knox bicycle plan review

cycling in knox
THE FUTURE

July 2008

Knox City Council

Council & Community: A Partnership in Progress

QUALITY PROCEDURE

DOCUMENT CONTROL

ISSUE AND REVISION

The revision status of this Document is shown below:

Revision No.	Issued By	Date	Approved By	Date	Revision
1	Leigh Hale	12/12/2007	LH	3/10/2007	Not for General Distribution
2	Leigh Hale	12/2/2008	LH	12/2/2008	Feedback from Knox Bike Committee and Council Staff
3	Leigh Hale	27/2/2008	LH	27/2/2008	Review by David Wood
4	Leigh Hale	26/03/2008	LH	26/3/2008	Review of Draft by Bicycle Committee
5	Leigh Hale	3/04/2008	LH	3/4/2008	Feedback from Melissa Sparrow & Ron Crawford
6	Leigh Hale	14/05/2008	MS	12/5/2008	Amendments by Melissa Sparrow
Final	Leigh Hale	16/07/2008	KCC		Draft Document Feedback

Managing Director – Leigh Hale Consulting Services Pty Ltd
Dated – July 16 2008

Contents

Vision

That the City of Knox will, through well planned bicycle networks and programs, increase the use of bicycles for commuting and recreation in a safe, convenient and sustainable manner for residents and visitors.

Aims

- To reduce the reliance on and use of cars for transport to work, school, shopping and recreation.

- Provide well designed shared paths and on-road lanes that link the Knox communities to public transport, activity centres and recreation areas as well as regional destinations.

- Plan to further reduce casualty crashes through well designed infrastructure and increase driver awareness of cyclists through pavement markings and signs.

- Increase the use of bicycles for trips to work to double the existing use rate to account for 1.5% of all work trips in the City of Knox by 2013.

- Increase the use of bicycles for transport to schools to account for 30% use (at least once per month) by students by 2013.

- To advocate that VicRoads provide on-road lanes as part of the Principal Bike Network and ensure that all new road works and or the introduction of bus lanes incorporate provision for bicycles.

- To promote and support the use of bicycles as a healthy, environmentally friendly means of transport as well as being safe and cost effective.

- To measure bicycle use and the effectiveness of programs developed as part of this bicycle review

Executive Summary

Knox City Council engaged Leigh Hale Consulting Services Pty Ltd in June 2007 to undertake a review of the Knox Bicycle Plan.

The objectives of the review have been to consider the progress of bicycle facility implementation since the last review, identify the underlining principles for future development, consider the community's needs, develop new programs for bicycle facilities and encourage and support an increase in the use of bicycles as a means of transport throughout the City of Knox.

The community needs have been determined through an extensive questionnaire based on a consultation process involving schools and the general public as well as feedback from the Knox Bicycle Committee and Council Staff.

The outcomes of the review are:-

- Acknowledgement of Council and the State strategies, policies and plans that interact in developing the Municipal Bicycle Network.
- That there has been a reduction in casualty crashes involving cyclists since the last review with no fatalities in the data period. The reduction was significant in the 13 to 17 age group whereas in the age group 40 to 60 casualty crashes have actually increased.
- Implementation of cycle facilities since the last review has provided new shared path links, and on-road lanes.
- The completion of the EastLink project provides additional off-road paths and with associated on-road facility works by VicRoads, this will provide enhanced connectivity to other Local Government areas and the East Link Trail.
- The community feedback identified a priority to improve the on-road connectivity within the existing bicycle network.
- A method of ranking on-road and shared path projects has been developed in conjunction with Council officers.
- An Action Plan for new bicycle facilities and a program for future actions have been developed.
- Precinct Maps covering the whole municipality showing existing and proposed on and off-road facilities have been prepared.

The following Underlining Principles have been identified:-

Off-road Paths

Guiding Principles

- Improve access to cycle facilities that link communities, public transport and activity centres.
- Where possible, provide as a minimum, 2.5m wide paths where shared use with pedestrian or other users is required.
- For high volume routes, path widths should meet AustRoads Guide to Traffic Engineering Practice – Part 14 Bicycles.
- All paths should meet Disability Discrimination Act (DDA) requirements.
- Provide shared paths within reserves that link and provide a local route to on-road facilities or existing shared paths.
- To achieve convenient and safe off-road facilities, destination, warning and regulatory signs should be incorporated into the existing off-road system and be part of all new proposed paths.
- Ensure new sub-divisions and green field developments provide cycle links to existing cycle infrastructure in a safe and direct manner.
- Reduce hazards along paths through scheduled maintenance program.

On-road Facilities

Guiding Principles

- Improve connectivity of on-road facilities to link employment centres and inter-regional travel.
- Reduce road pavement hazards along bike lanes and routes and actively facilitate improvements especially during road rehabilitation works.
- That connecting the on-road arterial road bicycle network and inter-regional links are a high priority throughout Knox.
- Promote the use of ‘quiet and linking streets’ as local links to major off-road bike trails and on-road facilities.
- Recognition that cyclists have a legitimate right to road space.

Storage Facilities

Guiding Principles – Bicycle Storage

- That both short and long term secure bicycle storage is essential at bus inter-modal interchanges and train stations.
- That Council lead the way in the provision of bicycle storage at all community facilities in the municipality.
- That the planning scheme provides for bicycle facility requirements for new developments and that existing shopping centres and other key developments be encouraged to meet the planning scheme provisions.
- That all shopping centre revitalisation programs developed by Council incorporate bicycle storage facilities.

Engaging the Communities

Guiding Principles

- Promote and support the use of bicycles as a healthy, environmentally friendly, safe and cost effective means of transport.
- Support ‘ride to work’ days within the community and the ‘ride to school’ and bike education programs in schools.
- Ensure footpath and shared path routes to schools are free from obstructions by overhanging or protruding vegetation and are maintained in a safe and functional condition.

To implement the Bicycle Plan the following Action Plan has been put forward:-

Action Plan – Part A

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.1 Off-road Paths	1. That proposed footpaths identified in this report be widened to 2.5m and signed for shared path use.	Council	Priority by ranking	As per Part B	Projects included in Part B
	2. That bicycle links along 'quiet and linking streets' be identified by finger board signs. That linking footpaths be widened to 2.5m with appropriate access ramps.	Council	Signs installed over 3 years. Priority by ranking	Number of links signed	Annual Budget For Bike Signs Projects included in Part B
	3. That the routes using 'quiet and linking streets' be audited for road pavement and other hazards at the time of finger board signage installation.	Council	Audit to be linked to the install of signs	Number of links audited	Annual Budget For Bike Signs Projects included in Part B
	4. That the method of ranking developed to compare new footpath proposals and shared paths be adopted and that an annual construction program be implemented to construct the top 3 priorities as a minimum.	Council	Over 5 years	N/A	N/A
	5. That a program be developed to install directional signs throughout the shared path system and linking on-road facilities.	Council	Signs installed over 3 years	As per Part B + Annual Bike Count	Bike Signs Annual Budget $50,000
	6. That a bicycle safety audit be undertaken on all the underpasses within the Knox bicycle off-road network (16 underpasses).	Council	Audits over a 3 year program	No of Audits completed + Collision reports to Council	Audit Annual Program $15,000

Related Section	Recommendations	Responsibility	Time Lines/Priority	Measure Process	Estimated Cost
4.2 On-Road Bicycle Facilities	1. That VicRoads be urgently requested to review bus lanes not signed as a joint bicycle lane with the objective to having all bus lanes being able to be used by cyclists.	Council VicRoads	Immediately	N/A	VicRoads Costs
	2. That the amendments to the Principal Bike Network (PBN) proposed in the 2001 review that have not been adopted by VicRoads continue to be pursued and that the PBN include on-road facilities along the whole length of Stud Road.	Council VicRoads	Immediately	N/A	VicRoads Costs
	3. Establish and maintain on-road bicycle logos as per VicRoads guidelines for wide kerb side lanes along arterial roads and local collector roads.	Council – Local Roads VicRoads Arterial Roads	Over 5 years	Length of Roads completed + Bicycle Casualty Rates	Annual Implementation Budget $20,000
	4. Use coloured surface treatments in conjunction with on-road bicycle logos to increase driver awareness of cyclists along arterial roads and local collector roads.	Council – Local Roads VicRoads Arterial Roads	Over 5 years	As above	Part of above Budget
	5. That all new local area traffic treatments (LATM) be designed to accommodate bicycles.	Council	Immediately	Safety Audit of new treatments prior to construction	No additional costs
	6. That a review of all existing LATMs be undertaken with a view to identify the treatments that can be modified to accommodate cyclists	Council	Over 5 years	Number of treatments reviewed per year	Council Staff
	7. Implement a construction program to modify existing LATM treatments where practical.	Council	Over 5 years	Number of treatments modified per year	Annual Implementation Budget $20,000

Related Section	Recommendations	Responsibility	Time Lines/Priority	Measure Process	Estimated Cost
4.2 On-Road Bicycle Facilities (cont'd)	8. To reduce road pavement hazards and achieve a high level of service for bicycle lanes and routes within the City of Knox that a code of practice be prepared to define the limiting tolerances required for safe bicycle travel.	Council	Within 1 year	Code in place	Council Staff
4.3 Bicycle Storage	1. That Council support the Minister for Public Transport's initiatives for bicycles and public transport and request that the Minister release the audit and review report of the train station bike locker system as soon as it is completed.	Council	Immediately	N/A	N.A.
	2. That Council request that the Minister for Public Transport provide funds for secure bicycle storage at Knox City Bus Inter-modal interchange and Stud Park Bus Inter-modal interchange.	Council	Immediately	Number of secure bicycle storage provided	Department of Transport Costs
4.3 Bicycle Storage	3. That Council provide bicycle storage at community facilities and consider allocating funds to install 30 standard bicycle rails per year with priority given to Community Buildings.	Council	Over 5 years	Number of Bike Rails per year	Annual Implementation Budget $15,000per year
	4. That discussions be initiated with shopping centre managers with a view of providing well placed, well lit, secure bicycle storage preferably undercover at their centres.	Council	Immediately	Number of Bike Rails per year	Council staff
	5. That the requirement for bike storage and other facilities at workplaces for employees and customers under the Planning Scheme be vigorously pursued during the planning process for new developments.	Council	Immediately	Number of Bike storage facilities per year	Council staff

Related Section	Recommendations	Responsibility	Time Lines/Priority	Measure Process	Estimated Cost
4.4 Engaging the Community	1. That Council encourage the use of bicycles to travel to school and to promote bicycle education in Schools by :-				
	• Developing a program for school cycle access audits. (45 schools Primary and Secondary Schools at approx. $1500per Audit).	Council	Over 5 years	Number of Audits per year	$15,000per year
	• Establishing a program to prepare Cycle Access Plans to schools to identify safe access routes. (45 Primary and Secondary schools at approx. $2000per Audit).	Council	Over 10 years	Number of Cycle Access Plans per year	$10,000per year
	• Promoting the benefits of bike education programs to School Councils by expanding the Walking School Bus Co-ordinator role to encompass bike programs(estimate to be 0.6EFT)	Council	Immediately	Number of Schools undertaking Bike Ed Programs per year	$45,000
	• Funding training of volunteers for bike education programs and Ride2School days	Council	Within 1 year	Amount of Fund obtained + Volunteers trained	Seek funding through State funded Ride2School program and TravelSmart
	• Facilitating school 'ride to school' days	Council	Within 1 year	Amount of Fund obtained + Schools registered in 'ride to school' day	Seek funding through State funded Ride2School program and TravelSmart
	• Establish a Knox 'ride to school' day	Council	Within 1 Year	Amount of Fund obtained + Schools registered to participating	Seek funding through State funded Ride2School program and TravelSmart

Related Section	Recommendations	Responsibility	Time Lines/Priority	Measure Process	Estimated Cost
4.4 Engaging the Community	2. That Council encourage the increase of bicycle trips to work, public transport, local shops and community facilities and major activity centres by:				
	• Publishing a Bike Plan brochure 5000 brochures	Council	Within 1 year	Census figures for bicycle trips to work + Ride To work day data	Printing and Distribution $5,000
	• Promote 'National Ride to Work Day' by encouraging the local community to take part in the event through local advertising and Council staff participation.	Council	Within 1 year	Knox residents registered for ride to work day.	Advertising $2,000

Action Plan – Part B

New projects that upgrade and extend the on-road and off-road network over the next five years.

Priority	Ranking Score	Project	Project Description	Ward	Project Cost Estimate	Accumulated Program Cost for the year	Proposed Year
1	105	Bayswater Railway Station	Separated shared path through the car park. Council has received a Local Area Access Program grant	Dinsdale	109,000	109,000	08/09
2	97..5	Mountain Hwy	Koomba Park – 105 Mountain Hwy ($67,000 contribution from EastLink)	Collier	150,000	259,000	08/09
3	82	Corhanwarrabul Creek	Stud Rd (at Kelletts Rd) to Dandenong Creek. Council have received a Parks Victoria grant	Tirhatuan	800,000	1,059,000	08/09 to 10/11
4	70	Burwood Hwy	Milpera Cres - Knox School 200m	Collier	54,000	54,000	09/10
5	70	Ferntree Gully Rd	1644 Ferntree Gully Rd - Bunjil Way (south side, ~100m)	Friberg	27,000	81,000	09/10
6	70	Burwood Hwy	Knox School - Traydal Cl Pedestrian signals	Collier	108,000	189,000	09/10
7	70	Ferntree Gully Rd	Stud Rd - Henderson Rd (~1200m, south side)	Tirhatuan	324,000	324,000	10/11
8	70	Taylors Ln	Kelletts Rd - Wellington Rd (~1620m, east side)	Tirhatuan	440,000	440,000	11/12
9	70	Fulham Rd	Stud Rd - Bridgewater Way (~570m)	Tirhatuan	155,000	155,000	12/13

1. Introduction

The Knox Bicycle Plan was last reviewed in 2001. Significant housing development has occurred since and road congestion pressures have seen the construction of EastLink and improved public transport services. The challenge is to develop a bicycle plan that integrates with the various transport modes as well as providing a continuity of facilities for bicycles to be a valid and important mode of transport within Knox.

