and reconstructions, and accordingly they should be prioritised separately.

9.2 Unsealed Roads

9.2.1 Sealing of Unsealed Roads

As previously discussed, whilst sealed pavements, improve the rideability of these roads, reduce vehicle operating costs, reduce travelling time and enhance road user safety, the cost of undertaking the construction and ongoing maintenance is beyond the level of Council's existing financial capability. It is therefore recommended that sealing of unsealed roads not be given a high priority at this time. Factors such as availability of suitable gravels in the vicinity of a road and isolation will have an effect on this recommendation into the future.

9.2.2 Grading and Resheeting of Unsealed Roads

Unsealed roads are programmed and prioritised for grading based upon hierarchy and traffic volumes. Gravel resheeting works are undertaken, after inspection, on a needs basis.

9.3 Further Considerations For Prioritising Works

Further to the outlined priority systems, there are a number of factors that should be taken into consideration when deciding on a works program, including future residential developments, Section 94 contributions and not spending all funding in a concentrated area for an extended period as this will lead to dissatisfaction amongst residents in other untouched areas.

9.4 Rolling Works Program

In order to maximise the knowledge and understanding of as many residents as possible the previously outlined strategy will be used to develop a 5 year rolling works program. This program will be reviewed annually and, if necessary amended.

9.5 Priority Matrixes

Whilst Council does not have the necessary data at this point in time, the following priority matrix is recommended to attain a ranking to compare road projects:

9.5.1 Rehabilitation / Reconstruction Priority Matrixes – Rural Sealed Roads

Criteria	Scale	Points
Road Usage		
Annual Average Daily Traffic (AADT)	<25	0
	25<100	1
	100<250	2
	250<500	3
	500<750	4
	750 to 1000	5
	>1000	6
Heavy Vehicles / Day	<25	0
	25<50	1
	50<100	2
	100 to 200	4
	> 200	6
Road Condition		
Roughness	< 110	0
	110< 140	3
	140 to170	5
	>170	7
% Surface Defects	< 10	0
	10 to 30	3
	>30	6
Road Improvements		
Rectifies Geometry Deficiency	No	0
	Improves Vertical or Horizontal Geometry	2
	Improves Vertical & Horizontal Geometry	3
Rectifies Formation Width Deficiency	<1m	1
	1<2 m	2
	>2m	3
Total Score		
Benefit / Cost Ratio = Total Points / Cost per square metre (excluding drainage costs)		

9.5.2 Rehabilitation / Reconstruction Priority Matrixes – Urban Sealed Roads

Criteria	Scale	Points
Road Usage		
AADT	<50	0
	50<100	1
	100<250	2
	250<500	3
	500<1000	4
	1000 to 2500	5
	>2500	6
Heavy Vehicles	<25	0
	25<50	1
	50<100	2
	100 to 200	4
	> 200	6
Road Condition		
Roughness	< 110	0
	110< 150	3
	150 to190	5
	>190	7
% Surface Defects	< 10	0
	10 to 30	3
	>30	6
Road Improvements		
Rectifies Geometry Deficiency	No	0
	Improves Vertical or Horizontal Geometry	2
	Improves Vertical & Horizontal Geometry	3
Rectifies Formation Width Deficiency	<1m	1
	1<2 m	2
	>2m	3
Total Score		
Benefit / Cost Ratio = Total Points / Cost per square metre (excluding drainage costs)		

Section 10. Reduction of Roadside Hazards

10.1 Introduction

Council currently operates under a Roadside Environmental Management Plan (REMP) which was adopted in March 2003. The goal of the REMP is to provide best practice framework for the management of roadside corridors and adjoining lands in a manner that maintains and enhances their existing ecological values while considering the social, economical and functional nature of these areas.

In combination with these principles, Council also has a duty of care to satisfactorily construct and maintain all roads (that Council has resolved to maintain) to enhance the safety of all users. Section 88 of the Roads Act 1993 gives Council the power to remove any roadside object that may be considered to be detrimental to the safety of motorists. Therefore, to ensure transparency Council must have a consistent Code of Practice to remove these hazards. There are three types of roadside hazards that this Code of Practice would seek to remove:

- Those blocking the vision which is vital to enable motorists to drive a vehicle in a safe manner;
- Those that are likely to be hit by a motorist causing property damage and possible injury / loss of life; and
- Those that have the potential to injure road users or occupiers of the land adjacent to the roadway and/or cause damage to their property.

10.2 Hazards Obstructing Vision

When considering a motorists vision, a line should be drawn from a height of 1.15m (average eye height of a driver in a car) to a point 200mm above ground level (the item being viewed).

