Road Network Management Plan

Department of Engineering Services

Tenterfield Shire Council

May 2013

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1. Introduction

1.1 Scope

Council is the Roads Authority for an extensive network of roads. Most of these roads are public roads as defined by the Roads Act 1993. However there are roads that are maintained by Council that are not public roads. Within the Shire there are also public and non-public roads and are not maintained by Council, but which provide public access to properties.

This Road Network Management Plan provides guidelines for determining whether a road is included in the Council-maintained road network. If a road meets the eligibility criteria, then it will be classified into the Council-maintained road network and thereafter managed by Council.

It is very important to understand that Council has limited resources. The standards included within this plan are the targeted outcomes for our road network and do not necessarily reflect the existing situation. This plan will assist in establishing a consistent standard and serviceability for a safe road network.

1.2 Objectives of the plan

Within the limit of available resources and in accordance with Council's Policies and adopted priorities, this plan outlines the strategies by which Council aims to provide:

- a reasonable standard of access for local and through traffic in rural, urban and village areas of Tenterfield Shire;
- a consistent and robust methodology for the inclusion/exclusion of roads and streets to be maintained;
- a road network which performs at an adequate functional level of service, consistent with road category and usage;
- a consistent and robust methodology to imposing road improvement charges or works in respect of development activities;

This plan provides Council with:

- a management tool to assist in the compliance with Council's duty of care obligations in the road network;
- strategies to minimise Council's exposure to litigation through a program of affirmative action with regards inspecting, monitoring, assessing and responding to the condition of roads assets.

1.3 Outcomes

It is expected that the Road Network Management Plan will achieve the following outcomes:

- Establish road maintenance strategies which provide maximum serviceable life for each different road class given available resources.
- Effective lobbying of government sources for additional road funding through reliable and accurate data;

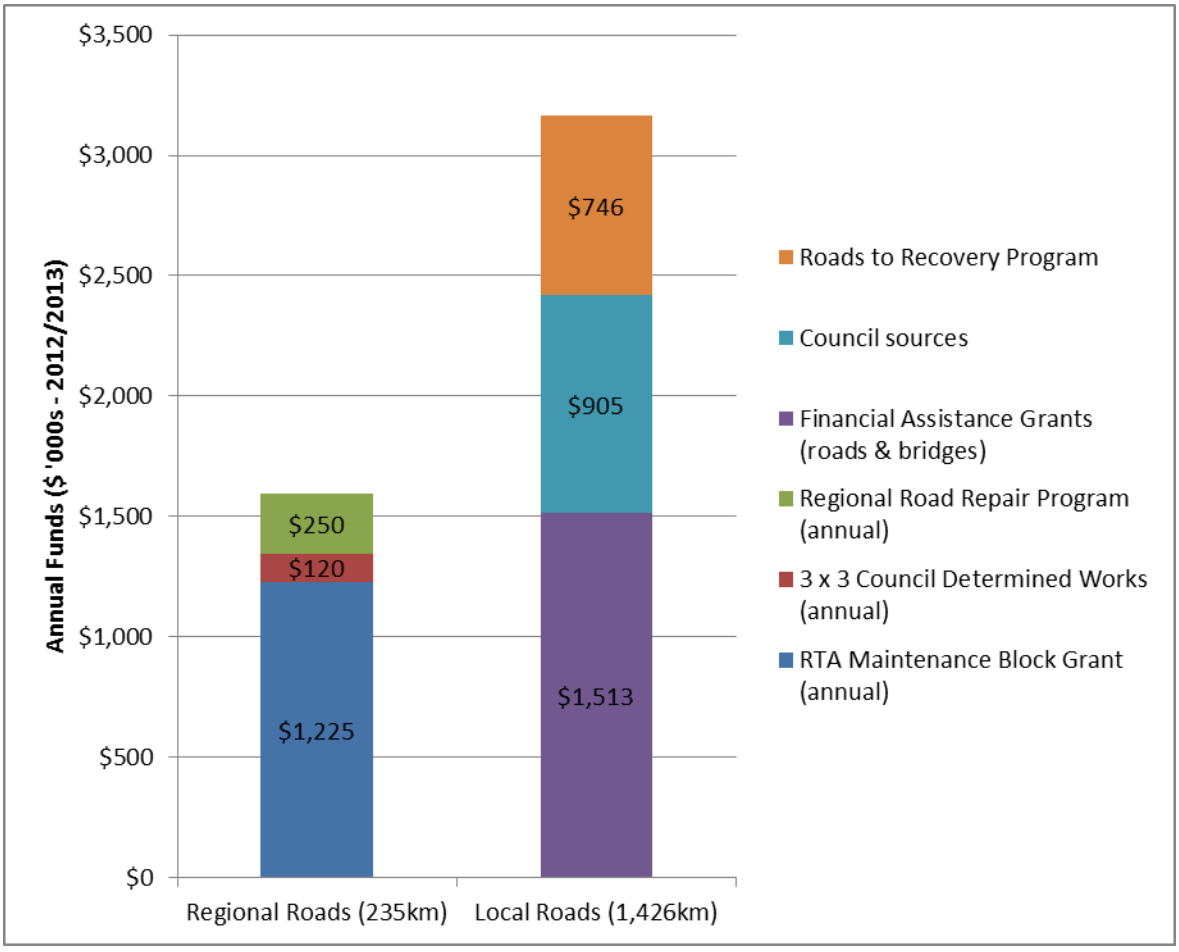
- A program to gradually increase the proportion of Council roads positioned within public road reserves;
- Delivery of an evidence based roads program for the maintenance, renewal and upgrade based on a skilled stable local workforce supplemented with quality local contractors.

It is intended that this Road Network Management Plan will be a living document. In order to achieve this, the Road Network Management Plan will be reviewed bienially, but at least once per Council term.

1.4 Funding

Council receives funding for road maintenance and construction from many sources. An indication of the level of funding available can be seen in Figure 1-1.

Figure 1-1 Annual road funding for local and regional roads - 2012/2013



Council determines the road funding program as part of its development of the annual Operations Plan. As a general guide, priority for funding of roadworks will be given to:

1. Maintaining the existing road, street and bridge network including reseals;
2. Providing safety related improvements;
3. Gravel re-sheeting program;

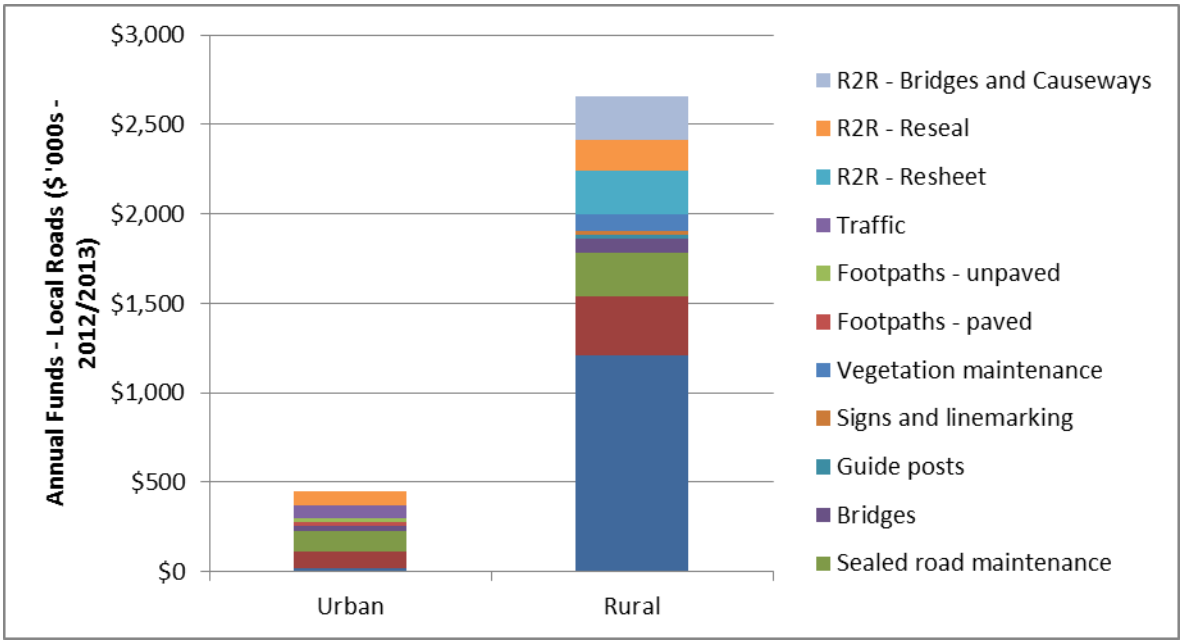
4. Heavy patching and pavement rehabilitation of sealed roads;

The available funding for local roads is distributed between rural and urban roads to maintain service levels as best as is possible with available resources (Figure 1-2 / Table 1-1). The large bias towards rural road funding is largely due to the size of the asset when compared to the urban road network.

Table 1-1 Distribution of local road funding

	Urban	Rural	Total	%
Unsealed maintenance	$16	$1,210	$1,226	39%
Road drainage maintenance	$93	$330	$423	13%
Sealed road maintenance	$120	$240	$360	11%
Bridges	$28	$81	$109	3%
Guide posts		$23	$23	1%
Signs and linemarking		$20	$20	1%
Vegetation maintenance		$90	$90	3%
Flood Remediation		$58	$58	2%
Footpaths - paved	$21		$21	1%
Footpaths - unpaved	$21		$21	1%
Traffic	$70		$70	2%
R2R - Resheet		$248	$248	8%
R2R - Reseal	$80	$168	$248	8%
R2R - Bridges and Causeways		$248	$248	8%
Total	**$448**	**$2,716**	**$3,164**	

Figure 1-2 Distribution of local road funding



1.5 Road Hierarchy

Due to Council's limited financial resources there is insufficient funding to maintain all roads at the highest desirable level. Therefore, it is important to ensure that what funds are available are spent in the most effective way. This is achieved by ensuring that the highest usage, or strategically important roads receive the highest funding levels.

