This report was prepared by

Warren Salomon and Dick van den Dool

Sustainable Transport Consultants
ABN 19 101 162 716
Warren Salomon, Principal
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Facsimile 02 9012 0793

In association with
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter Street SYDNEY NSW 2000
Telephone 02 9233 1277 Facsimile 02 9235 2490

for

Marrickville Council
PO Box 14
PETERSHAM NSW 2049
Telephone (02) 9335 2179
Facsimile (02) 9335-2029

Contents

List of maps

1 Executive summary

The Marrickville Bicycle Strategy updates previous bicycle plans and aims to facilitate increased bicycle use within the Marrickville Local Government Area (LGA) over the next ten years and beyond.

Development of the Strategy is supported by a number NSW Government and Council policies, including the RTA's NSW Bicycle Guidelines and Council's Management Plan, Urban Strategy and Integrated Transport Strategy. It is also supported by a number of other Council cycling-related projects and promotional activities.

Extensive community consultation has been undertaken in developing the new Strategy, and submissions received from its public exhibition in early 2007 have been taken into account in developing the final version. It is proposed that strategic support for the Strategy be strengthened through the preparation of Planning and Social studies in early 2008.

The most significant and expensive component of the Bicycle Strategy is development of the bicycle network, and the total cost estimate for the proposed network is $7.2M. The other less significant (but nonetheless important) component is implementation of bicycle parking and associated end-of-trip facilities. Council will continue to develop a detailed rolling program for bicycle network and parking works based on the broad objectives, priorities and cost estimates provided by this Strategy. Although the Bicycle Strategy has proposed a ten-year implementation period, its adoption does not commit Council to funding Bicycle Strategy works within that period. It will be appropriate and necessary to vary the funding estimates and timing of the Strategy's works program each year to match available funding. Apart from its planning role, the Bicycle Strategy is also intended to serve an advocacy role for generating greater funding and other support from the NSW and Commonwealth Governments and other stakeholders for cycling in Marrickville. As such, it will enhance Council's ability to secure the funding necessary to construct the proposed facilities.

It is expected that a proportion of network construction costs would be met through Council programs external to the Bicycle Strategy e.g. bicycle-related works undertaken as part of the ongoing upgrade of Council's facilities and in implementing the existing Local Area Traffic Management (LATM) Scheme program. Of the costs that are incurred within the Bicycle Strategy, it is also expected that up to 50% would be met by NSW Government grants and projects. Grants for on-road network implementation would be mainly from the RTA's Bikeplan 2010 program, whilst grants for off-road (path) network implementation would be mainly from the Department of Planning's Metropolitan Greenspace Program (MGP) and Cooks River Foreshore Improvement Program (CRFIP). Most of the proposed bicycle parking facilities will be provided and/or funded (in whole or in part) by agencies and organisations external to Council, with Council acting as a facilitator in most instances.

The Bicycle Infrastructure Development Strategy is a four point action plan consisting of:

1. A **bicycle network plan** which will:
   a. Build a coherent network consisting of system of bicycle routes: regional routes for quicker, longer trips; local routes for shorter, localised trips; and, traffic calmed local streets for easy access to all destinations;
   b. Provide a system of signage and network mapping for easy way-finding and place details to encourage and assist riders to better use the network;
   c. Set up a monitoring system designed primarily to track usage and to facilitate the removal of identified accident black-spots;
   d. Formulate a staged schedule of works consisting of standardised design solutions and specific design solutions; and,

e. Make recommendations on integrating ongoing network development with Council's asset management systems and the wider planning processes.

2. A **bicycle parking plan** to provide guidance and recommendations to:
   a. Improve and expand the level and quality of bicycle parking in the public domain;
   b. Support the economic viability of businesses, entertainment/food venues and residential developments with specially targeted parking facilities which provide security from theft and protection from the weather;
   c. Require and encourage the private sector and government agencies to provide bicycle parking and end of trip facilities in and around their buildings; and,
   d. Develop effective strategies to reduce bicycle theft.

3. Develop better **integration with public transport** through a Cycle and Ride program to:
   a. Improve bicycle network access to all railway stations;
   b. Improve and extend (long term and short term) parking provision at all railway stations and selected high volume bus stops; and,
   c. Improve station accessibility and rider and walker safety around station entrances in conjunction with Council traffic calming programs.