Roadside hazards that can obstruct vision can include, or be a combination of:

- Vegetation - Including trees, shrubs, grass, etc
- Embankments - In areas where the road is cut into the natural ground, rock outcrops, etc
- Artificial - Including buildings, fences, guardrails, etc.

10.2.1 Stopping Sight Distance

A driver's reaction to an emergency isn't immediate. The delay includes a period for perception and identification of the emergency, a period to judge what reaction is needed, and the reaction itself. The sum of these is the "Reaction Time". The RTA recommends the following reaction times:

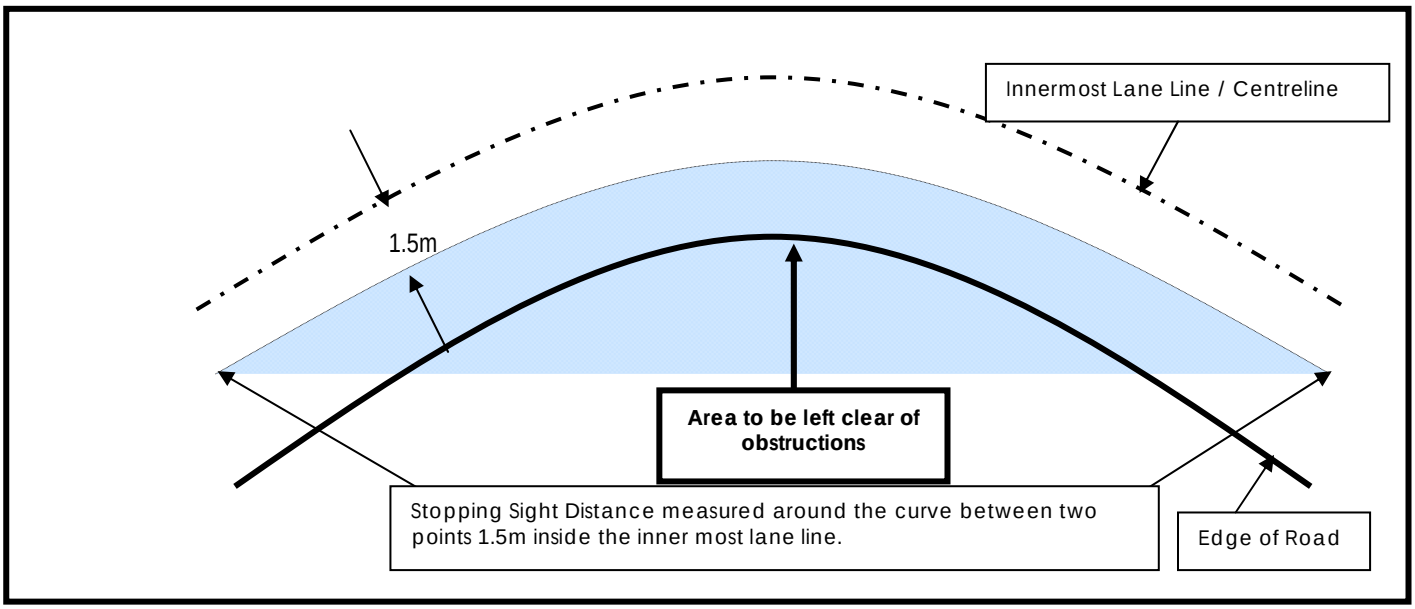
- **1.5 seconds-** for drivers travelling on a road with a speed limit less than or equal to 100km/h, where access is uncontrolled and drivers travel in conditions that will assume alertness for the unexpected.
- **2.5 seconds-** for drivers travelling on a road with a speed limit 100km/h or more, where access is controlled and drivers travel in conditions of free speed and are not alert for the unexpected.

In addition to the reaction time a motorist also needs time for the vehicle to stop after the brakes have been applied. This is called the "BRAKING DISTANCE". "STOPPING SIGHT DISTANCE" is the minimum distance needed by a driver of a vehicle to react and stop before hitting an object. The Stopping Sight Distance on bitumen or concrete surfaces is obtained from the table below.