The development of a **Road Hierarchy** recognises the relative importance of individual roads. It provides a mechanism for setting inspection frequencies, intervention levels, response times, construction standards, maintenance frequency and performance criteria, including such things as levels of flood immunity. The class of a road within the Road Hierarchy determines:

- target design standards for new road construction or rehabilitation – width, surface type, pavement thickness, drainage structures, etc;
- levels of service – how often a road is maintained and to what standard;
- inspection regime – how often inspected, intervention levels and response times for defects;
- priority for upgrading.

This Road Network Management Plan incorporates a Road Hierarchy where roads have been classified in accordance with a number of clearly defined and measurable criteria. It is anticipated that the most difficult decisions and the ones which will give rise to the most disputes will be about road classification. For this reason it is very important to have a way of determining a road's classification which is based on measurable criteria. These criteria must then be applied consistently throughout the Shire. This will ensure that the process can be presented to the community as fair, equitable and defensible.

1.5.1 How the class of roads is determined

All roads in the road schedule (Appendix A-C) have been classified using recorded data where available (e.g. traffic counts), and where data is not yet recorded, best estimates for each criteria. As more measurement takes place with time, and/or circumstances change, the classification for a road or a portion of a road may change. For longer roads, it is likely that different sections may have a different classification as the level of traffic changes and/or additional factors such as the presence of a school bus run impacts usage. Some roads may be classified at a higher grade where their potential to contribute to economic growth is identified. The case for any roads meeting these criteria is clearly outlined in this plan.

1.5.2 Road network classification review

The road schedule is reviewed when the road network management plan is revised.

1.5.3 The different road classes

The road classes in the hierarchy are:

Rural

- Class A – Regional Roads
- Class B – Primary Rural
- Class C – Secondary Rural
- Class D – Local Access

Urban

- Class A – Arterial (State Highways)
- Class B – Sub-Arterial (Regional Roads)
- Class C – Collector
- Class D – Local Access
- Class E – Lanes

The criteria for classifying roads are described in Sections 3 and 4.

1.6 Relevant legislation and legal considerations

The primary legislation defining the responsibilities of local and state authorities with regards to roads is the Roads Act 1993 (available online from http://www.austlii.edu.au/au/legis/nsw/consol_act/ra199373/), although there are a number of additional pieces of legislation that impact on Council's responsibilities and powers.

A key consideration in the management of the road network is of course Council's potential liability to the travelling public. The current position is described by the Civil Liability Act 2002 available at http://www.austlii.edu.au/au/legis/nsw/consol_act/cla2002161/

1.6.1 Civil Liability Amendment (Personal Responsibilities) Act 2002

The Civil Liability Act 2002 (the Act) was passed by NSW Parliament on 20 November 2002.

The Act makes important changes to the way that courts deal with claims against public authorities including road authorities such as Councils. These changes recognise that services provided to the community by Councils are not provided for commercial gain but for the public good. The Act does not sanction a public authority to act in a negligent or unsafe way but will require the courts to take into account principles relating to the financial and other resources available to the authority, the general responsibilities of the authority, and its compliance with general practices and applicable standards.

The Act protects regulatory and roads authorities if they could have done something to avoid a risk but did not do so. Public authorities carry out what is often a limitless task with necessarily limited resources. The Act provides immunity for a public authority for breach of statutory duty unless it acted irrationally. A roads authority that has not exercised a discretionary power to mend a pothole will not be liable unless it actually knew about the particular risk that led to the injury. If the roads authority did know about the particular risk, it will still be able to rely on the general "resources" protection of the Act for public authorities.

The sections of the Act affecting the liability of Public Authorities are contained in Part 5 and particularly clauses 42 to 46 inclusive.

Section 42 requires Courts to weigh up a Council's resources and competing responsibilities when determining whether it owes, or has breached, a legal duty of care. In the process, it clarifies that the principles extend to all functions of a Council, not just those in the nature of a road authority.

Section 43 provides that a Council cannot be sued for breach of statutory duty unless the act or omission alleged is grossly unreasonable.

Section 44 provides that a Council is not liable for failing to exercise functions to regulate other parties activities, unless the Plaintiff would have had standing in other proceedings to compel Council to exercise that power. Section 44 provides immunity beyond that which exists at common Law but the immunity is confined to specific circumstances.

Section 45 is an attempt to codify the non-feasance immunity which existed at common law for roads authorities prior to 31 may 2001. The section states that a roads authority is immune from suit where the harm arises from a failure to carry out, or consider carrying out, road work unless at the time the authority had actual knowledge of the particular risk which caused the harm. Importantly, the section clarifies that liability does not arise just because the authority had knowledge of the risk.

Section 46 has twin intentions to ensure that where a Council exercise a function:

- It does not attract greater liability than if it had not exercised the function at all, and
- It is not to be taken as an indication the function should have been exercised previously, in that fashion.

For example, where a Council filled a pothole which tripped a claimant, that action cannot, of itself be taken as evidence of the action the Council should have taken prior to the fall. It is now much more difficult for courts to conclude that the post-accident exercise of a function constitutes evidence of negligence.

2. Public Road Management

Under the Roads Act 1993, Council only has a maintenance responsibility for public roads that have been dedicated to Council. In practice Council manages and maintains roads where this is not necessarily the case. This occurs because the legal status is not clearly defined for some roads, others are not on public road reserves, or sit on public road reserve for only part of their length and many are in crown reserves that have not been dedicated to Council.

Public roads have been created in the past, in numerous ways, under many different pieces of legislation. It is not always clear whether a road is or is not a public road, and at times it may be necessary to carry out extensive searches to determine the status of a road.

This plan assumes that all roads currently on the road register (Appendix A-C) are public roads. However, there are a number of roads which may be 'doubtful' public roads. These include:

- Roads owned by other authorities eg. Crown and State Forests; and
- Roads or sections of roads where the physical road is not contained within the legal road reserve.

Council is working progressively towards the dedication of all roads maintained by Council. However, where existing roads have minor deviations outside the Public Road Reserve, no action will be taken to correct the situation unless reconstruction of that section is undertaken or development applications are submitted for adjacent land. In the latter case, the developer will be responsible for the correct gazettal of the road.

2.1 Opening Public Roads

Part 2 of the Roads Act 1993 provides the legislative framework for the opening of public roads. The procedure to be followed by a roads authority for the opening of a public road is as follows:

- A plan of subdivision or other plan that bears a statement of intention to dedicate specified land as a public road is registered with the Registrar-General and becomes public road upon registration of the plan (section (9);
- Council may, by notice published in the Government Gazette, dedicate any land held by it as a public road (section 10);

2.2 Closing Public Roads

Part 4 of the Roads Act 1993 provides the legislative framework for the closing of public roads. The procedure to be followed by a roads authority to close a public road is as follows:

- Application by the roads authority (Council) to the Minister to close the public road (clause 34);
- Minister must advertise the road closure in a local newspaper calling for submissions within 28 days (clause 35);
- Consent issued by the roads authority (clause 37);
- Minister publishes notice is Gazette closing the public road (Clause 37);

- Upon publication of notice, the road ceases to be public road and rights of passage and access are extinguished

2.3 Naming of Public Roads

Section 162 of the Roads Act 1993 provides for Council to name and number all public roads for which it is the roads authority. Roads include rural roads and town streets. Council must obtain the concurrence of the RMS in the case of a classified road. Council cannot proceed with a proposal to name or rename a road against an objection made by Australia Post, Department of Lands or the RMS (in the case of a classified road) except with the approval of the Minister.

The process for naming roads is described in **Policy No. 3.192 - Subdivision – Road Naming**.

2.4 Adding/deleting roads or streets to the road network

The following matters will be considered in determining whether a road/street not currently included the Road Hierarchy is eligible for inclusion:

- Is the road/street a "public road" as defined by the Roads Act 1993?
- How many properties does the road/street serve?
- Does the road/street meet the standards for the appropriate Road Class in Council's hierarchy?
- Have all Development Consent conditions, where applicable, been fulfilled by the developer in respect of the road/access to allotments/development site?

A road/street which meets all of the criteria described below will become eligible for inclusion in the Road Network Management Plan. Council may, at its discussion, include any road/street that does not meet these criteria and set a Classification for the road/street in accordance with the guidelines provided in this document.

2.4.1 Procedure

When an application is received to include a road/street in Council's Road Network Management Plan, the Director will determine whether the road/street meets the eligibility criteria detailed below. Council will allocate resources from the time of inclusion of the road/street in Road Network Management Plan towards the future management and maintenance of the road/street.

All new road/street lengths included to Council's Road Network Management Plan will be noted on Council's asset database with the length included in subsequent Grants Commission Returns.

2.4.2 Eligibility Criteria

The following criteria must be met for a road to be added to Council's Road Network Management Plan:

- the road must serve more than one property in different ownership; and
- the road must have the legal status as a "public road" as defined by the Roads Act 1993; and

- the road must meet the standards for the appropriate Road Class in Council's hierarchy; and
- where applicable, all Development Consent conditions must have been fulfilled by the developer in respect of the road/access.

All costs associated with achieving the above requirements shall be borne by the applicants seeking the inclusion of the road in Council's Road Network Management Plan.

2.4.3 Properties Served

Public roads which provide access to two properties with different ownership will only be eligible for the lowest classification under Council's road hierarchy system. In any event, Council shall only maintain any no-through-road to, at most, the property boundary of the last property.

Council will not accept any maintenance or improvement responsibility for internal access roads, regardless of the legal status of such access roads.

2.4.4 Existing maintenance arrangements

Where a public road only serves a single property but is included on the road register due to historical maintenance arrangements, Council may either continue its inclusion on the register as the lowest class of road, or remove it from the register at its discretion. Where the road is removed from the road register, private works will be available to the property owner for the maintenance of the road.

