

# Lismore City Council



# Cycleway Plan 2011- 2014



This report was reviewed in 2011 by:

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## 1. EXECUTIVE SUMMARY

In 2007 Local Government Engineering Services Pty Ltd was engaged to prepare a bicycle strategy for the City of Lismore, including a study of existing cycling facilities and a prioritised plan for the development of cycleways to meet the needs of both commuting and recreational cyclists throughout the city.

The study involved extensive consultation with Councillors and staff at Lismore City Council, schools and school children, Police and other Government Departments, community interest groups, cycling organisations and the general public.

The report also included recommendations for an education and promotional strategy, a section on the use of shared footpaths by the aged and disabled members of the community, and suggestions for sources of external funding for the work.

Outputs from the study included a map of Lismore showing the proposed network of new off-road and on-road cycleways, and a prioritised program of works to form the final *Cycleway Strategy Plan 2007*.

As at 2007 Lismore City had approximately 17.9 km of existing cycleways and a further 13.1 km of existing footpaths which could be widened to meet the standards for a cycleway / shared pathway. To expand the cycling network, the total program of proposed cycleways and cycling infrastructure included:-

|                              |         |
|------------------------------|---------|
| Proposed off-road cycleways  | 14.6 km |
| Proposed on-road cycleways   | 5.4 km  |
| Existing paths to be widened | 13.1 km |
| Total length =               | 33.1 km |

Plus 35 road crossings and the provision of 14 bike racks and 2 secure bike parking stations.

The 2007 report included a prioritised program of works with 84 separate sections of cycleway combined into 19 practical work packages at a total estimated cost of \$4.4 million.

The *Cycleway Strategy Plan* has been reviewed in 2011 by Lismore City Council. The review aims to provide an updated listing of the current and proposed cycleways within the city area as well as an assessment of the method used to create the prioritised works program.

Since the development of the 2007 *Cycleways Strategy Plan*, the following works have been undertaken:

|  |          |
|--|----------|
| Constructed off-road cycleway            | 4.3 km   |
| Constructed on-road cycleway             | 0.7      |
| Existing paths widened to meet standards | 4.9 km   |
| Total length constructed since 2007      | = 9.9 km |

Through consultation with works and engineering staff it was determined that the geographical "work packages" used in the 2007 cycleway strategy plan were impractical due to the way in which the works are funded and therefore having a single prioritised works listing would be the most suitable method for determining the construction of future cycleways. The 2011 review and subsequent

development of a new prioritised program of works outlines 72 separate sections of cycleway at a total length of 37.4 km which will cost an estimated \$6.4 million to construct.

Under the review, the *Cycleway Strategy Plan* has been re-named the Cycleway Plan and as such will be referred to in this way for the remainder of this document.

## 2. INTRODUCTION

Within any community there is a need for an accessible, equitable, safe and efficient transport system. Whilst cycling may only make up a very small part of the overall system it is nonetheless very important. It not only provides an alternate method of transport, but also an effective means for exercise, recreation and competitive cycling.

An effective Cycleway Plan will help and encourage many non-cyclists and even existing cyclists to engage in more cycling. This in turn will help promote greater health within and throughout the community, and can present a safer more economical and environmentally friendly way to travel.

An effective Cycleway Plan needs to consider all of the different aspects of cycling, from localised cycling to schools and shopping centres to recreational and competitive cycling.

Lismore is a regional centre for the far north coast of NSW known as the '*Rainbow Region*'; this label reflects the region's diversity and penchant for natural living and the environment. As a result Lismore has developed as an area with a high level of environmental awareness, and hence cycling will play an important part in keeping with the tradition of the area.

Topographically, Lismore is a very diverse area. Lismore's western half (CBD, North Lismore, East Lismore and South Lismore), set around the Wilsons River is a low lying flood prone area. Whilst the eastern half (Lismore Heights and Goonellabah), rises dramatically over quite a short distance away from the flood prone western half.

Other noticeable features of Lismore are the rivers and railway lines in the lower flood prone areas and the resulting squeeze points created by rail and river crossings. The outer areas of Lismore have very generous road corridors, whilst some of the road corridors closer to the centre of the city have limited width to accommodate traffic and pedestrians as well as cyclists. The city also has many parks/fields and open spaces for possible use by cyclists.

## 2.1 Scope of Works

This Cycleway Plan aims to fulfil the following objectives:

- Provide an effective and adequate cycle network for the cycling community within the urban areas of Lismore.
- Provide safer and more efficient routes to cycle attractors in the Lismore area.
- Improve cycling conditions so they are suited to all types of cyclists, (ie both commuters and recreational cyclists).
- Encourage the use of bicycles in order to improve community health in general.
- Identify the need for cycling facilities, such as bike racks and other parking facilities.
- Use alternate routes (where possible) to the Bruxner Highway, the CBD and other noted problem areas.
- Follow the guidelines and standards set down by the Roads and Traffic Authority (RTA) for cycleways.
- Attract the maximum amount of funding possible from external sources.
- Develop an effective cost benefit strategy for the construction of cycleways by Council.

## 2.2 Study Methodology

### Previous Cycleway Plan

The previous Cycleway Plan was completed in 2007 for Lismore City Council by Local Government Engineering Services Pty Ltd. It was a comprehensive study which involved extensive community consultation. In general this document will remain consistent with the 2007 document, providing updated information only where necessary.

This review will concentrate on the system used to prioritise the construction of each section of cycleway to ensure that any new sections that require inclusion in the plan are prioritised in a consistent manner.

This plan aims to produce a final network which is effective and relevant to meet both the current and future needs of the cycling community.

### Engineering Planning Approach



When planning a project of this type it is necessary to identify all of the engineering components, both new and existing, that will play a role in the Cycleway Plan. These components are as follows:

**Existing cycleway infrastructure:** Where feasible, existing paths and cycleways should be utilised and/or upgraded to avoid unnecessary expense and ensure the method is cost effective.

**Cycleway design, position and maintenance:** When constructing a cycleway the parent road and surrounding area must be considered. It is important to apply the most suitable cycleway to an area in question. Existing cycleways may require upgrading work to bring them up to standards or they may require removal depending on their relevance and importance.



An existing off-road shared footpath along Walker Street in East Lismore

**Cycleway types:** There are three main types of cycleway we can apply to this study. These being:

- on-road
- off-road, and
- shared path

This plan will recommend the appropriate cycleway type depending on location, characteristics of the surrounding area and safety.

**Commuter and Recreational Cyclists:** There are two main classes of cyclist in any community. They are commuters and recreational cyclists.

Commuting cyclists are those cycling to a specific destination, such as school or work. Commuters prefer direct routes and fast travel times.

Recreational cyclists ride for fun or exercise. They value interesting routes and outlooks, preferably off-road, and they like the convenience of looped paths.



**Cycle Attractors:** The identification of cycle attractors (i.e. destinations which attract cyclists) in the Lismore area is a key component of this study. These attractors form the basis of the Cycleway Plan, as these are the desired destinations for both commuters and recreational cyclists. We also need to consider the warrant for safe bike storage areas at these locations.

**Main roads:** Although they provide direct access to many of Lismore's cycle attractors they usually have high volumes of traffic and can be dangerous for all cyclists. On-road cycleways are best avoided, where possible, on these roads. An appropriate treatment is off-road cycleways or the use of an alternate route.

**Traffic management devices:** Traffic management devices include such things as traffic lights, roundabouts, pedestrian crossings, pedestrian activated lights, and warning and regulatory signs. Warning signs include appropriate signage along cycleways.

**Physical, Social & Environmental Constraints:** Physical constraints include the river, the railway line, and the topography of Lismore.

Social constraints may include the demographics of the Lismore population, the cycling habits and desires of the community and their interaction with other road users including the aged and disabled. In this study, community consultation and questionnaires were used to gauge social constraints.



Pedestrian activated lights at the intersection of Diadem Street and Ballina Road

Environmental issues influencing the planning of cycleways include the identification of sensitive environmental areas.

**Commuter & Recreational Networks:** This study aims to connect the key cycling attractors in Lismore, which will automatically benefit commuting cyclists. Some cycleways are proposed specifically for recreational use. But where possible, cycleway locations are provided for both commuters and recreational cyclists in order to provide better value. For example, it is proposed to provide loops in the network where possible, especially in residential areas.

**Education Strategy:** It has become clear during the course of this study that there is a need for an education strategy to remind cyclists and other road users about road rules and the rights of cyclists on the road.

### 2.3 Consultations

The development of the 2007 Cycleway Plan involved consultation with the public and relevant authorities. Contact was made with the cycling community, bike shops, all public and private schools in the area, the police traffic officer and relevant council representatives. These groups were contacted and informed of the development of this plan.

The consultation process included:

- Two concept presentation meetings (one public & one for the city councillors),
- Contact made and several meetings with the principals or deputy principals of Lismore's schools,
- Survey (by questionnaire) of the school aged cyclists in Lismore,
- Contacting and survey (by questionnaire) of the Northern Rivers Peddlers Cycle Group,
- Correspondence with meeting attendees after presentation of the concept plan,
- Additional surveys delivered to the general public by the Lismore Climate Action Group,
- Several meetings with Council staff,
- Review of the preliminary report by Council staff, and
- Two meetings (one public and one for the city councillors) to present the final report.

### Issues & problems

The consultation process was essential in identifying the key issues relating to cycling in Lismore which are of concern to the community. Some of these issues and problem areas are described below:

- The need to consider carefully the existing cycle infrastructure throughout Lismore, and to connect and utilise the most relevant existing cycleways.
- The need for a suitable and safe link between the lower CBD area and the higher residential area of Lismore Heights and beyond. Most cyclists responded that their preferred route is Rotary Drive, followed by Ballina Rd and then High Street.

**It is important to note that since the initial Cycleway Plan was developed, the Rotary Drive route has been constructed, as has much of the route along High Street and Ballina Road.**

- Many cyclists (especially commuters) favour the use of on-road cycle lanes, even though it is recognised that off-road cycleways are safer.

- The community would like to see more cycleways and in general most people understand the need for compromises between on-road and off-road cycleways due to available space and Council's budget.
- Footpaths and cycleways may need to cater for a variety of users also including skateboards and scooters.
- Bike parking facilities are needed at key destinations particularly the CBD where the use of bikes is discouraged. Some locations for bike parking were suggested including the Post Office, the Library and Lismore Square.

**Since the 2007 Cycleway Plan was developed bike lockers have been installed in the Browns Creek Carpark at the rear of Woodlark Street to service the CBD area.**



Footpaths and cycleways need to cater for a variety of users



Bike parking facilities are needed in the CBD

- An educational program is required for both cyclists and drivers to increase awareness levels. For cyclists it is increasing their knowledge of road rules and for drivers it is increasing their awareness of the rights of cyclists on our roads.
- Dangerous intersections for cyclists were reported as being: all roundabouts, Ballina Rd, Dawson Street, and the major intersections of the CBD. However, it is noted that riding of bicycles is prohibited in the CBD.

One problem area brought up several times was access to Richmond River High School across Simes Bridge and the crossing of Molesworth Street near this bridge which is a safety issue of concern to the school.

A shared pathway was constructed along Orion Street from Molesworth Street to Dawson Street during the 2008/09 financial year. There is no crossing aid in the form of a refuge or pedestrian crossing at the intersection of Molesworth and Orion Streets and this issue has been addressed through Lismore City Council's Pedestrian Access and Mobility Plan 2011 – 2014, however the width of the road is a major constraint at this location. It has been proposed that pedestrian fencing be installed at this corner to ensure both pedestrians and cyclists cross the road at the safest location.

### **Suggestions**

Some specific suggestions made during the consultation process included:-

- Buses being able to carry bikes which may encourage further cycling within the community.
- Centre lines on bike paths, to help with sight distance.
- Future developments and subdivisions should be designed with consideration to the Cycleway Plan.

### **Public Meeting & Concept Plan Presentation**

A Public Meeting to present the concept plan was held at the Lismore Council Chambers on 28 March 2007. The concept plan was presented to Council and members of the public as a series of power point slides.

Generally the concept plan was well received. Public and Council input has helped fill in areas of uncertainty in our plan, as well as providing better alternatives to some proposed routes.

The concept plan acted as a preliminary progress report to Council and the community. Feedback and criticism of the concept plan was taken on board in preparation of the final Cycleway Plan.

*Letters and feedback from correspondence after the first public meeting are attached in Appendix I.*

### **Acknowledgements**

*Local Government Engineering Services would like to thank the following groups for their help and input: members of Northern Rivers Peddlers, Southern Cross University, Lismore's schools and authorities, NSW Police - Richmond Local Area Command, the Lismore community, Councillors and staff from Lismore City Council.*

## 3. CHARACTERISTICS OF LISMORE

### 3.1 Physical Conditions

#### Climate, topography and land use

Lismore has a population of approximately 46,000 people. Whilst the majority of the city is residential, the CBD area contains 3 major shopping centres and there are many open areas, parks and river side paths that could be effectively developed into successful cycleways.

Lismore has many defining features, both built and natural, which separate the urban areas. The Wilsons River separates North and South Lismore from the CBD area, whilst the rail line separates North and South Lismore. The hills towards the east of the city define Lismore Heights and East Lismore.

Lismore is essentially separated into two geographically different areas. The geographically lower area of Lismore, centred around Wilsons River and Leycester Creek, encompasses Lismore's CBD area and a large portion of residential area. These areas are very prone to flooding. However, with the recent implementation of the new flood levee designed to protect this part of Lismore from 1 in 100 year floods, this area is now less susceptible to flooding. The geographically higher area of Lismore, Lismore Heights and Goonellabah, are not prone to flooding at all.

Current areas and destinations used by cyclists include schools, shops, parks, workplaces and recreational areas. A successful Cycleway Plan requires the linking of these destinations with safe cycleway routes.

#### Road Hierarchy

Road Hierarchy is a system used to rank roads by importance, according to their traffic volumes, size and position in the area.

The current road hierarchy plan for Lismore divides the roads into five main categories, these are: main arterial roads, distributor (sub-arterial) roads, collector roads, local roads and access roads.

*A map demonstrating the Road Hierarchy for the Lismore Urban Area is shown in Appendix F.*

Lismore's position around the Bruxner Highway / Ballina Road does not lend itself well to less experienced cyclists. Arterial roads often represent the shortest and quickest paths to retail, commercial centres and other cycle attractors. Arterial roads are really only suited to the more experienced cyclists, due to their higher volumes of traffic. This presents a problem for cyclists wishing to commute to these destinations, as they are difficult to avoid unless the cyclists wishes to take another slower route to the same destination.

This Cycleway Plan will take into account the aforementioned factors regarding road hierarchy.

#### Existing Cycleways

At the time of the Cycleway Plan review 2011, Lismore had a total of 26.8 km of cycleways constructed to acceptable standards, and a further 16km of footpaths which could be widened and signposted to bring them up to acceptable standards as cycleways.

*Maps of the existing and proposed cycleway network is demonstrated in Appendix C.*

## 3.2 Profile of Cycling in Lismore

### Current Cycle Attractors

There are currently several major attractors of cyclists in Lismore. These include sporting parks, shops, schools and workplaces.

### Sporting Grounds

Most of the sporting grounds in Lismore are concentrated in and around the CBD area. Lismore Park has fourteen sporting venues. The majority of Lismore's sporting venues are all within relative short cycling distance of each other. This concentration of sporting venues represents a major cycle attractor for Lismore's sporting community. There are also four sporting venues within Goonellabah which will require linking to the cycleway network.

### Schools

Children make up a large proportion of cyclists in Lismore, and their lack of knowledge of road rules and general inexperience make them vulnerable as cyclists. For this reason all the local schools were subject to a cycling questionnaire, to extract information about school aged cyclists. Schools represent a major cycling attractor for Lismore's youth and it is important that the cycleway network developed for them is dedicated to safety and directness.

### Shops and Workplaces

The Lismore CBD is an area in which cyclists are not encouraged to venture. However, shops and workplaces represent potentially significant cycle attractors. Lismore's CBD has limited parking facilities for cyclists.

Lismore's working community is not limited to the CBD and cycling is an effective alternate means of transport for commuters who work outside the CBD area. Other places of work therefore need to be considered, such as the Lismore Base Hospital, Southern Cross University, St Vincent's Hospital and Lismore's industrial areas and other such places of work.

One issue revealed by the consultation process was that there are a number of cyclists from outlying areas who cycle into town for work or other purposes.

### Other Cycling Attractors

Other cycling attractors include the Goonellabah Skate Park, the Goonellabah Sports and Aquatic Centre, the Lismore Showground, and caravan parks.

### Extent of Cycling

In the community of Lismore, and indeed the entire 'Rainbow Region' area, the overall extent of cycling is relatively large when compared to other areas of the state. Neighbouring towns, such as Ballina have managed to implement very effective cycleway networks, however these areas have a flatter topography than Lismore, and are therefore more suited to cycling.

Lismore needs an effective Cycleway Plan if it is to keep up with the region's environmentally friendly image and the changing global trends toward cleaner transportation methods.

### Constraints

There are certain areas in Lismore which take the form of constraints for cyclists. Such areas were given careful consideration when creating the Lismore Cycleway Plan.



### **Railway Lines**

North and South Lismore are roughly separated by a rail line that is no longer in use. This presents a constraint for cyclists in this area of Lismore. Currently there are a number of rail crossings consisting of road crossings and underpasses. These crossings create squeeze points for cyclists wishing to cross the rail line as they are on heavily trafficked roads.

### **Rivers**

The rivers in lower Lismore place similar constraints on cyclists in the area. Bridges and crossings create squeeze points for cyclists attempting to cross the river at these locations. Whilst many crossings provide for vehicles and pedestrians they do not always cater for cyclists.

In particular, Simes Bridge which leads to Richmond River High School, was the subject of numerous comments during the consultation process undertaken in 2007.

### **CBD Area Cycling**

Cycling in the CBD is currently discouraged by Lismore City Council, with markings along all footpaths in the CBD area depicting that cycling (and rollerblading or skate boarding) is not allowed on CBD footpaths. Many of the roads within the CBD have angle parking on the edge and 90° parking within a centre island. Cyclists find it difficult to effectively use the roads, and are not encouraged to use the footpaths either. This creates a problem in that; this area is a major attractor to cyclists in Lismore, and yet it does not cater for them adequately.

As part of the review process, a CBD Strategy has been developed whereby on-road routes have been identified which will link into the CBD to appropriate bike parking facilities. It is unsafe for the pathways in the CBD to be shared due to the large volume of pedestrians and it has therefore been determined that the best outcome is for cyclists to travel via on-road cycle lanes to appropriate points where bike parking facilities would be provided, and from there they could travel on foot around the CBD. These routes have been included in the prioritised works program for construction / installation and are demonstrated in Appendix C.

## **4. CONSULTATION**

### **4.1 Consultation with Council and staff**

As part of the development of the initial Cycleway Plan, several meetings were held with staff to obtain essential information, confirm objectives of the study, and to ensure that the study was following the brief.

A meeting was held with Councillors to present the preliminary findings of the study.

A copy of the draft report was provided to staff for review, and some very useful feedback was gained as a result of this.

Some of the feedback provided included important information that the Consultants were not aware of such as:-

- Plans for development of the riverbank with cycle paths
- Extension of an existing cycle path to Regatta Estate

Other feedback included:-

- Correction of errors in the draft report



- Provision of realistic cost rates for footpath and cycleway construction
- A request for the inclusion of a strategy for the ranking of priorities
- Comments about access for disabled and other users
- Suggestions for Wade Park
- Comments about environmental issues at Rotary Park, and
- Comments about grammar and spelling errors in the draft report.

A meeting was held with staff to review the feedback comments before the final report was produced.

## 4.2 Public Consultation

A copy of a questionnaire designed for Lismore's general public was made available to the 'Lismore Climate Action Group' who voluntarily agreed to distribute this questionnaire around to the general public. These questionnaires were distributed and given a deadline to be returned to Council by 28 April, 2007. As of this date, none of the distributed questionnaires were returned.

## 4.3 Consultation with Schools

The consultation phase of the Cycleway Plan involved contacting all schools in the Lismore area.

School Principals were included in the questionnaire process, and asked to oversee the issuing of questionnaires to their students.

School aged cyclists make up a significant part of Lismore's cycling community. Due to their age they have less experience with road usage and road rules, and they are often less aware of the importance of safety on roads. For example, teenagers often attempt to take the shortest route possible, preferring to cross when they meet a road edge instead of making their way further along the road to a pedestrian crossing.

Of the 251 school students surveyed 103 were high school students.

## 4.4 Questionnaires

A questionnaire was issued to all schools in the Lismore area, the Northern Rivers Peddlers Cycling Group, and the general public. The key results that emerged are as follows.

*Raw data for this survey can be found in Appendix G and Appendix H.*

### **Bicycle Theft**

About 18% of students surveyed said that their bike had been stolen in the last 3 years. The majority of the victims of bicycle theft were high school students. Just over half (52%) of the bikes were stolen from the owner's home or from a house they were visiting. Only 17% were taken from shops and only 10% were taken from the CBD area. This is a significant departure from the last study, where 62% of bikes were stolen from shopping areas.

Students ranked the Lismore Square (47%) as the site that most needed secure bike parking, followed by Lismore's CBD (27%), parks and sporting fields (23%), schools (20%) and finally local shops (19%). These trends match those found by the previous study.

Since the previous study in 1995, bicycle theft has risen by a little over 6%. However, there has been a shift in the locations where bikes are being stolen. The previous study reported 62% of bikes were taken from shopping areas; however the more recent survey conducted for this study revealed that 52% were reported stolen from the owner's home or the home of a friend. The most recent study showed that only 25% were stolen from shopping areas.

### **Bicycle Accidents**

153 of the 251 students (63.5%) surveyed had been involved in an accident in the last three years. Of the total number of cyclists involved in accidents around 33% said that their accident prevented them from riding further for a short time and 16% said that the accident was serious enough to stop further cycling and resulted in hospitalisation. The other accidents were not serious enough to prevent further cycling immediately.

Of the 50% of the accidents serious enough to prevent further cycling, it was found that 59% of these accidents occurred on roads; 15% occurred on footpaths/bike paths or parks and 25% occurred at home or were not specified.

Another trend which emerged from the survey was that the majority of reported accidents occurred in the CBD area, and these accidents mainly occurred at intersections.

As expected, the majority of serious accidents happen on roads, with only a small percent occurring on designated paths.

### **Safety Equipment**

One alarming statistic to emerge from the survey was that only 40% of students 'always' wear their helmet when cycling and about 16% never wear helmets. This non-compliance with the helmet law urgently needs to be addressed to help prevent future fatalities and serious injuries.

72% of cyclists had reflectors on their bike. But only half of the students had bells installed on their bikes. It is noted that most new bikes come standard with a bell and reflectors. So it can be assumed that many students remove the bells from their bikes.

### **Intention to cycle more / take up cycling**

91% of students surveyed said that they would cycle more if current safety conditions were improved.

39% of students said they would cycle more to school, 60% said they would cycle more to shops or facilities, and 76% said they would engage in more recreational cycling. This is a 10% increase in the number of students prepared to cycle more, since the previous study.

Students were asked to identify the main reasons currently preventing them from cycling. These were identified as follows:

- Traffic volume simply too high
- Unsafe Crossings
- Road surface quality not good enough
- No safe bicycle storage
- Too many large vehicles/trucks
- Roads too narrow

Students were then asked to identify any streets/intersections that are particularly dangerous or unsuitable for cycling due to the reasons above. The most frequently identified as dangerous are as follows:

- all roundabouts
- Ballina Road
- Cynthia Wilson Drive
- Wyrallah Road
- Dalley Street
- Dawson Street
- Magellan/Diadem Street
- Molesworth Street

Finally, students were asked to identify improvements that they thought were most important. These were identified as follows:

- Marked bike lanes on roads
- Off road bike paths through open spaces/parks
- Secure bike parking especially in the CBD area
- Sealed road edges for cyclists
- Educating motorists and cyclists about their rights on the road

The survey results provide a clear indication of support for an expanded network of safe cycleways throughout the City of Lismore.

## 5. ENGINEERING STRATEGY

### 5.1 Plan Development

#### Concept Plan

A concept plan was created to show the most effective (shortest) cycle network possible to link Lismore's current cycleway infrastructure with identified cycling attractors. For the purposes of the preliminary concept plan, all proposed cycleways were assumed to be off-road dedicated cycleways.

The concept plan was presented to the Councillors and the public in two separate meetings, one a closed meeting to Councillors and Policy Advisory Group (PAG) members and the other an open public meeting. The feedback received from the presentation of the concept plan played a major role in the decisions and recommendations of this report and resulting Cycleway Plan.

*Letters, feedback and responses relating to the concept plan presentation can be found in Appendices I and J.*

#### Preliminary Cycleway Plan and Draft Report – 2007 Plan

A draft report with preliminary cycleway plans was produced and provided to Council staff for review and comment.

Feedback from the review by staff and a subsequent meeting with key staff members was used in the formulation of the final report and Cycleway Plan.

### Final Cycleway Plan - 2007

The final cycleway plan and final report were presented to a public meeting on Monday 19 November 2007 and to a meeting of City Councillors on Tuesday 20 November 2007.

### Cycleway Plan Review - 2011

The 2011 review of the Cycleway Plan coincided with the development of Lismore City Councils *Sport and Recreation Plan* and the review of the *Pedestrian Access and Mobility Plan*, both of which have links with the Cycleway Plan. Consultation with relevant Council staff has taken place throughout the review process to ensure continuity between the three documents. Further consultation has included:

- Meetings with Council Management and Engineering staff to ensure the requirements of the review are met
- Presentations to the Infrastructure and Assets, Sport and Recreation and the Sustainable Environment Policy Advisory Groups
- Presentations to Lismore City Councillors

Following amendments the reviewed Draft Cycleway Plan was presented to Council prior to being put on Public Exhibition for 28 days which provided the community an opportunity to comment on the revised Plan prior to the Final document being produced and presented to Council for adoption in September 2011.

