City of Canterbury
Canterbury Bike Plan 2016

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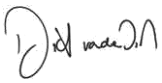
A	27/05/16	Final	Phil Gray	Dick van den Dool	Dick van den Dool	

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1. Introduction

1.1 Background

The City of Canterbury is an inner-west municipality of 34km^2 that accommodates a population of 150,000 and is located 11km southwest of the Sydney CBD (approximately). As with many other inner city municipalities, they are experiencing significant growth and strain on the transport network, especially with the historically high reliance on private car travel, which has resulted in significant traffic congestion and intrusion into residential areas. As such, there is a push to more efficiently manage the transport network and integrate it better with land use development to reduce the reliance on the use of private car travel and move more people within the available road space. Key to this is having increased residential densities and mixing of land uses proximate to key transport nodes (such as train stations), and supporting more space efficient transport modes like walking and cycling for short and commuter trips.

In this regard, GTA Consultants was commissioned by Canterbury Council in December 2014 to undertake a review of the 2000 Bike Plan and outline the direction for cycling in Canterbury to achieve a more efficient transport network as the municipality continues to grow and develop, as well as take advantage of the many other social, health and environmental benefits that come with increased bicycle use.

This Bike Plan responds to Canterbury Council's requirements for a new plan to reflect existing and future community needs and provides the information, tools and strategy to achieve the goals set out in the Canterbury Integrated Plans 2014-2023. This new plan seeks to provide for the people that live in, undertake activities within and pass through the Canterbury Local Government Area (LGA), while integrating with the broader metropolitan strategies and bicycle network, both existing and planned.

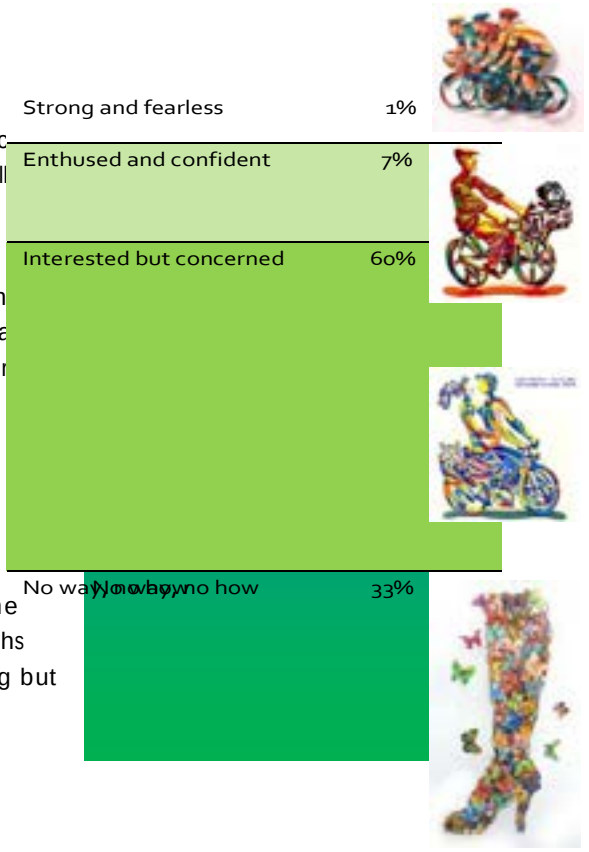
1.2 Purpose of this Bike Plan Review

This Bike Plan Review guides further development of the bicyc network and facilities throughout the Canterbury LGA, as well maximising integration with other transport modes and connections to surrounding LGAs.

Importantly, this Bike Plan seeks to create cycling environmen that engage people who otherwise would not regularly ride a reduce the reliance on private car use to help achieve a mor efficient transport network.

Roger Geller (City of Portland Bicycle Coordinator) famously categorised bicycle users as follows:

- Strong and fearless (~1% of people) – will ride regardless roadway conditions
- Enthused and confident (~7%) – comfortable to share the roadway with vehicles but prefer separated bicycle paths
- Interested but concerned (~60%) – curious about cycling but are afraid to ride amongst vehicles
- No way, no how (~33%) – not interested in cycling



The above percentages are broad generic estimates, and were developed to help understand what the various user types and proportions exist within the general population. Interestingly, subsequent studies have found these ratios to be largely true.

It is assumed the above first two categories of cyclists are already cycling in the Canterbury LGA, and will continue to regardless of the road conditions provided.

As such, this Bike Plan does not target the 8% of the population that will always cycle. Rather, it has been prepared to target the "interested but concerned" user category which encompasses 60% of people, or 90,000 people who reside in the Canterbury LGA. This represents a large portion of potential cyclists who fall into this user type that could become regularly cyclists, which would help achieve a significant increase in the efficiency of the transport network.

In order to get the "interested but concerned" user category to cycle regularly, a suitable environment whereby users feel safe and achieve comparable travel times to alternative transport modes is required. To achieve such a suitable environment, the following broad level infrastructure improvements are required and set out in this strategy:

- Identify and develop a full bicycle network throughout the municipality and connect with the surrounding LGAs to support bicycle use for short and commuter trips
- Prioritise bicycle movements over at least private car use on the road corridors and junctions that make up the bicycle network
- Increase the level of separation and/or calm vehicular speeds to be at least comparable to cyclist speeds
- Provide bicycle facilities that are able to be used by people of all abilities, i.e. 8 to 80 years of age
- Provide sufficient and convenient end-of-trip facilities.

2. Policy Background

2.1 Preamble

There are a number of policy documents pertaining to cycling on a national, state and local level. These documents primarily aim to improve and increase the use of active transport options within their relevant jurisdictions. Most of these documents note that the attitudes toward cycling must be changed along with the provision of any new or upgraded infrastructure.

The following section outlines this strategic context on a national level, on the New South Wales state level, and finally on the local Canterbury level.

2.2 National Context

There are two main documents that inform the Canterbury Bike Plan on a national level, The Australian National Cycling Strategy (2010) and the Walking, Riding and Access to Public Transport (2013). A summary of each can be found below, with more detail available in Appendix A.

Australian National Cycling Strategy (2010)

The National Cycling Strategy was released by Austroads and The Australian Bicycle Council in 2010. The overarching vision for the strategy is to realise a "step-change" in attitudes to cycling and in the numbers of riders in Australia. In the short term, the strategy sets the goal to double the number of people cycling across the nation over the next five years. The strategy sets out a coordinated framework for the development of cycling in Australia to 2016.

Walking, Riding and Access to Public Transport (2013)

The Walking, Riding and Access to Public Transport details a plan to improve the use of active transport in Australia. While states and local governments already have policies to improve their active transport networks, this plan consolidates key issues across the country to produce a more national approach to promoting active transport. The plan identifies that increasing the modal share for active transportation (i.e. walking, cycling and public transport) provides a number of positive results. The plan has also determined several barriers and opportunities to improving active transport modes.

With an understanding that *"distance is one of the most important factors in determining whether people consider walking or riding for their daily commute"*, the plan suggests a strategy of planning by 2km walking and 5km cycling catchments to major activity centres, where commuters will benefit the most from improvements to active transport modes.

2.2.1 NSW Context

A number of documents have been developed at the state level and will inform the Canterbury Bike Plan. A brief summary of each is outlined below, with further detail available in Appendix A.

NSW Bike Plan (2010)

The NSW Bike Plan, prepared with input from various government agencies, aims to support growth in bicycle usage *and "help make NSW one of the world's best places to ride a bike"*. The plan outlines at least $5 million funding each year for regional cities and local councils to complete neighbourhood cycleway networks.

A Plan for Growing Sydney (2014)

A Plan for Growing Sydney (Sydney Metropolitan Strategy) is the NSW Government's 20 year plan for the Sydney Metropolitan Area. It provides direction for Sydney's productivity, environmental management, and liveability; and for the location of housing, employment, infrastructure and open space. The NSW Government's vision for Sydney is: a strong global city, a great place to live.

NSW Long Term Transport Master Plan (2012)

The NSW Long Term Transport Master Plan sets the framework for the NSW Government to deliver an integrated, modern transport system. The final version sets out 220 short, medium and long term actions to integrate, grow, modernise and manage the transport network across NSW. The Master Plan contains a specific target to double the number of bicycle trips in Metropolitan Sydney by 2016, with further growth in cycling for all trips in NSW by 2031, particularly in urban centres.

Planning Guidelines for Walking and Cycling (2004)

The Planning Guidelines for Walking and Cycling provide guidance to land-use planners to ensure that walking and cycling improvements are taken into consideration in planning policy and practice. The guidelines provide a walking and cycling focus to the NSW Government's *Integrating Land Use & Transport Planning Policy Package*.

The guidelines suggest that *"when making planning instruments, councils are encouraged to integrate relevant state and local policies related to walking and cycling"*. This includes development policies in the DCPs and LEPs that encourage walking and/or cycling that would be considered during the development assessment stage thereby encourage improvements to walking and cycling facilities.

NSW 2021: A Plan to Make NSW Number One (2011)

NSW 2021 sets out the government's transport and service delivery. The plan aims to more than double the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, by 2016. The plan includes a priority action to complete the construction of the Metro Sydney Bike Network and work with local councils to complete local cycle networks as part of an integrated transport network.

Sydney's Cycling Future (2013)

Sydney's Cycling Future presents a new direction for bicycle infrastructure planning in metropolitan Sydney by focusing on people who would like to ride more often if cycling was made a safer and more convenient option. It aims to make cycling a feasible transport option for these people.

The strategy aims to prioritise investment on projects that have the greatest potential to get the most people to shift their short transport trips to bicycle. In order to achieve this, it aims to invest in connected routes within 5 kilometres of major centres and public transport interchanges. It proposes a three-tier hierarchy of safe cycleways to major centres and seeks to invest in state priority corridors to safely link with inner Sydney.

Sydney's Walking Future (2013)

Sydney's Walking Future recognises that walking is a fundamental component of an integrated transport system with most public transport trips starting and ending with walking.

The strategy seeks to create a culture of walking for transport by promoting walking as a viable and attractive transport choice, particularly for travelling to and from work and school. The strategy aims to focus infrastructure investment on completing connections within two kilometres of centres and public transport interchanges. In addition to this, the strategy aims to link walking to urban growth and to prioritise the needs of pedestrians in the planning, design and construction of new transport and urban development projects.

NSW Local Government Integrated Planning and Reporting Guidelines

The NSW Local Government Integrated Planning and Reporting Guidelines provides councils with guidance in undertaking their planning and reporting in accordance with the *Local Government Act 1993* and the *Local Government (General) Regulation 2005*. The guidelines allow councils in NSW to produce plans that can be connected and compared, allowing councils "the maximum leverage from their efforts by planning holistically for the future".

2.2.2 Local Context

The following is a number of planning and strategy documents prepared by the City of Canterbury. More detail on each can be found in Appendix A.

Canterbury Bike Plan (2000)

The Canterbury Bike Plan updates the 1986 Canterbury Bike Plan, and takes into consideration the established cycle network and facilities within the Canterbury LGA. The Plan was based on the following criteria:

- Safety - a route that provides a safe facility for cyclists and other road users
- Coherence - a continuous route that has a distinct and identifiable
- Directness - a route that is as direct as possible
- Attractiveness - a route that compliments and enhances its environment in such a way that cycling is attractive
- Comfort - a route that enables a comfortable flow of bicycle traffic and is easy to use.

These principles are still relevant; however, since the completion of this plan, bicycle planning practice has advanced with education and behaviour change programs now also considered standard elements of a local bike plan.

Canterbury Pedestrian Access and Mobility Plan (1999)

The Canterbury Pedestrian Access and Mobility Plan was among the first to be undertaken in NSW. The main aim of this plan is to improve coherence, directness, safety, comfort, attractiveness and equity of access for pedestrians. High use pedestrian areas were considered, including CBD's, neighbourhood shopping centres and Canterbury Hospital.

The plan recommended that the provision of traffic, pedestrian and cyclist facilities in the road space should be considered in an integrated way. It was also recommended that Council should take shared paths into consideration when installing new footpaths.

Regional Cycleway Crossing at Canterbury Road Review (Draft) (2014)

A Draft Regional Cycleway Review was undertaken on the Cooks River Cycleway for the Canterbury Road underpass. The review determined that the underpass does not meet the required standard for this type of facility with a number of deficiencies identified, including pathway being too narrow, the low vertical clearance, obstacles on the path, and that the pathway can become flooded. A number of options for improvement were assessed, but the review favours retaining the existing alignment and pathway, but providing upgrades to the route.

Canterbury Integrated Plans

The City of Canterbury has prepared Integrated Plans in order to create a "Sustainable Canterbury" by balancing current needs to ensure they do not compromise the needs of future generations. Within these Integrated Plans are the *Community Strategic Plan 2014-2023*, which Plan identifies the long-term aspirations for life and work in Canterbury LGA, and the *Council Delivery Program 2014-2017*, which guides the action for Council to take up to 2017 in order to complete goals set out in the Strategic Plan.

Canterbury Environment Management Plan (2011)

The City of Canterbury Environment Management Plan is structured around key themes affecting the City's environment. The Plan sets goals for environmental management, indicators for whether the goal is being achieved and specifies actions for achieving these goals. The sustainable transport goal is *"to reduce the environmental impacts of vehicle usage through the development and promotion of sustainable transport options"*.

Canterbury Strategic Recreation Plan (2010)

The Canterbury Strategic Recreation Plan provides the strategic framework for the provision of recreation services and facilities to address the current and future needs of the Canterbury City community. The Plan discusses improving the system of shared pathways for walkers and cyclists and connecting the existing limited system.

Canterbury Strategic Recreation Plan Review and Audit (2013)

The Canterbury Strategic Recreation Plan Review and Audit provides a desktop review of the Strategic Recreation Plan (2010). It involves an overall review of the status and usability of the Plan with regard to its strengths and deficits; refines the current Action Plan including order of priority, what may still be of use, what could be retained, what could be divested to recommend achievable; targets for future open space and recreation objectives in the LGA; develops a Structure Plan which provides the overall 'bigger picture' for open space in the public domain across the Canterbury LGA, and; to facilitate meetings/workshops with Councils PCG/internal stakeholder to assist in the longer term recreation planning for the City.

City of Canterbury Playgrounds and Playspaces Study (2014)

The City of Canterbury Playgrounds and Playspaces Study guides the future provision, development and management of Council owned and managed playgrounds and Playspaces across the City.

Bike Safety Recreation Facility Feasibility Study (2014)

The Bike Safety Recreation Facility Feasibility Study considers whether a bike safety recreation facility should be established in the City of Canterbury and if so where it would be best located. The study has found that there is justification to consider establishing a bike safety facility in the City of Canterbury and Peace Park has been identified as the best site option.[1]

Regional Bicycle Network Plan for Seven SSROC Council (2008)

The Regional Bicycle Network Plan aims to promote sustainable transport in a general sense, capitalise on increasing recreational and commuter ridership in inner-Sydney LGAs and improve co-ordination of the various NSW Government and council bicycle planning projects underway. Projects include council bikeplans (e.g. new bikeplans for City of Sydney, Marrickville, Leichhardt and Randwick), the Iron Cove Bay Run, the Alexandra Canal Cycleway, the Cooks River path upgrade study, the NSW Coastline Cycleway, the Botany Bay Trail and various RTA regional cycleway projects.

GreenWay Missing Links Report (Draft) (2015)

The Draft GreenWay Missing Links Report identifies the key links that need to be completed along the GreenWay Trail. The GreenWay Trail is a 5.8km long sustainable transport and urban environmental corridor connecting the Parramatta River at Iron Cove to the Cooks River at Earlwood. The corridor follows the route of the Inner West Light Rail and has a catchment of

[1] It should be noted that since this study was adopted a further Council resolution from 27 August 2015 has resolved that the preferred location for the bike safety facility is Gough Whitlam Reserve in Earlwood

48,000 people. A total of 2.6km (45%) of the trail is in place, with approximately 3.2km (55%) yet to be completed.

In addition to identifying the missing links in the trail, the report prioritises the development of these links, which has been informed by consultation with Transport for NSW, the GreenWay Councils (Canterbury, Marrickville, Leichhardt and Ashfield) and the GreenWay Steering Committee. The report also identifies opportunities to improve three priority east-west feeder links to enhance the Greenway's connectivity to key east-west regional cycle routes and/or heavy rail stations/interchanges such as Dulwich Hill and Lewisham.

The report recognises that the estimated overall cost for the completion of the missing links is in the range of $5,600,000 to $8,150,000.

Cooks River Path Signage Strategy (2010)

The Cooks River Path Signage Strategy guides the implementation of new Cooks River signs, along with other types of signage needed to improve wayfinding, safety and access to the path. It aims are to:

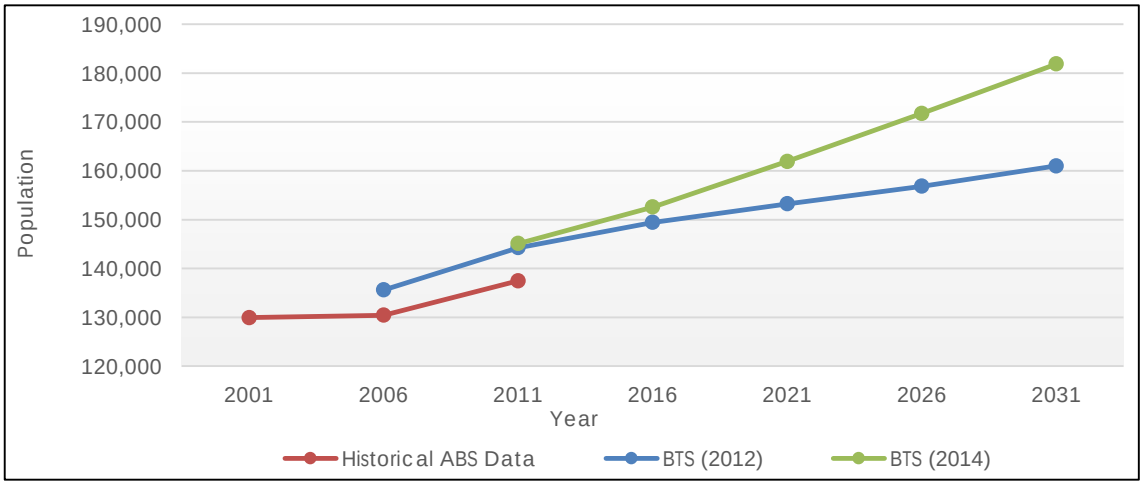
- minimise the operational risks to users by clearly indicating regulatory status, potential hazards and conflict points of the path
- improve access and the wayfinding ability of path users along the path and its feeder routes by clearly identifying:
    - external linkages to the path
    - initial points of contact with the path
    - navigation along the path
    - important path components and landmarks such as parks, creek crossings, road crossings, facilities (toilets, water, food etc.), heritage and points of interest.
- develop a unified and consistent standard of path signage design, installation/mounting, maintenance and management.

3. Existing Conditions

3.1 Population

At the 2011 Census, the Canterbury LGA had a population of 137,454 people, representing 24% of the total population residing in the Southern Sydney region. Over the 2006-2011 period, Canterbury's population has increased at an average annual rate of 1.05%. According to the NSW Bureau of Transport Statistics (BTS), by 2031 the City of Canterbury is expected to reach a population of between 160,000 and 180,000 people (BTS 2012 and BTS 2014, respectively). See Figure 3.1 for the historical and projected population for the City of Canterbury from 2001 to 2031.

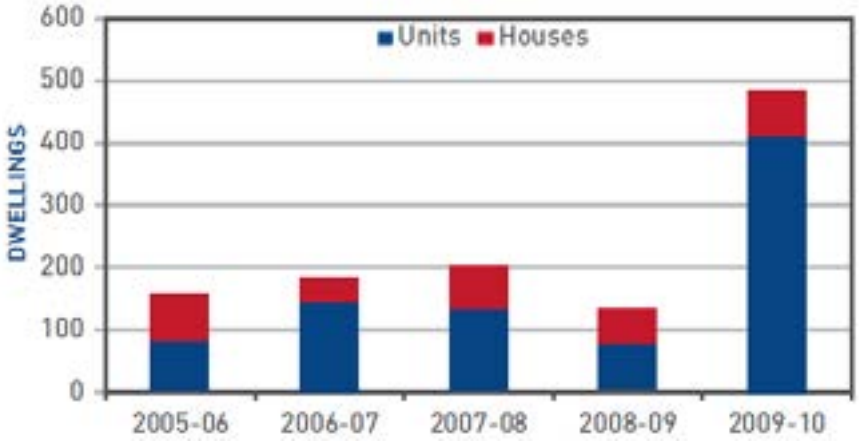
Figure 3.1: Historical and Projected Population for the City of Canterbury, 2001 to 2031



3.2 Development

The Canterbury LGA recorded one of the higher levels of new residential approvals in the Southern Sydney region in 2009-10, accounting for 17.0% of the regional total. As shown in Figure 3.2, the number of new building approvals in the LGA fluctuated over the five-year period from 2005-2010, with a significant jump in 2009-10 from the previous year. The variations are primarily driven by the number of new unit approvals.

Figure 3.2: Canterbury LGA Building Approvals 2005-2010



Source: Canterbury LGA Fact Sheet, November 2010, http://www.canterbury.nsw.gov.au/Discover/Living-and-working-in-Canterbury/Demographics-Statistics

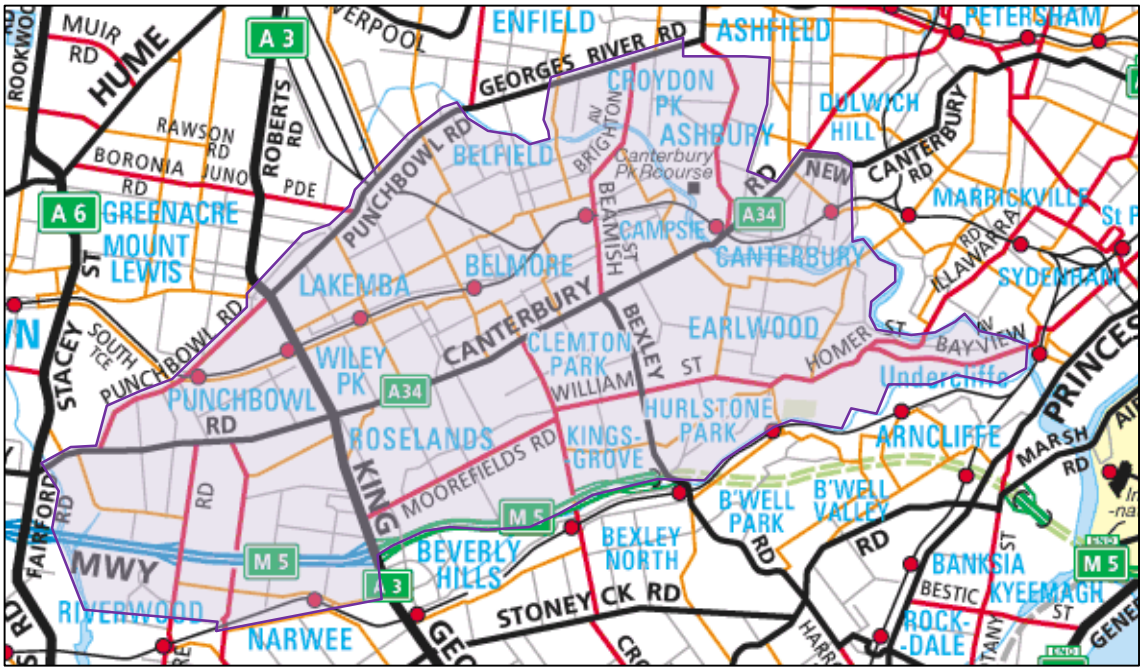
3.3 Transport Networks

3.3.1 Overview

The City of Canterbury has a number of existing transport networks including the road network, a rail network and a bus network. The road network consists of a number of RMS controlled and Council controlled roads. Many of the RMS controlled roads are considered significant roads because of the high volumes of traffic they carry. The rail network includes two railway lines, the T3 – Bankstown Line and the T2 – Airport Line, with a number of stations on each line within or directly adjacent to the Canterbury LGA. The bus network consists of a number of bus routes that connect various suburbs within the Canterbury LGA.

Figure 3.3 below shows the existing road network, including road hierarchy, as well as the railway lines and stations within and adjacent to the Canterbury LGA.

Figure 3.3: Canterbury LGA Showing Existing Transport Networks



Further information on the existing transport networks can be found at Appendix B.

3.3.2 Road Network

Based on RMS controlled roads and on-site observations, Figure 3.4 has been produced to indicate the magnitude of traffic on key roads throughout Canterbury. These highly trafficked roads show where the large majority of road users would unlikely feel safe cycling unless a clearly separated cycling path was provided.

Figure 3.4: High Traffic Volume Roads throughout Canterbury LGA

Basemap Source: Whereis, http://www.whereis.com/, accessed 15 June 2015

3.3.3 Rail Network

Canterbury LGA is well serviced by trains with railway stations on both the T3 – Bankstown Line and T2 – Airport Line located in the LGA.

The T3 – Bankstown Line operates in an east-west direction through the centre of the Canterbury LGA with services to Sydney CBD (inbound) and Bankstown and Liverpool (outbound). Seven stations on this line are located within the Canterbury LGA as follows:

- Hurlstone Park
- Canterbury
- Campsie
- Belmore
- Lakemba
- Wiley Park
- Punchbowl

Trains operate to these stations every 5-10 minutes during peak travel periods and every 15 minutes outside the peak.

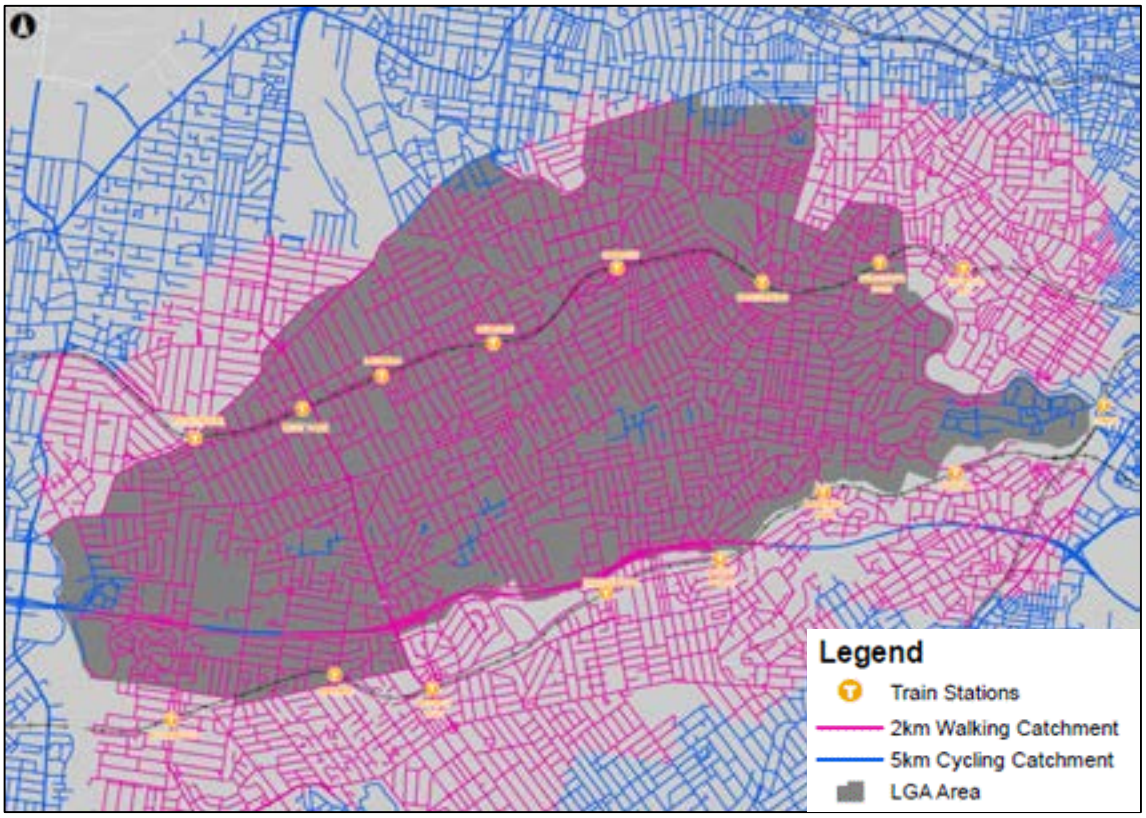
The T2 – Airport Line also operates in an east-west direction along the boundary of Canterbury and Rockdale and Canterbury and Hurstville LGAs. The rail line operates to Sydney CBD and Sydney Airport (inbound) and Campbelltown/ Macarthur (outbound). One station (Narwee) is located within the Canterbury LGA with another five stations located in Rockdale and Hurstville. The stations (and LGA) are as follows:

- Narwee (Canterbury)
- Bardwell Park (Rockdale)
- Bexley North (Rockdale)
- Kingsgrove (Hurstville)
- Beverly Hills (Hurstville)
- Riverwood (Hurstville)

Trains operate to these stations every 5-15 minutes during peak periods and every 15-30 minutes outside peak periods.

As seen in Figure 3.5, most of the LGA is within a reasonable walking distance (2km) of a railway station and all of the LGA is within a reasonable cycling distance (5km) of a railway station.

Figure 3.5: Canterbury Walking and Cycling Catchments



The large number of railway stations within and adjacent to the Canterbury LGA, as well as the high frequency of rail services would make Canterbury a great place for people to cycle short distances to trains.

Sydney Metro

Sydney Metro is Australia's largest public transport project and will provide more trains and faster services for customers across the network. It is a new standalone railway network, and is considered the solution to clearing the city's public transport bottlenecks and will deliver a quality of rail service never before seen in Australia.

Along with major upgrades to the Western Line, Sydney Metro will deliver the capacity to increase the number of trains entering the CBD across the entire Sydney railway system from 120 to about 200 in the busiest hour of the day. This means that across greater Sydney, the railway network will have room for an extra 100,000 train customers an hour in the peak.

The Sydney Metro network will have the capacity to operate 30 trains an hour through the CBD in each direction – a train every two minutes in each direction.

Sydney Metro Northwest between Rouse Hill and Chatswood, is under construction, with almost half of the tunnelling now completed. Sydney Metro Northwest will open in the first half of 2019 and offer fast, safe and frequent services between Rouse Hill and Chatswood. From Chatswood, Sydney Metro City & Southwest will extend metro rail under Sydney Harbour, through new stations in the lower North Shore, Sydney CBD and south west to Bankstown (Figure 3.6).

Part of the existing T3 – Bankstown Line will also be upgraded and converted to metro rail, with the following stations within the Canterbury LGA being part of this upgrade:

- Canterbury
- Campsie
- Belmore
- Lakemba
- Wiley Park
- Punchbowl.

Figure 3.6: Sydney Metro Map

Source: SydneyMetro.info

3.3.4 Bus Network

The LGA is well serviced by buses with several bus routes operating though the LGA. The majority of the LGA is serviced by State Transit buses (Sydney buses) with routes operating to the north and east of Canterbury LGA. The westernmost portion of Canterbury is serviced by Punchbowl Bus Company and Transdev buses with routes operating to the south and west.

A large proportion of the bus routes in Canterbury operate in a north-south direction to complement the east-west running rail lines. These bus routes connect the rail lines and provide public transport services to suburbs to the north which have no heavy rail lines. These services operate at 15 minute intervals on average.

Maps of the various bus routes in Canterbury are included in Appendix B.

There are many bus stops located in the Canterbury LGA, a lot of which are in close proximity to services and other desired destinations.

The bus route maps have been used as part of the network development. Where possible, cycle routes should be separated from bus routes on narrow roads.

4. Movement Patterns

The NSW Bureau of Transport Statistics (BTS) is responsible for collating and analysing transport related data for the state. Data sources include the ABS Journey to Work (JTW) and Household Travel Survey (HTS) datasets.

4.1 Household Travel Survey

The HTS is a comprehensive source of personal travel data for the Sydney Greater Metropolitan Area. The HTS datasets include information about the key modes of travel and purpose of travel in each participating LGA.

Travel Mode

The mode of travel for all trips taken by Canterbury residents in 2012/2013 is shown in Table 4.1, with the modes ranked according to the volume of trips per day. Bicycle trips are included in "Other Modes". A previous detailed analysis of Mode of Travel indicated cycling could consist of 50% of "Other Modes".

Table 4.1: Mode of Travel (HTS 2012/2013)

Mode	Volume of Trips (approx.)	Percentage of all Trips
Vehicle Driver	195,000	46%
Vehicle Passenger	107,000	25%
Walk Only	61,000	14%
Train	32,000	8%
Bus	21,000	5%
Other Modes	5,000	1%
Total	421,000	100%

Source: NSW Bureau of Transport Statistics

As shown in Table 4.1 "Other Modes" contribute to a very small portion of trips undertaken by Canterbury residents. Given the assumption of bicycles contributing to 50% of other modes, it is estimated that Canterbury residents could make 2,500 bicycle trips per day (0.5% of all trips).

The mode of travel used by Canterbury residents has been compared with the average of neighbouring LGAs (Ashfield, Bankstown, Burwood, Hurstville, Marrickville, Rockdale, Strathfield) and the Sydney Metropolitan Area (Central, South, West Central and North sub-regions) as shown in Figure 4.1.

Figure 4.1: Mode of Travel (HTS 2012/2013)

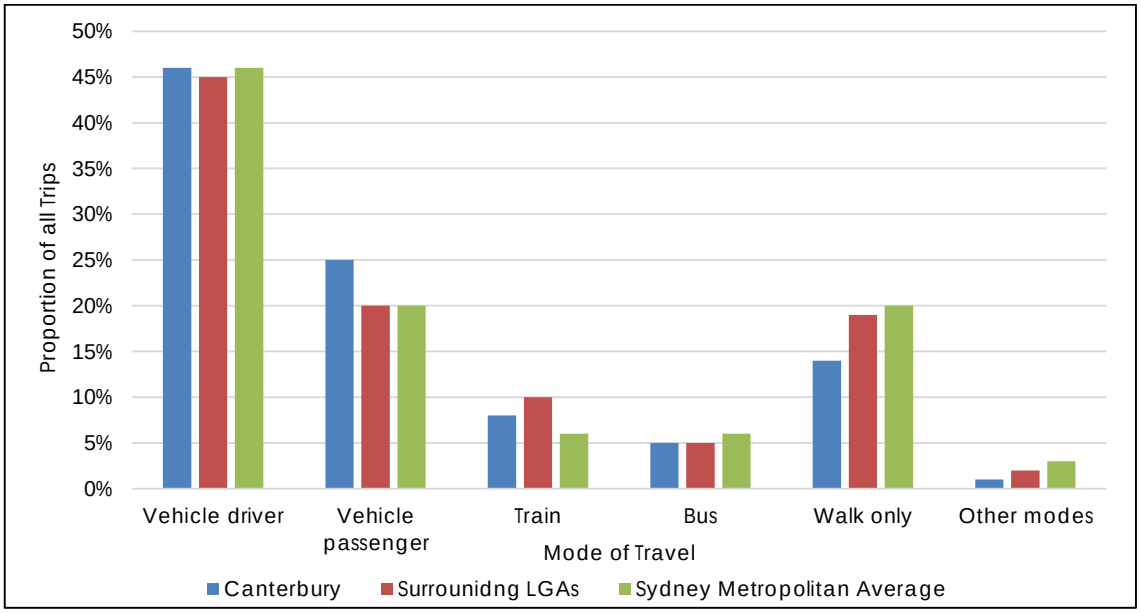


Figure 4.1 shows that Canterbury has a larger number of trips by vehicle than average and a smaller number of people using active travel modes (walking and cycling). The proportion of trips made by bicycle (50% of "Other Modes") is approximately 0.5% in Canterbury whilst the surrounding LGA average is 1% and Sydney Metropolitan average is 1.5%.

Travel Purpose

The purpose of all trips taken by Canterbury residents in 2012/2013 is shown in Table 4.2, with the purpose ranked according to the volumes of trips per day.

Table 4.2: Purpose of Travel (HTS 2012/2013)

Purpose	Volume of Trips (approx.)	Percentage of all Trips
Social/ Recreation	118,000	29%
Service Passenger	72,000	18%
Shopping	65,000	16%
Commute	58,000	14%
Education/ Childcare	36,000	9%
Personal Business	24,000	6%
Work Related Business	18,000	4%
Other	11,000	3%
TOTAL	402,000	100%

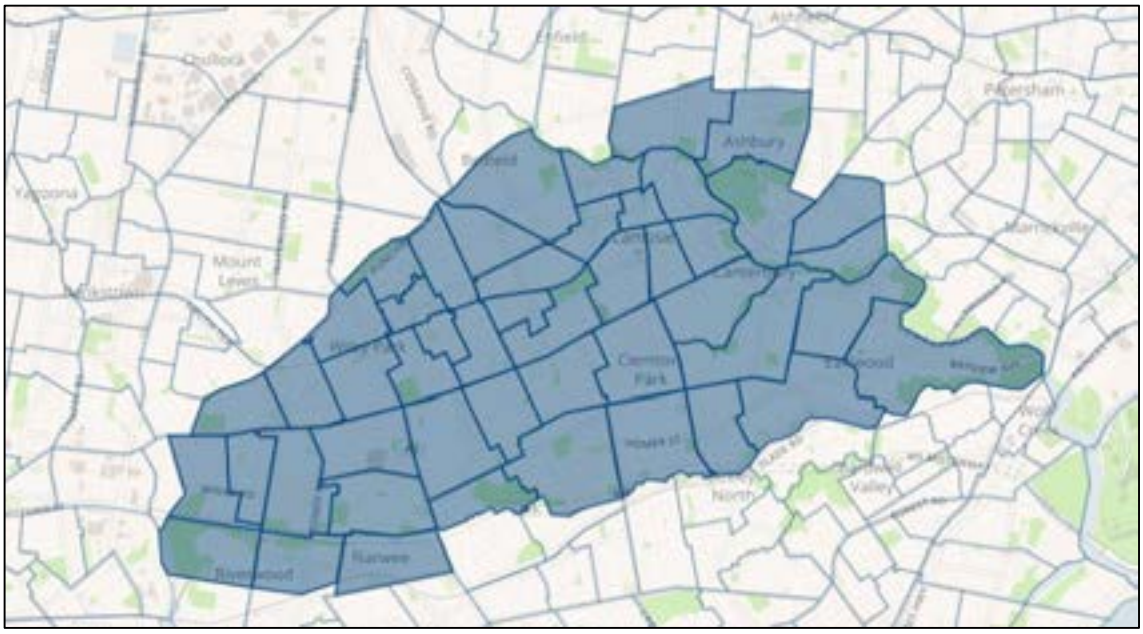
As shown in Table 4.2, social/ recreational trips account for the largest proportion of daily trips by Canterbury Residents, followed by trips to pick-up/ drop-off passengers, shopping trips and commuting to work.

4.2 Journey to Work Data

The 2011 Census Journey to Work (JTW) data measures existing travel patterns to employment areas and the mode of travel to work.

The JTW data is measured by Travel Zones, which is a small geographical area. The Canterbury LGA includes 48 Travel Zones as shown in Figure 4.2.

Figure 4.2: Canterbury Travel Zones

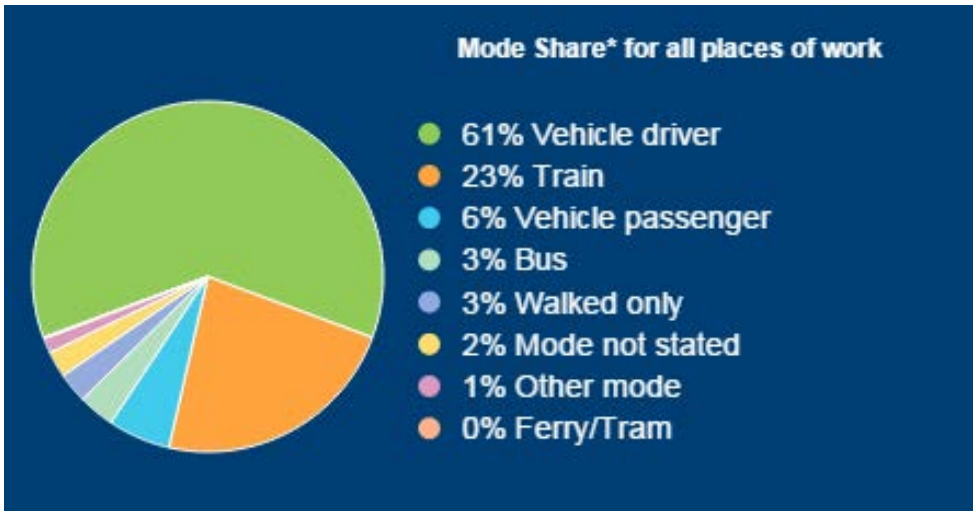


Source: NSW Bureau of Transport Statistics

Canterbury Residents

GTA Consultants undertook analysis of the mode share for all trips made by the employed residents of Canterbury LGA to their place of employment, the results of which are summarised in Figure 4.3.

Figure 4.3: Employed Canterbury Residents Mode of Travel to Work (2011 Census Data)



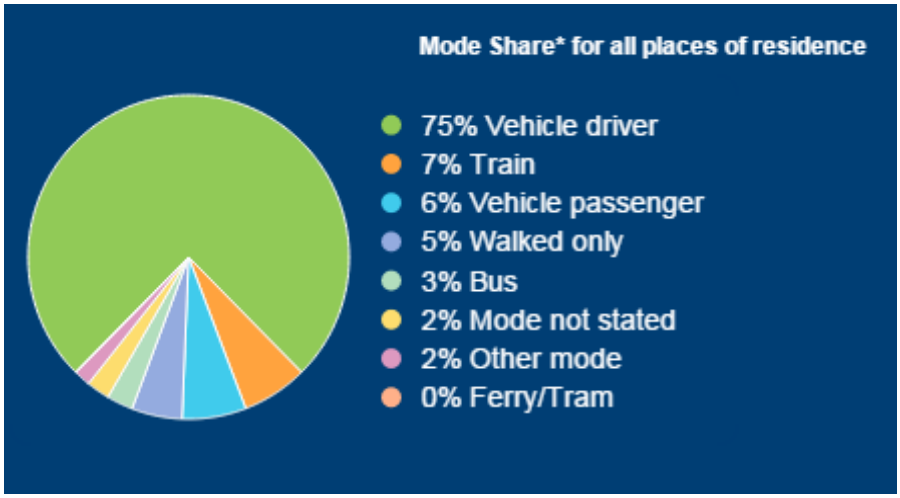
Source: NSW Bureau of Transport Statistics

Of the 54,374 employed residents of Canterbury, the vast majority drive to work or catch the train. Other modes contribute to 1% of all trips to work, 0.5% of which could be trips by bicycle. The largest proportions of employed residents travel to the Sydney City for work (23%) or are employed within the Canterbury LGA (16%).