2.5 Roads Ineligible for Inclusion in Road Network

Those roads that are not being maintained by Council at the time this Plan is adopted will not be admitted to the Road Hierarchy unless the conditions listed in Section 2.4 are met.

Roads not currently maintained and managed by Council include:

- Dedicated public roads or part thereof, which Council has chosen not to maintain;
- Public Roads which have not been constructed.

3. Rural roads

With respect to rural roads, this Plan deals only with roads classified as Regional and Local and therefore under the control of Council as a roads authority. The major roads of the New England Highway and the Bruxner Highway to the East of Tenterfield are state highways and under the control of RMS. The Road Hierarchy is as described below in Table 3-1.

Table 3-1 Rural Road Classifications

Road Class	Description of Class
A – Regional Roads	Regional roads form part of the State-wide Regional network of roads, providing transport links between major towns and cities. They are roads classified in accordance with the NSW State Government's classification system and are included in the calculation of Council's annual Block Grant for Regional Roads.
B – Primary Rural	Primary Rural roads are the highest priority rural local roads and carry higher traffic volumes greater than 75 vehicles per day. Historically continuous school bus routes and roads which carry 50 – 75 vehicles per day and carry greater than 3% heavy vehicles are eligible for classification as Primary Rural.
C – Secondary Rural	Secondary Rural roads are mid priority rural local roads and carry traffic volumes less than 75 vehicles per day but which service more than 10 different property owners and have an average traffic volume greater than 20 vehicles per day. Secondary rural roads may also serve as bus routes.
D – Local Access	Local access roads are the lowest priority local roads servicing less than 10 different property owners or have traffic volumes of less than 20 vehicles per day.

3.1 Road Safety

Maintenance work necessary to ensure a road is safe will be carried out as and when required, irrespective of the class of road or the maintenance strategy for that class of road. Priority shall also be given to enhancement work that is assessed by the appropriately qualified technical people as required to rectify road safety problems.

Council uses a risk management approach to the maintenance of safety on the road network through a system of formal inspections, evaluation of the risk to road users and control of the risk by the use of appropriate maintenance activities. The risk evaluation is based on a rating system, with high risk problems prioritised.

3.1.1 Inspections

Regular inspections of the road network are made to identify defects and risks to motorists. These inspections are applied to both sealed and unsealed roads and are designed to identify potential defects likely to cause damage to the roadway or vehicle. Inspections identify defects such as the following:

- potholes, corrugations, rutting & other pavement defects;
- edge break & shoulder scouring;
- objects/debris on road;
- vegetation causing sight distance problems.

which affect:

- roads;
- guideposts & signs;
- bridges and approaches;
- table drains;
- shoulders;
- vegetation;
- drainage structures;
- sedimentation facilities;
- barriers.

Inspections are also carried out at night to check:

- reflectivity of signs and delineators;
- location & spacing of guideposts;
- condition & effectiveness of line marking & other traffic devices.

Inspections will be undertaken upon receipt of a public complaint, or as part of the regular inspection process. The following table identifies the minimum frequency of inspections to be undertaken based on road class. Inspections may occur at any time during the maintenance cycle, but are targeted to occur after half of the maintenance cycle has expired.

Table 3-2 Inspection Frequency

Inspection Type	**Road Class**			
	Regional	**Primary Rural**	**Secondary Rural**	**Rural Access**
Safety & Road	6 mths	12 mths	12 mths	2 yrs
Night	12 mths	2 yrs	Nil	Nil

3.1.2 Risk Evaluation

Risk evaluation will be undertaken using a rating formula considering the type of the observed defect and the likelihood of it causing a problem for traffic. Scores for the likelihood of occurrence and common types of defects are described in Appendix F: .

The likelihood of a hazard causing an accident or damage is largely a value judgement by the inspector and should consider;

- The volume of traffic on the road
- The location of the hazard relative to the travelling lane
- The nature of the hazard
- The road alignment – both horizontal and vertical curves (crests).

The risk score is calculated as the product of the likelihood of occurrence and hazard type.

Figure 3-1 Risk score matrix

Hazard Type \ Likelihood of problem	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

3.1.3 Risk Control

The type and style of control technique adopted to address identified risks will depend on the resources, facilities and expertise available, although there are some basic control measures that are generally implemented:

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

The factor that is common to all of the above control measures is the time to respond. Table 3-3 sets out the response times for various Road Risk Ratings.

Table 3-3 Target Road Risk Action Response Times

RISK RATING	PRIORITY	CONTROL MECHANISM	RESPONSE TIME
Up to 4	Low	Monitor	N/A

5 - 11	Medium	Inspect and make safe Effect repair	Within 2 weeks Within 3 months
12-14	High	Inspect and make safe Effect repair	Within 1 week Within 3 months
15-19	Very High	Inspect and make safe Effect repair	Within 2 working days Within 1 month
20+	Urgent	Inspect and make safe Effect repair	Within 1 working day Within 2 working days

3.2 Maintenance and renewal

The following sections detail specific maintenance and renewal activities applicable to all sealed and unsealed roads. Both sealed and unsealed roads are subject to two different categories of maintenance – planned and unplanned. Planned maintenance and renewal is that which occurs as part of Council's asset management schedule and most commonly involves the grading of gravel roads and resealing of sealed roads. Unplanned maintenance is reactive and occurs in response to dangerous conditions, or significant degradation of the surface to the point that it is well below a serviceable standard.

Renewal of the network is where major works are undertaken to restore sections of road to a new or near new standard. These works may include:

- Gravel resheeting;
- Road resealing, reconstruction or rehabilitation;
- Replacement of drainage structures;
- Replacement of bridges and causeways.

Where insufficient funds are available to enable the work identified in the maintenance and renewal schedules, the unfunded amount will be identified in the Road Network Asset Management Plan as "Backlog" works.

3.2.1 Unsealed Roads

Council has over 1200 km of unsealed roads for which it has accepted maintenance responsibility. The annual budget for the maintenance of these roads is in the order of $1.6M annually (including drainage), or >50% of the annual road maintenance budget. A further $250K (8%) is spent on the resheeting programme.

The maintenance of unsealed roads must deal with dynamic situations in which road conditions change significantly due to climatic conditions (usually heavy rainfall) and traffic changes over a very short period of time. Planned maintenance activities are primarily aimed at restoring the riding surface to an acceptable condition (e.g. repairing potholes, corrugations, ravelling, etc), and correcting the drainage system to preserve the pavement on a regular basis. Unplanned maintenance may involve filling of significant potholes, removal of significant corrugations or fill in of wash outs in response to identified serviceability or safety issues.

3.2.1.1 Planned Maintenance

Maintenance Grading

Unsealed roads require regular grader maintenance due to the effects of weather and passing traffic on the exposed aggregated surface.

Planned Maintenance Grading is designed to restore the shape of the road, remove potholes and ruts, remove corrugations, repair and clean out drainage and compact the running surface. The type of grading will depend on the site conditions and the condition of the road and will range from surface correction with a light grade, watering and rolling to the scarifying of the surface to the depth of the pothole, rut or corrugation generally up to 100 mm. Compaction is essential and is achieved by application of water (water cart) and compaction using a roller.

On completion of maintenance grading, the road surface will be shaped to a crown with crossfalls of 3-6% on straights or to a uniform one-way crossfall of 3-6% depending on road class and horizontal curvature. This crossfall will allow water to shed from the pavement as quickly as possible to minimise the formation of potholes.

Tenterfield Shire has been split into 3 sectors with approximately equal lengths of unsealed roads. Details of the roads in each sector including the order that roads will be maintained can be found in Appendix D: . It is important to note that the maintenance register show the progression of roads in the cycle, not precise dates by which dates will be maintained. It is likely that the start dates for maintenance on individual roads will be later than that listed due to weather, or upgrades to selected roads. Further, not every road is maintained every year. D Class roads are maintained on a bi-annual basis and their inclusion in the schedule for the year does not mean they will be graded if it is not their turn that year.

The sectors have approximately 400 km of unsealed roads each. Each sector has been assigned a gravel road maintenance gang consisting of a grader and watercart. Each gang has either a roller attachment for the grader, or a separate roller.

The maintenance of each class of road occurs on a cycle in accordance with Table 3-4 below.

Table 3-4 Target Maintenance cycle

Class	Description	Planned Maintenance
A	Regional Roads	Between 3 and 6 monthly
B	Primary Rural	12 month cycle
C	Secondary Rural	12 to 18 month cycle
D	Local Access	Target biennial cycle

Resheeting

Part of the process for maintaining a running surface on unsealed roads is the addition of material to replace material lost through wear, erosion or grading. As many roads in Tenterfield are built on and from granite soils, this material can sometimes be sourced locally from the road alignment, or alternatively by recovering material previously lost to the verges. However, where clay or other unsuitable road foundation soils exist, roads may require resheeting using imported gravels.

The annual gravel resheeting program is developed during the preparation of the Operational Plan with an annual budget of approximately $250,000 which funds 12.5km. The programmed replacement period for gravel resheeting is in accordance with Table 3-5.

Table 3-5 Target Resheeting program

Class	Description	Frequency of Resheeting (years)
A	Regional Roads	10
B	Primary Rural	15
C	Secondary Rural	20
D	Local Access	None except for safety and trafficability

When unsealed roads are resheeted with gravel, the targeted compacted thickness of gravel will generally be 100 mm irrespective of their classification. This thickness is based on the requirement of 2.5 times the maximum particle size for effective compaction.

The quality of pavement materials for use in unsealed road resheeting will generally be determined by the availability of naturally occurring materials in the area of the resheet. Gravels with a CBR of at least 15 (although preferably higher) and PI between 5 and 15 will be used where available.

Prior to resheeting, the road will be shaped to the widths specified in Section 3.3. After placement of the gravel resheeting, there should be a uniform thickness of gravel.