## 5.2 Considerations

### Existing Cycling Environment

Lismore's existing cycleway network is a mix of single stretches of shared cycleway and substandard cycleway lanes along road shoulders. Many of the single stretches of cycleway begin and finish wholly within a small area. Many of the cycleway lanes along main roads also begin and finish over a relatively small distance. This results in an incomplete arrangement of cycleways with no apparent connection between them.

### Relevant Acts and Australian Standards

Reference has been made to the following standards and guidelines for cycleway design:-

- AS 1428 Design for access and mobility
- AS 1742 Traffic Control Devices Part 9 Bicycles
- AS 2890.3 Bicycle Parking Facilities
- AUSTRROADS Guide to Road Design Part 3 Geometric Design 2009
- AUSTRROADS Guide to Road Design Part 6A. Pedestrian and Cyclist Paths
- AUSTRROADS Guide to Road Design Part 4. Intersections and Crossings
- AUSTRROADS Guide to Road Design Part 4B. Roundabouts

### Crime Prevention Through Environmental Design (CPTED)

Crime Prevention through Environmental Design (CPTED) is a crime prevention strategy based around the design, structure and planning of cities and neighbourhoods. The strategy calls for designs that naturally encourage surveillance from the public, reduce opportunities for crime and increase the general feeling of safety for members of the public who use the area.

### **Theory behind CPTED**

Before most criminals commit an offence, they usually think rationally about whether or not a crime will be worth the effort - essentially a cost/benefit analysis of the possible offence. The goal of CPTED is to create the reality and/or perception that the cost of being caught outweighs the benefits of getting away with the offence. This can be achieved by: heightening perceptions of risk (detection, challenge and apprehension); increasing the effort required to carry out an offence (time, energy and required resources); reducing actual and perceived crime rewards (minimising, removing or concealing benefits) and eliminating or reducing the conditions offenders use to rationalise or excuse criminal behaviour.

### **Elements of CPTED**

CPTED is focused on several key areas which include natural surveillance, technical surveillance and lighting, landscape design, territorial definition, access control, environmental maintenance, activity planning and space management. The areas relating to cycleway design are discussed in greater detail below.

**Territorial Definition:** Good design can help encourage a person's territorial urges, that is, to defend their territory from outsiders. A well designed space, such as a cycleway, could be made to feel as if it belonged to the lawful public. This in turn results in the territorial defence, through the public, of the cycleway or space in question. Territorial definition will provide a watchful public eye over the cycleway.

**Natural Surveillance:** as the name suggests, natural surveillance occurs naturally as a result of the design of an object and the territorial defence felt by those around it. As residents and workers go about their daily activities they constantly but casually observe and monitor public and semi-public spaces. Natural surveillance is a direct result of the territorial definition and the feeling that their space needs to be watched. This translates to a cycleway, of which no part is completely hidden from the public. If the territory of the cycleway is properly defined, then the public will engage in natural surveillance. With the introduction of the natural surveillance there is an increase in safety for those using the cycleway as offenders will become aware that they are under the surveillance of the public.

**Lighting and Technical Surveillance:** A well lit area, even if in reality no members of the public are present, can create the perception of increased risk for a potential offender. The same is true with technical surveillance in the form of security cameras. Offenders feel they are being watched constantly and they perceive an increase in the risk of being apprehended. The combination of natural surveillance and lighting will also enhance the feeling of safety for those using the cycleway while increasing the risk of potential offenders being seen and/or apprehended.

**Space Management:** A constructed space or area needs to be carefully designed to ensure it appeals to the public through its 'soft' management practices and its 'soft' architecture and design. 'Soft' architecture responds to people and the design welcomes and reflects the presence of human beings. Whilst 'soft' management practices assume that most users can learn to accept and even seek out responsibility and exercise high degrees of creativity and imagination when participating in the environment. Through physical design and site layout, a space needs to be developed which can be easily managed by the general public, whilst maintaining the attractive aesthetics of the site. This in turn means that the safety of users on the cycleway is easier to manage.

**Environmental Management and Landscape Design:** to ensure that the public can be watchful at all times the area surrounding the cycleways should be maintained and managed. Some possible complications with surveillance include landscaping, trees and shrubs. It is possible to remove or alter mounds or hills which may hide an area from view prior to the construction of a cycleway. This more or less solves the problem they pose for natural surveillance by the public. However, the main

environmental management concern comes from trees and shrubs growing alongside the cycleway. The maintenance of these trees and shrubs is important. If left to grow freely they can block the line of sight to the cycleway and break natural surveillance of a section or area, or pose a hazard to cyclists if branches or leaves grow over the cycleway. It is necessary that the growth around the cycleway is carefully maintained. Shrubs should be no higher than waist height while tree branches should begin well above head height.

### **Arguments for CPTED**

CPTED provides an effective means for reducing crime through the help and support of the public. The major arguments supporting this idea are as follows:

- The main supporting argument for CPTED is that it reduces the amount of resources required from the local authorities, rendering it a much more cost effective solution in the long run.
- CPTED changes represent a permanent alteration to the surrounding area and do not require support programs with ongoing costs. CPTED can be easily supported by inexpensive programs such as neighbourhood watch and good public and private management of the area.

### **Arguments against CPTED**

It should be noted that a more suitable title for this 'crime prevention tool' would be Crime Deterrence Through Environmental Design. This is based on the fact that you can make it as difficult or as costly as possible for an offender to commit a crime, but you cannot literally stop them from committing it. Hence this method more accurately deters the criminal, as it cannot completely stop them.

- The main problem believed to be associated with CPTED is that the method does not stop the problem. It simply displaces it. That is, if an offender decides not to commit a crime within an area designed with CPTED, they will simply move to another area and commit the crime. For example, if an area has its security improved with better locks and security cameras, then the criminal will simply move to an easier target area, or commit a different crime.
- Introducing these changes into some areas can also be initially very costly. This, combined with resistance to change, can make it difficult to get a CPTED programme off the ground.

### **Complications of implementing CPTED**

Some problems associated with the implementation of CPTED include:

- CPTED is often viewed as a solution to crime which consequently displaces more traditional methods of crime prevention. It should be viewed as an aid in the deterrence of crime.
- Many existing structures may not have been originally designed with CPTED in mind. Hence, it may be financially, politically or morally difficult to implement CPTED changes into certain systems.
- Police often regard public involvement in the planning process as 'meddlesome'.
- Striking a balance between security, practicality and aesthetics can pose design problems and issues for architects.



### **Benefits of implementing CPTED**

The major benefits associated with the implementation of CPTED include:

- An increase in safety for the public and reduction of opportunities for offenders to commit crime. The public does not need to be consciously aware of CPTED for it to work correctly and effectively.
- CPTED can result in better use of areas intended for public use. This may include parks, town squares, CBD areas and cycleways.
- Less strain on resources for police, security and other law enforcement groups. Presents a more cost effective solution in the long run, as it can be incorporated into most new designs.

### **CPTED in this Cycleway Plan**

The aforementioned benefits and drawbacks of CPTED do not create any additional complications, so the addition of CPTED elements to the Lismore Cycleway Plan should only result in benefits and not drawbacks to the public. Keeping in mind that unconscious or natural surveillance is the key, most members of the public will be completely unaware that they are taking part.

Elements of CPTED can be incorporated into the detailed design of cycleways in Lismore. This can be as simple as maintaining tree and shrub heights adjacent to cycleways, and making sure that no sections of the network are concealed from view.

CPTED methods can also be incorporated into the design of designated bike parking areas. As long as these areas are placed in public view, it will be much more difficult for thieves to steal bikes unnoticed.

New developments adjacent to the cycleways should also be encouraged to implement CPTED in their design. This will ensure that new developments do not compromise the existing CPTED in the area.

## **5.3 The Cycleway Plan**

Lismore currently has some short stretches of cycleways that end within a short distance of where they start. These stretches, however, are often linked by footpaths which are too narrow for both pedestrians and cycling. So cyclists either use the pedestrian footpaths which becomes dangerous for all users, or the roadway with high volumes of traffic. Whilst this is slowly being rectified by the construction of new cycleways, and widening of existing footpaths, there is still much work to be done to create a cohesive cycleway network.





**Many paths in Lismore are too narrow for both pedestrians and cyclists**

### **Commuter Cycle Routes**

A key step in the process of planning cycleways is to identify cycling attractors. These are the destinations commuter cyclists travel to such as school, work or sporting venues. The key attractors for cycling in Lismore are discussed in Section 3.2.1.

Equally important is the identification of the existing cycle network infrastructure.

An effective network requires the effective linking of cycle attractors whilst utilising as much of the existing cycleway infrastructure as possible and finally using the shortest or most convenient routes while not compromising safety.

### **Recreational Cycle Routes**

Recreational cycle routes encompass those routes through open spaces or scenic backgrounds and are used by cyclists purely for leisure. Recreational cycling routes often forego convenience and directness, and are usually intended for cyclists of all ages and levels of experience. Recreational routes present an attractive and healthy way for the cycling community to spend its recreation time.

*Designated Recreational Routes are demonstrated in Appendix D.*

### **Dual purpose routes**

Dual purpose commuting / recreational routes can be created by providing loops in the network as well as linking attractors. This can provide for the needs of both commuters and recreational riders and provide better value for money in construction costs.

### **Shared Footpaths and Cycleways**

Most of the current cycleways in Lismore are 'shared' paths – ie paths for both pedestrians and cyclists. Whilst this may seem practical, many of these shared paths are too narrow in width for cyclists and present a hazard for both pedestrians and cyclists. Many cyclists prefer to avoid these paths and use the road instead.

### **Missing Links**

As part of the 2011 review of the Cycleway Plan, a number of 'missing links' have been identified. These 'missing links' are small sections of cycleway within the network that require construction whereby the remainder of the route is already in place. Examples of this can be found along Ballina Road near Kellas Street, and High Street near Lismore Heights Public School. These locations have been identified within the Works Program and may be given priority over other works to ensure completion of entire sections of the network and therefore increasing usability.

### **On-road Cycle Lanes**

On-road cycle lanes are the preferred option in commercial precincts as the volume of pedestrian traffic entering and exiting businesses is in direct conflict with passing cyclists should they be on the pathway. Therefore, on-road lanes are the preferred option along routes leading into the CBD, and in other commercial areas such as along Wyrallah Road and Bridge Street.

## **5.4 Engineering Actions**

### **Cycleway Standards – Required Space and Cycleway Envelopes**

Guidelines are provided for the implementation of on-road and off-road cycleways in the Austroads manual – "Guide to Road Design – Part 6A Pedestrian and Cyclist Paths".

Extracts from the Austroads manual are provided in Appendices K, L and M.

Previous standards recommended a minimum width of 2.0m for the construction of shared pathways which is what paths have been constructed to thus far where possible.

Revised recommendations state that the minimum width should be no less than 2.5m and therefore any shared pathways constructed in the future would aim to meet this recommendation. Whilst guidelines proposed by Austroads are adhered to where possible, this is not always achievable and in some instances shared paths may be less than the recommended 2.5m width. Any paths constructed to the outdated standard of 1.8m have been included in the revised Works Program to be widened to 2.5m. In addition, any routes deemed as purely recreational would be constructed to a minimum width of 3m and have been costed accordingly.

### **Cyclist Education Facilities**

Wade Park in East Lismore has a road safety playground for young children. The park features concrete paths with signs along the paths and at intersections. The park is designed to help children learn about road rules and safe bicycle riding. The signs along the paths are the ones most commonly encountered in everyday road usage such as stop signs and give way signs. There are also signs encouraging the use of helmets and other safety equipment.



**Wade Park road safety playground for children**

### **On-Road & Off-Road Cycleways**

On-road cycleways consist of a marked lane along the edge of a road for cyclists, usually on both sides of the road. Often the installation of an on-road cycleway will require the widening of an existing road.

Off-road cycleways are located clear of the road carriageway and are generally preferred for safety reasons. However it is not always possible to construct off-road cycleways due to limited space within the road reserve, or limited budget as off-road cycleways usually cost a lot more to construct than on-road cycleways.



**A typical off-road cycleway**

When asked at the public meeting, the majority said that they would like to see a combination of both on and off-road cycleways, accepting that compromises needed to be made in some circumstances.

### **Bike Parking Facilities**

An effective Cycleway Plan requires strategically placed parking facilities for users. These facilities may vary from simple bike racks to secure lockable bike stations.

It has been identified that there is a need for secure bike parking in the CBD as it is a key attractor for commuter cyclists. As previously discussed cycling is not permitted on the footpaths in the CBD and cycling on the roads is difficult, due to the traffic, and limited space. Many cyclists therefore cycle to the CBD but dismount on arrival, preferring to proceed to their destination on foot. This represents a need for strategically placed bike parking around the edges of the CBD to provide these commuters with suitable parking facilities.

In areas of the CBD where space for bike racks is an issue, single car spaces in parking lots could be converted to cater for bike parking by adding a bike rack at either end of the original parking space. This should also be applied to the public car park located between the PCYC and Trinity College.

Normal 'toaster' style bike racks can damage the spokes of the more expensive bikes. And owners are reluctant to leave their expensive bikes on these racks. Alternatively, lockable bike stations (possibly coin operated) could be provided at strategic locations such as the CBD.

Other areas, such as the Heritage Park Skate Park and other public parks need bike racks to accommodate for cyclists.

Bike lockers have been installed in the Browns Creek Carpark at the rear of Woodlark Street as part of the CBD Strategy since the inception of the initial 2007 Cycleway Plan. This is a secure location monitored by CCTV security cameras, for cyclists to leave their bikes whilst in the CBD.

Attempts are made to include bike parking facilities as part of other capital works programs where feasible.



The bike lockers at Browns Creek Carpark

The Bike Lockers located in the Browns Creek Carpark at the rear of Woodlark Street provide a secure facility in which to park a bike. The lockers operate by cyclists using their own locks to secure their bike whilst they are in the CBD and are monitored by CCTV cameras.

*Further details on the types of bike parking facilities available are provided in Appendix N.*

### **Route and General Signage**

Cycleways should be signposted in accordance with the Austroads manual. Standard signs include cycleway symbol signs to indicate the start and end of cycleways and at appropriate intervals as required.

Other signs include 'Give Way' signs at intersection crossing points; warning signs indicating cyclists may be in the area for motorists entering Lismore; and signs encouraging motorists to watch for cyclists at certain crossing points in Lismore.

Signs indicating destinations and their corresponding distances could also be installed to assist cyclists find their destination.

*For information on sign types relevant to this section see Appendix O.*

### **Intersection & Crossing Point Treatment Traffic Management**

Intersections and roundabouts have been identified as problem areas for cyclists.

Roundabouts in particular are an issue for cyclists and pedestrians. Roundabouts are excellent traffic control devices for managing large volumes traffic at intersections. But they do not usually cope well with bicycles, and careful design is required.

The detailed design of crossing points for the cycleway network may include such devices as refuge islands or marked pedestrian crossings.

### **Specific areas of Concern**

#### **Simes Bridge Intersection**

Simes Bridge, located at the intersection between Molesworth Street and Orion Street, is a narrow bridge spanning the Wilsons River. It provides the main access to Richmond River High School (RRHS) for children who walk, cycle or are dropped off at the Trinity bus exchange. To compensate for the narrowness of the bridge Council has recently added a fenced walkway along the western side of Simes Bridge. The fence extends south along Molesworth Street to the south side of Orion Street, and this creates an issue for students approaching on the northern side of Orion Street, as they must detour back along Molesworth Street to utilise this protected walkway. Many students take a short-cut by crossing on the unprotected bridge side against the oncoming traffic, usually during peak traffic times. The same issues above are true for cyclists as well and have been raised multiple times, as a hazard for cyclists and school children alike.

It has also been noted that Simes Bridge provides almost sole access from the Trinity Bus exchange, the CBD and Lismore Heights to RRHS. Orion Street and Molesworth Street have also been raised as problem areas as they provide access to Simes Bridge. Orion Street has been deemed unsafe by school representatives due to its narrowness and lack of walkway or verge for safe use by pedestrians. A pedestrians and cyclists "cross here" sign has been installed on the northern side of Orion Street just before its intersection with Keen Street. There has also been a request for a pedestrian crossing or refuge island at the intersection of Keen and Orion Street.

**Following the consultation undertaken in the development of the 2007 Cycleway Plan, a shared pathway has been constructed along the southern side of Orion Street from Dawson Street to Molesworth Street. Whilst this has improved access in this area, the addition of a pedestrian refuge island to accommodate the crossing point of the proposed path to the existing path over Simes Bridge, and pedestrian fencing may help encourage further use of this section and improve safety.**



### Link from Lismore to Lismore Heights

The biggest dilemma for this report has been selecting a suitable route for cyclists linking the low lying area of Lismore with the elevated areas of Lismore Heights and Goonellabah.

There are five obvious alternatives:-

- High Street
- New Ballina Road
- Rotary Drive
- Ballina Street, or
- Cynthia Wilson Drive

Cynthia Wilson Drive is totally unsuitable for cyclists because it is too steep, and New Ballina Road is too narrow.



Cynthia Wilson Drive is too steep for cyclists



New Ballina Road is too steep and narrow for cyclists.



Ballina Road has very heavy traffic but sufficient width for on-road Cycle Lanes



High Street has less traffic but is a longer, indirect route for commuting cyclists.

Ballina Road (Bruxner Highway) has very heavy traffic volumes but has sufficient width for the painting of on-road cycleway lanes on both sides of the existing bitumen carriageway.

The preferred route is Rotary Drive because it is the most direct, and is the favoured alternate of the majority of cyclists questioned. It already has a narrow concrete path which could possibly be widened in some sections.

But for much of the length of Rotary Drive, the concrete path cannot be widened any further due to limited space on the edge of the embankment.

One alternative would be the construction of an attractive cantilevered boardwalk supported on vertical piles into the sloping edge between Rotary Drive.

An example of this style of boardwalk can be seen in the photo below, a pedestrian footpath leading to Shelly Beach in Port Macquarie.



A cantilevered styled boardwalk connected directly to the roads edge protected by bollards. Careful design would be required during the detailed design phase to minimise disturbance to trees and bushes along the edge of Rotary Park. It has been pointed out by Council staff that Rotary Park is zoned 7(a) Environmental Protection, and any tree removal would be strongly opposed. Rotary Park is a dedicated flora reserve and is also identified as an Endangered Ecological Community under the Threatened Species Conservation Act.

Another idea was for Rotary Drive to become a light vehicle thoroughfare or shared road, with large trucks and buses discouraged by the provision of traffic calming devices. Rotary Drive would become a slow and safer route for all users including pedestrians, cyclists and light vehicles only. Heavy vehicles and buses would be encouraged to use other routes such as Ballina Road.

The shared road has been adopted in this report, but in case the environmental concerns for Rotary Park are too difficult to overcome, and the shared road concept is unacceptable due to traffic needs, we have also included optional cycleways on Ballina Road and High Street.



Since the adoption of the Cycleway Plan in 2007 the path at Rotary Drive has been widened and lengthened to provide the first complete route from upper to lower Lismore. A wire rope safety barrier has been erected between the path and the traffic, however a barrier is still required to protect cyclists from dropping off the steep decline on the southern side and this has been included in the reviewed Works Program. Several lengths along the High Street route have been constructed and much of the existing paths along Ballina Road in Goonellabah and Lismore Heights have been widened to shared path standards.



Rotary Drive is the preferred route according to the majority of cyclists questioned and has been constructed as a shared pathway since the 2007 Cycleway Plan was developed.

## 6. BEHAVIOURAL STRATEGY

### 6.1 Promotional & Encouragement Strategy

As the programmed construction of cycleways proceeds, Council could begin to promote the benefits of the Cycleway Plan and the community benefits of cycling in general. Effective encouragement, justified by the new cycleway network will help to increase the amount of bike users in the Lismore area.

#### Launch of the bike plan

Upon completion and acceptance of this report, Council could exhibit the plans showcasing the final design and important elements of the Cycleway Plan. This could be combined with the staged construction program presented in this report to give the public an idea of what sections to expect to see first, and when others will be constructed.

#### Signage

Route signage and facility location maps may help with encouragement. Destinations could be signposted for users travelling on the cycleways. Appropriate signage will also allow unfamiliar users to find their way around.

### **Promotional Scheme**

Council should endeavour to promote each stretch of new cycleway when it is ready for public use. This will help to keep the public informed and promote further use of the cycle network. In combination with this, Council should then announce the next stretch scheduled for construction and the expected time frame for it. By doing this Council can easily and effectively promote each new stretch of cycleway on and prior to completion.

These promotional programs for cycling could be administered by Council in conjunction with relevant community groups, other councils, government agencies or corporate organisations.

Current and potential cyclists should be reminded of the benefits of cycling, and encouragement should be made to promote cycling to shops, schools and for recreation.

Tourists unfamiliar with the Lismore area may find it easier to navigate on a bike. If Council could offer tourists (and residents) a 'bikes for hire' scheme this may increase bike usage further.

## **6.2 Education Strategy**

It is recommended that an education strategy be implemented by Council. This could take the form of a workshop or function during 'bike week', or an advertising campaign.

The issues which require addressing include:

- Road rights for all road users,
- The aspects of safety involved in cycling such as safety equipment and safe cycleway use,
- A number of the schools in Lismore have dedicated 'bike days' where students will be encouraged to cycle to places such as Wade Park and/or be lectured on all aspects of cycling.

It is important to keep motorists informed about the installation of on-road cycleways, and what they can expect to see in the near future. Motorists need to be aware of such developments in order to improve the safety of the cyclists using on-road cycleways.

Whilst the benefits of running promotional and educational campaigns would be undoubtedly beneficial to the community, Council does not currently have the staff or dedicated resources to implement a comprehensive Cycling Education Strategy and it is recommended that provision for this be investigated in the future.

The review of the Cycleway Plan has emphasised the need for increased education for both cyclists and drivers on their rights and responsibilities as well as the importance of promoting the cycleways that have been completed as it seems the community are unaware of areas that they can ride currently. It is recommended that the cycle routes be mapped and made available for both the community and tourists to provide information on various routes as well as promote cycling in the area.

### 6.3 Estimated cost of Promotional and Education Strategies

The estimated cost of the promotional and education strategies is as follows:-

|                             |                   |
|-----------------------------|-------------------|
| Launch of the Cycleway Plan | \$1,000 once only |
| Signage                     | \$5,000 per year  |
| Promotional Scheme          | \$500 per year    |
| Educational workshops       | \$2,000 per year  |

## 7. OUTCOMES

### 7.1 Development of the Cycleway Plan

The development of the proposed cycleway network shown on was developed taking all of the following issues into account:-

Linking of existing cycleways with established cycling attractors for commuting cyclists  
 Providing loops in the network for recreational cyclists  
 Avoiding where possible highly trafficked roads  
 Questionnaires and public meetings which provided important feedback

### 7.2 Priority program

#### Strategy for determining priorities – 2007 Cycleway Plan

The proposed network of new cycleway construction was divided into discrete and homogeneous sections. Each section was costed using average rates provided by Council staff. A formula was developed to assist in the scoring and ranking of each section of work into a priority list.

The formula awards points for each work section according to:-

1. Value for money on a length per dollar basis
2. Expected usage – based on information provided in the questionnaires plus guesswork. (There are no statistics available for cycling numbers in Lismore)
3. The number of attractors linked by the section of cycleway
4. Extra points where the cycleway section will benefit both commuters and recreational cyclists, and
5. Safe location or design

Using this method, 84 separate work sections were listed and costed. The total lengths of proposed cycleways are:-

|                              |         |
|------------------------------|---------|
| Proposed off-road cycleways  | 14.6 km |
| Proposed on-road cycleways   | 5.4 km  |
| Existing paths to be widened | 13.1 km |
| Total length =               | 33.1 km |

The total estimated cost of the work is \$4.4 million

#### Priority list

This list ranked the sections in priority order according to the formula above. Section numbers refer to the numbers on Drawing No 4 in the Appendix

### Program of Works

A priority programme of works was produced by grouping work sections into sensible work packages that could be logically constructed together, commencing with the highest ranked projects on the priority list.

This resulted in nineteen work packages valued at approximately \$200,000 to \$300,000 each.

### 7.3 Road Crossings

Road crossings have been suggested where appropriate and locations included in the estimated cost of each cycleway section.

### 7.4 Parking Facilities

The location of bike racks and suggested secure bike parking stations are shown on in Appendix E.

### 7.5 Review of the Priority Program

As part of the review of the Cycleway Plan and subsequent Prioritised Works Program, the method used in prioritising the works has been amended. Council works staff have determined that the “*work packages*” format used in the 2007 Cycleway Plan was impractical due to the way in which funding for the construction of each section of pathway is acquired, and therefore it was important to develop a single prioritised listing which would provide Council with a clear guideline as to what needs to be achieved and the best way to do so.

The revised prioritised Works Program uses a modified method in determining the expected usage of each section of pathway as opposed to the “*gestimate*” used in the 2007 Plan. A formula has been devised which accounts for the type and number of attractors within the vicinity of the cycleway, with greater emphasis placed on sections of cycleway that link to schools, commercial precincts or recreational facilities. Additional points were granted should the cycleway provide a link to major infrastructure such as an underpass. These points were correlated to a range of the expected number of daily users of the path.

Therefore the overall formula used for each work section is as follows:

1. Value for money on a length per dollar basis (length / cost x 50)
2. Expected Usage: the expected usage was determined as follows -  
Major attractor + number of attractors linked + infrastructure link = expected number of users.
3. The number of attractors linked by the section of cycleway
4. Extra points where the cycleway section will benefit both commuters and recreational cyclists
5. Safe location or design

Each item within the Works Program has been put through this formula to give it an overall weighting and prioritised as such against all other sections within the Program.