Speed Limit	Distance Travelled During Each Period (m)			Stopping Sight Distance (m)	
	Reaction Time Distance		Braking Distance (m)		
	1.5 seconds	2.5 seconds		1.5 seconds	2.5 seconds
50	20	N/A	25	45	N/A
60	25	N/A	35	60	N/A
70	30	N/A	50	80	N/A
80	35	N/A	65	100	N/A
90	40	N/A	80	120	N/A
100	45	70	105	150	175

10.2.2 Sight Distance At Curves

At a curve, the minimum distance that two drivers, approaching in opposite directions, need to see each other is determined by the Stopping Sight Distance in the table above. Hence, the minimum area to be cleared of obstructions to sightlines at a bend is given in the diagram below:



Whilst it is identified that sight distance on curves is a factor to be considered for road safety, the topography and nature of the roadside environment within Dungog Shire dictates that achieving these distances is rarely financially viable. Heavily tree lined winding roads are typical in most areas of the shire. Council's focus will therefore be in creating safer road conditions by improving road surfaces, delineation and by the provision of appropriate curve warning signage.

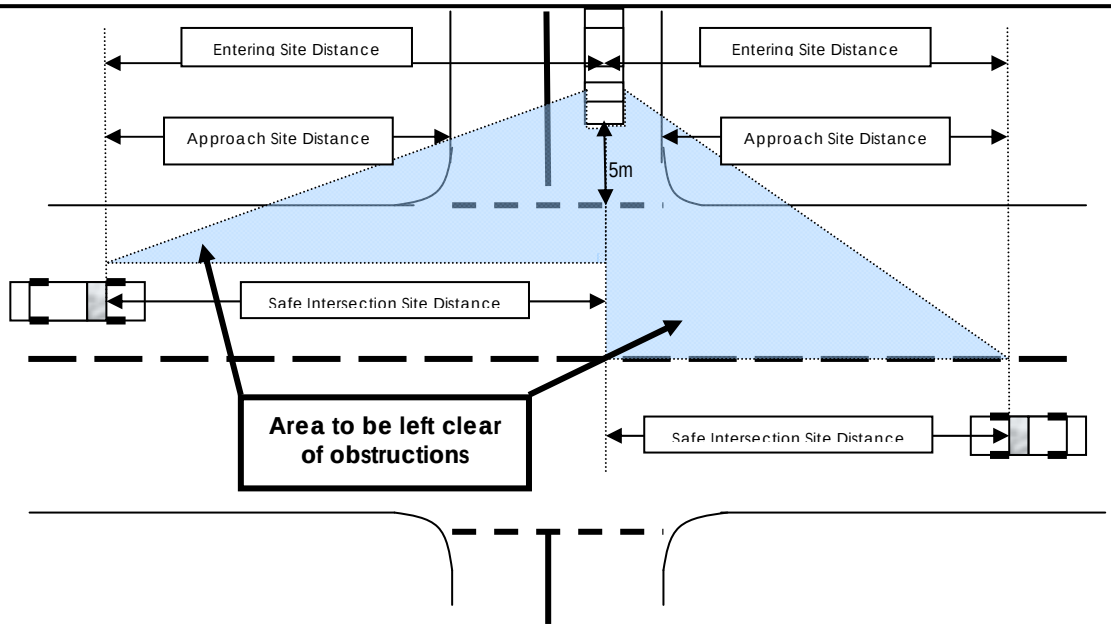
10.2.3 Sight Distance At Intersections

Approach sight distance - is the distance at each approach to an intersection, that enables drivers to clearly see and understand the layout of the intersection.

Entering Sight Distance - is the distance that a driver in a minor road at an intersection needs to react to an acceptable gap, start up and enter or the major traffic flow.

Safe Intersection sight distance is the distance that vehicles on a main road need to be able to see a vehicle from a minor road move into an intersection, and stop prior to a collision.

The area to be cleared at an intersection, if possible, is shown in the diagram below.



Speed Limit or Design Speed	Approach Sight Distance		Safe Intersection Sight Distance		Entering Sight Distance
	1.5 seconds	2.5 seconds	1.5 seconds	2.5 seconds	
40	30		60		80
50	40		80		100
60	55		105		135
70	70		130		185
80	90		160		225
90	115		190		345
100	145	170	225	255	470

10.3 Hazards At Risk Of Being Hit By A Motorist

10.3.1 Accidents Involving Roadside Hazards

Based on 1996 Australian data, compiled by the RTA, the social cost per crash of hitting some of the different types of roadside hazards are outlined in the table below:

Roadside Hazard	Size of Hazard	Speed Limit or Design Speed	% of Crashes involving fatalities	Social Cost per crash
Post, Poles & Trees	100mm diameter	< / = 70km/h	0%	$ 7,451
		80 – 90 km/h	0%	$ 11,301
		> / = 100 km/h	0%	$ 15,451
	200mm diameter	< / = 70km/h	2%	$ 48,974
		80 – 90 km/h	5%	$ 99,132
		> / = 100 km/h	13%	$ 206,977
	300mm diameter	< / = 70km/h	3%	$ 68,060
		80 – 90 km/h	8%	$ 139,512
		> / = 100 km/h	30%	$ 438,043

It is clear from the above table that once the base of a hazard is 200mm wide or more, the consequences of hitting this hazard in terms of fatalities & social costs increase significantly. However, this cut off point is considered to be too fine a line between whether a fatality may or may not occur. Therefore, objects wider than 150mm will be considered for removal.