3.2.1.2 Unplanned Maintenance

Unplanned maintenance of gravel roads is remedial work conducted to rectify an unsafe hazard, or to undertake localized remediation to damaged surfaces. Unplanned maintenance may include:

- filling potholes;
- removing corrugations;
- unblocking drains;
- replacing traffic control devices e.g. signs and guideposts

- removing obstructions including tree branches

Unplanned maintenance is often completed using different equipment to planned maintenance (usually a backhoe) and will not result in the quality of surface achieved by a grader crew. Unplanned maintenance is triggered through programmed inspections or public reports and complaints.

3.2.2 Sealed Roads

Council has over 400 km of sealed roads for which it has accepted maintenance responsibility. The annual budget for the maintenance of the surface of these roads is in the order of $650,000 annually including drainage and reseals, or about 23% of the annual local road budget. Of this, approximately 65% is spent on rural roads.

Planned maintenance and renewal are carried out to prolong the life of sealed roads and include resurfacing, rejuvenation, reconstruction and shoulder re-sheeting. Council's limited resources mean that, although we have targets for resealing, there will be a backlog due to a lack of funds.

Unplanned maintenance activities are primarily aimed at maintaining the wearing surface to an acceptable condition and include patching potholes, heavy patching, crack sealing, repairing edge breaks, etc. Due to their extent, timing and means of execution, these types of maintenance activities are not amenable to detailed forward planning. Consequently, a reporting system for recording public reports and complaints, and a system of regular inspections (refer section 3.1.1) has been developed so that repairs can be scheduled for assignment to the sealed road maintenance gangs. Other maintenance activities completed on an "on-demand" basis include drainage (cleaning surface drains, culverts, etc), vegetation, road signs and road furniture maintenance.

This plan separates out those seals which are not part of a continuous sealed section into a register of **Orphan Seals**. Orphan seals are those seals installed for short stretches for dust abatements, floodway protection or to improve the safety of steep grades. These seals are on roads which are otherwise gravel and therefore have a much lower level of service. Orphan seals are road sections less than 1km long with gravel at each end, and the sections less than 200m at the start of the intersection of a sealed road and an otherwise gravel road, that are generally constructed for the protection of the connecting sealed road.

3.2.2.1 Planned Maintenance

Bitumen Resealing

Bitumen resealing is undertaken to prevent further surface deterioration, to seal fine cracks, to prevent the infiltration of water into the pavement, to inhibit oxidation and hardening of the existing surface and to restore skid resistance.

The desirable bitumen resealing frequency is every 10 to 20 years. This is determined primarily by the rate of oxidation of the bitumen. Traffic volumes also affect the rate of deterioration of the sealed pavements with lower traffic volumes resulting in faster rates of oxidation and hence cracking and higher traffic volumes accelerate deterioration of the seal after it has begun to crack.

Table 3-6 Target resealing frequencies

Class	Description	Full Reseal (years)
A	Regional Roads	10
B	Primary Rural	15
C	Secondary Rural	15
D	Local Access	20

3.2.2.2 Unplanned Maintenance

Heavy Patching

Heavy patching is defined as the replacement of failed pavement, including primer sealing, up to an area of 500 square metres. Heavy patching will generally be carried out where defects have been identified through inspection or public reports/complaints. Heavy patching is also carried out prior to resealing.

Shoulder Grading/Re-sheeting

Shoulder grading is required when the shape or level of the shoulder is such that the adjacent sealed pavement cannot be drained adequately because of the build-up of vegetation, where the pavement cannot be adequately supported by the shoulder material, or when the edge drop off on sealed roads reaches the intervention level. Shoulder grading will generally be carried out on sections of road where resealing is programmed as a priority and at other locations where required by inspection. Shoulder grading will involve the use of a grader, roller and water cart as required. The crossfall of the shoulder will generally be 1-2% higher than that of the adjacent sealed surface to ensure that water does not penetrate the pavement gravel. Shoulder grading/resheeting will often require equipment such as a backhoe to complete additional drainage work.

Shoulder resheeting will be required where there is insufficient shoulder material available to provide an adequate crossfall and will be constructed to ensure the integrity of the road. This will require benching into the existing shoulder to prevent lamination, compaction with moisture adjustment and construction of a shoulder sufficiently wide to ensure the integrity of table drains.

3.2.3 Both Sealed and Unsealed Roads

3.2.3.1 Drainage

The maintenance of the road drainage system includes the cleaning out and repairing of culverts, clearing of inlet and outlet of drains, and regrading table drains.

Some of this work is carried out on gravel roads as part of the normal maintenance grading activity. The balance of this work, particularly on sealed roads, will be programmed based on Inspections. Silt and debris will be disposed of where it will not cause further silting either on batters or into stockpiles

3.2.3.2 Guide Posts

Guide posts will be installed or replaced generally on sealed roads only where there is a high component of through traffic that may be using the road at night or be unfamiliar with the road. However, because of specific hazards that may occur at other locations, guideposts will also be installed and/or replaced as the locations specified in the following table:

Class	Description	General	Culverts	Bridges	Causeways	Curves	Crest
A	Regional Roads	Where sealed	Req'd	Req'd	Req'd	Req'd	Req'd
B	Primary Rural	Where sealed	Req'd	Req'd	Req'd	Req'd	Req'd
C	Secondary Rural	-	Req'd	Req'd	Req'd	-	-
D	Local Access	-	Req'd	Req'd	Req'd	-	-

Where installed, guide post are spaced in accordance with the requirements of the RMS Road Design Guide. Guideposts shall be installed at the end of each culvert and on the approach side. Guideposts shall be installed on both edges of causeways and on approaches and departures as specified in section 5.4.4. Each guidepost will have a red and white reflector (Diamond Grade).

3.2.3.3 Signposting

Signposting will be used to warn motorists of road conditions, including No Through Road signs at the start of all terminating roads, Dry Weather Road Only and 4WD Only warning signs where appropriate.

Road name signs (fingerboard Type G5-1) will be provided at the start of all roads and at junctions along the roads.

On sealed portions of A class roads (regional roads), “gravel road” (type W5-19), “next km” (type W8-17-1) and the sliding car symbol (type W5-20) warning signposting (or similar as appropriate for each situation) will be installed prior to the commencement of an unsealed surface. The distance will be to the next sealed section of road. Where the length of sealed surface is less than 1km, such as at dust abatements, no warning signposting will be required.

Curve warning signposting (type W1-1 to W1-7 inclusive) will be provided on the approaches to curves on class A, B, and C roads where there is a significant (at least 20km/hr) change in speed necessary to safely navigate the curve radius. No advisory speed signposting will be provided. Hazard markers (type D4-1-2 or D4-1-3) will be provided on signposted curves where the necessary change in speed is 30km/hr or more.

All causeways/floodways on class A, B and C roads will have flood depth indicators and Causeway (W5-4) or Floodway (W5-7) warning signs as appropriate and Road Narrows (W4-1) when the causeway width is less than the approaching pavement width installed on each approach. Additional warning signs indicating “Road Subject to Flooding, indicators show depth” (G9-21) shall be installed on both approaches to causeways/floodways on Class A, B and C roads only where there is a higher component of through traffic that may be unfamiliar with the road.

3.2.3.4 Vegetation Control

The control of vegetation on road shoulders will only be undertaken adjacent to sealed road pavements. This may take the form of slashing with a tractor slasher or chemical control using spraying. On unsealed roads, no vegetation control will be undertaken except for the control of noxious weeds as required or where it is required to resolve a specific safety issue.

Generally, Council will not undertake vegetation control within the road reserve unless it is required to resolve a specific safety issue.

3.3 Enhancement

Enhancement is any work which improves a road to a higher standard than it has previously achieved and may include:

- Road rehabilitation (gravel overlay, in situ stabilisation)
- Road reconstruction
- Road realignment
- Road widening
- Sealing (including dust abatements)
- Drainage improvements
- Upgrading or replacing of bridges and causeways

This section details the standards that will be used when enhancement work is carried out on the road network.

3.3.1 Standards

3.3.1.1 Road Design Standards

Road enhancement work will be designed to the minimum design criteria in Table 3-7. The road will comply with all Council standard drawings.

Table 3-7 Road Design Standards

Road Class	Description	Carriageway Type	Pavement Width	Surface Width & Type	Design Speed
A	Regional	2 lane two way	8.0	Sealed 6.5m	80 km/hr
B	Primary Rural	2 lane two way	7.0	Sealed 6m or 7m unsealed	70 km/hr
C	Secondary Rural	1 lane two way	6.0	6m unsealed	60 km/hr
D	Local Access	1 lane two way	5.0	5m unsealed	50 km/hr

3.3.1.2 Drainage Structures

Drainage improvement work will be carried out to standards in Table 3-8 and will be in accordance with Council standard drawings.

Table 3-8 Drainage standards for new roads

Class	Description	Width of Road Over Drainage Structures		
		Culvert	Causeway	Bridge
A	Regional	8.5m	6.5m	6.5m
B	Primary Rural	7.2m	6.0m	6.0m
C	Secondary Rural	6.0m	4.0m	4.0m
D	Local Access	6.0m	4.0m	4.0m

3.3.1.3 Dust Abatements

Dust Abatements shall be constructed to the width for the class of road as specified previously under the Standards of Enhancement for Rural and Urban roads respectively. Dust abatements will only be approved in accordance with **Council Policy 2.041 – Dust Abatements**.

3.3.1.4 Road Network Extensions

Road and stormwater infrastructure shall be constructed in accordance with Councils Standards of Enhancement – Sections 3.3.1.1 (Rural) or 4.5.2.1 (Urban) at the road hierarchy of the maximum expected usage of the proposed subdivision or road extension.

3.3.1.5 Revegetating Exposed Surfaces after Construction

Where large bare areas are created during construction works (larger than those normally created during routine maintenance), these areas shall be revegetated. Revegetating can be in the form of mulch, topsoil and seed, seeded jute mesh and bitumen emulsion or any other proprietary product that provides a revegetated surface.