Using this method, 74 separate work sections were listed and costed. The total lengths of proposed cycleways are:-

|                              |         |
|------------------------------|---------|
| Proposed off-road cycleways  | 14.5 km |
| Proposed on-road cycleways   | 6.9 km  |
| Existing paths to be widened | 16 km   |
| Safety railing and fencing   | 1.3 km  |
| Total length =               | 37.4 km |

The total cost of the work is estimated at \$6.4 million in addition to the \$1,090,000 of cycleways constructed since 2007. It is recommended that the Works Program component of the Cycleway Plan be reviewed on an annual basis to ensure the inclusion of new developments into the Plan.

## 7.6 Other Options and Recommendations

Detailed below are other options available to council.

### External Issues

Whilst residents of Lismore will be aware of cyclists in the area, visitors to Lismore will not. It is therefore recommended that 'Beware Cyclists' warning signs are placed at the entrances to Lismore. This represents a low-cost and effective way to alert all motorists entering Lismore to the possibility of cyclists, thus reducing the possibility of accidents involving cyclists and motorists.

### Roundabouts

Further investigation is required into the safe negotiation of roundabouts for cyclists using on-road cycle lanes. Several of the on-road lanes proposed in the Cycleway Plan traverse at least one roundabout, many of which do not have sufficient width to cater for the vehicle lanes and an additional cycle lane which means that cyclists are left to fend for themselves once they approach the roundabout. Community feedback has been strong in suggesting residents are not happy, nor do they feel that this arrangement is safe and therefore this issue deters them from using the on-road cycle lanes altogether. Therefore an alternative solution is required.

Options include:

- Continuing the on-road cycle lanes through and around the roundabout – in some instances this would be made possible with amendments to the kerbing surrounding the roundabout
- Providing "Warning Cyclists" signage at each approach to the roundabout to encourage motorists to consider cyclists particularly in that area.
- Having cyclists deter from on-road cycle lanes onto off-road pathways to cross the intersection before returning to on-road cycle lanes

*Further information on these options is provided in Appendix R.*

### Increased Education and Promotion

As discussed previously, education and promotion of cycling is an integral component of this plan and should not be overlooked. Signage, promotion of newly constructed sections and driver and cyclist education will ensure the harmonious use of the Cycleway network

**Annual Review**

This plan and the items within its Works Program should be reviewed on an annual basis in conjunction with Council's Capital Works Program and Sport and Recreation Plan to ensure works within those programs that overlap with the Cycleway Plan are considered and resources best allocated in terms of construction each year.

**New Developments**

It is integral that this Cycleway Plan be considered in the planning for new developments and subdivisions to ensure that any new areas link in to this cycleway network.

**Maintenance**

Through consultation and observation it is noted that several of the constructed shared pathways are lacking in maintenance, mainly of vegetation that overhangs pathways or is overgrown and therefore limits the width of a pathway. This issue needs to be addressed as it acts as a deterrent to the community in using the shared pathways for cycling.

**IMPLEMENTATION****8.1 External Funding Sources**

Possible external funding sources are as follows:-

**The Roads and Traffic Authority**

Provided that the necessary steps are followed, the Roads and Traffic Authority can fund up to 50% of the required funding for an approved Cycleway Plan, and up to 100% on State roads.

**Corporate Contribution of Sponsorship**

Corporate sponsorship represents an excellent way for businesses to fund parts of the Cycleway Plan, while promoting a healthy image for their organisations. At the same time this will generate extra funds to support the construction of cycleways.

**Section 94 Contributions / Planning Agreements**

Section 94 of the Environmental Planning and Assessment act gives councils the right to raise contributions from developers for existing or planned infrastructure. Alternatively, depending on the complexity of the development, a planning agreement may be entered into which would incorporate funding for cycleways / pathways. Under these agreements the developer may undertake to the construct the cycleway themselves, or come to an arrangement to provide funding to Council so that they can construct the cycleway.

**Federal Funding**

Federal funding becomes available on occasion through various grant schemes, and any assistance that can be obtained will be pursued by Council staff. In particular, this would be investigated for proposed recreational routes which are costly to construct and are not met by RTA funding.

It is recommended that further opportunities for funding to support the construction of cycleways within this Plan be investigated.

## APPENDICES

## Appendix A: Completed Cycleways 2007 - 2011

| Street                      | From                            | To                              | Description                | Length (m) | Cost   |
|-----------------------------|---------------------------------|---------------------------------|----------------------------|------------|--------|
| Rotary Dr                   | Uralba St                       | Dixon Pl                        | Proposed off road cycleway | 720        | 115200 |
| High St                     | Lismore Heights Public School   | Barr Scott Dr                   | Proposed off road cycleway | 415        | 71400  |
| Ballina Rd                  | 40m west of Gallagher Dr        | Rous Rd                         | Path to be widened         | 1245       | 124500 |
| Ballina Rd                  | Rotary Dr Ballina Rd roundabout | 40m west of Gallagher Dr        | Proposed off road cycleway | 370        | 59200  |
| Uralba St                   | Dibbs St                        | Rotary Dr                       | Proposed off road cycleway | 85         | 18600  |
| Ballina Rd                  | Rous Rd                         | Goonellabah Public School       | Path to be widened         | 355        | 35500  |
| Rotary Dr                   | Dixon Pl                        | Rotary Dr Ballina Rd roundabout | Path to be widened         | 65         | 6500   |
| High St                     | Cooling St                      | Bellevue St                     | Path to be widened         | 375        | 37500  |
| High St                     | Barr Scott Dr                   | Ballina Rd                      | Proposed off road cycleway | 310        | 16200  |
| Uralba St                   | Existing path                   | Dibbs St                        | Path to be widened         | 360        | 41000  |
| Wyrallah Rd                 | Ballina St                      | Dalley St                       | On road cycle lane         | 700        | 14000  |
| Orion St                    | Dawson St                       | Molesworth St                   | Path to be widened         | 195        | 29500  |
| Dibbs St                    | Avondale Ave                    | Dalley St                       | Path to be widened         | 210        | 26000  |
| Oliver Ave                  | Kadina St                       | East to existing path           | Proposed off road cycleway | 150        | 24000  |
| Oliver Ave                  | Park                            | Waratah Way                     | Proposed off road cycleway | 210        | 33600  |
| Uralba St                   | Dawson St                       | Brewster                        | Path to be widened         | 340        | 34000  |
| Brewster St                 | Magellan St                     | Uralba St                       | Proposed off road cycleway | 350        | 56000  |
| Wilson St                   | Casino St                       | Terania St                      | Proposed off road cycleway | 660        | 110600 |
| McDermott Ave leisure route | Mcdermott Ave                   | Reserve behind Darcy Dr         | Proposed off road cycleway | 325        | 57000  |
| Kyogle St                   | Crown St                        | Wilson St                       | Proposed off road cycleway | 315        | 60400  |
| Winterton Pde               | Existing Path                   | Lake St                         | Path to be widened         | 270        | 27000  |



| Street              | From                       | To                         | Description                | Length (m) | Cost    |
|---------------------|----------------------------|----------------------------|----------------------------|------------|---------|
| Lake St             | Richmond River High School | Winterton Pde              | Path to be widened         | 180        | 18000   |
| Wilson St           | Elliot St                  | Casino St                  | Path to be widened         | 420        | 42000   |
| Pitt St and Lake St | Corner Pitt and Bridge St  | Richmond River High School | Path to be widened         | 235        | 28500   |
| High St             | 20m West of Diadem         | Diadem St                  | Path to be widened         | 55         | 5500    |
| Diadem St           | High St                    | Leycester St               | Proposed off road cycleway | 145        | 23200   |
| Leycester St        | Diadem St                  | Hindmarsh St               | Path to be widened         | 240        | 29000   |
| Orion St            | Keen St                    | Molesworth St              | Proposed off road cycleway | 190        | 40400   |
| Second Ave          | Ballina St                 | Avondale Rd                | Path to be widened         | 345        | 34500   |
|                     |                            |                            | TOTAL:                     | 9835       | 1218800 |

## Appendix B: Cycleway Plan 2011-2014 Works Program

| Item | Street                    | From                     | To                        | Description                | Side  | Crossings required | Length (m) | Est.Cost | Total Points | Comments             |
|------|---------------------------|--------------------------|---------------------------|----------------------------|-------|--------------------|------------|----------|--------------|----------------------|
| 1    | Ballina Rd                | Nielson St               | Second Ave                | Proposed off road cycleway | South | 1                  | 530        | 124250   | 9.21         | State                |
| 2    | Lismore Park Leisure Link | Dawson and Brewster St   | Magellan and Brewster St  | Proposed off road cycleway | n/a   | 1                  | 1520       | 415400   | 9.18         | Recreational Route 1 |
| 3    | Dawson St                 | Uralba St                | Orion St                  | Path to be widened         | East  | 1                  | 465        | 60800    | 8.88         | State                |
| 4    | Oliver Ave                | Goonellabah S & A Centre | Rous Rd                   | Path to be widened         | North | 2                  | 530        | 73600    | 8.86         |                      |
| 5    | Dawson St                 | Magellan St              | Uralba St                 | Path to be widened         | East  | 1                  | 260        | 36200    | 8.86         | State                |
| 6    | Dawson St                 | Magellan St              | Ballina St                | Path to be widened         | East  | 2                  | 380        | 55600    | 8.84         | State                |
| 7    | Wyrallah Rd               | Dalley St                | Oliver St                 | Path to be widened         | East  | 0                  | 210        | 25200    | 8.42         |                      |
| 8    | Ballina Rd                | Kellas Ave               | 453 Ballina Rd            | Path to be widened         | South | 0                  | 112        | 13440    | 8.42         | State Missing Link   |
| 9    | Ballina St                | Second Ave               | Union St                  | Path to be widened         | South | 1                  | 2165       | 264800   | 8.41         | State                |
| 10   | Wyrallah Rd               | Dibbs St                 | Wyrallah Rd Public School | Path to be widened         | East  | 2                  | 675        | 91000    | 8.37         |                      |
| 11   | Hindmarsh St              | Leycester St             | Brunswick St              | Path to be widened         | West  | 1                  | 205        | 29600    | 8.35         |                      |
| 12   | Ballina Rd                | Holland St               | Oliver Ave East           | Proposed off road cycleway | South | 0                  | 300        | 67500    | 8.22         | State Missing Link   |
| 13   | Casino St                 | Wilson St                | Caniaba St                | Proposed off road cycleway | North | 3                  | 430        | 111750   | 8.19         | Missing Link         |

| Item | Street           | From            | To                            | Description  | Side                              | Crossings required | Length (m) | Est.Cost | Total Points | Comments             |
|------|------------------|-----------------|-------------------------------|--|-----------------------------------|--------------------|------------|----------|--------------|----------------------|
| 14   | Rous Rd          | Ballina Rd      | Jubilee Ave                   | Path to be widened   | East to Pleasant, West to Jubilee | 1                  | 1000       | 125000   | 7.90         |                      |
| 15   | Keen St          | James St        | John St                       | Proposed off road cycleway   | East                              | 0                  | 255        | 57375    | 7.72         |                      |
| 16   | High St          | Bellevue St     | Lismore Heights Public School | Proposed off road cycleway   | East                              | 1                  | 420        | 99500    | 7.71         | Missing Link         |
| 17   | Brunswick Street | Dawson          | Carolina Rd                   | Proposed off road cycleway   | South to Donnans, then North      | 3                  | 935        | 225375   | 7.71         | State                |
| 18   | Wilson Ck        | Market St       | Orion St                      | Proposed off road cycleway   | West                              | 0                  | 1125       | 303750   | 7.69         | Recreational Route 2 |
| 19   | High St          | Beardow St West | Diadem St                     | On road cycleway - ped railing on outside, kerbing on inside, paint lane marking | South                             | 0                  | 300        | 90000    | 7.67         |                      |
| 20   | Conway St        | Ballina Rd      | Molesworth St                 | Proposed on road cycleway  | Both                              | 0                  | 825        | 41250    | 7.50         | On-Road              |
| 21   | Keen St          | Conway St       | Ballina Rd                    | Proposed on road cycleway  | Both                              | 0                  | 230        | 11500    | 7.50         | On-Road              |
| 22   | Keen St          | Orion St        | Browns Creek Carpark          | Proposed on road cycleway  | Both                              | 0                  | 450        | 22500    | 7.50         | On-Road              |
| 23   | Market St        | River           | Molesworth St                 | Proposed on road cycleway  | Both                              | 0                  | 170        | 8500     | 7.50         | On-Road              |
| 24   | Molesworth St    | Market St       | Conway St                     | Proposed on road cycleway  | Both                              | 0                  | 80         | 4000     | 7.50         | On-Road              |
| 25   | Carrington St    | Conway St       | John Crowther Carpark         | Proposed on road cycleway  | Both                              | 0                  | 170        | 8500     | 7.50         | On-Road              |

| Item | Street                          | From                | To                                    | Description                   | Side                 | Crossings required | Length (m) | Est.Cost | Total Points | Comments |
|------|---------------------------------|---------------------|---------------------------------------|-------------------------------|----------------------|--------------------|------------|----------|--------------|----------|
| 26   | Ballina Rd                      | Nielson St          | Rotary Dr<br>Ballina Rd<br>roundabout | Proposed on<br>road cycleway  | South                | 0                  | 1100       | 55000    | 7.50         | On-Road  |
| 27   | High St                         | Cooling St          | Bellevue St                           | Proposed on<br>road cycleway  | South                | 0                  | 375        | 18750    | 7.50         | On-Road  |
| 28   | Ross St                         | end of Ross         | Ballina / Kellas<br>rd roundabout     | Path to be<br>widened         | South                | 0                  | 647        | 67400    | 7.48         |          |
| 29   | Keen St and<br>Gundurimba<br>Rd | John St             | Albert Park<br>School                 | Path to be<br>widened         | n/a                  | 0                  | 645        | 77400    | 7.42         |          |
| 30   | Keen St                         | Ballina St          | James St                              | Path to be<br>widened         |                      | 0                  | 245        | 29400    | 7.42         |          |
| 31   | Simeoni Dr                      | Gordon Blair<br>Dve | Oliver Ave                            | Path to be<br>widened         | West                 | 0                  | 655        | 78600    | 7.42         |          |
| 32   | Reserve St                      | Rous Rd             | Existing Path at<br>Sportsfields      | Path to be<br>widened         | West                 | 0                  | 45         | 5400     | 7.42         |          |
| 33   | Dalley St                       | Dibbs St            | Military Rd                           | Path to be<br>widened         | North                | 1                  | 760        | 96200    | 7.40         |          |
| 34   | Dalley St                       | Wyrallah Rd         | Dibbs St                              | Path to be<br>widened         | South                | 1                  | 500        | 65000    | 7.38         |          |
| 35   | Elizabeth St                    | Wyrallah Rd         | Nielson St                            | Proposed off<br>road cycleway | South                | 0                  | 70         | 15750    | 7.22         |          |
| 36   | Union St                        | Kyogle St           | Opposite end<br>of existing path      | Proposed off<br>road cycleway | East                 | 1                  | 380        | 90500    | 7.21         |          |
| 37   | Dudley Dve                      | Oliver Ave          | Clare St                              | Proposed off<br>road cycleway | West                 | 3                  | 1005       | 241125   | 7.21         |          |
| 38   | Elliot Rd                       | Union St            | Crown St                              | Proposed off<br>road cycleway | South                | 1                  | 260        | 63500    | 7.20         |          |
| 39   | Kadina St                       | Kadina High         | Oliver Ave                            | Proposed off<br>road cycleway | East<br>then<br>West | 2                  | 480        | 118000   | 7.20         |          |
| 40   | Bruxner<br>Hwy                  | Existing path       | Caravan Park<br>past lake             | Path to be<br>widened         | East                 | 0                  | 720        | 86400    | 6.92         | State    |

| Item | Street                         | From                              | To                                | Description                | Side           | Crossings required | Length (m) | Est.Cost | Total Points | Comments   |
|------|--------------------------------|-----------------------------------|-----------------------------------|----------------------------|----------------|--------------------|------------|----------|--------------|--|
| 41   | McDermott Ave and Allingham Pl | Jubilee Ave                       | Gordon Blair Dr                   | Proposed off road cycleway | South          | 0                  | 665        | 149625   | 6.72         |  |
| 42   | Wilson Ck                      | Skate Park                        | Ballina St                        | Proposed off road cycleway | West           | 0                  | 260        | 58500    | 6.72         |  |
| 43   | Oliver Ave                     | South West corner of Hepburn Park | South East corner of Hepburn Park | Proposed off road cycleway | North          | 1                  | 290        | 70250    | 6.71         | Refuge island required when joining path from south to north |
| 44   | High St                        | Diadem St                         | Cooling St                        | Proposed on road cycleway  | Both           | 0                  | 1595       | 79750    | 6.50         | Missing Link   |
| 45   | Jubilee Ave                    | McDermott Ave                     | Ballina Rd                        | Path to be widened         | West           | 0                  | 495        | 59400    | 6.42         |  |
| 46   | Avondale Ave                   | Second Ave                        | Dibbs St                          | Path to be widened         | North          | 0                  | 250        | 30000    | 6.42         |  |
| 47   | Military Rd                    | Dalley St                         | Sth Cross Uni                     | Path to be widened         | West           | 0                  | 255        | 30600    | 6.42         |  |
| 48   | Bridge St                      | Existing path                     | Pitt St                           | Path to be widened         | West then East | 1                  | 305        | 41600    | 6.37         |  |
| 49   | Union St                       | Hollingworth Ck                   | Three Chain Rd                    | Path to be widened         | West           | 5                  | 805        | 121600   | 6.33         | State Recreational Route 4                                   |
| 50   | Krauss Ave                     | Three Chain Rd                    | Lismore Airport                   | Proposed on road cycleway  | Both           | 0                  | 1600       | 80000    | 6            |  |
| 51   | Crown St                       | Elliot St                         | Rhodes St                         | Path to be widened         | West           | 1                  | 300        | 41000    | 5.87         |  |
| 52   | Ballina Rd                     | Brewster St                       | Diadem St                         | Proposed off road cycleway | North          | 0                  | 220        | 35200    | 5.81         | State  |
| 53   | Holland St                     | South East corner of Hepburn Park | Ballina Rd                        | Proposed off road cycleway | West           | 0                  | 1160       | 185600   | 5.81         |  |

| Item | Street                   | From  | To                                   | Description                | Side  | Crossings required | Length (m) | Est.Cost | Total Points | Comments                   |
|------|--------------------------|---|--------------------------------------|----------------------------|-------|--------------------|------------|----------|--------------|----------------------------|
| 54   | Victoria St              | Ballina St  | Past Gerard St joining Existing Path | Proposed off road cycleway | East  | 0                  | 265        | 42400    | 5.81         |                            |
| 55   | Kyogle St                | Union   | Crown St                             | Proposed off road cycleway | North | 2                  | 350        | 56000    | 5.81         |                            |
| 56   | Union St                 | Union St Bridge                                   | Frank St                             | Proposed off road cycleway | West  | 0                  | 285        | 64125    | 5.72         |                            |
| 57   | Oliver Ave               | East of Waratah Way                               | Hepburn Park                         | Proposed off road cycleway | South | 1                  | 360        | 86000    | 5.71         | Missing Link               |
| 58   | Albert park fields loop  | Follows Bernstein St, Gundurimba Rd and the River |                                      | Proposed off road cycleway | Loop  | 0                  | 1260       | 340200   | 5.69         | Recreational Route 3       |
| 59   | River bank               | John St   | Bernstein St                         | Proposed off road cycleway | West  | 0                  | 285        | 76950    | 5.69         | Recreational Route 3       |
| 60   | John St                  | Keen St   | River                                | Proposed off road cycleway | South | 0                  | 195        | 52650    | 5.69         | Recreational Route 3       |
| 61   | Bruxner Hwy              | Path around Lismore Lake joining to section 8     |                                      | Proposed off road cycleway | East  | 0                  | 985        | 265950   | 5.69         | State Recreational Route 4 |
| 62   | River bank               | Bridge St   | Zadoc St                             | Proposed off road cycleway | n/a   | 55m Bridge         | 290        | 400,000  | 5.54         | State Recreational Route 4 |
| 63   | Union St                 | Elliot St   | Phyliss St                           | Path to be widened         | East  | 0                  | 260        | 31200    | 4.92         |                            |
| 64   | Dibbs St                 | Pound St  | Magellan St                          | Path to be widened         | West  | 0                  | 90         | 10800    | 4.92         |                            |
| 65   | Union St                 | Foleys Rd   | Hollingworth Ck                      | Path to be widened         | East  | 0                  | 60         | 7200     | 4.92         | State Recreational Route 4 |
| 66   | Union St Bridge Crossing | Western end of Union St Bridge                    | Existing Path on Bridge St           | Path to be widened         | West  | 0                  | 1250       | 150000   | 4.92         |                            |

| Item | Street      | From       | To          | Description        | Side  | Crossings required | Length (m) | Est.Cost | Total Points | Comments |
|------|-------------|------------|-------------|--------------------|-------|--------------------|------------|----------|--------------|----------|
| 67   | Pound St    | Hunter St  | Dibbs St    | Path to be widened | North | 1                  | 240        | 33800    | 4.86         |          |
| 68   | Magellan St | Hunter St  | Dibbs St    | Path to be widened | South | 1                  | 240        | 33800    | 4.86         |          |
| 69   | Hunter St   | Ballina St | Magellan St | Path to be widened | West  | 1                  | 205        | 29600    | 4.85         |          |
| 70   | Rhodes St   | Union St   | Crown St    | Path to be widened | South | 1                  | 200        | 29000    | 4.84         |          |
| 71   | Elliot St   | Crown St   | Wilson St   | Path to be widened | South | 0                  | 295        | 35400    | 4.42         |          |
| 72   | Terania St  | Bridge St  | Tweed St    | Path to be widened | South | 0                  | 530        | 63600    | 4.42         |          |

**Fencing and or railing**

|   |           |               |            |   |       |                      |     |        |      |  |
|---|-----------|---------------|------------|---|-------|----------------------|-----|--------|------|--|
| 1   | Rotary Dr | Dixon Pl      | Uralba St  | Safety railing on outside                           | South | 0                    | 720 | 180000 | 9.70 |  |
| 2   | Wilson St | Bridge        | Terania St | install brifen safety fencing between road and path | East  | 0                    | 240 | 48000  | 5.75 |  |
| <b>Total Length of Proposed Cycleway:</b> |           | <b>37.4km</b> |            | <b>Total Cost of Cycleway Program:</b>              |       | <b>\$6.4 million</b> |     |        |      |  |