Canterbury Employees

Analysis was also undertaken of the mode share for all trips made by people employed within Canterbury LGA, the results of which are summarised in Figure 4.4.

Figure 4.4: Canterbury Employees Mode of Travel to Work (2011 Census Data)



Source: NSW Bureau of Transport Statistics

Of the 26,111 people who are employed in the Canterbury LGA, 3 out of 4 drive to work. Other modes contribute to 2% of all trips to work, 1% of which could be trips by bicycle. Canterbury residents contribute to 32% of the workforce in the Canterbury LGA, other with large proportions travelling from bordering LGAs (Bankstown, Strathfield, Burwood, Ashfield, Hurstville, Rockdale and Kogarah).

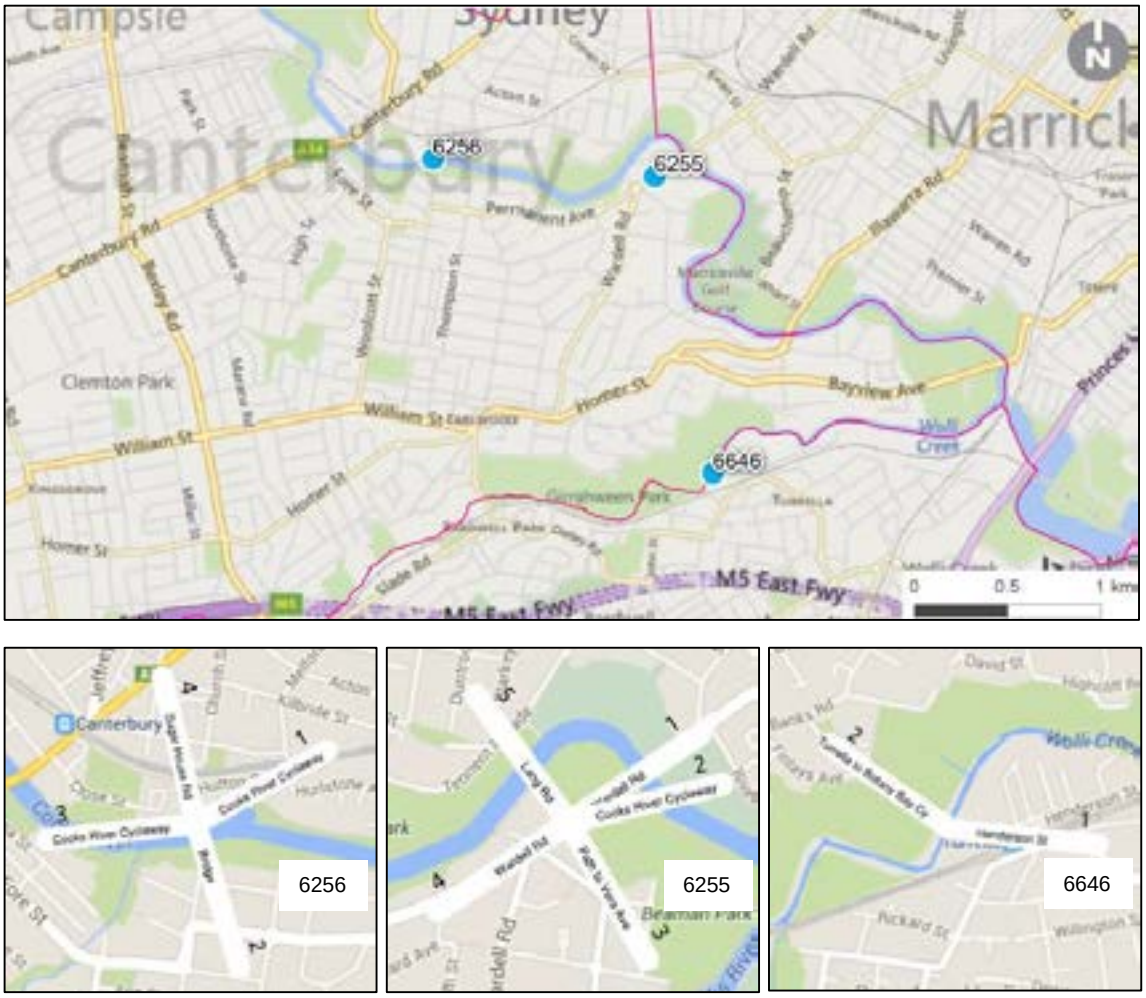
4.3 Cyclist Counts

Cyclist counts within Canterbury LGA have been undertaken in the form of "Super Sunday" counts. Super Sunday is an initiative of *Bicycle Network* which counts users of shared paths throughout Australia. The counts are designed to offer a snapshot of recreational usage on a Sunday in mid-November (peak demand) and enables councils to better understand usage of their recreational shared path network.

Super Sunday counts have been undertaken twice in the Canterbury LGA, in November 2013 and November 2014. Counts in Canterbury have focused on 2 locations along the Cooks River Path with an additional location added in 2014 with a count on the Turrella to Botany Bay Cycleway at the border of Canterbury and Rockdale Councils. The counts we undertaken at intersections with the direction of travel recorded. The count locations are described below and shown in Figure 4.5.

- Site 6255 – Wardell Road/ Cooks River Cycleway/ Lang Road/ Path to Vera Ave
- Site 6256 – Cooks River Cycleway/ Cooks River Bridge/ Sugar House Road
- Site 6646 – Turrella to Botany Bay Cycleway/ Henderson Street

Figure 4.5: Canterbury Super Sunday Count Locations



Source: Super Sunday Count Report, Bicycle Network, January 2015

The number of users at count site 6255 (cyclists, walkers, runners, dogs and other users) during the 4 hour Super Sunday periods are shown in Table 4.3.

Table 4.3: Counts – Site 6255

Year					Other	TOTAL
2014	422	166	43	19	18	668
	63%	*25%*	*6%*	*3%*	*3%*	*100%*
2013	62	45	17	5	10	139
	45%	*32%*	*12%*	*4%*	*7%*	*100%*

Source: Super Sunday Count Reports, Bicycle Network, January 2015 and March 2014

As shown in Table 4.3, the total number of users during Super Sunday increased from 139 in 2013 to 668 in 2014, an increase of approximately 480%. The largest proportion of users were cyclists at 63% in 2014.

The majority of cyclists were observed to travel along the Cooks River Path and Lang Road, which is a connection to the Cooks River Path on the opposite side of the Cooks River. Walkers used the Cooks River Path (and Lang Road) as well as Wardell Road.

The number of users at count site 6256 during the 4 hour Super Sunday periods are shown in Table 4.4.

Table 4.4: Counts – Site 6256

Year					Other	TOTAL
2014	367	227	47	51	6	698
	53%	*33%*	*7%*	*7%*	*1%*	*100%*
2013	427	137	31	49	0	644
	66%	*21%*	*5%*	*8%*	*0%*	*100%*

Source: Super Sunday Count Reports, Bicycle Network, January 2015 and March 2014

As shown in Table 4.4, the total number of users during Super Sunday increased from 644 in 2013 to 698 in 2014, an increase of about 8%. Although the total number of users increased slightly, the number of cyclists decreased in 2014. The largest proportion of users were cyclists at 53% in 2014.

The majority of cyclists travelled in an east-west direction along the Cooks River Path whilst walkers used the Cooks River Path and the bridge over the Cooks River to the south.

The number of users at count site 6646 during the 4 hour Super Sunday period are shown in Table 4.5.

Table 4.5: Counts – Site 6646

Year					Other	TOTAL
2014	15	72	2	17	0	106
	14%	*68%*	*2%*	*16%*	*0%*	*100%*

Site 6646 was included as a new count location in 2014. As shown in Table 4.5, the majority of users are walkers with only 15 cyclists using the path in the 4-hour count period.

The following is a summary of the three locations within Canterbury for the 2014 Super Sunday counts:

- On average there were 123 movements per hour recorded at each of the three survey locations.
- The Cooks River Cycleway and Sugar House Road intersection (site 6256) was the busiest site in Canterbury, with 175 movements per house.
- There was a 74% annual growth compared to the same locations counted in 2013.
- The most popular users within Canterbury were bicycles with 55%, followed by walkers with 31% of movements across the three sites.

5. Existing Bicycle Network

5.1 Existing Bicycle Network Plan

The current City of Canterbury Cycleway Plan (Figure 5.1) shows the existing cycling routes as well as routes proposed in the 2000 Canterbury Bike Plan.

Figure 5.1: Canterbury Bicycle Network

Source: City of Canterbury

As seen in Figure 5.1, the existing Canterbury Cycleway Plan comprises of two primary shared cycle paths (Cooks River and M5 Motorway) along the southern and northern edges of the LGA boundary. There are also other cycle routes within the municipality (including the Campsie to Clemton Park route); however the proposed bicycle network plan is not extensive and could not be expected to support all potential bicycle trips.

5.2 Existing Bicycle Network Facilities

In terms of what bicycle facilities currently exist within and connecting to the Canterbury LGA, Figure 5.2 has been prepared through saddle surveys, aerial photography and consultation with Council offices.

Figure 5.2: Existing Network Typology Map

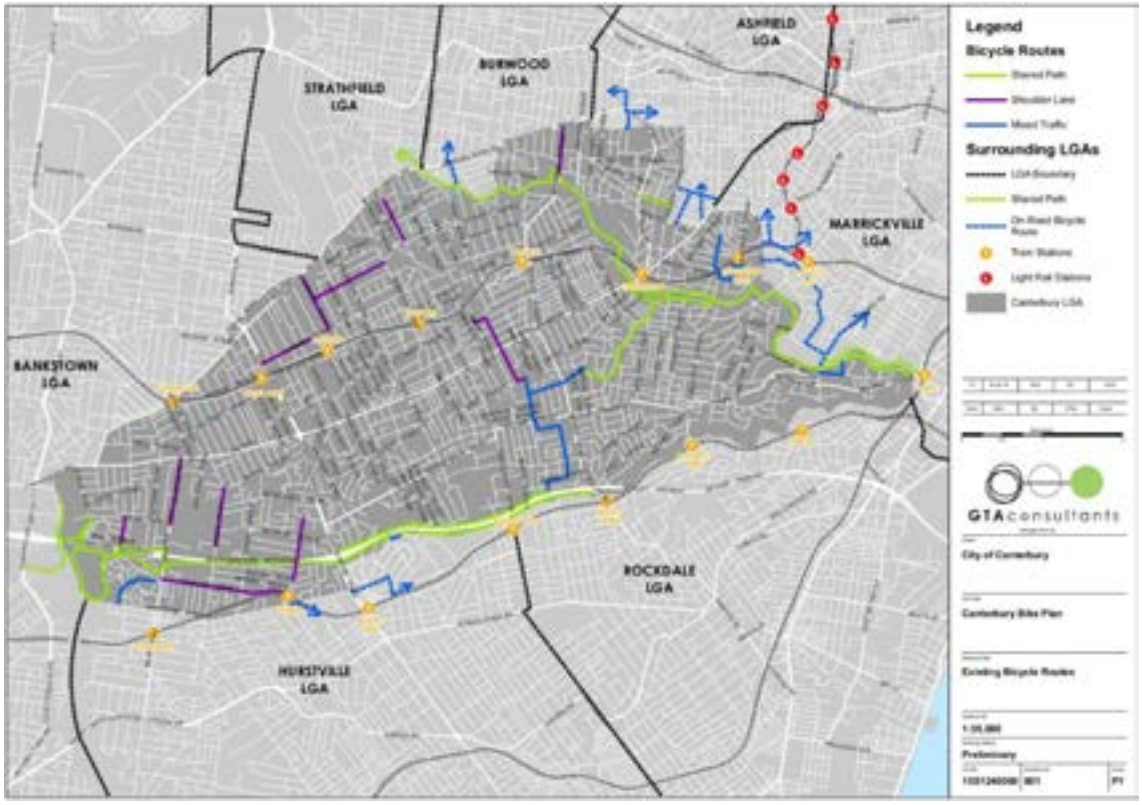


Figure 5.2 reflects that only a few additional facilities have been implemented since the preparation of the 2000 bicycle network plan. As such, there are still many gaps in the existing network, which can only be expected to be able to service a small proportion of potential cyclists.

5.3 General Study Area Observations

Various saddle surveys were conducted in Canterbury LGA to develop a full appreciation of the existing network, complemented by aerial photography assessments.

Canterbury LGA has a fragmented on-road bicycle network with a few signed, local road routes. A number of high volume roads (such as Canterbury Road and King Georges Road) creating barriers for safe cycling routes, and a number of the on-road facilities included combined parking/bike lanes or narrow bike lanes adjacent to parked cars (leading to riders at risk of being in the door zone). Some examples of provision for bikes at intersections were observed, along with dedicated bicycle lanterns at some signalised intersections.

Canterbury has some good off-road shared paths, with the Cooks River Path and the M5 Path being examples of these.

A selection of photos highlighting some of the existing cycling conditions is shown from Figure 5.3 to Figure 5.10.

Figure 5.3: On-Road Bicycle Approach Treatment (Bankside Ave)

Figure 5.4: Protected Departure for Right Turn (Bankside Ave/Undercliff Rd)

Figure 5.5: Typical Mixed Traffic Route

Figure 5.6: Narrow Path

Figure 5.7: Narrow Path

Figure 5.8: Bike Lane in the Door Zone

Figure 5.9: Bike Lane in the Door Zone

Figure 5.10: Bike Lane in the Door Zone

Bicycle parking racks were observed at train stations within Canterbury LGA, however these were not well used on the observation days, as shown from Figure 5.11 to Figure 5.14

Figure 5.11: **'Coat Hanger' Style Bike Parking**

Figure 5.12: **'Coat Hanger' Style Bike Parking**

Figure 5.13: Under-Utilised Bike Parking

Figure 5.14: Bike Parking at Capacity

The condition of linemarking varied from excellent and clear to fading and almost completely dissipated. The road surface varied from smooth and ideal to rough to the degree of causing safety concerns. Issues that contribute to surface roughness include:

- Cracked road surface
- Joints between lanes, often located in the ideal riding position
- Pot holes
- Utility cover and surround surface height differential.

The road network consists of various width carriageways. Wide road reserves have allowed for generous carriageways, whereas in other locations, the carriageway and adjacent footpath are relatively narrow. Car parking configurations range from parallel to 90 degree spaces. It is well known that parallel spaces present the risk of ''dooring'', when a narrow shoulder lane is located adjacent. Angled parking results in the feeling that a vehicle could drive straight out onto the travelling lane at any moment.

5.4 Signage and Wayfinding

There is limited bicycle signage and wayfinding provided throughout the City of Canterbury. The only bicycle route with specific signage and wayfinding developed for it is the Cooks River Trail.

There are a number of existing Cooks River signs located throughout the river corridor, however the Cooks River Path Signage Strategy recommends that these signs be removed at the time of the new signage installation. Examples of existing wayfinding signage on the Cooks River Path are shown in Figure 5.15 and Figure 5.16, with sample designs of proposed signage shown in Figure 5.17 and Figure 5.18.

Figure 5.15: Existing Signage on the Cooks River Trail

Figure 5.16: Existing Signage on the Cooks River Trail

Figure 5.17: Sample Map Sign for the Cooks River Path

Figure 5.18: Sample Directional Pole for the Cooks River Path

Examples of existing signage and wayfinding along the other bike routes within the City of Canterbury are shown in Figure 5.19 through Figure 5.24.

Figure 5.19: Council Path Behaviour Sign

Figure 5.20: Council Path Behaviour Sign

Figure 5.21: Existing Direction Signage

Figure 5.22: **'Bikes Excepted' Signage**

Figure 5.23: Existing Direction Signage

Figure 5.24: Existing Direction Signage

5.5 Crash History

Crash data within the City of Canterbury has been provided for the most recent available 5-year period (2009-2013), and is presented in Figure 5.25.

Figure 5.25: Crash History Map

Over the five year period there were 51 reported bicycle crashes within the Canterbury LGA. Of these, one accident resulted in a fatality, which occurred at the end of an existing bicycle route at the intersection of Burwood Road and Bruce Avenue. The majority of accidents occurred on roads that are not considered existing cycle routes.

Crash clusters are noted along the following roads:

- Benaroon Road
- Punchbowl Road
- King George Road.

The Punchbowl Road / King George Road intersection had more than one accident within the five-year period.

A number of key issues and constraints exist along the bike routes within the City of Canterbury, some of which are shown from Figure 5.26 to Figure 5.35.

Figure 5.26: No Bicycle Provision at Steps

Figure 5.27: Very Narrow Path, Low Height Clearance and Flooding Zone

Figure 5.28: Narrow Bridge

Figure 5.29: Road Closed to Bikes

Figure 5.30: Road Closed to Bikes

Figure 5.31: Bikes Made to Dismount

Figure 5.32: Hazard in Narrow Path

Figure 5.33: Retro-fitted Staged Crossing

Figure 5.34: Retro-fitted Staged Crossing

Figure 5.35: Bike Lane in Door Zone

6. Consultation and Feedback

As part of the review of the 2000 Bike Plan, GTA Consultants conducted stakeholder and community consultation workshops to receive feedback on the existing bicycle network and identify priorities for a new bike plan and hear any opportunities, concerns and objectives for inclusion in the new bike plan.

6.1 Stakeholder Consultation

City of Canterbury and GTA consultants held a stakeholder consultation workshop on 24 March 2015, which was attended by representatives of Rockdale, Bankstown, Marrickville and Ashfield Councils and NSW Police.

The workshop discussion included:

- conflicts between bicycles, pedestrians and vehicles at intersections and how to behave at intersections
- how users interact of cycleways and shared paths
- cyclists' speeds on cycling paths/ lanes
- underreporting of cycling injuries
- bicycle parking supply/ demand
- how to make cycling a more attractive mode of travel (i.e. safety, facilities)
- potential network infrastructure, including:
    - Bexley North to Wolli Creek cycleway
    - linear park through Wolli Creek
    - linkages into neighbouring LGAs including using bridges across Wolli Creek to link Canterbury cycleways to Rockdale cycleways.

Minutes of the stakeholder consultation workshop are provided in Appendix C of this report.

6.2 Community Consultation

The community consultation for this project included both a community consultation workshop and an online community questionnaire.

6.2.1 Community Consultation Workshop

City of Canterbury and GTA Consultants held a community consultation workshop on 25 March 2015. The workshop was attended by representatives from Bike Marrickville, Bike South West, Ashfield BUG, Australian Cyclists Party and the Canterbury Bike Shed as well as a number of local residents and users of Canterbury cycleways. The key discussion points from the workshop are highlighted below.

Infrastructure

- Limited/no cycling access to schools
- Shared path on Canterbury Road
- Widen bridges on cycleways
- Contra-flow cycling lanes on one-way streets
- More room for cyclists on up-hill sections of roads

Encouragement and Promotion

- Run cycling education programs in the LGA, particularly at schools
- Educate drivers on how to interact with cyclists on the road
- Run safe cycling programs.

Safety

- Provide markers on off-road paths for navigation and emergencies
- Consistent road crossings for off-road paths – drivers are currently confused
- LATM and road narrowing in LGA is unsafe for cyclists
- Limited lighting on off-road paths
- Too unsafe for children to ride to school

Signage/ Wayfinding

- No signs to navigate Cup and Saucer path

Bicycle Parking

- Limited or no bicycle parking available at most train stations

Minutes of the community consultation workshop are provided in Appendix C of this report.

6.2.2 Questionnaire

In order to involve the greater community in the consultation for the Bike Plan, residents of the Canterbury LGA and walkers and cyclists were invited to complete an online questionnaire. The questionnaire generated 212 responses during March and April 2015. The questionnaire focussed on existing issues relating to cycling infrastructure, safety and facilities in the LGA and gave respondents the option to suggest improvements they would like to see in the 2015 Bike Plan. This section provides a summary of the key findings from the questionnaire, with a detailed summary provided in Appendix C.

Overview of Respondents

Of the 212 people who completed the questionnaire:

- 82% of respondents ride a bike in Canterbury LGA, with 69% of those riding frequently (once a week or more).
- 36% of respondents stated that the main purpose of their cycling trips is to commute to work, 29% cycle for recreation and 24% for exercise.
- 74% stated they cycle 6km or more per trip.
- 80% of riders stated that they use the Cooks River Path, in comparison 29% use on-road routes, 12% use the M5 path and 9% use the Cup and Saucer Path.
- 56% are male and 44% are female.
- 75% of respondents live in Canterbury LGA with the highest number of respondents residing in postcodes 2193 (Ashbury, Canterbury and Hurlstone Park) and 2206 (Clemton Park and Earlwood).
- The highest proportion of respondents, at 46%, are aged between 35 and 49, 19% are younger than 35 and 35% are 50 or older.

Safety/ Conflicts

- 64% of respondents do not consider Canterbury to be a safe place to ride a bike. Some reasons included:
  - Many people do not feel safe riding on roads without separated paths. On these roads the space dedicated to cyclists is minimal (or shared with vehicles) which makes cyclists feel intimidated by vehicles on the road.
  - Many respondents stated that road crossings on separated paths are major conflict points between vehicles and cyclists. Generally vehicle drivers are not sure how to behave at the crossings.
  - Many people highlighted that the Cooks River Path underpass at Canterbury Road is an unsafe width and height for a cycleway.
  - Cooks River Path steps at Illawarra Road (near Adora Café) are unsafe for walkers, cyclists, particularly those with children and prams.
  - Safe, separated paths are limited to the Cooks River and the M5. Due to the limited supply of separated paths in the LGA the existing separated paths, especially the Cooks River Path, are heavily used and become congested. Users include cyclists travelling fast and slow, runners, walkers, children and animals (usually dogs). This creates conflicts between users and makes some users feel unsafe (generally walkers are constantly on the lookout and are intimidated by speeding cyclists).
  - Pedestrians and cyclists feel unsafe using off-road paths and back roads, including the Cooks River Path, at night due to limited lighting.
  - After grass trimming and bad weather, debris including grass and leaves are spread along cycle paths, the debris makes the paths quite slippery and dangerous for cyclists.
- 42% of respondents who do not ride a bike in Canterbury LGA specify that this is because the facilities are unsafe.
- 12% of respondents stated that they have been involved in or have witnessed bicycle related incidents involving injury in the Canterbury LGA with a further 4% stating that they have been involved in or have witnessed a near miss in the LGA. Some incidents include:
  - A number of people have sustained injuries to their hands and elbows, including broken fingers, at the Canterbury Road underpass on the Cooks River Path.
  - A number of injuries have occurred between vehicles and bicycles on roads within the LGA including at Cooks River crossing points. Many cyclists reported near misses for car-doorings in the LGA.
  - Maintenance works, including leaving open trenches and grass clippings, have resulted in injuries from bicycle wheels becoming stuck in the trenches or slipping on grass cuttings.
  - An injury has occurred on a footpath where a cyclist has hit a pedestrian, the cyclist moved onto the footpath because they felt unsafe cycling on the road.

Infrastructure and Cycling Routes

- 66% of respondents say that the existing cycling infrastructure is in good condition and well maintained, however there is not enough infrastructure.
- Some responses regarding existing infrastructure include:
  - Existing cycling routes are not direct and generally zig-zag around main roads, making them less convenient than driving and therefore poorly used.
  - There are a number of cycleways which stop suddenly, usually on a road, and give no further direction to cyclists.

- There are limited safe cycling routes in the western portion of the LGA, Lakemba in particular has no safe cycling routes.
- The existing on-road cycling paths have poor surfacing, including potholes and cracks.

- Respondents would like to see the following infrastructure in Canterbury:
  - More separated cycling paths, either on-road or off road. Existing on-road cycling paths on busy roads to be shielded from vehicles.
  - A direct east-west cycling route between Lakemba and the Cooks River Path, a route along the rail line would be ideal.
  - Cycling links between train stations, shopping districts/ town centres, major parks, schools and major cycleways.
  - A safe cycling connection between the end of the M5 Path and Cooks River Path, ideally close to the southern boundary of the Canterbury LGA.

Signage and Wayfinding

- 59% of respondents say that the existing signage and wayfinding is clear, however there is not much of it.
- Respondents highlighted the following shortfalls with the existing signage:
  - Many cyclists report seeing very few signs, or no signs when they are cycling through the LGA.
  - The existing signs are too small and are sometimes covered by trees.
  - The linemarking is faded in areas.
  - There is a lack of maps and information on off-road routes with some cyclists not knowing where to leave the path to access key destinations.
- Some suggestions for improvements include:
  - Signage should be bigger and should provide information on key trip generating locations such as town centres, parks etc.
  - Maps located at the start and end of cycleways or at key decision points would help cyclists navigate through the LGA.
  - Many cyclists want to see more behavioural signage, give way signs and warning signs including warning signs for cars about cycling routes.
  - Signage should include the distance and/or time to key destinations.

Parking and End of Trip Facilities

- Respondents stated they would like to see the following bicycle parking and end of trip facilities:
  - Secure bike parking at railway stations – sometimes bikes get stolen from railway stations.
  - More parking near shops, in town centres, at libraries, at bus stops and at parks and sportsgrounds/.
  - Sheltered bike parking.
  - More parking at all Railway Stations, particularly Campsie, Canterbury and Hurlstone Park.

Education/Promotion

- Some respondents suggested education programs for cycling including:
  - Educating drivers about how to interact with cyclists and share the road with cyclists.
  - Promote new cycling paths and facilities.
  - Education programs for children on how to cycle safely.

6.2.3 Other Community Feedback

GTA Consultants has also taken into account other forms of community feedback on the proposed Bike Plan and the existing bicycle facilities within the Canterbury LGA. These included comments made to council and feedback provided online on the Sydney Cyclist Forum. The following is a brief summary of comments made on the Sydney Cyclist Forum (in August and September 2011, so have been addressed)[2]:

- *Cooks River Cycleway underpass under Canterbury Road is a pinch point.*
- *Southern side of Cooks River, parallel to Permanent Avenue between Younger Avenue and Riverview Road, should be a paved path.*
- *Poor connection to the Hughes Park path from Bellbirds Street, Pheasant Street, Glenore Road and Fuller Avenue. No paved connection, no ramp or a combination of bollards, grass, steep gutters or cars parked too close to the access point (Glenore Road)*
- *Wooden bridges are very slippery in the wet*
- *Potential connections to adjacent councils:*
  - *Eastern end of M5 path could connect to Rockdale's routes near Bexley North station.*
  - *Turrella Reserve. It is supposed to connect through to Homer St.*
  - *Various proposed routes through Earlwood that don't seem to exist.*

GreenWay Schools Active Travel Study

The GreenWay Schools Active Travel Study focused on improving the health of the GreenWay school community with the aim to identify, plan and facilitate interventions that will work towards increasing active travel amongst students.

There are approximately 16,750 students in 35 schools within the GreenWay school community. 75% of primary schools (18) and 27% of secondary schools (3) responded to the survey[3].

The primary schools that responded to the survey have a medium level of active transport (40%):

- Motor Vehicle (48%)
- Walking (35%)
- Public Transport (12%)
- Cycling (3%)
- Scooting & Skating (2%).

The preferred modes of travel in the GreenWay school community are active modes. This points to the fact the preferences do not match the actual forms of transport being used which is currently led by motor vehicles.

The preference of mode from most preferred to least preferred was

i Walk
ii Ride
iii Scoot or Skate
iv Motor vehicles
v Public transport.

The main barrier is identified by 13 (72%) of the responding schools, and common to other Councils surveyed is that parents are concerned about traffic and the availability of low risk routes to school

[2] http://www.sydneycyclist.com/forum/topics/canterbury-council-bike-plan?id=1321712%3ATopic%3A325688&page=1#comments

[3] Based on the response rates it was decided to only include primary schools in the study.

Secondary barriers identified include:

- Poorly designed bike lanes or shared paths near the school (56%)
- Students often carry heavy bags and equipment (56%)
- Lack of adequate bicycle parking facilities (50%).

The highest priority initiatives, as identified by the schools are:

i Improving crossing points for kids to comfortably access school grounds
ii Installation/improvement of nearby bike lanes
iii Improved markings on-road i.e. bike lane markings or crossings
iv Maps of 'quiet neighbourhood routes' to the school
v Lower speed limits on surrounding streets.

The study made the following recommendations:

- Crossing Investigation:
  Improving crossings was the initiative likely to be linked to the highest rated barriers: parent concern, and lack of adequate crossing points.
- Involving the parent community:
  As identified by 72% of schools, parent concern is the primary barrier. Consider creating parent community groups based around communicating infrastructure improvements that would enable their child to walk or ride to school.
- Paths linked to schools:
  The schools have indicated they would like to see improvements relating to the pedestrian and bicycle networks to encourage active travel of students. This interest should encourage future planning to prioritise links and access for the community.
- Wayfinding and mapping activities:
  Wayfinding exercises around schools work as a way of showing students a "quiet route" to school with marked paths. This can encourage community commutes by providing a part way approach. Targeted to tackle distance and parent concern barriers.
- Recognise & Reward:
  An award scheme/program in the community could incentivise and advertise participation.

7. Infrastructure Options

7.1 Typology Overview

Given the competing demands for the finite road network in Canterbury, implemented routes incorporate a variety of treatments including mixed- traffic lanes, bicycle shoulder lanes and shared paths with each of these route serving a different cycling function.

Table 7.1 provides examples of cycling infrastructure types in Canterbury and surrounding LGAs which can be used for future cycling projects.

Table 7.1: Bicycle Infrastructure Typology in Canterbury and Surrounding LGAs

Typology	Example Image
Two-way separated bicycle paths (outside the road reserve) Two-way cycleways are exclusive bicycle paths that are completely separate from parked cars, vehicle traffic and pedestrians. They provide bi-directional travel on one side of the street. They can also be located in parks and reserves. This facility type attracts interested and concerned, enthused and confident and strong and fearless riders.	 *Sydney Harbour Bridge*
Two-way separated bicycle paths (in the road reserve) Two-way separated bicycle paths are located within the road reserve but are exclusive to bicycles. They are completely separate from parked cars, vehicle traffic and pedestrians. These facilities provide bi-directional travel along one side of the road and are highly desirable and safer than other on-road options. These facilities often require substantial engineering works to implement which needs to be balanced relative to competing demands for space within the road reserve, this type of facility is the preferred infrastructure type for major routes. This facility type attracts interested and concerned, enthused and confident riders, strong and fearless riders may use the road instead of the cycleway based on crowding and ease of use.	 *College Street, Sydney*
Bicycle Lanes Bicycle lanes are on-road, one-way facilities which designate road space exclusively for cycling. The lanes must be legally signposted with bicycle lane signs. In built-up areas, bike-lanes often run adjacent to parked cars and a buffer zone is incorporated to reduce the hazard of drivers opening their car doors. To increase driver awareness, bicycle pavement stencils and green coloured surfacing are used. This facility type attracts enthused and confident and strong and fearless riders.	 *Lilyfield Road, Rozelle*

Typology	Example Image
Bus lanes Bus lanes are legal instruments to control the use of a traffic lane by buses, taxis, hire cars, motor cycles and bicycles. These lanes may be time limited to AM and PM peak periods on weekdays or they may operate 24/7. To provide for a comfortable cycling environment that allows buses and bicycles to pass each other, widths in excess of 4.0m are preferred. Bus lanes are typically marked with red coloured pavement. On cycling routes, bicycle pavement markings may be used to emphasise the presence of cyclists within these lanes. This facility type attracts strong and fearless riders and sometimes enthused and confident riders.	 *Parramatta Road, Annandale*
Contra-flow bicycle lanes Contra-flow bicycle lanes are on-road lanes that are signed and marked to allow cycling in the opposite direction of an otherwise one-way street. Lanes are typically fitted with green paint to emphasise the presence of cyclists travelling in the opposite direction. A mixed-traffic facility can also be installed in the direction of vehicle travel in slow speed/ low volume environments. The RMS has released a Technical Direction reducing the requirements of providing contra-flow arrangements. This facility type attracts strong and fearless and enthused and confident riders and in slow speed/ low volume environments also the interested but concerned riders.	 *Grove Street, Lilyfield*
Shared Road Shoulders Road shoulders are one-way facilities which are shared between parked cars and cyclists. To encourage good parking discipline, it is recommended to add a supplementary broken line, but there is no formal buffer zone to guard from potential hazards such as opening car doors. To increase driver awareness, bicycle pavement stencils are often used and occasionally green coloured surfacing. Shoulder lanes adjacent to parking lanes present a safety hazard and are not favoured by many cyclists. These should be phased out in preference of separated cycleways. This facility type attracts enthused and confident riders although strong and fearless would generally use the traffic lane.	 *Burwood Road, Belfield*

Typology	Example Image
Mixed-traffic Mixed-traffic facilities are suitable for roads with low traffic volumes and speeds, such as quiet residential streets. Bicycle stencils provide awareness and promotion to all road users. Mixed traffic facilities are generally appropriate on roads with less than 5,000 vehicles per day with a maximum speed limit of 50km/h. This facility type attracts: strong and fearless riders in high traffic environments. In low traffic environments mixed-traffic facilities are suitable for the enthused and confident and also interested but concerned riders.	 *Bankside Ave, Earlwood*
Hybrid shared bicycle lanes and mixed-traffic Bicycle lane treatments are used in the uphill direction while in the downhill direction roads are linemarked and/or signed for mixed use by motor vehicles and bicycles. Shoulder lane treatments can also be used in the uphill direction. Given the slow speed of cyclists, the risk of dooring is low and if it did occur, there is unlikely to be a serious injury. Hybrid treatments are generally appropriate on roads with less than 5,000 vehicles per day with a maximum speed limit of 50km. In the uphill direction this facility type attracts enthused and confident riders although strong and fearless cyclists would generally use the traffic lane. In the downhill direction this facility type attracts strong and fearless cyclists. In low traffic environments mixed-traffic is suitable for enthused and confident and interested but concerned riders.	 *Lilyfield Road , Lilyfield*
Shared zones Shared zones are special low speed, mixed-traffic environments which are legally controlled by signs and line markings that restrict the speed limit to 10km/h. Parking is restricted to marked spaces to afford priority to pedestrians. Typically the road environment is designed with special pavements, speed controls and landscaping, with few or no distinguishable footpaths and preferably no kerbs. Approval for all shared zones must be sought from Roads and Maritime Services (RMS). Any formally designated shared zone attracts interested and concerned, enthused and confident and strong and fearless riders.	 *Bunda Street, Canberra*

Typology	Example Image
Head Start Storage Areas or "bike boxes" Bicycle boxes are linemarked bicycle storage facilities provided at signalised intersections. These facilities are used at signalised intersections, usually in conjunction with bicycle lanterns (bicycle traffic signals). The "bike box" allows a cyclist to wait for a traffic signal to change to green at the start of the travel lane, so that they can be clearly seen by other road users. When the signal changes, cyclists have a head start to prepare to ride from a stopped position. These facilities are appropriate on roads with less than 10,000 vehicles per day and a maximum speed limit of 60km/h. This facility type attracts strong and fearless and enthused and confident riders.	 *Northcote Street and Bexley Road, Clemton Park*
Right Turn Lane Right turn lanes assist cyclists making a right turn by providing a designated area for cyclists to wait for a gap in the oncoming traffic. Physical separation can also be included as it reduces the likelihood of a vehicle entering into the bicycle turn lane (as shown on the photo to the right). Right turn lanes can generally be appropriate on roads with less than 10,000 vehicles per day and a maximum speed limit of 60km/h. This facility type attracts strong and fearless (major roads), enthused and confident (general urban streets) and, where physical separation is incorporated, interested but concerned riders (connect quiet street routes across busy major roads).	 *Norton Street, Leichhardt*
General traffic No specific provisions are made for cyclists. Although most streets are suitable for cycling, others are unsafe due to high traffic volumes and speeds. Where an alternate route is not feasible/ easily accessible, cyclists will ride on streets with no infrastructure, ride on the footpath or avoid riding to begin with. This facility type attracts strong and fearless (major roads), enthused and confident (general urban streets) and interested but concerned riders (quiet streets).	 *Robinson Street, Wiley Park*

Typology	Example Image
Shared paths (in or not in the road reserve) Shared paths can be located adjacent to a road or through a park or reserve. They are used by both cyclists and pedestrians with linemarking and/or signage designating their legal status as a shared path and helping to encourage safe use by both user groups. Pedestrians have the right of way on shared paths. There is the potential for conflict between user types when volumes of pedestrians and cyclists are high or when the path width is narrow. This type of facility can generally be implemented wherever there is sufficient width to accommodate a 3.0m wide path. Wider paths may be required depending on the volume of cyclists and pedestrians. This facility type attracts interested but concerned, enthused and confident and to a lesser extent strong and fearless riders, dependant on alternative on-road routes.	 *Cooks River Path*

There are advantages and disadvantages of each facility type, a summary of which is presented in Table 7.2.

Table 7.2: Advantages and Disadvantages of Path Types

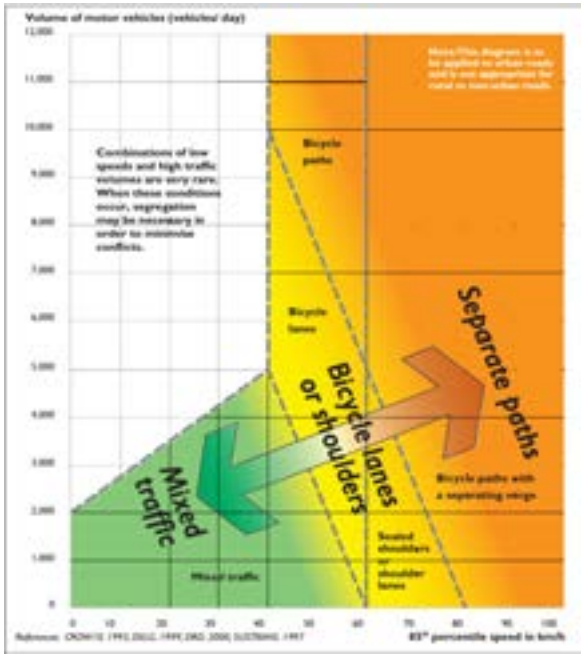
Type of Path	Description	Advantages	Disadvantages	Recommendation
Exclusive Bicycle Path	Legally can only be used by cyclists	○ Cyclists proceed without delays. ○ Usually a higher Level of Service (LOS) i.e. higher speeds, faster travel times.	○ Sometimes used by pedestrians when their own facilities are relatively poor.	○ Preferred where there are likely to be significant volumes of commuter cyclists. ○ Care is required to ensure that pedestrians can be accommodated elsewhere.
Shared Path	Shared path with pedestrians	○ Suitable for most users. ○ Useful to cyclists and pedestrians, hence maximises benefit to general community. ○ It is beneficial to vulnerable cyclists where an existing footpath can be adapted/widened. ○ Lower construction cost than separated paths. ○ Require less space.	○ Pedestrian-cyclist conflict is common as demand increases or if there is a mix of recreational pedestrians and commuting cyclists. ○ May result in slower speeds and delays for cyclists. ○ Not satisfactory in high usage areas – may discourage walking amongst the young, seniors and people with disabilities. ○ May be ineffective if thorough planning (consultation, observation and demand estimation) has not been carried out.	○ Shared paths benefit a range of users and are appropriate with modest numbers of pedestrians and cyclists. ○ As demand increases, shared paths but must be managed. ○ Design must be suitable for use and demand. ○ Intersections between path, road and driveways must be addressed. ○ Council must monitor user behaviour on the path.
Separated Path	Separate sections for cyclists and pedestrians.	○ Reduces conflicts between different user types. ○ Allows cyclists to travel at higher speeds making it more desirable for commuter cyclists. ○ Cyclists can ride without the delays which can occur on shared paths.	○ Higher cyclist speeds are possible, however pedestrians from the separated path can stray into cycling space. ○ Ineffective if pedestrian movement along or across the bicycle path is not minimised. ○ Ineffective if both paths are not of a comparable standard relative to the requirements of each type of user. ○ Higher cost of path due to increased width.	○ Appropriate if large numbers of cyclists and pedestrians will use them. ○ There should be separation between cyclists and pedestrians (e.g. different path levels).
Cycle Path next to road	Paved in a different colour and texture from adjoining sections. May be separated by a low kerb (common facility in Europe).	○ Can offer a low-stress environment that can be attractive to many cyclists. ○ Particularly helpful for short lengths such as squeeze points in the road carriageway.	○ Intersections are where cyclists are at highest risk. ○ Path obstructions/visibility issues: - inadequate visibility at driveways - frequent or busy driveways - inadequate clearance from opening car doors - bus passengers board and alight from bicycle path - pedestrians encroach on the bicycle path when the footpath is congested or waiting to cross - garbage collection obstructs the path ○ Where cyclists ride in both directions along paths, driveways and side roads may not expect bicycle traffic from both directions. ○ It is less convenient to turn right from bicycle path next to road. ○ It is expensive to establish this facility due to relocating kerb lines.	○ Between intersections, bicycle paths next to roads can provide attractive and safe facilities for a wide range of cyclists. ○ Consider safety and delay issues at intersections where it's preferable for the path to re-join the roadway.

Source: Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths (Austroads 2006)

7.2 Typology Selection

Typology selection for bicycle facilities within urban road corridors, as exists within the City of Canterbury is provided in the NSW Bicycle Guidelines and Cycling Aspects of Austroads Guides through the graph reproduced in Figure 7.1. It indicates that on-road bicycle facilities are considered suitable along low traffic volume and speed road corridors, but as traffic speeds and/or volumes increase, the level of separation for bicycle facilities should increase.

Figure 7.1: On-road Bicycle Path/ Lane Selection



Source: NSW Bicycle Guidelines, RMS, 2014

Given the limited number of roads where low traffic volumes and speeds exist in the City of Canterbury, as well as the general risk and user dislike of on-road facilities, a growing preference exists for separated facilities, especially for key strategic routes. Moreover, separated facilities support all user types for the majority of their trip types. The only significant user type not supported are recreation / training road cyclists, but they tend to look for more rural environments to achieve increased travel speed continuity (i.e. not regularly stopped due to intersections, crossings and general traffic congestion).

7.3 Separated Cycleways

Separated Cycleways that have been constructed in the City of Sydney LGA are typically separated from traffic lanes by concrete medians. These have provided high quality infrastructure, however it requires considerable civil works and expense with the reconfiguration of drainage and other civil works.