Knox City Council engaged Leigh Hale Consulting Services to undertake a review of the 2001 Knox Bicycle Plan.

The objectives of the Review were to:-

- Identify the principles that should frame the City of Knox's approach to the planning, development and experience of cycling.
- Consider the development of bicycle facilities and programs since the last review.
- Seek and determine the community's needs for safe cycle facilities throughout Knox.
- Examine the existing bike network and identify missing links and future opportunities for connectivity and integration with neighbouring Councils, Parks Victoria, VicRoads Principal Bicycle Network and East Link projects.
- Consider programs that will encourage and facilitate safe use of bicycles within the municipality.
- Identify acceptable design standards for bicycle facilities.
- To prepare a priority works program necessary to support cycling for the next five years.

1.1 Bicycles as a Transport Mode

Knox City Council has established a significant network of off-road paths which supports the use of bicycles for leisure and, to a lesser extent, commuter use.

The use of bicycles as a means of transport within Knox has historically been low and this review will consider how this can be improved.

The bicycle surveys undertaken as part of the review have indicated that there is strong support for cycling to be used as a legitimate form of transport.

VicRoads' Definition of a Bicycle

Under the Road Rules, a bicycle is a vehicle that has one or more wheels, and built to be propelled by human power through a belt, chain or gears (whether or not it has an auxiliary motor).

Under these rules, pedicabs, penny farthings, tricycles and unicycles are all considered to be bicycles. However, vehicles such as wheelchairs, wheeled toys and scooters are not considered to be bicycles.

Bicycles may be fitted with an auxiliary source of power provided the motor is not capable of generating a power output of more than 200 watts. If the motor is not the auxiliary source of power, or the motor's power output exceeds 200 watts, then the bicycle is a motor vehicle. The rider will be required to hold a motorcycle licence and have the vehicle registered before it can be used on the road network, including footpaths and bicycle paths.

Some electric powered vehicles with floor boards are described as bicycles because they have pedals and sometimes belts, chains, or gears. The primary source of power for these vehicles may be the electric motor, and the vehicle not built to be propelled primarily by human power. These vehicles are actually electric scooters. The rider, therefore, will be required to hold a motorcycle licence and have the vehicle registered before it can be used on the road network, including footpaths and bicycle paths.

It is to be noted that Shared Paths can be used by pedestrians as well as cyclists.

Pedestrian Motorized Devices

The definition of a Pedestrian includes people who are unable to walk and use a device such as:

- Scooters or buggies
- Electric wheelchairs.

New Shared Path Wellington

Under the Road Safety Act (1986) these devices are:

- Not defined as motor vehicles and therefore cannot be registered.
- Not allowed to be capable of travelling at more than 10 km/h on level ground. This is a legal requirement.
- To be used only by an injured or disabled person, who is unable to walk or who has difficulty in walking. People who do not have difficulty in walking are not permitted to use these devices.

People using these devices are pedestrians and must obey the same road rules as pedestrians.

1.2 Cycling within the Knox Policy Framework

The following policies and plans adopted by the Knox City Council impact on cycling programs and bicycle use throughout the Municipality.

Table 1- Links to Knox Policy Framework

Council Strategy, Plan or Policy	**Links that will impact on the Knox Bicycle Review**
Knox Community and Council Plan	The Knox Bicycle Plan Review 2001 is part of the long term strategies and action plan. As part of the Community and Council Plan under 'Sustainable Community – Accessible Transport Choices' the strategic objective is: "To advocate for and facilitate improvement in transport infrastructure and services for increased choices". To achieve this objective the following strategies have been put in place that are relevant to the Bicycle Review:- • "Advocate for funding of an accessible and integrated transport system with seamless connectivity that is relevant to current and future needs. • Advocate for the delivery of high level projects within the Bicycle and Pedestrian Plans. • Promote behavioural change in favour of walking, cycling and public transport use, within the Knox community".

Council Strategy, Plan or Policy	Links that will impact on the Knox Bicycle Review
Knox Pedestrian Plan	The Pedestrian Plan (September 2005) establishes a framework to improve the walking environment and facilitate and stimulate walking as a method of travel and recreational activity. The plan has identified one of its objectives as: "To integrate walking with other appropriate transport infrastructure to enable people to combine walking with cycling or public transport," (Page 7). There is a clear connection between walking infrastructure and cycling infrastructure and many of the proposed infrastructure projects within the Pedestrian Plan will also support or complement cycling use throughout Knox.
Knox Integrated Transport Plan	Cycling is one of the key elements of the Plan and has incorporated the following Vision and Aims in its "Increasing Cycling" chapter: **Vision** "Residents and visitors can travel in and through the Knox municipality using bicycles either as a means of transport or for recreational purposes". **Aims:** • Increase the use of cycling to account for 5% of all trips. • Provide an accessible on-road and off-road network that provides for safe and continuous travel throughout the municipality. • Ensure the needs of cyclists are taken into account through all infrastructure planning and design phases. • Embrace all opportunities to develop cycling links.

Table 1- Links to Knox Policy Framework (cont)

Council Strategy, Plan or Policy	Links that will impact on the Knox Bicycle Review
Knox Open Space Plan	A significant component of the bicycle network is within Council's reserves and parklands and the Open Space Plan has recognised the importance of the shared path network in its Key Goal 5: "Develop key links in the shared pathway network." The following tasks have been identified in the Open Space Plan: • Continue to monitor shared pathway condition and maintenance surfaces, signs and associated open space to ensure safety. • Construct with relevant State authorities key regional connections to Dandenong Ranges National Park and Dandenong Valley Parklands. Undertake other priority actions identified in the Bicycle Plan Review and advocate for improved shared pathways associated with the proposed Mitcham to Frankston freeway. • Continue to promote the health and environmental benefits of cycling and safe cycling practices.
Knox Sustainable City Plan	The Sustainable City Plan provides vision and mission statements to put into place the framework to achieve a leading sustainable city in Victoria. One of the Key Themes developed is in the area of Integrated Transport Planning. This area focuses on the strategies required to reduce greenhouse gas emissions. Cycling provides a mode of transport that has no greenhouse gas emissions.
Footpath and Shared Path Asset Management Plan	The Plan proposes operational and strategic techniques for managing footpaths and shared path assets sustainably. It outlines footpath and shared path design standards and renewal priorities.
Knox Road Management Plan	Defines infrastructure that falls under Knox City Council's jurisdiction, setting out areas of road network responsibility and defining management and maintenance practices necessary to discharge its duty as a road authority. Table 3 of the document outlines path hierarchy, path classifications, desirable widths and function of the paths.

1.3 Cycling within the State Policy Framework

The State Government has developed broad strategies for the development of Melbourne incorporating the following strategies that impact on and will support cycle use.

Table 2- Links to State Policy Framework

State Strategy, Plan or Policy	Links that will impact on the Knox Bicycle Review
Melbourne 2030	"In the next 30 years, Melbourne will grow by up to one million people and will consolidate its reputation as one of the most liveable, attractive and prosperous areas in the world for residents, business and visitors." "In establishing and articulating this vision through a set of Principles and nine Key Directions, *Melbourne 2030* provides a framework for governments at all levels to respond to the diverse needs of those who live and work in and near to Melbourne, and those who visit." Key Direction 8 - Better Transport focuses on transport and the importance of cycling and its integration with other transport modes. The following extract summarizes the important policies related to this key direction: "Upgrade and develop the Principal Public Transport Network and local public transport services to connect activity centres and link Melbourne to the regional cities (Policy 8.1). Improve the operation of the existing public transport network with faster, more reliable and efficient on-road and rail public transport"(Policy 8.2) Plan urban development to make jobs and community services more accessible (Policy 8.3). Coordinate development of all transport modes to provide a comprehensive transport system (Policy 8.4). Manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure (Policy 8.5). Review transport practices, including design, construction and management, to reduce environmental impacts (Policy 8.6). Give more priority to cycling and walking in planning urban development and in managing our road system and neighbourhoods (Policy 8.7). Promote the use of sustainable personal transport options (Policy 8.8) "

State Strategy, Plan or Policy	Links that will impact on the Knox Bicycle Review
Linking People and Spaces	Linking People and Spaces is a strategy for Melbourne's open space. It covers the metropolitan area including Port Phillip Bay and Western Port. The elements of the open space network include regional parklands, the coast and waters of the bays, major waterways, conservation and cultural values across Melbourne and the shared-use trail network. The following Key Actions relate to Knox's shared use trail network: • Extend the Dandenong Creek Trail from Boronia to the Dandenong Ranges National Park. Local Government, Parks Victoria. • Close the gaps in the rail trail between Bayswater and Belgrave. • Link the Corhanwarrabul Creek Trail to the Dandenong Creek Trail.

2. Community Bike Use

2.1 Safety in Knox

In the five years prior to the initial Bicycle Plan Review (2001) there were a total of 157 bicycle crashes, of which four (4) were fatalities. A comparison of the crash data for the previous and currently available five year periods is set out in Table 3 below. (Note that VicRoads CrashStats data is only updated to 31 December 2005).

Table 3 Comparison of Crash Data

5 year period	Fatalities	Serious	Other injury	Total
1994 to 1995 (part) Bike Plan review 2001	4	45	108	157
2001 to 2005	0	38	89	127

It is to be noted that no fatality bicycle crashes occurred in the last available 5 year period.

The reduction in the number of crashes equates to a decrease of approximately 19 percent from the original five year period.

Table 4 Bicycle Crash Type by Severity and Frequency
(for the ten most frequent accident types) 2001 to 2005

	Type	Description	Fatal	Serious Injury	Other Injury	Total Crashes
1	147	Bicycle/vehicle entering carriageway from driveway	0	4	17	21
2	148	Bicycle Emerging from Driveway/lane	0	5	10	15
3	130	Rear end	0	5	9	14
4	113	At intersection right near	0	4	8	12
5	133	Lane side swipe	0	4	6	10
6	174	Out of control on Carriageway	0	3	6	9
7	121	Vehicle opposing direction Right through	0	3	5	8
8	137	Left Turn Side Swipe	0	2	4	6
9	116	Left side near (intersection)	0	1	4	5
10	110	At intersection cross traffic	0	1	4	5

The following table details the highest crash sites involving bicycles in the City of Knox and provides improvement measures to reduce the number of crashes.

Table 5 Locations with the Highest Bicycle Crash Rates

Location	Crashes	Accident Types	Improvement Measures to reduce Crashes
Burwood Highway between Cathies lane and Milpera Crescent, Wantirna. Near The Knox School	6	Lane sideswipe crashes (4). Rear end crashes (2) Cyclists hit by car.	Note new pedestrian operated signals installed Dec 2007). **Seal shoulders to provide bike lane.**
Mountain Highway and High Street, Bayswater Complex intersections. Commercial area and Railway Station.	4	Bicycle off footpath hits bus, truck, and car. Another similar crash at Railway Pd nearby.	**Provide bike lane north side wide kerb side lane south side. Colour pavement through section**.
Mountain Highway between un-named and Barmah Drive Near Wantirna Primary School & SDA Church.	2	Rear end car hits bicycle. Bicycle hits car off footway.	**Seal shoulders to provide bike lane**
Dorset Road at Robertson Crescent, Boronia.	2	Left near side bicycle hit by car. Bicycle hits side of car from footpath.	**Monitor and review.**

Location	Crashes	Accident Types	Improvement Measures to reduce Crashes
Mountain Highway at Boronia Road (Forest Road), The Basin Roundabout at this location, Hindu Temple & Hall.	2	U-turn car hits bicycle. Right turn through bicycle hits car.	**Consider coloured pavement through roundabout.**
Kelletts Road and Laser Drive, Rowville Industrial area.	2	Rear end bicycle hits car. Right near bicycle hits car.	**Monitor and review.**
Commercial Road and Meagher Road, Ferntree Gully Sharp bend.	2	Left & right turn sideswipe.	**Monitor and review.**

The following table provides details of road lengths involving bicycles in the City of Knox and provides improvement measures to reduce the number of crashes.

Table 6 Road Lengths with Highest Bicycle Crash Rates

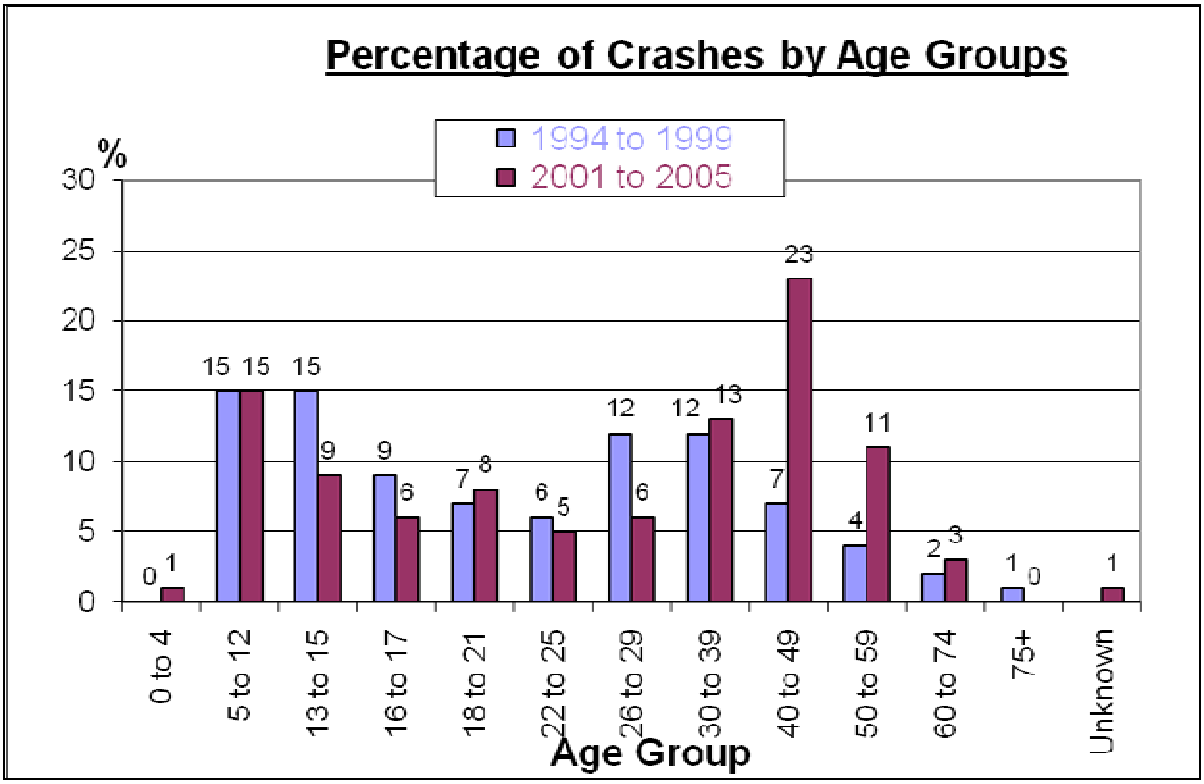
Location	Crashes	Crash Types	Improvement Measures to reduce Crashes
Ferntree Gully Rd Stud Rd to Burwood Hwy	8	Significant number of lane side swipe crashes. Rigid trucks involved in two crashes.	**It is considered shoulder sealing and the provision of bike lanes would reduce crashes.**
Burwood Hwy Stud Rd to Ferntree Gully Rd	5	Lane side swipe crashes.	**It is considered the provision of bike lanes would reduce crashes. Coloured pavement through complex intersections.**
Burwood Hwy Ferntree Gully Rd to Dandenong Tourist Rd	6	Lane side swipe crashes.	**It is considered the provision of bike lanes would reduce crashes. Coloured pavement through complex intersections.**
Dorset Rd Burwood Hwy to Boronia Rd	3	Lane side swipe crashes.	**Narrow kerb side lane in sections. Widen kerb side lane or provide bike lane when space allows. Coloured pavement through complex intersections.**