10.3.2 Clear Zones

The Clear Zone is the area outside the edge of a road that is available for emergency use by errant vehicles. The edge of the road is considered to be the edgeline (if marked), edge of all weather wearing surface (if edgeline isn't marked), or edge of gravel on an unsealed road. The basic premise of a clear zone is to provide a forgiving road environment in which an errant motorist has a chance of regaining control of his/her vehicle. A clear zone should have a maximum slope of 3:1 at a cutting, and 4:1 at an embankment. The relevant widths of the clear zone along the side of a road, as per the RTA Road Design Guide, are given in the following table:

Slope	AADT* <1000						AADT* 1000-3000						AADT* >3000					
	Embankment			Cutting			Embankment			Cutting			Embankment			Cutting		
	<60km/h	80km/h	100km/h	<60km/h	80km/h	100km/h	<60km/h	80km/h	100km/h	<60km/h	80km/h	100km/h	<60km/h	80km/h	100km/h	<60km/h	80km/h	100km/h
3:1	N/A	N/A	N/A	2.5	3.5	4.5	N/A	N/A	N/A	2.5	4	5	N/A	N/A	N/A	3	4.5	6
4:1	3.5	5.5	8.5	2.5	4	5	4	6	10	2.5	4.5	6	4.5	8	13	3	4.5	7
5:1	3	4.5	7	2.5	4	5.5	3.5	5	8.5	2.5	4.5	6	4	6	11	3	5	7.5
6:1	3	4	6.5	2.5	4	5.5	3	4.5	7.5	2.5	4.5	6.5	3.5	5.5	10	3	5	8
8:1	2.5	4	6	2.5	4	6	3	4.5	7	2.5	4.5	6.5	3	5	9	3	5	8.5
10:1	2.5	4	6	2.5	4	6	2.5	4.5	7	2.5	4.5	7	3	5	9	3	5	8.5
20:1	2.5	4	6	2.5	4	6	2.5	4.5	7	2.5	4.5	7	3	5	9	3	5	9
Flat	2.5	4	6	2.5	4	6	2.5	4.5	7	2.5	4.5	7	3	5	9	3	5	9

Whilst it is identified that clear zones are a factor to be considered for road safety, the topography and nature of the roadside environment within Dungog Shire dictates that achieving these distances is rarely financially viable. Heavily tree lined winding roads are typical in most areas of the shire. Council's focus will therefore be in creating safer road conditions by improving road surfaces, delineation and by the provision of appropriate curve warning signage.

For new road construction, the above table will be used as a guide.

For road rehabilitation works, the following basic guidelines will be adopted:-

- AADT<1000 - Clear Zone 2.5m on straights, 3.5m on outside of curves
- AADT>1000 - Clear Zone 3.0m on straights, 4.0m on outside of curves

In certain circumstances, where significant trees are within the above adopted guidelines, it may be more feasible to erected guardrail as protection. These situations will be reviewed on a case by case basis as required.

10.3.3 Dangerous Vegetation

Vegetation that is considered hazardous due to decay, disease and/or other circumstances can leave Council exposed to legal action due to branches or the whole tree falling onto persons or property. Any vegetation that may be at risk of such an occurrence should be referred to Councils Works Manager for assessment and further action if required.

10.3.4 Road Safety Audits

Road Safety Audits are the mechanism by which the safety factors of this policy can be implemented. A road safety audit is the checking of an existing/proposed road by a qualified examiner, which aims to identify any unsafe elements to prevent or reduce the severity of accidents. This will enable Council to be pro-active in the reduction of accidents, instead of merely taking remedial action, should an accident occur. All new road plans should be safety audited prior to construction.

10.4 Environmental Factors.

10.4.1 Erosion And Sedimentation

There is a need to conserve soils adjacent to roadways due to the effects of soil erosion, which include:

- The effects on domestic water supplies,
- Sedimentation of agricultural land,
- Damage to the road pavement, culvert inlets and outlets, and
- Undermining of bridge foundations.