4. **Bicycle friendly streets neighbourhoods** which will:
   a. Provide recommendations for improved bicycle access throughout the LGA though the incorporation of bicycle friendly design and construction criteria into:
      i. streets, roads, intersections and crossings;
      ii. traffic calming, street closures and speed reduction schemes; and,
      iii. local residential streets and community facilities.
   b. Provide two-way bicycle access on local one-way streets;
   c. Continue the Council program of removal of old-style drainage grates;
   d. Recommend a road repair and maintenance reporting system to respond to riders' needs; and,
   e. Recommend policies for cyclist provision during road works.

2 Study background and project objectives

In mid 2005 Marrickville Council resolved to review its current Bicycle Strategy and as part of this process formulate a comprehensive strategy to guide future development of cycling within the Marrickville LGA over the next ten years. The last Bicycle Strategy conducted in the area was completed in 1996 and partially implemented during the past decade.

Sustainable Transport Consultants Pty Ltd in association with Jamieson Foley Traffic & Transport Pty Ltd were engaged by Council to research and prepare a Bicycle Infrastructure Development Strategy as a key component of the overall Marrickville Bicycle Strategy 2007. This project is being conducted simultaneously with a separate Social Action Strategy by Council staff.

A key outcome of the 2007 Bicycle Strategy is to make cycling easier and more attractive in Marrickville and to reduce the community's car use, especially for local or short distance trips. The Bicycle Infrastructure Development Strategy will cater for all types of cyclists and trip types, including school students, users of hand-cycles and commuter and recreational cyclists. It aims to make all cycling trips comfortable, safe and direct.

2.1 Study objectives

The key objectives of the Bicycle Infrastructure Development Strategy are to:

- Review and analyse the existing bicycle network (within the LGA and surrounding areas) and technically assess its structure and engineering treatments
- Review and analyse the Marrickville road network to identify and assess the feasibility of new and future bicycle network routes and linkages to improve bicycle access within the LGA and to surrounding areas
- Prepare detailed mapping of the LGA and surrounding areas to clearly show the network routes and other bicycle infrastructure
- Prepare a detailed plan for the development of the new network and associated infrastructure over the next ten years (including a costed works schedule and concept treatment diagrams)
- Work closely with Council staff and community stakeholders, in particular the Marrickville and South Sydney Bicycle User Group (MASSBUG), to include local knowledge, detailed technical data and information and to verify research findings
- Provide seamless integration with the bicycle networks in adjoining council areas in order to ensure good regional and local connectivity
- Develop a program for monitoring the effectiveness of the network

2.2 Methodology

Key elements of this study included:

- Comprehensive technical assessment of existing facilities and plans involving MASSBUG and Council staff
- Three community workshops to review progress and set study directions
- Saddle survey of entire Council street network and surrounding areas
- Analysis of neighbouring council bicycle plans and networks
- Bicycle Infrastructure Development Strategy (this document)

2.3 The 2007 Marrickville Bicycle Strategy

The 2007 Marrickville Bicycle Strategy provides Council with a proactive policy to develop and increase the role of the bicycle as an important sustainable transport mode to benefit the health and economic wellbeing of the community.

The Marrickville Bicycle Strategy aims to strategically build on the positive characteristics of the bicycle travel while removing barriers:

Community benefits

- The bicycle is an ideal vehicle for convenient, door to door, travel. It is quick to start, easy to park and impervious to traffic congestion. It is particularly suited for trips up to 5km (the width of Marrickville LGA)
- The bicycle is very suitable as a link to rail transport to extend reach and trip length. Not every resident is within easy walking distance of a station but everyone in the Marrickville LGA is within 10 minutes easy cycling of a railway station
- Cycling travel times are predictable and reliable
- Construction of a workable bicycle network is relatively cheap and bicycle infrastructure can be easily (and cost effectively) included with road upgrades and maintenance works
- Bicycle traffic does not pollute, does not emit Greenhouse gases, is not noisy and is a practical way of reducing dependency on oil
- Bicycles take up very little space either when being ridden or when parked
- Bicycle traffic has a humanising effect on neighbourhoods
- Cycling is good for staying in shape and is relaxing
- Bicycle travel is affordable and accessible to almost all the community