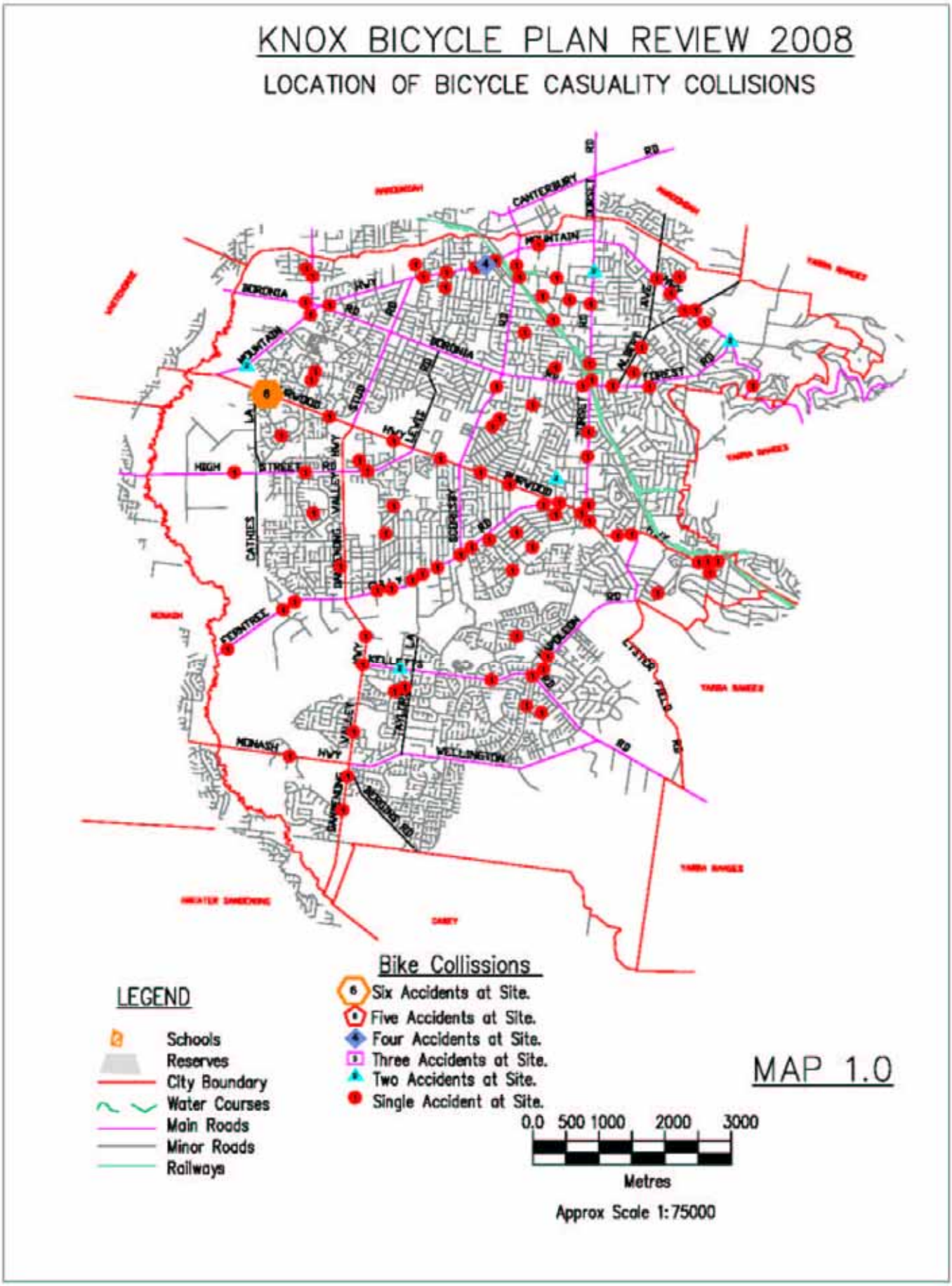
The majority of crashes have occurred on the arterial road system where 'sideswiping', 'turning into' and 'rear end' crashes with cyclist are prominent. Improved allocation of 'on-road' space for cyclists through wide kerb side lanes or bike lanes would assist in reducing these crash types. It is considered that using coloured pavements to identify the bike lanes would provide improved driver awareness, define cyclists preferred position on the road and provide greater clearance when passing.

There are a considerable number of crashes where cyclists have entered the road system via footpaths or driveways.

Comparing the ages of cyclists involved in crashes indicates a significant increase in older cyclists being involved in crashes and a general decrease in crashes for the 13 to 17 age group.
This may be due to the increase in bike use by the older groups and the outcomes of bike education in schools for the younger group however there is no data to provide evidence for this assertion.

Figure 1 Crash Age Group




KNOX BICYCLE PLAN REVIEW 2008
LOCATION OF BICYCLE CASUALITY COLLISIONS
Bike Collissions
6 Six Accidents at Site.
5 Five Accidents at Site.
4 Four Accidents at Site.
3 Three Accidents at Site.
2 Two Accidents at Site.
Single Accident at Site.
LEGEND
Schools
Reserves
City Boundary
Water Courses
Main Roads
Minor Roads
Railways
0.0 500 1000 2000 3000
Metres
Approx Scale 1:75000
MAP 1.0

2.2 Community Surveys

To develop an understanding of cycle use, the desires and needs of cyclists within the City of Knox a series of four bike surveys were prepared. These were for:

- Primary School Students
- Secondary School Students
- School Council/Principal
- General Public

In addition, the 2006 Census identified the use of cycles as a means of transport to work.

The Surveys sought to identify the following:

- Bike usage
- Frequency of use
- Major bicycle generators
- Destinations
- Users of bicycle facilities
- Restriction on bicycle use
- Missing links
- How cycling is rated as a means of transport
- School education programs and policies
- Current facilities at schools

Distribution

The Schools surveys were sent to all schools within the municipality and the General Public surveys were distributed to:

- Bicycle User and Walking Groups
- Libraries
- Bike Shops
- Community Houses and Recreation Centres
- Emergency Services
- The City Knox Customer Service Centres
- The Survey forms were available and could be completed on the internet

Responses

- **Primary School Students**
  22 Primary Schools out of a total of 36 schools representing a 61% response rate.
  1046 students completed the survey.
- **Primary School Principal/School Council**
  10 Schools out of 36 representing a 28% response rate.
- **Secondary Schools**
  4 Secondary Schools out of 9 schools representing a 44% response rate.
  276 students completed the survey.

- **Secondary School Principal/School Council**
  2 Schools out of 9 representing an 11% response rate.
- **General Public**
  253 responses were received 124 via the on-line survey.

Total Surveys Completed 1587

2.2.1 Survey Outcomes

The tables below summarise and analyse the responses.

Primary Schools

The surveys were distributed with the schools asked to randomly select two classes either in year levels 4, 5 or 6 within the school.

The number of responses has been greater than the similar survey conducted in the 2001 review and it is considered the outcomes are indicative for primary school students within this age range in the City of Knox. The following outlines some important outcomes from the Primary School Survey.

Table 7 Primary School Survey Outcomes

Survey Questions	Outcome (% of total responses)
Students that ride a bike	91%
School as a destination	23% (at least monthly) 44% never
The highest trip purposes are:	(at least monthly)
Recreation 'just for fun'	78%
Local Shops	41%
Visit Friends	35%
School	23%
Facilities used as a part of the trip	
Footpaths	70%
Roads	34%
Off-Road Shared paths	30%
Most Dangerous locations/situations (3 highest priorities)	
Lack of lighting at night	42%
Crossing Roads	38%
Lack of driver consideration	37%
Would improvement to dangerous situations increase your bike use	27%
Make no difference	27%
Weekly	24%
Daily	
Undertaken Bike Ed.	44% of students completing Survey

Table 7 Primary School Survey Outcomes (cont.)

Survey Questions	Outcome(% of total responses)
Road Rules taught by	
Parents	49%
Multiple sources	29%
School Bike Program	7%

While the outcomes are similar to the 2001 survey results, it is considered that the there is an on-going need to encourage students to ride to school. It is considered that with 91% of students riding bikes and only 23% riding to school (at least monthly) there is an opportunity to bridge this gap and encourage more children to ride to school.

Analysis of the students that ride to school (at least monthly) indicates that 64% of the students have undertaken the Bike Education Course.

Analysis of the students that undertake the Bike Education Course indicates 34% ride to school at least monthly, compared to students that have not had Bike Ed where only 18% ride to school at least monthly.

This data provides some evidence that Bicycle Education courses have increased the likelihood that students will ride to school.

Secondary Schools

The surveys were distributed to the secondary schools who were asked to randomly select two classes in their school. The number of responses received has been less than a similar survey conducted in the 2001 review. However it is considered a response of 276 is still very good and the outcomes are indicative for secondary students within this age range in the City of Knox.. It is interesting to note that the number of secondary schools has reduced from 17 to 9 since the 2001 Bicycle Review and may account for less student involvement

Fairhills Secondary College

Table 8 below outlines some important outcomes from the survey.

Table 8 Secondary School Survey Outcomes

Survey Questions	Outcome (% of total responses)
Students that ride a bike	52.5%
School as a destination	25% (at least monthly) 49% never
The Importance of Bicycles as a transport mode	
Not Important	46%
Important	46%
Very Important	7%
The highest trip purposes are	(at least monthly)
Local Shops	54.5%
Visit Friends	52%
Recreation	51%
School	25%
Facilities used as a part of the trip	
Footpaths	35%
Roads	19%
Off Road Shared Paths	16%
Factors discouraging cycling are	
Concern for Personal Safety	21%
Insufficient Space on-roads	18%
On-road vehicle speed/volume	18%
Don't own a bike	17.5%
Poor road surface	16%
Lack of lighting at night	15%
Would improvement to factors discouraging cycling increase your bike use	
Make no difference	37%
Weekly	19%
Daily	16%

The responses have identified that bike use drops off between primary school and secondary school and the trips/destination are more widely spread. The importance of cycling as a means of transport mirrors the "bike use" rate, that is, if you don't ride a bike, cycling is not an important transport mode. Only 25% of students that ride a bike actually ride to school.

There are a broad range of factors that discourage secondary students from riding, including safety when riding and personal safety is a significant issue for this age group.

General Public

The surveys were distributed widely within the community as detailed above. A poster was used to publicise the Bicycle Plan Review and availability of the survey forms. A notice was placed in the local papers as well. The Knox City Council set the survey up on its web site which enabled respondents to complete the survey on-line.

The number of respondents (253) was greater than a similar survey in 2001 (138). The people who responded generally ride a bike with the highest age group being between 36 and 55 (43.5%). Table 9 below outlines some important outcomes from the Survey:

Table 9 General Public Survey Outcomes

Survey Questions	Outcome
Age of Respondents	
Under 18	10%
18-25	2%
26-35	13%
36-55	48%
Above 55	30%
People that ride a bike	93%
The Importance of Bicycles as a transport mode	32%
Very Important	45%
Important	2%
Not Important	
The highest trip purposes are	(at least monthly)
Recreation	87%
Local Shops	51%
Cycle Training	45%
Visit Friends	40%
Work	35%
School/Education	25%
Facilities used as a part of the trip	
Off –Road Shared paths	38%
Footpaths	20%
Road & Footpaths	19%
The three highest factors discouraging cycling are	57%
Insufficient Space on-roads	46%
On-road vehicle speed/volume	40%
Incomplete Off-road Links	30%
Lack of Driver consideration	
Would improvement to factors discouraging cycling increase your bike use?	Yes 93%

General Public (cont'd)

The general public survey has been mainly completed by existing bike riders with only 7% being completed by non-bike riders. The highest destination/trip is for recreation with 87% of respondents engaging in this pursuit at least monthly.