Removal of roadside vegetation can increase soil erosion. Where vegetation needs to be removed due to driver vision and collision considerations, it should be replaced with vegetation that is an appropriate erosion and sediment control measure and maintains the principles of a safe roadside environment.

10.4.2 Loss Of Wildlife Habitat

In many areas, the roadside is the only place where native vegetation remains. This is often the only remaining habitat for wildlife species. Roadside vegetation should only be removed to satisfy the criteria of driver vision and clear zones as previously outlined.

10.4.3 Endangered Species Or Significant Cultural Features

Endangered plants, valuable landmarks such as historic markers and Aboriginal sites may occur alongside a road. Generally, where this is the case, the object should only be removed if it impairs driver vision. If the object is at risk of being hit by a motorist, it should be shielded using appropriate methods.

10.5 Policy

That Road Safety Audits, including the requirements of this Strategy, be regularly carried out on all existing roads under the care of Dungog Shire Council and that all identified works are ranked and a programme of works formulated.

That any vegetation thought to be at risk of falling onto persons and/or property be referred to Council's Works Manager for further investigation and action if required.

For road rehabilitation works, the following basic guidelines be adopted:-

- AADT<1000 - Clear Zone 2.5m on straights, 3.5m on outside of curves
- AADT>1000 - Clear Zone 3.0m on straights, 4.0m on outside of curves

That where vegetation needs to be removed it is to be replaced with vegetation that is an appropriate erosion and sediment control measure and maintains the principles of a safe roadside environment.

That when an object containing a "Survey Reference Mark" is to be removed, the mark is relocated as per appropriate legislation and guidelines.

Section 11. Condition Rating

11.1 Introduction

Condition rating of roads is carried out to enable Council to formulate long term replacement programs and to fulfil its statutory reporting requirements such as Section 428 of the Local Government Act – 1993 and "Australian Accounting Standard 27".

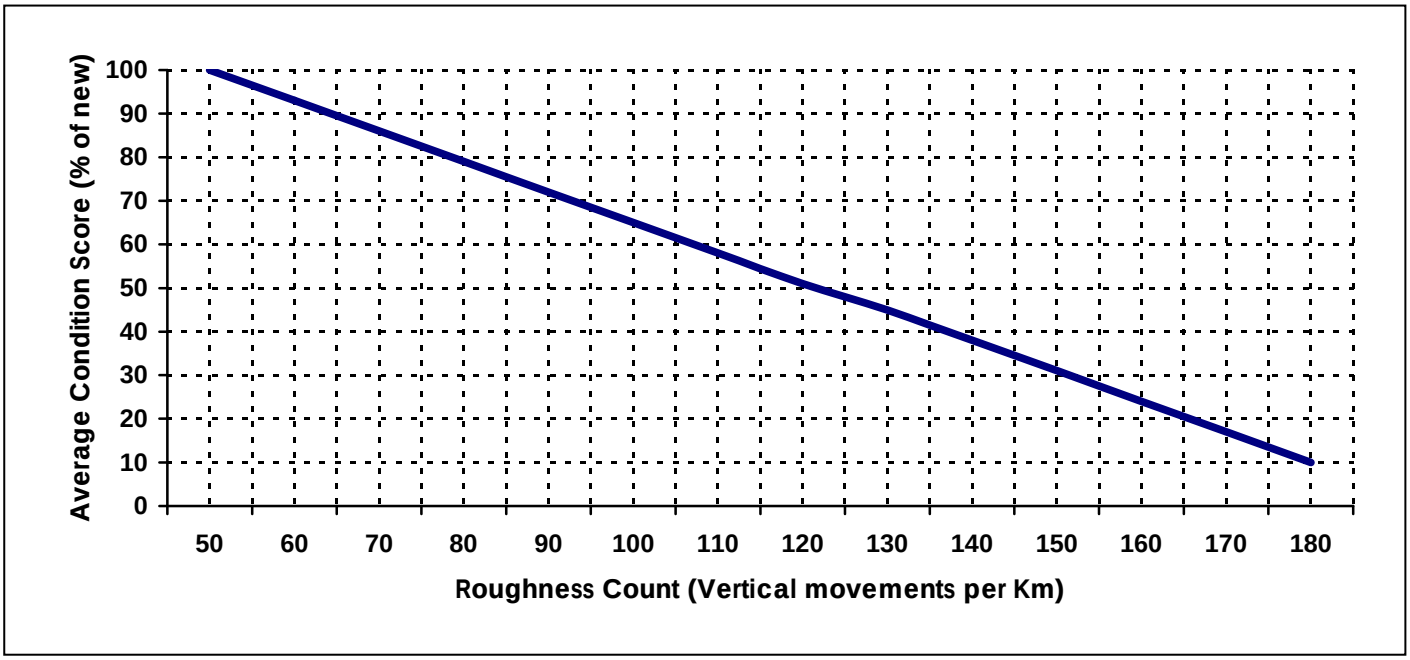
11.2 Sealed Roads

As previously mentioned, the 2 types of condition rating undertaken on Council's Sealed Roads are roughness and surface defects.