It is well established by state and local studies that the key to increasing cycling participation, particularly amongst female riders and also along busy routes is to provide separated bicycle paths. These paths provide added amenity and safety for cyclists and have proved to be popular in the City of Sydney LGA, particularly for commuter trips.

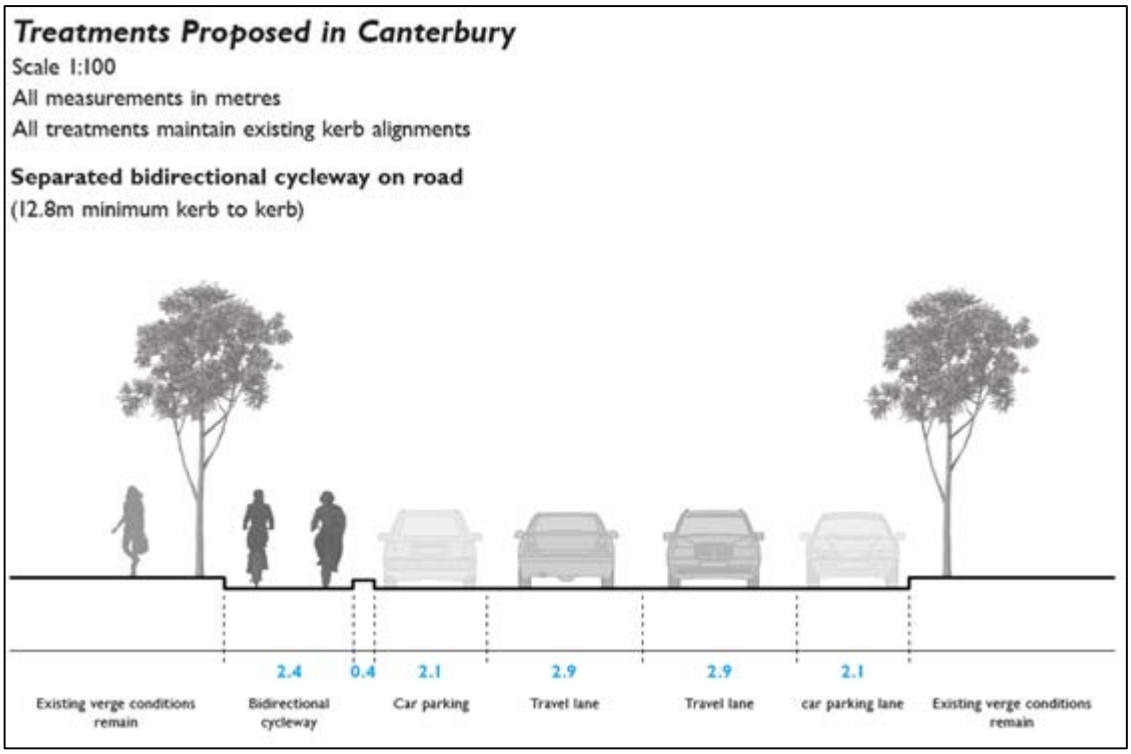
These paths typically require considerable expense and as such, cost-benefit analyses are typically conducted to justify the expense. This may involve:

- estimating usage
- cost savings from reduced accidents
- cost savings from reduced congestion
- improved health outcomes
- improved neighbourhood amenity and property value.

Two-way separated cycleways have the advantage of saving space and cost in comparison to two one-way cycleways because only one buffer area is required. The width required for a two-way facility is typically between the width of a standard car parking space and a traffic lane.

Separated two-way on-road bicycle paths can be constructed on 12.8 metre wide carriageways with limited loss of car parking as illustrated in Figure 7.2. This configuration provides the additional efficiency of a single separation median as well as overtaking space in the opposing bike lane.

Figure 7.2: ISRBP Separated Two-way Cycleway On-road Configuration



Source: ISRBP, AECOM, 2010 (pg. 86)

The dimensions in Figure 7.2 may need to be varied in response to specific local conditions. In constrained locations, two-way cycle paths can be 2.0m wide, based on a bicycle operation width of 1.0m on a flat section. The ideal minimum width is 2.2m wide.

AS 2890.5-1993 states that 2.1m is the minimum parallel parking lane width where the overall roadway width is restricted.

It is acknowledged that the through lane dimensions do not align with the guidelines provided in the *State Transit Bus Infrastructure Guide Issue 2*, which suggests the following widths:

- kerbside parking lane: 3.0m wide to cater for bus stops
- kerbside traffic lane: minimum of 3.5m to avoid drainage structures

- travel lanes: minimum desirable 3.2m two-way road or 3.5m one-way road, additional width required on curved sections of road. It is understood that lesser widths can be acceptable to Bus operators, this needs to be negotiated with relevant stakeholders.

However, there are examples in other jurisdictions where buses operate effective under significantly more constraint conditions.

The separation barrier of 0.4m is a commonly adopted minimal width although 1.0m is preferred.

There are many options for separation, each having various, cost, perceived safety, durability visual implications and effectiveness in keeping vehicles out. Some of these alternative options include:

- Concrete median
- Concrete barrier
- Painted buffer zone
- Separators (rubber/ plastic)
- Row planters
- Flexible bollards
- Tactile edge lines (rumble strips)
- Kerbs.

In some instances, a combination of treatments can be used.

- Alternate design details and treatments are evident in various Australian jurisdictions, ranging from high-cost complete urban renewal through to low-cost trial-like facilities (Figure 7.3 to Figure 7.9).
- Some high quality facilities will require substantial infrastructure investment and may need to be spread over several years.
- More cost-effective facilities may be used for trials or as a stop-gap measure for future more substantive investments.
- Bi-directional facilities require detailed attention at side streets and major driveways
- Contrary to bi-directional facilities, uphill-path/downhill-mixed facilities can be constructed in stages and can be blended with other uni-directional facilities such as mixed traffic, bicycle lanes and integrated facilities.

Figure 7.3: Bourke Street, Sydney - complete urban renewal

Figure 7.4: Bourke Road, Sydney - in-situ concrete median

Figure 7.5: Bunda Street, ACT - alternate treatment (one way pair)

Figure 7.6: Brisbane CBD - proprietary median

Figure 7.7: Perth Suburbs - visual separation

Figure 7.8: Albert Street, Melbourne - low-cost median

Figure 7.9: Campbell Street, Sydney - alternate treatment (uphill path, downhill mixed)

7.4 Bicycle Boulevards

Bicycle Boulevards are a well-established concept for prioritising bicycle access on local streets, although there has been little formal application in Australia to date. In essence the concept builds on the following three related principles/traffic management techniques:

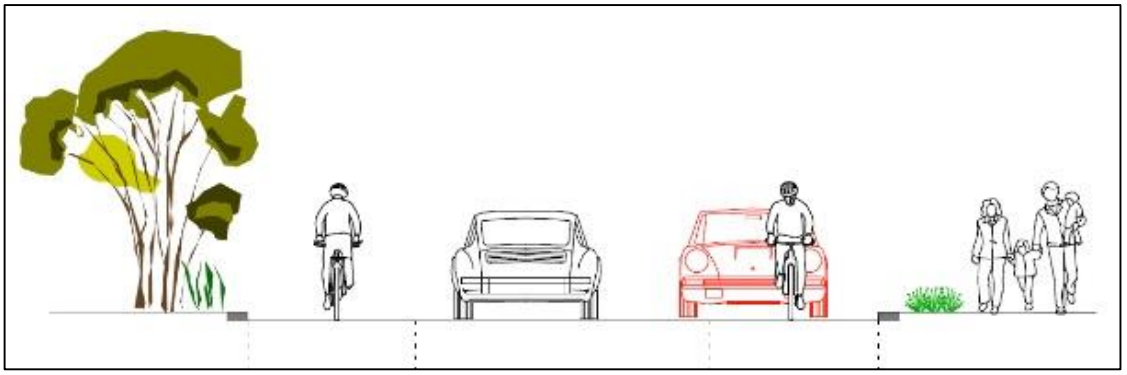
- Streets for people, which recognises the link and place functions of streets.
- Speed management, which recognises the need for slow speed environments to make streets safer and more comfortable to live in. Slow speeds also create a competitive advantage for walking and cycling for neighbourhood trips.
- Advisory bicycle lanes semi-formally allocate road space to cyclists. General traffic is a guest. Pedestrians retain their own space on the footpath.

By prioritising the cyclists and lowering vehicle speeds on local roads, a suitable environment for cyclists is able to be provided. Examples of potential treatment types are shown in Figure 7.10 and Figure 7.11.

Figure 7.10: Proposed Bicycle Boulevard – Perth, WA

Source: Department of Transport WA

Figure 7.11: Typical Bicycle Boulevard Cross-section



It should be noted that Bicycle Boulevards are not able to be provided throughout the road network, but on low volume residential local roads, where a more place function and user amenity is desired, such treatments can be expected to be beneficial to all of the community.

Demonstration projects of Bicycle Boulevards are being considered in several Australian jurisdictions, so can be expected to start being adopted and supported through educational and behavioural campaigns.

7.4.1 Streets for People

The South Australian Government Streets for People Compendium provides guidance for the development of pedestrian and cyclist friendly environments that provide a positive contribution to people's health and sense of community. The document aims to provide consideration for pro-people environments rather than anti-car sentiment.

The document defines streets with "link" and "place" functions, in summary:

- Link defines the streets movement function, with the user objective to save time.
- Place defines the streets destination and directly adjacent land uses in its own right with the user objective to spend time.

Contemporary urban practice allows for street design as "place" by incorporation spaces where people can gather and stay as well as providing a transport link. This can be used to encourage and support a low speed environment suitable for people.

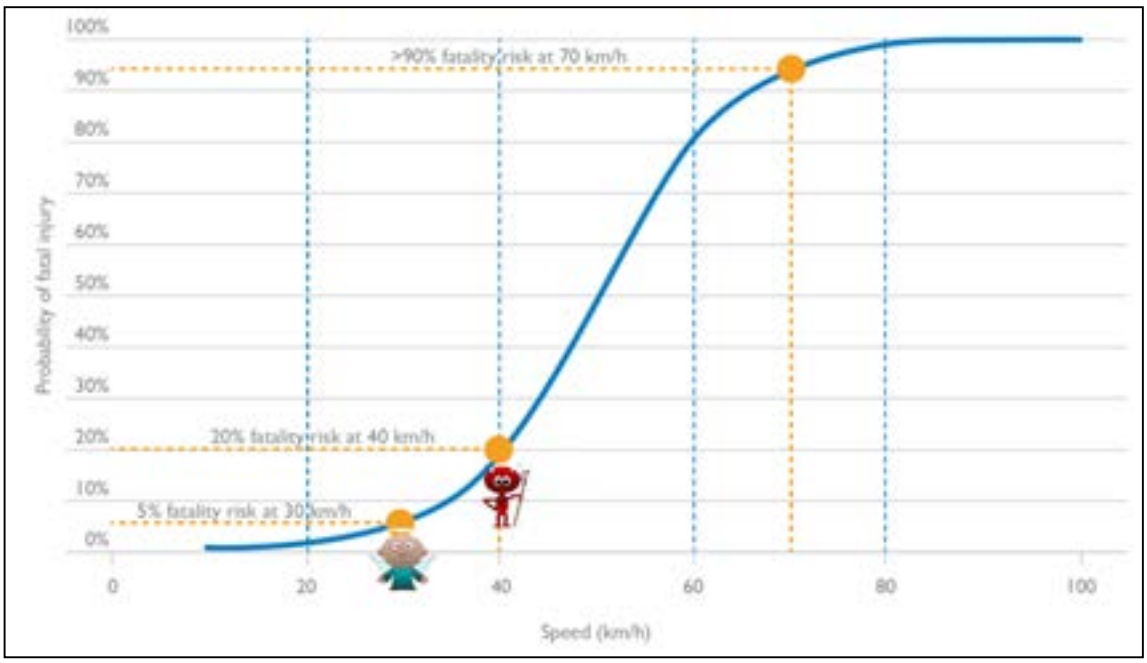
7.4.2 Speed Management

All local streets are considered part of the bicycle network. They provide low speed and volume environments that are less intimidating to the "interested but concerned" cyclists.

Current European initiatives are to introduce 30km/h speed limits on local streets. This reduces the speed differential between all road users and helps create "liveable streets". Australian and International crash research indicates a high probability of survival.

The graph in Figure 7.12 illustrates the relationship between bicycle/ vehicle accidents in terms of prevailing vehicle speeds and probability of survival. This shows a 5% chance of fatality at vehicle speeds of 30km/h. This chance of survivability rapidly reduces at impacts above 30km/h.

Figure 7.12: Bicycle Rider Probability of Fatality vs Vehicle Speed



Source: Cycling on Higher Speed Roads, Austroads, 2012

The ITF notes that severe crashes are most likely to occur when traffic speeds are above 40km/h. In addressing this issue on a global basis the ITF recommends the adoption of speed management measures as an integral part of cycle safety strategy planning.

Local area speed limits of 30km/h (20 mph) are well established in many European cities. They have been proven to be effective tools in reducing incidences of injury to vulnerable road users and create a more equitable speed environment that encourages walking and cycling. While Australia only has a few locations with 30km/h speed limits, the adoption of 30km/h speed limits for local residential areas, high pedestrian areas, and education precincts is considered to be best practice and an effective tool to nurture and grow walking and cycling by reducing the speed differential between vehicles and pedestrians/cyclists. It is recognised that the introduction of any 30km/h speed limits in the Canterbury LGA would potentially set a precedent (and require RMS approval) and that for it to be effective and adhered to it would need to be accompanied by associated supporting treatments such as education, awareness campaigns, engineering treatments and enforcement.

7.4.3 Bicycle Speeds

In addition to managing vehicle speeds, it is also recognised that cyclist speeds can be quite high on off-road paths. This can increase the potential conflict between pedestrians and cyclists on paths and may discourage pedestrians from using certain paths if cyclist speeds are continually high. Education and awareness initiatives to share the paths (and roads) can assist with ensuring appropriate travel speeds. Shared path behaviour signage or speed guidance signage can be applied directly to the path surfaces in locations known to have path behaviour issues. Examples of path pavement signage are shown in Figure 7.13 and Figure 7.14.

Figure 7.13: Path Behaviour Sign Example

Figure 7.14: Path Speed Signage

7.5 Road Narrowing

Narrowing roads using physical treatments or visually narrowing using line marking can encourage reduced speeds – particularly if accompanied by local area speed limit restrictions. A range of road narrowing options exist, including angled slow points, kerb build-outs and painted treatments. Any physical road narrowing treatments should include a suitable by-pass for cyclists (preferably 1.0m wide or more). The lane width between the treatments should be between 2.8m and 3.0m for maximum effect. To be most effective the treatment should narrow the road to a single lane so that an approaching vehicle would have to give way to a vehicle entering the narrow treatment. The determination of which vehicle gives way can be assigned using Give Way signs or it can be left to the road users to negotiate organically. Examples of two narrowing treatments are shown in Figure 7.15 and Figure 7.16.

Figure 7.15: Example of Road Narrowing Treatment with Bicycle By-Pass

City of Boroondara, Melbourne

Figure 7.16: Example of Road Narrowing Treatment with Bicycle By-Pass

Miller Street, Melbourne

8. Proposed Bicycle Network

8.1 Overview

The proposed network builds on the existing bicycle network, as well as the current City of Canterbury Cycleway Plan. It aims to fill in the gaps in the existing bicycle network through a permeable network, and proposes multiple typologies that link to key destinations within the Canterbury LGA.

The key rationale for establishing the updated bicycle network in Canterbury LGA is as follows:

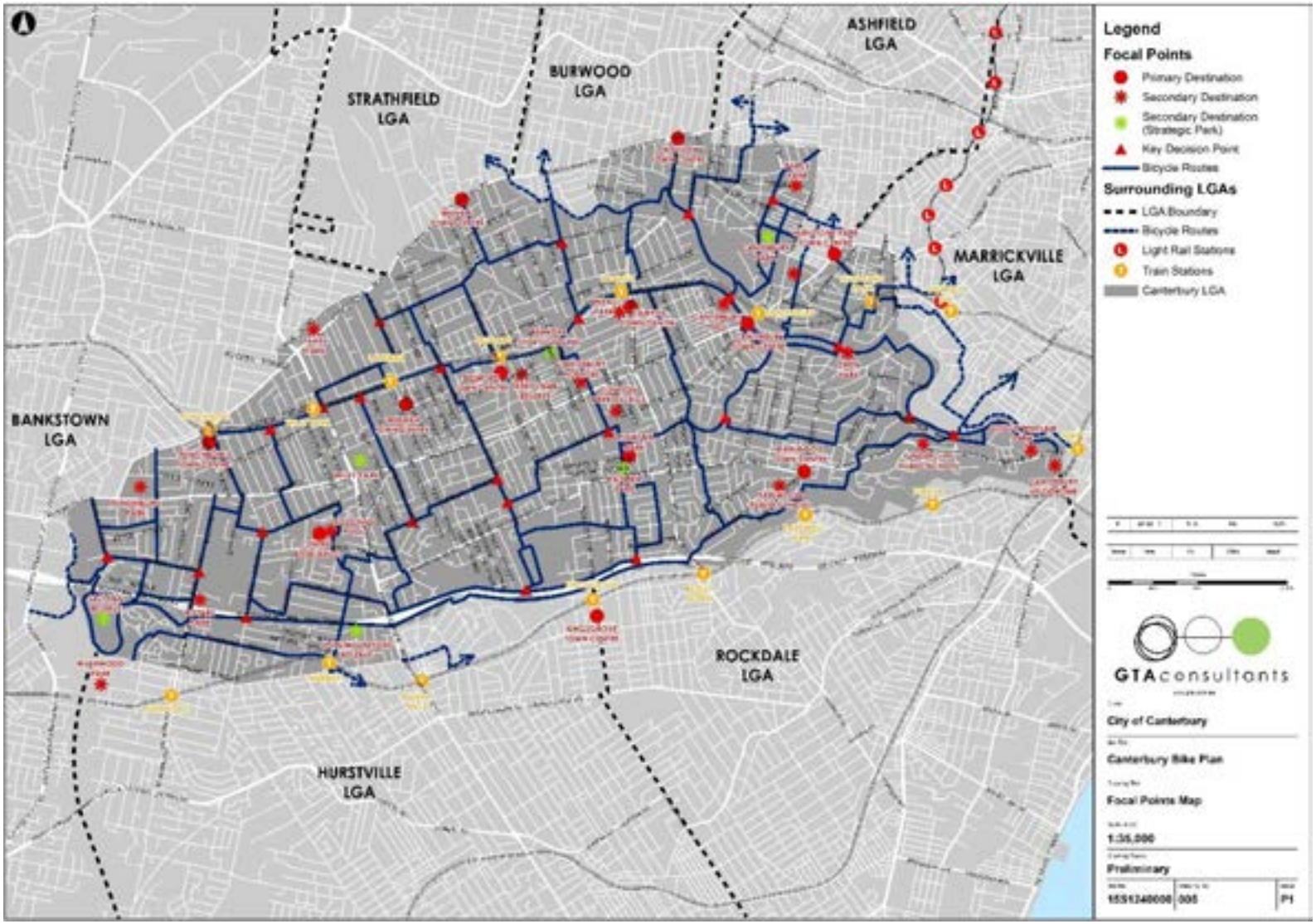
- Create an integrated, contiguous network by completing the missing links and developing safe, quality infrastructure and priority routes.
- Rationalise the existing network to increase the simplicity and legibility to new users.
- All local streets are part of the bicycle network. Low volume and speed local routes are appropriate as mixed use streets. Refer to Figure 7.1 for bicycle path selection graph.
- Bicycle shoulder lanes adjacent to parking lanes are generally considered unsafe and should be phased out. Cyclists must be encouraged to ride no closer than 1.0m from parked cars, i.e. mixed traffic routes.
- Interested but concerned cyclists will avoid high volume or high speed traffic routes. In this regard parallel routes were investigated, balanced with directness and legibility.
- Introduce separated cycleways along high traffic streets to connect traffic generating land uses and strategically assist in the formation of a regional bicycle network. These will be proposed on streets with minimum 12.8m wide carriageways to limit the loss of on-street car parking.
- Adopt and maintain regional infrastructure standards. This is already done for wayfinding signage and some shared paths.
- Where possible, provide routes that avoid steep inclines.

The proposed route network is outlined Figure 8.2. Appendix D provides a large scale plan.

8.2 Key Destinations and Trip Generators

Figure 8.1 shows the key destinations and trip generators within the City of Canterbury. These include a number of town centres, railway stations, sports grounds, pools, schools and hospitals. These are the places that people often visit that generate unique trips within the Canterbury LGA. This information has informed the proposed bicycle network.

Figure 8.1: Focal Points Map

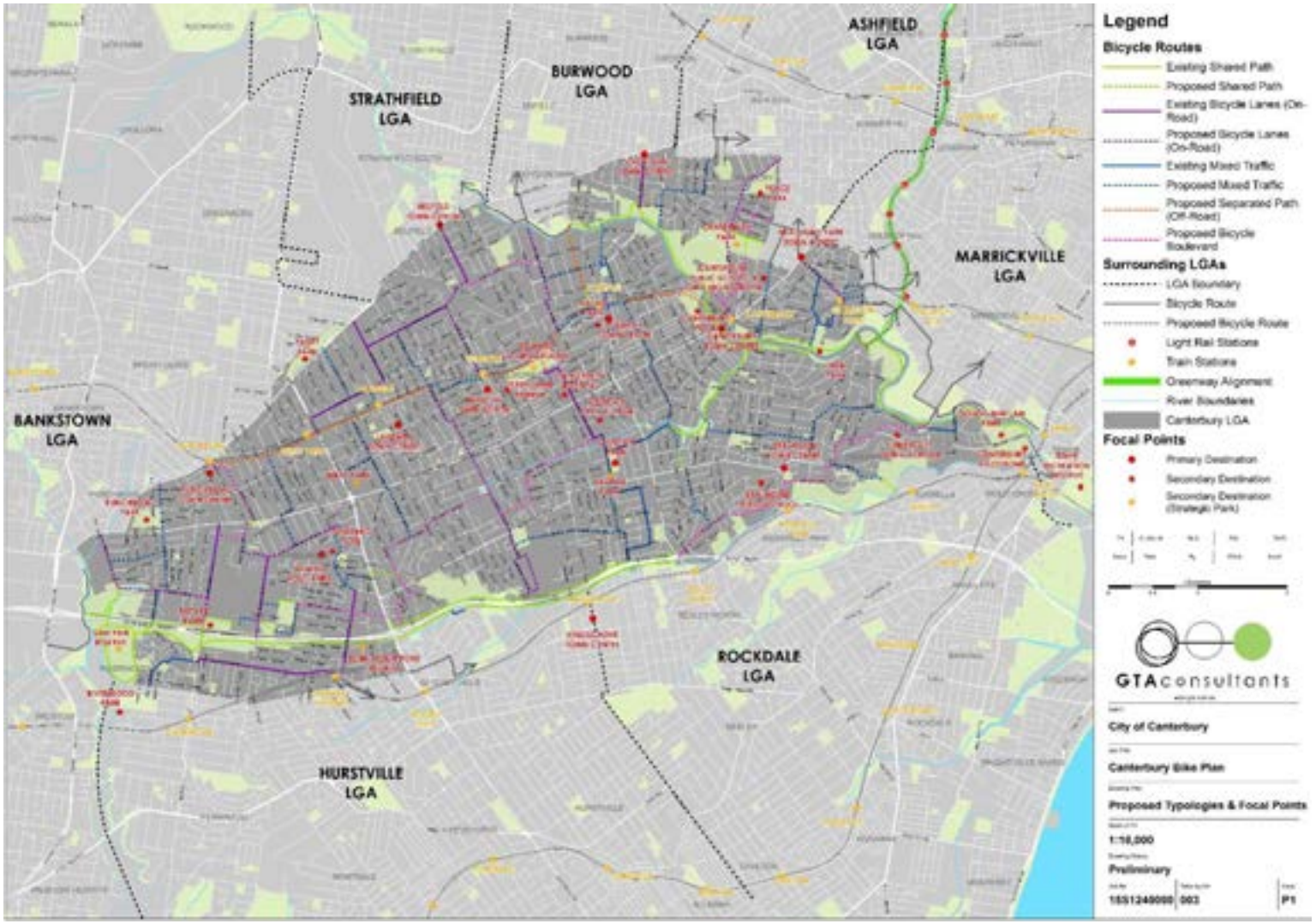


8.3 Proposed Bicycle Network

The proposed bicycle network (Figure 8.2) focuses on the following key elements:

- providing a permeable, fine grain network, while also having strong north-south and east-west spines
- combining typologies that include off-road, on-road and mixed traffic
- linking to key destinations, trip generators and train stations within the Canterbury LGA.

Figure 8.2: Proposed Bicycle Network (see Appendix D for a more detailed plan)



9. Infrastructure Plan

9.1 Overview

In order to efficiently design, fund and maximise the use of bicycle infrastructure, proposed infrastructure must be assessed and prioritised to achieve the greatest 'bang for your buck'. In this regard, the infrastructure that makes up the proposed bicycle network have been evaluated and ranked in order of priority to help Council implement the most beneficial-to-cost infrastructure first.

9.2 Route Evaluation

There is no set standard to evaluate bicycle routes. GTA assessed previous evaluation criteria from other Bike Plans and developed a priority ranking scheme specifically for the Canterbury LGA as presented in Table 9.1.

Table 9.1: Route Evaluation Matrix

Criteria	Sub-Criteria	Score				Weighting
		1	2	3	4	
Route Safety	Crash History	Injury crash x 2 each, Fatality x 10				20%
	Route Environment	High volumes and high speeds	Low volume/ high speed or high volume/ low speed	Low volume, low speed mixed traffic route	Separated paths	10%
Feasibility	Cost Expectation	>$50,000	$10,001 - $50,000	$5,001 - $10,000	$5,000 or less	20%
	Action Required	High level of input, land acquisitions (Multiple stakeholders)	Moderate Level of Input (Council and stakeholders)	Low Level of Input (Council only)	Minimal input (i.e. install a wayfinding sign)	10%
Strategic Importance	Types of Land Uses	1	2	3	4+	15%
	Type of Route	Local Route or lesser importance	Important Link, connects 3 or more routes	Key Local Route, provides link external to LGA	Regional Link	25%

Each criterion is discussed further as follows:

Route Safety

Crash History: Reported crashes are considered a critical criterion. Crashes were marked outside of the 1 – 4 scoring system instead scoring 2 for each casualty crash and 10 for any death. This was specifically designed to provide greater weighting to this criterion, particularly on high crash rate routes.

Route Environment: The route safety considers the typology proposed and typical traffic conditions along the route.

Feasibility

Cost Expectation: Lower cost proposals score higher.

Action Required: High levels of input and multiple stakeholders increase the time, cost and effort involved in a project. Projects with anticipated low levels of input score higher for this criterion.

Strategic Importance

Types of Land Uses: Each route was assessed to see how many different types of land uses are passed. It is anticipated the greater diversity of land uses passes, the higher the usefulness of the route. Key land uses noted in the Canterbury LGA include:

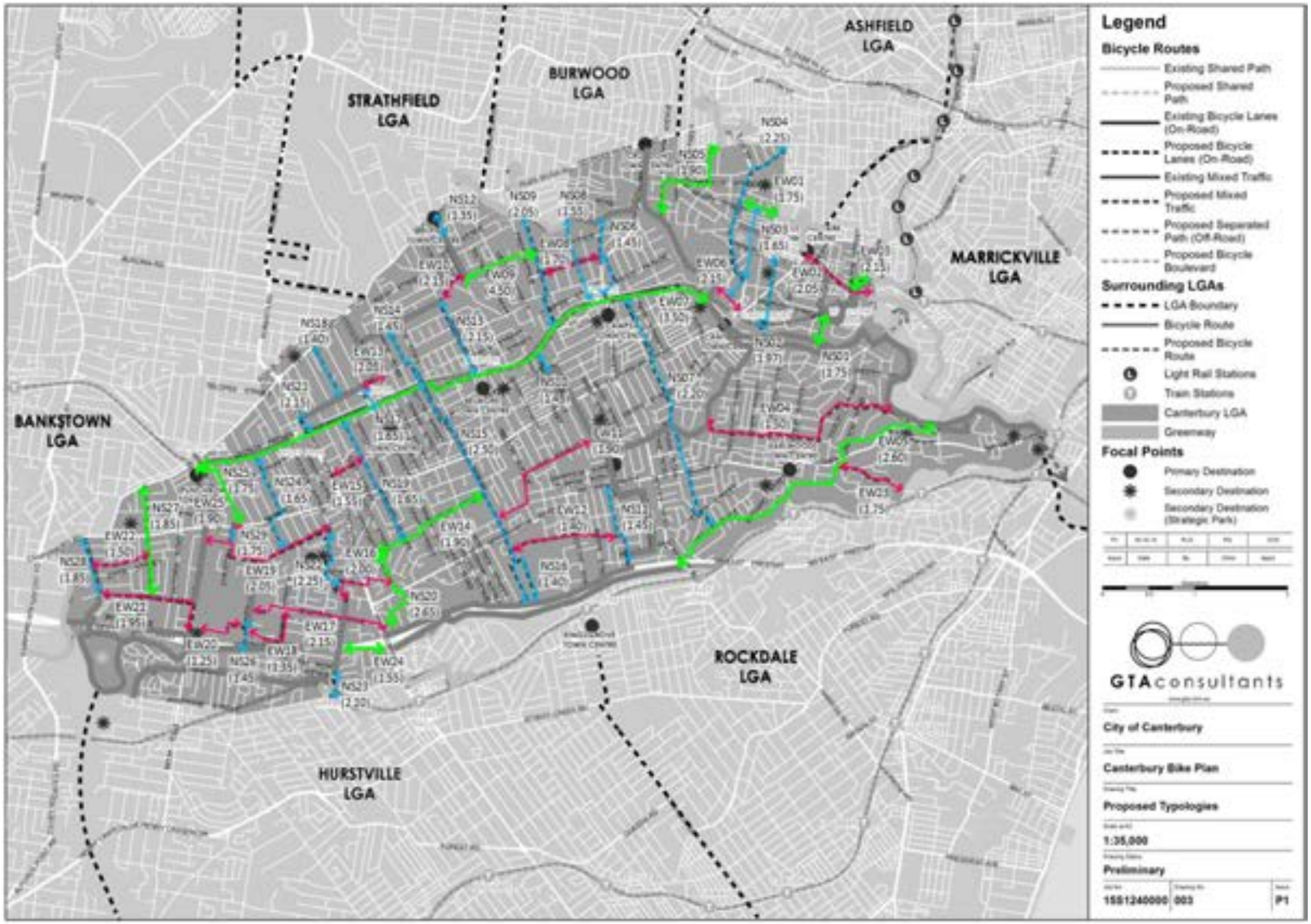
- Residential
- Educational
- Parks and Recreation
- Retail
- Commercial/ Office
- Factory/ Industrial
- Transport stations/ stops/ interchanges.

Type of Route: Routes that provide key links to surrounding LGAs or feature in regional strategic documents score higher than local routes.

9.3 Route Numbering

The proposed bicycle network in Figure 8.2 has been broken up into individual routes and numbered for ease of prioritising and implementing. The resulting routes and numbering is provided in Appendix D and presented in Figure 9.1.

Figure 9.1: Proposed Bicycle Network Route Numbering



9.4 Priority Ranking

Each proposed route has been scored using the Route Evaluation Matrix. The full assessment is provided in Appendix E and the priority ranking from highest to lowest is summarised in Table 9.2.

Table 9.2: Proposed Infrastructure and Prioritisation

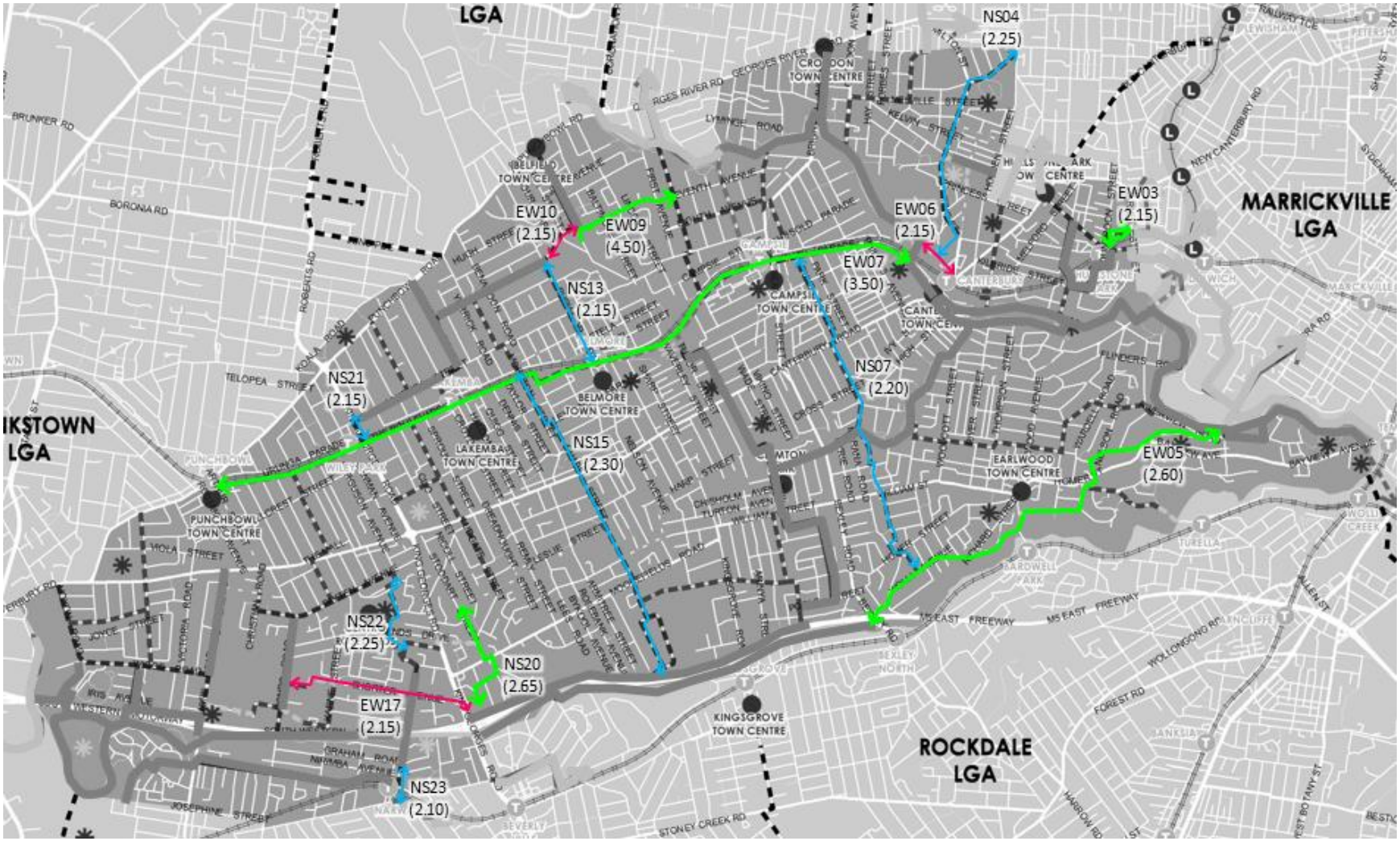
Route Designation	Suburbs	General Description	Proposed Typologies *	Route Length (m)	Route Evaluation Score	Weighted Score
EW09	Campsie, Belfield	Seventh Avenue, Omaha Street	Mixed Traffic	897	25	4.50
EW07	Canterbury, Campsie, Belmore, Lakemba, Wiley Park, Punchbowl	Charles Street, Tasker Park, South Parade, Lilian Street, Lilian Lane, Peter Moore Field, Terry Lamb Reserve, Tobruk Avenue, Bridge Road, Peel Street, The Boulevarde	Separated Path, Mixed Traffic	6,113	20	3.50
NS20	Roselands, Beverly Hills	Stoddart Street, Moorefields Road, Cooloongatta Road, Allambee Crescent	Mixed Traffic	1,033	16	2.65
EW05	Kingsgrove	Homer Street, Wellington Road, Twyford Avenue, Watkin Avenue, Banks Lane, Minnamorra Avenue, Sutton Avenue, Bardwell Park, Bray Avenue, Wolli Avenue, Bexley Road	Bicycle Boulevard	3,746	15	2.60
NS15	Lakemba, Belmore, Kingsgrove	Moreton Street, Leylands Parade, Chapel Street, Wirega Avenue, Garema Circuit (West), Beverly Grove Park	Bicycle Boulevard	2,741	14	2.30
NS04	Ashbury, Canterbury	Trevenar Street, King Street, John Street	Bicycle Boulevard	1,983	13	2.25
NS22	Roselands	Laneway, Diana Avenue, Centre Avenue, Roselands SC, Shared Path	Mixed Traffic	812	14	2.25
NS07	Campsie, Canterbury, Earlwood,	Duke Street, Canterbury Road, Northcote Street, Narani Crescent, Calbina Road, Shared Path, William Street, Main Street, Main Street, Homer Street, Charleston Avenue	Mixed Traffic, Shared Path	2,997	14	2.20
EW03	Hurlstone Park	Hampden Street, Duntroon Street	Mixed Traffic	275	14	2.15
EW06	Canterbury	Broughton Street	Bicycle Boulevard	413	14	2.15
EW10	Belfield, Belmore	Burwood Road	Bicycle Boulevard	397	13	2.15
EW17	Beverly Hills, Roselands, Riverwood	King Georges Road, Shorter Avenue, Bennett Park, Skinner Avenue	Mixed Traffic, Shared Path	1,439	14	2.15
NS13	Campsie, Belfield, Belmore	Burwood Road	Bicycle Boulevard	910	13	2.15
NS21	Wiley Park	King Georges Road	Bicycle Lanes (On-Road)	204	13	2.15
NS23	Narwee	Penhurst Road	Bicycle Lanes (On-Road)	182	13	2.10
EW02	Hurlstone Park	Floss Street, Crinan Street	Mixed Traffic, Bicycle Lanes (On-Road)	893	13	2.05

Route Designation	Suburbs	General Description	Proposed Typologies *	Route Length (m)	Route Evaluation Score	Weighted Score
EW13	Lakemba	Lakemba Street	Bicycle Lanes (On-Road)	76	13	2.05
EW19	Roselands, Punchbowl	Payten Avenue, Werona Avenue, Christian Road, Charlescotte Avenue	Bicycle Lane (On-Road), Mixed Traffic	1,601	13	2.05
NS09	Croydon Park, Campsie	Second Avenue, Ninth Avenue, Lock Street	Bicycle Lanes (On-Road)	1,315	13	2.05
EW16	Roselands	Shared Path Laneway, John K Stewart Reserve, Hilton Avenue	Shared Path, Mixed Traffic	852	13	2.00
EW21	Riverwood, Punchbowl	Belmore Road, Wiggs Road	Bicycle Lanes (On-Road)	1,318	12	1.95
EW25	Punchbowl	Canterbury Road	Shared Path	76	13	1.90
EW11	Campsie, Belmore, Kingsgrove	Harp Street, Nelson Avenue, Forsyth Street	Mixed Traffic	1,514	12	1.90
EW14	Roselands	Leslie Street, Dreadnought Street, Albion Street	Mixed Traffic	1,409	13	1.90
NS05	Ashbury, Croydon Park	Watson Avenue, Goodlet Street, Leith Street, Croydon Avenue	Mixed Traffic	1,355	12	1.90
NS27	Punchbowl	Rose Street, Cullens Road	Mixed Traffic	1,228	13	1.85
NS28	Punchbowl	Moxon Road	Bicycle Lanes (On-Road)	625	12	1.85
EW01	Ashbury	Third Street	Mixed Traffic	393	12	1.75
EW23	Earlwood	Hocking Avenue, Banks Road, Finlays Avenue, Wolli Creek Regional Park	Mixed Traffic, Shared Path	756	11	1.75
NS01	Hurlstone Park	Foord Avenue	Mixed Traffic	260	12	1.75
NS02	Canterbury, Hurlstone Park	Church Street, Church Street Overpass, Canterbury Sugar Walks, Sugar House Road	Mixed Traffic	919	11	1.75
NS25	Punchbowl	Arthur Street, Heggie Lane, Matthews Street, Hillcrest Street, Warren Parade	Bicycle Boulevard	860	12	1.75
NS29	Punchbowl	Christian Road	Bicycle Boulevard	203	11	1.75
EW08	Campsie	Eighth Avenue	Mixed Traffic	682	11	1.70
NS17	Lakemba	Croydon Street North	Mixed Traffic	185	12	1.65
NS03	Ashbury, Canterbury	Andrews Avenue, Canterbury Park, Jeffrey Street	Shared Path, Bicycle Lanes (On-Road)	830	11	1.65
NS19	Lakemba, Roselands	Ernest Street, Ludgate Street	Mixed Traffic	1,519	11	1.65
NS24	Wiley Park, Roselands	Robinson Street South, Hillcrest Street, Rawson Street, The Mall, Draper Avenue	Mixed Traffic	1,230	11	1.65
EW15	Lakemba	Edge Street	Mixed Traffic	383	11	1.55
EW24	Narwee	South of South Western Motorway, Rosetta Street	Shared Path	534	11	1.55

Route Designation	Suburbs	General Description	Proposed Typologies *	Route Length (m)	Route Evaluation Score	Weighted Score
NS08	Campsie	Fifth Avenue, Williams Parade, London Lane	Separated Path (Fifth Avenue) Shared Path (Williams Parade, London Lane)	802	10	1.55
EW04	Undercliffe, Earlwood	Macquarie Road, Riverview Road, Bass Road, Hamel Crescent, Collingwood Road, Hamilton Avenue, Thompson Street, Spark Street, Mooney Avenue, Westfield Street, Hughes Park	Mixed Traffic	2,521	10	1.50
EW22	Punchbowl	Carlton Parade	Mixed Traffic	606	11	1.50
NS06	Croydon Park, Campsie	Beamish Street Overpass (Over Cooks River), Beamish Street, Brighton Avenue, Shakespeare Street, Clissold Parade, Beamish Street	Mixed Traffic	1,125	10	1.45
NS10	Belmore	Peter Moore Field	Separated Path	187	10	1.45
NS11	Kingsgrove	William Street, Rosemeath Avenue, Homer Street, Lundy Avenue	Mixed Traffic	976	10	1.45
NS26	Riverwood	Bonds Road	Bicycle Lanes (On-Road)	176	9	1.45
NS14	Lakemba	Barremma Road, Lakemba Street, Moreton Street	Mixed Traffic	745	11	1.45
EW12	Kingsgrove	Homer Street, St. Albans Road, Clemton Park	Mixed Traffic	1,186	10	1.40
NS16	Kingsgrove	Garema Circuit (East)	Bicycle Lanes (On-Road)	579	10	1.40
NS18	Lakemba	Colin Street	Mixed Traffic	630	10	1.40
EW18	Narwee, Riverwood	Karne Street, Arilla Avenue, Wise Reserve	Mixed Traffic, Shared Path	759	10	1.35
NS12	Belfield	Burwood Road	Bicycle Lanes (On-Road)	136	9	1.35
EW20	Riverwood	Jindalee Place, Access Path, Rotary Park	Mixed Traffic, Shared Path	659	9	1.25

A plan showing the top 15 priority projects from Table 9.2 is shown in Figure 9.2.