Barriers to cycling

- Fragmented cycling networks with a lack of continuity and connectivity
- Insufficient knowledge of alternative back street routes
- Lack of end of trip and parking facilities
- Poor integration with general road transport system – high speed and high volume roads along popular trip desire lines, threatening behaviour of motorists
- Lack of confidence and cycling experience
- Actual and perceived lack of safety
- Terrain and weather

While some of these barriers are beyond intervention, a majority can be managed or addressed by individuals, communities and governments. The actions outlined in the Marrickville Bicycle Strategy seek to address these issues and create an environment with minimal barriers to cycling.

3 Cycling in Marrickville 2007

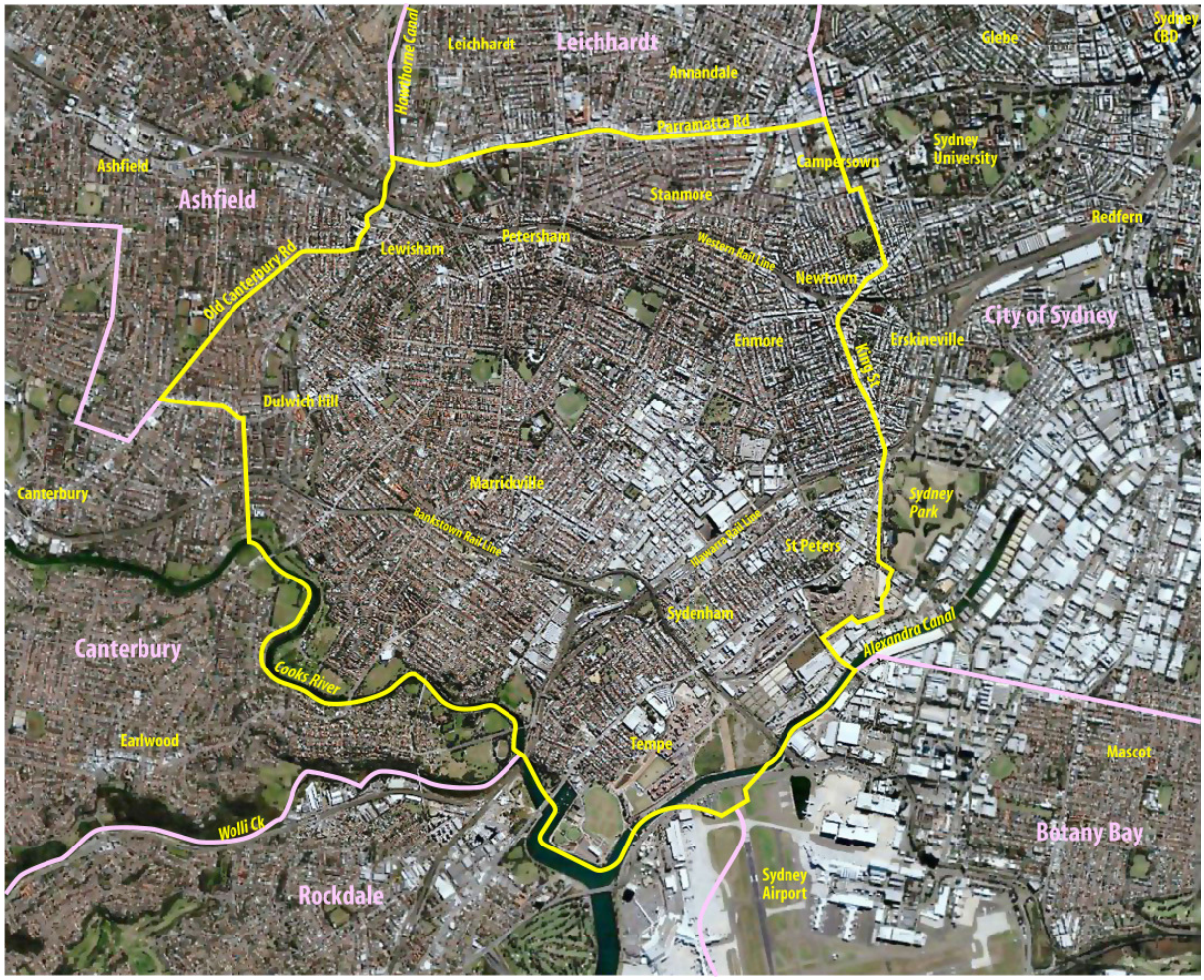


Figure 1 - Marrickville Council area and surrounding councils

The Marrickville LGA is located in Sydney's Inner West immediately adjacent to the City of Sydney. It is bordered on the north by Parramatta Rd, Australia's oldest roadway, and to the south by the Cooks River. The population of the LGA at the 2001 census was 73,431. The Council area is approximately 5km across east-west and north-south.

3.1 Transport in and around Marrickville

In the Marrickville LGA, 35.5% of the working population use public transport one or more times per week to get to work and 41.7% of the working population drive or ride in a car or truck only to get to work (ABS 2001). Public transport usage is much higher than the Sydney average where 19.3% use public transport to get to work, and motor vehicle usage is much lower than the Sydney average of 59.3%.