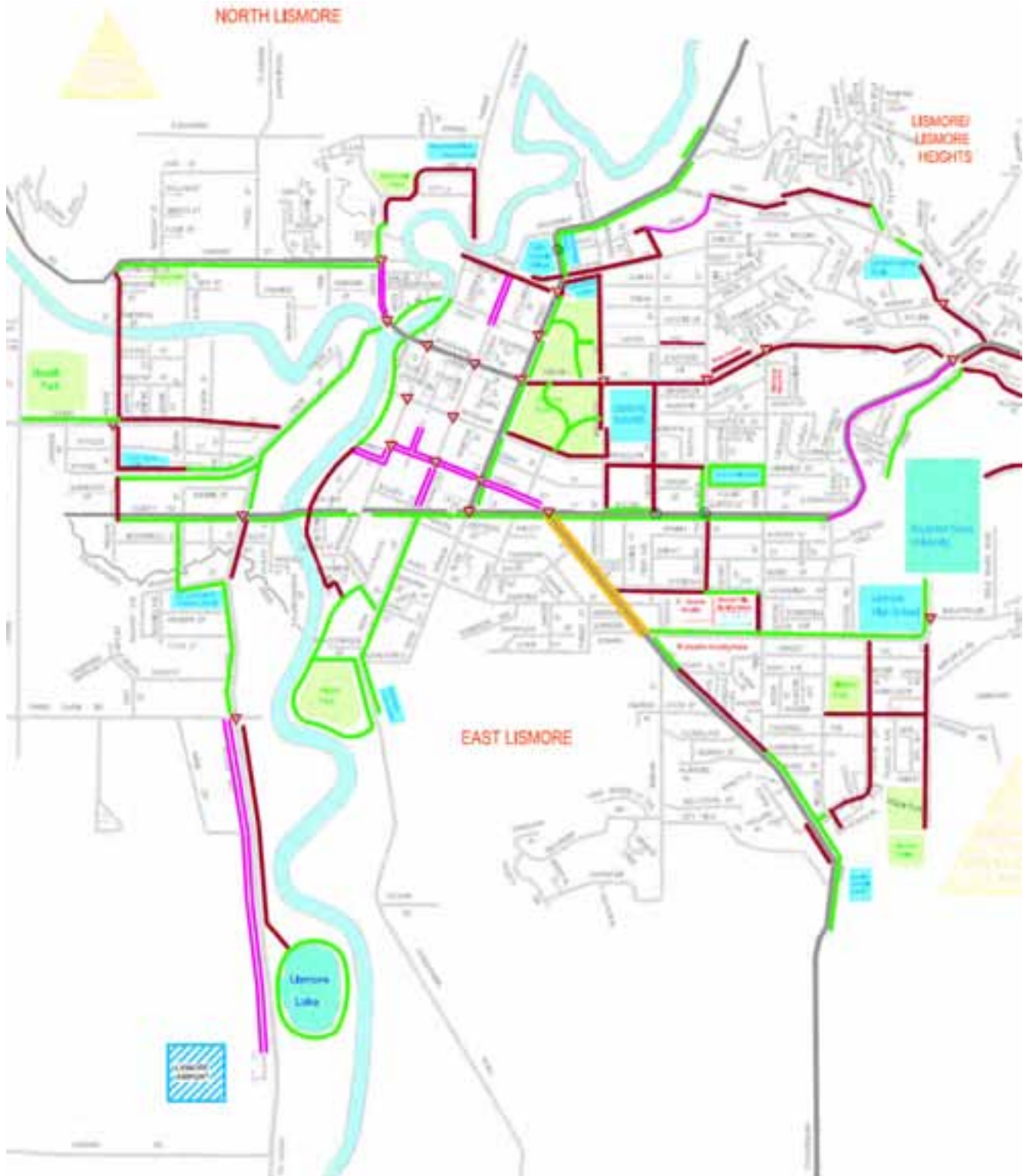


**Appendix C: Existing and Proposed Cycleway Network (maps):**

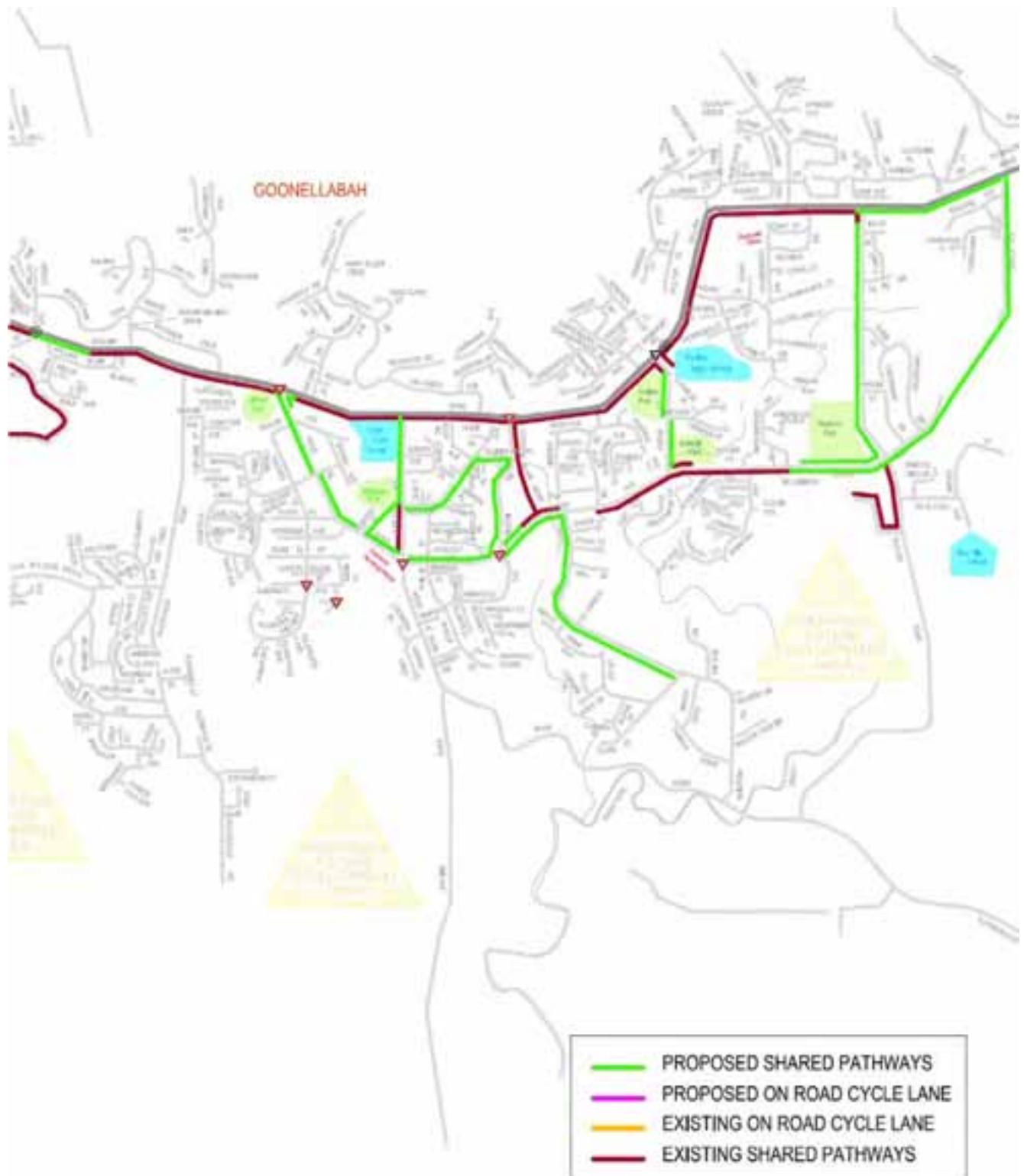
- **Whole Urban Area**
- **Lismore Central Business District and surrounds**
- **Lismore and Lismore Heights**
- **East Lismore**
- **North Lismore**
- **South Lismore**
- **Goonellabah**

Lismore Central Business District and surrounds





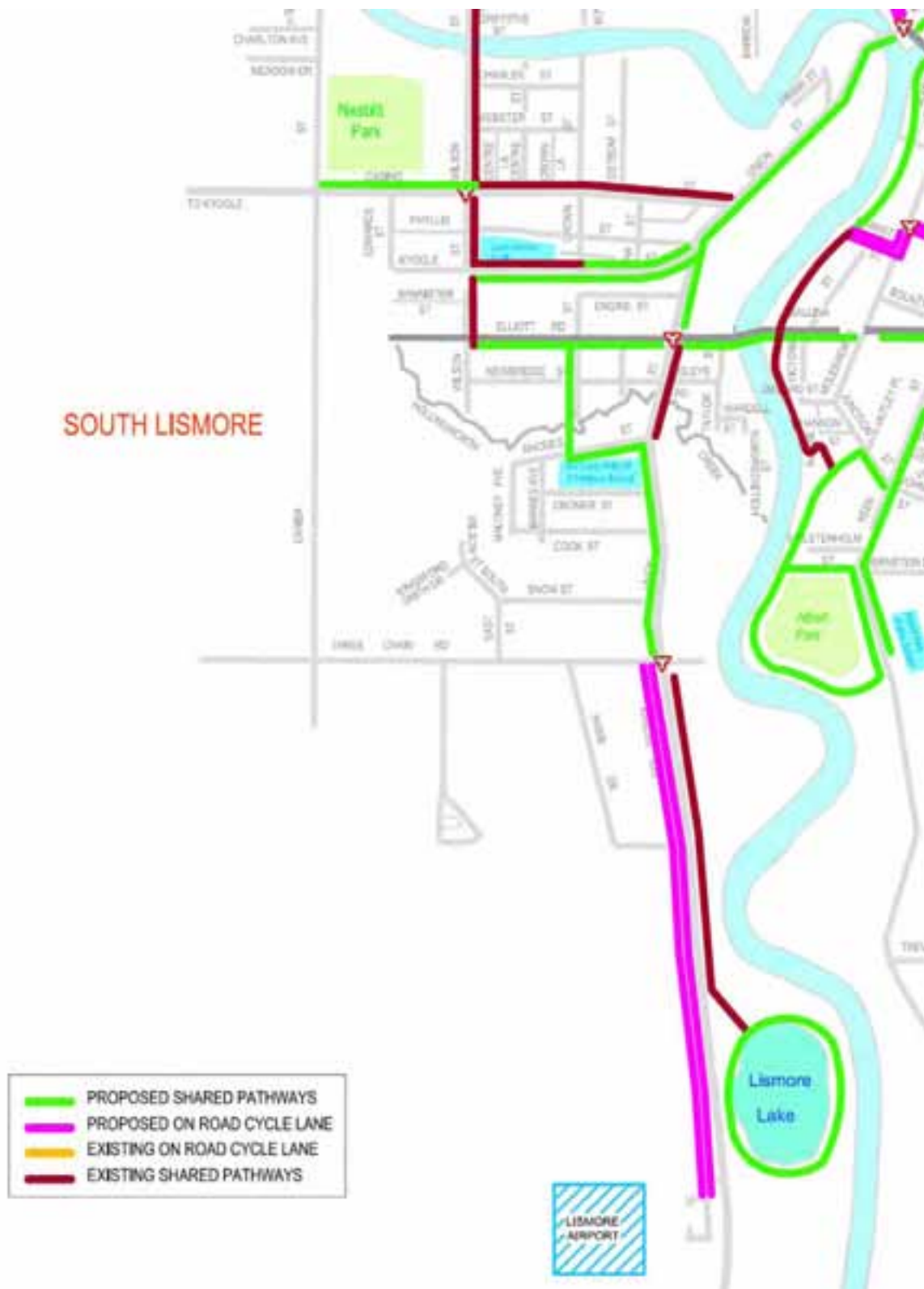
### Whole Urban Area



### Lismore and Lismore Heights

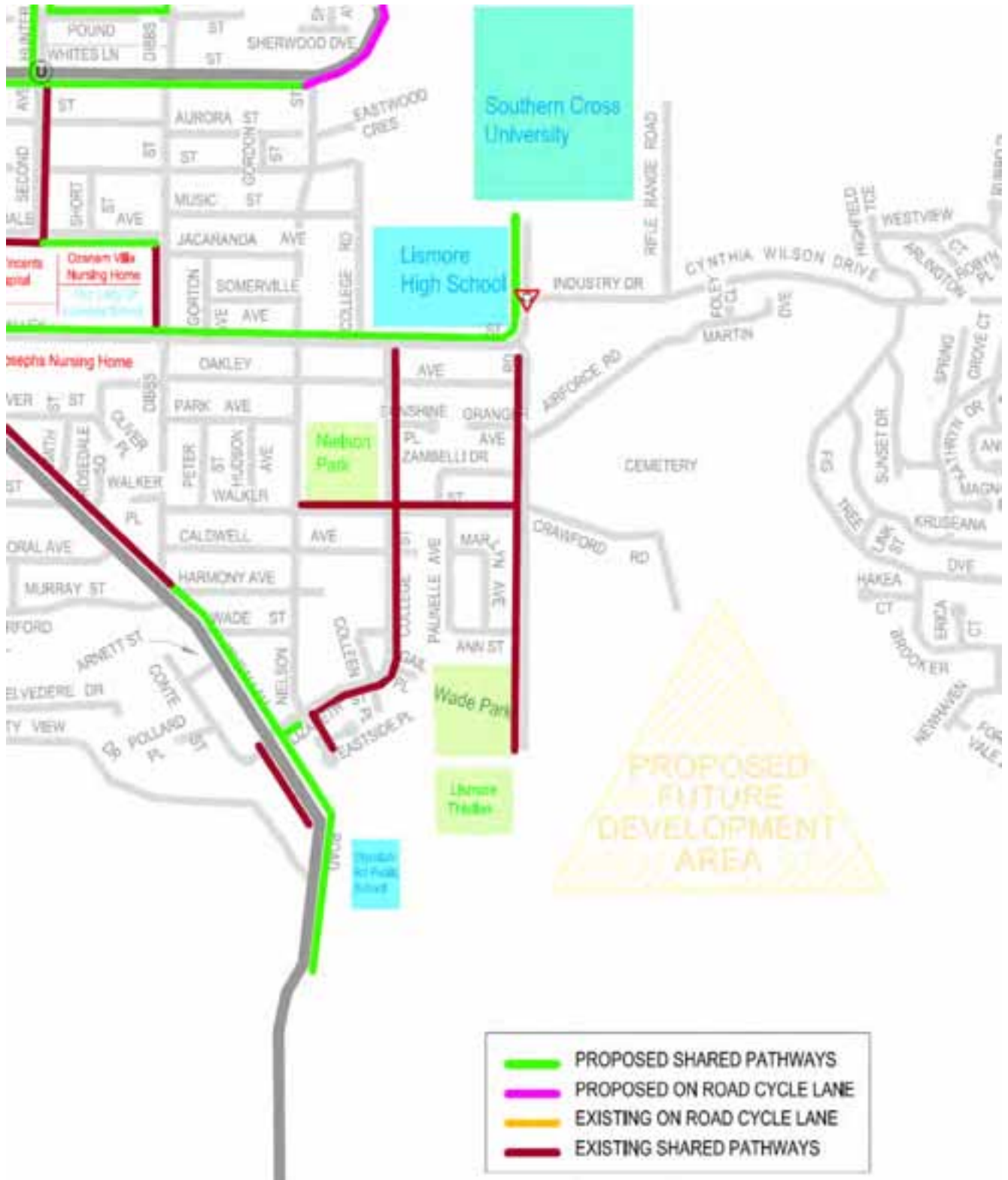
Lismore City Council  
Meeting held 12 July 2011 - Draft Pedestrian Access and Mobility and  
Draft Cycleway Plan Reviews