Figure 9.2: Top 15 Priority Projects



9.5 Action Plan

Implementation of the 4 Year Service Delivery Plan and the 10-year Strategy depends on a number of factors:

- Funding levels determined by council, which may vary from time to time
- Availability of co-funding options through aligned council projects
- Availability of supplementary third party funding sources (refer Section 14)
- Timing of government projects such as Sydney Metro
- Cost factors such as the design specifications, complementary investments, utilities, traffic engineering aspects, etc.

In order to develop the action plan for the next 4 years and 10 years, a unit cost was prepared for each facility type. The rates[4] do not include a contingency amount and are provided as indicative costs for the purpose of project planning. A summary of the unit rates used is provided in Table 9.3.

Table 9.3: Indicative rates for each route typology

Route Typology	Cost per m
Mixed Traffic	$55
Bicycle Lanes (On-Road)	$75
Bicycle Boulevard	$260
Shared Path	$270
Separated Cycleway (On-Road)	$400
Separated (Off-Road)	$500

Table 9.4 provides an indicative cost assessment. Further detail is provided in Appendix E. Cost will vary significantly depending on many factors as discussed above. For example, the City of Sydney's Bourke Street Cycleway in Surry Hills, involved effectively a complete urban renewal program with street lighting, roof water drainage, pedestrian safety, footpath replacement, water sensitive urban design, traffic calming, road safety, and traffic signal upgrades.

Annual Council funding of approximately $400,000 was assumed for the 4 Year Action Plan, with limited co-funding or third party funding. This would allow for development of four of the top six ranked projects:

- 900m mixed traffic route on Seventh Avenue and Omaha Street (Campsie, Belfield)
- 2.35km of combined mixed traffic (1.5km) and separated, off-road path (850m) along the railway corridor between Burwood Road and Charles Street / Cooks River Shared Path[5]
- 1km mixed traffic route between Stoddart Street and M5 Shared Path (north) (Roselands, Beverley Hills)
- 3.8km bicycle boulevard route between Homer Street/Undercliffe Road and M5 Shared Path (south)/Bexley Road

[4] Broad level or initial feasibility planning construction cost estimates prepared by GTA Consultants must not be relied upon for quoting, budgeting or construction purposes. More detailed estimates can only be prepared from detailed civil engineering design drawings and require the services of a qualified quantity surveyor.

[5] Noting that this includes only a section of the second ranked route for delivery in the 4-year action plan. The remaining route section is covered in the 10-year Action Plan

Table 9.4: Indicative Cost Assessment

Typology	# Projects	Total Length	Costs 4 Year Action Plan	Costs 10 Year Action Plan	Total Costs
Mixed Traffic	32	29,973m	$106,150	$466,785	$1,648,515
Bicycle Lanes (On-Road)	12	7,016m	-	$28,950	$526,200
Bicycle Boulevard	7	11,253m	$973,690	$2,649,400	$2,925,780
Separated Path (Off-Road)	3	5,484m	$425,000	$2,307,500	$2,742,000
Shared Path	8	2,519m	-	$125,280	$680,130
Total	62	56,245m	$1,587,500	$5,277,915	$8,522,625

Where appropriate, lower priority works should be brought forward:

- where works are of a minimal effort and cost nature and therefore should not be postponed to a medium/ long term timeframe
- to coincide with other infrastructure works to achieve cost savings, e.g. traffic facilities, pavement re-sheets
- if a significant health or safety concern can be resolved by an action in the delivery plan
- where there are no feasible solutions to high priority works and lower priority works could mitigate higher priority route issues.

From a strategic perspective, research for the City of Sydney indicates a need to focus on completing routes and connectivity of routes.

9.6 Other Projects (Surrounding LGAs)

In addition to the projects identified within the Canterbury LGA, it is equally important to consider strategic projects that involve connections across Council boundaries. Effective communication and collaboration between Councils will ensure network connections and routes are not impeded by Council boundaries.

On the above basis, the following projects should be further investigated in conjunction with the neighbouring Council.

9.6.1 Cooks Creek Extension - Wolli Creek

GTA previously undertook a feasibility and options assessment (for Rockdale LGA) for the continuation of the Cooks River trail south into Rockdale LGA. A comprehensive evaluation of all the feasible options was conducted with the preferred option being documented in a concept design. The preferred concept design is presented in the following figures.

Figure 9.3: Cooks River Southern Extension – Concept Design Overview Plan

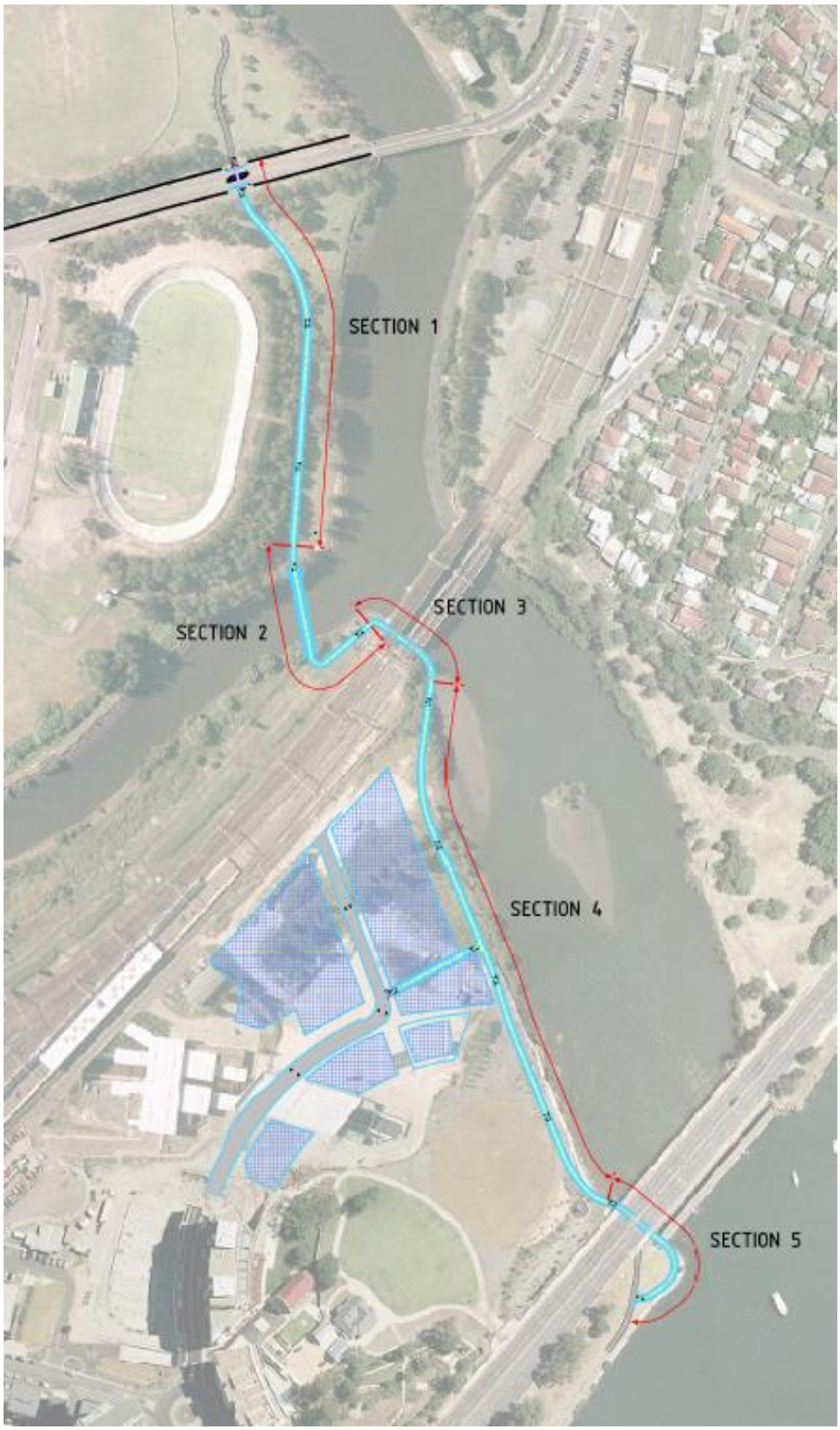


Figure 9.4: Cooks River Southern Extension, Section 1 – Concept Design

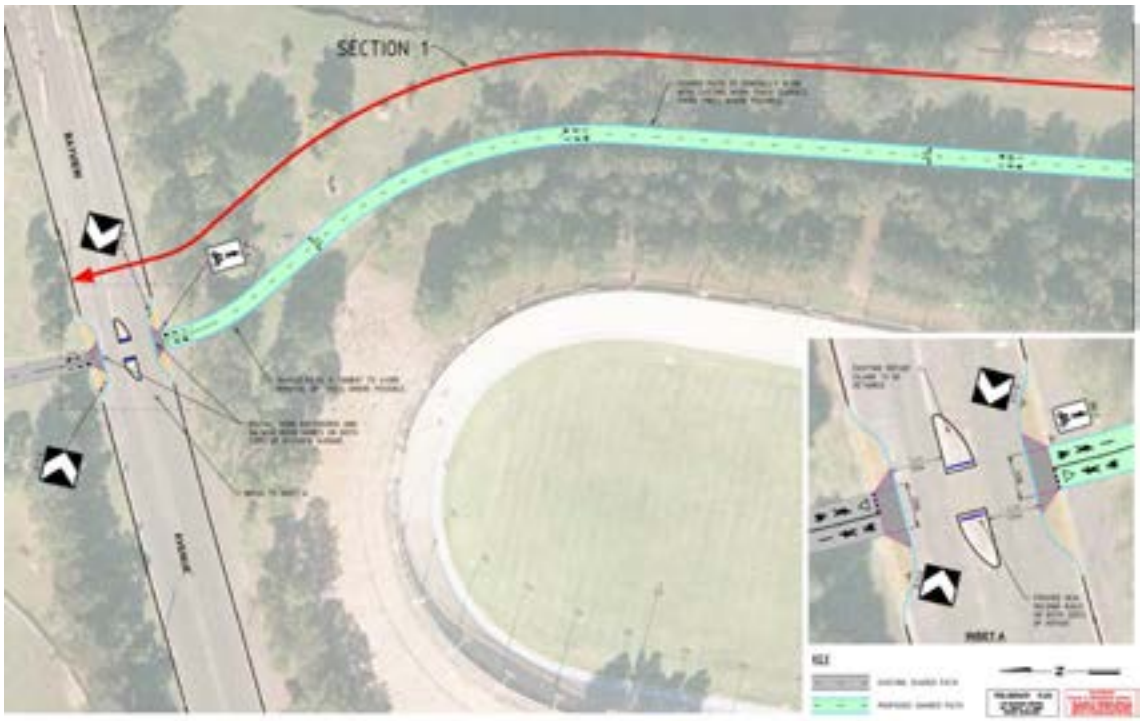


Figure 9.5: Cooks River Southern Extension, Sections 2-4 – Concept Design

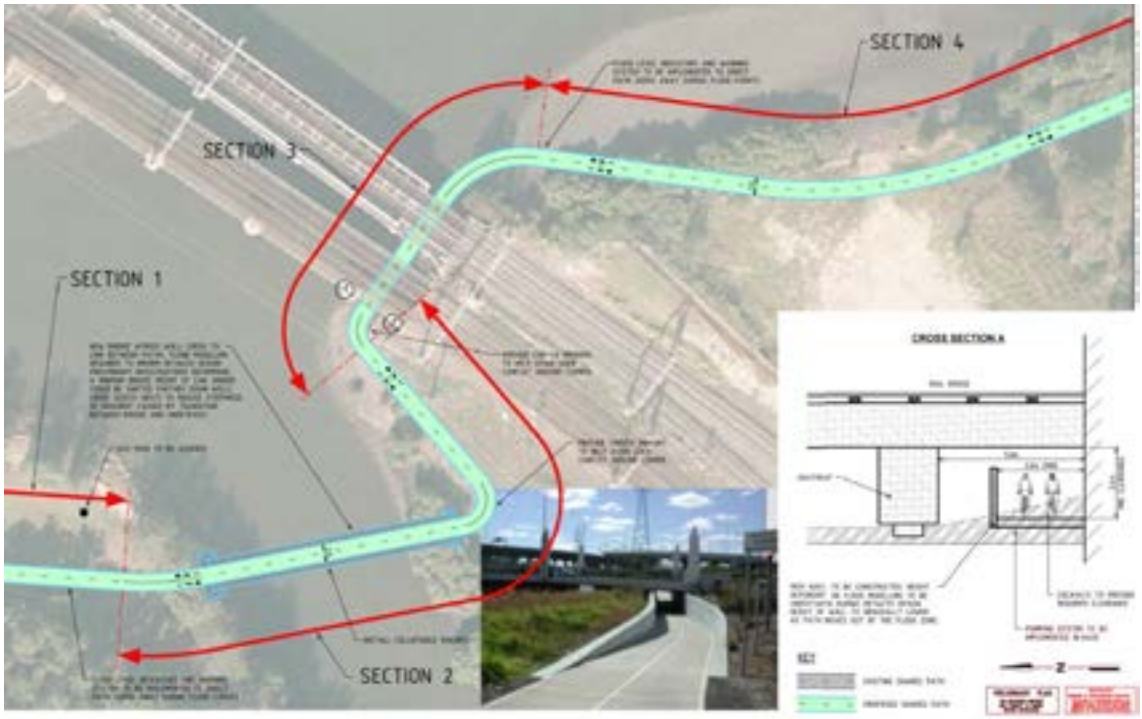


Figure 9.6: Cooks River Southern Extension, Section 4 – Concept Design

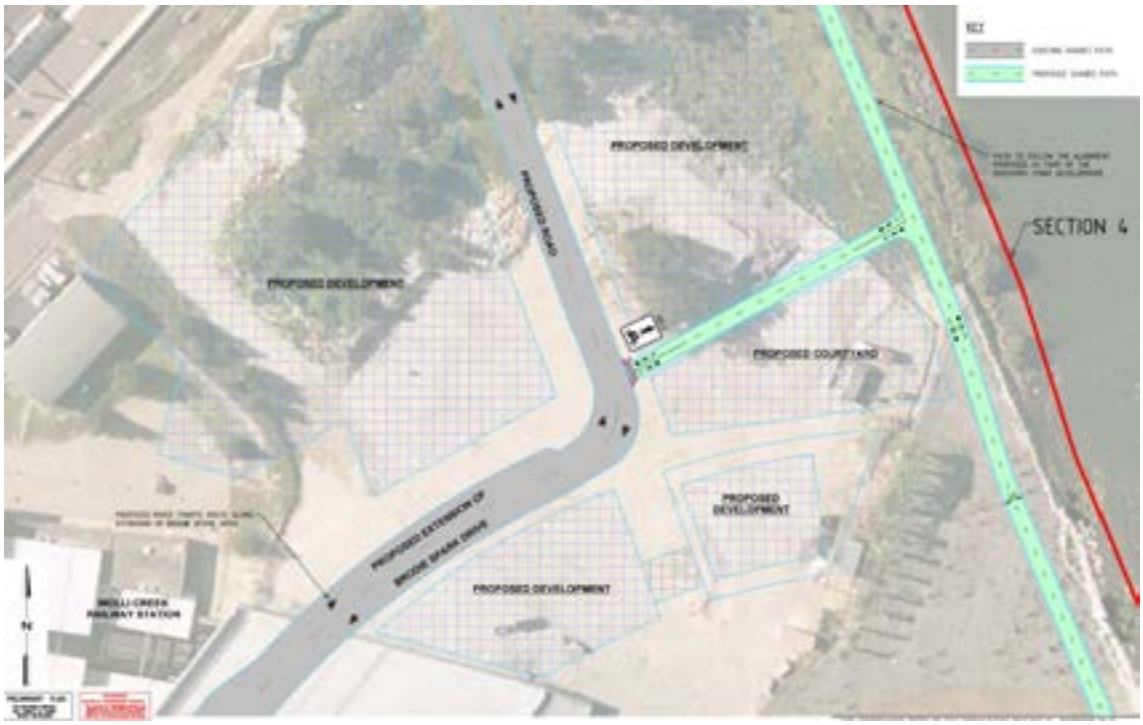
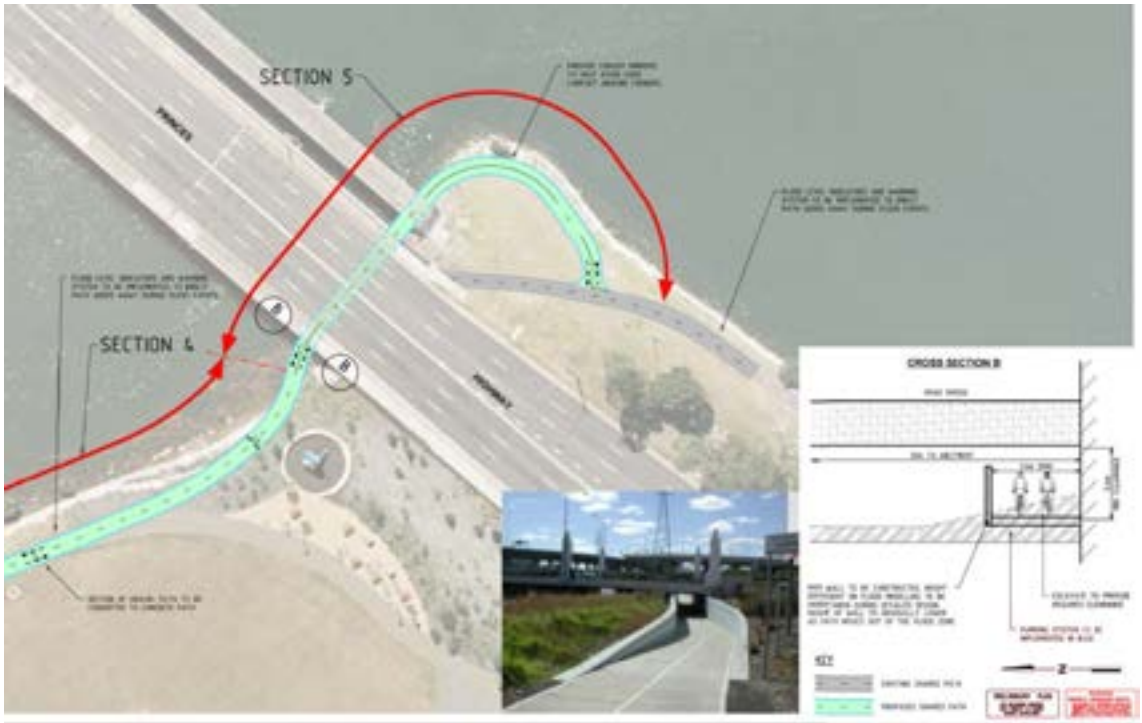


Figure 9.7: Cooks River Southern Extension, Section 4 and 5 – Concept Design



It is recommended that Canterbury Council liaise with Rockdale City Council to bring this project back onto the agenda and seek to take it to the next stage of development to enable this important link to be delivered.

9.6.2 The Greenway

As noted in Section 2.2.2, the GreenWay is a 5km long corridor, extending from the Cooks River at Earlwood in the south to Iron Cove in the north, passing through four local government areas following the line of the disused Rozelle freight rail corridor.

The GreenWay offers the community an alternative to the hectic inner west lifestyle and congested roads. It is a place for relaxation, a place to enjoy and reconnect with nature.

The Cooks River to Iron Cove GreenWay vision is for:

"a recognisable environmental, cultural and non – motorised transport corridor linking the sub-catchments of two of Sydney's most important waterways."

A map showing the southern end of the GreenWay (as shown on the plan from www.greenway.org.au) is shown in Figure 9.8.

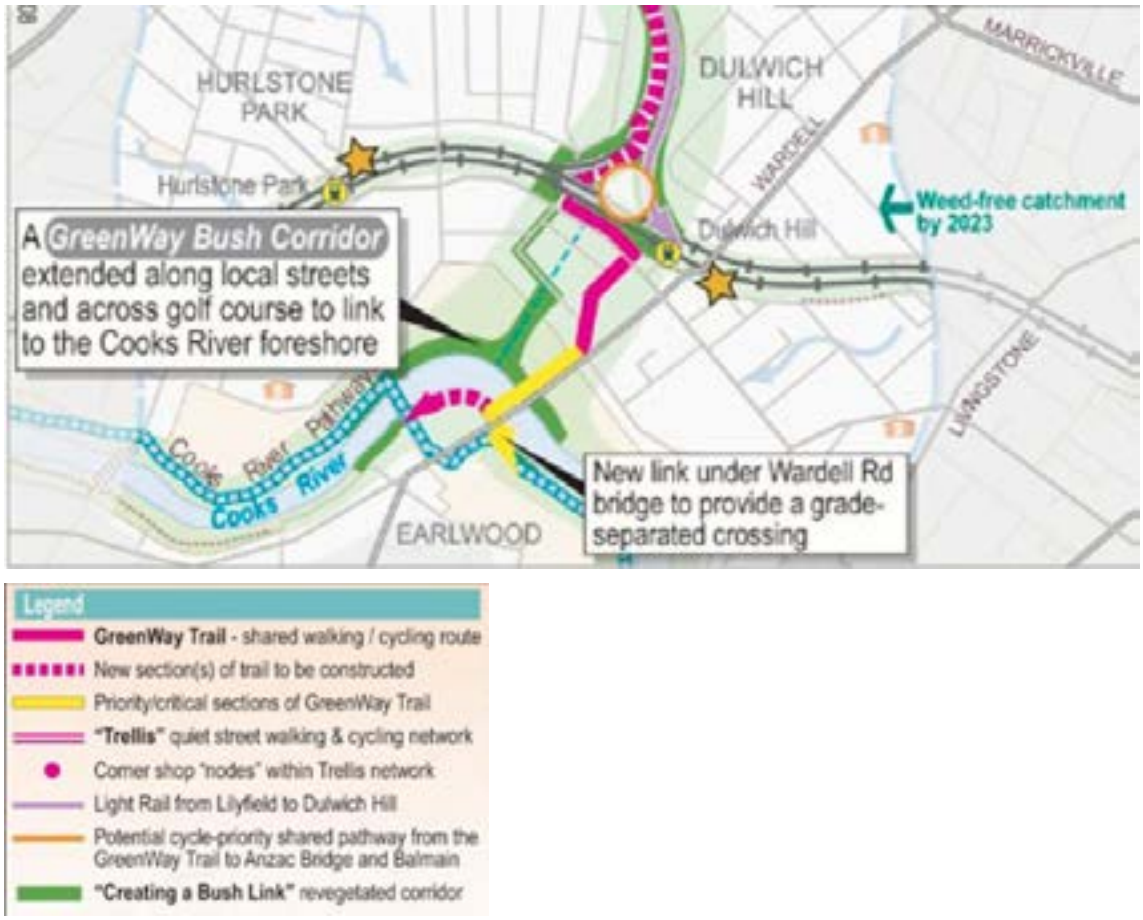
Figure 9.8: Proposed GreenWay Connection to Cooks River Trail

Source: www.greenway.org.au

Further work has been completed for this section in the Cooks River to Iron Cove GreenWay Masterplan and Coordination Strategy, 2013. From this study, the proposed route alignment shown in Figure 9.9. This includes the following:

- Cooks River to Jack Shannahan Reserve Dulwich Hill - link under Wardell Road Bridge on the southern side of the Cooks River.
- Upgrade of crossing at Wardell Road, possibly though expansion of the footway on the western side of the bridge.
- Trail connecting from Wardell Road to Tennyson Street via playground in addition to an on-street route.

Figure 9.9: Proposed GreenWay Route Alignment (Section 1)



Source: Cooks River to Iron Cove GreenWay Masterplan and Coordination Strategy, 2013

Further work has also been undertaken on the GreenWay connections in the Cooks River Pedestrian and Cycle Path Improvement Study – Pathway Development Strategy, 2006, prepared by Jamieson Foley Traffic and Transport, and Sustainable Transport Consultants.

The key recommendations for the southern connection of the GreenWay (linking the Cooks River Trail) were identified as follows:

Canterbury / Marrickville

- Widen western footpath on Wardell Road Bridge and approaches

Canterbury / Marrickville

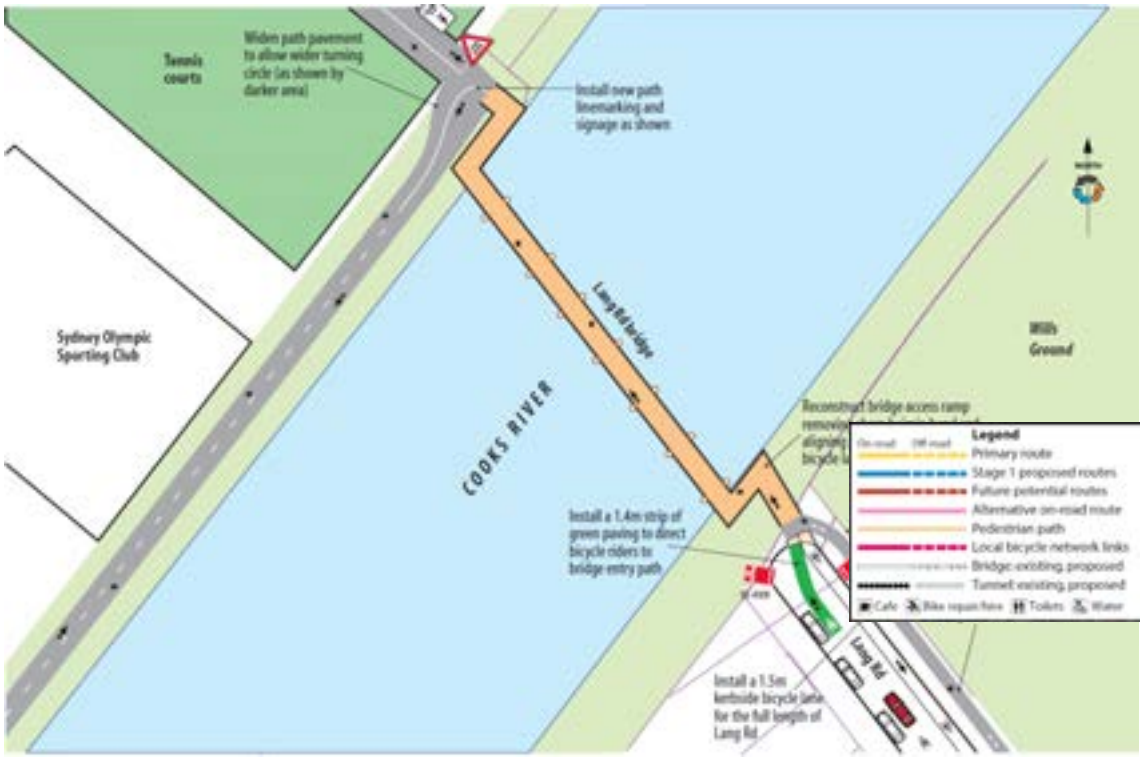
- Develop Masterplan and other instruments
- Provide pathway from the Bridge to Tennyson Street
- Reserve and Tennyson Street
- Sign and mark on-road route from Tennyson Reserve to
- Canterbury Road and beyond
- Provide pathway along western side of Dulwich Hill goods railway from Hercules Street to Constitution Road

Further detailed plans of the proposed route alignment/connections are shown below.

Figure 9.10: Proposed Cooks River Crossings and GreenWay Connections

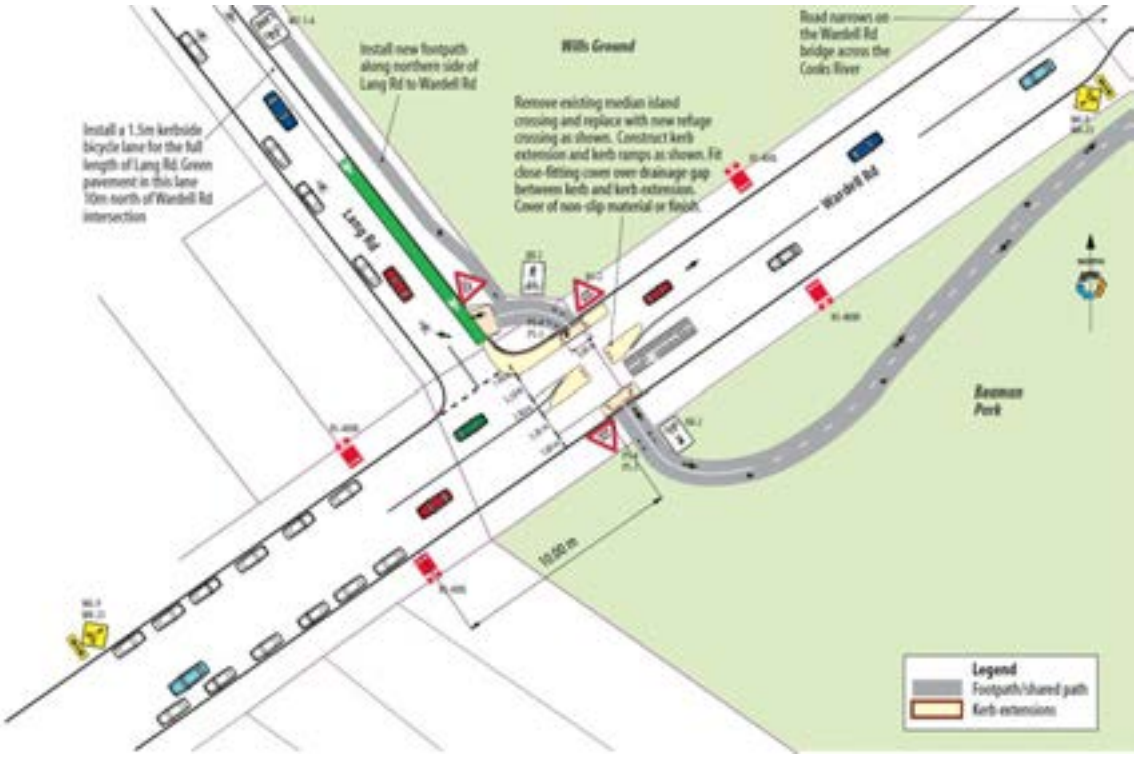
Source: Cooks River Pedestrian and Cycle Path Improvement Study – Pathway Development Strategy, 2006

Figure 9.11: Concept Diagram of Proposed Cooks River Crossing at Lang Road, Earlwood



Source: Cooks River Pedestrian and Cycle Path Improvement Study – Pathway Development Strategy, 2006

Figure 9.12: Concept Diagram of Proposed Path Crossing of Wardell Road, Earlwood



Source: Cooks River Pedestrian and Cycle Path Improvement Study – Pathway Development Strategy, 2006

Summary

On the above basis, it is recommended that Canterbury continue to collaborate with Marrickville City Council and other stakeholders to progress this important strategic active travel link between the two Councils.

9.6.3 Inner Sydney Regional Bicycle Network

The Inner Sydney Regional Bike Network (ISRBN) is a radial and orbital network of strategic bike routes within a ten kilometre radius of the Sydney CBD, created by improving the utilisation of the existing road network to provide a real and safe alternative to motorised transport. The City of Sydney (the City) has identified the ISRBN in collaboration with fourteen other councils and the NSW Government. The City of Canterbury is one of the Councils that are involved.

The ISRBN has been placed on the infrastructure priority list for review by Infrastructure Australia for potential funding by the federal government in an effort to reduce congestion and provide health benefits to the community. Infrastructure Australia has identified the ISRBN as a "Near Term" initiative, recommending the development of a business case within the next five years.

The proposal includes the upgrade of a network of 284 kilometres of dedicated cycling and shared cycling/walking paths, on existing radial and cross regional corridors within a 10 kilometre radius of the CBD.[6] An indicative plan showing the extent of the proposed network is shown in Figure 9.13.

[6] National Infrastructure Priority List 2016 – Long List

Figure 9.13: Indicative Sydney Regional Bicycle Network

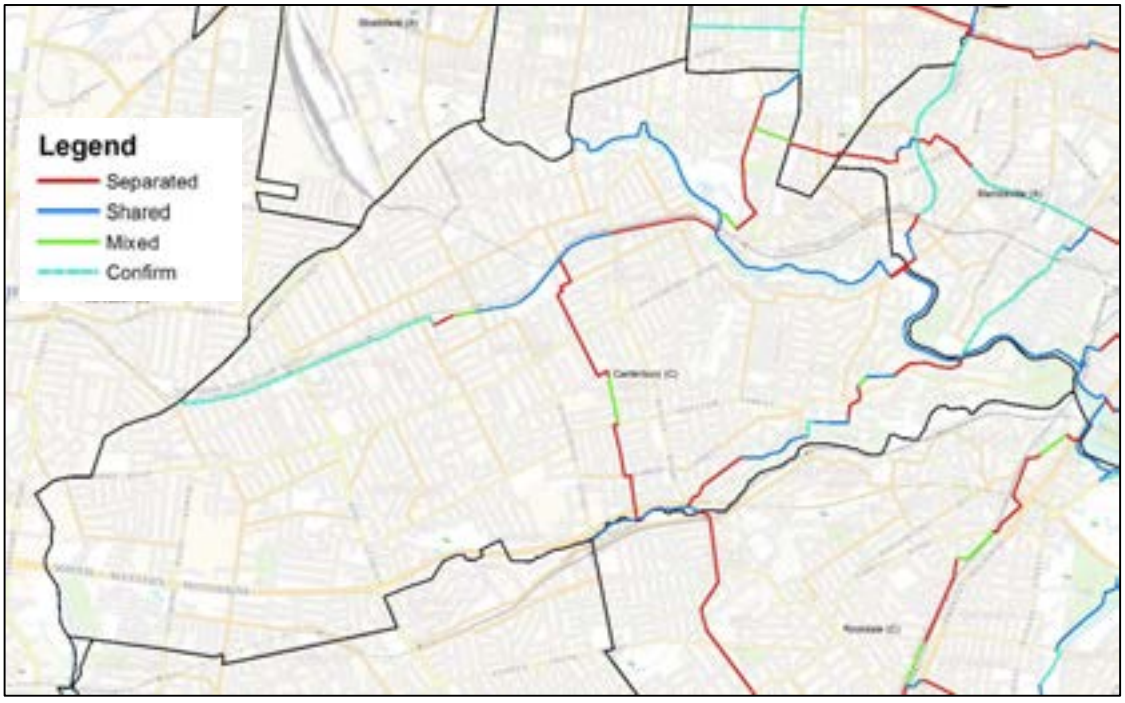
Source: Australian Infrastructure Plan 2016 - Long List -

A project is currently underway[7] to update the ISRBN network and produce an updated implementation strategy and business case through:

- Updated demand modelling
- Economic analysis (BCRs)
- Route review and staging
- identification of routes for de-prioritisation to reduce network density and focus on strategic routes
- Review and update the construction program in consultation with the fifteen councils

Draft plans for the ISRBN within the City of Canterbury have been developed by GTA Consultants and circulated to Council for comment. The proposed draft network is shown in Figure 9.14.

Figure 9.14: Preliminary DRAFT ISRBN for Canterbury City Council



The Draft network includes three new and one existing route/corridor:

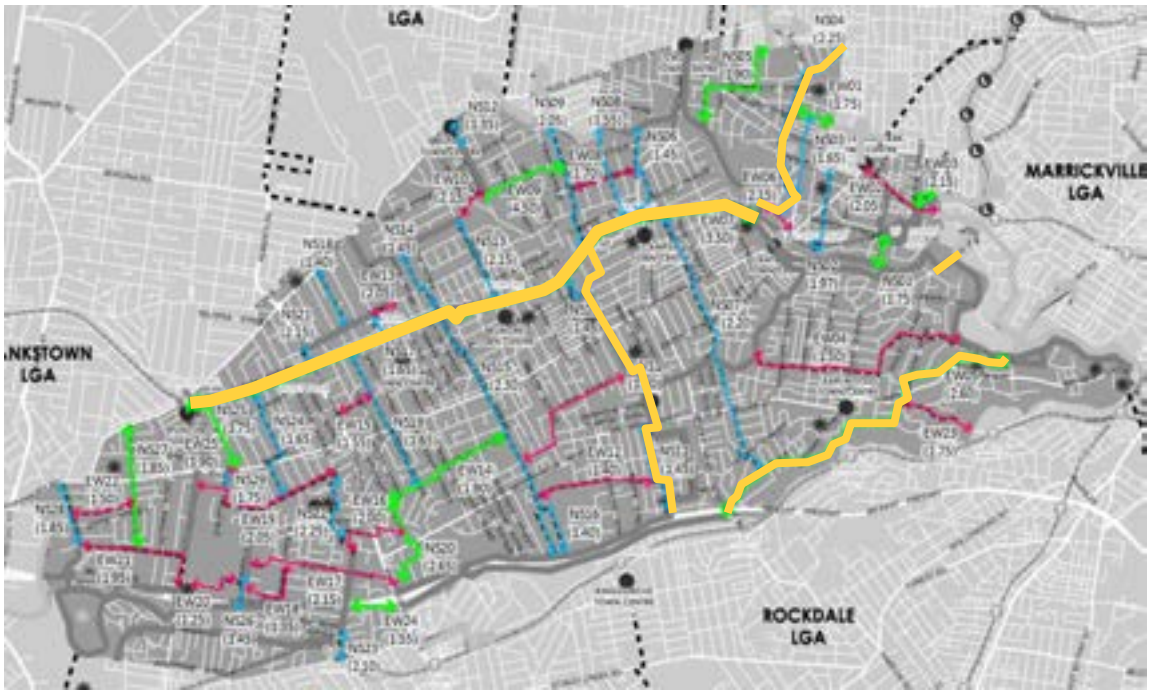
[7] Team led by Infrastructure Economist, including GTA Consultants.

- East-west central rail corridor route (proposed route designation EW07))
- North-south route between Loch Street and the M5 shared pathway (part of proposed route designation NS11)
- East-west route between the M5 shared pathway (Bexley Road) and the Cooks River Trail (proposed route designation EW05)
- North-south route between the Cooks River Trail and Ashbury (proposed route designation NS04)
- Cooks River Trail (existing)

The plan also includes a proposal to upgrade the crossing of Wardell Road to a separated facility. From the above list, the following routes are identified within the top six infrastructure priorities shown in Table 9.2.

To better appreciate the geographical location of these routes, they have been highlighted on the plan in Figure 9.15.

Figure 9.15: Location of ISRBN Routes in the Context of the Canterbury Bike Plan Network



Summary

The ISRBN routes are intended to be high quality off-road or separated infrastructure that is designed to appeal to at least 50% of the potential riding population. In most cases, this means a separated cycleway or shared path. The infrastructure is expected to be rideable by a 10-year-old child.

Having regard for infrastructure requirements of the ISRBN, there is a potential to strengthen some of the identified proposed routes to higher order, separated or off-road facilities. These could then be prioritised and developed further with a view to securing Federal funding to deliver them.

10. Shared Path Management Strategy

Shared paths are used widely across Australia. In five of Australia's eight states and territories, cyclists are allowed to use any footpath. In New South Wales cyclists are not permitted to ride on the footpath.

Shared paths are suitable facilities where the path width and volume of pedestrians and cyclists are appropriate to permit cyclists and pedestrians travelling in the same direction to safely pass one another. Pedestrians have right of way on shared paths at all times.

The probability of conflict between users on shared paths increases with high volumes of pedestrians and cyclists, and where the path is narrow. Ultimately, in order to eliminate conflict between pedestrians and cyclists, separate paths should be provided for each mode.

Good path lighting extends the usability of a path and makes it more attractive to use beyond the standard daylight hours. Consideration should be given to lighting recreational trails where there are significant concerns raised by pedestrians and cyclists regarding safety and security.

It is important that strategies are identified to mitigate cyclist-pedestrian conflict on shared paths across the LGA and improve the safety and amenity of all path users.

Key considerations will include:

- RMS Study of Bicyclist and Pedestrian Safety on Shared Paths
- City of Sydney Shared Pathway Pavement Markings Guide
- VicRoads Cycle Note 21
- QTMR TRUM Technical Note - Calculating the Widths of Shared Paths and Separated Bicycle Paths (Under Development)
- QTMR Cycle Note C2 - Reducing conflict between bicycle riders and pedestrians
- Austroads - Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths

There is a growing trend toward separating bicycle and pedestrian facilities. As discussed in Section 7.3, separated cycleways are often separated from traffic lanes by concrete medians. However, this can result in high costs and not all existing roads have the available space to accommodate these lanes.

Where shared facilities cannot be avoided, pedestrians should have priority and bicycle speeds reduced to be more comparable with pedestrians (noting a typical cyclist needs to travel at least 12km/h to maintain balance).

The City of Sydney has begun the Share the Path campaign to promote safety awareness and better behaviour on shared pathways. The Share the Path team will be out on Sydney's bike network to provide cycling tips, maps, free tune ups and other assistance to cyclists on shared paths.

Victoria Walks has released a paper on shared paths[8] which considers the various issues around shared walking and cycling paths. It reviews the literature on a number of topics including:

- The safety of shared paths, including collision risk, the speed of cyclists and potential impact on pedestrians
- User perception of shared paths
- The circumstances where walking and cycling paths should be segregated or separated
- International and local design guidance around shared paths
- The practice of converting footpaths to shared paths
- Legal liability issues raised by shared paths.

The paper focuses on determining whether shared or separated paths is the appropriate infrastructure choice.

Given the above, Canterbury Road does not have sufficient space to accommodate a dedicated bicycle facility without removing traffic lanes. As a result, the primary east-west bicycle route will be provided as a separated path adjacent to the Bankstown-T3 railway line, with the secondary east-west route being provided as on-road lanes in the residential streets south of Canterbury Road.