In the Marrickville LGA, the majority of households (43.7%) only have one motor vehicle with close to a quarter of households having no motor vehicle at all (23.1%). This compares with Sydney where 38.6% have one motor vehicle and 13.1% of dwellings have no motor vehicles. The average number of motor vehicles per household in Marrickville is 0.97.

No census statistics are available on bicycle ownership for Marrickville households but Sydney-wide figures (TPDC 2003) published by the NSW Transport and Population Data Centre in March 2004 provide a useful indicator:

- In 2000 Sydney's households owned a total of 1.15 million bicycles, up by more than 40% since 1991.
- This equates to 0.8 bicycles per household, up from 0.6 in 1991.
- 36% of all Sydney households own at least one bike, up from 32% in 1991.

There is recent evidence that bicycle usage may be higher in the Inner City areas. Recent research undertaken by the Central Sydney Area Health Service comparing the 2001 and 1996 Census data (CAHS 2003) notes that in Sydney the proportion of people cycling on their journey to work was greatest in the inner city areas of Sydney. Cycling registered a mode share of 2.2% in Marrickville, South Sydney (2.5%), and Leichhardt (2.0%).

5216 people living in Inner Sydney (within 10 km of Central Railway Station) cycled on their journey to work on Census day 2001. The biggest increases since 1996 in the proportion of people cycling to work were in the Statistical Local Areas of North Sydney (119%), Waverley (87%), Lane Cove (87%), Marrickville (79%), Ashfield (74%) and Leichhardt (67%).