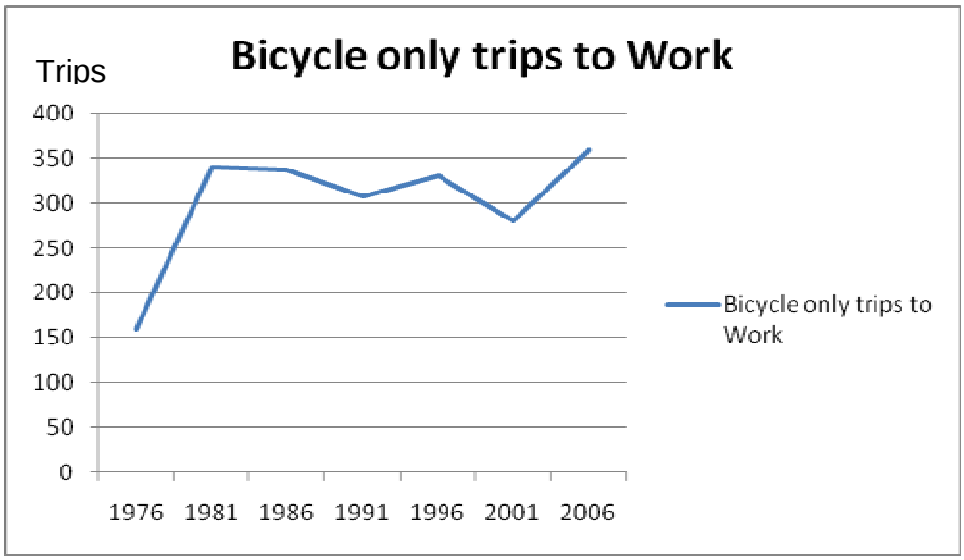
Even with this user profile the 'On-Road' discouraging facts were the most significant issues raised.
The general public survey sought feedback on missing links throughout the Municipality and to adjoining Councils; **Map 3.0 in Section 3.3** of this document outlines these responses and responses from secondary school students.

The significant outcome is that most of the missing links are along Arterial Roads.

Ride to Work (Australian Census)

The following graph (Figure 2) shows the data collected for each Census since 1976 and represents the number of people in the City of Knox who used a bicycle only to get to work.

Figure 2 Bike Trips to Work in the City of Knox



For the 2006 Census the bicycle only trips to work represented 0.6% of all trips to work in the City of Knox. This compares with 87% trips to work via car only, 3% via train only, 1% via bus only and 1.5% walking only.

The combination of different modes of transport in the City of Knox revealed that the numbers of people undertaking the following combinations were:

- Train/bicycle trips only 15 people
- Bus/bicycle trip combination no-one undertook this combination
- Train/car 1376 people
- Bus/car 117 people

2.3 Community Bike Use Summary

The surveys have provided evidence of a community that has good access to bikes and significantly use bike facilities for recreation purposes. There is increasing concern from all users in relation to on-road facilities, driver behaviour and personal safety.

The community has also acknowledged a willingness to change in relation to bike use if improvements are made to bicycle facilities. It is considered that the improvement of 'on-road' facilities and missing links are important to encourage the 'willingness to change mode'.

While there is generally good acknowledgment of the importance of cycling as a transport mode this has not been reflected in the use of bicycles for trips to work. It is considered that there is an opportunity to increase the use of bicycles alone and in combination with other transport modes especially public transport to achieve high participation in cycling to work.

The provision of easily accessible secure storage systems at shopping centres, community buildings, train stations and bus interchanges is essential to increase bicycle use.

Analysis of the primary school survey indicates that Bicycle Education programs increase bike use for 'trips to school' and the development and encouragement of further school programs should be considered.

Secondary school students have a broader range of destinations. The use of bicycles drops off after primary school and this age group is less likely to take up cycling even if bicycle facilities improve.

The trend of reduced crashes is encouraging, most significantly in the 13 to 17 age group. It is considered that Bicycle Education is also important both in primary and secondary schools to facilitate safe cycling and therefore reduced crashes. While the total number of crashes has reduced, there has been an increase in the number of crashes in the 40 to 60 age group.

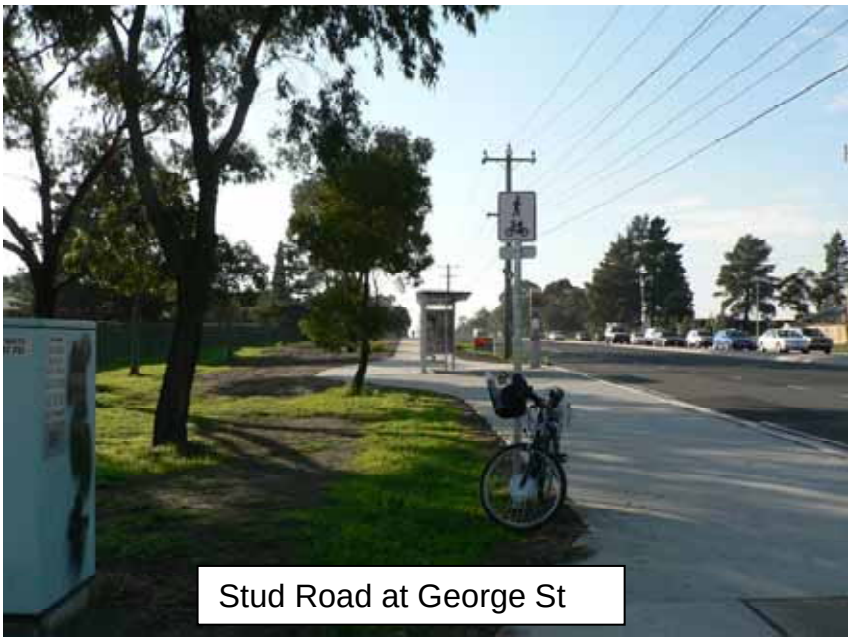
3. Bike Links Connecting Communities

3.1 Achievements Since the Last Review

A summary of infrastructure implementation since 2001 is shown in Table 10 below.

Table 10 Infrastructure Upgrade (not including EastLink projects)

Location	Type of Infrastructure
Stud Road – George St to Burwood Hwy	Off-road shared path west side
Stud Road – Fulham Rd and Wellington Rd	Off- road shared path east side
Stud Road – Dandenong Creek to Wellington Rd	On-road lane
Stud Road Service Rd – Boronia Rd to opposite Phyllis St	On-road lane
Wellington Rd – Taylors Ln to Napoleon Rd	On-road lane
Kelletts Rd Stud Rd to Napoleon Rd	On-road lane
Kelletts Rd Lakesfield Dr to Greenbank Ct	Off-road shared path north east side
Reserve Link – Karoo Rd to Corhanwarrabul Creek Trail	Off-road shared path
Reserve Link Ormonde Rd to Blackwood Park Rd to Ellendale St to Fairway Dr	Off-road shared path
Forest Rd (Ferntree Gully)Mountain Hwy to Clematis Av	On-road lane
Station St (Ferntree Gully) Burwood Hwy to Selman Av	On-road lane
Extension of the Dandenong Creek Trail from Colchester Rd East to Liverpool Rd Retarding Basin	Off-road shared path
Boronia Rd from Dandenong Creek to west of 765 Boronia Rd	Off-road shared path



Stud Road at George St

Design Standards Implementation

Knox Council has adopted weld mesh fence terminal treatments for off-road paths in accordance with VicRoads and AustRoads standards and is phasing out treated pine log type and other non-conforming treatments throughout the Municipality.

The Knox Road Management Plan has established path classifications, desirable widths and the function of shared paths and has also developed a renewal priority program.

Ferny Creek Trail

3.2 EastLink

The development of the EastLink project has maintained existing and extended the shared trail links and provided a new North–South path system between Ferntree Gully Rd and Mountain Hwy connecting into the Dandenong Creek Trail at both ends.

Knox City Council is negotiating a reserve along the EastLink reserve to connect the proposed Corhanwarrabul Creek Trail.

The following table provides a summary of how both on-road and shared trails have been completed as part of the EastLink Project.

Table 11 EastLink and Associated Projects

Location	Cycle facility Treatment proposed by EastLink	Cycle facility Treatment proposed by VicRoads
Koomba Rd	Shared path bridge over EastLink at the end of Koomba Rd linking the Dandenong Creek Trail	N/A
Boronia Rd- Mountain Hwy towards Dandenong Creek	Shared path south side Line marked wide kerb side lanes	N/A
Mountain Hwy	Shared path links to Burwood Hwy	N/A
Burwood Hwy to Ferntree Gully Rd along EastLink Reserve	Shared Footway along EastLink	N/A
Burwood Hwy	Shared path south side from EastLink path towards Dandenong Creek. Connection to path on Mountain Hwy and path through Wantirna Reserve	N/A
Pumps Rd	Shared path bridge over EastLink	N/A
High St	Possible shared path bridges over High Street Road	N/A
Blind Creek Trail	Shared path under EastLink	N/A
Blind Creek Trail to High St via Cathies Lane	Shared path from Blind Creek Trail to Cathies Lane crossing to East side North to High Street Rd.	N/A
George Street	Footpath link across George Street to EastLink Path	N/A

Location	Cycle facility Treatment proposed by EastLink	Cycle facility Treatment proposed by VicRoads
Ferntree Gully Rd EastLink to Stud Road	Shared pathway North Side. (in conjunction with VicRoads)	Wide kerbside lane and shared path north side
Corhanwarrabul Creek	Reserve set aside along East Link for future path from Corhanwarrabul Creek to Wellington Rd	N/A
Wellington Rd – Stud Rd to Dandenong Creek		Proposed shared path north side

3.3 Principal Bicycle Network

The attached map (Map 2) and Table 12 outlines the current Principal Bicycle Network (PBN) within the Knox municipality. The PBN is a VicRoads planning program to provide an integrated bicycle network across municipalities throughout metropolitan Melbourne.

The 2001 Bicycle Plan Review recommended changes to the PBN, Table 12 outlines the amendments adopted by VicRoads since the 2001 Bicycle Review. Table 13 outlines the amendments introduced by VicRoads since the last review.

Table 12 Principle Bike Network Amendments

Route	From to	PBN -2001	Proposed Amendment 2001 Review	PBN 2007 VicRoads Adopted
Dorset Rd	Burwood Hwy to Blind Creek Path	On-road lane	Off-road path east side (current road reserve width insufficient to provide lane widening opportunities)	Not Adopted
Boronia Rd	Mountain Hwy to Dandenong Ck	No proposal	On-road lane or wide kerb side lane (wide kerb side lane exists)	Adopt
Burwood Hwy	Blind Creek Path to Milpera Cr.	Existing off-road paths	On-road lane to provide a continuous on-road facility along its entire length.	Adopt
Burwood Hwy	Dandenong Ck to Cathies Lane	Proposed off-road path	On-road lane	Adopt
Burwood Hwy	Willow Rd to Mt. Dandenong Tourist Rd	No proposal	On-road lane	Adopted
Stud Rd	Dandenong Ck to Kelletts Rd	Proposed off-road path	On-road lane	Part adopt to Wellington Rd
Mountain Hwy	Stud Rd to Railway	No proposal	On-road wide kerb side lane	Adopt
Albert Av/Chandler Rd (Boronia)	Mountain Hwy to Dorset Rd	On-road lane and wide kerb side lane	On-road lane re-route to Boronia Rd and then to Dorset Rd	Adopt
Wellington Rd	Stud Rd to Dandenong Ck	No-proposal	On-road lane	Adopt
Dorset Rd Extension	Burwood Hwy to Napoleon Rd	No-proposal	On-road lane constructed as part of road construction	Not Adopted

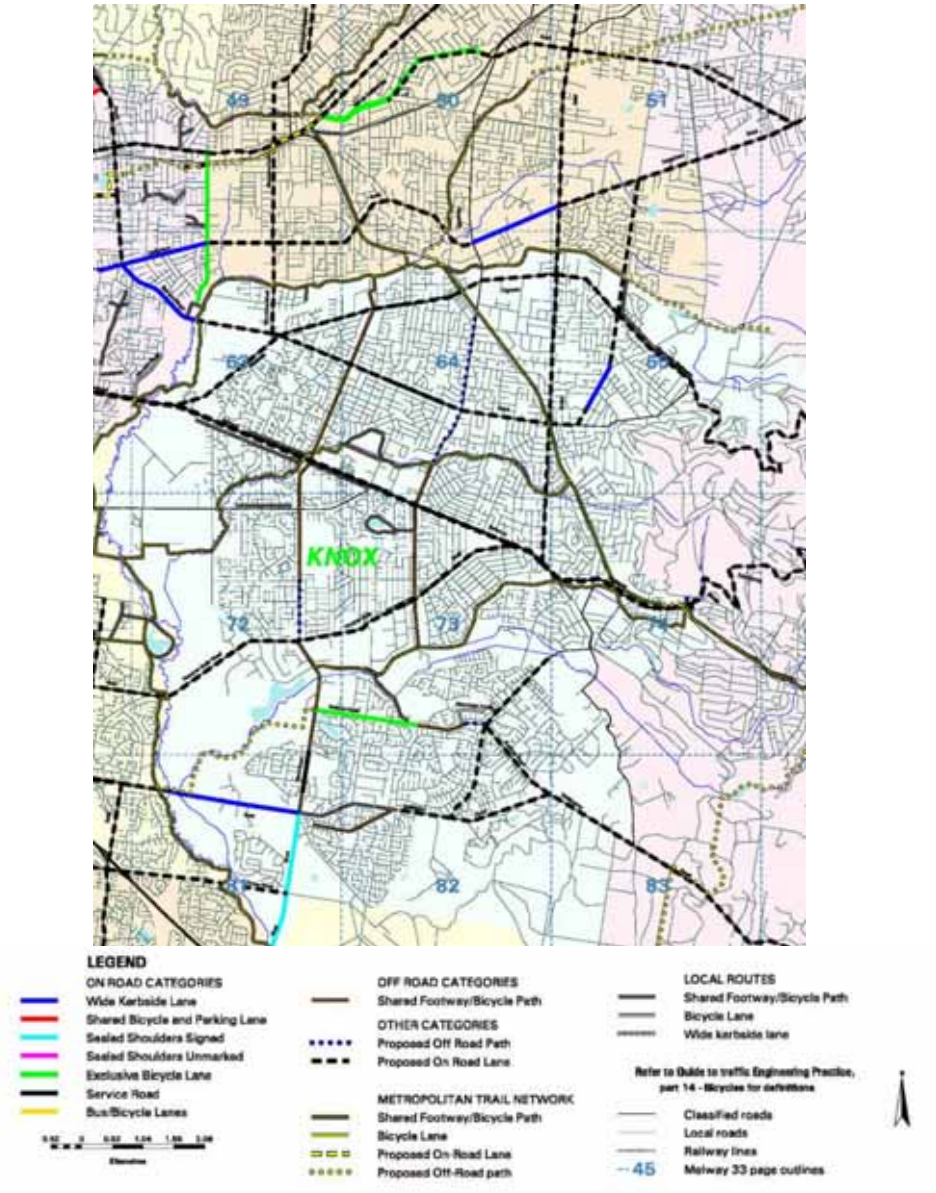
In addition the PBN has been amended to include the following:

Table 13 PBN 2007 Additions

Route	From to	Amendments
Napoleon Rd	Wellington Rd to Corhanwarrabul Creek	Proposed On-road Lane
Wellington Rd	Silkwood Way to Kelletts Rd	Proposed On-road Lane

Council can seek 100% funding from VicRoads for all bicycle facilities nominated to be part of the PBN. It is considered that the amendments to the PBN as proposed in 2001 should continue to be pursued.