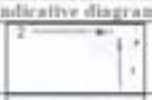
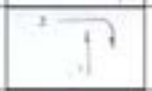
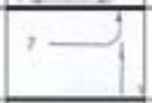
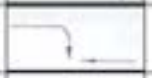
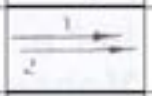
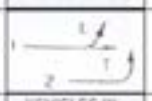
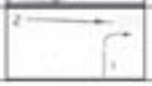
[8] Refer to http://www.victoriawalks.org.au/position_statements/

11. Intersection Conflict Management Strategy

With any transport network, the location that the majority of crashes occur is at intersections, be it between intersecting carriageways or with crossing facilities. This is namely due to intersections, by definition, having conflicting movements, and it is at these conflict points that crashes tend to occur. Dutch research indicates that 65% of bike-car crashes at intersections concern turning vehicles as opposed to crashes where bicycles cross the road (35%).

Research by GTA in the ACT confirms this, with the results of cyclist crash types at intersections for the ACT provided in Figure 11.1.

Figure 11.1: Cyclist Crash Study Results (ACT)

RUM Code	Number of Crashes	Indicative diagram
101 (Intersection: thru-thru)	166	
104 (Intersection: thru-right)	83	
400 (Manoeuvring: from footway)	79	
107 (Intersection: thru-left)	60	
202 (Vehicles from opposing directions: thru-right)	52	
305 (Vehicles from one direction: vehicles in parallel lanes, lanes side sweep)	43	
309 (Vehicles from one direction: left turn side sweep)	39	
301 (Vehicles from one direction: rear end)	38	
406 (Manoeuvring: leaving driveway)	21	
102 (Intersection: right-thru)	19	

There are many ways that conflict points at intersections can be managed, as indicated below:

- Removal or elimination of conflict points
- Reducing crash risk or exposure
- Reducing crash severity

No one way of managing conflict will be applicable across a whole bicycle network. As such, each of the above are discussed further and where they are most applicable.

Removal or Elimination of Conflict Points

The removal or elimination of conflict points is most commonly achieved through the separation of modes and/or movements, such as through grade separated bridges, underpasses and overpasses. Such treatments are generally only feasible where cyclists are required to cross freeways, or other high volume and/or speed arterial roads at mid-block locations.

For specific guidance on when grade separated pedestrian facilities are warranted, refer to Section 4.6.1 of VicRoads' Traffic Engineering Manual, Volume 1, Chapter 4.

Reducing Crash Risk or Exposure

At conflict points measures can be taken to help reduce crash risk or exposure for cyclists and other vulnerable road users. This includes such measures as prioritising crossing facilities to vulnerable road users through zebra and give way controlled facilities. Also, the use of shared zones in low traffic volume and speed environments can help achieve this.

As noted above, the majority of bike-car crashes at intersections concern turning vehicles. The use of the bend-out treatments, such as those developed for Bourke Street cycleway (City of Sydney) at Stanley Street and Devonshire Street, or straight raised crossings, as indicated in Figure 7.11 of Cycling Aspects of Austroads Guides, appear to be effective at managing some of these types of crashes.

At intersections, the use of head-start or separate signal phases for cyclists and pedestrians can be used to reduce crash risk or exposure. This is generally already provided for pedestrians, but only at a very limited extent for cyclists.

Reducing Crash Severity

Based on the current Australian National Road Safety Strategy 2011–2020, the 'Safe System' approach has been adopted. A key aspect of this approach is that it is unacceptable for road users to experience fatal or serious injuries as a result of a common user error, i.e. not seeing a cyclists or pedestrian crossing a road or through an intersection. As such, the road network needs to provide an environment that reduces the potential severity of any crashes to a level where fatal or serious injuries could not result.

In terms of vulnerable road users, this would be at an impact speed with a vehicle of less than 30km/h (this results in a 10% facility risk based on '*Wramborg Curves*'[9]). As such, where every vulnerable road users are expected, they should not be able to mix with vehicles travelling above 30km/h. This is often achieved through reduced speed limits, traffic calming measures and/or separation of facilities.

However, not all roads can be 30km/h and at times even separated bicycle and pedestrian facilities need to cross such roads. As such, the use of speed tables, combined with the bend-out or straight raised crossing treatments may be required.

[9] OECD, *Towards Zero: ambitious road safety targets and the safe system approach*, 2008, Organisation for Economic Co-operation and Development (OECD): Paris, France. http://www.internationaltransportforum.org/Pub/pdf/08TowardsZeroE.pdf

12. Maintenance

12.1 Overview

Council recognises the importance of maintaining a safe bicycle network and has been proactive in delivering extensive upgrade works on the Cooks River Path between Burwood Road and Broughton Street. This includes large lengths of new/resurfaced path. Regular maintenance is an essential component in ensuring that the cycling infrastructure in Canterbury remains safe and attractive to all users.

Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths (2009), suggests that regular maintenance activities should include the following elements as appropriate:

- filling of cracks
- trimming or removal of grass so that it does not intrude into the path
- sweeping of paths to remove debris such as broken glass and fine gravel (including that arising from construction and maintenance activities such as crack sealing)
- re-painting of pavement markings
- cleaning of signs
- trimming of trees and shrubs to maintain safe clearances and sight distances.

Maintenance audits should be conducted at least every 12 months subject to levels of use, and should focus on the following deficiencies:

- surface quality
- debris
- line marking deterioration
- signage
- overgrown vegetation
- lighting deficiencies
- flooding/standing water

The adoption of these regular maintenance audits is encouraged but it is recommended that the frequency of the inspections on the more popular and continuous off-road paths (such as the Cooks River Trail and M7 path) be increased to be every six months. Other locations that would benefit from further investigation are discussed below.

12.1.1 Cooks River Underpass at Canterbury Road

The Canterbury Road underpass is extremely narrow and prevents disabled access. The headroom under the bridge is sub-standard and sight lines are poor. This creates a significant constraint in the otherwise high quality and well patronised Cooks River Regional Pedestrian and Bicycle path.

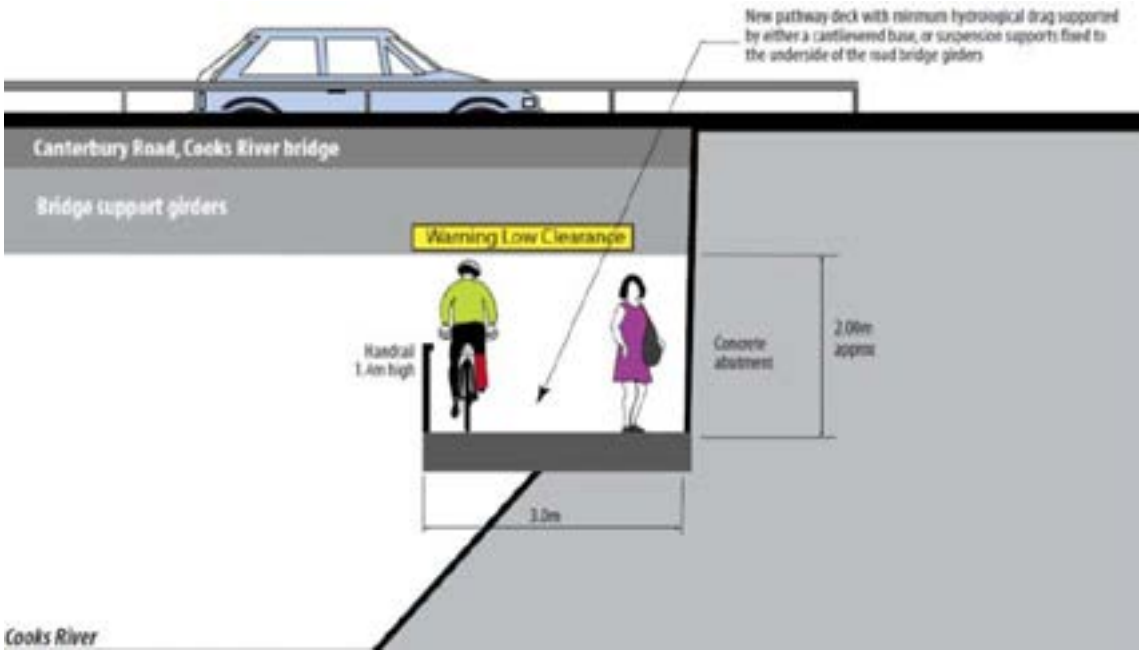
Figure 12.1 and Figure 12.2 show the existing conditions of the Cooks River Underpass at Canterbury Road.

Figure 12.1: Existing Conditions at the Cooks River Underpass

Figure 12.2: Existing Conditions at the Cooks River Underpass

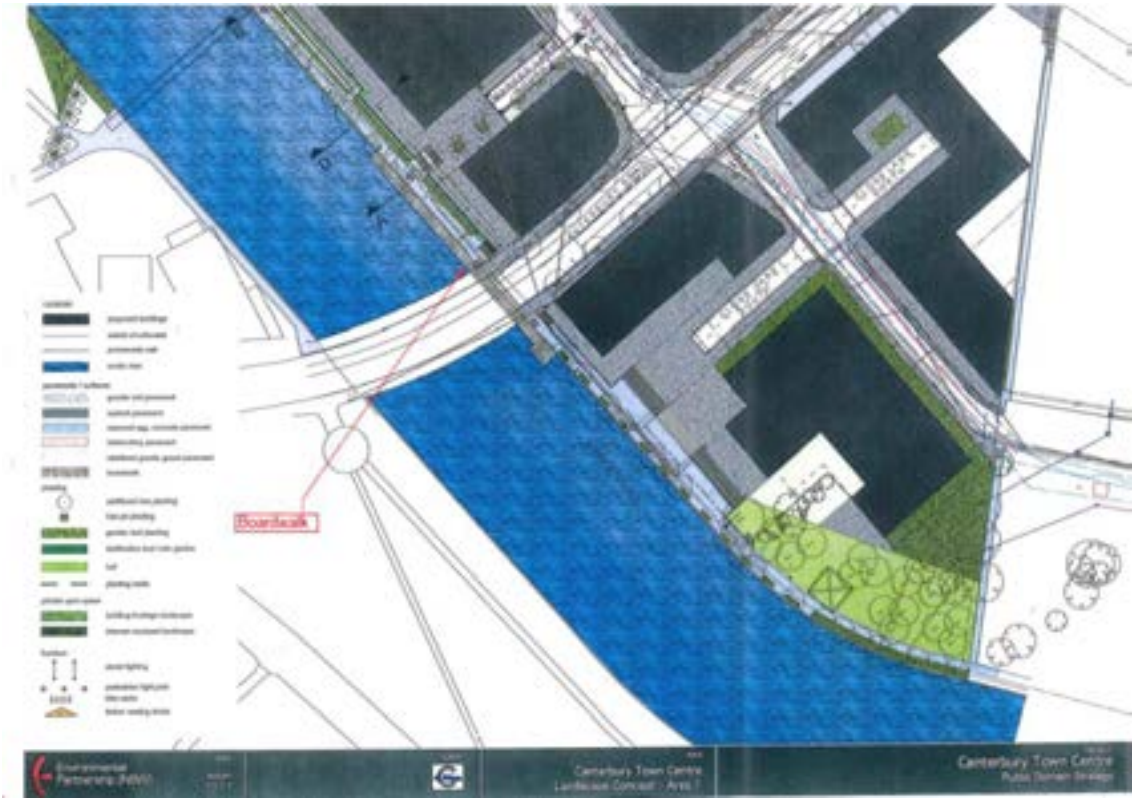
Work has previously been undertaken on this constraint point, with a concept plan for the proposed widening of the underpass presented in Figure 12.3.

Figure 12.3: Proposed Treatment of the Cooks River Underpass



The proposal has also been identified in the Canterbury Town Centre Public Domain Strategy, with an extract of the concept design shown in Figure 12.4.

Figure 12.4: Canterbury Town Centre Public Domain Strategy – Concept Design



Source: Canterbury Public Domain Strategy

Appendix F provides a copy of the report that presents the pathway development strategy and is based on the findings of two previous reports by the study team, including a formal road safety audit and an issues and options paper. It is recommended that the report be actioned to facilitate the widening of the Cooks River Underpass at Canterbury Road. Another example of a potential underpass treatment is shown in Figure 12.5.

Figure 12.5: Example of Underpass Flood Mitigation, Five Islands Road, Teralba, Lake Macquarie

12.1.2 Homer Street / Illawarra Road Bridge

The Cooks River Path at the Homer Street / Illawarra Road Bridge currently involves going up to the road, crossing it, then going back down along the river. The existing connection between the road and the Cooks River Path on the south-western side of the Homer Street / Illawarra Road Bridge currently contains steps, which makes it difficult for cyclists to access the path (Figure 12.6 and Figure 12.7).

It is recommended to modify the existing steps at the Homer Street / Illawarra Road Bridge to allow bikes to facilitate an easier connection between the road and the south-western side of the Cooks River Path.

Figure 12.6: Existing Steps at the Homer Street / Illawarra Road Bridge

Figure 12.7: Existing Steps at the Homer Street / Illawarra Road Bridge

12.1.3 Charles Street Underpass and Railway Line

The existing path along Charles Street is very narrow, with it almost disappearing under the Railway Line underpass (Figure 12.8). Temporary fencing has been put in place to widen the path, but cyclists are required to dismount to utilise the path (Figure 12.9). It is recommended to permanently widen the path by narrowing the vehicle lanes on Charles Street.

Figure 12.8: Existing Conditions at the Charles Street Underpass

Figure 12.9: Existing Conditions at the Charles Street Underpass

12.1.4 M5 Shared Path

The M5 shared path provides a good off-road recreational facility for users at the southwestern boundary of the LGA. Access to the route is, however, not highly visible and there is a lack of wayfinding signage directing users to the path from the surrounding road network. Adopting a comprehensive wayfinding strategy for the whole cycle network will improve navigation and accessibility to all routes in the LGA. In the interim, however, there are a number of locations that would benefit from immediate wayfinding, such as:

- Intersection of Woorail Avenue and Poole Street – provide wayfinding direction signage to M5 shared path

- King Georges Road / M5 shared path – install wayfinding signage directing cyclists and pedestrians between the shared path on the north side and the connecting footpath on the south side of the M5 Motorway (needs to be upgraded to a shared path).

In addition to the wayfinding items above, once the path to the west of King Georges Road has been upgraded to a shared path, an investigation should be undertaken to establish if it is feasible to install bicycle lanterns at the intersection to enable riders to cross while staying on their bikes. Similarly, it is recommended that bicycle lanterns be installed at the existing pedestrian operated signalised crossing of the M5 shared path at Kingsgrove Road. The existing crossing is shown in Figure 12.10.

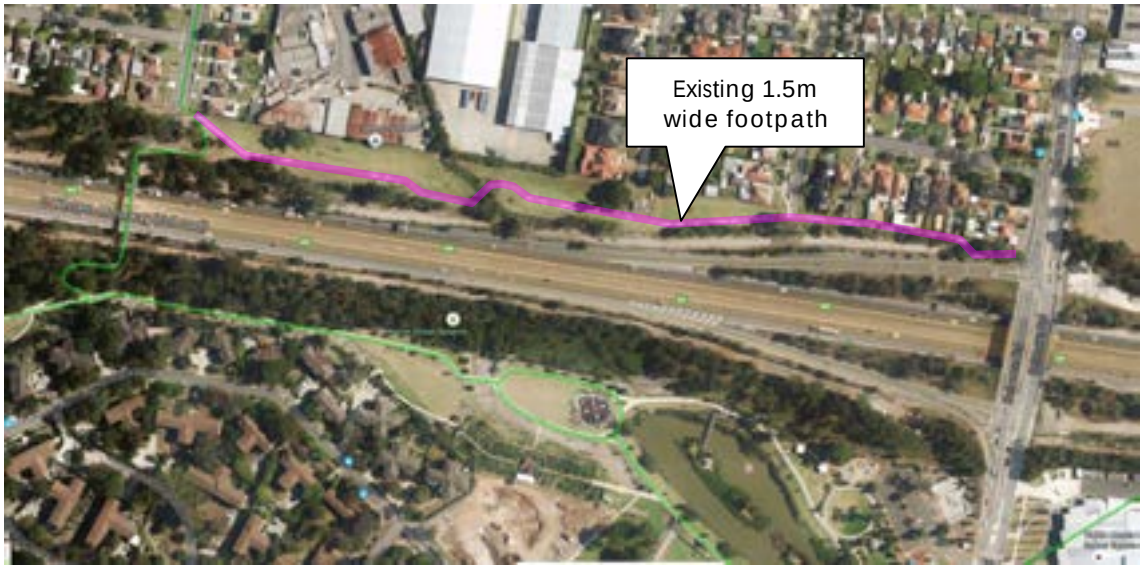
Figure 12.10: M5 Shared Path crossing of Kingsgrove Road

Source: Google Streetview

12.1.5 Footpath between Belmore Road and Bell Street

An existing footpath is situated in the linear park to the immediate north of the M5 Motorway between Belmore Road and Bell Street as shown in Figure 12.11. The path provides an important link to the pedestrian overpass of the M5 Motorway (linking to Saltpan Reserve) with opportunity to link into a new potential (proposed) shared path on the eastern side of Belmore Road.

Figure 12.11: Footpath between Belmore Road and Bell Street



Source: Google Maps

As noted above, the existing footpath is only 1.5m wide, however it is located in a linear park reserve with ample room to widen it, or provide a separated bicycle and pedestrian facility. This can be seen in Figure 12.12. As shown in the photograph, the path is already used by cyclists. In addition, there is a narrow pedestrian bridge along the route which creates a pinch-point. It is recommended that a separate bridge be provided for cyclists.

Figure 12.12: Narrow, 1.5m wide pathway

Figure 12.13: Narrow, pedestrian-only bridge

12.1.6 William Street POS

The existing pedestrian operated signals located at William Street (east of the intersection with Hilltop Street) have bicycle lanterns on them to enable cyclists to make the connection between Alfred Street and Hilltop Street without needing to dismount. The route is signposted, however the response time of the signals is quite long. It is recommended that the signal response time be reduced to encourage use of the crossing by bicycles, rather than crossing directly over William Street (which riders would be inclined to do if they have to wait too long). The crossing is shown in Figure 12.14.

Figure 12.14: William Street POS

Source: Google Streetview

12.1.7 Bayview Avenue Bridge, Earlwood

The existing vehicular bridge across Cooks River linking Bayview Avenue (Earlwood) and Richardsons Crescent (Tempe) is narrow and only had a single, 1.0m wide narrow footpath on the south side of the bridge. This is shown in Figure 12.15 and Figure 12.16.

Figure 12.15: Narrow bridge and footpath (looking east)

Figure 12.16: Narrow bridge and footpath (looking east)

It is acknowledged that whilst this link is not included in the network plan, it is still an import river crossing and should make provision for cyclists. In this regard, it is recommended that the footpath be widened to a minimum of 2.5m in order to safely accommodate two-way flow of pedestrians and cyclists.

13. Bicycle Parking and End-of-Trip Facilities

13.1 Overview

Cyclists are generally opportunistic and will generally seek to park as close to the destination as possible. Where no formal facilities are present, cyclists will improvise using other facilities such as fencing or street poles. This section discusses the provision of bicycle parking and end-of-trip facilities in suitable locations across the bicycle network.

13.2 End-of-Trip Facilities

The provision of bicycle parking facilities at destinations provides the fundamental requirements to support bicycle trips. In many instances, providing quality, fit-for-purpose bicycle parking may be all that is required (e.g. for short-stay visitor parking and parking for shopping trips). However, for commuters and riders requiring long-term parking, additional facilities are required to ensure that these users are adequately catered for. This includes the provision of appropriate change room facilities, personal storage (lockers) and space to store clothing and towels. The management and treatment of towels in end-of-trip facilities can have a significant impact on the attractiveness and amenity afforded by the facilities. It is important to note that some end of trip facilities, such as lockers and showers, are used by non-cyclists. These demands also need to be considered.

Best Practice Approach

It is widely acknowledged that the following principles are best practice in terms end-of-trip facilities:

- Physical Security: The level of physical security warranted for a bicycle parking facility is linked to its intended users. Long term users such as residents or staff typically warrant a secure bike locker or bicycle rail within a secure enclosure. Short term users such as shoppers or visitors require a conveniently located bicycle rail, potentially within the road reserve, and with good passive surveillance, and preferably protected from the elements. Regardless of user category, as noted in AS2890.3, it is recommended that both wheels are able to be chained to the chosen bicycle rail. Importantly, regardless of the physical security of a particular bicycle rail, physical separation is needed where bicycle parking is provided in a shared access area, to avoid potential damage as well as theft or vandalism of individual bicycle components.
- Amenity and Usability: Different types of facilities vary in the level of 'user friendliness'. For instance, 'Mona Lisa' style wall mounted racks (refer inset) often installed above the bonnet of car parking spaces will result in a large degree of inconvenience for many users. Whilst they are a practical option for retro-fitting, Mona Lisa mounts are unlikely to provide a practical option for regular cyclists, and there is merit in minimising the extent of their use in major new developments. When mounted over bonnets, these type of racks do not meet the revisions to Australian Standard AS2890.3 for accessibility.
- Similarly, 'Ned Kelly' style racks, vertically hung, may be difficult to use for some persons. The draft update to the AS2890.3 includes a requirement for 20% of all spaces to be ground level to ensure equitable access. The Australian Standard and manufacturer specifications typically cover off dimensional specifications such as length, facility width, and aisle width.
- Facility Access Management: For bicycle parking enclosures, a swipe card or duplicate key is often used to manage access. In some instances, building management may issue access to the same number of persons as there are bicycle parking spaces.

However, on a given day it may be unlikely that all parking spaces are utilised, particularly in larger installations. In instances such as these where resources are not pooled, this may inhibit the ability for some casual users to gain access to them. Further, in applications such as residential developments, rather than linking individual bicycle parking spaces to a land title, there may be merit in providing 'decoupled' parking which can be purchased or leased separately from the dwelling, enabling a more efficient distribution.

- Other end-of-trip facilities: End-of-trip facilities can include showers, lockers, drying rooms, ironing facilities and bicycle service/repair toolkits. These items can be equally if not more important than a bike parking space itself, as they make cycling a more attractive and feasible transport mode as well as being used by pedestrians and those who exercise before, during or after work. One consideration often overlooked is the management of towels and used apparel which may need drying out. This is an important consideration which can significantly deteriorate the quality of a bicycle parking facility if insufficient amenities are not available, as it decreases general hygiene and perceptions of cleanliness.

Cycling Aspects of Austroads Guides

The '*Cycling Aspects of Austroads Guides*' provides an overview of guidance found in other Austroads Guides on the design and rate of provision of end of trip facilities for cyclists. The following best-practice principles were identified:

- Bicycle parking facilities should be located within no more than 100m from the destination. Convenience is a critical factor in the utilisation of a bike parking facility.
- Austroads provides the basis for the existing Class 1-3 facility types. In this respect, the following is noted:
  - Individual bicycle enclosures provide the highest level of security. It is interesting to note that the provision needs for residential uses include Class 1 facilities only. In GTA's experience however, these facilities are very space inefficient, and larger enclosures preferred.
  - The provision for visitors indicates that Class 3 facilities are needed for all land uses. In GTA's experience, Class 2 facilities are also commonly proposed by developers, in a manner whereby the resident may 'call up' the visitor for access to on-site parking such as within a basement parking level.

13.3 Retrofit Parking

Typically retrofit bicycle parking is integrated with sign poles and other street furniture. This is likely to provide cyclists more opportunity to park near the desired destination than consolidated parking areas. Supplementary dedicated facilities may be required where demand exists or in response to specific requests.

Bicycle parking on footpaths is generally unobtrusive when parking longitudinally with the footpath given the typical width of a bike.

Recent experience in the City Sydney LGA, interstate and overseas indicates bike corrals may be effective in busy/constrained pedestrian areas, or in combination with footpath seating or landscaping. Research indicates potential benefits for business turnover.

Further detail is available in the recent Austroads publication AP-T281-14 "*Low Cost Interventions to Encourage Cycling: Selected Case Studies*"[10] (December 2014), in particular Sections 2, 8 and 9.

[10] https://www.onlinepublications.austroads.com.au/items/AP-T281-14

Figure 13.1: Bicycle Parking Corral, Melbourne

Figure 13.2: Bicycle Parking Corral, Ponsonby, Auckland

Source: Vroegop, presentation at VeloCity 2014, Adelaide

Figure 13.3: Bicycle Parking and Trip End Facilities at the Gold Coast Light Rail

Figure 13.4: Bike Corrals - reclaiming the road, providing parking as a tool to bring revenue into a shopping strip

	Observed occupancy rate	Expenditure $ per sqm per hour (Observed)	Full Occupancy	Potential Expenditure $ per sqm per hour (Full Occupancy)
One Car parking space	2.2	$7.20	5	$16.29
Ten bike parking spaces	3	$7.01	10	$23.07

This is really high. The 'All Melbourne' car occupancy rate is 1.1.

Bike corrals are competitive with car parking at existing use rates

Bike corrals have more room for growth.

MORELAND

14. Wayfinding, Signage and Linemarking Strategy

14.1 Trip Generators

A number of destinations exist within the Canterbury LGA that will generate trips on the various networks (as previously discussed in Section 8.2). These include town centres (such as Campsie, Punchbowl and Belmore) railway stations, sports grounds and parks, pools, schools and hospitals. Figure 8.1 in Section 8.2 shows the primary and secondary destinations and trip generators within the City of Canterbury.

14.2 Design of Wayfinding Signage

14.2.1 Wayfinding, Signage and Linemarking Strategy

Wayfinding, signage and linemarking are elements of the transport system that help users negotiate the network, easily and efficiently. These aspects emphasise the fine grain needs of pedestrians and cyclists, to accentuate a more conducive walking and cycling environment. A successful wayfinding system integrates with the natural and built environment to create a homogenous network that utilises landmarks to provide cues.

The wayfinding and signage component of the strategy will assist cyclists with individual travel choices without littering the network with more sign posts and visual clutter. Early agreement on "focal points" is a key project element. The strategy would serve as the functional framework for cyclist and pedestrian wayfinding signage and linemarking in the Canterbury LGA and would include the following:

- Identifying and adapting intuitive wayfinding and linemarking elements from contemporary guidelines for use Canterbury, including but not limited to:
  - *NSW Bicycle Guidelines*
  - *City of Sydney Bicycle Network Directional Signage Design Guidelines*
  - *City of Sydney Shared Pathways Pavement Markings.*
- Providing generic principles for an overall wayfinding and identification signage system.
- Identifying principles to plan a logical sequence of directional signs and information – recognising and planning decision points and the hierarchy of messages.
- Preparing a standard signage template and an implementation plan for bicycle directional signage in the LGA.
- Development of a focal points map to guide the implementation of wayfinding signage including the locations/ destinations to include on wayfinding signage.
- Providing clear guidelines and criteria for placing signs at key decision points.
- Graphic design - use of type, colour and other graphics that assist wayfinding.
- Providing indicative linemarking designs for on-road and off-road cycle facilities.

Identifying distances and walking times on signs enables the user to plan their journey with confidence. Walking times shall be determined based on an average walking speed of 1.2m/s to cater for a wide range of user abilities. Cyclists tend to find distances more useful and are generally more likely to gauge their own journey times based on their known riding speed.

15. Promotion and Behaviour Change

15.1 Overview

Effective encouragement of cycling involves the following target areas:

- Bicycle facilities and infrastructure (including route infrastructure and end-of-trip facilities);
- Education, awareness and promotion;
- Communicating planning principles and improving existing guidelines;
- Establishing a consistent project assessment framework across transport projects.

15.2 Current Promotional Activities

Several educational and promotional activities are currently undertaken by Canterbury Council, including:

- BYOB Tour (Bring Your Own Bike)
- Heart Foundation GEAR UP GIRL Ride
- Canterbury Bike Shed Open Day
- Basic Bike Maintenance Course.

These activities are promoted through the Canterbury Council website, which also contains information on road rules and safety tips for cyclists on shared paths and roads, cycling network maps and links to external cycling network maps.

Once safe, dedicated infrastructure is provided, this network provides a platform for bicycle encouragement programs or health promotion activities to coax non-riders back onto their bicycles. Shifting short car trips to bicycle, could reduce traffic congestion and parking pressure in busy Sydney activity centres.

15.3 Promotional Activities

Based on the current bicycle use in Canterbury (Section 4) and the support for separated cycling infrastructure (Section 10), the demographics of existing riders and bicycle owners indicate three key groups to encourage to cycle or to encourage to cycle more often: existing recreational cyclists; women; and, school children.

From this information, two targets for cycling promotion in Canterbury emerge:

- Safe, separated cycleways – physically separated, away from busy traffic – to increase perceptions of safety by women and young people;
- Regular encouragement programs – including the suite of existing ride events, cycling confidence skills courses and bicycle maintenance courses, tailored to increase rates of cycling amongst existing infrequent/ occasional recreational cyclists by demographic group.

Increase cycling for work trips and personal errands

As discussed in Section 4.2, of the 54,374 employed residents of Canterbury, 0.5% could be trips by bicycle, which is approximately 270 employed residents. Of the 26,111 people employed within Canterbury, 1% of trips could be by bicycle, which is approximately 260 people.

Intercept programs could be used to discourage anti-social behaviour, combining these awareness programs with a ride to work challenge, like Challenge for Change, could capture existing interest in recreational cycling into commuter bicycle trips.

Increase female participation in cycling

Given the gender imbalance between participation in cycling, elements of each program should seek to encourage women and children to bicycle. In Sydney and NSW cycling surveys, female respondents repeatedly cite concerns about riding on road or on shoulder lanes, particularly in or adjacent to busy traffic. By increasing rates of cycling participation by women, to at least the rates reported by men, would result in an additional 1,404 residents cycling.

Guided rides using existing separated infrastructure and cycling confidence courses upskill less confident riders. Graduates of the program could be used as 'ambassadors' to encourage more participants in the program – leveraging existing encouragement groups like CanToo or the Michelle Bridges 12-week weight loss programs could capitalise on existing, supportive groups rather than establishing a new, stand-alone group.

Increase childhood rates of cycling participation – through to high school and into university age groups.

Increasing the reported rates of recreational cycling amongst school children, into adulthood offers young people low cost, independent mobility for short trips.

Safe Routes to School maps and buddy programs are one way to increase parents' confidence in independent mobility for school children. Bike and ride programs encouraging parents to ride to school with their children, then complete their onward journey via public transport.

Potential promotion activities

Existing activities should be incorporated into the Encouragement and Promotion Strategy and funded. Bicycle programs should be brought under this single action plan and be part of a regular series of programs to increase cycling, promote safe cycling and raise driver awareness.

Additional ideas, as discussed during consultation with cyclists, have the potential to increase cycling:

- Developing branding, mapping and staff bike parking facilities as part of the wider bike plan.
- Preparing and delivering "ride to work," "bike to the beach" or "bike to the mall" encouragement programs, utilising the branding and bike parking promotion materials. Challenge for Change programs can encourage workplaces to compete or capture the interest of local clubs.

15.4 Education Activities

Short term education programs are relatively low cost and quick to implement, since the materials for the campaign already exist. Using existing bicycle safety campaigns, like the Amy Gillett Foundation's, or the City of Sydney's recent posters, target driver awareness and also cyclist's responsibilities.

This is a scalable activity, which could be used in pilot areas or expanded to busy roads or shared path environments.

A wide audience of potential cyclists presents an opportunity to trial consistent cycling messages and education programs. If successful, the branding and mapping initiative would be positioned to be shared throughout neighbouring businesses and organisations in the wider Canterbury area.

15.5 Launch Activities

A launch day should be conducted for the new facility or new casual bicycle parking to complement the infrastructure and network plan, the delivery of new bicycle infrastructure or bicycle parking. A community event informs existing cyclists about the new infrastructure, celebrates new investment and encourages non-riders to ask about the ride. A bike ride using the new infrastructure and ending at new bike parking at a major destination, could launch the infrastructure. Further "ride to work," "bike to the beach" or "bike to the mall" encouragement programs as discussed in Section 15.3 could raise awareness and sustain use of the facility.

15.6 Behaviour Change

The purpose of constructing additional facilities for active transport users is to improve safety for existing users and also to encourage new users. To encourage new users it requires a change in existing travel behaviours, as transport is considered to be a closed market. That is to say, that people generally make a given number of trips per day, so to get a new person to cycle or walk, it requires them not to drive. This change is likely to be slow at best when left to individuals to make such a choice, so pressures are applied through legislation, policy, infrastructure and service upgrades, planning / design elements, community and behavioural programs to get people to make such a change on a daily basis.

The way these pressures best work is by decreasing the barriers and increasing incentives associated with an activity. With cycling, recent research has identified the following seven environmental constructs that are likely to be related to active transport ridership:

- aesthetics
- green space
- convenience of routes
- access to amenities
- traffic volumes
- perceived road safety
- perceived personal safety.

Therefore, the provision of high quality shared path facilities that provide convenient and safe access to amenities should increase active transport volumes.

Additional pressures are also being applied to gain even further increases in active transport volumes and there is wide range of strategies that have been developed to create such behavioural change. Examples of transport related programmes that have been effective in Australia include TravelSmart, Ride to Work, Walking School Bus and Ride to School programmes.

Increased active transport volumes are also being supported by local and central planning policy. In Victoria, there are bicycle requirements associated with new development applications and there is an ability to have reduced car parking provisions, which all leverages individual decisions towards active transport.

16. Funding Opportunities and Sources

Funding will always remain a contentious issue and there will always be competing projects and services to be provided. Therefore it is important to promote the benefits the projects could provide.

It is important to establish a consistent project assessment framework across all transport projects such that the relative merits of (for example) a small cycling project can be compared to a major construction project.

One common tool used for road projects is cost-benefit analysis. Such analysis seeks to derive a benefit-cost ratio (BCR) through valuing in current terms:

- Capital project cost
- Maintenance and other ongoing costs
- Vehicle operating cost (VOC) savings
- Time cost savings per vehicle hour
- Accident cost savings
- Environmental externalities (costs or benefits).

Such analysis can be applied to cycling projects with additional economic parameters included such as health benefits. Such analysis is dependent on the availability of suitable data which can be difficult, particularly for smaller projects. Due to the wide-ranging benefits, quantification can be difficult where these involve other government sectors and indirect links, such as health benefits.

The recommended bicycle network plan proposes high quality infrastructure in line with contemporary community aspirations for bicycle use. There are a number of funding programs which may provide the additional financial support necessary for implementation of both the physical infrastructure and the related social plan to meet current and future community needs.

Three websites that provide further detail:

- www.cyclingresourcecentre.org.au/section/category/funding
- www.cyclingpromotion.com.au/funding-opportunities.html
- www.bicycleinfo.nsw.gov.au/tools_and_resources/funding_for_cycling_projects.html

A summary of potential funding sources is provided below.

16.1 State Government

TfNSW/Roads and Maritime Services

This TfNSW Master Plan contains a specific target to double the number of bicycle trips in Metropolitan Sydney by 2016, with further growth in cycling for all trips in NSW by 2031, particularly in urban centres.

TfNSW generally improves the bicycle network through the RMS however TfNSW has an active transport department for the delivery of projects outside of RMS control. TfNSW documentation states a preference to fund strategic links to create a connected bicycle network.

During 2012/13 just under $6 million was allocated to local government cycleway works in 61 Councils under matched funding arrangements between Council/ NSW government. $12 million was invested in 112 local bicycle network projects.

The RMS 50/50 funding program is designed to assist councils with the development and implementation of their local bicycle networks. Full details are available in the Memorandum of Understanding available on the RMS website: http://www.rms.nsw.gov.au/documents/business-industry/partners-and-suppliers/traffic-facilities/mou-0609.pdf. Programs for potential funding include:

- Regional Roads REPAIR Program (22602) – the objective of this program is to provide additional assistance to councils to undertake larger works of rehabilitation, and development on Regional Roads to minimise the long-term maintenance costs of these roads commensurate with their function and usage. Walking and cycling infrastructure could potentially be included within this cost.
- Accident Blackspot Treatments (26301) – the objective of this program is to reduce the occurrence and severity of crashes at known crash locations by installing cost effective treatments, ensuring a road safety return.
- Cycleways (27304) – this program is aimed specifically at designing and constructing new on-road and off-road cycleways that increase the level of network availability in NSW. Funding arrangements fall into two broad categories:
    - State bicycle routes identified in the BikePlan 2010 – 100% funded by the RMS but under the care and control of the Council following completion.
    - Local bicycle routes identified in a Council's Bike Plan – 50/50 funded and to be maintained by Council following completion.
- Bicycle Facilities (27305) – this program is aimed at improving the operation of existing cycleways. Typical projects include upgrades of existing cycleways, retrofitting at existing traffic control signals, installation of kerb ramps and replacement of unsafe drainage grates.
- Bicycle User Support (27306) – this program aims to support cycling through research, training and promotion. Typical projects include bicycle promotion, bicycle use surveys, development and production of cycleway maps and cycling related guidelines.
- Local Government Pedestrian Facilities (27401) – this program helps to provide facilities on local and regional roads to improve pedestrian safety, mobility and access. Shared zones are eligible for funding under this program.

Bike Week Funding

NSW Bike Week is a state-wide NSW Government funded initiative held in September that aims to raise the profile of cycling as a healthy, easy, low cost and environmentally friendly transport alternative for driving short trips. Funding is available to promote local community NSW Bike Week events, which should be designed to encourage cycling in the local community.

Community Builders

The NSW government provide a directory for potential funding and grant sources for community type projects. It provides a location to search programs from:

- Federal government
- State government
- Local government (not relevant)
- Institutions
- Philanthropic trusts
- Businesses

This can be searched at http://www.communitybuilders.nsw.gov.au/funding.html. There is also guidance as to how to write more successful applications.

16.2 NSW Department of Planning and Environment (DoPE)

Metropolitan Greenspace Program

The Metropolitan Greenspace Program is administered by the Department of Planning and provides matching funding for improvements which could be made to access regionally-significant metropolitan open space in NSW. Since 1990, up to $2.5 million has been awarded annually, on a matched funding basis.

The objective of the program is to assist local government in the development and planning of regionally significant open space and to enable more effective use of these areas by the public. The program aims to promote partnerships between State and Local Government. Successful projects in the last round of funding included the Withers Road Cycleway (Hills Shire Council), a feasibility study into the extension of the Cooks River Cycleway (Rockdale City Council) and planning and design of an off-road mountain bike facility (Ku-ring-gai Council).

This funding stream may be suitable for the Parramatta Road crossing of The GreenWay.

NSW Environment Trust

The Department of Environment and Heritage (DEH) manages a number of grant programs under the banner of NSW Environment Trust. Each grant program funds projects which rehabilitate or regenerate the environment, or promote environmental education and sustainability. Cycling infrastructure can be incorporated into projects as a way to reduce greenhouse gas emissions by reducing car dependency and increasing cycling. Details of past and present programs are provided on the Environment & Heritage website: (http://www.environment.nsw.gov.au/grantsandfunding/).

ClubGRANTS

Clubs that earn over $1 million annually in gaming machine revenue provide funding for community projects and services, and in turn receive dollar-for-dollar gaming tax deductions. Last year (2013) $92 million was allocated to eligible causes through the ClubGRANTS program.

This funding can also be used to implement cycling encouragement initiatives like cycling programs, workshops and distributing maps. Further details are available on the ClubsNSW website (http://www.clubsnsw.com.au/community/clubgrants/about-clubgrants).

16.3 Federal Government

Department of Infrastructure and Transport

The Department of Infrastructure and Transport (DIT) offers a range of funding opportunities under the banner of the Nation Building Program. Details of all programs are provided via the DIT website, including the following:

Roads to Recovery Program

In November 2000, this program was introduced as a single intervention by the Commonwealth to address the specific problem of local roads reaching the end of their economic life, and their replacement being beyond the capacity of local government. Over four years from 1 July 2009, the Australian Government, will provide additional funding of $1.75 billion. This is in addition to its untied Financial Assistance Grants to councils for roads and other purposes. This program has been used by councils throughout Australia to fund bicycle infrastructure development and upgrades.

Black Spot Program

The Black Spot program began in 1996-97 and is part of the government's commitment to reduce crashes on all roads in Australia – it has approval to run to 2013-14. The program, which provides $59.5 million per annum, targets road locations where crashes are occurring. Typical projects include upgrading traffic signals and improving roundabouts at dangerous locations. This program has been used by councils throughout Australia to fund bicycle infrastructure development and upgrades.

16.4 Other Funding Opportunities

Reinstatement Works

Following significant corridor upgrades for water, sewer or power, the local road network must be reinstated. These works may be undertaken by the contractor or by council. During the reinstatement works it is an opportune time to deliver bicycle facilities within the existing kerbs.

Private Development

Property developers and property managers levy new buildings to fund local walking and cycling infrastructure nearby. If a development is occurring (such as a shopping centre), bicycle parking facilities and safe bicycle routes around the site can be integrated into the plans encourage cycling for short trips.

Business Improvement Districts

Local business districts may levy members to deliver bicycle infrastructure, including cycleways and bicycle parking. This investment may become a platform for encouragement programs to increase short neighbourhood trips to the centre and can be integrated into the plans to encourage cycling for short trips.

Advertising

Revenue from business and clubs in the local area can provide funding for advertising within the LGA. These advertisements could be cycling related by providing bicycle maps and information and encouragement advertisements.

Section 94 Contribution Plans

Section 94 of the Environmental Planning & Assessment Act 1979 permits councils to include as a condition of development consent, the reasonable dedication of land or the payment of monies, or both, for development that is likely to require the provision of, or increase the demand for public amenities and public services within the area.

Councils must adopt a contributions plan before they levy a contribution. A contributions plan identifies public services and amenities to meet the demand of development. The City of Canterbury should consider including bicycle facilities as part of contribution plans, especially in already congested areas that either have limited ability to provide additional traffic capacity or adopt low car parking rates and/or driver mode share, i.e. there is a need or demand that exists to support cyclists in accessing the area.

17. Monitoring and Evaluation

Regular monitoring of the bike plans strategies and programs should be used to evaluate the success of the Bike Plan during the implementation timeframe.

During this review of the Canterbury Bike Plan, there were few indicators to demonstrate where the bicycle plan was (or was not) achieving the objectives of the plan. The administrative and performance indicators recommended here, should be formally established and measured against regularly, for each of the plans being undertaken in the Bike Plan. At a minimum, an annual review of the Bike Plan should assess what infrastructure and programs have been implemented, the uptake of these initiatives, value-for-money for health, environment and quality of life outcomes.