**South Lismore**





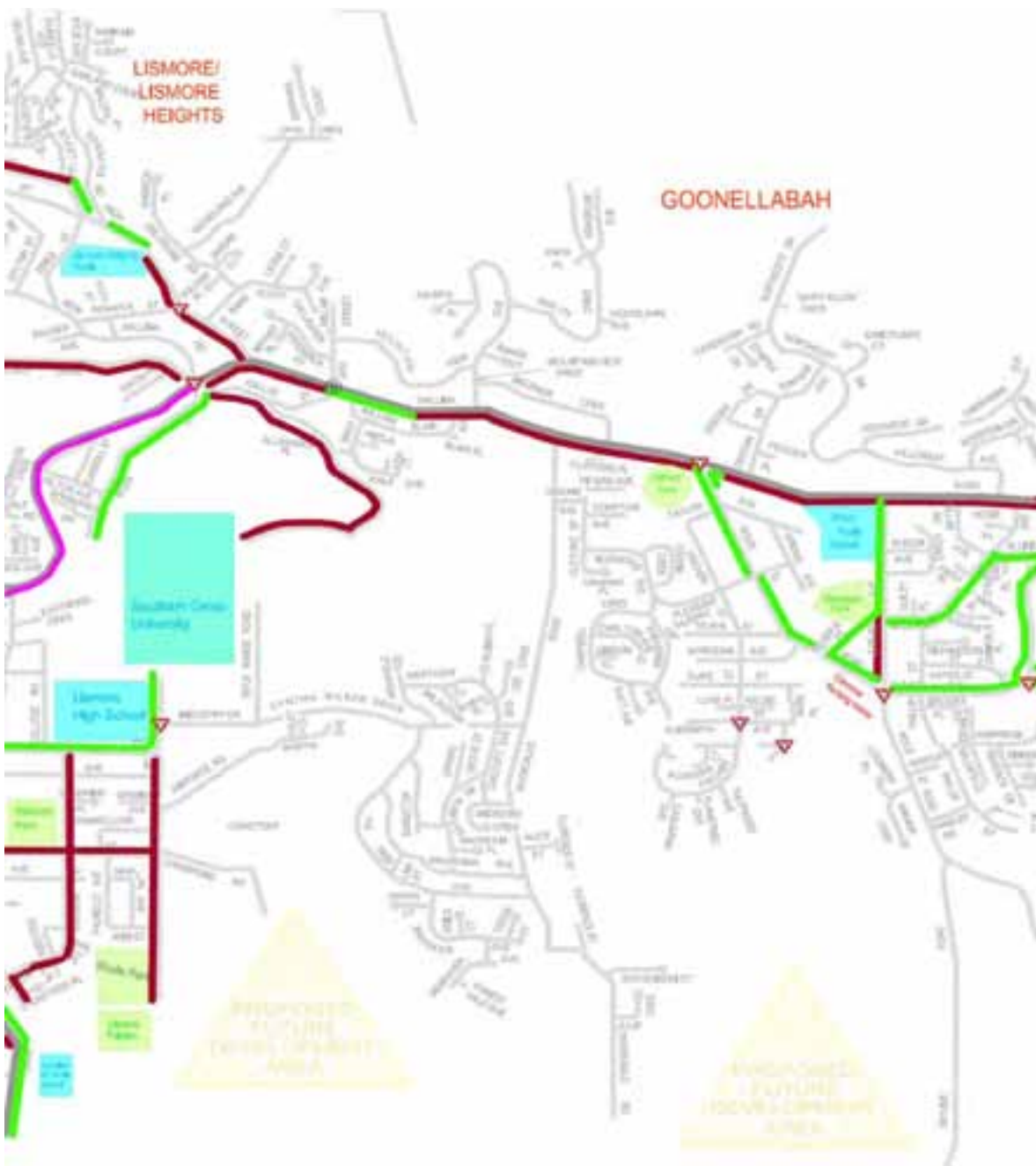




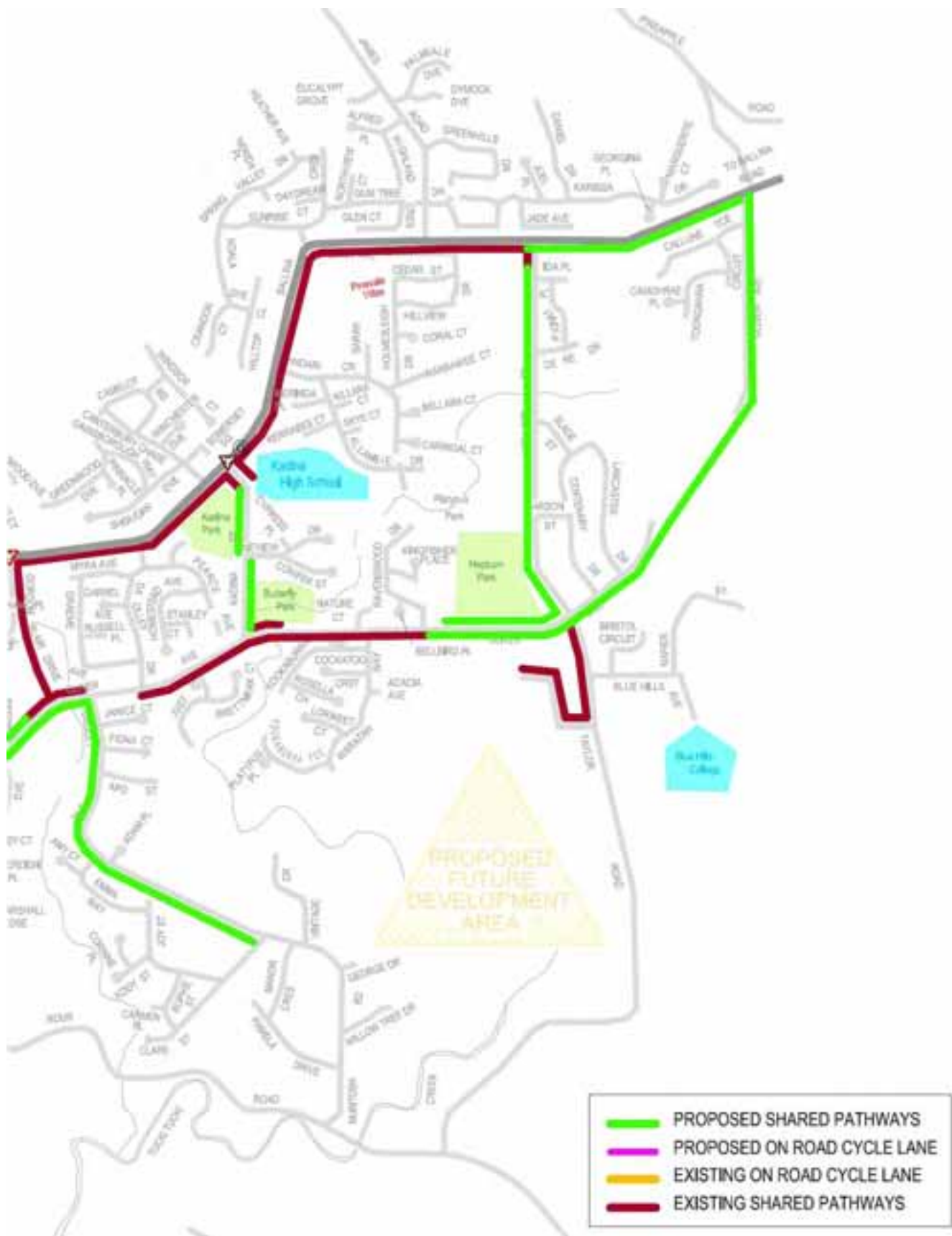
North Lismore

# NORTH LISMORE



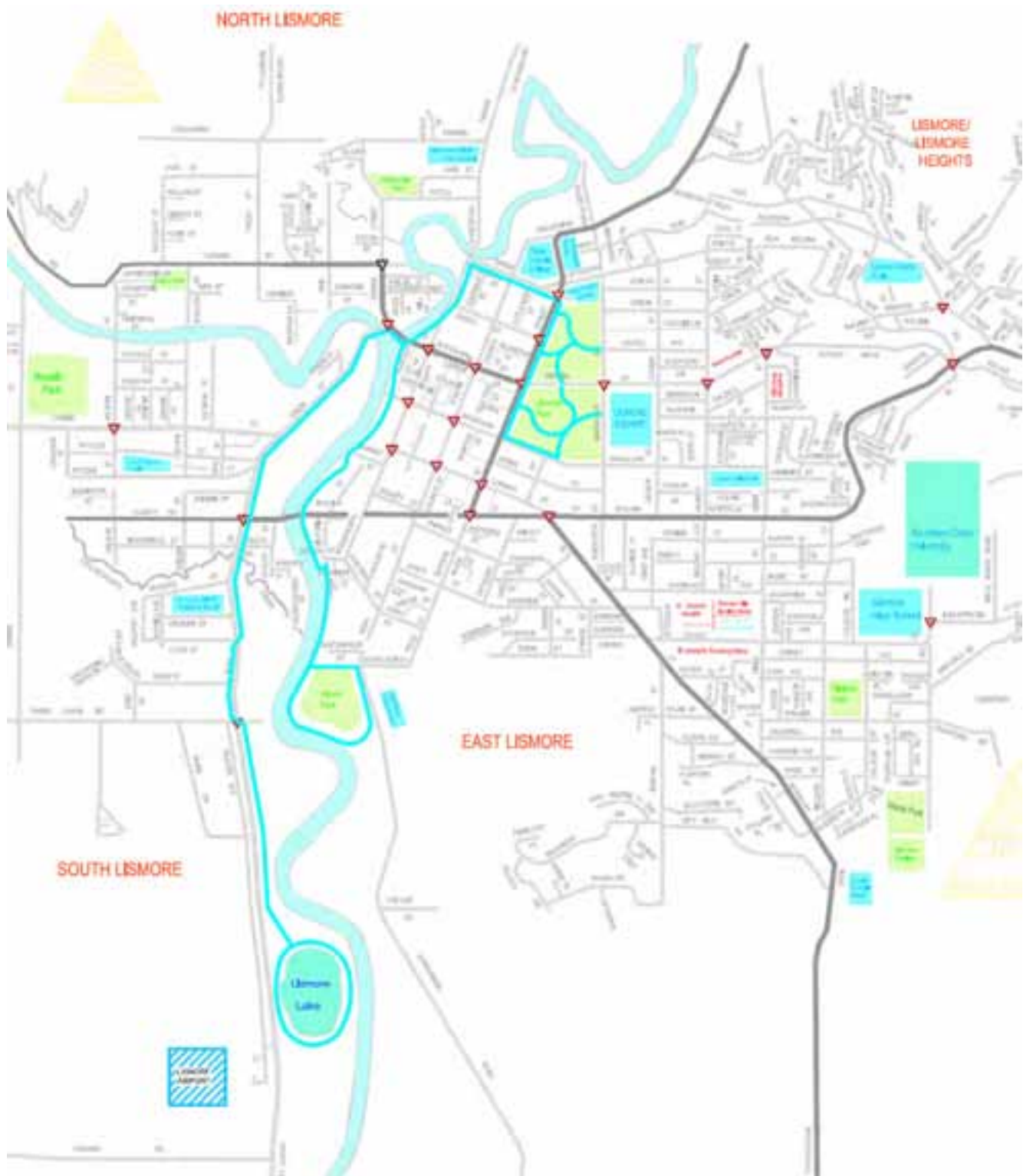


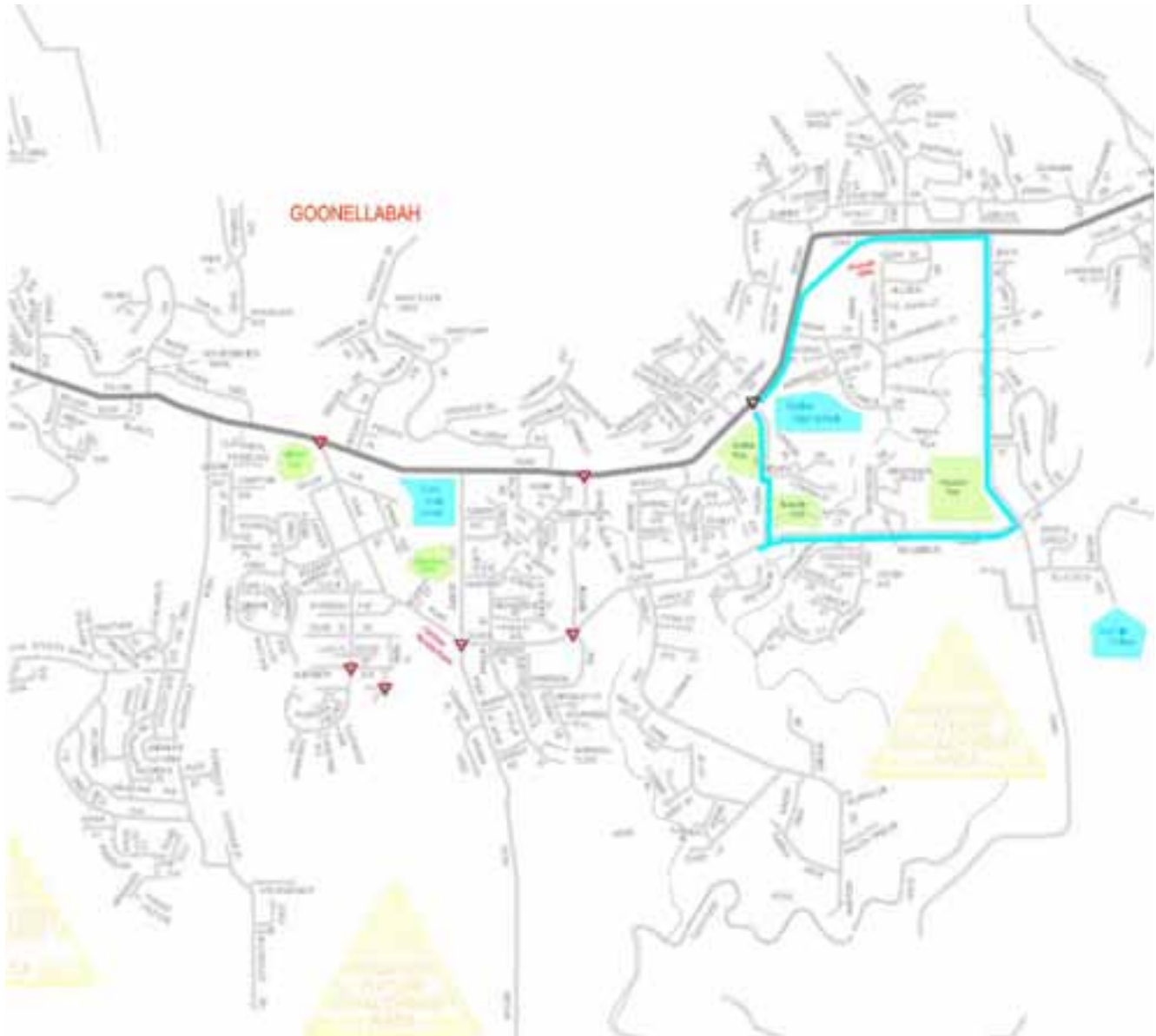
Goonellabah



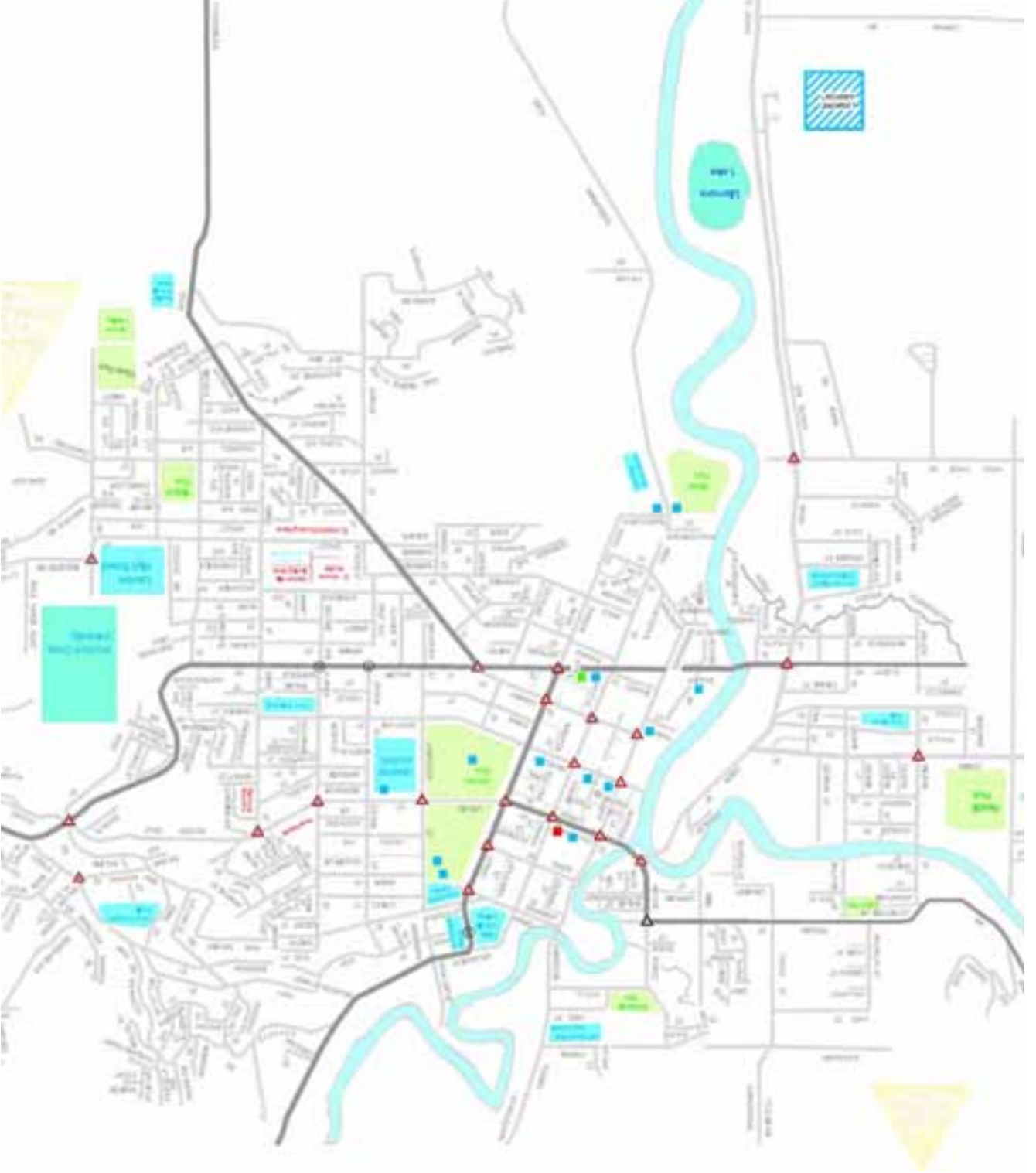


Appendix D: Designated Recreational Routes (map)

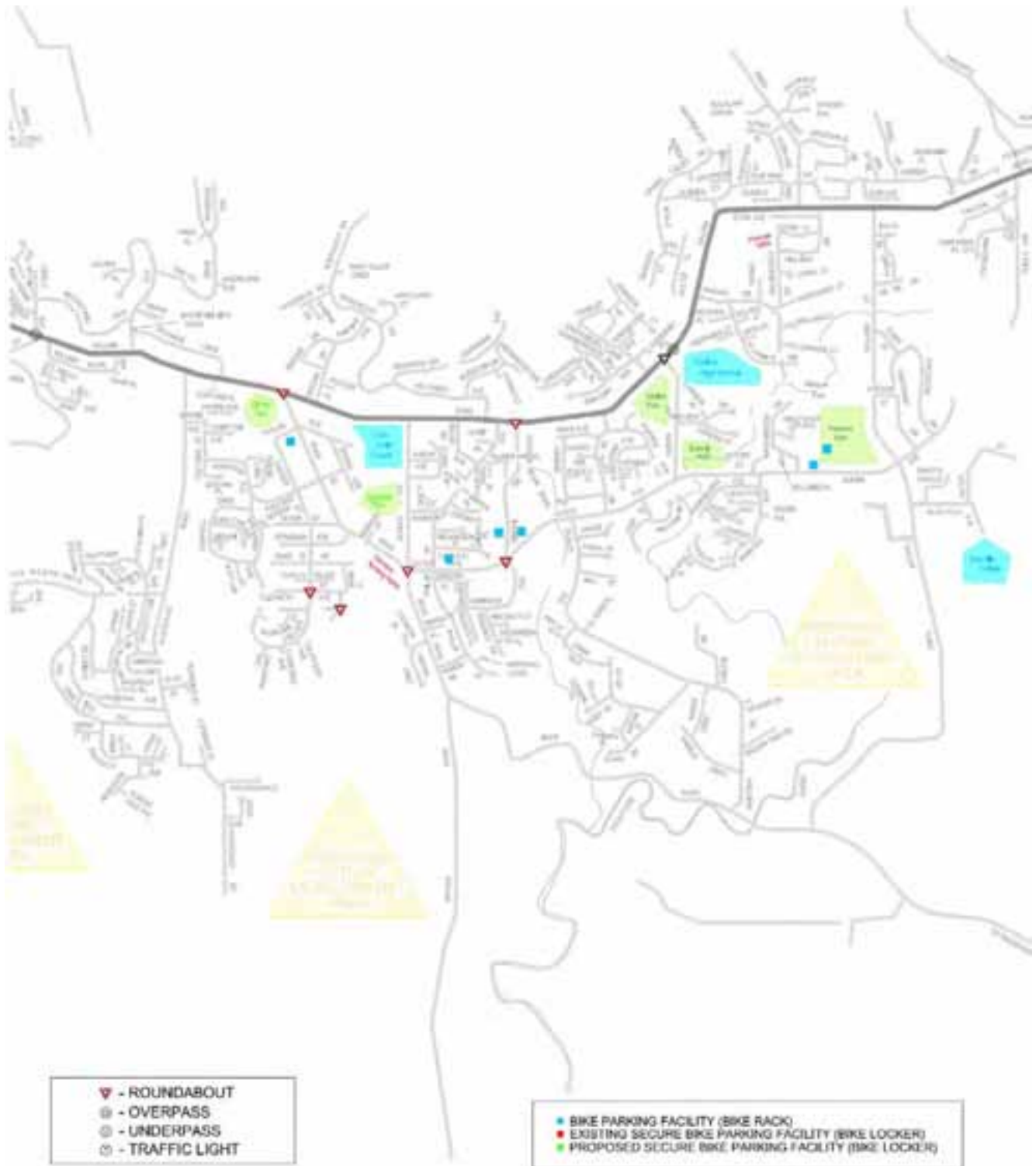




**Appendix E: Bike Parking Facilities (map)**

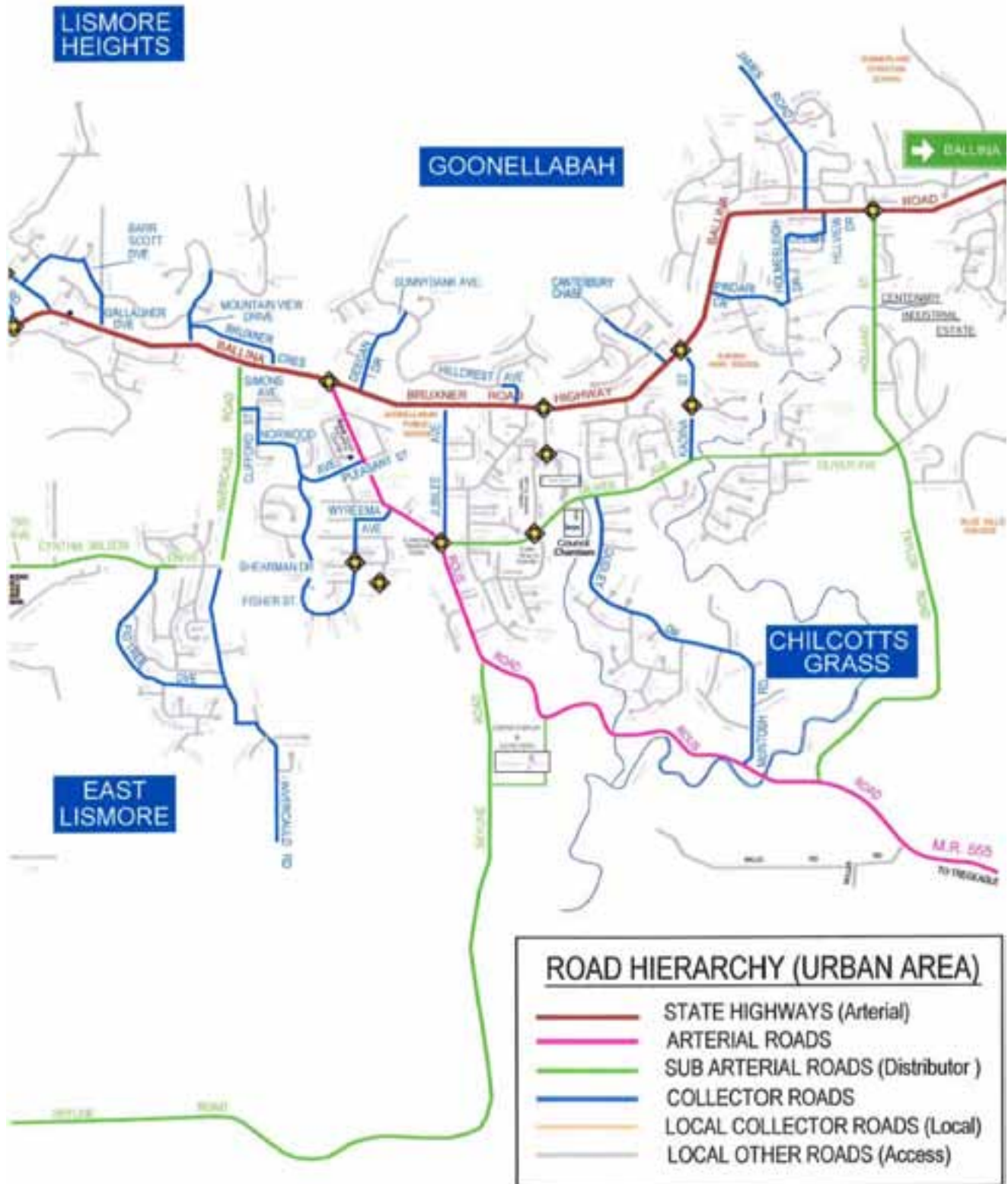






Appendix F: Road Hierarchy (map)





**Appendix G: Survey Raw Data: School Principal Surveys**

## Primary School Principal's Survey Results

Of the 8 schools to which this survey was given, only two School Principal surveys were returned. These were from Lismore Public School and Wyrallah Rd Public School.

|                                    |   |
|------------------------------------|---|
| Lismore Public School              |   |
| # of students:                     | 300   |
| # of students who ride:            | < 20  |
| Parking provisions:                | Bike rack in designated area                |
| Road safety programs:              | PDHPE/part of syllabus                      |
| Actions to encourage safe cycling: | Bike safety day each year                   |
| Improvements:                      | Expanded cycleways and cycle lanes on roads |

|                                    |  |
|------------------------------------|--|
| Wyrallah Rd Public                 |  |
| # of students:                     | 535  |
| # of students who ride:            | uncertain  |
| Parking provisions:                | Secure locked below school building                          |
| Road safety programs:              | PDHPE road safety unit                                       |
| Actions to encourage safe cycling: | lectures demos, police bike talks bike afternoon @ wade park |
| Improvements:                      | better cycleways   |



## Appendix H: Survey Raw Data: School Student Surveys

Surveys were distributed to all schools in the Lismore city area. Three schools responded by returning questionnaires. These were:

Richmond River High (56 surveyed)  
Kadina High School (47 surveyed)  
Wyrallah Rd Public School (146 surveyed)

This equates to a total of 251 surveyed students. This presents us with an even spread of students of primary and high schools ages.

The results were compiled together and are as follows:

How often do you cycle to the following places?

|                               | Almost everyday | About once/week | About once/month | Less than once/month | Almost never |
|-------------------------------|-----------------|-----------------|------------------|----------------------|--------------|
| The shops                     | 29              | 44              | 17               | 23                   | 118          |
| Your School                   | 21              | 9               | 4                | 10                   | 190          |
| Friends house or recreational | 39              | 58              | 39               | 26                   | 73           |

Has your bike been stolen in the last 3 years?

# of yes answers: 46  
% of stolen bikes: 18.3%

If so, from where was your bike stolen?

| Area     | count | % of each |
|----------|-------|-----------|
| Home     | 24    | 52.2%     |
| at shops | 8     | 17.4%     |
| In town  | 5     | 10.9%     |
| school   | 2     | 4.3%      |
| other    | 6     | 13.0%     |

Which areas of Lismore require secure bike parking?

# of students surveyed: 251

| Area Noted            | # of times | % of each |
|-----------------------|------------|-----------|
| Lismore Square        | 119        | 47.4%     |
| Lismore CBD           | 67         | 26.7%     |
| School                | 50         | 19.9%     |
| Parks/Sporting fields | 57         | 22.7%     |
| other shops           | 47         | 18.7%     |

The majority of bikes stolen were stolen from the high school students (33 of the 46 bikes stolen belonged to high school students). This could mean that it is mostly students of this age who are stealing the bikes.

It is also worth noting that by far the most likely place to have your bike stolen from is your home. 52% of bikes stolen were from the owner's home or from a home they were visiting. This is a noticeable change from the previous survey where the majority of bikes (62%) were stolen from around shopping centres. The number of bike thefts from shopping centres has dramatically decreased over the last 12 years to only 17%.

The most requested area to have secure bike parking was Lismore Shopping Square at 47%, followed by the CBD even though cycling is discouraged within this area.



## Appendix I: Public Meeting Letters and Feedback

Below are the letters received following the first public meeting and the presentation of the concept plan. They are listed in no particular order and are as follows:

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### Letter 1

Cycleway

Re the public meeting on cycleways in Lismore.....I think your presentation was excellent, plus the feedback. The challenge will be to appease both recreational cyclists and those wishing to access the CBD; many of the former would prefer avoiding the CBD when out just for an enjoyable ride.

The plans you presented were a good compromise and I was particularly pleased with the effort being made to link the elevated areas (Goonellabah and Lismore Heights) with the flatter country with a cycleway. I'm in favour of having a cycleway separate as much as is practically possible from established roadways but realise some compromise here is unavoidable. Going on what I've seen in other areas (Toowoomba and in London), would you consider an unbroken dividing line down the centre of the cycleway? That will keep all traffic (pedal and foot) to the left hand side.

In my opinion we (the cyclists) should try not to hinder this project any longer which would be the case by suggesting/demanding heaps of modifications to what really is quite an acceptable plan the way it is. We have been waiting since 1995 for something like this, so let's have no more delays and do all we can to help you put a final draft before Lismore Council ASAP.

Kevin Elsley  
44 High Street,  
Lismore Heights.  
(02) 66 24 6891

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**Letter 2**

Richmond River High School

Parents and Citizens' Association

Submission to Lismore Cycleway Study – Simes Bridge Area – 02/04/07

This submission is in regard to the safety of Richmond River High School students walking or riding to and from school via Orion Street, Simes Bridge and Winterton Parade, either from residences in Lismore or after being dropped off at the Trinity bus exchange. This is the most direct pedestrian route from Trinity or the CBD to RRHS. It is also the direct vehicle route from Bangalow Rd, Lismore Heights and the CBD to North Lismore and points beyond.

We feel that there are three serious safety issues which our students face each day when walking or riding this route:

The lack of any formal pedestrian crossing across Keen Street at its intersection with Orion Street (at Xerox print shop). This intersection can be quite busy especially in the morning and has poor line of sight, especially for vehicles travelling east or west along Orion Street and turning right into Keen Street.

The lack of a suitable footpath or cycleway along Orion Street between Keen and Molesworth Streets. The section adjacent to the Catholic Education Office is an area of particular concern. The road carriageway here is only wide enough for two vehicles to pass and is on a crest with low cuttings on both sides. There is almost no verge or footpath between the roadway and the cuttings. The only way to traverse this section on foot is to walk along the edge of the actual traffic lane and interact with whatever traffic is passing at the time. The carriageway does not have an apron, so there is no room for vehicles to pass bicycles safely.

The approach to Simes Bridge. This is another busy intersection, especially in the morning and has poor line of sight for vehicles travelling north along Molesworth Street and west along Orion Street towards the intersection. The pedestrian safety fence alongside the bridge walkway is a very welcome addition to our students' safety. However it extends south along Molesworth Street to the south side of Orion Street, creating an issue for students approaching on the northern side of Orion Street. We have a large number of students, some as young as 12 years old, negotiating this route every school day morning and afternoon; and especially on Wednesday sports afternoon when students attend activities at the Police Citizens Youth Club and other venues. We feel that this is a dangerous area for an experienced adult to walk, let alone for teenagers, often in groups, who may not have developed the same level of road sense as an adult with driving experience.

The number of students walking this route has increased due to the development of the Trinity Bus exchange as a major drop-off point and the growth in the student population at Richmond River High School.

In addition, the number of vehicles using these sections of road can be expected to increase with the development of the ring road system (which includes Simes Bridge and Orion Street) as the preferred route for traffic bypassing the CBD. Traffic is already busy, especially during the morning peak period when the greatest number of students and vehicles are using the road system at the same time. The new major round-about at the corner of Orion and Brewster Streets is also likely to increase traffic flows down Orion Street.

In the absence of any defined pedestrian route along the lower part of Orion Street, our students have been observed doing the following:

Some students walk down the southern side of Orion Street along the edge of the carriageway or on the narrow grass verge between the carriageway and the cutting. This unfortunately places them in close proximity and with their backs to west-bound traffic with limited line of sight.

Some students avoid walking close to the traffic on the south side of Orion Street by cutting through the Catholic Education Office car park. They then walk down through the revegetated riverbank area on the northern side of Orion Street. Unfortunately, this then brings them to the wrong side of the intersection for accessing the Simes Bridge walkway.

Students choosing to walk down the northern (and safer) side of Orion Street are then faced with a dilemma at Simes Bridge as they are on the wrong side of the road to access the protected walkway across the Bridge. They have several options at this point:

They can cross Orion Street, then cross Molesworth Street and go around the end of the safety fence. To do this they have to negotiate traffic on both Orion and Molesworth Streets without any formal pedestrian crossings and with poor line of sight for approaching traffic on both carriageways. This represents a fair amount of backtracking. So some students succumb to the temptation to walk straight across the southern end of Simes Bridge and jump the safety fence on to the walkway. Some students have even been seen crossing Simes Bridge in the face of oncoming traffic on the east side where there is no walkway at all, in order to avoid having to negotiate the safety fence. In the absence of a clearly defined and safe route, we cannot rely on our young people to always make sensible decisions. No amount of advice or education on the part of parents or school staff can guarantee the safety of our students negotiating a dangerous and confusing pedestrian route. The above safety issues in regard to narrow carriageways and poor lines of sight also apply to students riding through this intersection. Given the current situation, we are concerned that a serious incident is inevitable.

We offer the following suggestions, which we feel would provide a marked improvement in safety for our students and require very little cost outlay on the part of Council:

Construction of a formal pedestrian/cycle crossing or centre island refuge across Keen Street along the south side of Orion Street. (Item 1 above).

Widening of the road verge along the south side of Orion Street between Keen and Molesworth Streets to allow for a formed level footpath with kerbing and channelling (minimum) to separate pedestrians from vehicles, or construction of a shared zone for bicycles and pedestrians. (Item 2 above).

Construction of a formal pedestrian/cycle crossing or centre island refuge across Molesworth Street along the south side of Orion Street aligned with the new safety fence. (Item 3 above).

Placing a Give Way sign for vehicles approaching from the south along Molesworth Street, so that they are slowed before having to negotiate the pedestrian crossing and the intersection. A number of parents and school staff have reported that this is a dangerous intersection to negotiate in a vehicle from Orion Street, because there is poor line of sight back down Molesworth Street. Vehicles travelling up Molesworth Street from the south can appear suddenly out of a deceptively low dip in the carriageway. And they are often travelling quite fast if they intend to proceed straight ahead over the bridge, as they currently have right of way. Placing a Give Way sign on Molesworth Street would seem to be consistent with prioritising Simes Bridge and Orion Street as part of the ring road system (Item 3 above).

We hope you are able to incorporate these suggestions into the final cycleway plan with a high priority for early attention.

Rob Fleetwood  
for The Executive,  
RRHS P & C Association  
817 Boyle Rd. Coffee Camp, 2480.  
Ph: 02 6689 9356  
[robnros@mullum.com.au](mailto:robnros@mullum.com.au)

**Letter 3**

2 April 2007 Heidi Chappelow and Lazuli Kubenk,

We are members of Lismore Climate Action Group, and its sub-committee Planet Safe Travel: creating environmentally sustainable transport options.

We attended the public meeting last Wednesday regarding Lismore Cycleways.

We would like to correspond with you regarding improvement of the cycle plan, and related consultation process

Firstly, thankyou for your friendly and professional presentation, the plan you presented was well thought out in some regards and highlights safety and convenience. It focussed on the difficult Goonellabah to town link, and access to cycle attractors (mainly recreational and educational).

We are concerned that the premise of surveying mainly school cyclists seems to have limited the vision. (School cyclists have minimal functional use for the CBD compared to a Uni Student who may also have no car but needs to do their shopping, get to work, pay their bills etc on their bike.)

The plan presented looked as if a lot of money and time would be tied up in 22km of "ideal vision" off-road cycleways, and limit progress toward making the city more practical for all cycle users.

The evening unfortunately seemed to be inadequately advertised, and was virtually inaccessible to cycle users being in Goonellabah at night.

We appreciated that you were open to new ideas, so here are ours:

-Urgent importance to go ahead with the improvements to the bridge used to access Richmond River High.

- We request that work on the final draft of the cycle plan be halted. To link the cycleways plan with the Urban Traffic Plan (UTP) and do further research, outlined below.

- Linking the Cycle plan for Lismore with the Urban Traffic Plan (also currently in development), to ensure the CBD can function appropriately for both bicycle and vehicle users.

Council needs to make arrangements so that you are given the power to work alongside and informing the Urban Traffic Plan, once this is in place, please use it to create a more wholistic approach for both cyclists and other road users.

We have written a Letter to Stephen Yam, and have spoken to Selina Runge, regarding the linking of the UTP and the Cycleway plan. Selina has requested a meeting with Ruth Povall in the Economic Development Unit to explore this practical possibility further. We will ensure you are kept up to date of any progress.

- Linking the Cycle Plan and Urban Traffic Plan with the Cities for Sustainability Plan, to create a visionary Urban Traffic Plan heading toward necessary cultural and infrastructure change in line with Council's Carbon Emissions Targets. We will be addressing counsellors, to assist with this.

-Increasing the scope of the survey undertaken by LEGS, to include other interest groups ie tertiary students, rural commuters, people without cars and the driving public, who may take to cycling if the road conditions were improved.

This would bring attention to more comprehensive list of cycle attractors. We have members able to distribute surveys amongst tertiary students.