Map 2 - Principal Bicycle Network



3.4 Links to Adjoining Municipalities

Table 14 Links to Adjoining Municipalities

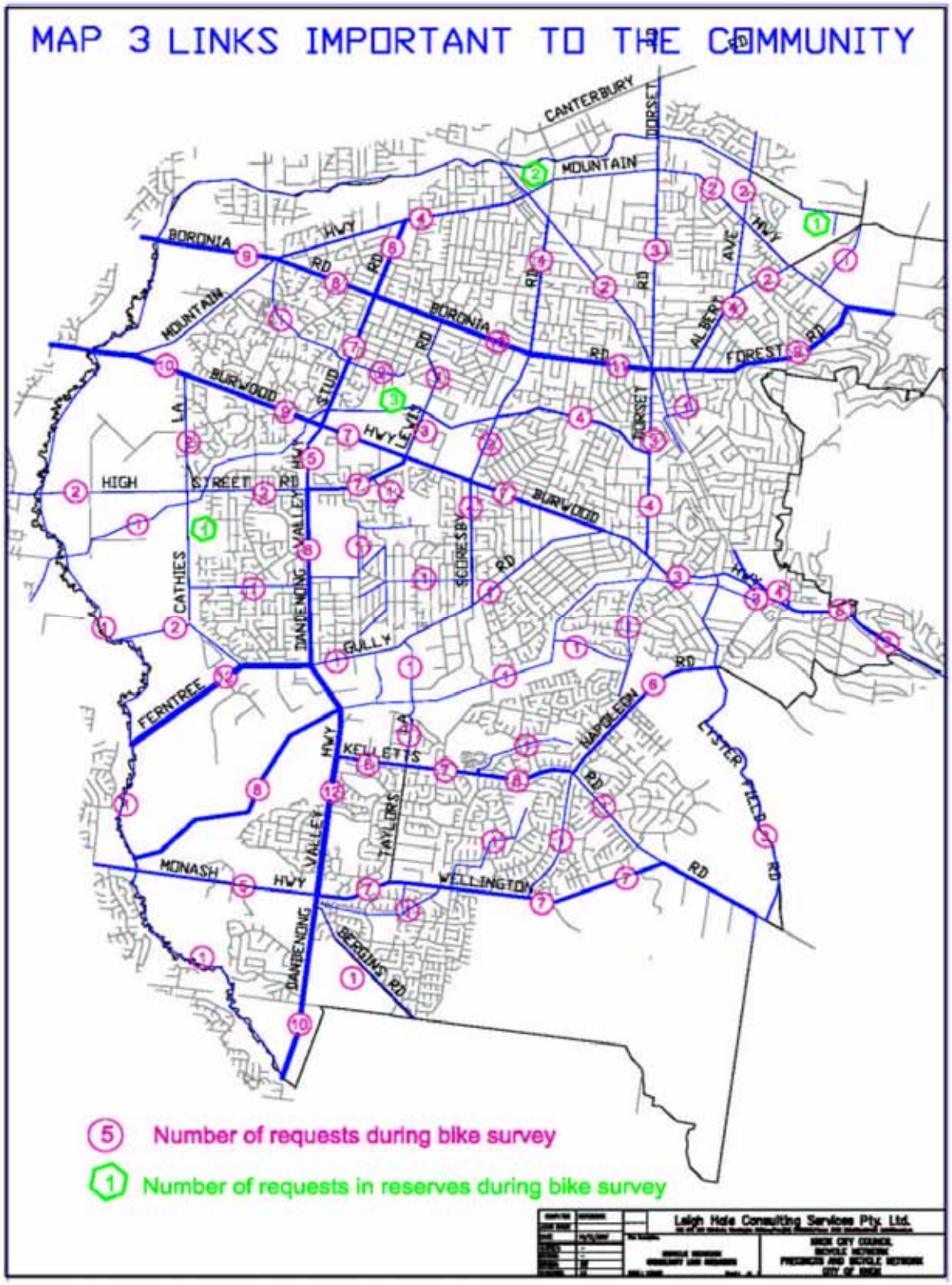
Municipality	Bike Planning	Major Connections
Maroondah CC	Maroondah Bicycle Strategy October 2004	Dandenong Creek Trail Colchester Road EastLink Trail to Canterbury Rd Tarralla Creek Trail Belgrave Rail Reserve Trail Dorset Rd – On-road Lane -PBN
Yarra Ranges Shire	Yarra Ranges Shire Hike and Bike 2005	Burwood Hwy/Belgrave Trail Mountain Hwy On-road
Casey CC	Bicycle Shared Pathways Oct 06	Heany Park Rd to Churchill National Park Trails Bergins Rd to Churchill National Park Trails
Greater Dandenong CC	City of Greater Dandenong Bicycle Strategy October 2002	Dandenong Creek Trail Police Rd
Monash CC	Monash by Bike	Dandenong Creek Trail-PBN Ferntree Gully Rd-PBN Wellington Rd-PBN Blind Creek Trail. Shepherd Rd to Glen Waverly Train Station
Whitehorse CC	Whitehorse Bicycle Strategy Draft Report March 07	Dandenong Creek-PBN Burwood Hwy Trail-PBN Boronia Rd-PBN

3.5 Links Identified by the Community

As part of the bike survey it was requested that secondary students and the general public identify links that are needed to complete the Knox Bicycle Network. **Map 3** indicates the links and number of responses for each link.

This information has been an important component in the considerations for recommended bicycle facilities. The Map clearly indicates strong demand for bicycle facilities along the arterial road network and while the survey did not seek the type of facility preferred it is considered that in the long term that both on-road and shared paths are required on these important roads.

Map 3 - Bike Links Important to the Community



4. Guiding Principles and Future Actions

4.1 Off-Road Paths

Guiding Principles

- Improve access to cycle facilities that link communities, public transport and activity centres.
- Where possible provide, as a minimum, 2.5m paths where shared use with pedestrian or other users is required.
- All path widths should meet AustRoads Guide to Traffic Engineering Practice – Part 14 Bicycles.
- All paths should meet Disability Discrimination Act (DDA) requirements.
- Provide shared paths within Reserves that link and provide a local route to on-road facilities or existing shared paths.
- To achieve convenient and safe off-road facilities destination, warning and regulatory signs should be incorporated into the existing off-road system and be part of all new proposed paths.
- Ensure new sub-divisional and green field developments provide cycle links to existing cycle infrastructure in a safe and direct route.
- Reduce hazards along paths through a scheduled maintenance program.

4.1.1 Proposed Footpaths

The Knox Pedestrian Plan has identified priorities for footpath links throughout the municipality. As part of this review these recommended links and priorities have been considered for incorporation into the Bicycle Plan Review.

The bicycle survey responses indicate that footpaths are used not only by children under 12 years of age but most school students and adults. The Knox Footpath and Shared Path Asset Management Plan Pedestrian Path Hierarchy define the footpath function and desirable width. It is considered that ‘Key Access’ and ‘Reserve Access’ routes should be wide enough to be designated as shared paths for bike access by all ages. This is especially important along the major creek trails.

The following footpaths identified in the Knox Footpath and Shared Path Asset Management Plan are considered to be important for cycle links and it is recommended that they be widened (if necessary) and designated as a ‘Shared Path’. The priority number reflects the identified priority (as at Dec 2007) for footpaths developed by Council.

Table 15 Widening of proposed footpaths and upgraded to shared paths

Priority	Road	Path Length	Width Recommended
1	Boronia Rd	Mountain Hwy - Thaxted Pd	2.5
3	Wellington Rd	Gearon Ave - Pinehill Drv	2.5
5	High Street Rd	Stud Rd - Wallace Rd (West)	2.5
6	Wellington Rd	Clauscen Dr - Braeburn Pd	2.5
7	Burwood Hwy	Milpera Cres - Traydal Cl	2.5
8	High Street Rd	Leo Crt- Burwood Hwy	2.5
9	Burwood Hwy	Lakewood Dr - Captain Snooze	2.5
17	Gates Head Dr Res	Knox City Carpark - Gates Head Dr	2.5
22	Mountain Hwy	Cobbity Crt - Baldwin Ave	2.5

4.1.2 Quiet and Linking Streets

There are many bike routes that use a combination of facilities to link to major destinations or extended bike trails. Many of these routes use a combination of existing footpaths and 'quiet and linking streets' and have been designated on the bike plans as 'On-road Bike Links'.

Whereas the 2001 Bike plan review recommended that these links be formalized with either on-road or shared path facilities it is now considered that bike routes that use low vehicle speed local roads and bicycle friendly streets be identified through signs. Where routes require existing footpaths between courts, reserves or road closures to be used, it is recommended that these footpaths be upgraded and widened; access improved and designated as shared paths so that all cyclists can legally use them.

Significantly these 'Quiet and Linking Streets' routes provide links, mid precinct, to important activity centres such as Knox City Shopping Centre, recreation centres and schools. Most of these bike links connect to traffic signals at major roads.

It is considered that identification of these bike links through finger board signs and on-road bike logos is essential for the community to have confidence in being able to achieve their destination intentions. Road advisory 'Bicycle' signs should be erected where needed to warn drivers of cyclists using the road.

The reduction of bicycle hazards along 'Quiet and Linking Streets' and associated shared paths is important to ensure safe travel and acceptance of these routes within the community.

4.1.3 Proposed Shared Path Links

The Knox Footpath and Shared Path Asset Management Plan and Council officers have identified the desire for additional shared pathways since the 2001 Bicycle Plan Review. Council officers have also developed a method of ranking and comparing priorities for both footpaths and shared paths.

The shared path links have been identified through the review process, the questionnaire responses and Council officers.

The development of EastLink shared pathway cross links has established shared pathway links that have rectified some missing links and developed opportunities to provide continuous bike paths especially to the Dandenong Creek Trail.

4.1.4 Destination Signs

While warning and regulatory signs have been well established throughout the off-road shared path system there are only a few destination signs currently in place. Destination signs not only provide valuable advice on direction and distance, they also provide incentives to casual cyclists to consider using the routes for shopping, work/school and public transport links as well as a location in case of emergencies.

The Knox Bicycle Committee considers destination signs are an important priority to be achieved over the next 3 years.

4.1.5 Underpasses

The off–road bicycle network includes a significant number of underpasses which reduce the conflict between motor vehicles and bicycles and improve travel time for bicycles.

Many of the underpasses are part of the Melbourne Water Floodway system and during heavy storms are closed because of flooding.

Unfortunately some of the underpasses have reduced widths, steep descents and curved entries and exits and there have been some crashes between cyclists and also with pedestrians.

The system of underpasses is considered to be extremely important component of the Knox bicycle network and to ensure that safety is maintained it is considered that a safety audit of all the underpasses should be undertaken to identify any safety issues that require improvement.

RECOMMENDED ACTIONS – Off-Road Paths

1. That proposed footpaths identified in this report be widened to 2.5m and signed for shared path use.
2. That bicycle links along 'quiet and linking streets' be identified by finger board signs and that linking footpaths be widened to 2.5m with appropriate access ramps.
3. That the routes using 'quiet and linking streets' be audited for road pavement and other hazards at the time of fingerboard signage installation.
4. That the method of ranking developed to compare new footpath proposals and shared paths, be adopted and that an annual construction program be implemented to construct the top 3 priorities as a minimum.
5. That a program be developed to install directional signs throughout the shared paths system and linking on-road facilities.
6. That a bicycle safety audit be undertaken on all the underpasses within the Knox bicycle off-road network.

4.2 On-Road Bicycle Facilities

Guiding Principles

- Improve connectivity of on-road facilities to link employment centres and inter-regional travel.
- Reduce road pavement hazards along bike lanes and routes and actively facilitate improvements especially during road rehabilitation works.
- That connecting the on-road arterial road bicycle network and inter-regional links are a high priority throughout Knox.
- Promote the use of 'quiet and linking streets' as local links to major off-road bike trails and on-road facilities.
- Recognition that cyclists have a legitimate right to road space.

The Principal Bike Network (PBN) establishes the planning for the backbone of the on–road facilities within the City of Knox. Implementation of sections of network have been undertaken by VicRoads and in recent times by works associated with EastLink. There are also on-road facilities within the local road network established by Council.

The bicycle survey responses identified that insufficient road space was one of the three most important factors inhibiting bicycle use by adults and secondary school students.

The Knox Integrated Transport Plan has identified that on-road arterial inter-regional connections is lacking within the Knox bicycle network.

The Knox Bicycle Committee has, during the development of this review, identified the on-road arterial network as a high priority for improvement.

Submissions on the Draft Bicycle Plan Review have also emphasized the need to consider pavement hazards as a consequence of pavement failures, rehabilitation and other miscellaneous works undertaken by VicRoads, Council or Service Authorities.

Pavement hazards such as low or high service pit covers, raised pavement lips adjacent to kerbs, and potholes can present a significant safety issue to cyclists.

Bicycle lanes, routes and links identified in this report should have a high level of service for bicycles. To achieve this it is considered desirable that a code of practice be prepared that provides guidance on the limiting tolerances required for safe bicycle travel along roads and lists all the roads where this should be achieved. When Council is to undertake works or when it is notified of proposed works by other authorities' contractors and sub-contractors should be required to include the code of practice into their quality procedures when undertaking the works.