Following the launch of the new bicycle infrastructure or programs, periodic monitoring should be conducted to ensure the cycleway or programs operate as planned and report successes with stakeholders.

It is suggested that Canterbury Council undertake sufficient monitoring and evaluation by the following means:

- Implementation of actions recommended in the previous bike plan
- Annual bike counts at key locations
- Annual review of crash statistics, specifically reported bicycle crashes
- Bicycle advisory committee consultation
- Holding and supporting various events.

These activities provide the necessary data to continually evaluation the success of the bicycle strategy.

17.1 Infrastructure Usage

The Roads and Maritime Services (RMS) have indicated that permanent cycle counters should be included in all new works.

Temporary count programs

Canterbury Council undertakes regular, temporary bicycle counts at several locations through the annual Bicycle Network "Super Tuesday" count (or through temporary manual counts) along bicycle desire lines. These counts monitor the growth of cycling in the LGA and support funding applications for future cycling projects.

The program of annual "Super Tuesday" temporary counts should be maintained and supplemented to count cyclists at areas which do not have dedicated bicycle routes or infrastructure and appear to demonstrate high rates of bicycle use. Quarterly temporary pedestrian and bicycle counts should be conducted, through manual or temporary point-based counters

Permanent counters

Permanent bicycle (and pedestrian) counters should be installed in existing shared paths to monitor use of the shared path network, by both cyclists and pedestrians. This monitoring should be used to trigger physical separation between cyclists and pedestrians. For example, Figure 17.1 and Figure 17.2 bicycle and pedestrian count information is used to guide the selection of separated or shared bicycle and pedestrian paths.

Figure 17.1: Recommended path widths – strong peak direction (90-10 split)

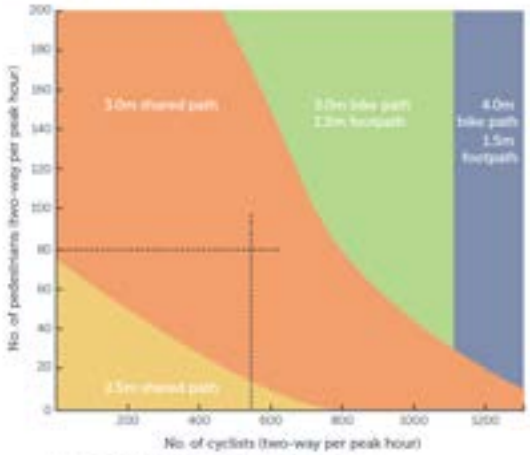
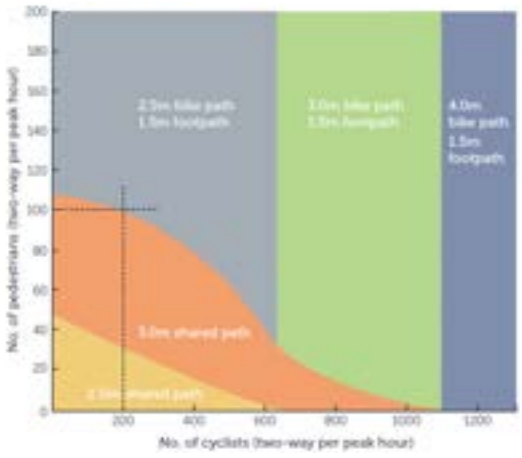


Figure 17.2: Recommended path widths – no strong peak direction (50-50 split)



Installing permanent bicycle counters in new bicycle infrastructure would provide a robust, data-based platform to demonstrate regular bicycle use and peak period demand and seasonal variation not typically captured by occasional counts. Cost-effective and unobtrusive counters are available and can be installed simply at cordon locations. To promote bicycle use, consideration could be given to visual displays integrated with the counters.

Figure 17.3: Bicycle Barometer in Moreland, VIC

Figure 17.4: Bicycle Counter and Trip Timer in The Netherlands

Bicycle Parking

Regular bicycle parking audits should be conducted of existing council bicycle parking infrastructure, in order to assess the use of the parking and inform the provision of additional bicycle parking facilities. When bicycle parking provision is observed to be at least 75% full, additional racks should be provided.

Areas with significant, observed bicycle parking demand should inform the program of bicycle parking provision.

During the audits, areas with abandoned bicycles should be noted. Apparently abandoned bicycles should be 'tagged' for removal with a handlebar notice and removed within a fortnight.

17.2 Crashes

CrashLink provides crash data on traffic incidents in NSW. To be reported, a crash must cause $500 in damage, result in a police call out or a hospital visit. The bicycle crashes in the database tend to be severe, since minor incidents are unlikely to result in a policy call out or hospital visit. As a result, crash blackspots in the database reflect serious areas of concern.

CrashLink should be interrogated regularly to establish bicycle crash blackspots and report to the Traffic Committee and internal / external transport stakeholders in order to prioritise responses.

17.3 Participation

Intercept surveys

Conduct intercept surveys with pedestrians and cyclists at major desire lines and activities following the launch of new infrastructure or wayfinding routes, to understand if they are new riders or attracted to the facility from a previous route.

Participation

Participation in programs is a valuable measure of program success. The programs should be reviewed regularly through this monitoring strategy. Sample indicators could be collected through event or program registrations and confirmed through completed feedback forms, in order to gauge participation in events and response to bicycle programs. Given the gender imbalance between men and women participation rates, the first monitoring strategy should gauge participation by women and children to differentiate if the target market increasing.

Web interest

Additional participation, or interested in participation, could be tracked through the Canterbury Council bicycle webpage which would track basic information about interest generated by the website. Google Analytics provides an overview of page-views and visitor counts, more advanced data could be collected on the "conversion" of webpage visitors to register for a program or to download the network map.

17.4 Evaluation and Reporting

Results of monitoring activities should be reported regularly (e.g. fortnightly, monthly) to the Transport Data Centre and Canterbury Councillors to inform future cycleway, shared path and bicycle parking funding allocation and direct bicycle investment within Canterbury. Where data demonstrates performance, inform internal and external bicycle stakeholders regarding current bicycle use, areas of concern and report the response to successful programs.

Usage data should also be provided to the Sydney Local Health District, for use preparing encouragement programs and physical activity targets.

Monitoring should also inform evaluation strategies to assess less successful initiatives to increase effectiveness.

References

References

In preparing this report, reference has been made to the following:

- Inspections of the Canterbury Local Government Area
- A Plan for Growing Sydney (2014)
- Australian National Cycling Strategy (2010)
- Canterbury Bike Plan (2000)
- Canterbury Bike Safety Recreation Facility Feasibility Study (2014)
- Canterbury Integrated Plans 2014 - 2023
- Canterbury Pedestrian Access and Mobility Plan (1999)
- Canterbury Economic Development and Employment Strategy
- Canterbury Environment Management Plan (2011)
- Canterbury Strategic Recreation Plan (2010)
- Canterbury Strategic Recreation Plan Review and Audit (2013)
- Canterbury LGA Fact Sheet (2010)
- Canterbury Local Environmental Plan and Development Control Plan Draft (2012)
- City of Canterbury Playgrounds and Play Spaces Study (2014)
- City of Canterbury Strategic Recreation Plan
- City of Canterbury Town Centre Parking Strategy
- Community ID – Canterbury Profile – Journey to Work Data
- Cooks River Pedestrian and Cycle Path Improvement Study (2006)
- Cooks River Path Signage Strategy (2010)
- GreenWay Active Transport Plan
- GreenWay Missing Links Report (Draft) (2015)
- GreenWay Schools Active Travel Study
- NSW 2021: A Plan to Make NSW Number One (2011)
- NSW Bureau of Transport Statistics
- NSW Bike Plan (2010)
- NSW Long Term Transport Master Plan (2012)
- Planning Guidelines for Walking and Cycling (2004)
- Regional Bicycle Network Plan for Seven SSROC Council (2008)
- Regional Cycleway Crossing at Canterbury Road Review (Draft) (2014)
- Super Sunday Count Report, Bicycle Network, January 2015 and March 2014
- SydneyMetro.info
- Sydney's Cycling Future (2013)
- Sydney's Walking Future (2013)
- Walking, Riding and Access to Public Transport (2013)

Appendix A

Strategic and Policy Context

A.1 Federal Policy

A.1.1 Australian National Cycling Strategy (2010)

The National Cycling Strategy was released by Austroads and The Australian Bicycle Council in 2010. The overarching vision for the strategy is to realise a "step-change" in attitudes to cycling and in the numbers of riders in Australia. In the short term, the strategy sets the goal to double the number of people cycling across the nation over the next five years. The strategy sets out a coordinated framework for the development of cycling in Australia to 2016 under the following priorities and objectives:

- Cycling Promotion – Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity.
- Infrastructure and Facilities – Create a comprehensive network of safe and attractive routes to cycle and end of trip facilities.
- Integrated Planning – Consider and address cycling needs in all relevant transport and land use planning activities.
- Safety – Enable people to cycle safely.
- Monitoring and Evaluation – Improve monitoring and evaluation of cycling programs and develop a national decision making process for investment in cycling.
- Guidance and Best Practice – Develop nationally consistent technical guidance for stakeholders to use and share best practice across jurisdictions.

A.1.2 Walking, Riding and Access to Public Transport (2013)

The Walking, Riding and Access to Public Transport details a plan to improve the use of active transport in Australia. States and local governments in Australia already have policies in place for improvement of their active transport networks. This plan consolidates key issues across Australia to produce a more national approach to promoting active transport.

The plan identifies that increasing the modal share for active transportation (i.e. walking, cycling and public transport) provides the following positive results:

- increased capacity, and reduced congestion, in the overall transport network
- reduced environmental impacts
- improved public health and reduced healthcare costs
- improved community wellbeing and social cohesion.

The plan has determined several barriers and opportunities to improving active transport modes, as follows:

Barriers

- Lack of continuous, convenient connections
- Lack of physical safety
- Lack of personal safety and comfort
- Lack of awareness
- Lack of skills
- Lack of motivation
- Poor governance

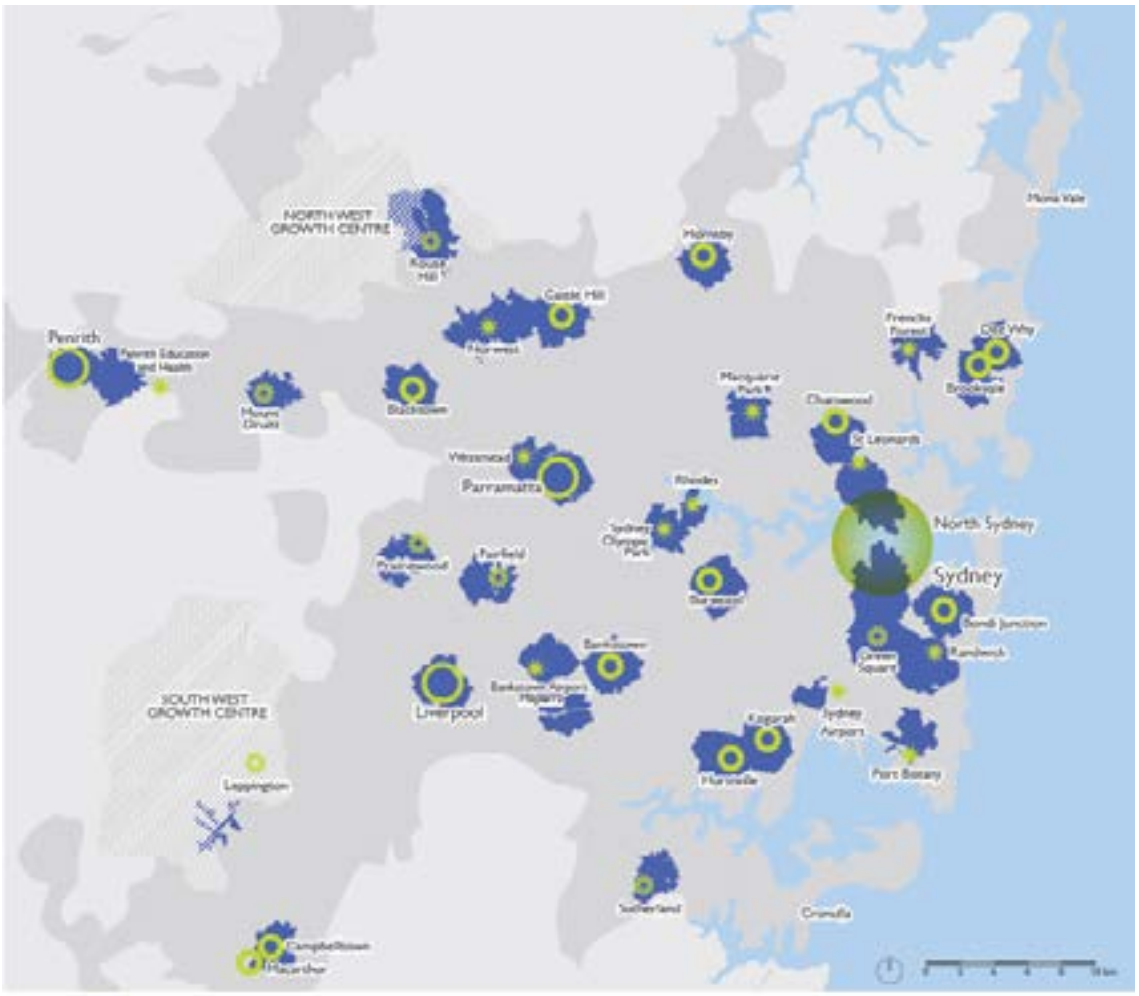
Opportunities

- Plan comprehensive networks
- Build appropriate infrastructure
- Provide mid-trip, end-of-trip facilities
- Provide Information
- Provide skills training
- Encourage greater participation (by increasing awareness and accessibility of transport options)
- Improve governance

With an understanding that "distance is one of the most important factors in determining whether people consider walking or riding for their daily commute", the plan suggests a strategy of planning by 2km walking and 5km cycling catchments to major activity centres, where

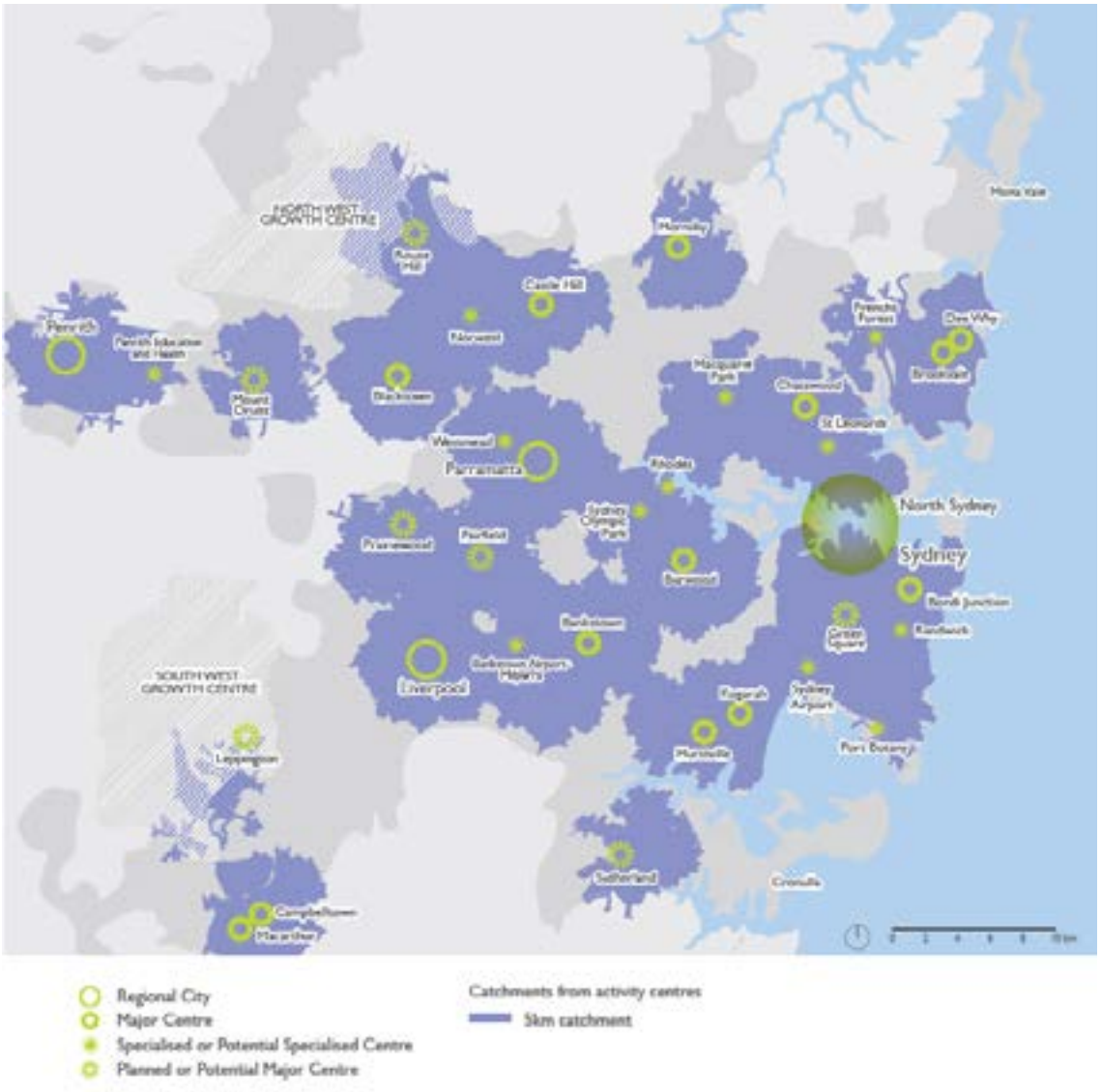
commuters will benefit the most from improvements to active transport modes. Figure A.1 and Figure A.2 illustrates potential walking and cycling catchments to major centres in the Sydney metropolitan area.

Figure A.1: Potential 20-minute walking (2km) catchments to major activity centres in Sydney



Source: NSW government bicycle geodatabase

Figure A.2: Potential 20-minute cycling (5km) catchments to major activity centres in Sydney



Source: NSW government bicycle geodatabase

A.2 State Policy

A.2.1 NSW Bike Plan (2010)

The NSW Bike Plan was prepared with input from various government agencies to support growth in bicycle usage and "help make NSW one of the world's best places to ride a bike". The plan outlines at least $5 million funding each year for regional cities and local councils to complete neighbourhood cycleway networks.

The action plans relevant to the Canterbury Bike Plan are reproduced as follows:

- 2.1 Improve cycle networks in Sydney by:
  - c) working with local councils to improve the neighbourhood connections that serve Metropolitan Strategy centres to offer a 40-minute low-stress cycling travel time for residents within a 10km radius of any major centre.

- 2.4 Increase dollar-for-dollar assistance to fund local Bike Plan actions that:
  - a) complete cycle networks in urban areas, making funding conditional (where relevant) on the development of networks that connect across local council boundaries
  - b) improve wayfinding signage for existing facilities.

The NSW Bike Plan also lists actions to:

- increase use of local cycleways
- provide information/ awareness of bicycle routes
- promote school and safe cycling programs
- promote, reinforce and enforce road user's awareness and responsibilities towards vulnerable road users
- promote the correct safety equipment for bike-riding
- promote combined travel by bicycle and public transport
- promote the installation and use of end-of-bike trip facilities at major destinations
- promote cycle tourism and organised community cycling events
- encourage local cycling-related small businesses
- facilitate partnerships of government, community and business stakeholders to deliver NSW Bike Plan actions
- ensure transport investment decisions are informed by the usage, costs and benefits of cycling
- seek the support of the Australian Government in promoting bike-riding.

A.2.2 A Plan for Growing Sydney (2014)

A Plan for Growing Sydney (Sydney Metropolitan Strategy) is the NSW Government's 20 year plan for the Sydney Metropolitan Area. It provides direction for Sydney's productivity, environmental management, and liveability; and for the location of housing, employment, infrastructure and open space.

The NSW Government's vision for Sydney is: a strong global city, a great place to live.

To achieve this vision, the Government has set down the following goals that Sydney will be:

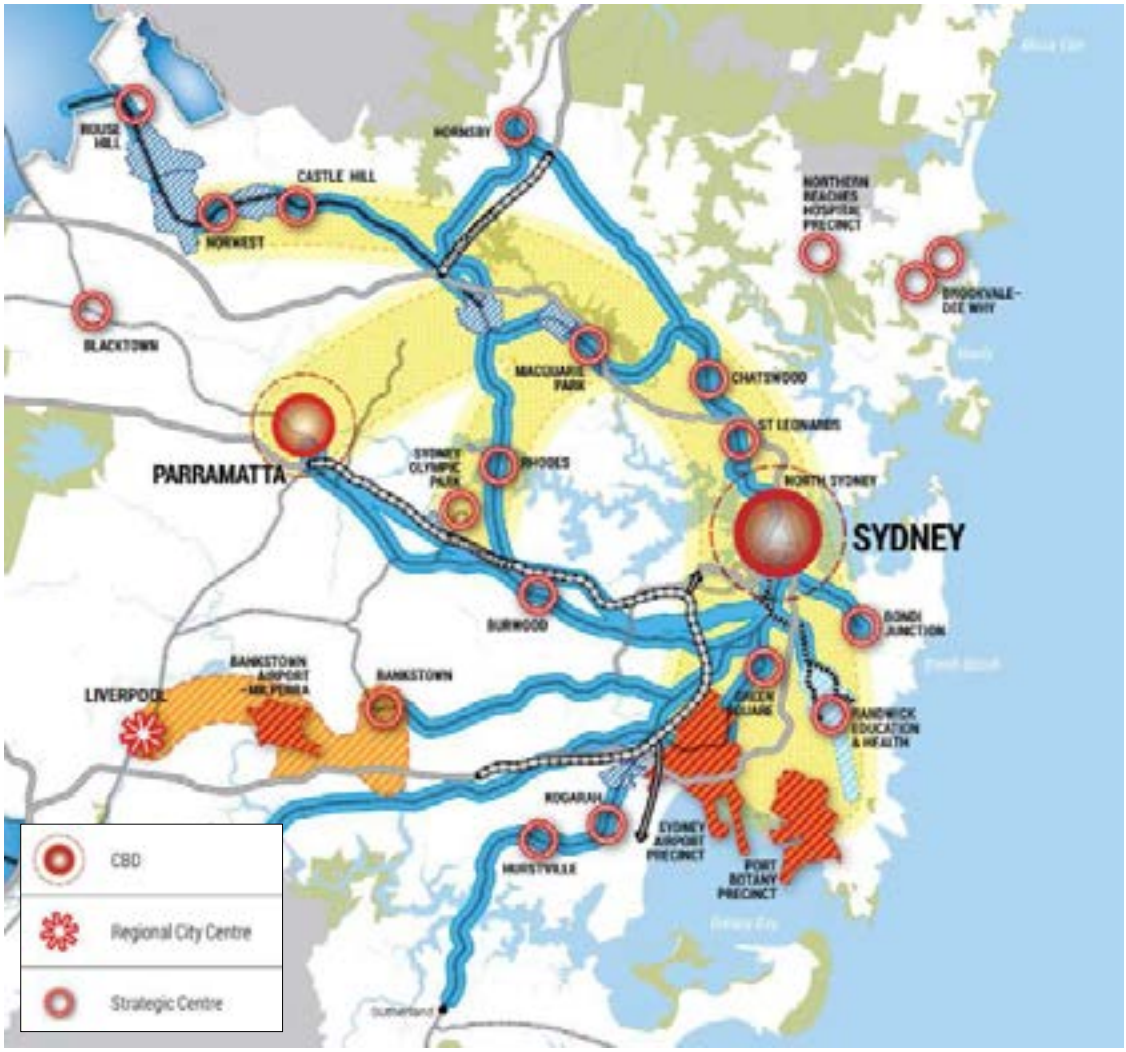
i A competitive economy with world-class services and transport
ii A city of housing choice, with homes that meet our needs and lifestyles
iii A great place to live with communities that are strong, healthy and well connected
iv A sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources.

Figure A.3 shows the Plan for Growing Sydney, which highlights several Strategic Centres for development. Although none of the centres within City of Canterbury have been selected as Strategic Centres, there is opportunity to connect centres by providing bicycle routes through Canterbury.

Routes which could connect centres could include:

- Bankstown – Burwood
- Hurstville/ Kogarah – Burwood
- Bankstown – Sydney Olympic Park/ Rhodes
- Sydney – Bankstown
- Green Square - Bankstown

Figure A.3: A Plan for Growing Sydney



Source: A Plan for Growing Sydney, NSW Government, 2014, pg. 12-13

A.2.3 NSW Long Term Transport Master Plan (2012)

The NSW Long Term Transport Master Plan sets the framework for the NSW Government to deliver an integrated, modern transport system. The final version of the NSW Long Term Transport Master Plan was released in December 2012 and sets out 220 short, medium and long term actions to integrate, grow, modernise and manage the transport network across NSW, including five key measures related to cycling:

i Improved access to user-friendly bike trip information.
ii A long term NSW Cycling Investment Program to improve the planning, management and delivery of cycleway capital programs, supported by design solutions and standards to reflect customer needs.
iii A program to increase and improve bike parking at public transport interchanges.
iv A Connected Cycling Network that targets investment in clearly defined cycleways within a 5 kilometre radius of major urban centres in the short-term and 10 kilometre radius of centres in the longer term.
v Enhanced cycling routes in regional centres to increase the number of people who cycle.

The Master Plan contains a specific target to double the number of bicycle trips in Metropolitan Sydney by 2016, with further growth in cycling for all trips in NSW by 2031, particularly in urban centres.

A.2.4 Planning Guidelines for Walking and Cycling (2004)

The Planning Guidelines for Walking and Cycling provide guidance to land-use planners within local councils, consultancies and State agencies in ensuring walking and cycling improvements are taken into consideration in planning policy and practice. The guidelines provide a walking and cycling focus to the NSW Government's *Integrating Land Use & Transport Planning Policy Package*.

The guidelines suggest that "when making planning instruments, councils are encouraged to integrate relevant state and local policies related to walking and cycling". This includes development policies in the DCPs and LEPs that encourage walking and/or cycling that would be considered during the development assessment stage, thereby encourage improvements to walking and cycling facilities.

The guideline indicates that some of the following concepts will assist planners in creating walkable and cycleable cities.

- Accessible centres – by aiming for city centres that are well accessed by cycling or walking. In this planners could look to urban renewal concepts rather than urban expansion.
- Walking and Cycling catchments – where improvements are focused within a small area where the "potential" and "actual" walkability" is taken into account. A catchment of 400m radius (5min walk) and a 1.5km radius (5min cycle) from the city centre has been defined as the distances that commuters are willing to choose walking and cycling as their mode of transport.
- Regional networks – which "can serve an important transport and recreational role" by providing "links between centres and act as a framework for finer grained local cycleway networks".
- Integrating walking and cycling into the design of neighbourhoods – to create an effective walking and cycling network that is safe, secure, and provides well integrated and accessible links to the neighbourhood centre.
- Community Engagement – may raise issues related to the impact of walking and cycling facilities development.
- Transport Access Guides – to promote walking and cycling as well as provide commuters the information required identify walking and cycling as a potential transport mode.
- Off road paths and trails – are increasing in popularity and provide an effective form of encouragement for modal shift from cars
- End of trip facilities

The guideline also provides assistance to planners and developers through consideration of potential funding sources such as:

- Council rates
- RTA cycleway grants to councils on a dollar for dollar basis
- Other NSW Government grants, e.g. DIPNR dollar-for-dollar grants to councils for the NSW
- Coastline Cycleway
- Commonwealth Government grants, e.g. Roads to Recovery funds and Australian Greenhouse Office grants
- Private sector grants and community funds
- Developer contributions, the subject of this chapter

In accordance with Section 94 of the EP&A Act, developers are required to pay their fair share of the cost of infrastructure. Thus the contribution rate from external sources would be determined

from an assessment of supportive council plans/ policies, population and identification of an aim for modal shift from vehicle to walking, cycling or public transport.

A.2.5 NSW 2021: A Plan to Make NSW Number One (2011)

NSW 2021 was released in 2011 and sets out the government's transport and service delivery. The plan includes a goal to more than double the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, by 2016. The plan included a priority action to complete the construction of the Metro Sydney Bike Network and work with local councils to complete local cycle networks as part of an integrated transport network.

A.2.6 Sydney's Cycling Future (2013)

Sydney's Cycling Future was released in December 2013 following the release of the NSW Long Term Transport Master Plan to provide a mode specific cycling strategy. It presents a new direction for bicycle infrastructure planning in metropolitan Sydney by focusing on people who would like to ride more often if cycling was made a safer and more convenient option. It aims to make cycling a feasible transport option for these people by:

- investing in separated cycleways and providing connected bicycle networks to major centres and transport interchanges
- promoting better use of existing infrastructure
- engaging with partners across government, councils, developers and bicycle users.

The strategy aims to prioritise investment on projects that have the greatest potential to get the most people to shift their short transport trips to bicycle. In order to achieve this, it aims to invest in connected routes within 5 kilometres of major centres and public transport interchanges. It proposes a three-tier hierarchy of safe cycleways to major centres:

- regional bicycle corridors – highly used routes that connect to major destinations, on cycleways that are separate from motor vehicles and pedestrians
- local bicycle network – lower use corridors that connect to priority corridors and neighbourhood destinations within catchments
- quiet local streets – connecting residential destinations and local services in low traffic environments, design treatments make provision for people on bikes.

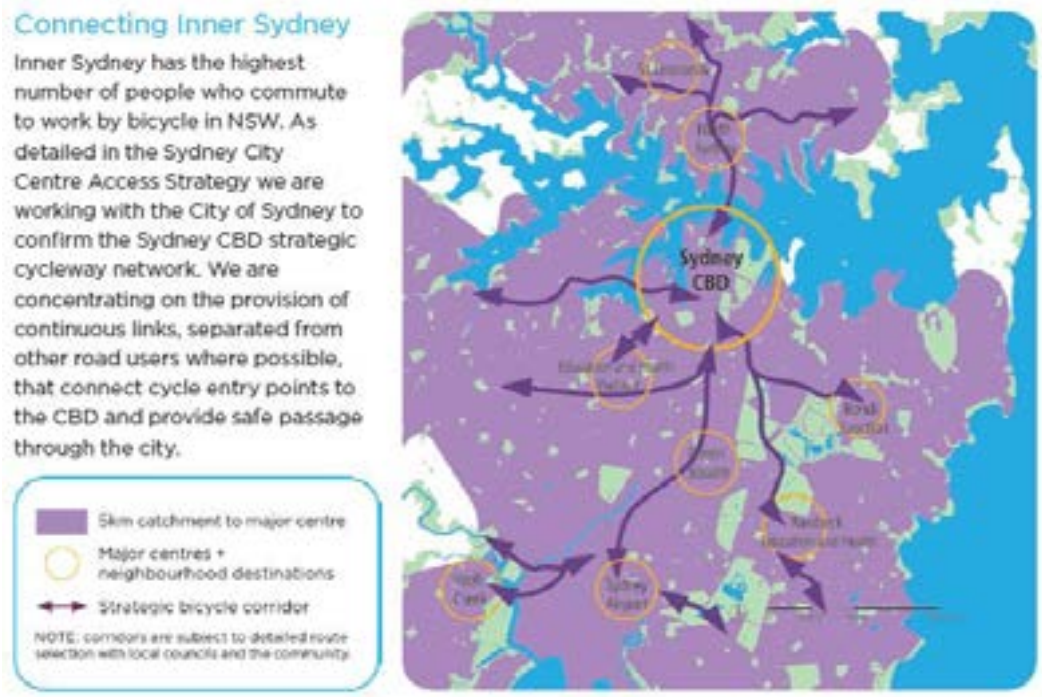
The strategy seeks to invest in state priority corridors to safely link the following corridors with inner Sydney:

- North Shore Links – North Sydney, St Leonards and Chatswood
- Eastern Suburbs Links – Bondi Junction to the CBD
- Inner West Links – Sydney University, Royal Prince Alfred Hospital, Sydney College of the Arts.
- South East and Light Rail Links– Randwick racecourse, hospital and university precinct, with specific reference to the Anzac Parade corridor from Kingsford to La Perouse
- Sydney Airport Links – Green Square, Mascot and Wolli Creek.

The strategy outlines a "Connecting Centres Program" to assist councils to complete local bicycle networks to major centres in metropolitan Sydney. This program aims to complete links within a 5 kilometre catchment of major centres in the short term and expand to 10 kilometres catchments in the longer term.

The document outlines several key centres and strategic bicycle corridors for connecting these centres. Although none of the key centres specified are located within the Canterbury LGA, there is opportunity for bicycle paths between centres to be operate through the LGA. Figure A.4 shows a number of strategic links through inner Sydney.

Figure A.4: Strategic Links through Inner Sydney



Source: Sydney's Cycling Future, TfNSW (pg. 16, 2013)

Figure A.5: Infrastructure Preference

Source: Sydney's Cycling Future, TfNSW, (pg 12, 2013)

The document also shows a strategic corridor from Bankstown to the Sydney CBD which could operate through the Canterbury LGA, as well as a route from Wolli Creek to Marrickville, which passes through the easternmost portion of the LGA.

Sydney's Cycling Future also identifies preferred infrastructure treatments for cycling facilities. The most favoured solutions are for bicycle facilities to be segregated from other transport modes, including walking. The customer infrastructure preference identified is shown in Figure A.5. Sydney's Cycling Future community consultation further confirms user preference for on and off-road separated bicycle paths.

A.2.7 Sydney's Walking Future (2013)

Sydney's Walking Future was released in December 2013 following the release of the NSW Long Term Transport Master Plan to provide a mode specific walking strategy for Sydney. The strategy

recognises that walking is a fundamental component of an integrated transport system with most public transport trips starting and ending with walking.

The key aim of Sydney's Walking Future includes:

- promoting walking for transport
- connecting people to places through safe walking networks around centres and public transport interchanges
- engaging with partners across government, councils, non-government organisations and the private sector.

The strategy seeks to create a culture of walking for transport by promoting walking as a viable and attractive transport choice, particularly for travelling to and from work and school. The strategy aims to focus infrastructure investment on completing connections within two kilometres of centres and public transport interchanges. In addition to this, the strategy aims to link walking to urban growth and to prioritise the needs of pedestrians in the planning, design and construction of new transport and urban development projects.

A.2.8 NSW Local Government Integrated Planning and Reporting Guidelines

The NSW Local Government Integrated Planning and Reporting Guidelines provide councils guidance in undertaking their planning and reporting in accordance with the *Local Government Act 1993* and the *Local Government (General) Regulation 2005*. The guidelines allow councils in NSW to produce plans that can be connected and compared, allowing councils "the maximum leverage from their efforts by planning holistically for the future".

Figure A.6 shows the basic framework of the Integrated Planning and Reporting guidelines. Guidance in implementing the framework is provided in greater detail in the supporting document, Integrated Planning and Reporting Manual, 2013.

Figure A.6: Integrated Planning and Reporting framework

Source: NSW Government, Department of Premier and Cabinet, 2013

A.2.9 Sydenham to Bankstown Urban Renewal Corridor Strategy (2015)

The Department of Planning and Environment has prepared Sydenham to Bankstown Urban Renewal Corridor Strategy which establishes a strategic planning framework to guide future development and infrastructure delivery in the corridor over the next 20 years. The strategy focuses around eleven stations along the Bankstown Railway line, with seven of the stations falling within the City of Canterbury. These stations include: Hurlstone Park, Canterbury, Campsie, Belmore, Lakemba, Wiley Park and Punchbowl. A plan showing the corridor location is included in Figure A.7. The strategy proposes to increase the number of dwellings in the corridor by an additional 36,000 dwellings by 2036, with almost 70% of these dwellings expected to be within the City of Canterbury.

Figure A.7: Sydenham to Bankstown Urban Renewal Corridor

Source: http://www.planning.nsw.gov.au/Plans-for-Your-Area/Priority-Growth-Areas-and-Precincts/Sydenham-to-Bankstown-Urban-Renewal-Corridor/Map (accessed 7/4/16)

The Strategy makes the following comments with respect to connecting the regional cycle network:

- *"Introduce a shared bicycle/pedestrian path along the existing rail corridor between Bankstown and Sydenham to support local movement between centres.*
- *Extension of the Greenway bicycle route between Lewisham and Dulwich Hill to provide connection to Sydney University and CBD."*

The proposed and existing transport infrastructure within the corridor is shown in Figure A.8.

Figure A.8: Sydenham to Bankstown Urban Renewal Corridor – Transport Infrastructure

Source: Sydenham to Bankstown – Urban Renewal Corridor Strategy 2015

In Council's Mayoral Minutes (November 2015), it was cited that of the benchmarks developed for land use planning, three of the benchmarks had not been addressed at all. These included: 1) housing affordability, 2) provision of schools and education facilities and 3) precinct sustainability. Further discussion was also provided suggesting that the remaining four benchmarks had not been adequately met.[11]

[11] Mayoral Minutes, 12 November 2015, File No. M-14-5 Pt2, S-54-7

A.3 Regional Policy

A.3.1 Inner Sydney Regional Bike Plan (2010)

The Inner Sydney Regional Bike Plan (ISRBP) was an initiative of the City of Sydney, developed in conjunction with 14 surrounding LGAs to identify an arterial cycleway network for 1.2 million people in 164 suburbs. The network aims to improve connections between home, work, shopping and recreation areas, increasing the liveability of inner Sydney locations. It includes 160 kilometres of separated cycleways and 70 kilometres of upgraded shared paths.

Research conducted during the preparation of the document indicates that 75% of non-regular cyclists would cycle more if there were more separated bicycle lands and off-road routes.

The study identified discontinuous networks between Council boundaries. The study process attempted to resolve these issues, however at the end of the study period a number of locations were unresolved. In terms of the Canterbury LGA and surrounding areas, the only connection issue was to Marrickville Council on either side of the Cooks River cycleway as shown in Figure A.9.

Figure A.9: Network Gap Between LGAs Remaining Unresolved During Study Period

Source: Inner Sydney Regional Bike Plan Implementation Strategy, pg. 27, AECOM/ City of Sydney, 2010

The plan was informed by the 2006 Regional Bike Plan, prepared by South Sydney Regional Organisation of Councils (SSROC), in consultation with local Bicycle User Groups (BUGs).

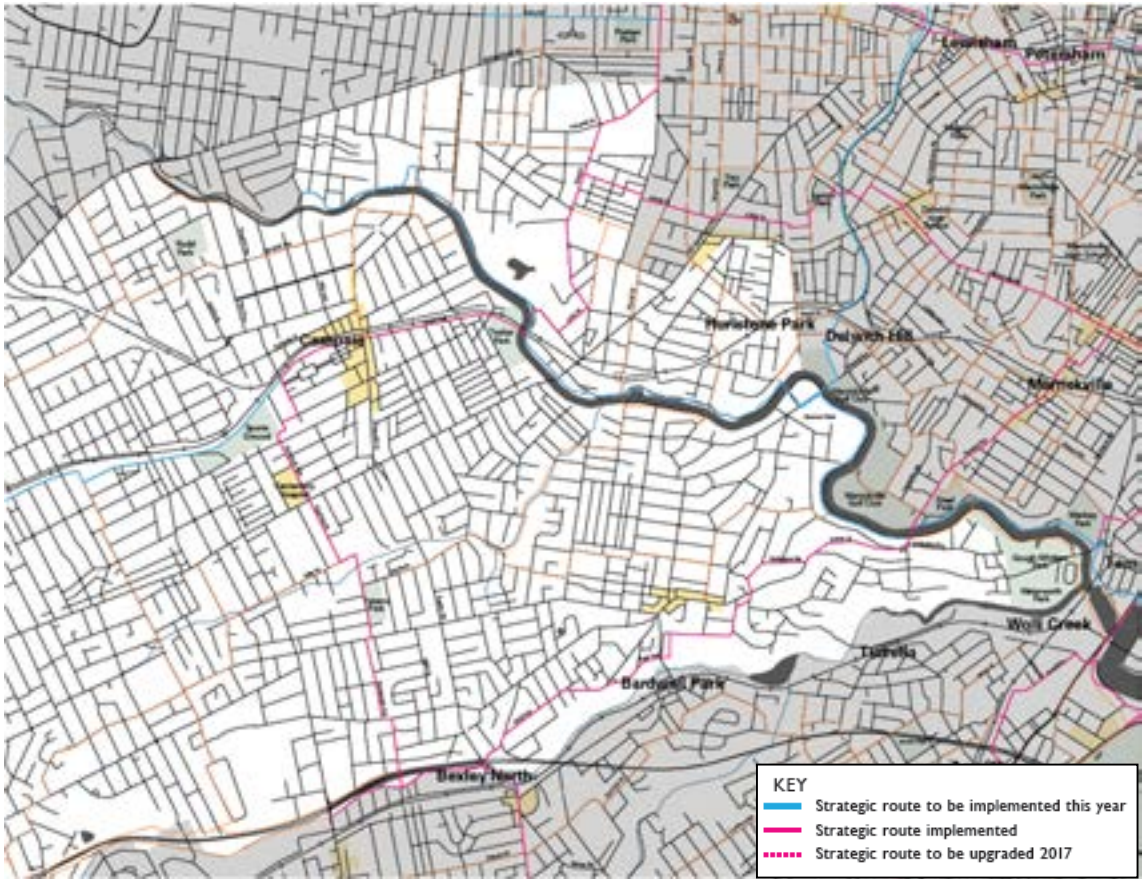
The ISRBP proposes the following treatments to be implemented in the Canterbury LGA as outlined in Table A.1

Table A.1: Inner Sydney Regional Bike Plan Proposed Treatment Canterbury

Location	Treatment	Year	Status
Alfred Street	Mixed zone	2013	Implemented – stencils on road
Bray Ave	Shared path in park	2012	Not implemented
Bridge Road (Marie Street to Burwood Road)	Mixed zone	2017	Not implemented
Bridge Road (Peel Street to Marie Street)	Separated bidirectional cycleway on road	2017	Not implemented
Broughton Street	Mixed traffic	2014	Not implemented
Charlotte Street	Separated bidirectional cycleway on road	2013	Shoulder lane adjacent to parked cars
Cooks River Trail	Shared path upgrade	2017	Not implemented
Evaline Street	Separated bidirectional cycleway on road	2013	Not implemented
Harp Street	Separated bidirectional cycleway on road	2013	Shoulder lane adjacent to parked cars
Hocking Ave	Separated bidirectional cycleway on road	2012	Not implemented
Homer Street (Illawarra Road to Bayview Ave)	Separated bidirectional cycleway on road	2012	Not implemented
Homer Street (Bayview Ave to Wellington Road)	Shared path on verge	2012	Not implemented
John Street	Separated bidirectional cycleway on verge	2014	Not implemented
King Street	Separated bidirectional cycleway on road	2014	Not implemented
Lang Road	Shared zone	2017	Stencils on road
Lilian Lane	Shared zone	2012	Not implemented
Lilian Street	Shared zone	2012	Not implemented
Loch Street	Separated bidirectional cycleway on road	2013	Not implemented
Lundy Avenue	Separated bidirectional cycleway on road	2013	Stencils on road (between M5 and Poole Street)
Minnamorra Avenue	Separated bidirectional cycleway on road	2012	Not implemented
Myall Street Park	Shared path upgrade	-	Not implemented
Rosemeath Avenue	Separated bidirectional cycleway on road	2013	Not implemented
Sutton Avenue	Shared path in park	2012	Not implemented
South Parade	Separated bidirectional cycleway on road	2012	Not implemented
Third Street	Mixed zone	2016	Not implemented
Thorncraft Parade	Separated bidirectional cycleway on road	2013	Shoulder lane adjacent to parked cars
Trevenar Street	Shared path on verge	2014	Not implemented
Twyford Avenue	Mixed zone	2012	Not implemented
Wardell Road (Ewen Park to Lang Road)	Separated bidirectional cycleway on road	2017	Not implemented
Watkin Ave	Separated bidirectional cycleway on road	2012	Not implemented
Wellington Road	Shared zone	2012	Not implemented
Wolli Avenue	Separated bidirectional cycleway on road	2012	Not implemented
Wolli Creek Recreation Park	Sharepath upgrade	2012	Not implemented

The regional bicycle network proposed within Canterbury LGA by 2017 is shown in Figure A.10.