Roughness counts are the primary indicator of road condition used by Dungog Shire Council. Newly constructed or rehabilitated road should have a count of about 50 vertical movements per kilometre. Roads nearing the end of their effective life will have a count of about 175 or more vertical movement per kilometre.

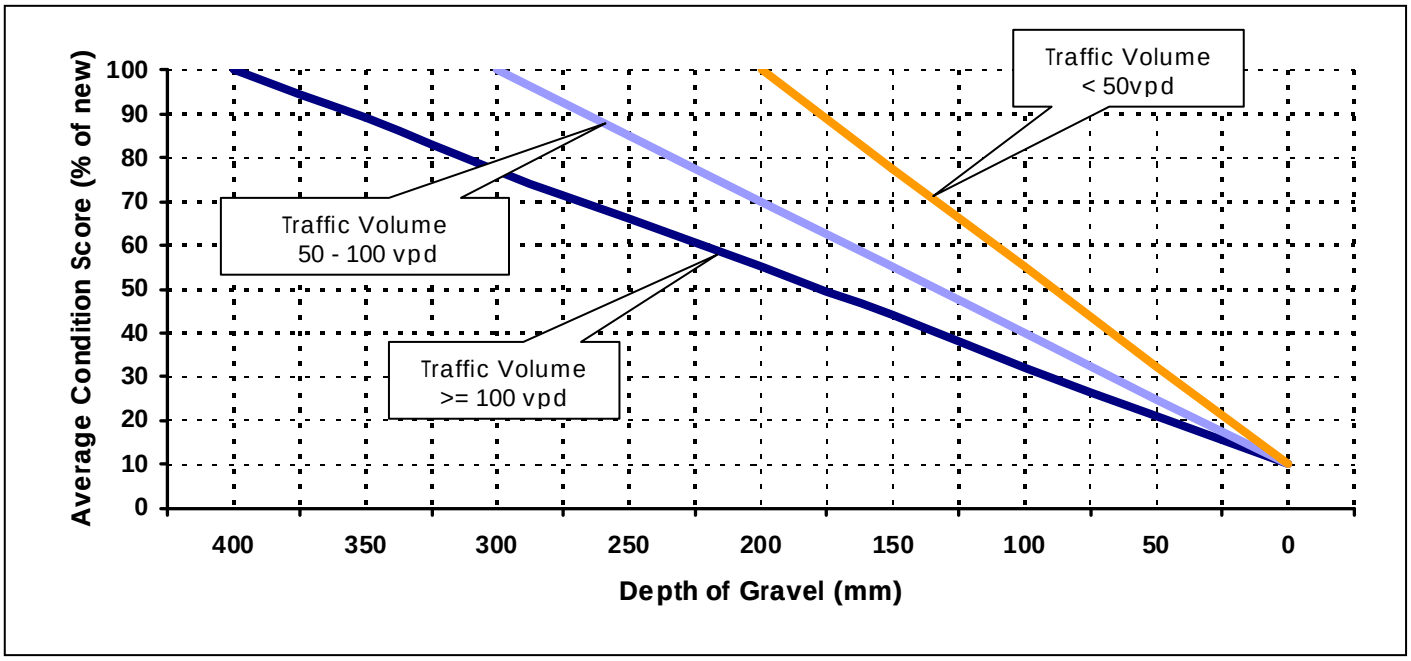
Roughness counts are to be updated every 5 years and those with a count >150 vertical movements per kilometre are more closely investigated, with defects including rutting and cracking of the wearing surface assessed.