4. Urban and village streets

4.1 Classification

Council has approx. 74 km of urban and village streets as described in the Urban Road Register (Appendix C:). For a street in a town or village area to be eligible for maintenance by Council, it must be included in the Urban Road Register.

4.1.1 Criteria

The criteria used in this classification system are:

- The traffic volume using the road;
- Whether the street is part of a school bus route;
- Density of homes;
- Whether the street is being used to access property or is used by traffic to pass through the area.

4.1.2 Street Classes

The Street Hierarchy has been based on the AUSTROADS publication "Guide to Traffic Engineering Practice" and provides for five classifications of street as follows:

Class	Street description
A	Arterial
B	Sub-arterial
C	Collector
D	Local access
E	Lanes

4.1.2.1 Class A – Arterial

Arterial Streets provide principal avenues of communication and links between parts of large cities or between major towns and cities. Within the towns and villages of Tenterfield Shire, only the New England Highway and Bruxner Highway perform this function. They are roads classified as National or State in accordance with the State Government's classification system. Maintenance on the central portion of the road is the responsibility of State and Federal Governments. However, Council has a maintenance responsibility for the parking lanes, footpaths and road reserve of these roads.

4.1.2.2 Class B – Sub – Arterial Streets

Sub-Arterial Streets are those streets which connect arterial streets to areas of development and other major areas of the town or shire. These streets carry high traffic volumes with a broad range of vehicle types. In the towns and villages of Tenterfield Shire, only the Regional Roads meet these requirements.

4.1.2.3 Class C – Collector Streets

Collector streets are those streets which provide a link for traffic from the residential street system, some rural areas, industrial areas and other trip generators to other collector streets, sub-arterial or arterial streets.

4.1.2.4 Class D – Local Access Streets

Local Access Streets are streets which principally provide access to and from property. These streets generally carry low traffic volumes and form the bulk of streets within Tenterfield Shire.

4.1.2.5 Class E – Lanes

These streets generally provide alternative access to properties. They are narrower than Class D streets and generally have very low traffic volumes.

4.2 Road Safety

4.2.1 Introduction

Maintenance work necessary to ensure a road is safe will be carried out as and when required, irrespective of the class of road or the maintenance strategy for that class of road. Priority is given to enhancement work that is assessed by the appropriately qualified technical people as required to rectify road safety problems.

Council uses a risk management approach to the maintenance of safety on the road network through a system of formal inspections, evaluation of the risk to road users and control of the risk by the use of appropriate maintenance activities. The risk evaluation is based on a rating system, with high risk problems prioritised.

4.2.2 Inspections

Various types of Inspection will be made to identify defects and risks to motorists and pedestrians. These inspections will be applied to both sealed and unsealed streets and are the same as listed in Section 3.1.1 Inspections.

The following table identifies the minimum frequency of inspections to be undertaken on town and village streets. In general, it will not be necessary to regularly inspect streets at night due to the presence of street lighting.

Table 4-1 Urban road inspection frequency

Inspection Type	Road Class				
	A	**B**	**C**	**D**	**E**
Safety & Road	6 month	1 year	1 year	1 year	2 years

4.2.3 Evaluation

Evaluation of the information collected from the above inspections will be made in accordance with section 3.1.2 Risk Evaluation.

4.2.4 Control

Generally, control measures which will be implemented on town and village streets will be the same as shown in section 3.1.3 Risk Control.

4.3 Footpath Safety

4.3.1 Inspections

In addition to the inspections detailed in section 4.2 Road Safety, inspections will also be undertaken on footpaths in town and village areas. Details of the inspections are shown in the following table:

Table 4-2 Footpath inspections

Type	Purpose	Defects to be identified	Requirements
Footpath	Identify defects likely to pose a danger or safety threat to pedestrians	• Trip hazards – cracks, pavers, roots, etc; • Irregular surfaces, holes, slippery, etc; • Obstructions, overhanging limbs, etc; • Sigange • Lighting – dark spots	Walk footpaths and record defects

The minimum frequency of inspection to be undertaken will be based on footpath type and the number of pedestrians using the facility as shown in the following table. Records of inspection will be kept (refer Appendix G: - Forms) and used to determine the programmed maintenance works. Any defects that cannot

be rectified within the specified response time will be listed in a Maintenance Defects Register and will become back-log maintenance works.

Table 4-3 Footpath inspection frequencies

Pedestrian Volume	Frequency
Very High (CBD)	6 months
Medium	12 months
Low	24 months

4.3.2 Evaluation and Control

As there are relatively few paved footpaths in Tenterfield Shire, evaluation of the information collected from the above inspections will be made on a case by case basis and any defect likely to impact on safety will have measures to make them safe and repaired implemented in accordance with Table 4-4.

Table 4-4 Target Footpath Response Times

Pedestrian Volume	Response Time (Make Safe)	Response Time (Repair)
Very High	1 day	2 weeks
Medium	2 days	1 month
Low	2 days	2 months

4.4 Maintenance and renewal

The following sections detail specific maintenance activities applicable to all sealed and unsealed urban streets. Other maintenance activities which are not detailed will continue to be done for all street classes on an 'as required' basis.

Reference is made throughout this section to a visual condition rating system which is used to rate the condition of many aspects of sealed and unsealed streets. This is based on the RMS document, ROCOND 90 – Road Condition Manual

The standard of maintenance for different classes of street and the deterioration which is allowed to occur before appropriate maintenance is carried out is based in part on the visual condition rating system. Where insufficient funds are provided to enable the identified work to be undertaken, the unfunded amount will be listed in the Maintenance Defects Register as "Backlog" works.

4.4.1 Unsealed Streets

Planned and unplanned maintenance for unsealed streets is similar to that for Class C roads as described section 3.2.1 Unsealed Roads.

4.4.2 Sealed Streets

Planned and unplanned maintenance for unsealed streets is similar to that for sealed roads as described in section 3.2.2 Sealed Roads, excepting the resealing program which is in accordance with Table 4-5.

Table 4-5 Urban street reseal program

Class	Description	Reseal (years)
A	Arterial (shoulders)	20
B	Sub-arterial	12
C	Collector	15
D	Local access	15
E	Lanes	20

4.4.3 Both Sealed and Unsealed Streets

4.4.3.1 Drainage

The maintenance of the street drainage system includes such work as cleaning out and repairing culverts; clearing the inlets and outlets of drains and pits; regrading shoulders, table drains and open channel. Some of this work is carried out on gravel streets as part of the normal maintenance grading activity. The balance of this work, particularly on sealed streets, will be programmed based on condition inspections.

4.4.3.2 Guide Posts

Guideposts are generally not required in urban or village areas where kerb and gutter exists. Guideposts will be installed on other streets where street lighting is poor and on each approach to piped accesses. Guideposts will also be installed at each culvert end.

Guide Posts, where installed, will be spaced in accordance with the RMS's Road Design Guide.

4.4.3.3 Road Verges

Road verges other than road shoulders shall be maintained in accordance with **Policy No 2.131 - Maintenance of Nature Strips and Verges**. Generally this places the responsibility for maintenance with the property owner.

Where inspection reveals defects in road verge which represent a risk to motorists or other users of the road reserve, the property owner will be identified and a letter forwarded with a request to repair the defect(s) in the access within a period of 1 week. Should further inspection reveal that the defect has not been repaired, Council will undertake the necessary repairs at private works rates and forward an account to the property owner for payment.

4.5 Enhancement

4.5.1 Introduction

Enhancement work is any work which increases the value of the street network. These works may include:

- Street rehabilitation;
- Street reconstruction;
- Street realignment;
- Street widening;
- Sealing;
- Drainage improvements;
- Upgrading or replacing bridges;
- Developing and upgrading footpaths/cycleways.

This section details the standards that will be used when enhancement work is carried out on the street network.

4.5.2 Standards

4.5.2.1 Street Design Standards

Street enhancement work will be carried out to the following standards excepting in the case of physical or budgetary constraints.

Class	**Description**	**Urban**		**Villages**	
		Min. Seal	K to K	Min. Seal	K to K
A	Arterial	7 m	13 m	7 m	13 m
B	Sub-Arterial	7 m	13 m	7 m	10 m

C	Collector	7 m	11-13 m	7 m	11-13 m
D	Local Access	6 m	10 m	6 m	8 m
E	Lane	5 m	5 m	5 m	5 m

4.5.2.2 Drainage Structures

Drainage improvement work will be carried out to the following standards.

Class	**Description**	**Width of street over drainage structures**	**Target minimum frequency of drainage structures overtopping (yrs)**
A	Arterial	8.5	10
B	Sub-Arterial	6.0	10
C	Collector	6.0	10
D	Local Access	6.0	5
E	Lanes	6.0	2

4.5.2.3 Kerb & Gutter

Where Kerb and Gutter is required, it will be constructed in accordance with the Tenterfield Shire Council Standard Drawings.

Contributions for kerbing and guttering will be sought from adjoining landowners in accordance with the requirements of the Roads Act 1993 at a rate of 50% of the cost of construction. The rate for this work will be set annually in the Fees and Charges. Contributions for kerbing and guttering will be sought from adjoining landowners on corner lots in accordance with **Policy 2.110 – Kerb and Gutter (Corner Lots).**

Where concrete kerb and gutter works are to be undertaken to replace granite guttering blocks, such works will be undertaken in accordance with **Policy No 2.111 – Kerb and Gutter – Replacement of Granite Gutter Blocks**.

4.5.2.4 Concrete/Paved Footpath and cycleways

Council may provide concrete paving on footpaths for reasons of amenity or safety. The minimum width of footpaths will be 1.2m. Concrete footpaths are generally installed only where connected to the existing footpath network or between distinct community facilities with high volumes of pedestrian traffic.