Commuter cyclists have raised the issue of traffic light detector loops failing to recognize cyclists and the need for cycle detector loops along the Principal Bicycle Network (PBN) and on Main Roads throughout Knox.

The 2001 Bicycle Plan Review recommended amendments to the PBN for on-road facilities and most have been agreed to (see Table 12 above). However it is considered that the proposals for Stud Rd should be an on-road lane or wide kerb side lane along the whole length rather than predominately shared off-road facilities. Currently a bus lane has been established along sections of Stud Rd and while the section between Dandenong Creek and Wellington Rd allows use by bicycles, the section north from Wellington Rd is not signed to allow bicycle use.

It is considered the other recommended amendments to the PBN in the 2001 Bicycle Plan Review should continue to be pursued.

The Victorian Road Safety (Road Rules) Regulation rule 154 (2) and 158 (2b) indicate that a bus lane is for the exclusive use of public buses unless signed to include bicycles.

While VicRoads guidelines in relation to bus lane widths and frequency of bus services may be the factor for not signing these sections of the road it is considered a review by VicRoads should be requested for what is considered to be a very important on-road bicycle link.

Bus Lane Stud Road

The community surveys have indicated the concern of on-road cyclists in relation to insufficient space. It is considered that the increased use of wide kerbside lane line markings and the use of coloured surface treatments would increase driver awareness of the possible presence of cyclists and provides a guide to the drivers of the space required by the cyclists.

VicRoads (VicRoads, 2004)[1] studies have been undertaken to ascertain drivers' understanding of the markings and on car tracking positions. The studies found that:

- 86% of motorists and 95% of bus drivers understood the markings to mean a bicycle facility for shared use had been provided and that it is likely that cyclists would use the road.

- Cyclists feel more comfortable when cycling along a road that has the markings than along a road that does not have the markings.

- The amount of clearance that drivers give to cyclists when overtaking them is dependent upon the width of the lane and that drivers give more clearance to cyclists when the lane is wider.

4.2.1 Local Area Traffic Management Treatments

Throughout Knox there are many Local Area Traffic Management (LATM) treatments which provide excellent speed reduction outcomes however some designs force on-road cyclist to enter narrowed pavement areas and compete for space with cars and other larges vehicles. The merging manoeuvre that cyclists are required to do at these types of treatments increases the risk of cyclists being side swiped.

[1] VicRoads Cycle Notes No.13 July 2004

Both VicRoads and AustRoads have developed a range of LATM treatments that are bicycle friendly and provide a choice of treatment for particular situations.

There are many existing LATM treatments that can be modified to accommodate bicycles; however some treatments have well established trees and vegetation that the removal of which would diminish the amenity of the area.

The type of treatment above is able to be reasonably altered to accommodate bicycles. Each treatment will require individual consideration as to what modification is appropriate. Alterations may include coloured surface treatment to highlight the by-pass and identify to drivers the lane widths required by cyclists especially at the departure side of the LATM treatment.

The wheel marks through this treatment identify the alignment of vehicles entering and departing the treatment. Because of well established trees at this location a bicycle by-pass is not suitable to improve bicycle access along the road. Signs and coloured surfaces can improve driver's awareness of merging bicycles and the space required for cyclists.

RECOMMENDED ACTIONS – On-Road Bicycle Facilities

1. That VicRoads be urgently requested -to review bus lanes not signed as a joint bicycle lane with a view of having all bus lanes being able to be used by cyclists.

2. That the amendments to the Principal Bike Network (PBN) proposed in the 2001 review that have not been adopted by VicRoads continue to be pursued and that the PBN include on-road facilities along the whole length of Stud Road.

3. Establish and maintain on-road bicycle logos as per VicRoads guidelines for wide kerbside lanes along arterial roads and local collector roads.

4. Use coloured surface treatments in conjunction with on-road bicycle logos to increase driver awareness of cyclists along arterial roads and local collector roads.

5. That all new local area traffic treatments (LATM) be designed to accommodate bicycles and that current LATM procedures and standard treatments incorporate this requirement as a matter of policy.

6. That a review of all existing LATMs be undertaken to identify the treatments that can be modified to accommodate cyclists.

7. Implement a construction program to modify existing LATM treatments where practical.

8. To reduce road pavement hazards and achieve a high level of service for bicycle lanes and routes within the City of Knox that a code of practice be prepared to define the limiting tolerances required for safe bicycle travel.

4.3 Bicycle Storage

Guiding Principles – Bicycle Storage

- That both short and long term secure bicycle storage is essential at bus inter-modal interchanges and train stations.
- That Council lead the way in the provision of bicycle storage at all community facilities in the municipality.
- That the planning scheme bicycle facility requirements be actively pursued for new developments and that existing shopping centres and other key developments be encouraged to meet the planning scheme provisions.
- That all shopping centre revitalisation programs developed by Council incorporate bicycle storage facilities.

Bicycle Storage is an integral part of the bicycle network facilities and while there are locations not under the control of Council, advocacy for higher levels of storage facilities is important to encourage bicycle use throughout the municipality.

There is a range of storage facilities that are available dependent on the type of bicycle storage required.

Long term storage is generally required at train stations, bus interchanges, places of employment and schools. Long term storage is generally a locker or a parking rail in a lockable compound. Short term storage is generally a parking rail. It is preferable that all bicycle storage is under cover, well lit, secure and well located to prevent interference to pedestrian movements.

The Planning Scheme clause 52.34 details the requirements for bicycle facilities for new developments including the number and type of bicycle parking spaces and shower facilities required. A permit may be granted that varies, reduces or waives these requirements. The current planning scheme clauses for bicycle facilities were introduced in the planning scheme in January 2006.

It is to be noted that the re-development of the Boronia Station has resulted in a reduction of bicycle storage.

Recently the Victorian Minister of Public Transport (February 14, 2008) released a revised policy on bikes and Public Transport following significant outcry on the ban of bikes on trains.

1. Bikes can be taken for free on all rail services, Connex and VLine, at any time including peak periods.
2. The bike-carrying sections of the train will be signed and a code of conduct issued.
3. The VLine timetable will show which trains have the most space for bikes. (The green and purple Velocity trains do not have a luggage area that easily accommodates bikes.)
4. Connex will trial some internal fit-outs to facilitate the carriage of bikes and other luggage.
5. Folding bikes will be permitted on trams and buses from April. Guidelines for this will be issued.
6. $1m will be spent on bike storage cages at 20 stations across the metropolitan and regional system.
7. Station upgrades will automatically include a bike cage.
8. The private bike locker system will be audited and reviewed.

The items relating to bike storage are a clear acknowledgement of the importance of secure storage at transport centres. In particular item 8 is seen as an important review, as it appears that some lockers may not be fully utilised and there is no simple method to determine the occupancy rate of the lockers.

Bayswater Station

Table 16 Bicycle Parking at Shopping Centres

Shopping Centre	Existing Bike Storage Facilities	Recommended New Facilities
Tyner Rd West	None	Two standard parking rails preferably under cover
Wantirna Mall	One Multi-'front wheel in'. Two Steel Hoops	Eight standard parking rails throughout the centre preferably under cover
Studfield	None	Five standard parking rails preferably under cover
Mountain Gate	Five Multi-'front wheel in'. Thirty spaces total	Ten standard parking rails throughout the centre preferably under cover
Knox City	None	Five standard parking rails at each entry
Boronia	Three Stainless Steel Hoops	Eight standard parking hoops throughout the centre preferably under cover
Ferntree Gully	Two 'front wheel in' type racks	Five standard parking rails preferably under cover
Upper Ferntree Gully	One wave rack next to shopping Trolley rack	Five standard parking rails preferably under cover
Lysterfield Rd	None	Two standard parking rails preferably under cover
Rowville Lakes	Two 'front wheel in' type racks	Two standard parking rails preferably under cover
Stud Park	Ten standard parking rails throughout the centre	Relocate or provide additional parking rails undercover
Bayswater	None	Ten standard parking rails throughout the centre preferably under cover
Knox Gardens	Three dual 'front wheel in'. Six spaces total	Two standard parking rails preferably under cover
Scoresby Village	Two Stainless Steel Hoops	None
Knoxfield	None	Two standard parking hoops preferably under cover
The Basin	One Stainless Steel Hoop	Two standard parking hoops preferably under cover
Wellington Village Square	None	Five standard parking rails preferably under cover
Local Milk bars	Varies	One standard parking rail

Table 17 Bicycle Parking at Bicycle Generators

Bicycle Traffic Generator	Existing Bike storage Facilities	Recommended New Facilities
Knox City Council Offices	1 parking rail 6 lockers for Council staff	That council implement the requirements for bicycle facilities as required under the Planning Scheme Clause 52.34-3 requirements i.e. 1 space to each 300sq.m. of floor area for employees 1 space to each 1000sq.m. of floor area for visitors.
Knox Leisure Works	Two Multi-'front wheel in' spaces total six	Ten standard parking rails throughout the centre preferably under cover
Knox Regional Netball Centre	None	Ten standard parking rails throughout the centre preferably under cover
Knox Basketball Stadium and Community Centre	Eleven 'front wheel in'	Ten standard parking rails throughout the centre preferably under cover
Carrington Park Activity Centre	None	Five standard parking rails
Community Centres and Neighbourhood Houses	Varies	At least two standard parking rails per site
Boronia Branch Library and Boronia Basketball Centre	Nine 'front wheel in'	Five standard parking rails
Sports Grounds with Pavilions	Varies	At least two standard parking rails per site
Lewis Park	None	Five standard parking rails near pavilions and five standard parking rails at the skateboard ramps
Gilbert Park	None	Five standard parking rails
Knox Park	None	Five standard parking rails
Tim Neville Arboretum	None	Five standard parking rails
Bayswater Park – Playground	None	Five standard parking rails

Bayswater Park - Playground

Table 18 Bicycle Parking at Public Transport Facilities

Public Transport Facility	Existing Bike Storage Facilities	Recommended New Facilities for Transit Authorities
Upper Ferntree Gully Station and Bus Interchange	8 Lockers 5 bicycle hoops	Place cover over hoops
Ferntree Gully Station	21 Lockers 5 bicycle hoops	Place cover over hoops
Boronia Station and Bus Interchange	14 Lockers	5 bicycle hoops under cover
Bayswater Station and Bus Interchange	12 Lockers 10 Bicycle hoops under cover	
Knox City Bus Inter-modal interchange	None	Five standard parking hoops Under cover
Stud Park Bus Inter-modal interchange	None	Five standard parking hoops Under cover

RECOMMENDED ACTIONS – Bicycle Storage

1. That Council support the Minister for Public Transport's initiatives for bicycles and public transport and request that the Minister release the audit and review report of the train station bike locker system as soon as it is completed.
2. That Council request that the Minister for Public Transport provide funds for secure bicycle storage at Knox City Bus and Stud Park Bus Inter-modal interchanges.
3. That Council provide bicycle storage at community facilities and consider allocating funds to install 30 standard bicycle rails per year with priority given to Community Buildings.
4. That discussions be initiated with shopping centre managers with a view to providing well placed, well lit, secure bicycle storage preferably undercover at their centres.
5. That the requirement for bike storage and other facilities at workplaces for employees and customers under the Planning Scheme be vigorously pursued during the planning process for new developments.

Cyclists seek convenient undercover storage

4.4 Engaging the Communities

Guiding Principles

- Promote and support the use of bicycles as a healthy, environmentally friendly, safe and cost effective means of transport.
- Support 'ride to work' day within the community and the 'ride to school' and bike education programs in schools.
- Ensure footpath and shared path routes to schools are free from obstructions by overhanging or protruding vegetation and are maintained in a safe condition.

4.4.1 Encouragement

Why encourage greater use of bicycles as a means of transport?

Cycling has the lowest use of any transport mode, however the surveys show that within the Knox City Council bikes are generally available and while 'On-road' facilities have been highlighted by the community for improvement, 'off-road' facilities are generally accepted as being well located and continuous.

Cycling has some significant advantages to the individual as well as the community as a means of transport. Advantages include:

Individual

- Low cost
- Low maintenance
- Provides healthy exercise and improves fitness
- Provides quicker destination arrival for short trips
- Provides a realistic transport option for non-drivers
- Provides social activity and social interaction for a very broad range of ages
- Provides a reduced ecological/environmental footprint for transport

Community

- Greenhouse emission neutral
- Reduces car parking demand
- A reduced crash threat to other road users
- Reduces energy consumption
- Reduced costs for infrastructure compared to other transport modes
- No air or noise pollution
- Has a small infrastructure foot print

Objectives of an Encouragement program

- To highlight trip options for cycling in Knox
- To identify the advantages of cycling
- To provide visible evidence within the community of safe cycling
- To provide information and resources for the different categories of cyclists
- To promote cycling as a desirable transport mode

Who are the target groups, what do we want to achieve and how can we achieve it?

Primary School Students

Table 19 Encouragement Primary Students

Achievement	Benefits	How can we achieve it
Increase bike trips to school	• Improves health and fitness • Reduce car congestion at pick up and drop off times thereby improving safety • Reduce car parking • Reduces cost • Improves the environment	• Undertake school cycle access audit. • Provide a Cycle Access Plan to schools to identify safe access routes. • Identify the benefits of Bike Education Programs. • Promote the advantages of riding as a mode of transport. • Facilitate school 'ride to school' days. • Assist schools obtain grants for bike storage facilities.

Secondary School Students

Table 20 Encouragement Secondary Students

Achievement	Benefits	How can we achieve it
Increase bike trips to school	• Improves health and fitness • Reduce car congestion at pick up and drop off times thereby improving safety • Reduce car parking • Reduces cost • Improves the environment	• Facilitate a school cycle access audit by students. • Provide a Cycle Access Plan to schools to identify safe access routes. • Promote the benefits of Bike Education Programs to school Councils. • Promote the advantages of riding as a mode of transport. • Facilitate school "ride to school' days. • Assist schools obtain grants for bike storage facilities.