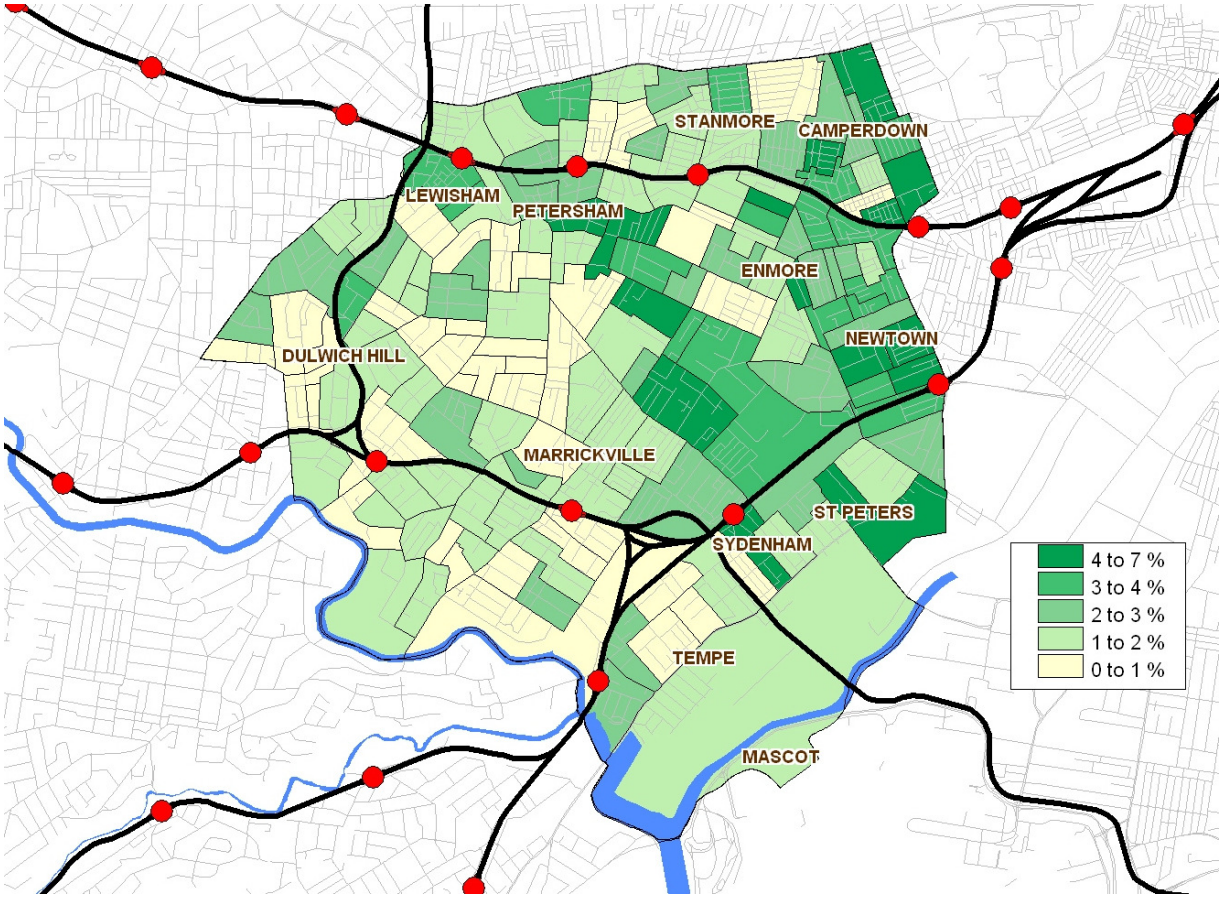


Figure 2 – Marrickville residents who bike to work by census district (Data source: ABS Census 2001)

3.2 Marrickville's cycling environment

Map 1 shows the typography of the Council area and barriers to movement – both natural and constructed. The natural landform is characterised by a low sandstone ridge running east-west between Petersham and Redfern. North-south offshoots of this ridge run close to the eastern and western boundaries of the LGA with a low lying basin (formerly the Gumbamorra Swamp) in between. This area was drained in 1897 and is now primarily an industrial zone.

The earliest roads in the area tended to follow the ridge lines to take advantage of their easier grades for horse drawn carriages, steam trams and eventually the lower-powered vehicles of the early oil age. As a consequence, roads with the gentlest grades such as King Street – Princes Highway in the east and Enmore Road-Stanmore Road-New Canterbury Road in the west are now the most heavily trafficked. The development of the rail network in the late 19th and early 20th Centuries also sought easier grades by contouring along the sides of creek valleys and paralleling the main ridge lines.

The Marrickville LGA is bounded by some of Sydney's busiest transport arteries (east-west: Parramatta Road, Western Railway Line, Canterbury Road – including Enmore, Stanmore and New Canterbury Roads; north-south: King Street – Princes Highway and Illawarra Railway Line) making safe and easy travel by bicycle to adjoining LGAs and trip generators often difficult and problematic.