Cycleways, will be constructed in accordance with Austroad's *Cycling Aspects of Austroads Guides 2011*.

4.5.2.5 Signposting

Signposting will be used to provide information, regulate traffic movement and warn motorists of changes in road conditions. Specifically, *No Through Road* signs will be installed at the start of dead end streets. *Dry Weather Only* and *4WD Only* warning signs will also be installed where appropriate.

Street name signs (*fingerboard Type G5-1*) may be provided at the start of all streets and at junctions along the streets, but will not necessarily appear at each junction. While streets signs are important for emergency and navigational purposes, recent technologies such as mobile devices and GPS units have reduced their provision as a priority, although there are a small number of sites where improved street signage is definitely required.

5. Bridges & large culverts

5.1 Introduction

Council has 151 bridges and large bridge culverts on the regional and local road and street network. Of these bridges, there are 57 on regional roads, 89 on local roads, and 6 on urban streets. 59 bridges are timber, including 2 on regional roads at Boonoo Boonoo River and Bookookoorarra Creek.

The register of Tenterfield Shire Council bridges is included in Appendix E: .

5.2 Safety at Bridges

All maintenance work necessary to positively provide for the safety of road users at bridges shall be carried out as and when required, irrespective of the class of road/street on which the bridge is situated. Priority shall also be given to enhancement work that is assessed by the appropriately qualified technical people as required to rectify safety problems at the bridge.

Council will take a risk management approach to the maintenance of safety at bridges. This is through the implementation of a system of defect identification through a formal inspection process, evaluation of the risk to road users and control of the risk by the use of appropriate maintenance activities The risk evaluation is based on a rating system, where the greater the Risk Rating the greater the urgency.

5.3 Inspections

5.3.1 Safety

A visual inspection will be included in the Safety and Roadway inspection undertaken on the road or street. This will include signposting, obvious defects in the deck, handrailing and any approach guardfencing, blockage of scuppers, vegetation growth, etc. Evaluation and control of any defects noted will be undertaken in accordance with sections 3.1.2 or 4.2.3 as appropriate.

5.3.2 Structural

In addition to the safety inspection, a visual inspection will also be undertaken by a suitably qualified and experienced inspector. This inspection will be made on an annual basis for bridges on Class A - Regional Roads and for bridges in urban areas. For bridges on all other classes of road, the visual structural inspection will be undertaken on a biennial basis.

In addition, a detailed structural inspection will be undertaken on all timber bridges, irrespective of road classification, on a six yearly cycle. This inspection may include test boring of structural members to determine condition, and will be carried out by a suitably qualified and experienced inspector. Should this inspection find faults or deterioration in condition on a particular bridge, then the detailed structural

inspection will be carried out on a 5 yearly cycle for the structure or at a lesser time period as considered necessary.

Records of inspections will be kept and used to determine the programmed maintenance works (refer Appendix G: – Forms). The identified defect will be listed in a register which will be used to track completion, etc.

5.4 Maintenance of Bridges

5.4.1 Termite Treatment

Treatment of any infestations found will be carried out immediately by a suitably qualified exterminator.

5.4.2 Structural Timber

All timber supplied for the maintenance and repair of timber bridges shall comply with the requirements of RMS QC Specification Part 380 – Timber for Bridges. The dimensions for structural components in Table 5-1 will be applied to ensure uniformity of material specifications, unless different sizing is necessary due to the existing bridge configuration:

Table 5-1 Timber sizing

Girders, Piles & Corbels	min 400 diameter at small end. Timbers to be suitable for given span
Decking	200 x 100 on local Roads / 200 x 125 on Regional Road
Sheeting	250 x 50
Kerbs	200 x 200

5.4.3 Signposting

Narrow bridge warning signposting (*type W4-1*) will be incrementally erected on all bridges that are less than 6.1m wide on local roads at a distance of 2V from the bridge abutment. In addition, bridge width markers (*type D4-3*) will be installed at abutments to define the width of the bridge between kerbs. Where the bridge is likely to be overtopped, flood depth indicators will be erected in accordance with Section 3.2.3.3 Signposting.

5.4.4 Vehicle and pedestrian barriers

Except for Class A (regional roads), handrailing or structural barriers other than kerbs will not be provided on timber or concrete decked bridges. This is in recognition that most of the bridges on local roads carry low

traffic volumes, the bridges are general low level structures subject to overtopping and timber handrailing is not a suitable barrier. On regional roads, any upgrades will incorporate the installation of guardrail where budgets and existing configuration of bridges permit.

5.5 Enhancement

When a timber bridge is scheduled for major repair, an economic evaluation will be undertaken to determine if a more suitable structure can be installed such as a concrete box culvert, Doolan deck, reinforced or prestressed modular concrete deck, etc. The bridge will be designed by a certified bridge design engineer.

6. Miscellaneous

6.1 Rural Addressing

Rural addressing is a simple and permanent means of identifying, locating and addressing properties in rural areas. The basic element of the system is the logically sequenced property numbers related to the distance of the property from the start of the road. Numbers increase by increment of 2 for every 20 metres of road frontage, odd numbers on the left and even numbers on the right hand side of the road.

Rural addressing has been introduced in Tenterfield Shire. New rural addresses can be established through the completion of an application form and payment of the fee. The rural addresses are available as a layer on the Council's MapInfo database.

6.2 Accesses

Construction and maintenance of accesses is the responsibility of the property owner and is described in **Policy 2.130 Construction and maintenance of property access from Council roads.** Generally this places the responsibility for construction, maintenance and costs thereof with the property owner.

6.3 Road verges

Road verges other than road shoulders shall be maintained in accordance with **Policy No 2.131 - Maintenance of Nature Strips and Verges**. Generally this places the responsibility for maintenance and costs thereof with the property owner.

6.4 Public gates and vehicle by-passes

Public gates, vehicle by-passes (grids), associated signposting and road approaches shall be maintained in accordance with **Policy No 2.162 – Public Gates and By-Passes**. Generally this places the responsibility for the installation, maintenance, and costs thereof with the permit holder(s) for the public gate.

6.5 Public utilities in road reserves

Council from time to time receives requests from various public utilities (Country Energy, ERGON Energy, TELSTRA, etc) for the installation of plant within the road reserve. While utility authorities have powers under relevant legislation (both state and federal) to install plant, consultation is a prerequisite for construction and maintenance activities. Normally Council would raise no objections to any proposed works.

For consistency, the public utilities will be requested to take the following matters into consideration when undertaking works within the road reserve:

1. Cable/conduit/pits are to be located within defined corridors as defined in any Council development standards (urban), or as close to the property boundary as possible (rural or no corridor specified).
2. Proposed locations and depths of conduit/cable shall be actually achieved in the field and clearly marked accordingly.
3. A minimum depth of 450 mm to top of conduit within road reserves and under footpaths and a minimum 600 mm to top of conduit under table drains and road pavements is required. Where a standard drawing exists for the service, this takes priority.
4. Disturbance to the natural conditions by the operations of Public Utility equipment and staff, including any sub-contractors, is limited.
5. The removal of any trees greater than 200 mm diameter must be formally approved by Council.
6. All areas that are disturbed by the operations are to be restored to pre-existing conditions which will include, but not be limited to, levelling, compaction to prevent future sinking, topsoiling and seed with a compatible grass seed mixture (if necessary).
7. Suitable erosion and sediment control measures are implemented prior to work commencing, are maintained throughout the operations and are removed when disturbed areas have been restored.
8. Underground boring for conduits must be undertaken where it is proposed to cross a sealed road formation, to cross a concrete footpath, to cross concrete kerb and gutter and on formed footways.
9. Trenching may be allowed on gravelled roads provided backfilling and compaction of trench is achieved to prevent future consolidation;
10. Traffic control is to be provided before and during operations in accordance with the current RMS and Australian standards.
11. Two business days' notice is provided to Council's nominated contact person.

6.5.1 Utility allocations within road reserves

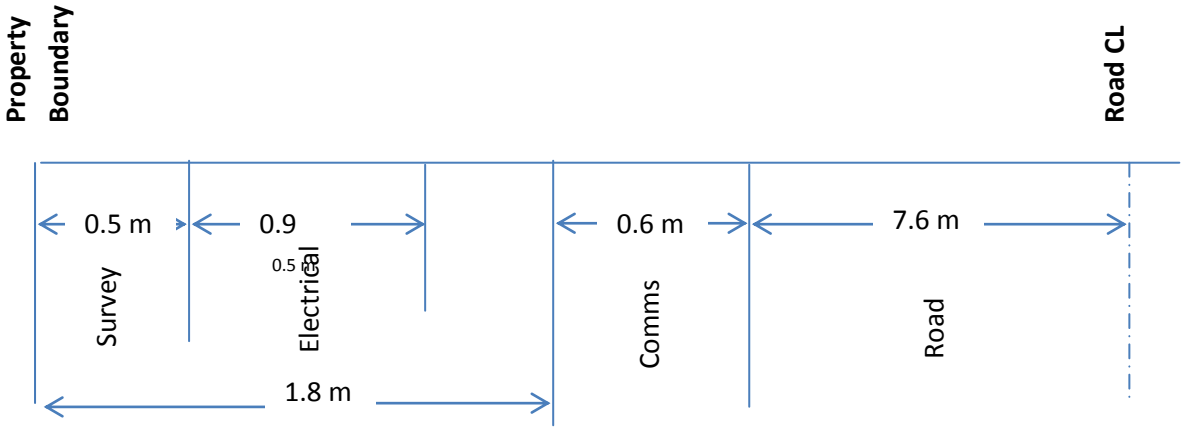
New and replacement utilities shall be located in allocated location as noted in the Tenterfield's standard engineering drawings for urban environments, and in accordance with Figure 6-1 for rural roads. Where the infrastructure is already in place, the allocation may be changed if there is an existing utility located within

the specified zone (as identified by Dial Before You Dig). If an existing utility is located within a Service Provider's allocation consult Council's Engineer to obtain an approved alternative allocation.