Figure A.10: Proposed Inner Sydney Bicycle Network 2017 (Canterbury)



Source: Inner Sydney Regional Bike Plan Implementation Strategy, pg. 91, AECOM/ City of Sydney, 2010

A.3.2 Cooks River Pedestrian and Cycle Path Improvement Strategy (2006)

The Cooks River Pathway, also commonly referred to as the Bay to Bay Walk or Cooks River Cycleway is a shared pedestrian bicycle path which runs from Botany Bay to Homebush Bay. A large proportion of the Pathway is located within the Canterbury LGA with the majority of the path located off-road.

The following key issues were identified for the Pathway:

- Pathway is too narrow for users in sections, causing congestion
- Pathway is not well maintained in areas
- Conflicts between different modes (i.e. bicycles and pedestrians, bicycles and vehicles at at-grade crossings)
- Lack of wayfinding signage
- Lack of behavioural signage

A.3.3 The Greenway Active Transport Strategy and Action Plan (2012)

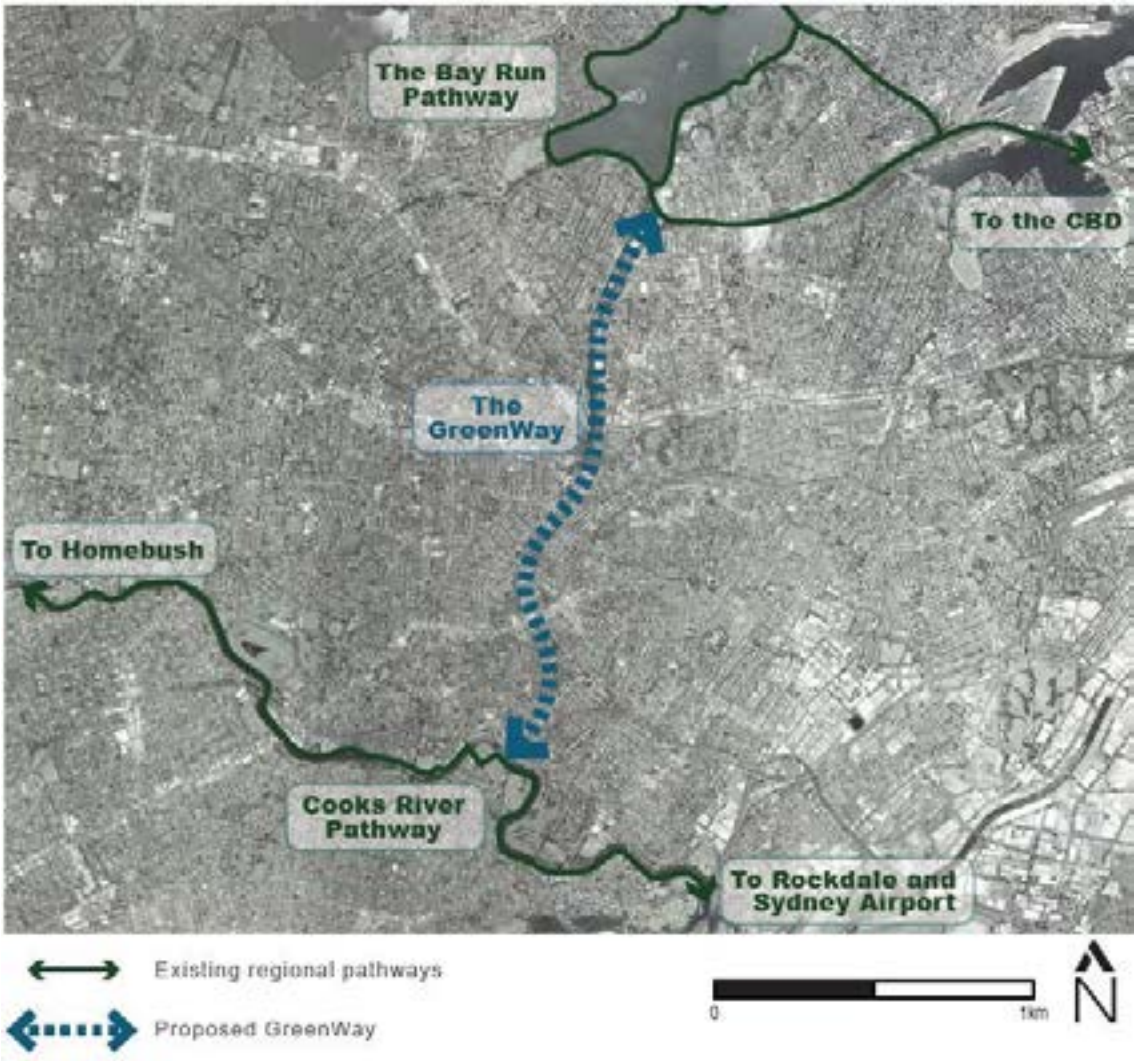
The GreenWay Active Transport Strategy and Action Plan (2012), builds on previous works that have been undertaken, such as the GreenWay Master Plan and Coordination Strategy (2009). The GreenWay is a shared path corridor that connects bicycle and walking paths from The Bay Run to the Cooks River Pathway as shown in Figure A.11. Adjacent to the GreenWay is the recently extended light rail line that runs from Central Station to Dulwich Hill.

The aim of the proposed GreenWay corridor is to "enable a broader active transport culture, foster greater community engagement with the environment and increase patronage of the planned light rail extension". The GreenWay includes a combination of off-road and on-road

bicycle paths, safe walking paths that connect employment centres and green open spaces that provide a "valuable habitat for native flora and fauna".

The Greenway connects with the Cooks River Pathway at the northern boundary of the Canterbury LGA and would provide cycle links with Marrickville, Ashfield and Leichhardt LGAs.

Figure A.11: GreenWay Corridor



Source: The Greenway Active Transport Strategy and Action Plan, pg. 19, AECOM, 2012

A.3.4 Other Council Bike Plans

City of Sydney Cycle Strategy and Action Plan 2007 – 2017

The City of Sydney Cycle Strategy and Action Plan 2007-2017 is Council's commitment to making cycling an equal first choice transport mode with along with walking and using public transport.

The strategy provides the infrastructure to ensure a safer and more comfortable cycling environment and the social initiatives to encourage more people to cycle as a means of ordinary transport. It is based on a comprehensive analysis of cycling issues by consultants for the City, with significant input provided by the cycling community.

The purpose of the Strategy is to:

- Establish a long-term vision for cycling in the City;
- Provide direction and actions to achieve a greater level of cycling participation;
- Define the cycling network and infrastructure that will be delivered by Council;
- Define the social initiatives to be undertaken to support the provision of cycling infrastructure; and
- Identify specific, practical, and achievable actions to be implemented and delivered by the City.

The strategy aims to:

- Create and maintain a comfortable and bicycle friendly environment in Sydney to encourage more residents, visitors and workers onto bicycles;
- Improve cycling safety;
- Promote the benefits of cycling; and
- Increase the number of trips made by bicycle in Sydney;

Marrickville Bicycle Strategy (2007)

The 2007 Marrickville Bicycle Strategy proposed a number of regional routes that connect to the Canterbury LGA. The Cooks River generally forms the separation between the two LGAs. The most recent bicycle map for Marrickville LGA shows a direct link to the Cooks River Path at Illawarra Road.

The bicycle map also shows cycling routes on Ness Avenue and The Parade which end at the Garnett Street boundary to the Canterbury LGA.

The proposed Greenway would also include a Cooks River crossing between the LGAs.

The remainder of the Councils bordering Canterbury LGA do not have a Bike Plan, however bicycle network maps have been prepared.

Bankstown

Bankstown LGA is located to the west of Canterbury with a long border along Punchbowl Road and Saltpan Creek. Despite the long border, only one cycling link connects the LGAs with a connection at Salt Pan Reserve in Canterbury LGA to the Salt Pan Creek Reserve in Bankstown LGA.

Strathfield

Strathfield LGA is located to the north of Canterbury with a short border along Punchbowl Road. The Cooks River Pathway continues to the Strathfield LGA.

Burwood

Burwood LGA is located directly to the east of Strathfield LGA and also shares a short border at the north of the Strathfield LGA. The Councils are separated by the Cooks River and Georges River Road. The Cooks Rover Pathway travels through Burwood between Canterbury and Strathfield LGAs. An on-road, north-south bicycle route travels through Burwood LGA connecting to the Cooks River Pathway at Lees Avenue.

Ashfield

Ashfield LGA is located to the north of Canterbury and to the east of the Burwood LGA. The Crinian Street on-road cycleway in Canterbury connects to the Queen Street cycleway in Ashfield. The Ashfield bicycle map also shows a cycling route on Hardy Street which ends at the Princess Street boundary with Canterbury LGA.

Rockdale LGA

Rockdale LGA is located to the south of Canterbury. The LGAs are separated by the Airport, Inner West South and rail line, and as such, there are limited options for bicycle links. A bridge across Wolli Creek at Henderson Street, near Turrella Station, provides an opportunity for a cycleway connection and is currently a marked cycleway in Rockdale LGA.

Hurstville LGA

Hurstville LGA is located to the east of Rockdale Council and shares a long border to the south of Canterbury LGA. The Councils are separated by the M5 Freeway and other major roads. The Bryan Street/ Penshurst Road on-road cycleway in Hurstville LGA begins a very short distance from the end of the Hannans Road cycleway in Canterbury LGA. A cycleway on Ponyara road in Hurstville LGA also begins at the Canterbury LGA boundary and within a short distance of the Hannans Road cycleway.

A.4 Local Policy

A.4.1 Canterbury Bike Plan (2000)

Overview

The Canterbury Bike Plan (Arup, 2000) was produced to update the 1986 Canterbury Bike Plan taking into consideration the established cycle network and facilities in the Canterbury LGA. The Plan was based on the following criteria:

- Safety - a route that provides a safe facility for cyclists and other road users
- Coherence - a continuous route that has a distinct and identifiable
- Directness - a route that is as direct as possible
- Attractiveness - a route that compliments and enhances its environment in such a way that cycling is attractive
- Comfort - a route that enables a comfortable flow of bicycle traffic and is easy to use.

These principles are still relevant; however, since the completion of this plan, bicycle planning practice has advanced with education and behaviour change programs now also considered standard elements of a local bike plan.

Routes

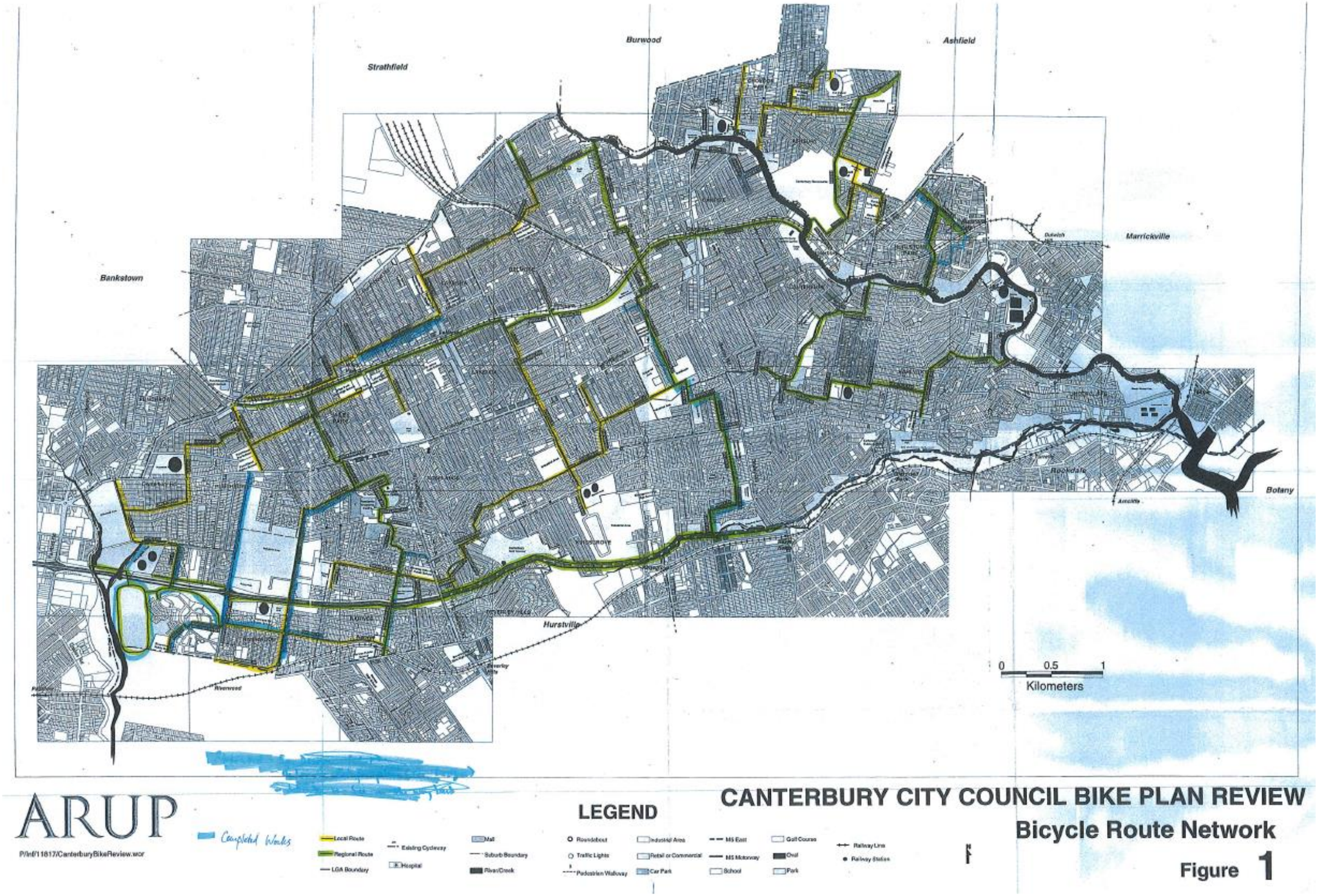
The 2000 Bike Plan recommended several local and regional routes both on-road and off-road as shown in Figure A.12. The regional routes are summarised in Table A.2.

Table A.2: 2000 Bike Plan Proposed Regional Routes

Route No.	Route Name	Route	Links	General Description and Observations	Status (2015)
1	Ashfield (Ashfield LGA) – Canterbury (Cooks River)	Holden St – Trevenar St – King St – John St – Broughton St – Charles St (Cooks River Cycleway)	Peace Park, Canterbury Park, Canterbury Racecourse, Holden St retail outlets, King St retail outlets	This Route would provide a northern link to the Cooks River Cycleway from Ashfield through Ashbury and Canterbury. Trevenar St, John St and Broughton St are all local streets. King St is a secondary road.	Not constructed
2	Hurlstone Park Railway Station – Cooks River, Canterbury Road	Hurlstone Park Railway Station – Crinian St – (Canterbury Road) – Dunstaffenage St – Foorde Av – Cooks River Cycleway	Hurlstone Park Railway Station, Crinian St retail outlets	This Route would provide access between Hurlstone Park Railway Station and retail outlets and the Cooks River Cycleway. The extension of the route to Canterbury Rd would provide a future link through Ashfield LGA to Holden St via Queen St.	Partially Constructed
3	Cooks River Loop: Underwood – Earlwood – Cup and Saucer Creek	Cooks River – Macquarie Rd – Riverview Rd – Bass Rd – Hamel Cres – Collingwood Ave (to Homer Street) – Hamilton Ave – Thompson St – Spark St – Woolcott St – Francis St – Warbuton Pde – Cup and Saucer Creek footway – (Northcote St) – (France St) – Burlington Ave – Karool Ave – Cooks River – (Burton Reserve – Cooks River)	Homer St retail outlets, Earlwood Park, Canterbury South Public School	This Route would provide access to Earlwood's retail precinct in Homer Street as well as access to local recreational and educational facilities.	Not constructed
4	Belfield/ Croydon Park (Burwood LGA) – Campsie – Clemton Park – M5 East (Kingsgrove – Rockdale LGA)	Burwood Rd – Clarence St – (Cooks River) – First Ave – Ninth Ave – Loch St – Evaline St – Loftus St – Thorncraft Pds – Charlotte St – Harp St – Alfred St – Jarrett St – Ferrier Pde – William St – Miller St – Woodrail Ave – Poole St – Lundy Ave – M5 East northside – Nairn St – M5 East southside	Burwood Rd retail outlets, Rudd Park, Harcourt Public School, Belmore Sports Ground, Canterbury Memorial Hospital, Harp St industrial area, Yatama Park, Clemton Park Public School	This Route would provide a north-south link across the centre of Canterbury LGA, through Campsie. The Route would intersect with the key east-west routes alongside the railway line and the M5 east.	Partially constructed
5	Cooks River Cycleway: Belfield/ Croydon Park (Burwood LGA) – Tempe (Marrickville LGA)	Punchbowl Rd – Cooks River – Second Ave – (Burwood LGA) – Burwood Rd – Cooks River – Hampton St – Wentworth St – Brighton Ave – Cooks River – Lang Rd – Wardell Rd – Cooks River – Illawarra Ave – Bayview Ave	Homebush Bay/ Botany Bay, Flockhart Park, Sando Reserve, Rosedale Reserve, Picken Oval, Croydon Park, Lees Park, Canterbury Racecourse, Ewen Park, Beaman Park, Gough Whitlam Park	This Route is part of the existing Homebush Bay to Botany Bay (Bay to Bay) Cycleway. The Route serves as both a recreational path for pedestrians and cyclists, as well as providing an important route across LGA boundaries for commuter cyclists. The Route is a focal point for the Bike Plan, linking with several of the other Routes.	Not constructed

Route No.	Route Name	Route	Links	General Description and Observations	Status (2015)
6	Rail Trail: Punchbowl – Wiley Park – Lakemba – Belmore – Campsie – Cooks River (Canterbury)	The Boulevarde – Peel St – Bridge Rd – Tobruck Ave – Belmore Sports Ground – Lillian Lane – Lillian St – South Pde – Tasker Park – Cooks River	Punchbowl Railway Station, Punchbowl retail outlets, Wiley Park Girls High School, Wiley Park Public School, Wiley Park Railway Station and retail centre, Lakemba Railway Station and retail centre, Belmore Railway Station and retail centre, Belmore Sports Ground, Campsie Railway Station and retail centre, Tasker Park	-	Not constructed
7	Punchbowl – Roselands – Narwee Railway Station	Robinson St – Hillcrest St – Rawson St – Canterbury Rd – Pentland Ave – Payten Ave – footway – Diana Ave – Centre Ave (private) – Roselands Ave (private) – Roselands Dr (private) – Hilton Ave – Penshurst Rd – Narwee Railway Station	Roselands Shopping Centre, Roselands Swimming Pool, John Mountford Reserve, Narwee Railway Station and retail outlets	This route would provide a north-south link at the western end of the LGA, linking the western end of the Punchbowl – Canterbury Rail Trail with the M5 Cycleway.	Partially constructed
8	M5 East Cycleway	North side: King Georges Road – Lundy Ave South Side: King Georges Road – Bexley Rd	Kingsgrove industrial area	This is a proposed route along both sides of the M5 which would connect to the existing off road route between Riverwood and Beverly Hills. Together the routes would provide an important east-west link across the southern boundary of Canterbury LGA.	Constructed

Figure A.12: 2000 Existing and Proposed Network



Treatments

The 2000 Bike Plan recommended four treatment types as shown in Table A.3.

Table A.3: 2000 Bike Plan Treatment Types

Treatment	Description	Uses
Bike Lane + Parking Lane	Road pavement marked with a 2.0m parking lane and a 1.5m bike lane	Kerbed streets with significant on-street parking demand and traffic volume > 3,000 vpd
Bike/ Parking Lane	Road pavement marked with a 3.0 – 3.5m bicycle lane which vehicles may park in	Kerbed streets with low demand for on-street parking and traffic volume >3,000 vpd
Shared Road Space	No pavement markings, signposting only	Traffic volume <3,000 vpd
Shared Path	2-3m path for shared use by cyclists and pedestrians	Open spaces and adjacent to main roads

In addition, the Bike Plan made recommendations for treatments at roundabouts, signalised intersections and for signage and pavement markings/ logos.

A.4.2 Canterbury Pedestrian Access and Mobility Plan (1999)

The Canterbury Pedestrian Access and Mobility Plan (PAMP) (Arup, 1999) was jointly funded by Canterbury City Council and RMS and was among the first to be undertaken in NSW. The main aim of the PAMP is to improve:

- Coherence
- Directness
- Safety
- Comfort
- Attractiveness
- Equity of access

High use pedestrian areas were considered including CBD's, neighbourhood shopping centres and Canterbury Hospital.

The PAMP recommended that the provision of traffic, pedestrian and cyclist facilities in the road space should be considered in an integrated way. It was also recommended that Council should take shared paths into consideration when installing new footpaths.

A.4.3 Regional Cycleway Crossing at Canterbury Road Review (Draft)

A Draft Regional Cycleway Review (Traffic Matters, 2014) was undertaken on the Cooks River Cycleway for the Canterbury Road underpass. The underpass does not meet the required standard for this type of facility with the following deficiencies identified:

- pathway is too narrow
- low vertical clearance
- obstacles on the path, including an exposed pipe
- pathway becomes flooded during flooding and/ or king tides.

The following potential options were assessed:

i Retain Existing Route – keep existing alignment and pathway but upgrade the pathway and remove obstacles. Vertical clearance would be increased by lowering the pathway and increasing the width.

ii New Ramp to Canterbury Road – construct new ramps from the existing pathway to street level and provide a level crossing on Canterbury Road.

iii New Ramp to Close Street – deviate from the current route by running the pathway along Close Street and provide a level crossing on Canterbury Road.

The Draft Regional Cycleway Review favours the option to retain the existing route.

A.4.4 Canterbury Integrated Plans

City of Canterbury has prepared Integrated Plans in order to create a "Sustainable Canterbury" by balancing current needs to ensure they do not compromise the needs of future generations.

The plans ensure Canterbury can be a great place to live, work and play both now and in the future. Council plans to do this by keeping the things the public like about the City and working with the general public to make life better.

The vision for the City of Canterbury includes the following transport related goal:

"Traffic flows smoothly and safely, with a minimum of congestion. Our City is pedestrian and bicycle friendly. There is good public transport, and enough parking."

The following themes would be used to turn the vision into a reality:

i Attractive city
ii Stronger community
iii Healthy environment (including transport alternatives)
iv Strategic leadership
v Improving council

Community Strategic Plan 2014-2023

The Community Strategic Plan identifies the long-term aspirations for life and work in Canterbury LGA. Key aspirations relating to active travel includes:

- Our City is pedestrian and bike friendly, with well-maintained footpaths and bike paths connected across the City through town centres, streets and parks.
- Parking for cars and bikes, and bus shelters and seats, are available near shops and public transport.

Council Delivery Program 2014-2017

The Council Delivery Plan guides the action for Council to take up to 2017 in order to complete goals set out in the Strategic Plan. Key action relating to active travel include:

- implement a cycle plan
- hold four cycling workshops per year
- participate in regional programs to improve awareness and access to active transport routes and programs
- promote cycling through a series of workshops on bicycle maintenance and cycling instruction.

A.4.5 Canterbury Environment Management Plan (2011)

The City of Canterbury Environment Management Plan is structured around key themes affecting the City's environment. The Plan sets goals for environmental management, indicators for whether the goal is to being achieved and specifies actions for achieving these goals. The goal, indicators and actions for sustainable transport are described below.

Goal

To reduce the environmental impacts of vehicle usage through the development and promotion of sustainable transport options.

Indicators

- Greenhouse gas emissions
- New cycling/ walking facilities available and usage
- Mode of transport to work
- Private vehicle ownership per proportion of population

Actions

- Upgrade and maintain pedestrian/ bike paths in accordance with the Canterbury Bike Plan, Cooks River Path Improvement Strategy and other strategic documents.
- Promote the use of sustainable transport options i.e. cycling, walking and public transport.
- Promote cycling and hold cycling maintenance and instruction course.
- Participating in the Greenway: Cooks River to Iron Cove Green Corridor project (community action).

A.4.6 Canterbury Strategic Recreation Plan (2010)

The Canterbury Strategic Recreation Plan provides the strategic framework for the provision of recreation services and facilities to address the current and future needs of the Canterbury City community.

The importance of recreation in Canterbury is described by the following benefits:

- Personal and individual benefits – reduces physical health problems and improve psychological wellbeing.
- Social and community benefits – strengthens social bonds and cultural relationships and reduces the incidence of crime.
- Environmental benefits – reduces vehicle use, which improves air quality.
- Economic benefits – savings in health costs, improved productivity at work and attracting new residents to the area.

The Plan discusses improving the system of shared pathways for walkers and cyclists and connecting the existing limited system.

A.4.7 City of Canterbury Playgrounds and Playspaces Study (2014)

The City of Canterbury Playgrounds and Playspaces Study guides the future provision, development and management of Council owned and managed playgrounds and Playspaces across the City.

The Study provides directions relating to:

- Playground Provision (new provision and reviewing some existing playgrounds)
- Hierarchy (including the identification of suggested regional, district and higher level neighbourhood playgrounds)
- Enhancing the play value and diversity of playgrounds (including the need for toddler, older children and 'all abilities' playgrounds and playspaces)
- Enhancing landscapes and the environment (including the need for unique landscaping as part of the play experience and natural shade)
- Enhancing amenities and infrastructure (with strategies relating to pathways, toilets, shade structures, fencing and signage)

In addition, a specific direction is provided for each existing playground and play space including whether there should be an upgrade, replacement, removal or other direction.

Appendix B

Existing Conditions

B.1 Road Network

Roads within the Canterbury LGA of significance to the RMS with either full control or RMS having a strategic interest are listed in Table B.1.

Table B.1: RMS Significant Roads in Canterbury LGA

Road Name(s)	Route No.	From	To	Description
Freeways/ Motorways/ Tollways				
M5 (South Western) Motorway	6005	Bankstown Council Boundary	Bexley Road	East-west direction along southern boundary of LGA
Highways/ Main Traffic Routes				
Canterbury Road	167	Bankstown Council Boundary	Ashfield Council Boundary	East-west direction through centre of LGA
Bexley Road	169	Canterbury Road	M5 Motorway	North-south direction between Campsie and Bexley North
King Georges Road	200	Punchbowl Road	M5 Motorway	North-south direction between Punchbowl and Beverly Hills
Punchbowl Road, Georges River Road	549	Canterbury Road	Milton Road, Ashfield	East-west direction between Punchbowl and Ashbury
Alternative Traffic Routes				
Brighton Ave, Beamish Street	2014	Georges River Road	Canterbury Road	North-south direction between Croydon Park and Campsie
Moorefields Road, William Street, Homer Street, Illawarra Road	2021	King Georges Road	Cooks River	East-west direction between Beverly Hills and Earlwood
King Street, Jeffrey Street	2040	Ashfield Council Boundary	Canterbury Road	North-south direction between Ashbury and Canterbury
Belmore Road	2050	Canterbury Road	Hurstville Council Boundary	North-south direction between Punchbowl and Riverwood
Bayview Avenue	2099	Homer Street	Cooks River	East-west direction within Earlwood
Unclassified Regional Routes				
Bonds Road	7006	Canterbury Road	Josephine Street	North-south direction between Roselands and Riverwood
Slade Road, Hartill-Law Road	7030	Bexley Road	Homer Street	North-east/ south-west direction between Bexley North and Earlwood
Burwood Road	7047	Punchbowl Road	Canterbury Road	North-south direction between Belfield and Belmore
Lakemba Street, Albert Street, Ninth Ave	7051	King Georges Road	Beamish Street	East-west direction between Wiley Park and Campsie
Fore Street, Burlington Ave, Karool Ave, Permanent Ave, Wardell Road	7053	Canterbury Road	Cooks River	East-west direction between Canterbury and Earlwood
Fifth Ave, Burwood Road	7067	Georges River Road	Ninth Avenue	North-south direction between Croydon Park and Campsie
Kingsgrove Road	7309	Canterbury Road	M5 (South Western) Motorway	North-south direction between Belmore and Kingsgrove
Broadarrow Road	7479	King Georges Road	Airport, Inner West and South Rail Line	East-west direction between Beverly Hills and Narwee

Source: RMS Schedule of Classified Roads and Unclassified Regional Roads, January 2014, RMS Sydney and Blue Mountains Street Directory 2012

The roads listed in Table B.1 carry significant volumes of traffic. It is important to recognise these roads in perspectives for funding and limitations to modify road configurations with consideration of the RMS's traffic movement requirements.

B.2 Rail Network

A map of rail lines and stations in the vicinity of Canterbury LGA is shown in Figure B.1.

Figure B.1: Rail Lines in Canterbury LGA

Source: Extract from http://www.sydneytrains.info/stations/pdf/suburban_map.pdf, viewed 2 April 2015

B.3 Bus Network

Maps of the bus routes in Canterbury are shown in below in Figure B.2 (Sydney Buses), Figure B.3 (Punchbowl Bus Company) and Figure B.4 (Transdev).

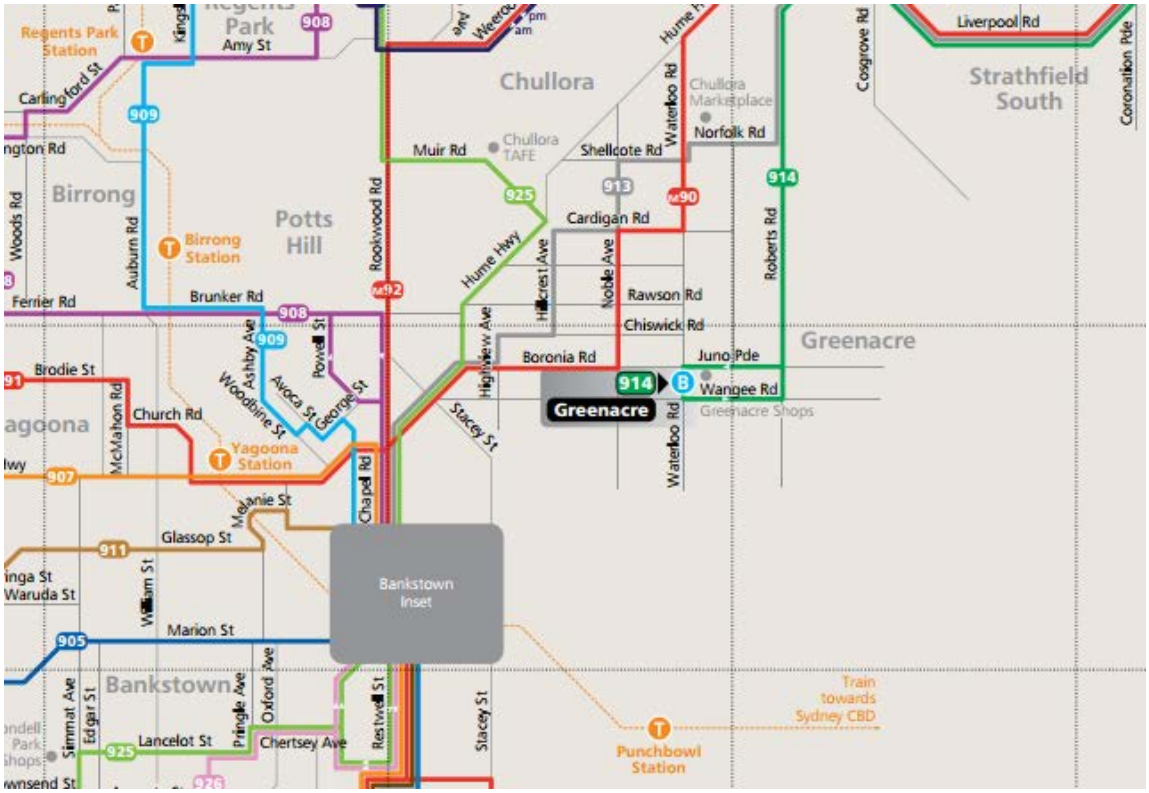
Figure B.2: Sydney Buses in Canterbury LGA

Source: Sydney Buses, http://www.sydneybuses.info/routes/routes/14054_STA_region_web_map_south.pdf, viewed 2 April 2015

Figure B.3: Punchbowl Bus Company Buses in Canterbury LGA

Source: Punchbowl Bus Company, http://www.punchbowlbus.com.au/pdf/networkmap.pdf, visited 7 April 2015

Figure B.4: Transdev Buses in Canterbury LGA



Source; Transdev, http://www.transdevnsw.com.au/files/14396_Region_13_Network_map.pdf, visited 2 April 2015

Appendix C

Consultation and Feedback

Minutes of Meeting

Job No:	15S1240000	**GTA Rep:**	DVD, RLG	**Date:**	24 March 2015
Job Name:	Canterbury Bike Plan			**Time:**	10:00am
Client:	City of Canterbury			**Location:**	Canterbury Council Administration Centre
Purpose:	Stakeholder Workshop # 1 (surrounding councils and government)				

Attendees:	Colin Mable – Rockdale Council Henning Bracker – Bankstown Council Suzannah Byers – Marrickville Council Davide Torresan – Ashfield Council John Micallef – NSW Police Peter Lay – City of Canterbury Colleen Barclay – City of Canterbury Jordan Moy – City of Canterbury Bala Maharajah – City of Canterbury Terry Toufic – City of Canterbury Dick van den Dool – GTA Consultants Rebekah Giana – GTA Consultants
Distribution:	All Attendees

Representative		Action
1. Introductions		
2. Summary of Previous Bike Plan		
GTA Consultants	The objectives of the previous (2000) Bike Plan were discussed, please refer to the attached presentation for a summary of the 2000 Bike Plan.	
3. Overview of the 2015 Canterbury Bike Plan Review		
GTA Consultants	The objectives and key focus areas of the 2015 Bike Plan were discussed, please refer to the attached presentation for a summary of the 2015 Bike Plan.	

Representative		Action
4. Stakeholder Discussion Forum		

Police	○ Intersection facilities for bike paths/lanes are important, i.e. traffic lights, pedestrian crossings. Each have their own legislation.
	○ Many conflicts between bicycles and vehicles occur at roundabouts because cyclists/ drivers do not know who to give way too. Needs to be resolved.
	○ Cyclists will always be at danger to running into car doors if cycle paths are adjacent to car parking.
	○ Cycle paths/ lanes are created for leisure riding:
	  ○ Fast riding, reckless riding and negligent riding is an offence by law
	  ○ A community cycling facility is not a training facility
	  ○ As there are no speed limits, ensuring safe riding is behaviour based
	  ○ Cyclists need to be educated on safe cycling and on which speeds/ behaviour is appropriate on public cycling paths. Advertisements would be a good start.	

Bankstown Council	○ In bike plans and other Council plans, cars are still being prioritised on the roads. ○ The focus should be the movement of people, not the separation of modes. ○ People and their quality of life should be the highest priority and not making cars the safest mode of travel. ○ Focus should be made on our sedentary lifestyle, further worsened by driving cars. A lot of money could be saved on the health budget by people using active modes of transport and as such, driving should not be encouraged. ○ By changing the road design (giving more space to pedestrians and cyclists) behaviour could change naturally. ○ Bankstown Council are close to completing a draft Transport Strategy following which will set out the overall strategic directions for all transport, including walking and cycling. More details on walking and cycling will be set out in a separate, complementary bike/pedestrian plan. ○ In order to evaluate the success of a bike/ped plan, there is a need for 1) targets (eg mode share, safety, health) and 2) base data.	
Rockdale Council	○ A cycleway was supposed to be built between Bexley North and Wolli Creek, this never happened.	

Representative		Action
	○ The Cup and Saucer Creek Cycleway was built to connect the Cooks River Path to the M5, but this is not a good option for commuters from the south. ○ A linear park through Wolli Creek (regional route) would be ideal, with option for a boardwalk. Rockdale Council would support this and would be seeking support from the State Government. ○ Would like to see linkages from Canterbury into Rockdale, the new bridge near Turrella Station would be a good option. Linkages could also be at Wolli Creek near the Velodrome and near Bardwell Park Station. ○ The rail bridge on the Cooks River at Wolli Creek may be upgraded soon. Opportunity for a new cycling link ○ Sydney's Cycling Future includes two new connections across Cooks River at Marsh Street and Princes Highway. ○ The airport with 15000 employees is a major destination and already attract significant numbers of bike commuters. ○ Significant development is currently occurring in Wolli Creek, which will attract increase bike commuters to the airport.	
Marrickville Council	○ Marrickville Council has received feedback that Bayview Avenue, Marrickville and Wardell Road, Dulwich Hill, are too narrow for cycling lanes, especially the pathways across Cooks River. ○ Cyclists are confused as to how to obey traffic signals and who to give way to at intersections. ○ Marrickville Council are updating their bicycle maps and have just distributed "Staying Active" maps which have been extremely popular and well received in the LGA. ○ Marrickville do cycling confidence course every month with varying success, the courses are run by Bikewise and the City of Sydney are helping Marrickville Council to promote these.	
City of Canterbury	○ There have been many unreported injuries on Canterbury cycleways with underreporting a big issue for less serious cycling crashes. ○ A man broke his neck on Macquarie Road, Earlwood, after a cyclist came around a blind corner quickly on a desire line to the Cooks River Path. ○ There is a need to target "lycra clad" riders on how to ride safely on bike paths and shared paths in the LGA. Note this is a difficult-to-reach target group who don't like to stop for information.	

Representative		Action
	○ There is a misunderstanding on how users should interact on cycleways, particularly with children. ○ Many people in Canterbury are cycling for a purpose, i.e. cycling to work. ○ There is a need to be proactive with bicycle safety, not reactive. ○ Bike parking at Campsie station is over-used. ○ Canterbury Council believe that the Bike Plan would be succeeding when people who would not otherwise ride in the LGA feel safe to do so and bike usage (including bike parking usage) increases. ○ The Bike Plan is about making the cycling infrastructure competitive with other infrastructure, both in terms of safety/comfort and speed/convenience/travel time. Therefore it will get used more because it is perceived by users as better than other modes (i.e. driving a car).	

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Minutes of Meeting

Job No:	15S1240000	**GTA Rep:**	DVD, RLG	**Date:**	25 March 2015
Job Name:	Canterbury Bike Plan			**Time:**	6:00pm
Client:	City of Canterbury			**Location:**	Canterbury Council Administration Centre
Purpose:	Stakeholder Workshop #2 (community stakeholders)				

Attendees:	Ian Phillips – Bike Marrickville Warren & Sue Artlett – Bike South West Peter Teow – Bike South West Colin Jones – Ashfield BUG Kim Santarossa – Ashfield BUG Noel McFarlane – ACP Allan Waldon – Bike Shed Micheal Thomson – Canterbury Cycleway User Stuart Gibb – Canterbury Cycleway User Stan Koutsoumbis – Local Resident Peter Lay – City of Canterbury Colleen Barclay – City of Canterbury Jordan Moy – City of Canterbury Councillor Linda Eisler – City of Canterbury David Amos – City of Canterbury Dick van den Dool – GTA Consultants Rebekah Giana – GTA Consultants
Distribution:	All Attendees

Representative		Action
1. Introductions		
2. Summary of Previous Bike Plan		
GTA Consultants	The objectives of the previous (2000) Bike Plan were discussed, please refer to the attached presentation for a summary of the 2000 Bike Plan.	
3. Overview of the 2015 Canterbury Bike Plan Review		
GTA	The objectives and key focus areas of the 2015 Bike Plan were	

Representative		Action
Consultants	discussed, please refer to the attached presentation for a summary of the 2015 Bike Plan.	