-Improved public consultation process: widely advertised, accessible venue for cyclists, specifically targeting the newly surveyed groups, and accessible for school aged cyclists. We note that your survey did not pick up, the skate park as a cycle attractor. This indicates insufficient research even amongst the surveyed target group.

-Timeline and budget approach that first creates maximum impact for minimum dollars, ie marking cycleways on all roads or sections graded wide enough, and signage to alert drivers to the presence of cyclists.

-Staged approach as your plan suggests, toward cycle-path network of excellence.

Which includes

- Ample, safe and progressive access for bicycles and other non-car transportation within and around the CBD.

-Increasing opportunities and benefits for car-alternate options.

Examples include reducing on-road car parking to facilitate cycle ways, marking cycleways on all roads, on sections graded wide enough, including rural commuter corridors. Delegated shady car-parks for people carpooling, edge of town car-parking stations, community education, and signage, city-bike public access scheme – Eg: Copenhagen's City Bike Program

<http://members.aol.com/humorme81/citybike.htm>

We would like to support you to achieve these aims. You may be surprised at the latent public and council support behind a progressive approach. We are in the process of contacting some councillors who may be able to support you to achieve these aims.

Please contact us if you would like to discuss anything relating to our concerns.

Heidi Chappelow, Lazuli Kubenk  
Planet Safe Travel  
lazulihappy@yahoo.com.au  
1659 Dunoon Rd Dunoon

Ps: No doubt you are all well educated regarding urban planning and cycling issues, we have done some research on the Internet regarding bicycle cities around the world. Attached is a page of web-links you may find helpful.

## Appendix J: Web links and electronic feedback

### Email 1

Here is discover Amsterdam, city of bicycles, a bit about the City Council's push for cycle infrastructure history:

<http://www.fietsen.123.nl/route%20ontdek%20amsterdam%20eng.htm>

Here is Bicycle NSW Policy recommendations in lead up to 2007 state elections and beyond

[http://www.bicyclensw.org.au/Assets/Downloads/bicyclensw\\_policyrecommendations.pdf](http://www.bicyclensw.org.au/Assets/Downloads/bicyclensw_policyrecommendations.pdf)

Especially note:

#### 2. Climate Change: Support community interest in sustainable transport options

Climate change is very real. Any rational government is morally and ethically bound, to do all that it reasonably can, to reduce green house gas emissions and reach its targets for air quality. Riding a bicycle is an important action that individuals can take to contribute to a reduction in greenhouse gases.

Australian Greenhouse Office (AGO) data for every 1km cycled that normally would be travelled by private vehicle there is a saving of 0.00033 tonnes of greenhouse gas emissions. It therefore follows that shifting people from cars to bicycle transport will have a material impact on greenhouse gas emissions. Providing infrastructure and encouragement to ride to work (as detailed in Transport point) is one of the most important examples of this shift, ride to school is another.

#### 3. Transport: Implement a coordinated approach to infrastructure provision and behaviour change.

The government has a responsibility to help make cycling a more viable travel solution, by improving facilities for cyclists and making it safer to cycle. There are more bicycles sold each year (approx. 1.2 million)

#### 9. Treasury & the Economy: Support the key health and environment policies of the National Reform Agenda

The bicycle business is big business with more bikes than cars sold in Australia each year. For its part, the Federal government has already recognised the importance of cycling in its Sustainable Cities report of 2005. Cycling has a key role to play in the liveability and sustainability of our cities and communities, which are critical to maintaining Australia's economic performance. The latest round in the National Reform Agenda brings focus to the human capital and environmental outcomes as requirements for the future competitiveness of the Australian economy in a global context. At a time when the NSW economy lags behind the rest of the country, cycling is all the more relevant.

Corporate Social Responsibility is increasingly important for corporations, with greater focus on the triple bottom line of economic, social and environmental considerations. By introducing cycling programs, employers can encourage more staff to cycle to the place of employment and reap the benefits with healthier, happier employees. However, to facilitate an increase in the number of people cycling to their places of employment, along with the improvement of cycling infrastructure, the community needs some form of education (e.g. bicycle maintenance, cycling basics).

Bicycle NSW supports the findings of a Senate Committee Report 'Australia's future oil supply and alternative transport fuels', calling on changes to the tax system to remove the distortions that favour car use over public transport or cycling.

The RTA Bicycle Count data shows a 45% increase in bicycle traffic between 2002 and 2005 into Sydney CBD.

City of Sydney Draft Cycle Plan 2006 - 2016

<http://www.cityofsydney.nsw.gov.au/Council/documents/OnExhibition/CycleStrategy/CyclingStrategyExhibitionDraft2006Part1.pdf>



## Executive Summary

### Background

Research indicates a significant switch from cars to bicycles as a mode of transport can be achieved through the provision of appropriate bicycle facilities and programs. New bike planning in cities across North America is delivering significant gains in cycling participation.

Davis, California, for example has increased cycling as a mode of transport to 10% of total trips. European models including Deft in Holland or Copenhagen in Denmark have demonstrated that with the highest levels of commitment, very significant shifts towards cycling of up to 30% can be achieved. Surveys undertaken in Sydney in 1990 show that regular cycle trips could increase by 20% if the road system was made safer and more convenient. The City of Sydney Cycle Strategy and Master Plan (the Plan) is Council's commitment to improving cycling in the City. It provides the social and infrastructure directions and actions to achieve a greater level of cycling participation, and a safer and more comfortable cycling environment over the next 10 years. The Plan is part of the City's Integrated Transport Strategy currently being developed. It is based on a comprehensive analysis of cycling issues by consultants for the City, including input from the cycling community. The Plan is consistent with the City's Corporate Plan objectives, especially in the key focus area of transport and accessibility. Building on the former City of Sydney, South Sydney Council, and Leichhardt Bike Plans, the Plan identifies a range of network and infrastructure priorities and social initiatives and action plans to deliver these initiatives.

Bike-only lanes let cyclists shift into a new gear

<http://www.smh.com.au/news/environment/bikeonly-lanes-let-cyclists-shift-into-a-new-gear/2007/03/23/1174597882715.html>

Here is the web address for oybike, street hire system, UK

<http://www.oybike.com/?gclid=COzsfefGolsCFQvUIAod8GMQhg>

Sharing the road with bikes: How does Copenhagen do it?

By PATRICIA CHASE. Special to the Journal

<http://www.i-sustain.com/learningCenter/Publications/Creating%20a%20Bicycle%20Culture%20-%20DJC%20Article.htm>

### 32% cycle to work

Currently 32 percent of workers bicycle to work. In surveys, 50 percent say they cycle to work because it is fast and easy. An equal number say they do it for exercise. Financial reasons play a part for some cyclists. Weather does have an impact on cycle use but not as much as one might expect. Sixty percent of cyclists normally cycle in rainy weather and 66 percent continue cycling in the winter in temperatures that hover around freezing. Still, these figures aren't good enough for the Department of Traffic Planning, which now has the goal of increasing bicycle commuters to 40 percent. With high levels of cycling, it would be natural to expect a high accident rate, but the paradox is that the more cyclists there are, the safer it is. This is because a critical mass has been achieved in which drivers have a heightened sense of awareness about bicyclists. How has Copenhagen achieved such a high level of bicycle use? First of all, bicycle planning has the same status as public transport in planning and funding. Bike paths and routes are either clearly marked or separated from vehicular traffic by curbs, bike lanes have their own traffic signals and bikes are prioritised over cars at places where they meet.

### Steep taxes, little parking

Extensive marketing and public relations campaigns have been implemented to get people to leave their cars at home for in-city travel, even if they have a car for use on the weekends. In addition to good planning, the local and national governments use a big stick when it comes to trying to keep people from relying on cars. Fees and taxes for automobile purchase add 200 percent to the price of

a new car. There are few parking spaces, and the ones that exist are very expensive. In order to insure that everyone has access to a bike, Copenhagen has a free bike program called City Bikes. Riders pay a refundable deposit of about \$3 to have unlimited use of a bike within a specified area. The cost of the program is paid by sponsors, who pay about \$280 per year for a minimum of 25 bikes. In return for sponsorship, the bikes carry advertisements, which appear on the top tube panel and disk wheels. The bicycles used in the City Bikes program were designed with components that are incompatible with other bikes, preventing theft of parts. Since the launch of the program, bicycle theft in Copenhagen has decreased. The City Bikes program has become part of Copenhagen's downtown culture, and a visible sign that Copenhagen cares about being a liveable city.

#### Scandinavian sustainability

In March, a group of architects, engineers, developers and others from Washington and Oregon went to Sweden and Denmark to look at urban sustainability projects. The DJC is running a series of weekly articles on sustainability in Scandinavia, based on places visited by the tour group. The tour was organized by International Sustainable Solutions, a group with offices in Seattle and Aalborg, Denmark. The organization encourages the sharing of knowledge and the creation of market opportunities for sustainable products and practices.

For more information about International Sustainable Solutions, contact Patricia Chase at [Patricia@i-sustain.com](mailto:Patricia@i-sustain.com) or visit [www.i-sustain.com](http://www.i-sustain.com)

#### Copenhagen's City Bike Program

<http://members.aol.com/humorme81/citybike.htm>

#### Evolution of a Bicycle Friendly Community - the Davis Model

<http://www.bicyclefriendlycommunity.org/davis1.htm>

**Email 2**

Hello Colin,

Thank you for your presentation last night.

Attached is a map of the area north west of Lismore indicating the catchment area for cyclists commuting to Lismore.

As you will see, this feeds into Tuncester but the road from Tuncester to Lismore has a narrow pavement and is busy. There is plenty of room to the side of the road and it might be feasible to construct a parallel cycle path - or widen the present road.

Other routes from the north - Dunoon Road, the Nimbin Road - as narrow, busy and very hilly which is a drawback for cycling.

Any questions, feel free to contact me.

Hugh Nicholson

Ph: 02 6688 6204

Email: [terania@activ8.net.au](mailto:terania@activ8.net.au)



Appendix K: Cycleway pavement specifications and dimensions

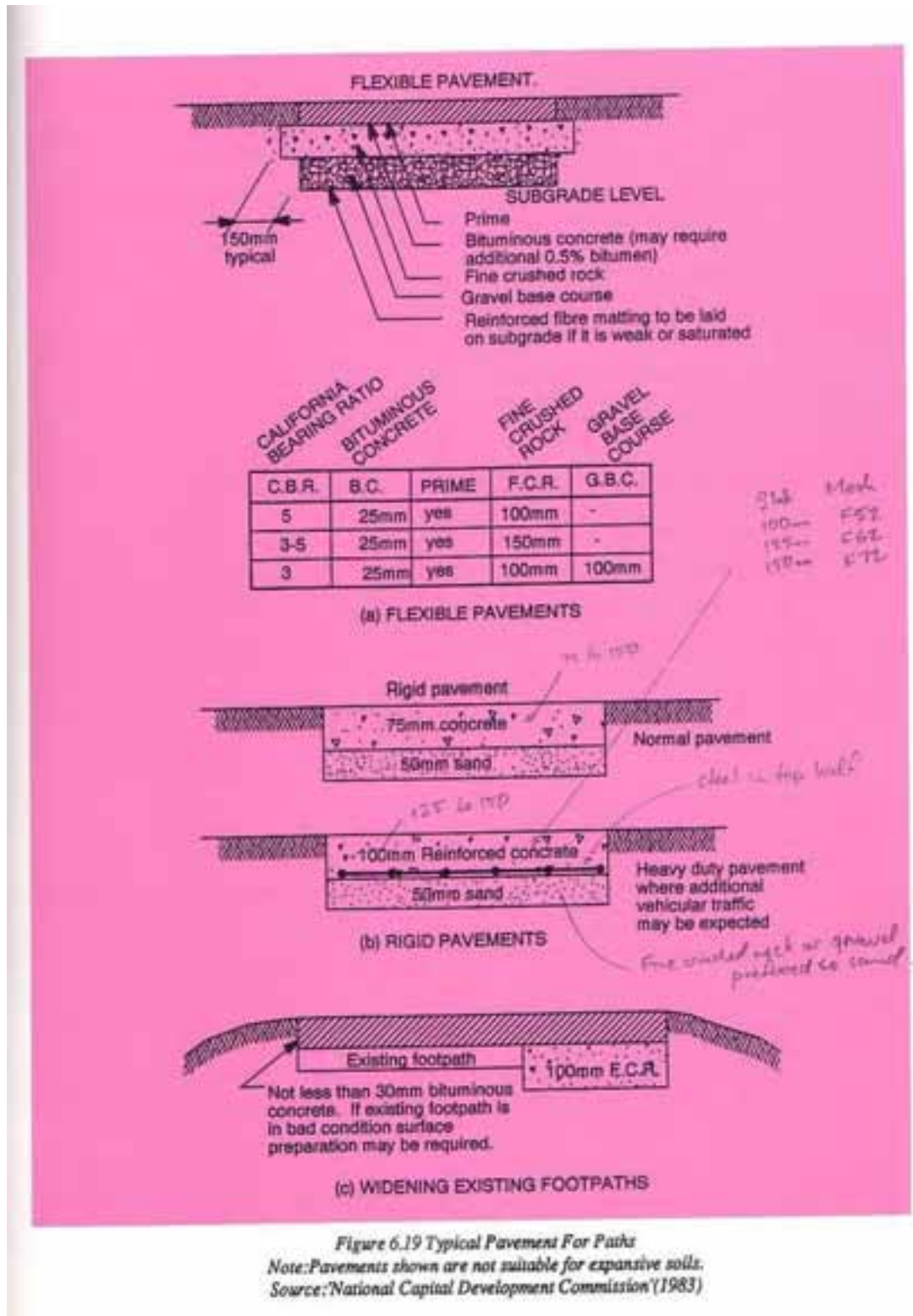


Figure 1: Typical Pavements for Paths – Widening and Construction



See Below for Addendum

## AUSTROADS

### ERRATUM SHEET for Guide to Traffic Engineering Practice, Part 14 - Bicycles

#### Section 6.9 Pavements

1. This erratum sheet has been published to correct an error in Section 6.9 of the Austroads Guide and to provide some additional information on the design of rigid pavements for bicycle paths. The source of the information is a technical article entitled "*Permanent Cycleways*" by the Cement and Concrete Association of Australia.
2. Figure 6.19 of the Guide is erroneous in that:
  - The reinforcement is provided to control cracking and therefore should be shown in the to half of the pavement. This is achieved in practice by the use of bar chairs.
  - Fine Crushed Rock or gravel should be preferred to sand as a sub-base material.
  - The slab thickness required will depend on sub-grade conditions. A thickness between 75 mm and 150 mm may be required for plain concrete whilst the thickness of reinforced slabs may vary between 125 mm and 150 mm.
3. The suggested minimum strength concrete for bicycle paths is 26 Mpa (fc) but strength should be increased if the pavement will be subjected to freeze/thaw conditions.
4. The following mesh is required for reinforced concrete pavements:

| SLAB THICKNESS | MESH REQUIRED |
|----------------|---------------|
| 100 mm         | F52           |
| 125 mm         | F62           |
| 150 mm         | F72           |

5. Joints in rigid pavements are either contraction joints or expansion/isolation (at the end of a concrete pour) joints. Contraction joints may be sawn or formed when the concrete is wet. They should be no more than 3 mm wide, extend about a quarter of the slab thickness from the slab surface, and be placed at about 3 metre intervals. As an alternative PVC crack inducers have been successfully used but it is recommended that insitu testing be performed to verify their use. Expansion joints should extend the full depth of the slab, be 10 mm wide, be filled with a compressible filler and be placed at about 12 metre intervals.
6. Where the slope of the path exceeds 5% the use of Anchor Blocks should be considered to guard against slippage of the slab. The blocks consist of a beam of concrete measuring 200 mm high by 300 mm wide cast integrally across (ie. transverse to the path) the bottom of the slab.
7. Surface finishes produced from a hessian drag, wooden float or light broom should provide sufficient skid resistance for bicycles. On Segregated Paths other finishes (eg. stamped, coloured, textured) can be used to advantage for the pedestrian path surface to discourage cyclists from using it.

Figure 2: Erratum sheet for Figure 1 above

## Appendix L: Path Widths (Austroads Guide to Road Design Part 6A 2009)

### 7.5.2 Bicycle Paths

Table 7.3 shows desirable widths and acceptable ranges of width for bicycle paths (i.e. exclusive use). The upper limit of the acceptable range in the table should not discourage designers from providing a greater width where it is needed (e.g. very high demand that may also result in overtaking in both directions).

Table 7.3: Bicycle path widths

|                                 | Path width (m)                      |                                     |
|---------------------------------|-------------------------------------|-------------------------------------|
|                                 | Local access path                   | Major path                          |
| Desirable minimum width         | 2.5                                 | 3.0                                 |
| Minimum width – typical maximum | 2.5 <sup>1</sup> – 3.0 <sup>2</sup> | 2.5 <sup>1</sup> – 4.0 <sup>2</sup> |

1. A lesser width should only be adopted where cyclist volumes and operational speeds will remain low.
2. A greater width may be required where the number of cyclists is very high.



### 7.5.3 Shared Paths

Table 7.4 shows desirable widths and acceptable ranges of width for shared use paths. As for bicycle paths, the upper limit of the acceptable range in the table should not discourage designers from providing a greater width where it is needed (e.g. very high demand that may also result in overtaking in both directions).

Table 7.4: Shared path widths

|                                 | Path width (m)                      |                                     |                                     |
|---------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                 | Local access path                   | Commuter path                       | Recreational path                   |
| Desirable minimum width         | 2.5                                 | 3.0                                 | 3.5                                 |
| Minimum width – typical maximum | 2.5 <sup>1</sup> – 3.0 <sup>2</sup> | 2.5 <sup>1</sup> – 4.0 <sup>2</sup> | 3.0 <sup>1</sup> – 4.0 <sup>2</sup> |

1. A lesser width should only be adopted where cyclist volumes and operational speeds will remain low.

2. A greater width may be required where the numbers of cyclists and pedestrians are very high or there is a high probability of conflict between users (e.g. people walking dogs, roller bladders and skaters etc.).

### 7.5.4 Separated Paths

Table 7.5 and Table 7.6 show desirable widths and acceptable ranges of width for two-way and one-way separated paths respectively. However, where it is appropriate (e.g. high traffic demand) designers may provide a greater width than the typical maximum shown in the tables.

Table 7.5: Separated two-way path widths

|                                 | Path width (m) |          |       |
|---------------------------------|----------------|----------|-------|
|                                 | Bicycle path   | Footpath | Total |
| Desirable minimum width         | 2.5            | 2.0      | 4.5   |
| Minimum width – typical maximum | 2.0 – 3.0      | ≥ 1.5    | ≥ 4.5 |

Table 7.6: Separated one-way path widths

|                                 | Path width (m) |          |       |
|---------------------------------|----------------|----------|-------|
|                                 | Bicycle path   | Footpath | Total |
| Desirable minimum width         | 1.5            | 1.5      | 3.0   |
| Minimum width – typical maximum | 1.2 – 2.0      | ≥ 1.2    | ≥ 3.4 |

## Appendix M: Path Gradient (Austrroads Guide to Road Design Part 6A 2009)

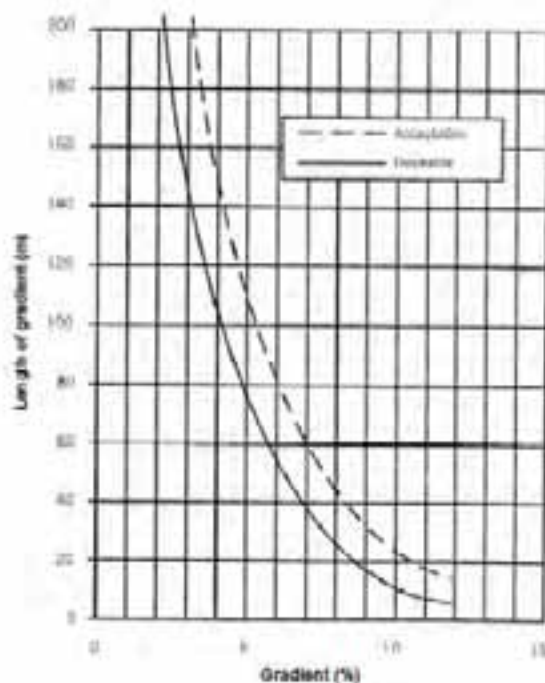
#### 7.4.1 Ease of Uphill Travel

Figure 7.1 shows the maximum lengths of uphill gradient acceptable to cyclists. The figure is based on a review of the ease of uphill travel (Andrew O'Brien & Associates 1996).

In using the figure designers should understand that:

- Above 3% the acceptable length reduces rapidly and it is considered this is the desirable maximum gradient for use on paths. However, in practice there are cases where it is not feasible to achieve a 3% maximum and the designer has no choice but to adopt a steeper gradient.
- In cases where 3% cannot be achieved consideration should be given to limiting gradient to a maximum of about 5% and providing short flatter sections (say 20 m long) at regular intervals to give cyclists travelling both uphill and downhill some relief from the gradient.

It is sometimes difficult to achieve these gradients where a path follows a river and a connection between paths must be achieved in the vicinity of a steep escarpment. It should also be noted that a long, uphill grade preceded by a downgrade is more acceptable than one preceded by a flat or slightly rising grade.



#### Notes:

Gradients and the associated length would normally be based on the distance between the tangent points for an isolated steep section. However, where there are consecutive grades of varying steepness (all uphill) or large radius vertical curves, these should be calculated based on the intersection points of the respective vertical curves.

In general, the 'acceptable' line in the figure would be satisfactory for paths with a high proportion of regular or physically fit cyclists, which in most instances would include commuter and sporting cyclists. Otherwise, the 'desirable' line in the figure is recommended.

Source: Based on a review by Andrew O'Brien & Associates (1996).

Figure 7.1: Desirable uphill gradients for ease of cycling

Appendix N: Bike Parking Facilities



Bicycle Lockers

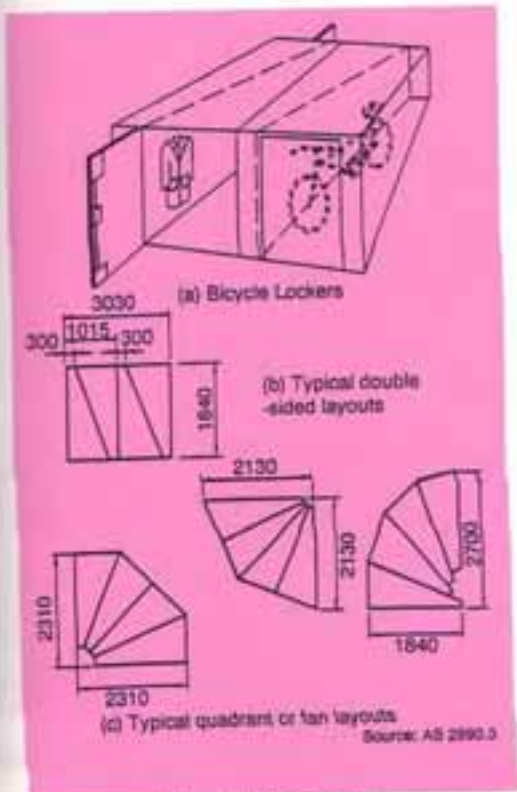


Figure 5.1 Bicycle Locker

5.3.5 Types of Parking Devices

There are three classes of bicycle parking facilities which offer various levels of security, from high to low. These classes and the main types of user are described in Table 5.2. Bicycle parking devices which do not allow the frame and both wheels to be conveniently and effectively locked to the facility cannot be regarded as secure.

(a) The Bicycle Locker

Bicycle lockers such as those shown in Figure 5.1 offer the highest level of bicycle parking security currently available. They are appropriate for all day parking, the most common venue being railway stations and bus terminals to encourage the use of dual mode travel. They have the added advantage that helmets and other gear can be securely stored along with the bicycle, perhaps overnight, thus giving the cyclists more flexibility in their travel arrangements. It is important that the use of lockers is managed by an appropriate authority such as the managers of the relevant shopping centre, major building or railway station.

Users of bicycle lockers should not be allowed to supply their own locks as lockers may end up being appropriated by occasional users and remain empty and locked. It is essential that those responsible for the management of the lockers supply the locks for a fee, retain a duplicate key to enable regular checking of the usage, and maintain a register of regular users. Alternatively, a coin operated

Appendix O: Cycleway Signage

7.2 REGULATORY SIGNS

Regulatory signs are used to formally establish and terminate a bicycle lane or bicycle path, and to control bicycle movements on the road system, particularly at intersections. They form the basis for traffic regulations regarding priority and other driver behaviour. These signs should be provided on all bicycle paths and bicycle lanes in accordance with relevant State traffic regulations, as the minimum signage requirement. However, where traffic volumes are low and motorists are not likely to utilise a bicycle lane an edge line and bicycle pavement symbols will usually be sufficient.

Regulatory signs also include "Give Way" signs and "Stop" signs specifically provided on paths where it is necessary to enforce that cyclists either give way to cyclists using an intersecting path or to motor vehicles using an intersecting right of way. They would normally only be used where sight distance is restricted and cannot be

improved or where a safety problem has developed. The signs can be half the size of those recommended for use on the road system because of the relatively lower approach speeds.

Commonly used signs relating to bicycles are:

7.2.1 Bicycle Lane Designation

The sign in Figure 7.1 (a) is used to legally establish an exclusive bicycle or a shared bicycle/parking lane on the road carriageway so that motorists are advised of the legal status of the lane and traffic regulations can be enforced. Supplementary plates such as that shown in Figure 7.1(b) may also be used to specify times of operation. This sign is also used to terminate the lane by the addition of the supplementary "END" plate shown in Figure 7.1 (c).

7.2.2. Bicycle Path Designation

The sign in Figure 7.2 is used to legally establish an off-road path provided exclusively for bicycles. It informs pedestrians and motorists of the purpose of the lane and permits traffic regulations to be enforced. It is also used in conjunction with the "END" plate in Figure 7.1 (c) to terminate the path.