Recreational Cyclist

Table 21 Encouragement

Achievement	Benefits	How can we achieve it
Increase bike trips to local shops and community facilities	• Improves health and fitness • Reduce the reliance on cars • Reduce car parking problems • Reduces cost • Improves the environment	• Publish the Bike Plan brochure including a pocket guide. • Provide a 'Cycle Access Plan' for local shopping centres and community centres to identify safe access routes. • Provide directional signs to and along the off-road path system and quiet and linking streets. • Provide secure well located bike parking areas. • Provide map locality plans at shops and community facilities. • Include Bike Plan Brochure in new residents kit and Garbage calendar mail out

Commuter / Utility Cyclist

Table 22 Encouragement Commuter / Utility Cyclist

Achievement	Benefits	How can we achieve it
Increase bike trips to work and public transport	• Improves health and fitness • Reduce the reliance on cars • Reduce car parking problems • Reduces cost • Improves the environment	• Publish the Bike Plan brochure. • Provide a 'Cycle Access Plan' for stations and bus interchanges to identify safe access routes. • Provide directional signs along the off-road path system and quiet and linking streets to trains and bus interchanges. • Provide secure bike parking areas at bus Interchanges. • Improved identification of on-road facilities by using coloured surface treatments. • Promote 'National Ride to Work Day' by encouraging the local community to take part in the event. • Develop a program to provide directional signs throughout the bicycle network. • Ensure Planning Scheme requirements for bicycle facilities are installed.
Increase cycle access to major activity areas	• Assists employees and customers identify access options including cycling to the activity Centre	• Develop a precinct access plan brochure with major employers to identify access options including walking and cycling to the activity centre. • Develop a program to provide directional signs within the major activity areas. • Develop a bicycle parking implementation program within the activity centre.

Touring/Sporting Cyclists

Table 23 Encouragement Touring/Sporting Cyclists

Achievement	Benefits	How can we achieve it
Increase visibility and recognition of cyclists sharing the road along on-road routes	• Improved driver awareness • Reduced crashes	• Publish the Bike Plan brochure • Maintenance of on-road bike lane line marking and bike logos • Use wide kerbside lane markings • Identification of on-road facilities by using coloured surface treatments at intersections and appropriate midblock locations

Funding for access plans can be sought through the State Government's Travel Smart and Local Area Access Program Grants. Recently the City Knox received a grant for the Talaskia Road Precinct Travel Plan.

4.4.2 Education

The current survey and the survey conducted in 2001 identified within schools that bike education results in increased cycle use. The bicycle education in schools clearly develops an awareness and understanding of conflicts between cars and bikes as well as provides confidence for cyclists to ride safely.

From the diminished survey responses from School Councils it is evident that schools are having considerable difficulty in facilitating bike education within their curriculum.

In March 2007 the State Government commenced a four year funding program to Bicycle Victoria's Ride2School program in both primary and secondary schools. To assist this program VicRoads will use 150 bike trainers to help schools deliver bike education and safety programs. The first Ride 2School day occurred in March 2007 and will continue for the next 3 years.

Council can provide support and encourage schools to develop bike education programs and also support the Ride2School program. This could be achieved by:

- Establishing a program to develop precinct access plans for school.
- Auditing access to school.
- Addressing infrastructure requirements.
- Promoting Ride2school.
- Fund training volunteers for bike education programs and Ride2school day.
- Establishing a Knox ride to school day.

Since the last 2001 survey there has been a reduction in bicycle crashes, however the type of crashes continues to highlight the need for both drivers and cyclists to be aware of the interaction between bicycles and vehicles. Drivers are sometimes not aware of cyclists using the road system.

The use of bike logos for on-road lanes and wide kerb side lanes assists driver awareness of cyclists using the road and a program of implementing and maintaining these logos is important for driver education. Coloured surface treatment in conjunction with the logos strengthens this message.

4.4.3 Enforcement

It is considered that education and encouragement are far more effective tools to support increased bicycle use than taking action to prevent behaviour and/or issuing an infringement notice.

The issues that have been raised by the community that could lead to enforcement relate to the sharing of paths with pedestrians and land owners and the sharing of roads with motorists.

Shared paths are legitimately used by pedestrians, and electric wheel chairs/scooters. Cyclists need to give warning and give way to these other users. There are currently some signs along the shared trail system that remind cyclists to share the facilities. Recent cycle and pedestrian counts along some trails indicate that most of the system is not overloaded and can cope with the mix of pedestrians and cyclists with due care by both parties.

Dogs off leads can pose a considerable danger to cyclists using shared paths and persistent offenders would need to be addressed through Council's Rangers.

Children 12 years and younger (as well as adults supervising these children) can legally ride on footpaths. The bicycle surveys indicate many other adults also use footpaths. Over hanging and protruding vegetation along footpaths reduces cyclist visibility, reduces path widths and also produce safety hazards. Many landowners are just not aware of this issue and would simple comply if they were aware of the need. This awareness can be incorporated into school cycle access audits, so that the critical footpaths are addressed as part of an encouragement program for students.

There is evidence that motor cycles illegally use the path system and active community reporting and knowledge will assist the Police apprehend the offenders.

Cyclists sharing the road system face the same road rules, as motorists and need to diligently obey the rules especially at traffic signals or like any other road user face fines if they do not.

Cyclists must wear helmets and while we did not seek a response on this issue in the bike surveys anecdotal evidence suggests teenage children are the worst non-helmet wearing offenders.

The crash data indicates that both driver behaviour and cyclist behaviour have resulted in crashes and usually injury to the cyclists. It is considered that awareness by both parties of each other is critical in the road environment and for the cyclist to be safe.

RECOMMENDED ACTIONS – Engaging the Community

1. That Council encourage the use of bicycles to travel to school and to promote bicycle education in schools by:

   - Developing a program for school cycle access audits.
   - Establishing a program of Cycle Access Plans to schools to identify safe access routes.
   - Promoting the benefits of bike education programs to School Councils by expanding the Walking School Bus Co-ordinator role to encompass bike programs (estimate to be 0.6EFT).
   - Funding training volunteers for bike education programs and Ride2School days.
   - Facilitating school 'ride to school' days.
   - Establishing a Knox 'ride to school' day.

   Within limits of annual funding by Council.

RECOMMENDED ACTIONS – Engaging the Community (cont)

2. That Council encourage the increase of bicycle trips to work, public transport, local shops and community facilities and major activity centres by:

   - Publishing a Bike Plan brochure.
   - Promoting 'National Ride to Work Day' by encouraging the local community to take part in the event through local advertising and Council staff participation.
   - Developing a pilot program to instigate a Cycle Access Plan to identify safe access routes for one of the following activity centre areas:

     o public transport hub
     o major shopping centre
     o community facility
     o major employment centre

   Within limits of annual funding program with a view to reviewing and extending the program in future years.

3. That Council acknowledge the benefits of introducing and maintaining on-road bicycle logos/line markings, coloured pavement and bicycle destination signs both off-road and on-road in the encouragement of increased bike use throughout Knox.

4. That signs encouraging shared path users to 'share the path' continue to be used and maintained to remind users to be courteous and for cyclists to warn pedestrians of their approach.

5. Action Plan and Priorities

As part of the investigations into the Bicycle Plan Review a series of recommendations relating to future directions, encouragement, education, enforcement and planning have been identified. There have also been new bicycle facilities upgrading or extending the network proposed as part of the investigation. These have been assessed using a ranking system which provides a means of comparing on-road and off-road projects. The Ranking System is outlined in **Table 14.**

The Action Plan has developed a priority of all proposed works within a 10 year plus horizon and a staged 5 year program.

Part A of the Action Plan provides the priority for projects that have been initiated through the future direction review and recommendations.

Part B of the Action Plan provides projects that upgrade and extend the on-road and off-road network.

Monitoring Program

Each recommendation of Part A of the Action Program has a proposed measuring process that enables the proposed action to be accessed for performance and delivery of outcomes.

Recommendations in Part B of the Action Plan will be assessed on delivery of the project as part of Council overall capital works program.

EastLink path connection and under-pass Blind Creek Trail

5.1 Action Plan – Part A Future Directions Review

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.1 Off-road Paths	1. That proposed footpaths identified in this report be widened to 2.5m and signed for shared path use.	Council	Priority by ranking	As per Part B	Projects included in Part B
	2. That bicycle links along 'quiet and linking streets' be identified by finger board signs. That linking footpaths be widened to 2.5m with appropriate access ramps.	Council	Signs installed over 3 years. Priority by ranking	Number of links signed	Annual Budget For Bike Signs Projects included in Part B
	7. That the routes using 'quiet and linking streets' be audited for road pavement and other hazards at the time of finger board signage installation.	Council	Audit to be linked to the install of signs	Number of links audited	Annual Budget For Bike Signs Projects included in Part B
	8. That the method of ranking developed to compare new footpath proposals and shared paths be adopted and that an annual construction program be implemented to construct the top 3 priorities as a minimum.	Council	Over 5 years	N/A	N/A
	9. That a program be developed to install directional signs throughout the shared path system and linking on-road facilities.	Council	Signs installed over 3 years	As per Part B + Annual Bike Count	Bike Signs Annual Budget $50,000
	10. That a bicycle safety audit be undertaken on all the underpasses within the Knox bicycle off-road network (16 underpasses).	Council	Audits over a 3 year program	No of Audits completed + Collision reports to Council	Audit Annual Program $15,000

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.2 On-Road Bicycle Facilities	1. That VicRoads be urgently requested to review bus lanes not signed as a joint bicycle lane with the objective to having all bus lanes being able to be used by cyclists.	Council VicRoads	Immediately	N/A	VicRoads Costs
	2. That the amendments to the Principal Bike Network (PBN) proposed in the 2001 review that have not been adopted by VicRoads continue to be pursued and that the PBN include on-road facilities along the whole length of Stud Road.	Council VicRoads	Immediately	N/A	VicRoads Costs
	3. Establish and maintain on-road bicycle logos as per VicRoads guidelines for wide kerb side lanes along arterial roads and local collector roads.	Council – Local Roads VicRoads Arterial Roads	Over 5 years	Length of Roads completed + Bicycle Casualty Rates	Annual Implementation Budget $20,000
	4. Use coloured surface treatments in conjunction with on-road bicycle logos to increase driver awareness of cyclists along arterial roads and local collector roads.	Council – Local Roads VicRoads Arterial Roads	Over 5 years	As above	Part of above Budget
	5. That all new local area traffic treatments (LATM) be designed to accommodate bicycles.	Council	Immediately	Safety Audit of new treatments prior to construction	No additional costs
	6. That a review of all existing LATMs be undertaken with a view to identify the treatments that can be modified to accommodate cyclists	Council	Over 5 years	Number of treatments reviewed per year	Council Staff
	7. Implement a construction program to modify existing LATM treatments where practical.	Council	Over 5 years	Number of treatments modified per year	Annual Implementation Budget $20,000

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.2 On-Road Bicycle Facilities	9. To reduce road pavement hazards and achieve a high level of service for bicycle lanes and routes within the City of Knox that a code of practice be prepared to define the limiting tolerances required for safe bicycle travel.	Council	Within 1 year	Code in place	Council Staff
4.3 Bicycle Storage	1. That Council support the Minister for Public Transport's initiatives for bicycles and public transport and request that the Minister release the audit and review report of the train station bike locker system as soon as it is completed.	Council	Immediately	N/A	N.A.
	2. That Council request that the Minister for Public Transport provide funds for secure bicycle storage at Knox City Bus Inter-modal interchange and Stud Park Bus Inter-modal interchange.	Council	Immediately	Number of secure bicycle storage provided	Department of Transport Costs
4.3 Bicycle Storage	3. That Council provide bicycle storage at community facilities and consider allocating funds to install 30 standard bicycle rails per year with priority given to Community Buildings.	Council	Over 5 years	Number of Bike Rails per year	Annual Implementation Budget $15,000per year
	4. That discussions be initiated with shopping centre managers with a view of providing well placed, well lit, secure bicycle storage preferably undercover at their centres.	Council	Immediately	Number of Bike Rails per year	Council staff
	5. That the requirement for bike storage and other facilities at workplaces for employees and customers under the Planning Scheme be vigorously pursued during the planning process for new developments.	Council	Immediately	Number of Bike storage facilities per year	Council staff

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.4 Engaging the Comm-unity	1. That Council encourage the use of bicycles to travel to school and to promote bicycle education in Schools by :-				
	• Developing a program for school cycle access audits. (45 schools Primary and Secondary Schools at approx. $1500per Audit).	Council	Over 5 years	Number of Audits per year	$15,000per year
	• Establishing a program to prepare Cycle Access Plans to schools to identify safe access routes. (45 Primary and Secondary schools at approx. $2000per Audit).	Council	Over 10 years	Number of Cycle Access Plans per year	$10,000per year
	• Promoting the benefits of bike education programs to School Councils by expanding the Walking School Bus Co-ordinator role to encompass bike programs(estimate to be 0.6EFT)	Council	Immediately	Number of Schools undertaking Bike Ed Programs per year	$45,000
	• Funding training of volunteers for bike education programs and Ride2School days	Council	Within 1 year	Amount of Fund obtained + Volunteers trained	Seek funding through State funded Ride2School program and TravelSmart
	• Facilitating school 'ride to school' days	Council	Within 1 year	Amount of Fund obtained + Schools registered in 'ride to school' day	Seek funding through State funded Ride2School program and TravelSmart
	• Establish a Knox 'ride to school' day	Council	Within 1 Year	Amount of Fund obtained + Schools registered to participating	Seek funding through State funded Ride2School program and TravelSmart

Related Section	Recommendations	Responsibility	Time Lines Priority	Measure Process	Estimated Cost
4.4 Engaging the Comm-unity	2. That Council encourage the increase of bicycle trips to work, public transport, local shops and community facilities and major activity centres by:				
	• Publishing a Bike Plan brochure 5000 brochures	Council	Within 1 year	Census figures for bicycle trips to work + Ride To work day data	Printing and Distribution $5,000
	• Promote 'National Ride to Work Day' by encouraging the local community to take part in the event through local advertising and Council staff participation.	Council	Within 1 year	Knox residents registered for ride to work day.	Advertising $2,000
	• Develop a pilot program to instigate a Cycle Access Plan to identify safe access routes for one of the following activity centre areas:- o public transport hub, o major shopping centre o community facility o major employment centre Within limits of annual funding program with a view to reviewing and extending the program in future years.	Council	Within 2 years	Number of Cycle Access Plans per year	$5,000
	3. That Council acknowledge the benefits of introducing and maintaining on-road bicycle logos/line marking, coloured pavement and bicycle destination signs both off-road and on-road in the encouragement of increased bike use throughout Knox.	Council	Immediately	N/A	N.A
	4. That signs encouraging shared path users to 'share the path' continue to be used to remind users to be courteous and for cyclists to warn pedestrians of their approach.	Council	On going for all new projects	Reported Shared path collisions	Part of project costs

5.2 Action Plan – Part B Capital Works Priority

The Council has developed a method of assessing footpath, shared path and on-road facilities and is summarized in Table 14 below.