Hence, the roughness count of a road can be used to indicate the theoretical condition of the road as a percentage of new condition, as depicted in the following graph:



11.3 Unsealed Roads

Due to the unpredictability and fast changing nature of unsealed roads, which mostly results from weather patterns, it is almost impossible to use an indicator of rideability (roughness) as a basis of condition. The only consistent and repeatable method of assessing the deterioration of an unsealed road is to record the depth of imported gravel on the road. As the depth of gravel decreases, mainly due to traffic use, the condition and remaining life of the road before gravel resheeting is required also decreases. Hence the traffic volume and depth of gravel when new is taken into account as shown in the graph below:



Section 12. Valuation

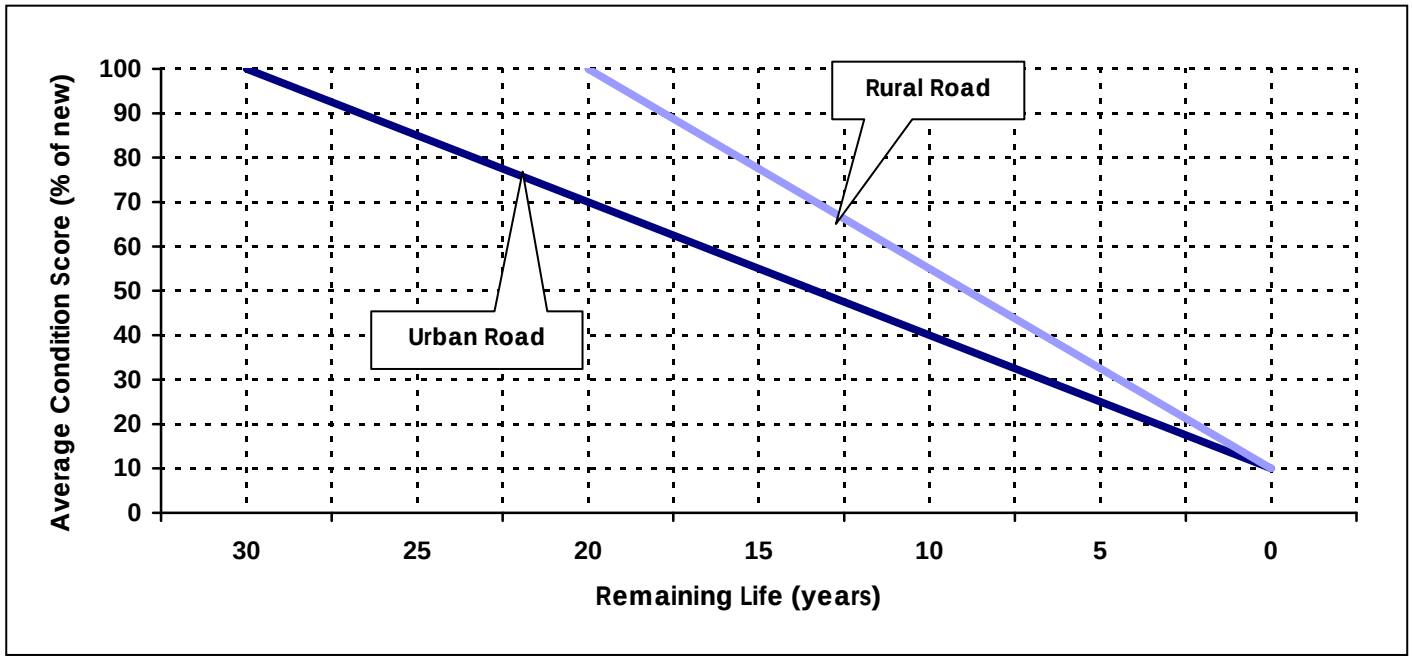
12.1 Written Down Replacement Cost

The Written Down Replacement Cost of the road (i.e the value of the asset) is then obtained by multiplying the Current Replacement Cost by the Overall Condition Score.