Figure 7.1 Bicycle Lane Sign



Figure 7.2 Off-Road Path Sign





Figure 7.3 Shared Path Sign

**7.2.3 Shared Path Designation**

The sign in Figure 7.3 is used at the beginning of shared paths to establish the legal status of the path. It is also used at the end of these paths in conjunction with a supplementary "END" plate [Figure 7.1 (c)].



Figure 7.5 Bicycle Prohibition Sign

**7.2.5 Bicycle Prohibition**

The sign in Figure 7.5 is used at locations beyond which a cyclist is not permitted to proceed riding a bicycle.



Figure 7.4 Segregated Footway Sign

**7.2.4 Segregated Footway**

The sign shown in Figure 7.4 is used at the beginning of paths on which pedestrian and bicycle traffic is intended to be separated. The areas to be used by each user group are usually indicated by a longitudinal painted line and by the sign. Contrasting surfacing may also be utilised in which case the painted line may be omitted, but the sign must always be provided. The sign is also used in conjunction with an "END" plate to terminate the segregated footway.



Figure 7.6 Bicycle Control Sign

**7.2.6 Bicycle Control Sign**

The sign in Figure 7.6 is used at locations where it is necessary to direct cyclists to follow a certain route.

**7.2.7 "Bicycles Excepted" Signs**

The signs in Figure 7.7 are examples of general traffic signs which are used to prohibit motor vehicles from entering particular streets or areas usually to improve traffic flow on a major road or to prevent the intrusion of through traffic into sensitive areas. In most cases these same restrictions should not apply to bicycles in which case the signs can be easily modified by the words "BICYCLES EXCEPTED" on either the sign or a supplementary plate.



Figure 7.7 Modified Signs

### 7.3 WARNING SIGNS

Warning signs should only be used where a hazard is not obvious to approaching drivers and riders and the provision of the sign is necessary for safety. If installed, the sign should be far enough from the hazard to allow for a driver or cyclist to react and stop at the operating speed of the road or path.

The signs shown in Figure 7.8 are from AS 1742.9. The sign in Figure 7.8 (a) is used to warn motorists of the fact that cyclists are likely to be using the road ahead and, when used with the supplementary plate in Figure 7.8 (b), that cyclists are likely to be crossing or entering the road in the vicinity of the sign. The sign in Figure 7.8 (c) is used to

warn cyclists using off-road paths that they are approaching an intersection with a road and should only be used in situations where cyclists cannot identify the presence of an intersection from a distance which will enable them to stop safely.

The signs shown in Figure 7.9 are not included in AS 1742.9 but might be useful in appropriate circumstances. The sign in Figure 7.9 (a), together with 7.8 (b), warns drivers that cyclists and pedestrians might be encountered at the crossing. The signs in Figure 7.9 (b) and 7.9 (c) are used to warn cyclists of a steep downhill grade or a slippery surface respectively.

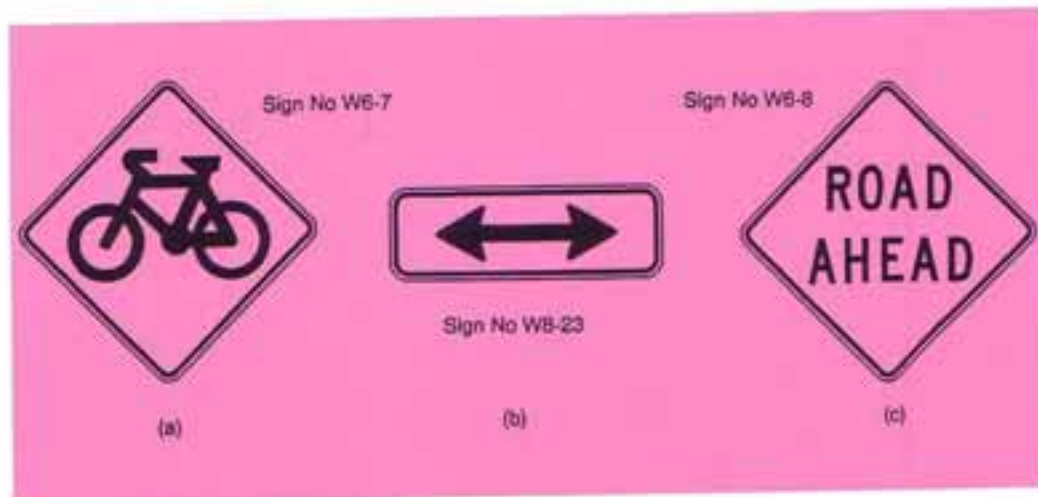


Figure 7.8 (a, b & c) Cyclist Warning Signs



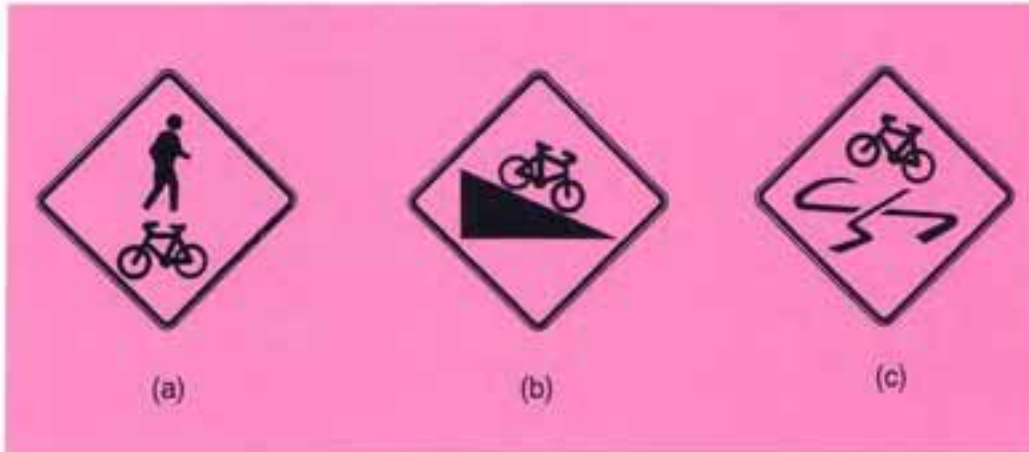


Figure 7.9 Bicycle Warning Signs

There are other situations in practice for which Australian Standard warning signs have not been developed. Examples of these include warning signs for low clearance and flooding in situations where a drainage culvert is utilised as a road or rail underpass for cyclists. Others would be situations where a path narrows unexpectedly, a tight curve is not obvious to cyclists able to approach at high speed or where a "blind corner" exists because of physical constraints on path alignment. In these situations if a new sign is to be designed it should closely follow the principles on which the Australian Standard is based.

#### 7.4 GUIDE SIGNS

Guide signs are very important to cyclists as they define the route and provide necessary information to enable cyclists to conveniently find their way around the network.

Guide signs are required:

- At all junctions between paths specifying key destinations (eg. suburbs, universities, recreational facilities etc.) and distances to those destinations.
- At all junctions between paths and roads specifying the name of the intersecting road, key destinations and distances to those destinations.
- Along paths between junctions to reassure cyclists that they are on the right path. A maximum spacing of 3 kilometres is suggested which relates to 12 minutes cycling at 15km/h; a reasonable balance between cyclists needs and cost.
- On the adjacent road system to guide cyclists to a path.
- On paths directing cyclists to important services such as toilets, water, and food shops.
- Along roads where the bicycle route is not obvious

through pavement marking (eg. route turns a corner or roads are being used to connect sections of path)

The importance of these signs becomes evident in using routes which utilise a number of local streets and off-road paths, and which may follow watercourses, and hence change direction frequently thus causing cyclists to become confused as to their location.

The bicycle route marker sign shown in Figure 7.10 (a) is used as the primary symbol to define on routes. The route marker sign should always be used in conjunction with useful information such as a destination and distance as illustrated in Figure 7.10 (b).

The bicycle route marker may be used in conjunction with various supplementary plates to provide the name of the route, directions from the route to destinations and the existence of special facilities such as parking. Examples of these plates are shown in Figures 7.11 (a), (b) and (c). Other examples in relation to parking facilities are shown in section 8 of this guide. The signs may simply be finger board signs utilising standard signing symbols as shown in Figure 7.12. It should be noted that the suggested colour scheme for the signs in Figures 7.11 and 7.12 are in accordance with the 1991 edition of AS1742.2 which is preferred but contrary to the colour scheme in the 1986 edition of AS1742.9.

On recreational routes it is desirable to provide direction and location signs for toilets, drinking water, shops and places of interest. Where routes pass through river valleys and parkland it may also be desirable to provide signs of an environmentally sensitive design such as those developed for the Metropolitan Trails Network in Victoria. Details of these signs are given in "Sign Guidelines For The Metropolitan Trail Network, Department of Planning and Urban Growth, State Government of Victoria, August 1990.

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Figure 7.10 Bicycle Route Markers

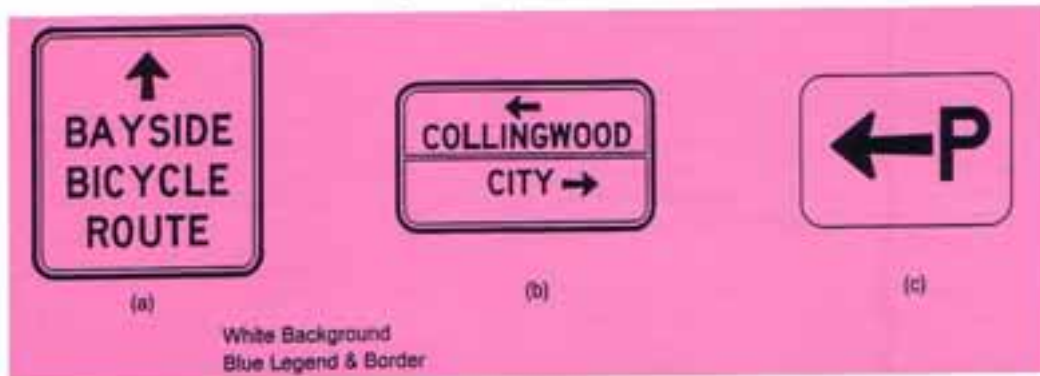


Figure 7.11(a,b, & c) Supplementary Signs



Figure 7.12 Finger Board Signs



*Trail Identification Signs - Victoria*



*Regulatory Sign*

## 7.5 OTHER USEFUL SIGNS

A number of other signs which are considered to be useful are shown below. They are not included in the Australian Standard but may be considered for use in appropriate circumstances. Other special signs may be required to suit unusual situations.

The sign shown in Figure 7.13 is a temporary sign which could be utilised on paths, road shoulders and bicycle lanes to warn cyclists during the short period of time between surface damage being reported and repairs being effected.

The sign shown in Figure 7.14 should be used to warn cyclists of the existence of hazardous gaps between planks in bridge decks. It should only be used where the number of cyclists using the road is negligible or where it is not economically or practically feasible to solve the problem of gaps in the deck.

The sign shown in Figure 7.15 is a sign used to provide an instruction to motorists at locations where it is critical that they look out for cyclists. It may be used at the following locations where cyclists are experiencing operational or safety problems.

- Where a road or carriageway narrows and creates a squeeze point for cyclists.
- At "S lane" and "S lane" treatments where cyclists are squeezed for space.
- At the end of a bicycle lane.
- At the start of diverge tapers and the end of merge tapers

It may also be placed below the Stop, Give Way and

Roundabout regulatory signs at intersections to instruct motorists that they may encounter a cyclist passing through the intersection. Typical locations may include the following.

- On the approaches to multi-lane roundabouts or large single lane roundabouts.
- On left turn slip lanes where left turning traffic is provided with a merge taper or an auxiliary lane.

## 7.6 PAVEMENT MARKINGS

Pavement markings include linemarking and pedestrian and bicycle logos which are used to guide the movement of bicycle and motor traffic, and to provide support to regulatory signs.

Linemarking for on-road bicycle lanes should adhere to standard practice for carriageway markings apart from location of the lines. Bicycle lanes are defined by an 80 mm wide solid white line except near intersections where a standard continuity line may be used.

Off-road paths may utilise the following types of lines.

- A **separation line** should be used to separate opposing bicycle traffic movements on heavily trafficked sections of path or where sight lines are restricted. They are also used to separate pedestrian and bicycle lanes on segregated paths.
- An **edgeline** may be used to delineate paths particularly where there are frequent and/or low standard curves.



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Figure 7.13 Temporary Sign

- A continuity line may be used to delineate the edge of the path of through bicycle traffic across an intersecting path, to delineate the edges of bicycle lanes where significant volumes of motor traffic is intended to merge into or cross the lane, or to indicate the end of a path.
- A stop line or give way line is used at path intersections where it is necessary for the safety of cyclists to provide a Stop sign or a Give Way sign.

Bicycle logos and pedestrian logos provide a very useful method of advising of the presence of pedestrians and or bicycles. They have the following applications.

- On bicycle lanes and paths to reinforce the regulatory signs.
- On shared paths in conjunction with pedestrian logos, again to reinforce the regulatory signs.
- On sealed shoulders and kerbside lanes where few parked and moving motor vehicles use the lane and it is desired to indicate the presence of cyclists without the expense and formality of regulatory signs.
- At the intersections of paths and roads to mark the actual location of the cyclist crossing and reinforce the warning given to motorists by the warning signs.



Figure 7.14 Gaps In Deck Sign

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BICYCLES

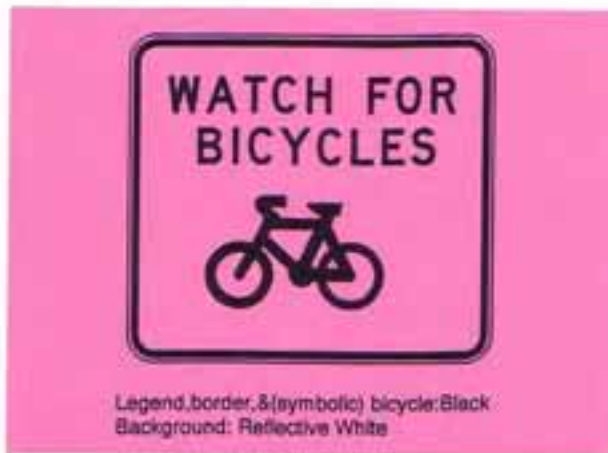


Figure 7.15 Bicycle 'Alert' Sign

Where necessary the bicycle logos can be supplemented by directional arrows to indicate the permissible directions of travel.

Details of setting out the bicycle and pedestrian pavement logos is included in AS 1742.9 although a larger elongated pedestrian logo may be preferred.

Typical signing and linemarking arrangements for a bicycle lane and a path/road intersection are shown in Figures 7.16 and 7.17 respectively.



Bicycle Route Sign



Guide Sign for Cyclists

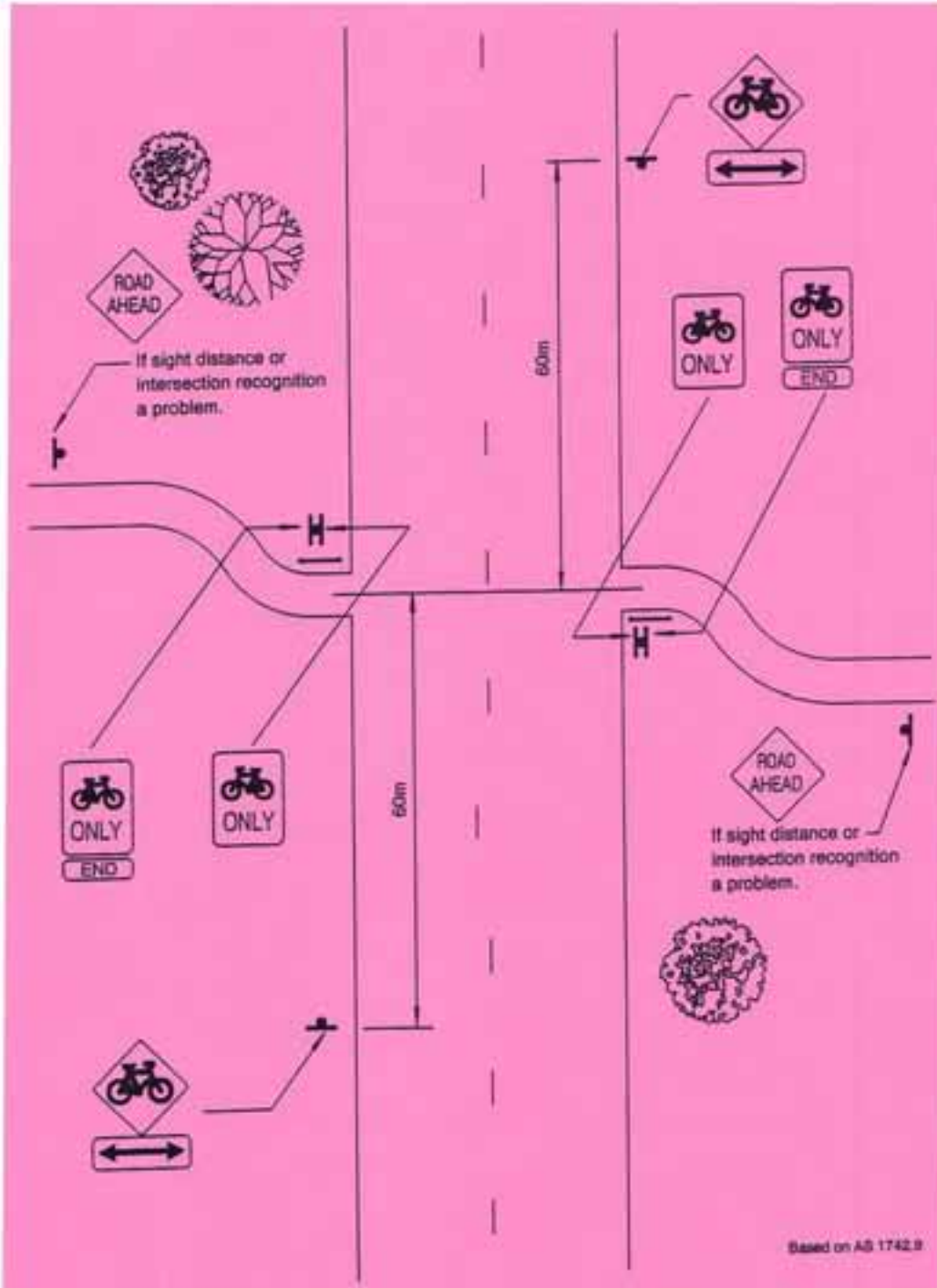


Figure 7.17 Typical Treatment of Bicycle Path/Road Intersection



## Appendix P: Refuge Islands & Intersection

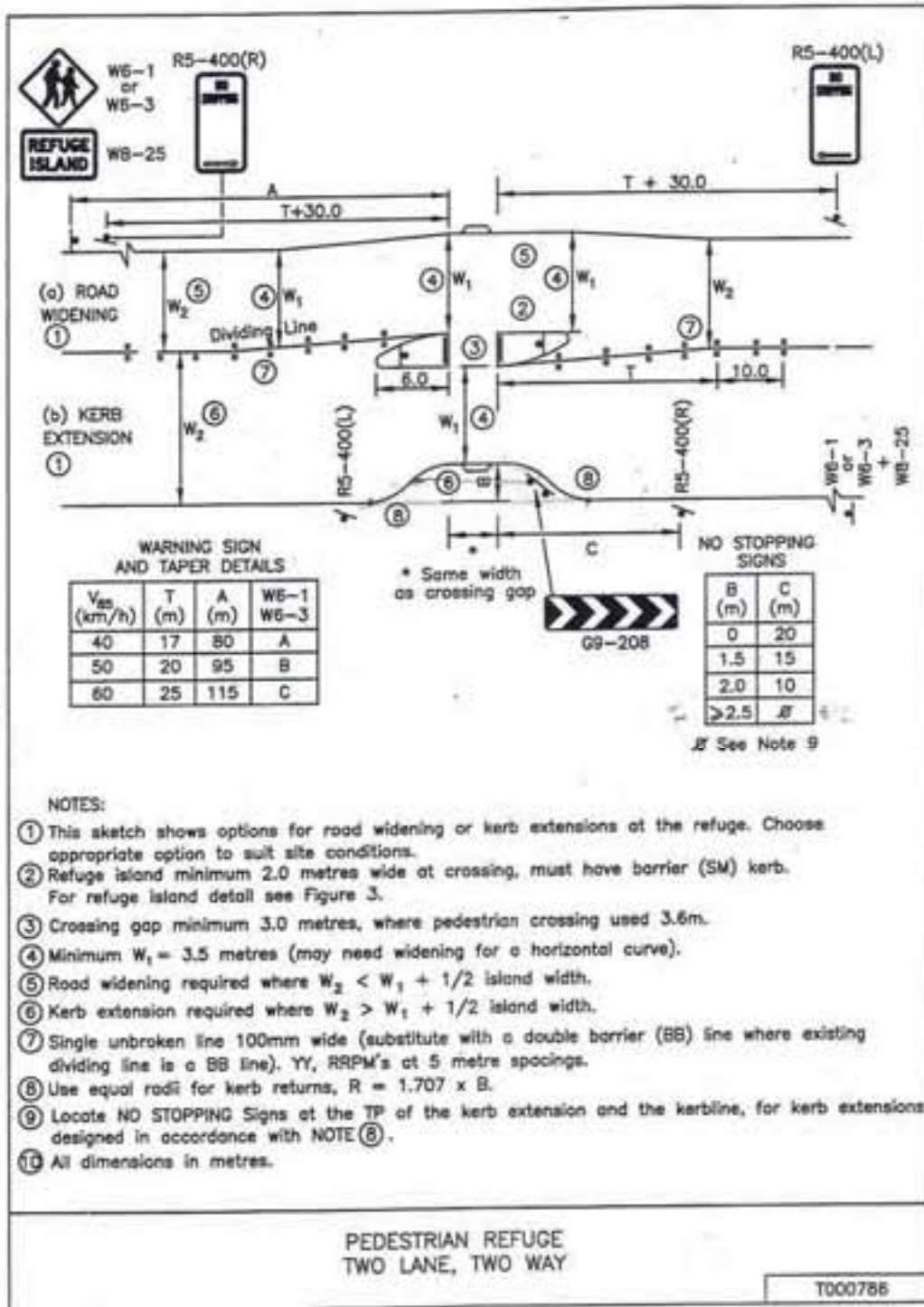


Figure 2

**Treatments**

## Appendix Q: On-road Bicycle Lanes (Austroads Guide to Road Design Part 3 2010)



Note: Green coloured surface treatments should only be used to increase driver and cyclist awareness of a bicycle lane, and to discourage drivers from encroaching into a bicycle lane. The treatment should be used sparingly to maintain its effectiveness.

Figure 4.24: Exclusive bicycle lane

Depending on the practice of the road authority and the site conditions, the channel may not be included as part of the bicycle lane width. This is due to potential safety concerns, including:

- edge drop off between the pavement and channel surfaces, particularly when open graded friction course (OGFC) is used
- hazards in and adjacent to the kerb and channel such as the surface condition of the channel and drainage pit entrances
- the likelihood of the bicycle pedals striking the kerb.

Table 4.17: Exclusive bicycle lane dimensions in urban areas

| Speed limit <sup>(1)</sup><br>(km/h) | Lane width <sup>(2),(3)</sup><br>(m) |           |           |
|--------------------------------------|--------------------------------------|-----------|-----------|
|                                      | 60                                   | 80        | 100       |
| Desirable                            | 1.5                                  | 2.0       | 2.5       |
| Acceptable range                     | 1.2 – 2.5                            | 1.8 – 2.7 | 2.0 – 3.0 |

Notes:

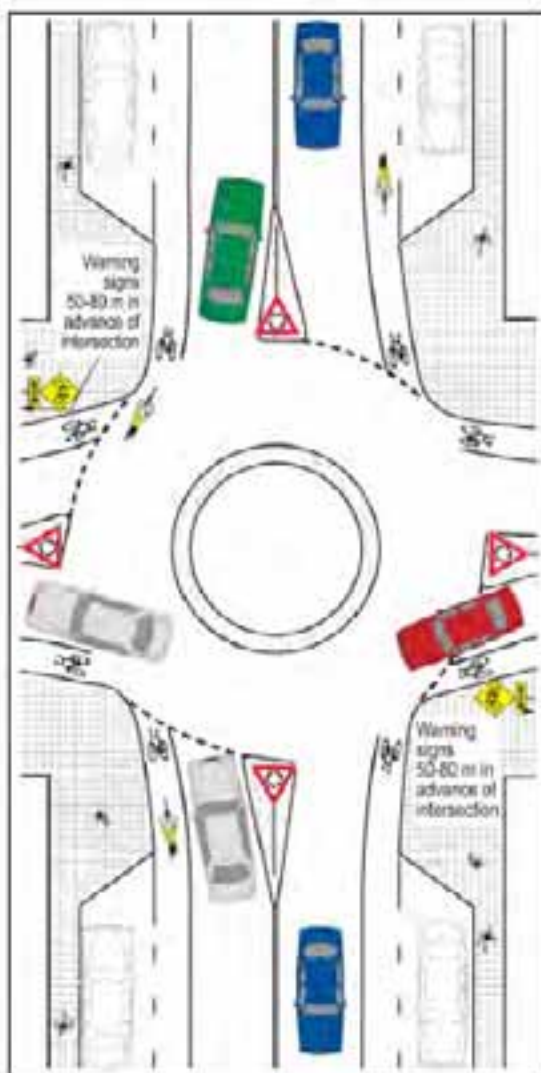
1. The posted or general speed limit is used, unless 85<sup>th</sup> percentile speed is known and is significantly higher.
2. Interpolation for different speed limits is acceptable.
3. The width of the lane is normally measured from the face of the adjacent left hand kerb. The width of road gutters/channels (comprising a different surface medium) should be less than 0.4 m where minimum dimensions are used. The figures in the table presume that surface conditions are to be of the highest standard. Where there are poor surface conditions (see the *Guide to Road Design – Part 6A: Pedestrian and Cyclist Paths 2009e*, Appendix B) over a section of road adjacent to the gutter, then the width of the exclusive bicycle lane should be measured from the outside edge of that section.