The plan identifies long term actions for a horizon of 10 years plus and develops specific actions that are considered needing to be addressed in the next 5 years.

Table 14 Project Assessment Criteria

SHARED PATHS			ON-ROAD FACILITIES		
Assessment Criteria for New Bicycle/Shared Paths Projects	**Rating**	**Score**	**Assessment Criteria for On-Road**	**Rating**	**Score**
Governance			**Governance**		
Path identified on Bicycle Plan	No Yes Yes and links to an activity centre	0 10 20	Path identified on Bicycle Plan or Principal Bicycle Networks	No Yes Yes and links to an activity centre	0 10 20
Path has been subject to insurance claims	None 1 More than 1	0 5 10	Path has been subject to insurance claims	None 1 More than 1	0 5 10
Social / Community Engagement / Community Benefit			**Social / Community Engagement / Community Benefit**		
Path Location (including whether there is a path on the opposite side of the road)	No Non-arterial with footpath Non-arterial without footpath Arterial with footpath Arterial without footpath	0 5 10 15 20	Crashes involving bicycles over a five year period	0 1 to 2 3 to 4 4 to 6 >6	0 5 10 15 20
Path links to activity centre/schools/shops/sporting grounds	No Links indirectly Links directly	0 5 10	Links to Public Transport	No Links indirectly Links directly	0 5 10
Existing path	None Formal crushed rock Worn track Informal crushed rock	0 5 15 15	Inter-neighbourhood links	Local Local collector/industrial Roads Arterial Roads Part of PBN	0 5 10 15
Customer requests for new path	0 1 to 2 More than 3	0 2 5	Customer requests for new path	0 1 to 2 More than 3	0 2 5
Links to existing bike/shared path	No Yes	0 10	Links to existing bike/shared path	No Yes	0 10

SHARED PATHS			ON-ROAD FACILITIES		
Assessment Criteria for New Bicycle/Shared Paths Projects	**Rating**	**Score**	**Assessment Criteria for On-Road**	**Rating**	**Score**
Environmental			**Environmental**		
Impact on environment (i.e. Difficult terrain)	No Moderate Yes	10 5 0	Impact on environment (i.e. Difficult terrain)	No Moderate Yes	10 5 0
Economic / Financial Impact			**Economic / Financial Impact**		
Contribution from other source e.g. 50% rate payer contribution, grants etc.	Yes No	+50% 0	Contribution from other source e.g. 50% rate payer contribution, grants etc.	Yes No	+50% 0
		150			**150**

Table 15 - Council's Joint Shared Path and On-Road Program

Priority	Road	Path Length	Points	Path Type	Total Cost
1	Bayswater Station	Mountain Hwy - Bayswater Rd	105	SP	110,000
2	Mountain Hwy	Koomba Park - 105 Mountain Hwy	97.5	SP	160,000
3	Corhanwarrabul Creek	Stud Rd - Dandenong Creek	82	SP	800,000
4	Burwood Hwy	Milpera Cres - Knox School 200m	70	SP	55,000
5	Ferntree Gully Rd	1644 FTG Rd - Bunjil Way(south side 100m)	70	SP	27,000
6	Burwood Hwy	Knox School to Traydal Cl	70	SP	108,000
7	Ferntree Gully Rd	Stud Rd - Henderson Rd	70	SP	324,000
8	Taylors Lane	Kelletts Rd - Wellington Rd	70	SP	440,000
9	Fulham Rd	Stud Rd - Bridgewater Way	70	SP	155,000
10	Sutton Lake	Stud Rd - Bridgewater Way	70	SP	108,000
11	Mountain Hwy	Railway line - Dorset Rd	70	SP	486,000
12	Gateshead Dr	Knox City SC - Gateshead Dr	70	SP	19,000
13	Blind Creek Trail	Blind Creek Trail at Stud Rd to Knox City SC signals (east side)	70	SP	27,000
14	Ferntree Gully Rd	Harley St - Kathryn Rd	70	SP	108,000
15	Blind Creek Trail	Link from Blind Creek trail to Knox City SC	70	SP	14,000
16	Reserve Link 3	Park Ridge Reserve	65	SP	95,000
17	Reserve Link 6	Rathmullen Rd - Scoresby Rd	65	SP	65,000
18	Mountain Hwy	Albert Ave- Dorset Rd	65	SP	378,000
19	Ferny Creek Trail	Ferny Creek Trail at Netball Centre to Centre	65	SP	27,000
20	Napoleon Rd	Glenfern Rd - Allora Ave	60	SP	122,000
21	Napoleon Rd	Walkway at school Xing - Kelletts Rd	60	SP	79,000
22	Ferntree Gully Rd	Henderson Rd - 1632 Ferntree Gully Rd	60	SP	176,000
23	Scoresby Rd	Blind Creek - Station St	60	SP	719,000
24	Kelletts Rd	Napoleon Rd - Lakesfield Dr	60	SP	108,000
25	Reserve Link 1	Kelletts Rd@ Lakesfield Dr-Redgum Crt	60	SP	108,000
26	Reserve Link 2	Gill Crt - Napoleon Rd	60	SP	11,000
27	Reserve Link 4	Egan-Lee Reserve @Allister Av - Riddell Rd	60	SP	103,000
28	Reserve Link 8	Chandler Reserve	60	SP	27,000
29	Reserve Link 11	Amazon Crt	60	SP	22,000
30	George St	Stud Rd - EastLink	60	SP	432,000
31	Kellbourne Dr & Murrindal Dr	Karoo Rd - Murrindal Dr (existing bike lane)	60	SP	270,000
32	Blind Creek Trail	Cathies Ln - EastLink path	60	SP	33,000
33	Mountain Hwy	Armstrong Rd - ped signals near Violen St	60	SP	57,000
34	Mountain Hwy	ped signals - Lemon Gv	60	SP	22,000
35	Rail Trail	Mt Dandenong Tourist Rd - Rail Trail	60	SP	68,000
36	Ferny Creek Trail	Ferny Creek Trail - Taldra Dr	60	SP	27,000
37	Ferny Creek Trail	Ferny Creek trail at Ferntree Gully Community Centre access road-Station St/Burwood Hwy signals	60	SP	27,000

Priority	Road	Path Length	Points	Path Type	Total Cost
38	Blind Creek Trail	Seal unsealed section of Springfield Rd to Blind Creek Trial	60	SP	9,000
39	High Street Rd	Tyner Rd - Burwood Hwy	55	SP	106,000
40	High Street Rd	Tyner Rd - Stud Rd	55	SP	260,000
41	Mountain Hwy	Ped Lights - Harold St	55	SP	162,000
42	Kelletts Rd	Greenbank Ct - Rosewood Blvd	55	SP	149,000
43	Kelletts Rd	Karoo Rd- Waterford Valley	55	SP	76,000
44	Boronia Rd	Mountain Hwy - Stud Rd	55	SP	365,000
45	Reserve Link 5	Burnett Rd - Peppermint Gv	55	SP	27,000
46	Reserve Link 7	Roy Crt- Dinsdale Rd	55	SP	11,000
47	Reserve Link 9	Kristen Crt	55	SP	19,000
48	Blind Creek Trail	Blind Creek Trail - Wadhurst Dr	55	SP	41,000
49	Mountain Hwy	Petalnina Dr - Wantirna Rd	50	SP	165,000
50	Kelletts Rd	Jacob Rd - Napoleon Rd	50	SP	114,000
51	Gresford Rd reserve	Mountain Hwy - Hadlow Rd	50	SP	27,000
52	Reserve Link 10	Genista Ave - Warbler Ct (via Tormore Reserve	50	SP	14,000
53	Ferny Creek Trail	Ferny Creek Trail at Dawson St-Burwood Hwy signals	50	SP	44,000
54	Ferny Creek Trail	Ferny Creek Trail at Glenfern Rd - Burwood Hwy signals	50	SP	11,000
55	Ferny Creek Trail	Link from Ferny Creek Trail via Henderson Rd & Valleyview Rd to Taylors Ln	50	SP	44,000
56	Blind Creek Trail	Hillcrest Cres - Dobson Park sealed access road	50	SP	22,000
57	Reserve Link 12	Reserve links Tynham Cl - Dobson St- Renwick Rd-Ferguson Ct-Clyde St	50	SP	108,000
58	Napoleon Rd	Wellington Rd - Teofilo Dr	47	SP	106,000
59	Wellington Rd	Pinehill Dr - Napoleon Rd	47	SP	127,000
60	Napoleon Rd	Palmerston Rd - Rathgar Rd	45	SP	111,000
61	Mountain Hwy	Barmah Dr - Knox Private Hospital	45	SP	297,000
62	Police Rd	Dandenong Creek trail - Police Rd	45	SP	135,000
63	Coppelia St	Reserve Link between Coppelia St link to Mowbray Dr	45	SP	41,000
1	Henderson Rd	Ferntree Gully Rd - Ferny Creek trail	42	OR	10,000
2	Bergins Rd	Stud Road- Heany Park Rd	42	OR	260,000
64	Napoleon Rd	Teofilo Dr- walkway at school Xing	40	SP	322,000
65	Wellington Rd	Napoleon Rd - Kelletts Rd	40	SP	486,000
66	Fairway Dr	Reserve link between Fairway Dr and Fairway Dr Mid Block	40	SP	16,200
67	Bunnett Rd	Bunnett Rd South and North along Access driveways section links	40	SP	8,100
68	Starlight Reserve Link	Tetragona through Reserve to Canter St	40	SP	72,900
69	Napoleon Rd	Kelletts Rd - walkway to Bethelle Crt	35	SP	72,900

	Off-road Facility
	On-road Facility

Table 16 - On-road Facilities Program - VicRoads' Funded

ON-ROAD FACILITIES							
Priority	**Road**	**On-Road Section**	**Type of Facility**	**Points**	**Length (m)**	**Responsibility**	**Total Cost ($)**
1	Burwood Hwy	Dandenong Ck to Stud Rd	Seal Shoulders	90	3,500	VicRoads	364,000
2	Burwood Hwy	Ferntree Gully Rd to Mt Dandenong Tourist Rd	Wide kerbside lane Bike Symbols +line marking	90	3760	VicRoads	9,000
3	Mountain Hwy	Stud Rd to Dorset Rd	Seal shoulders and wide kerb side lane	85	3500	VicRoads	364,000
4	Mountain Hwy	Dorset Rd to Forest RD	Seal shoulders and wide kerb side lane	82	3300	VicRoads	344,000
5	Ferntree Gully Road	Scoresby Rd to Burwood Hwy	Seal Shoulders	82	2090	VicRoads	218,000
6	Boronia Rd	Stud Rd to Forest Rd	Seal shoulders and wide kerb side lane	80	5000	VicRoads	520,000
7	Stud Rd	Wellington Rd to Ferntree Gully Rd	Seal shoulders and wide kerb side lane	80	3350	VicRoads	349,000
8	Dorset Rd	Burwood Hwy to Boronia Rd	Wide kerbside lane Bike Symbols +line marking	80	2600	VicRoads	6,000
9	Dorset Rd	Boronia Rd to Dandenong Ck	Wide kerbside lane Bike Symbols +line marking	80	3250	VicRoads	8,000
10	Burwood Hwy	Stud Road to Scoresby Road	Wide kerbside lane Bike Symbols +line marking	75	2140	VicRoads	5,000
11	Stud Rd	Ferntree Gully Rd to Burwood Hwy	Seal shoulders and wide kerb side lane	75	3400	VicRoads	354,000
12	Stud Rd	Burwood Hwy to Mountain Hwy	Seal shoulders and wide kerb side lane	70	3100	VicRoads	323,000
13	Ferntree Gully Rd	Stud Road to Scoresby Road	Sealed Shoulders	67	2390	VicRoads	248,000

ON-ROAD FACILITIES (cont'd)							
Priority	**Road**	**On-Road Section**	**Type of Facility**	**Points**	**Length (m)**	**Responsibility**	**Total Cost ($)**
14	Mountain Hwy	Burwood Hwy to Stud Rd	Seal shoulders and wide kerb side lane	72	4230	VicRoads	440,000
15	Burwood Hwy	Scoresby Rd to Ferntree Gully Rd	Seal Shoulders	80	1900	VicRoads	198,000
16	Napoleon Rd	Wellington Rd to Lysterfield Rd	Seal Shoulders	65	4430	VicRoads	461,000
17	Boronia Rd	Dandenong Ck to Stud Rd	Seal shoulders and wide kerb side lane	60	3060	VicRoads	319,000
18	Albert Ave	Boronia Rd to Dandenong Ck	Bike lane Wide kerbside lane Bike Symbols +line marking	60	3000	VicRoads	7,000
19	Wellington Rd	Silkwood Way to Kelletts Rd	Seal Shoulders	55	3090	VicRoads	322,000
20	Wantirna Rd	Mountain Hwy to Dandenong Ck	Seal shoulders and wide kerb side lane	55	1080	VicRoads	113,000
21	Kelletts Rd	Napoleon Rd to Lysterfield Rd	Seal Shoulder	55	3600	VicRoads	375,000

5.3 Precinct Plan

The following plans show the existing bicycle network and the proposed new on-road and off-road facilities. It also identifies “Quiet and Linking Street” which can be used to gain access to off-road and on-road links.