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Representative		Action
4. Stakeholder Discussion Forum		
All	**Infrastructure** o Some school children ride to Canterbury Public School, Canterbury Girls High School and Canterbury Boys High School, the overpass on Church Street (over Canterbury Road) is too narrow to safely ride across. o Unwin Street is a major connection for children cycling to the schools, there is plenty of room for a separated cycleway or widened footpath. o It is unsafe to cross King Street near Jeffrey and Unwin Streets to access the schools, riders must take a long detour to Canterbury Road (about 300m) to the signalised crossing. o Cyclists would like to see a shared path on the existing Canterbury Road footpaths which are used rarely by pedestrians. o Buses turn around at the intersection of Broughton and John Street, buses sometimes reverse suddenly which is unsafe for cyclists on the road. o There is no ramp to the bridge over the Cooks River near Canterbury Pool for cyclists on Charles Street, kerb ramps are blocked by the concrete safety wall. o The concrete wall on Charles Street to protect the Cooks River path is great for safety but the on-road riding width is too narrow and could cause a rider to hit their wheel on the barrier kerb. A mountable kerb would be more appropriate with the area functioning as a shared path. o The bike rack at Canterbury Pool is often hard to access because cars park illegally in front. o The narrow stairs on the Cooks River Path at Illawarra Road are very hard to use. o The crossing on Illawarra Road on the south side of the Cooks River Path is not safe. o An additional crossing on Illawarra Road on the north side of the Cooks River would be safer and easier to access the Cooks River Path. o Riders would like a slip lane for cyclists at the Homer Street/ Illawarra Road roundabout. o Beamish Street is too narrow for cycling. o There are no cycling links between Canterbury and Bankstown. o Riders are keen for a cycling path along the Bankstown Rail Line between Punchbowl and Canterbury. o Safe cycling infrastructure is required near school before	

DRAFT

Representative		Action
	encouraging cycling, it is currently very unsafe for children to ride to school in Canterbury. o Riders would like to see contra-flow cycling lanes on one-way streets. o On uphill streets, there needs to be more room for cyclists because they ride much slower than cars compared to downhill, i.e. move the road centre line ("up-hill-down-hill lanes"). **Education and Encouragement** o More cycling education programs need to be run in the LGA. o People (drivers) need to be educated that cars can easily kill people, particularly cyclists and pedestrians. o Schools should run class projects on safe cycling and cycling ideas. o Schools should be pulled into cycle path decision making near schools. o Funding has recently been cut on a cycling program being run at some schools. o Nick Chapman and Councils near the proposed Greenway cycling route are working with Bicycle Network. o Education could target mothers to educate them on how cycling can be safe. **Safety** o On off-road paths there is no way of telling where you are if you have an accident/ emergency. In Melbourne they have numbered shields on cycleways (similar to those on highways) which can be quoted to the emergency services so they can find you. o Riders would like consistent road crossings on roads which intersect with the Cooks River Path. o Riders like the pedestrian crossing treatment at the intersection of the Cooks River Path on Wardell Road. Cars stop at this crossing because it is marked as a full pedestrian crossing. o Piano keys at crossings, which are not designated pedestrian crossings, confuse pedestrians, cyclists and drivers because they look like raised pedestrian crossings. o Riders have heard that the breakdown lane on the M5 is being removed between King Georges Road and Bexley Road, forcing cyclists onto the M5 – this is unsafe. o The road narrowing on Trevenar Street, Ashbury makes cycling unsafe as bicycles are forced to the centre of the road. o Shared paths are being used by commuters at night time,	

DRAFT

Representative		Action
	they are not very safe. ○ Lighting is poor on off-road cycling paths, a sensor lighting system would be great (for example Spindlers Park, at Johnstons Canal, Leichhardt). ○ There is no lighting on any off-road cycle routes in Burwood or Strathfield. ○ School children really want to ride to school but it is too unsafe. **Signage/ Wayfinding** ○ There is no signage to the cul-de-sacs which are accessed from Cup and Saucer Path, making it hard for riders to navigate. **Bike Parking** ○ There is limited or no available bike parking and most train stations in the LGA, Canterbury and Campsie are particularly full.	

City of Canterbury
City of Cultural Diversity

CANTERBURY BIKE PLAN 2015
CITY OF CANTERBURY

M I N U T E S

Time: 10am-midday
Date: Friday 2 July 2015

1. Attendance

Dick van den Dool	**GTA consultants**
Phil Gray	**GTA consultants**
Peter Lay	**City of Canterbury**
Colleen Barclay	**City of Canterbury**
Phil Rudder	**City of Canterbury**
Alan Shooter	**City of Canterbury**
Lisa Mackay	**City of Canterbury**

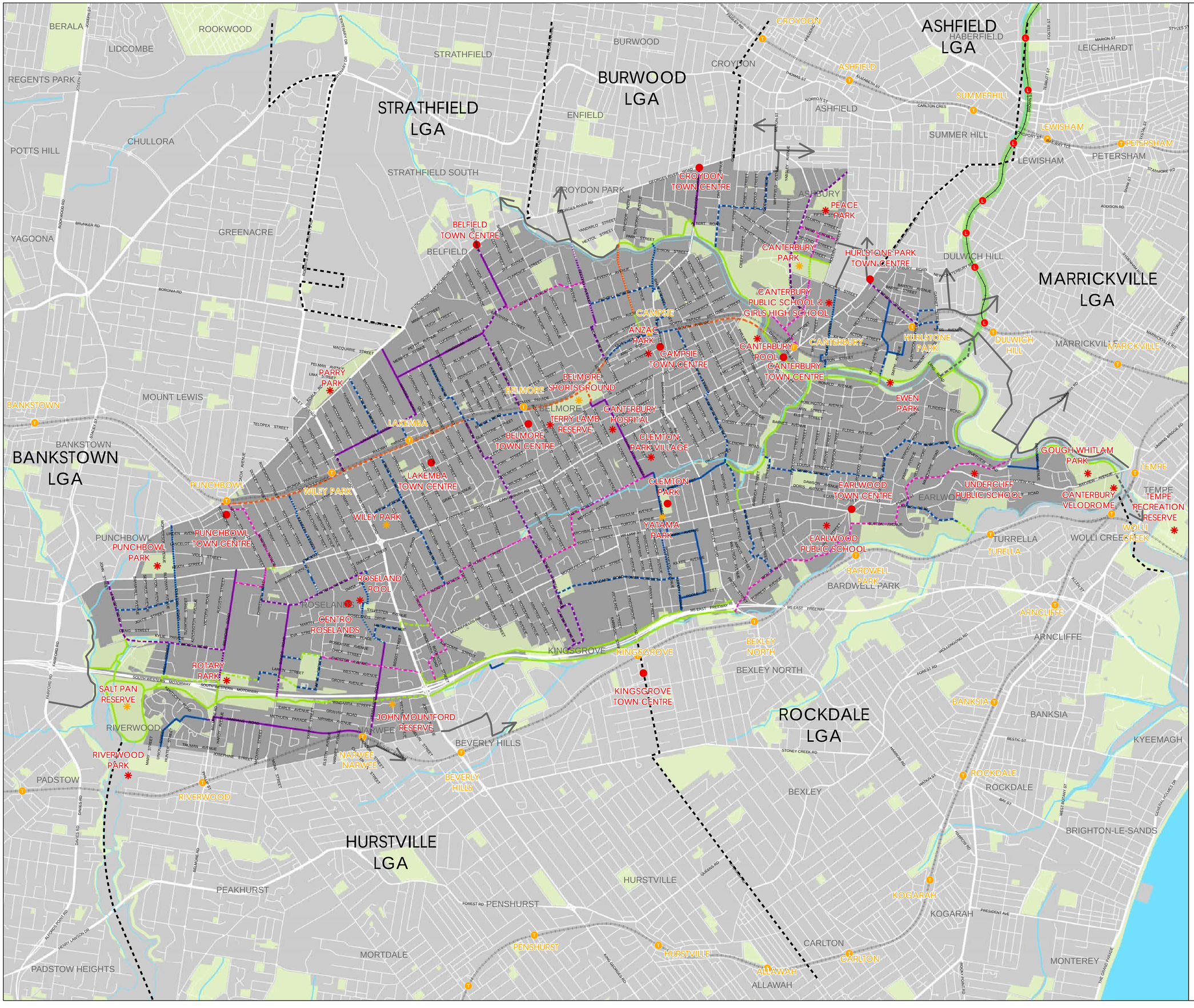
- We discussed alternative and parallel routes east and west of Beamish Street. Colleen to send Phil Gray her ideas about suitable routes
- More bicycle parking is required in Campsie and Peter Lay suggests that additional parking at major destinations be nominated in the bike plan.
- Colleen discussed the possibility of a bicycle ramp up and down the over railway bridge joining North Parade to South parade Campsie
- Colleen discussed serious bicycle accident in Earlwood leading to the Cooks River shared path. Colleen to send details of the accident and location to Phil Gray.
- Peter asked Dick and Phil to include and provide links to council's priority recreational areas, parks and playgrounds in the bicycle plan. Peter supplied the details of these areas to Dick.
- Colleen discussed conflicts between pedestrians and cyclists along the footpath in Wardell Road south of the bridge. Colleen to provide details and Peter request that GTA prepare assessment report and proposed

treatment options. (Investigation to be treated as a variation to the project).

- Dick suggested shared paths on the footpaths along Canterbury Road. This can work with education and markings on the footpath. ‘Cyclists are guests on the footpath. This is an alternative route to the The Boulevarde.
- Dick suggested that we look at Carrington Road Marrickville as a good example of managing cyclists on road. Contact and talk to Simon and Campbell Barfield at Marrickville Council.
- Dick also suggested looking at the ‘Bicycle Boulevard’ plan being considered at North Sydney Council.
- Peter discussed the Green way project and wants the bike plan to specifically identify the upgrade of the Lang Road Pedestrian/Bike. The bridge is in need of replacement. Dick said that we should contact and talk to Nick Chapman Ashfield council as they are currently submitting a proposal in connection with the Greenway for funding.
- Peter Also advised that there is a concept for a separate pedestrian/bike crossing in parallel to the Wardell Road Bridge to facilitate river crossing.
- Peter also advised that the upgrade of the Karool Ave pedestrian cycle pathway needs to be included in the bike plan report. Similar to Lang Road bridge the bridge is at the end of its useful life and needs to be replaced.
- Decision to meet again, after everyone has considered the draft map in 3 to 4 weeks’ time. Peter to schedule a meeting.
- Allan Shooter asked a question about whether the tender includes costings of proposed works. Peter advised that the costings of proposed works is part of the project brief.

Appendix D

Proposed Bicycle Network



Legend

Bicycle Routes

- Existing Shared Path
- Proposed Shared Path
- Existing Bicycle Lanes (On-Road)
- Proposed Bicycle Lanes (On-Road)
- Existing Mixed Traffic
- Proposed Mixed Traffic
- Proposed Separated Path (Off-Road)
- Proposed Bicycle Boulevard

Surrounding LGAs

- LGA Boundary
- Bicycle Route
- Proposed Bicycle Route
- Light Rail Stations
- Train Stations
- Greenway Alignment
- River Boundaries
- Canterbury LGA

Focal Points

- Primary Destination
- Secondary Destination
- Secondary Destination (Strategic Park)

Issue	Date	By	Chkd	Appd
P1	01-04-16	RLG	PG	DVD

Kilometres

0 0.5 1 2

GTAconsultants

www.gta.com.au

Client

City of Canterbury

Job Title

Canterbury Bike Plan

Drawing Title

Proposed Typologies & Focal Points

Scale at A1

1:18,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
15S1240000	003	P1

Appendix E

Route Prioritisation

PROPOSED ROUTES / MISSING LINKS

Priority Rank	Route Designation	Regional / Local / Recreational	Suburbs Served and External Links	Description	Typologies Proposed	Start Location	End Location	Route Length (m)						Status	Other Considerations	Casualty crashes	Death	Crash History	Route Environment	Cost Expectation	Action Required	Types of Land Uses	Type of Route	Score	Cost	Weighted Score
								Mixed Traffic	Bicycle Lanes (On-Road)	Bicycle Boulevard	Separated Path (Off-Road)	Shared Path	Total					20%	10%	20%	10%	15%	25%			
1	EW09		Campsie, Belfield	Seventh Avenue, Omaha Street	Mixed Traffic	Seventh Avenue / Second Street	Omaha Street / Burwood Road	897					897	Proposal		1	1	12	2	2	3	3	3	**25**	$ 49,335.00	4.50
2	EW07		Canterbury, Campsie, Belmore, Lakemba, Wiley Park, Punchbowl	Charles Street, Tasker Park, South Parade, Lilian Street, Lilian Lane, Peter Moore Field, Terry Lamb Reserve, Tobruk Avenue, Bridge Road, Peel Street, The Boulevarde	Separated Path, Mixed Traffic	Charles Street / Cooks River Shared Path (North)	The Boulevarde / Rail Reserve (South) / Punchbowl Road	1,498			4,615		6,113	Proposal		3		6	4	1	1	4	4	**20**	$ 2,389,890.00	3.50
3	NS20		Roselands, Beverly Hills	Stoddart Street, Moorefields Road, Cooloongatta Road, Allambee Crescent	Mixed Traffic	Stoddart Street / Albion Street	Allambee Crescent / M5 Shared Path (North)	1,033					1,033	Proposal		2		4	3	1	3	2	3	**16**	$ 56,815.00	2.65
4	EW05		Kingsgrove	Homer Street, Wellington Road, Twyford Avenue, Watkin Avenue, Banks Lane, Minnamorra Avenue, Sutton Avenue, Bardwell Park, Bray Avenue, Wolli Avenue, Bexley Road	Bicycle Boulevard	Homer Street / Illawarra Road	Bexley Road / Kingsgrove Avenue Reserve			3,746			3,746	Proposal		2		4	2	1	2	3	3	**15**	$ 973,960.00	2.60
5	NS15		Lakemba, Belmore, Kingsgrove	Moreton Street, Leylands Parade, Chapel Street, Wirega Avenue, Garema Circuit (West), Beverly Grove Park	Bicycle Boulevard	Moreton Street / The Boulevarde	Beverly Grove Park			2,741			2,741	Proposal				0	2	1	3	4	4	**14**	$ 712,660.00	2.30
6	NS04		Ashbury, Canterbury	Trevenar Street, King Street, John Street	Bicycle Boulevard	Trevenar Street / Holden Street	King Street / John Street / Jeffrey Street			1,983			1,983	Proposal		1		2	1	1	2	4	3	**13**	$ 515,580.00	2.25
6	NS22		Roselands	Laneway, Diana Avenue, Centre Avenue, Roselands SC, Shared Path	Mixed Traffic	Laneway / Payten Avenue	Shared Path / Hilton Avenue	812					812	Proposal				0	2	2	3	4	3	**14**	$ 44,660.00	2.25
8	NS07		Campsie, Canterbury, Earlwood,	Duke Street, Canterbury Road, Northcote Street, Narani Crescent, Calbina Road, Shared Path, William Street, Main Street, Main Street, Homer Street, Charleston Avenue	Mixed Traffic, Shared Path	Duke Street / South Parade	Charleston Avenue / Wolli Avenue	2,772				225	2,997	Proposal		1		2	2	1	3	4	2	**14**	$ 213,210.00	2.20
9	EW03		Hurlstone Park	Hampden Street, Duntroon Street	Mixed Traffic	Hampden Street / Garnet Street	Duntroon Street / Crinan Street	275					275	Proposal				0	3	2	4	2	3	**14**	$ 15,125.00	2.15
9	EW06		Canterbury	Broughton Street	Bicycle Boulevard	Broughton Street / Canterbury Road / Canterbury Station	Broughton Street / Cooks River Shared Path (North)			413			413	Proposal				0	3	1	3	4	3	**14**	$ 107,380.00	2.15
9	EW10		Belfield, Belmore	Burwood Road	Bicycle Boulevard	Burwood Road / Omaha Street	Burwood Road / Yangoora Road			397			397	Proposal				0	2	1	3	3	4	**13**	$ 103,220.00	2.15
9	EW17		Beverly Hills, Roselands,	King Georges Road, Shorter Avenue, Bennett Park, Skinner Avenue	Mixed Traffic, Shared Path	King Georges Road / South Western Motorway	Skinner Avenue / Bonds Road	1,200				239	1,439	Proposal				0	3	1	3	4	3	**14**	$ 130,530.00	2.15
9	NS13		Campsie, Belfield, Belmore	Burwood Road	Bicycle Boulevard	Burwood Road / Yangroora Road	Burwood Road / Bridge Road / Tobruck Avenue			910			910	Proposal				0	2	1	3	3	4	**13**	$ 236,600.00	2.15
9	NS21		Wiley Park	King Georges Road	Bicycle Lanes (On-Road)	King Georges Road / Lakemba Street	King Georges Road / The Boulevarde		204				204	Proposal		1		2	2	2	2	3	2	**13**	$ 15,300.00	2.15
15	NS23		Narwee	Penhurst Road	Bicycle Lanes (On-Road)	Penhurst Road / Hannans Road	Penhurst Road / Graham Road		182				182	Proposal				0	2	2	3	3	3	**13**	$ 13,650.00	2.10
16	EW02		Hurlstone Park	Floss Street, Crinan Street	Mixed Traffic, Bicycle Lanes (On-Road)	Floss Street / Garnet Street	Crinan Street / Canterbury Road	253	640				893	Proposal				0	2	1	3	4	3	**13**	$ 61,915.00	2.05
17	EW13		Lakemba	Lakemba Street	Bicycle Lanes (On-Road)	Lakemba Street / Wangee Road	Lakemba Street / Croydon Street North		76				76	Proposal				0	2	3	3	3	2	**13**	$ 5,700.00	2.05
17	EW19		Roselands, Punchbowl	Payten Avenue, Werona Avenue, Christian Road, Charlescotte Avenue	Bicycle Lane (On-Road), Mixed Traffic	Payten Avenue / Laneway	Charlescotte Avenue / Belmore Road	437	1,164				1,601	Proposal				0	2	1	3	4	3	**13**	$ 111,335.00	2.05
17	NS09		Croydon Park, Campsie	Second Avenue, Ninth Avenue, Lock Street	Bicycle Lanes (On-Road)	Second Avenue / Cooks River Shared Path (North)	Lock Street / Lilian Lane		1,315				1,315	Proposal				0	2	1	3	4	3	**13**	$ 98,625.00	2.05
20	EW16		Roselands	Shared Path Laneway, John K Stewart Reserve, Hilton Avenue	Shared Path, Mixed Traffic	Shared Path / Stoddart Street	Hilton Avenue / King Georges Road	565				287	852	Proposal				0	3	1	3	3	3	**13**	$ 108,565.00	2.00
21	EW21		Riverwood, Punchbowl	Belmore Road, Wiggs Road	Bicycle Lanes (On-Road)	Belmore Road / South Western Motorway	Wiggs Road /Moxon Road		1,318				1,318	Proposal				0	2	1	2	4	3	**12**	$ 98,850.00	1.95
22	EW25		Punchbowl	Canterbury Road	Shared Path	Canterbury Road / Warren Parade	Canterbury Road / Christian Road					76	76	Proposal				0	4	2	3	2	2	**13**	$ 20,520.00	1.90
22	EW11		Campsie, Belmore, Kingsgrove	Harp Street, Nelson Avenue, Forsyth Street	Mixed Traffic	Charlotte Street / Harp Street	Forsyth Street / Chapel Street	1,514					1,514	Proposal				0	2	1	3	3	3	**12**	$ 83,270.00	1.90

Priority Rank	Route Designation	Regional / Local / Recreational	Suburbs Served and External Links	Description	Typologies Proposed	Start Location	End Location	Route Length (m)						Status	Other Considerations	Casualty crashes	Death	Crash History	Route Environment	Cost Expectation	Action Required	Types of Land Uses	Type of Route	Score	Cost	Weighted Score
22	EW14		Roselands	Leslie Street, Dreadnought Street, Albion Street	Mixed Traffic	Leslie Street / Chapel Street	Albion Street / Stoddart Street	1,409					1,409	Proposal				0	3	1	3	4	2	13	$ 77,495.00	1.90
22	NS05		Ashbury, Croydon Park	Watson Avenue, Goodlet Street, Leith Street, Croydon Avenue	Mixed Traffic	Watson Avenue / Goodlet Street	Croydon Avenue / Cooks River Shared Path	1,355					1,355	Proposal				0	2	1	3	3	3	12	$ 74,525.00	1.90
26	NS27		Punchbowl	Rose Street, Cullens Road	Mixed Traffic	Rose Street / Punchbowl Road	Cullens Road / Wiggs Road	1,228					1,228	Proposal		1		2	3	1	4	2	1	13	$ 67,540.00	1.85
26	NS28		Punchbowl	Moxon Road	Bicycle Lanes (On-Road)	Moxon Road / Canterbury Road	Moxon Road / Wiggs Road		625				625	Proposal				0	2	2	3	3	2	12	$ 46,875.00	1.85
28	EW01		Ashbury	Third Street	Mixed Traffic	Third Street / Holden Street	Third Street / King Street	393					393	Proposal				0	3	2	4	1	2	12	$ 21,615.00	1.75
28	EW23		Earlwood	Hocking Avenue, Banks Road, Finlays Avenue, Wolli Creek Regional Park	Mixed Traffic, Shared Path	Hocking Avenue / Banks Lane	Wolli Creek Regional Park	547				209	756	Proposal				0	3	1	2	2	3	11	$ 86,515.00	1.75
28	NS01		Hurlstone Park	Foord Avenue	Mixed Traffic	Foord Avenue / Burnett Street	Foord Avenue / Cooks River Shared Path (North)	260					260	Proposal				0	3	2	4	1	2	12	$ 14,300.00	1.75
28	NS02		Canterbury, Hurlstone Park	Church Street, Church Street Overpass, Canterbury Sugar Walks, Sugar House Road	Mixed Traffic	Church Street / Princess Street	Sugar House Road / Cooks River Shared Path (North)	919					919	Proposal				0	2	1	3	2	3	11	$ 50,545.00	1.75
28	NS25		Punchbowl	Arthur Street, Heggie Lane, Matthews Street, Hillcrest Street, Warren Parade	Bicycle Boulevard	Arthur Street / The Boulevarde	Warren Parade / Canterbury Road			860			860	Proposal				0	3	1	3	3	2	12	$ 223,600.00	1.75
28	NS29		Punchbowl	Christian Road	Bicycle Boulevard	Christian Road / Canterbury Road	Christian Road / Charlescotte Avenue			203			203	Proposal				0	2	1	3	2	3	11	$ 52,780.00	1.75
34	EW08		Campsie	Eighth Avenue	Mixed Traffic	Eighth Avenue / Beamish Street	Eighth Avenue / Second Avenue	682					682	Proposal				0	2	2	3	2	2	11	$ 37,510.00	1.70
35	NS17		Lakemba	Croydon Street North	Mixed Traffic	Croydon Street North / Lakemba Street	Croydon Street North / Railway Parade	185					185	Proposal				0	3	2	4	2	1	12	$ 10,175.00	1.65
36	NS03		Ashbury, Canterbury	Andrews Avenue, Canterbury Park, Jeffrey Street	Shared Path, Bicycle Lanes (On-Road)	Andrews Avenue / Fourth Street	Jeffrey Street / King Srreet / John Street		601			229	830	Proposal				0	2	1	3	3	2	11	$ 106,905.00	1.65
36	NS19		Lakemba, Roselands	Ernest Street, Ludgate Street	Mixed Traffic	Ernest Street / The Boulevarde	Ludgate Street / Albion Street	1,519					1,519	Proposal				0	2	1	3	3	2	11	$ 83,545.00	1.65
36	NS24		Wiley Park, Roselands	Robinson Street South, Hillcrest Street, Rawson Street, The Mall, Draper Avenue	Mixed Traffic	Robinson Street South / The Boulevarde	Draper Avenue / Peyton Avenye	1,230					1,230	Proposal				0	3	1	2	3	2	11	$ 67,650.00	1.65
39	EW15		Lakemba	Edge Street	Mixed Traffic	Edge Street / King Georges Road	Edge Street / Ernest Street	383					383	Proposal				0	2	2	4	2	1	11	$ 21,065.00	1.55
39	EW24		Narwee	South of South Western Motorway, Rosetta Street	Shared Path	South of South Western Motorway / Penshurst Street	Rosetta Street / King George Road					534	534	Upgrade				0	4	1	3	1	2	11	$ 144,180.00	1.55
39	NS08		Campsie	Fifth Avenue, Williams Parade, London Lane	Separated Path (Fifth Avenue) Shared Path (Williams Parade, London Lane)	Fifth Avenue / Cooks River Path	London Lane / Wilfred Avenue/Campsie Station				682	120	802	Proposal				0	2	1	2	3	2	10	$ 373,400.00	1.55
42	EW04		Undercliffe, Earlwood	Macquarie Road, Riverview Road, Bass Road, Hamel Crescent, Collingwood Road, Hamilton Avenue, Thompson Street, Spark Street, Mooney Avenue, Westfield Street, Hughes Park	Mixed Traffic	Macquarie Road / Cooks River Shared Path	Hughes Park Shared Path	2,521					2,521	Proposal				0	2	1	3	2	2	10	$ 138,655.00	1.50
42	EW22		Punchbowl	Carlton Parade	Mixed Traffic	Carlton Parade / Cullens Road	Carlton Parade / Moxon Road	606					606	Proposal				0	3	2	4	1	1	11	$ 33,330.00	1.50
44	NS06		Croydon Park, Campsie	Beamish Street Overpass (Over Cooks River), Beamish Street, Brighton Avenue, Shakespeare Street, Clissold	Mixed Traffic	Beamish Street Overpass / Cooks River Shared	Beamish Street / South Parade	1,125					1,125	Proposal				0	1	1	3	4	1	10	$ 61,875.00	1.45
44	NS10		Belmore	Peter Moore Field	Separated Path	Peter Moore Field North	Peter Moore Field South / Tudor Street / Palmer Street				187		187	Proposal				0	4	1	2	1	2	10	$ 93,500.00	1.45
44	NS11		Kingsgrove	William Street, Rosemeath Avenue, Homer Street, Lundy Avenue	Mixed Traffic	William Street / Alfred Street	Lundy Avenue / Poole Street	976					976	Proposal				0	3	1	3	1	2	10	$ 53,680.00	1.45
44	NS26		Riverwood	Bonds Road	Bicycle Lanes (On-Road)	Bonds Road / South Western Motorway	Bonds Road / Jindalee Place		176				176	Proposal				0	1	2	3	1	2	9	$ 13,200.00	1.45
44	NS14		Lakemba	Barremma Road, Lakemba Street, Moreton Street	Mixed Traffic	Barremma Road / Yangoora Road	Moreton Street / The Boulevarde	745					745	Proposal				0	3	1	4	2	1	11	$ 40,975.00	1.45
49	EW12		Kingsgrove	Homer Street, St. Albans Road, Clemton Park	Mixed Traffic	Homer Street / Rosemeath Avenue	Clemton Park / Wirega Avenue	1,186					1,186	Proposal				0	2	1	3	3	1	10	$ 65,230.00	1.40
49	NS16		Kingsgrove	Garema Circuit (East)	Bicycle Lanes (On-Road)	Garema Circuit / Wirega Avenue	Garema Circuit (South-West corner)		579				579	Proposal				0	3	2	3	1	1	10	$ 43,425.00	1.40
49	NS18		Lakemba	Colin Street	Mixed Traffic	Colin Street / Lakemba Street	Colin Street / Punchbowl Road	630					630	Proposal				0	3	2	3	1	1	10	$ 34,650.00	1.40

Priority Rank	Route Designation	Regional / Local / Recreational	Suburbs Served and External Links	Description	Typologies Proposed	Start Location	End Location		Route Length (m)							Status	Other Considerations		Casualty crashes	Death		Crash History	Route Environment	Cost Expectation	Action Required	Types of Land Uses	Type of Route	Score		Cost		Weighted Score
52	EW18		Narwee, Riverwood	Karne Street, Arilla Avenue, Wise Reserve	Mixed Traffic, Shared Path	Karne Street / Shorter Avenue	Wise Reserve / Bonds Road		539				220	759		Proposal						0	3	1	3	2	1	**10**		$ 89,045.00		1.35
52	NS12		Belfield	Burwood Road	Bicycle Lanes (On-Road)	Burwood Road / Downes Street	Burwood Road / Punchbowl Road			136				136		Proposal						0	2	2	2	2	1	**9**		$ 10,200.00		1.35
54	EW20		Riverwood	Jindalee Place, Access Path, Rotary Park	Mixed Traffic, Shared Path	Jindalee Place / Bonds Road	Rotary Park / Belmore Road		279				380	659		Proposal						0	2	1	3	2	1	**9**		$ 117,945.00		1.25
									29,973	**7,016**	**11,253**	**5,484**	**2,519**	**56,245**														**TOTAL**	**$ 8,522,625.00**		

Appendix F

Canterbury Road Underpass

Canterbury Road Underpass

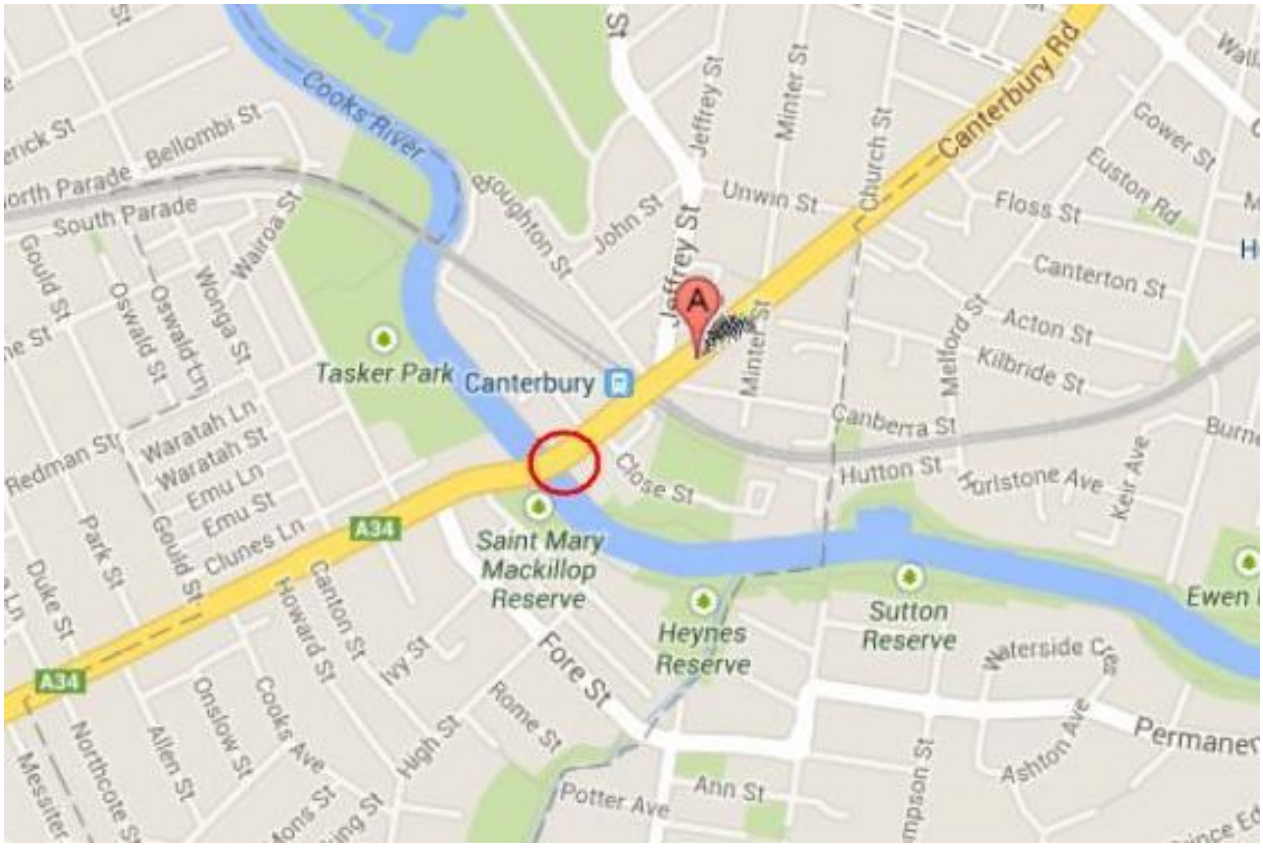
Background

The Cooks River Pathway is one of the oldest shared pedestrian and bicycle paths in Sydney. It is a largely off-road facility that runs from Homebush Bay in the west to Botany Bay in the east. The route is about 34.6km long from Mason Park at Homebush Bay Drive to the Cooks River entrance at Botany Bay. The pathway crosses the boundaries of Strathfield, Burwood, Canterbury, Marrickville and Rockdale Councils.

Jamieson Foley, Sustainable Transport Consultants and The Environment Works were engaged by the Cooks River Foreshores Working Group to study the pathway and identify safety, access and other issues with a view to developing a strategy for the improvement of the walking and cycling environment.

The report presents the pathway development strategy and is based on the findings of two previous reports by the study team, including a formal road safety audit and an issues and options paper.

The improvement study of the Cooks River bikepath was completed in December 2004, and identified improvement works required in the Canterbury local government area totalling $10.8m including the need to widen the path under the Canterbury Road bridge.



Locality Map – Canterbury Road Underpass

The Canterbury Road underpass is extremely narrow and prevents disabled access. The headroom under the bridge is substandard and site lines are poor it is a critically weak link of the Cooks River Regional Pedestrian bikepath (see safety audit and photos below of the narrow pathway).

Morgan Pl
Regional pathway users (ie bicycles and pedestrians) must give way to general traffic on local streets.

Tasker Park foot bridge
U-rails block access to bridge for some groups of users, particularly the disabled.

Canterbury Road - underpass
Pathway extremely narrow and prevents disabled access. Headroom substandard. Concrete pipe protrudes from pavement. Poor sightlines. Narrow and rough pathway on eastern approach.

Canterbury Road - southern path
Discontinuity of southern pathway. Inadequate directional and regulatory signage. Narrow sections of pathway along Canterbury Road. No direct access to northern section of pathway.

Bridge over Cup and Saucer Creek
Bridge too narrow. Poor pavement connections.

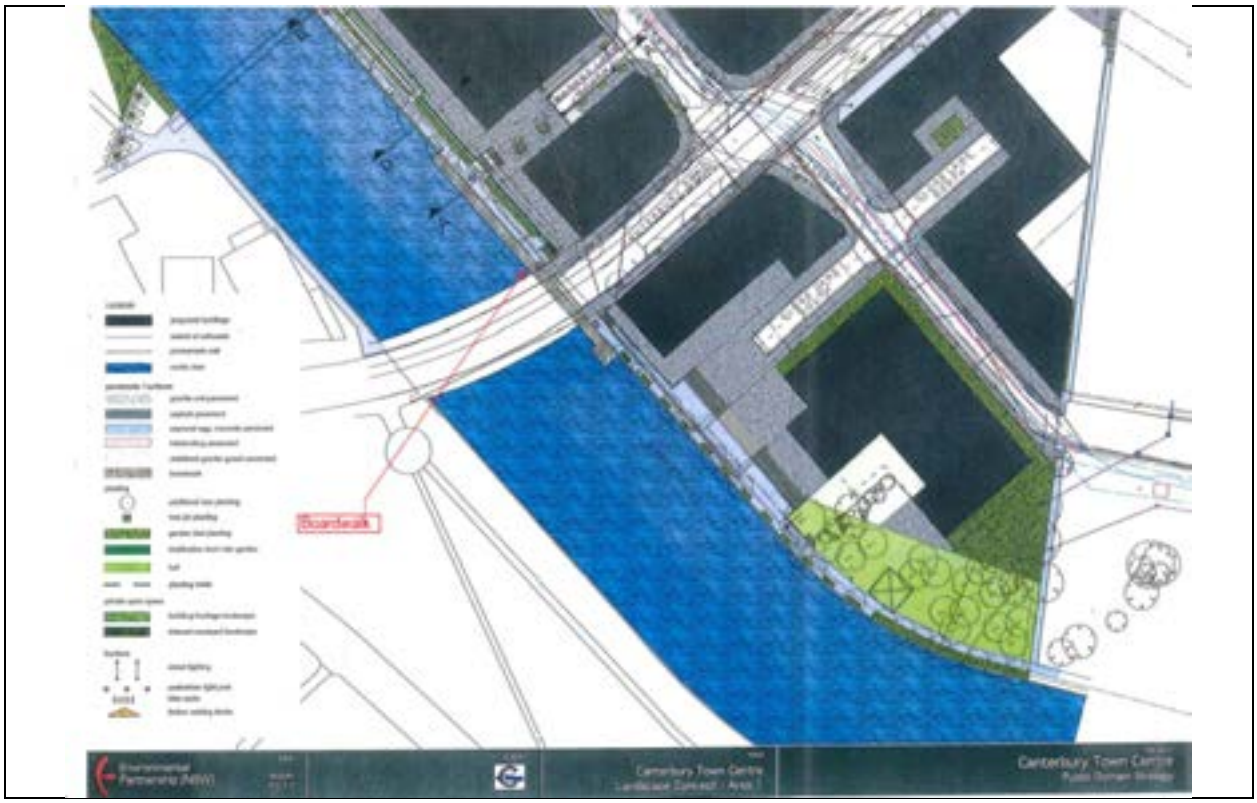
Extract of the Safety Audit

Looking South at Canterbury Road Bridge

Looking North at Canterbury Road Bridge

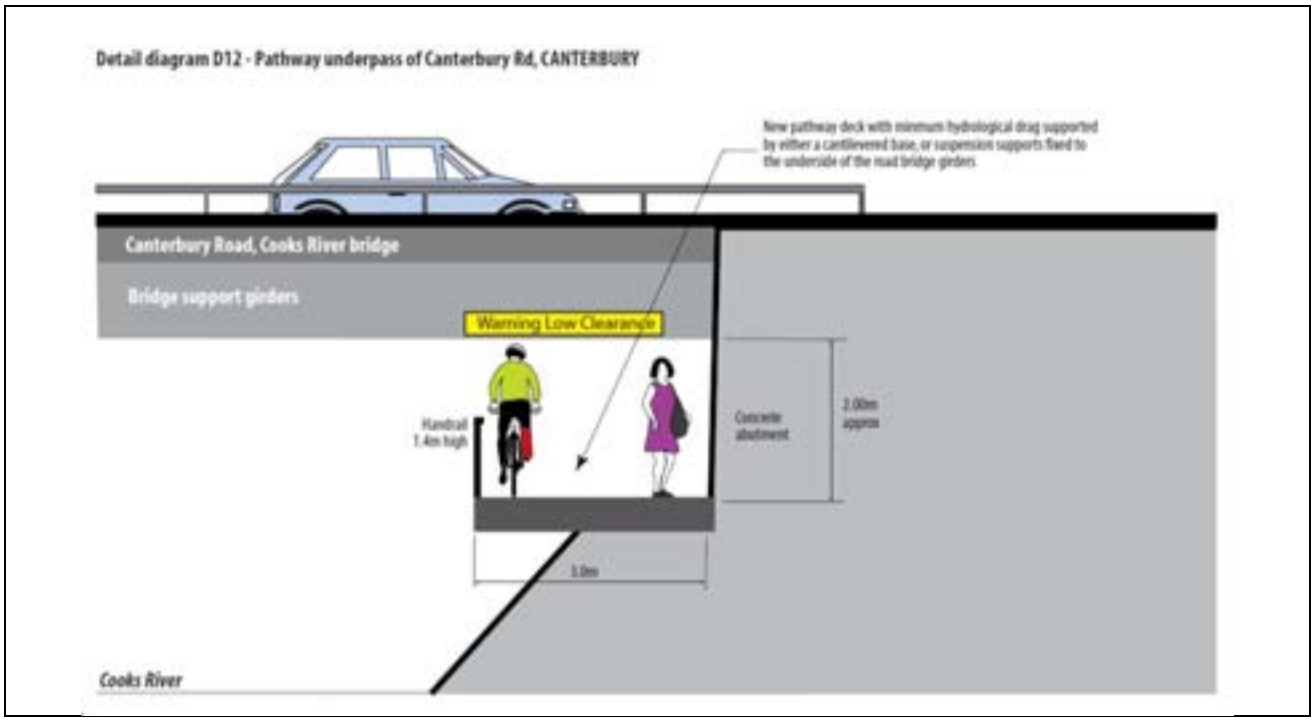
Canterbury Town Centre Masterplan

Within the Masterplan for Canterbury Town Centre there is a provision to install a boardwalk connecting the 3 metre wide path on either side of the bridge. The vision to create an attractive waterfront along the Cooks River through provision of pedestrian cycleway, landscaped open spaces and opportunities for outdoor activities (see concept plan below).



Cooks River Bikepath Improvement Study – Concept Plan

A concept plan for the widening of the underpass was examined in the Cooks River Bikepath Improvement Study (see concept plan below).



Although it is desirable to construct a full height, full width underpass, there are no opportunities in the foreseeable future. Access to the waterway below the height of the canal wall would provide a lower cost solution but is not available due to frequent flood events (2 year ARI).

Provided approvals from the relevant authorities can be obtained (i.e. Sydney Water and RMS), the proposal to widen the existing underpass using a light weight structure supported by a cantilevered base or suspended from the bridge deck and headwall, at existing head room clearance. The issues of concern with this proposal are head room clearances and the risks involved in relying solely on signage for warning purposes, and the level of the path which is within the 2 year ARI flood event. Alternatively, an all weather at grade crossing of Canterbury Road, has also been identified as a viable option.

Drainage pipe at the Canterbury Road bridge

To complicate matters further there is a drainage pipe located within the bridge structure facilitating stormwater drainage of surrounding properties and Canterbury Road owned and maintained by the Roads and Maritime Services (RMS).

In order to improve the safety of pedestrians and cyclists using the regional bike and pedestrian path we have installed signs to warn the path users of the pipe's existence. This is a temporary measure and a permanent solution to divert the flow away from the pathway is an essential requirement.

We require a detailed feasibility study to maintain a 3 metre wide continuous pedestrian and cyclist movement along this regional pathway.

The contents of the report should as a minimum include the following;-

- A statement of needs
- Identify key stake holders and undertake initial consultation
- Options analysis
- Project due diligence
- Legal Issues (land ownership etc)
- Owner and statutory approvals in principle
- Risk analysis
- Financial Assessment

Work program, timeframe and reporting

Draft report will be required to be submitted no later than xxxx 2013.

Content of the consultant's submission

Consultants proposing to undertake the study are required to submit the following information in a submission consisting of no more than 5 pages including attachments:

- An appreciation of the strategic/operational context for the study
- A proposed study methodology covering all tasks
- A proposed timetable, including anticipated points of contact with, and reporting to us and stakeholder groups
- Details of personnel proposed to carry out study tasks
- A nominated project leader responsible for overall management

- Charges, the basis for charges and a proposed payment schedule

Selection Criteria

Each proposal will be assessed against the following criteria, with additional consideration given to the succinctness, relevance and clarity of the proposal:

- The consultant's track record in similar work
- The proposed methodology for undertaking the project
- The consultant's understanding of the outcomes, task and associated organisational and situational issues
- The consultant's experience and qualifications
- The availability of staff with the required skills
- The consultant's capacity to complete the project on time (and previous record at meeting deadlines)

Consultancy agreement

The agreement between the consultant and the Canterbury City Council for the provision of the service shall be in accordance with the consultancy agreement under the Australian Standard AS 4122-2010 General Conditions of Contract for Engagement of Consultants.

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