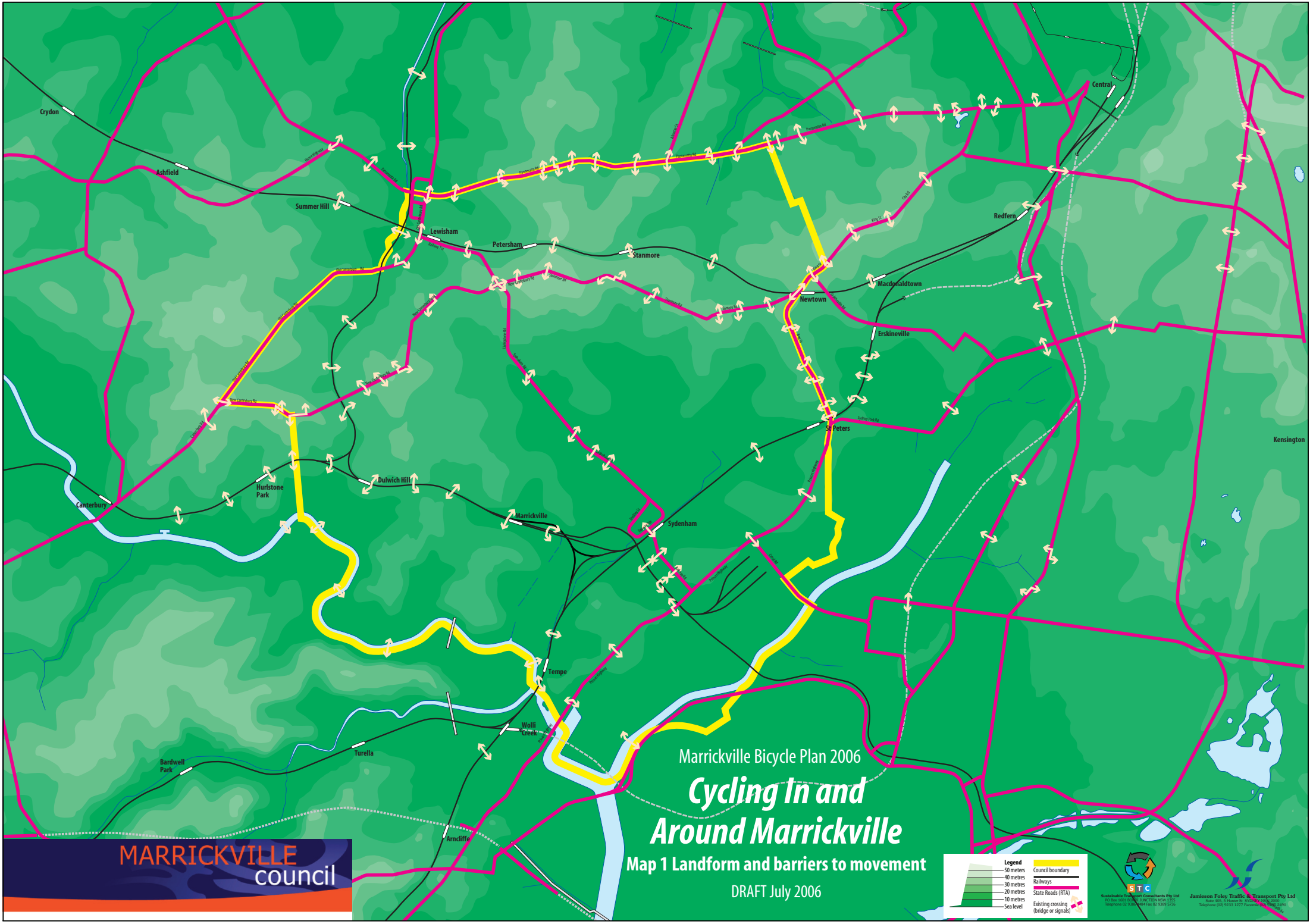
Map 1 shows the barriers to movement and the constructed crossing points of State Roads, railway lines and water courses. These points, usually bridges, underpasses or traffic signals, are not distributed evenly around the transport network and are largely the result of piecemeal historic development. For example the region's oldest road, Parramatta Road, is well served with signalised traffic crossings whereas both Canterbury Roads and the Illawarra Railway line at Sydenham are poorly served.

One of the key aims of this project is to investigate and improve bicycle access throughout the LGA and to surrounding areas. Though the Marrickville LGA is generally well served with barrier crossing points there are a number of critical locations where crossings are either lacking or are poorly configured for bicycle riders and pedestrians. These are identified in the detailed route construction scheduling and prioritised according to their importance in the overall development of the bicycle network.