## Appendix R: On-road Cycle lanes at Roundabouts (Austroads Guide to Road Design Part 4B 2009)

### 5.3.3 Bicycle Lanes at Single-lane Roundabouts

#### Local street with bicycle lanes

Figure 5.2 shows a treatment that is suitable for bicycle routes at local street intersections that have low approach speeds and low volumes. It provides warning signs and bicycle lanes on the approaches but no special treatment within the circulating roadway. The bicycle lanes must extend to the holding lines so that a squeeze point for cyclists is not created. The low volume of heavy vehicles on this type of road means that the road can be shared with cyclists. Cyclists typically turn right with general traffic.



Source: Adapted from RTA (2006).

Figure 5.2. Bicycle lane at a small single-lane roundabout on local road (some jurisdictions may not favour this treatment – refer Section 5.3.1)

*Collector road or arterial road with no physical separation of bicycle lanes*

The treatment shown in Figure 5.4 has been adopted and implemented by some road authorities. It provides a bicycle lane on the roundabout approaches and departures without any physical separation. It is known that many motorists will cut across the bicycle lane on the entry and exit curves when no cyclists are present. For this reason, the maximum entry path radius criteria in Section 4.5.5 should be applied by assuming drivers will cut across the bicycle lane (i.e. Step 3 in Figure 4.6 will involve drawing a line 1.5m from the kerbed left edge of the bicycle lane).

There is some concern that this treatment may lead to conflict between heavy vehicles and bicycles where the route carries a relatively high volume of both freight vehicles and cyclists. It is therefore suggested that the entries of these treatments should be designed so that the swept paths of entering design vehicles do not have to encroach into the bicycle lane. However, where a site has low volumes of both trucks and bicycles encroachment may be allowed if necessary to achieve the maximum entry radius criteria in Section 4.5.5.



Source: Adapted from VicRoads (2008)

**Figure 5.4:** Two bicycle routes crossing at a single-lane roundabout with no physical separation of bicycle lanes (some jurisdictions may not favour this treatment – refer Section 5.3.1)

**Appendix S: Method for determining Expected Usage**

| Criteria                      | Performance Conditions  | Score  |
|-------------------------------|-------------------------|--------|
| Number of Attractors Linked   | 1 Attractor             | 5      |
|                               | 2 Attractor             | 10     |
|                               | 3 Attractor             | 15     |
|                               | >3 Attractors           | 20     |
| Type of Attractor             | Residential             | 5      |
|                               | Recreational / Sport    | 10     |
|                               | Commercial / Retail     | 12     |
|                               | Schools / University    | 15     |
|                               | Schools and Commercial  | 20     |
| Links to major infrastructure | Over / Underpass        | 10     |
| Total Score:                  |                         |        |
| Estimated usage score         | Estimated usage (range) | Points |
|                               | 0-10                    | 1pt    |
|                               | 11-20.                  | 1.5pts |
|                               | 21-40                   | 2pts   |
|                               | 41-60                   | 2.5pts |



## Appendix T: Scoring Criteria for prioritising Cycleway Works

|   |               | Points |
|---|---------------|--------|
| <b>Attractors linked</b>                        | 1 attractor   | 1      |
|   | 2 attractors  | 2      |
|   | 3 attractors  | 3      |
|   | >3 attractors | 3.5    |
| <b>Caters for recreational and commuter use</b> | One only      | 1      |
|   | Both          | 2      |
| <b>Other Benefits</b>                           | CPTED         | 1      |
|   | Rd Hierarchy  | 1      |
|   | Safety        | 1      |
| <b>Estimated Usage</b>                          | 0-10          | 1      |
|   | 11-20.        | 1.5    |
|   | 21-40         | 2      |
|   | 41-60         | 2.5    |

## Appendix U: Cycleway Plan Works Program Prioritised Scoring Criteria

| Item | Street                    | From                     | To                            | Description  | Side                              | Crossings required | Length (m) | cost / m | Estimated Cost | Value m per \$ | (M per \$x50) | Attractors usage score | Attractor | Link to major infrastructure | Estimated users range | Estimated users Points | Attractors linked Points | Recreational/Commuter route | Safety | Total Points | Comments             |
|------|---------------------------|--------------------------|-------------------------------|--|-----------------------------------|--------------------|------------|----------|----------------|----------------|---------------|------------------------|-----------|------------------------------|-----------------------|------------------------|--------------------------|-----------------------------|--------|--------------|----------------------|
| 1    | Ballina Rd                | Hielson St               | Second Ave                    | Proposed off road cycleway   | South                             | 1                  | 530        | 225      | 124250         | 0.0043         | 0.21          | 15                     | 20        | 20                           | 41-60                 | 2.5                    | 3.5                      | 2                           | 1      | 9.21         | State                |
| 2    | Lismore Park Leisure Link | Dawson and Brewster St   | Magellan and Brewster St      | Proposed off road cycleway   | n/a                               | 1                  | 1520       | 270      | 415400         | 0.0037         | 0.18          | 15                     | 20        | 0                            | 21-40                 | 2                      | 3                        | 2                           | 2      | 9.18         | Recreational Route 1 |
| 3    | Dawson St                 | Uralba St                | Orion St                      | Path to be widened   | East                              | 1                  | 465        | 120      | 60800          | 0.0076         | 0.38          | 20                     | 20        | 0                            | 21-40                 | 2                      | 3.5                      | 2                           | 1      | 8.88         | State                |
| 4    | Oliver Ave                | Goonellabah S & A Centre | Rous Rd                       | Path to be widened   | North                             | 2                  | 530        | 120      | 73600          | 0.0072         | 0.36          | 20                     | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 2                           | 1      | 8.86         |                      |
| 5    | Dawson St                 | Magellan St              | Uralba St                     | Path to be widened   | East                              | 1                  | 260        | 120      | 36200          | 0.0072         | 0.36          | 20                     | 20        | 0                            | 21-40                 | 2                      | 3.5                      | 2                           | 1      | 8.86         | State                |
| 6    | Dawson St                 | Magellan St              | Ballina St                    | Path to be widened   | East                              | 2                  | 380        | 120      | 55600          | 0.0068         | 0.34          | 20                     | 20        | 0                            | 21-40                 | 2                      | 3.5                      | 2                           | 1      | 8.84         | State                |
| 7    | Wyrallah Rd               | Dalley St                | Oliver St                     | Path to be widened   | East                              | 0                  | 210        | 120      | 25200          | 0.0083         | 0.42          | 15                     | 12        | 0                            | 21-40                 | 2                      | 3                        | 2                           | 1      | 8.42         |                      |
| 8    | Ballina Rd                | Kellas Ave               | 453 Ballina Rd                | Path to be widened   | South                             | 0                  | 112        | 120      | 13440          | 0.0083         | 0.42          | 15                     | 15        | 10                           | 21-40                 | 2                      | 3                        | 2                           | 1      | 8.42         | State Missing Link   |
| 9    | Ballina St                | Second Ave               | Union St                      | Path to be widened   | South                             | 1                  | 2165       | 120      | 264800         | 0.0082         | 0.41          | 20                     | 20        | 20                           | 41-60                 | 2.5                    | 3.5                      | 1                           | 1      | 8.41         | State                |
| 10   | Wyrallah Rd               | Dibbs St                 | Wyrallah Rd Public School     | Path to be widened   | East                              | 2                  | 675        | 120      | 91000          | 0.0074         | 0.37          | 15                     | 15        | 0                            | 21-40                 | 2                      | 3                        | 2                           | 1      | 8.37         |                      |
| 11   | Hindmarsh St              | Leycester St             | Brunswick St                  | Path to be widened   | West                              | 1                  | 205        | 120      | 29600          | 0.0069         | 0.35          | 15                     | 15        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 2      | 8.35         |                      |
| 12   | Ballina Rd                | Holland St               | Oliver Ave East               | Proposed off road cycleway   | South                             | 0                  | 300        | 225      | 67500          | 0.0044         | 0.22          | 15                     | 12        | 0                            | 21-40                 | 2                      | 3                        | 2                           | 1      | 8.22         | State Missing Link   |
| 13   | Casino St                 | Wilson St                | Caniaba St                    | Proposed off road cycleway   | North                             | 3                  | 430        | 225      | 111750         | 0.0038         | 0.19          | 15                     | 10        | 0                            | 21-40                 | 2                      | 3                        | 2                           | 1      | 8.19         | Missing Link         |
| 14   | Rous Rd                   | Ballina Rd               | Jubilee Ave                   | Path to be widened   | East to Pleasant, West to Jubilee | 1                  | 1000       | 120      | 125000         | 0.0080         | 0.40          | 20                     | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 1      | 7.90         |                      |
| 15   | Keen St                   | James St                 | John St                       | Proposed off road cycleway   | East                              | 0                  | 255        | 225      | 57375          | 0.0044         | 0.22          | 15                     | 5         | 0                            | 11-20                 | 1.5                    | 3                        | 1                           | 2      | 7.72         |                      |
| 16   | High St                   | Bellevue St              | Lismore Heights Public School | Proposed off road cycleway   | East                              | 1                  | 420        | 225      | 99500          | 0.0042         | 0.21          | 20                     | 15        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 1      | 7.71         | Missing Link         |
| 17   | Brunswick Street          | Dawson                   | Carolina Rd                   | Proposed off road cycleway   | South to Donnans, then North      | 3                  | 935        | 225      | 225375         | 0.0041         | 0.21          | 10                     | 15        | 20                           | 41-60                 | 2.5                    | 2                        | 2                           | 1      | 7.71         | State                |
| 18   | Wilson Ck                 | Market St                | Orion St                      | Proposed off road cycleway   | West                              | 0                  | 1125       | 270      | 303750         | 0.0037         | 0.19          | 20                     | 20        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 1      | 7.69         | Recreational Route 2 |
| 19   | High St                   | Beardow St West          | Diadem St                     | On road cycleway - ped railing on outside, kerbing on inside, paint lane marking | South                             | 0                  | 300        | 300      | 90000          | 0.0033         | 0.17          | 20                     | 15        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 1      | 7.67         |                      |
| 20   | Conway St                 | Ballina Rd               | Molesworth St                 | Proposed on road cycleway  | Both                              | 0                  | 825        | 50       | 41250          | 0.0200         | 1.00          | 20                     | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road              |
| 21   | Keen St                   | Conway St                | Ballina Rd                    | Proposed on road cycleway  | Both                              | 0                  | 230        | 50       | 11500          | 0.0200         | 1.00          | 20                     | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road              |

| Item | Street                         | From                              | To                                | Description                | Side           | Crossings required | Length (m) | cost / m | Estimated Cost | Value m per \$ | (M per \$x50) | Attractor usage score | Attractor | Link to major infrastructure | Estimated users range | Estimated users Points | Attractors linked Points | Recreational/Commuter route | Safety | Total Points | Comments   |
|------|--------------------------------|-----------------------------------|-----------------------------------|----------------------------|----------------|--------------------|------------|----------|----------------|----------------|---------------|-----------------------|-----------|------------------------------|-----------------------|------------------------|--------------------------|-----------------------------|--------|--------------|--|
| 22   | Keen St                        | Orion St                          | Browns Creek Carpark              | Proposed on road cycleway  | Both           | 0                  | 450        | 50       | 22500          | 0.0200         | 1.00          | 20                    | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 23   | Market St                      | River                             | Molesworth St                     | Proposed on road cycleway  | Both           | 0                  | 170        | 50       | 8500           | 0.0200         | 1.00          | 20                    | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 24   | Molesworth St                  | Market St                         | Conway St                         | Proposed on road cycleway  | Both           | 0                  | 80         | 50       | 4000           | 0.0200         | 1.00          | 20                    | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 25   | Carrington St                  | Conway St                         | John Crowther Carpark             | Proposed on road cycleway  | Both           | 0                  | 170        | 50       | 8500           | 0.0200         | 1.00          | 20                    | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 26   | Ballina Rd                     | Hielson St                        | Rotary Dr Ballina Rd roundabout   | Proposed on road cycleway  | South          | 0                  | 1100       | 50       | 55000          | 0.0200         | 1.00          | 20                    | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 27   | High St                        | Cooling St                        | Bellevue St                       | Proposed on road cycleway  | South          | 0                  | 375        | 50       | 18750          | 0.0200         | 1.00          | 20                    | 5         | 0                            | 21-40                 | 2                      | 3.5                      | 1                           | 0      | 7.50         | On-Road  |
| 28   | Ross St                        | end of Ross                       | Ballina / Kellas rd roundabout    | Path to be widened         | South          | 0                  | 647        | 120      | 67400          | 0.0096         | 0.48          | 10                    | 15        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.48         |  |
| 29   | Keen St and Gundurimba Rd      | John St                           | Albert Park School                | Path to be widened         | n/a            | 0                  | 645        | 120      | 77400          | 0.0083         | 0.42          | 15                    | 15        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.42         |  |
| 30   | Keen St                        | Ballina St                        | James St                          | Path to be widened         |                | 0                  | 245        | 120      | 29400          | 0.0083         | 0.42          | 15                    | 10        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.42         |  |
| 31   | Simeoni Dr                     | Gordon Blair Dve                  | Oliver Ave                        | Path to be widened         | West           | 0                  | 655        | 120      | 78600          | 0.0083         | 0.42          | 15                    | 12        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.42         |  |
| 32   | Reserve St                     | Rous Rd                           | Existing Path at Sportsfields     | Path to be widened         | West           | 0                  | 45         | 120      | 5400           | 0.0083         | 0.42          | 15                    | 10        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.42         |  |
| 33   | Dalley St                      | Dibbs St                          | Military Rd                       | Path to be widened         | North          | 1                  | 760        | 120      | 96200          | 0.0079         | 0.40          | 15                    | 15        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.40         |  |
| 34   | Dalley St                      | Wyrallah Rd                       | Dibbs St                          | Path to be widened         | South          | 1                  | 500        | 120      | 65000          | 0.0077         | 0.38          | 15                    | 15        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.38         |  |
| 35   | Elizabeth St                   | Wyrallah Rd                       | Hielson St                        | Proposed off road cycleway | South          | 0                  | 70         | 225      | 15750          | 0.0044         | 0.22          | 10                    | 15        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.22         |  |
| 36   | Union St                       | Kyogle St                         | Opposite end of existing path     | Proposed off road cycleway | East           | 1                  | 380        | 225      | 90500          | 0.0042         | 0.21          | 10                    | 12        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.21         |  |
| 37   | Dudley Dve                     | Oliver Ave                        | Clare St                          | Proposed off road cycleway | West           | 3                  | 1005       | 225      | 241125         | 0.0042         | 0.21          | 10                    | 12        | 0                            | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.21         |  |
| 38   | Elliot Rd                      | Union St                          | Crown St                          | Proposed off road cycleway | South          | 1                  | 260        | 225      | 63500          | 0.0041         | 0.20          | 15                    | 12        | 0                            | 21-40                 | 2                      | 3                        | 1                           | 1      | 7.20         |  |
| 39   | Kadina St                      | Kadina High                       | Oliver Ave                        | Proposed off road cycleway | East then West | 2                  | 480        | 225      | 118000         | 0.0041         | 0.20          | 10                    | 15        | 10                           | 21-40                 | 2                      | 2                        | 2                           | 1      | 7.20         |  |
| 40   | Brunxner Hwy                   | Existing path                     | Caravan Park past lake            | Path to be widened         | East           | 0                  | 720        | 120      | 86400          | 0.0083         | 0.42          | 10                    | 10        | 0                            | 11-20                 | 1.5                    | 2                        | 1                           | 2      | 6.92         | State  |
| 41   | McDermott Ave and Allingham Pl | Jubilee Ave                       | Gordon Blair Dr                   | Proposed off road cycleway | South          | 0                  | 665        | 225      | 149625         | 0.0044         | 0.22          | 10                    | 10        | 0                            | 11-20                 | 1.5                    | 2                        | 1                           | 2      | 6.72         |  |
| 42   | Wilson Ck                      | Skate Park                        | Ballina St                        | Proposed off road cycleway | West           | 0                  | 260        | 225      | 58500          | 0.0044         | 0.22          | 10                    | 10        | 0                            | 11-20.                | 1.5                    | 2                        | 1                           | 2      | 6.72         |  |
| 43   | Oliver Ave                     | South West corner of Hepburn Park | South East corner of Hepburn Park | Proposed off road cycleway | North          | 1                  | 290        | 225      | 70250          | 0.0041         | 0.21          | 10                    | 10        | 0                            | 11-20                 | 1.5                    | 2                        | 1                           | 2      | 6.71         | Refuge island required when joining path from south to north |
| 44   | High St                        | Diadem St                         | Cooling St                        | Proposed on road cycleway  | Both           | 0                  | 1595       | 50       | 79750          | 0.0200         | 1.00          | 15                    | 5         | 0                            | 11-20                 | 1.5                    | 3                        | 1                           | 0      | 6.50         | Missing Link   |

| Item | Street                  | From  | To                                   | Description                | Side           | Crossings required | Length (m) | cost / m | Estimated Cost | Value m per \$ | (M per \$x50) | Attractors usage score | Attractor | Link to major infrastructure | Estimated users range | Estimated users Points | Attractors linked Points | Recreational/Commuter route | Safety | Total Points | Comments                   |
|------|-------------------------|---|--------------------------------------|----------------------------|----------------|--------------------|------------|----------|----------------|----------------|---------------|------------------------|-----------|------------------------------|-----------------------|------------------------|--------------------------|-----------------------------|--------|--------------|----------------------------|
| 45   | Jubilee Ave             | McDermott Ave                                     | Ballina Rd                           | Path to be widened         | West           | 0                  | 495        | 120      | 59400          | 0.0083         | 0.42          | 10                     | 15        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 1      | 6.42         |                            |
| 46   | Avondale Ave            | Second Ave  | Dibbs St                             | Path to be widened         | North          | 0                  | 250        | 120      | 30000          | 0.0083         | 0.42          | 10                     | 15        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 1      | 6.42         |                            |
| 47   | Military Rd             | Dalley St   | Sth Cross Uni                        | Path to be widened         | West           | 0                  | 255        | 120      | 30600          | 0.0083         | 0.42          | 10                     | 15        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 1      | 6.42         |                            |
| 48   | Bridge St               | Existing path                                     | Pitt St                              | Path to be widened         | West then East | 1                  | 305        | 120      | 41600          | 0.0073         | 0.37          | 10                     | 15        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 1      | 6.37         |                            |
| 49   | Union St                | Hollingsworth Ck                                  | Three Chain Rd                       | Path to be widened         | West           | 5                  | 805        | 120      | 121600         | 0.0066         | 0.33          | 10                     | 12        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 1      | 6.33         | State Recreational Route 4 |
| 50   | Krauss Ave              | Three Chain Rd                                    | Lismore Airport                      | Proposed on road cycleway  | Both           | 0                  | 1600       | 50       | 80000          | 0.02           | 1.00          | 10                     | 12        | 0                            | 21-40                 | 2                      | 2                        | 1                           | 0      | 6            |                            |
| 51   | Crown St                | Elliot St   | Rhodes St                            | Path to be widened         | West           | 1                  | 300        | 120      | 41000          | 0.0073         | 0.37          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 2                           | 1      | 5.87         |                            |
| 52   | Ballina Rd              | Brewster St                                       | Diadem St                            | Proposed off road cycleway | North          | 0                  | 220        | 160      | 35200          | 0.0063         | 0.31          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.81         | State                      |
| 53   | Holland St              | South East corner of Hepburn Park                 | Ballina Rd                           | Proposed off road cycleway | West           | 0                  | 1160       | 160      | 185600         | 0.0063         | 0.31          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.81         |                            |
| 54   | Victoria St             | Ballina St  | Past Gerard St joining Existing Path | Proposed off road cycleway | East           | 0                  | 265        | 160      | 42400          | 0.0063         | 0.31          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.81         |                            |
| 55   | Kyogle St               | Union   | Crown St                             | Proposed off road cycleway | North          | 2                  | 350        | 225      | 56000          | 0.0063         | 0.31          | 10                     | 5         | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.81         |                            |
| 56   | Union St                | Union St Bridge                                   | Frank St                             | Proposed off road cycleway | West           | 0                  | 285        | 225      | 64125          | 0.0044         | 0.22          | 5                      | 12        | 0                            | 11-20                 | 1.5                    | 1                        | 2                           | 1      | 5.72         |                            |
| 57   | Oliver Ave              | East of Waratah Way                               | Hepburn Park                         | Proposed off road cycleway | South          | 1                  | 360        | 225      | 86000          | 0.0042         | 0.21          | 10                     | 10        | 0                            | 11-20                 | 1.5                    | 2                        | 1                           | 1      | 5.71         | Missing Link               |
| 58   | Albert park fields loop | Follows Bernstein St, Gundurimba Rd and the River |                                      | Proposed off road cycleway | Loop           | 0                  | 1260       | 270      | 340200         | 0.0037         | 0.19          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.69         | Recreational Route 3       |
| 59   | River bank              | John St   | Bernstein St                         | Proposed off road cycleway | West           | 0                  | 285        | 270      | 76950          | 0.0037         | 0.19          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.69         | Recreational Route 3       |
| 60   | John St                 | Keen St   | River                                | Proposed off road cycleway | South          | 0                  | 195        | 270      | 52650          | 0.0037         | 0.19          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.69         | Recreational Route 3       |
| 61   | Bruxner Hwy             | Path around Lismore Lake joining to section 8     |                                      | Proposed off road cycleway | East           | 0                  | 985        | 270      | 265950         | 0.0037         | 0.19          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.69         | State Recreational Route 4 |
| 62   | River bank              | Bridge St   | Zadoc St                             | Proposed off road cycleway | n/a            | 55m Bridge         | 290        |          | 400,000        | 0.0007         | 0.04          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.54         | State Recreational Route 4 |
| 63   | Union St                | Elliot St   | Phylliss St                          | Path to be widened         | East           | 0                  | 260        | 120      | 31200          | 0.0083         | 0.42          | 5                      | 12        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.92         |                            |
| 64   | Dibbs St                | Pound St  | Magellan St                          | Path to be widened         | West           | 0                  | 90         | 120      | 10800          | 0.0083         | 0.42          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.92         |                            |
| 65   | Union St                | Foleys Rd   | Hollingsworth Ck                     | Path to be widened         | East           | 0                  | 60         | 120      | 7200           | 0.0083         | 0.42          | 5                      | 12        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.92         | State Recreational Route 4 |

| Item                          | Street                   | From                           | To                         | Description   | Side  | Crossings required | Length (m) | cost / m | Estimated Cost | Value m per \$ | (M per \$x50) | Attractors usage score | Attractor | Link to major infrastructure | Estimated users range | Estimated users Points | Attractors linked Points | Recreational/Commuter route | Safety | Total Points | Comments |
|-------------------------------|--------------------------|--------------------------------|----------------------------|---|-------|--------------------|------------|----------|----------------|----------------|---------------|------------------------|-----------|------------------------------|-----------------------|------------------------|--------------------------|-----------------------------|--------|--------------|----------|
| 66                            | Union St Bridge Crossing | Western end of Union St Bridge | Existing Path on Bridge St | Path to be widened                                  | West  | 0                  | 1250       | 120      | 150000         | 0.0083         | 0.42          | 5                      | 12        | 0                            | 11-20                 | 1.5                    | 1                        | 2                           | 0      | 4.92         |          |
| 67                            | Pound St                 | Hunter St                      | Dibbs St                   | Path to be widened                                  | North | 1                  | 240        | 120      | 33800          | 0.0071         | 0.36          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.86         |          |
| 68                            | Magellan St              | Hunter St                      | Dibbs St                   | Path to be widened                                  | South | 1                  | 240        | 120      | 33800          | 0.0071         | 0.36          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.86         |          |
| 69                            | Hunter St                | Ballina St                     | Magellan St                | Path to be widened                                  | West  | 1                  | 205        | 120      | 29600          | 0.0069         | 0.35          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.85         |          |
| 70                            | Rhodes St                | Union St                       | Crown St                   | Path to be widened                                  | South | 1                  | 200        | 120      | 29000          | 0.0069         | 0.34          | 5                      | 15        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 1      | 4.84         |          |
| 71                            | Elliot St                | Crown St                       | Wilson St                  | Path to be widened                                  | South | 0                  | 295        | 120      | 35400          | 0.0083         | 0.42          | 5                      | 5         | 0                            | 0-10                  | 1                      | 1                        | 1                           | 1      | 4.42         |          |
| 72                            | Terania St               | Bridge St                      | Tweed St                   | Path to be widened                                  | South | 0                  | 530        | 120      | 63600          | 0.0083         | 0.42          | 5                      | 5         | 0                            | 0-10                  | 1                      | 1                        | 1                           | 1      | 4.42         |          |
| <b>Fencing and or railing</b> |                          |                                |                            |   |       |                    |            |          |                |                |               |                        |           |                              |                       |                        |                          |                             |        |              |          |
| 1                             | Rotary Dr                | Dixon Pl                       | Uralba St                  | Safety railing on outside                           | South | 0                  | 720        | 250      | 180000         | 0.0040         | 0.20          | 20                     | 12        | 0                            | 21-40                 | 2                      | 3.5                      | 2                           | 2      | 9.70         |          |
| 2                             | Wilson St                | Bridge                         | Terania St                 | install brifen safety fencing between road and path | East  | 0                  | 240        | 200      | 48000          | 0.0050         | 0.25          | 5                      | 10        | 0                            | 11-20                 | 1.5                    | 1                        | 1                           | 2      | 5.75         |          |