Where a Utility/Service Provider wishes to encroach on space allocated to another Utility/Service Provider, it must consult and obtain a written agreement from the other. Both Utility/Service Providers shall record such encroachments on their respective mapping systems and forward a copy of the agreement to Tenterfield Shire Council for approval. Where space constraints exist, communications and electrical services may be installed in a shared corridor corresponding to the normal electrical corridor.

In cases where Council's rural roads are not located centrally within the road reserve, the Utility/Service Provider is required to locate their assets so that they do not encroach on Council's infrastructure allocation as measured from the centre of the carriageway. (Centre line to centre of table drain is 7.5m, to back of table drain is 8.0m).

Figure 6-1 Rural Road Utilities Allocations.



Appendix A: Regional Road Register

The road registers are saved separately as pdf files and are available from the TSC Website.

Appendix B: Rural Road Register

The road registers are saved separately as pdf files and are available from the TSC Website.

Appendix C: Road Register – Urban roads

The road registers are saved separately as pdf files and are available from the TSC Website.

Appendix D: Gravel maintenance cycle program

The maintenance cycle program is saved separately as a pdf file and is available from the TSC Website.

Appendix E: Register of bridges and large culverts

Bridge No	Road Name	Date	Stream	Length (m)	Width (m)	Type
Regional						
62218	Mt Lindesay Rd		Boonoo Boonoo River	39.8	5.90	Timber Beam
62219	Mt Lindesay Rd		Bookookoorarra Creek	28.45	4.30	Timber Beam
36101	Mt Lindesay Rd	1968	Tooloom Creek	52.5	7.30	Steel Girder
36102	Mt Lindesay Rd		Tooloom Creek	43.6		Steel Girder
18901	Mt Lindesay Rd	c1980	Acacia Creek	21.0	8.05	Concrete Box Culvert
29003	Mt Lindesay Rd		Wards Creek	7.7	8.85	Concrete Box Culvert
29002	Mt Lindesay Rd	1947	Ruby Creek	12.8	8.65	Concrete Beam
26001	Mt Lindesay Rd	1948	Herding Yard Creek	7.1	6.80	Concrete Box Culvert
62201	Mt Lindesay Rd	1948	Unnamed Ck (Naas St)	5.5	0.00	Concrete Box Culvert
62202	Mt Lindesay Rd	1941	Red Bill Swamp Ck	9.0	7.30	Concrete Box Culvert
62203	Mt Lindesay Rd	1956	Pitkins Swamp Creek	45.7	7.90	Steel Girder
Seg 25	Mt Lindesay Rd			6.8	9.20	Concrete Box Culvert
62204	Mt Lindesay Rd		Washpool Ck (London Bridge)	34.2	6.95	Concrete Beam
62207	Mt Lindesay Rd		Resurrection Creek	8.8	6.40	Concrete Box Culvert
62205	Mt Lindesay Rd	1997	Carroll's Creek	12.0	8.00	Doolan Deck-Concrete
62220	Mt Lindesay Rd		Bookookoorarra	6.2	18.30	Concrete Box Culvert
62210	Mt Lindesay Rd	1937	Jenner's Creek	13.0	7.00	Concrete Beam
62209	Mt Lindesay Rd		Murson's Creek	14.4	10.40	Concrete Box Culvert
62211	Mt Lindesay Rd	1990	Wylie Creek	10.5	8.40	Concrete Box Culvert
62225	Mt Lindesay Rd	2003	Kelly's Bridge	9.2	10.80	Concrete Box Culvert
62212	Mt Lindesay Rd	1930	Wylie Creek	55.0	6.10	Concrete Beam
62213	Mt Lindesay Rd	1930	Maryland River	64.5	6.10	Steel Beam
62214	Mt Lindesay Rd	1931	Koreelah Creek	65.7	6.10	Concrete Beam, Concrete Arch
62215	Mt Lindesay Rd		Stockyard Creek	6.6	12.80	Concrete Box Culvert
62217	Mt Lindesay Rd		Unnamed	13.0	6.10	Concrete Box Culvert
62221	Mt Lindesay Rd	2010	Acacia Creek	19.5	9.36	PSC Planks
62222	Mt Lindesay Rd	2009	Oakey Creek	32.7	9.00	PSC Girder
62223	Mt Lindesay Rd	2009	Little Oakey Creek	32.0	9.00	PSC Girder
62224	Mt Lindesay Rd	2010	Hoffman's Creek	23.1	9.36	PSC Planks
62227	Mt Lindesay Rd		? Golden Mile ?			Concrete Box Culvert
62226	Mt Lindesay Rd		? Golden Mile ?			Concrete Box Culvert
9540	Bruxner Way		Browns Ck	16.6	10.30	PSC Plank
9541	Bruxner Way		Millers Ck	15.6	9.50	PSC Plank
2820	Bruxner Way		Saltwater Gully	11.73	9.14	CBC
2821	Bruxner Way		Whalans Ck	15.77	13.31	CBC
10117	Bruxner Way		Ten Mile Ck	10.038	9.84	CBC
8901	Bruxner Way		Swamp Ck	36	9.10	Conc Beam
2824	Bruxner Way	1968	Deadmans Ck	10	9.06	CBC
2825	Bruxner Way		Unnamed Ck	15.84	0.00	CBC
2826	Bruxner Way		Unnamed Ck	6.8	24.38	CBC

9542	Bruxner Way		Mole River	60	9.15	PSC Plank
2828	Bruxner Way		Unnamed Ck	22.4	16.94	CBC
2829	Bruxner Way		Unnamed Ck	14.52	12.19	CBC
2830	Bruxner Way		Unnamed Ck	12.95	17.32	CBC
2831	Bruxner Way		Unnamed Ck	8.69	10.00	CBC
	Bruxner Way					CBC
9543	Bruxner Way		Reedy Ck	62.4	9.95	PSC Plank
2833	Bruxner Way		Yellow Gully Ck	10.66	0.00	PSC Plank
2834	Bruxner Way		Unnamed Ck	22.96	14.60	CBC
2835	Bruxner Way		Unnamed Ck	6.88	21.34	CBC
7321	Bruxner Way		Dumaresq R Fd/w	30	10.20	PSC Plank
2837	Bruxner Way		Dumaresq R Fd/w	8.3	9.90	CBC
2838	Bruxner Way		Gulf Ck	43.18	10.02	CBC
2839	Bruxner Way		Sandy Ck	20.24	10.02	CBC
7325	Bruxner Way		Dumaresq R Fd/w	18	9.20	PSC Plank
2841	Bruxner Way		Black Ck	16.48	10.05	CBC
2842	Bruxner Way		Unnamed Ck	6.85	9.86	CBC
2843	Bruxner Way		Black Ck Billab	19.02	10.06	CBC

Rural

50771	Back Creek Rd	-	Tenterfield Creek	46.15	4.60	Timber beam
51001	Barlows Gate Rd	-	Acacia Creek	17.10	5.25	Timber beam
51542	Beaury Creek Rd	-	Beaury Creek	12.00	5.00	Timber beam
51543	Beaury Creek Rd	-	Boundary Creek	10.00	5.30	Timber beam
51544	Beaury Creek Rd	-	Five Mile Creek	15.90	5.60	Timber beam
51871	Billirimba Rd	-	Hawkins Gully	6.74	5.10	Timber beam
51873	Billirimba Rd	-	Swamp Oak Creek	11.80	4.80	Timber beam
51874	Billirimba Rd	-	Quigeram Creek	8.10	3.30	Timber beam
51875	Billirimba Rd	-	Billirimba Creek	9.50	3.70	Timber beam
52201	Black Swamp Rd	-	Cataract River	32.65	3.50	Timber beam
53191	Boorook Rd	-	Cataract River	43.40	4.80	Timber beam
53192	Boorook Rd	-	Boorook Creek	11.50	3.90	Timber beam
54511	Castlerag Rd	-	Deepwater River	10.45	3.60	Timber beam
55061	Cheviot Hills Rd	-	Fairfield Creek	10.20	3.60	Timber beam
56051	Cullen's Creek Rd	-	Koreelah Creek	9.50	3.30	Timber beam
59351	Gould Falls Rd	-	Acacia Creek	7.00	4.00	Timber beam
59461	Graham's Creek Rd	-	Graham's Creek	15.70	5.45	Timber beam
60451	Harrigan's Lane	-	Unnamed Creek	6.30	4.15	Timber beam
60452	Harrigan's Lane	-	Boonoo Boonoo River	13.60	3.90	Timber beam
61112	Hooten's Rd	1948	Clarence River	32.00	4.15	Western Span only
61111	Hooten's Rd	-	Emu Creek	42.40	3.50	Timber beam
61441	Johnstone's Rd	-	Pye's Creek	10.70	3.60	Timber beam
61662	Kelly's Rd	-	Swamp Oak Creek	6.1	4.7	Timber Beam
62211	Kia-Ora Rd	-	Five Mile Creek	8.30	3.55	Timber beam
62431	Leeches Gully Rd	-	Washpool Creek	8.36	6.00	Timber beam
62761	Lindsay Creek Rd	-	Lindsay Creek	18.80		Timber beam
69251	Lower Rocky River Rd	-	Unnamed Creek	6.30	2.70	Timber beam