12.2 Remaining Life

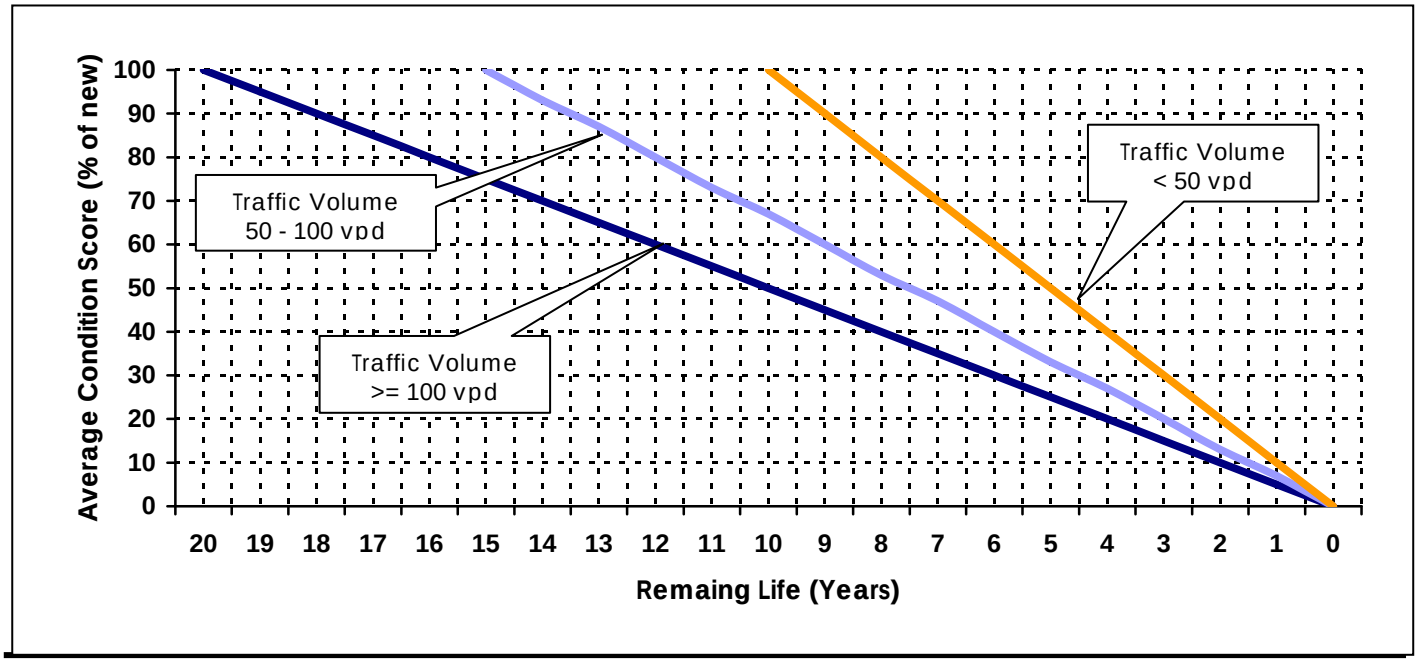
12.2.1 Sealed Roads

The remaining life of a sealed road is calculated using the appropriate line on the following chart.



12.2.2 Unsealed Roads

As previously discussed the remaining life of an unsealed road is a factor of the level of usage of the road and the condition of the road. Hence, the remaining life is determined from the graph below.



Appendix 1. Dictionary

For the purposes of this Strategy the following terms have the following meanings:

AADT	The Annual Average Daily Traffic or average number of vehicles using a road (both directions) per day
Clear Zone	This is the area from the outside edge of the travel lanes that is available for the emergency use by errant vehicles that leave the road. This zone can include any adjoining lane/s, road shoulder, verge and batter
Construction	The process of undertaking new works that provides a new asset
Complaints	Information received by Council identifying situations that have changed from normal. Complaints are managed through Council's Customer Request Management System (CRM)
Control Measures	Measures taken to minimise Council's area of exposure
Design Speed	A nominal speed adopted to determine the geometric features of a road
Evaluation	Examination of the factors identified in the inspection and used to make an informed decision
Geographical Information System (GIS)	A computerised mapping system
Heavy Vehicles	Those vehicles identified as Class 3 or above as per the NAASRA guidelines
Inspection	A formalised assessment of a given asset or hazard
Maintenance	The process of preserving an existing asset to its existing level of service by either reactive or pro-active methods
Periodic Maintenance	Planned Maintenance carried out at regular intervals to prolong the life of an asset
Pro-active Maintenance	A system of identifying defects in an asset through planned inspection
Reactive Maintenance	Maintenance that is carried out in response to customer complaints
Reconstruction	The process of renewing an existing asset, including making significant improvement to the geometry and standard of the asset. This is an aspect of Periodic Maintenance.
Rehabilitation	The process of renewing an existing asset, without making significant improvement to the geometry or standard of the asset. This is an aspect of Periodic Maintenance.
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.
Risk Control	The part of risk management, which involves the provision of policies, standards and procedures to eliminate, avoid or minimise adverse risks facing a Council.
Road Carriageway	is that portion of a road or bridge devoted particularly to the use of vehicles, inclusive of shoulders, auxiliary lanes and kerb and gutter.
Road Hierarchy	System of classification of the status of roads within the road network
RoadLoc	System used by the RTA to break up Classified Roads into smaller segments
Routine Maintenance	Generally minor day to day maintenance carried out to sustain the existing level of service that the asset currently provides.
Road Network	The system of roads maintained and either fully or partially funded by Council
SISD	Safe Intersection Sight Distance
Standards	The benchmarks for new work which this manual, within the fiscal limitations of Council, seeks to achieve