64521	McLeod's Creek Rd	1974	McLeod's Creek	11.85	3.20	Timber beam
65072	Mole River Rd	-	Tableland's Creek	37.00	4.10	Timber beam
65451	Mount Clunie Rd	-	Unnamed Creek	9.40	3.74	Timber beam
65452	Mount Clunie Rd	-	Woodenbong Creek	10.60	3.70	Timber beam
65731	Mt Speribo Rd	-	Horse Swamp	7.50	4.56	Timber beam
65951	Needham's Creek Rd	1943	Tooloom Creek	31.80	3.10	Timber beam
67161	Paddy's Flat Rd	-	Unnamed Creek	10.10	6.23	Timber beam - widened
67201	Paddy's Flat Rd (nth)	-	School Gully	11.30	3.76	Timber beam
67202	Paddy's Flat Rd (nth)	-	Kangaroo Creek	19.00	4.20	Timber beam
67203	Paddy's Flat Rd (nth)	-	Unnamed Creek	11.20	4.87	Timber beam
67200	Paddy's Flat Rd (nth)	-	Tooloom Creek	42.00	4.95	Timber beam
67351	Patterson's Rd	-	Acacia Creek	11.40	3.60	Timber beam
67423	Plains Station Rd	-	Gap Creek	11.45	4.94	Timber beam
67424	Plains Station Rd	-	Booth Creek	22.00		Conc Box
67933	Pye's Creek Rd	-	Pye's Creek	9.30	3.55	Timber beam
67934	Pye's Creek Rd	-	Pye's Creek	12.00	4.00	Timber beam
68921	Rivertree Rd	-	Maryland River	14.30	3.60	Timber beam
69361	Rocky River Rd	-	Demon Creek	8.22	3.70	Timber beam
69362	Rocky River Rd	-	McLeod's Creek	43.70	4.90	Timber beam
69801	Sandy Flat Rd	-	Five Mile Creek	31.65	3.25	Timber beam
70461	Silent Grove Rd	-	Nukoorapeta Creek	10.10	4.07	Timber beam
71121	Springfield Rd	-	Mole River	22.05	3.55	Timber beam
71231	Springs Rd	-	Unnamed Creek	9.00		Timber beam
72111	Sunnyside Loop Rd	-	Blacksmith's Creek	11.20	6.40	Timber beam - widened
73581	Tooloom Rd	1934	Beaury Creek	31.10	5.26	Timber beam
73583	Tooloom Rd	1934	Wallaby Creek	28.00	5.30	Timber beam
73901	Torrington Rd	-	Deepwater River	18.90	4.88	Timber beam
73903	Torrington Rd	-	Kangaroo Creek	6.70	6.60	Timber beam
74591	Urbenville Rd	-	Unnamed Creek	10.10	4.10	Timber beam
75081	Wallaroo Range Rd	-	Bookookoorara Ck	8.65	3.95	Timber beam
75411	White Swamp Rd	-	Woodenbong Creek	17.40	4.40	Timber beam
75412	White Swamp Rd	-	Koreelah Creek	23.46	4.45	Timber beam
50331	Acacia Plateau Rd	-	Acacia Creek	20.00	5.40	Prestressed Concrete Girder
50991	Bald Rock Rd	-	Bluff River	32.18	5.14	Concrete beam
50992	Bald Rock Rd	2003	Fords	10.70	4.90	Concrete Box culvert
51541	Beaury Creek Rd	-	Beaury Creek	11.00	5.00	Doolan Deck
51545	Beaury Creek Rd	-	Beaury Creek			
51546	Beaury Creek Rd	-	Beaury Creek	10.60	4.13	Concrete
51872	Billirimba Rd	-	Barney Downs Creek	13.80	4.28	Prestressed Concrete Girder
53521	Brassington Creek Rd	-	Bluff River	10.77	4.80	Concrete Beam
55941	Cullendore Rd	-	Maryland River	63.00	4.50	Concrete Box Girder
61221	Hynes Bridge Rd	1997	Dumaresq River	64.20	4.80	Concrete
61661	Kelly's Rd	-	Barney Downs Creek	0.00		Box Culvert
64961	Mingoola Station Rd	-	Dumaresq River	48.10	7.30	Concrete Box Girder

65071	Mole River Rd	-	Mole River	48.00	5.00	Doolan Deck - Concrete
67162	Paddy's Flat Rd	-	Emu Creek	24.00	5.00	Doolan deck - Concrete
67421	Plains Station Rd	1932	Timbarra River	84.00	5.20	Prestressed Concrete Girder
67424	Plains Station Rd	2010	Booth Ck	10.79	7.37	Box Culvert
67931	Pye's Creek Rd	-		9.60	10.80	Concrete Box culvert
67932	Pye's Creek Rd	-	Deepwater River	20.68	4.25	Concrete Box Girder
67935	Pye's Creek Rd	-	Mole River	64.50	4.30	Concrete Box Girder
70241	Scrub Rd	-	Hawkins Creek	7.00	8.50	Concrete Culvert
70242	Scrub Rd	-	Tenterfield Creek	25.70	10.80	Concrete Culvert
70243	Scrub Rd	-	Unnamed Creek	14.90	7.90	Concrete culvert (armco)
73431	Timbarra Rd	-	Swamp Oak Creek	20.00	4.83	PC Concrete beam
73584	Tooloom Rd	-	Unnamed Creek	0.00		Concrete Culvert @ Tooloom Falls Rd
73582	Tooloom Rd	2002	Needham's Creek	12.25	6.80	Doolan Deck
73902	Torrington Rd	-	Nukoorapeta Creek	12.00	8.00	Doolan deck - Concrete
73904	Torrington Rd			7.80	9.00	Concrete box culvert
75413	White Swamp Rd	2002	Koreelah Creek	21.60	4.90	Doolan Deck
76071	Wylie Creek Rd	-	Maryland River	31.00	3.70	Prestressed Concrete Girder

Urban

90214	Molesworth St	pre 1948	Tenterfield Creek	46.7	9.8	Timber beam & footway
90261	Tooloom St, Legume	-	Acacia Creek	9.9	4.1	Timber Beam - Widened
90211	Douglas St	-	Tenterfield Creek	37.0	8.8	Concrete box girder
90212	High St	-	Tenterfield Creek	46.0	6.8	Concrete box girder
90213	Manners St	Since 1977	Tenterfield Creek	24.1	9.6	Concrete box girder
90215	Naas St	-	Tenterfield Creek	15.0	10.6	Concrete box girder

Appendix F: Risk Evaluation

Risk assessment matrices

Risk Rating Formula

Likelihood of occurrence (Matrix A) x Hazard Type (Matrix B) = Road Risk Rating

Matrix A - Likelihood score

Category	Description
1	Very unlikely
2	Unlikely
3	Possible
4	Likely
5	Highly likely

Matrix B – Type of problem score

DESCRIPTION OF HAZARD	Hazard Type				
	5	4	3	2	1
Obstructions and Substances on Road					
Small sized object with a max dimension of < 100mm					1
Medium sized object with a max dimension of between 100 and 200mm			3		
Large sized object with a maximum dimension of greater than 200mm	5				
Flexible and Rigid Pavements - Sealed					
Spilled Materials on Sealed Road					
Spills of granular materials < 6m2					1
Spills of granular materials > 6m$_2$ or spills of oil, wet clay or other slippery substances < 6m$_2$			3		
Spills of oil, wet clay or other slippery substances > 6m$_2$	5				
Potholes					
Potholes diameter 200mm to 300mm and/or depth of 50mm to 75mm					1
Potholes of diameter greater than 300mm and/or depth greater than 75mm			3		
Shoving and/or Rutting					
Deformations 50 to 100 mm deep and greater than 4m long					1
Deformations greater than 100mm deep and greater than 4m long and/or ponding water hazardous to traffic			3		
Edge Drop and Rigid Pavement Joints					
Urban area - drop 50 to 75 mm and greater than 5m long					1
Drop 75 to 150 mm and greater than 5m long			3		
Drop greater than 150 mm	5				
Unsealed Roads					

DESCRIPTION OF HAZARD	Hazard Type				
	5	4	3	2	1
Rutting and Scouring					
Up to 50 mm deep and > 150mm wide and < 10m long					1
Up to 50 mm deep and > 150mm wide and > 10m long				2	
50 to 100mm deep and < 150mm wide and < 10m long				2	
50 to 100mm deep and < 150mm wide and > 10m long			3		
50 to 100mm deep and 150 to 300mm wide and < 10m long			3		
50 to 100mm deep and 150 to 300mm wide and > 10m long		4			
>100 mm deep and/or > 300 mm wide	5				
Potholes					
> 150mm diameter and up to 50mm deep and < 10m long					1
> 150mm diameter and up to 50mm deep and > 10m long				2	
150 to 300mm diameter and 50mm to 100mm deep and < 10m long			3	2	
150 to 300mm diameter and 50mm to 100mm deep and >10m long			3		
> 300mm diameter and 50mm to 100mm deep and < 10m long			3		
> 300mm diameter and 50mm to 100mm deep and > 10m long		4			
> 300mm diameter and > 100mm deep	5				
Corrugations					
15 to 25mm deep and < 10m long					1
15 to 25mm deep and > 10m long				2	
> 25mm deep and < 10m long				2	
> 25mm deep and > 10m long			3		
Signage					
Regulatory and Warning Signs					
In poor condition				2	
Missing or illegible	5				
All Other Signs					
In poor condition					1
Missing or illegible				2	
Roadside Furniture					
Guide Posts and Reflectors					
In poor condition					1
Missing two or more consecutive posts and/or reflectors			3		
Missing guideposts and/or reflector in a critical location	5				
Guardrail and Safety Fencing					
In poor condition					1
In a dangerous condition				2	
Road Markings					
Longitudinal Line Marking, Transverse Markings, Pavement Symbols and Pavement Markers Missing or illegible in a critical location				2	

Appendix G: Forms

Tenterfield Shire Council Road Inspection Report

Road Inspected: _____

Location (e.g. segment / landmark/ chainage)	**Defect**	**Interim Safety?**	**Proposed Repair**	**Risk Scores**			**Comment**	**DB ID**
				Likelihood	Defect Type	Total		

Item	**Checked?**	**General Comments**	**Item**	**Checked?**	**General Comments**
Gates and Bypasses			**Drainage**		
Vehicle Access Safety / Impact			**Bridges**		
Verges			**Signage**		

Date: _____ Inspected By: _____ Signature: _____