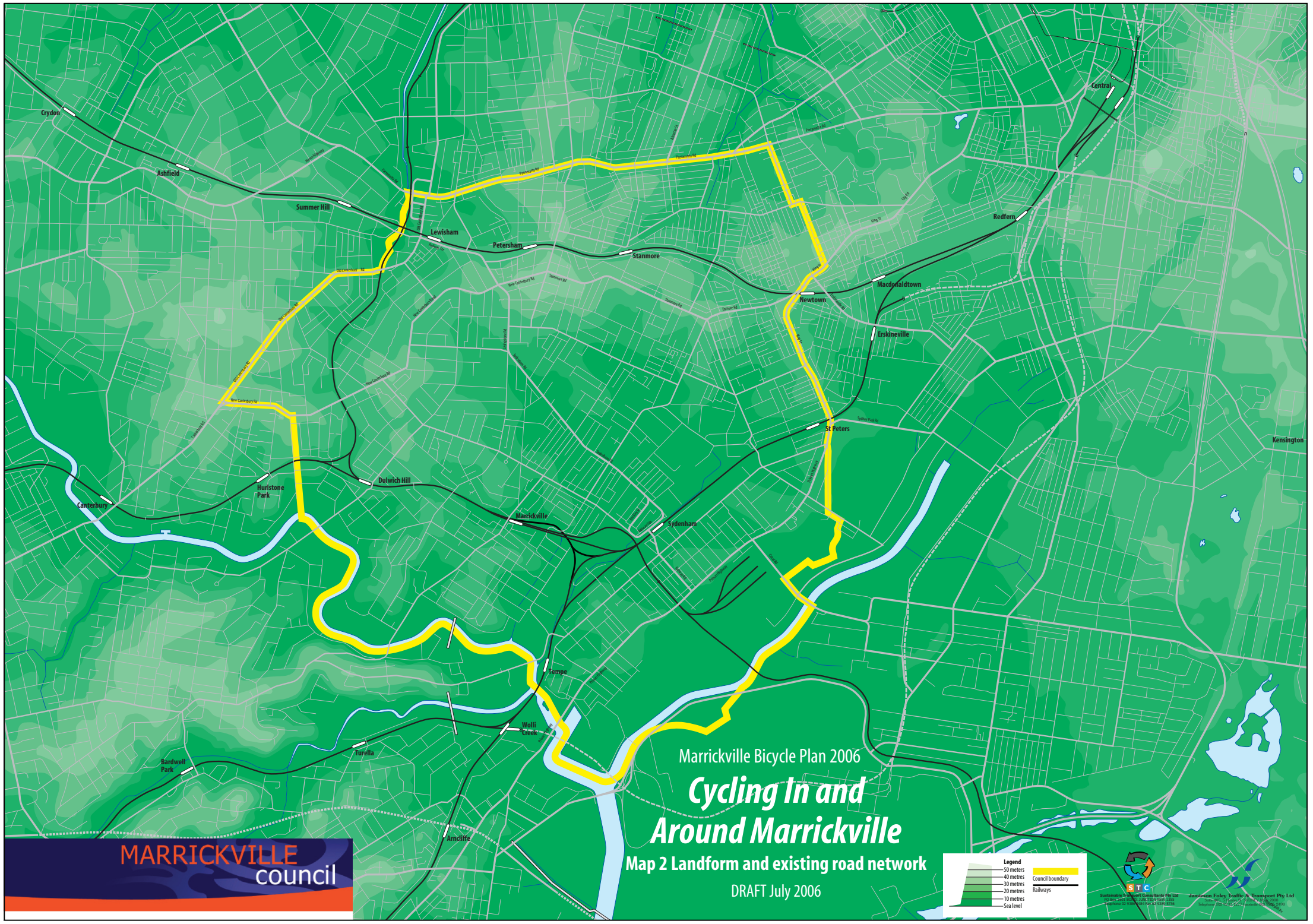
As a general principal this study aims to work within current constraints and to utilise existing barrier crossing points. Similarly, as new road construction in an already heavily developed area is almost impossible, this infrastructure Strategy aims to retrofit modern bicycle network facilities into the existing street network and landform.

Map 2 shows the existing road network superimposed on a relief map of the region. The higher street density in the older, more closely settled areas, gives greater permeability for travel through and around these precincts. As there is no consistent subdivision pattern throughout the LGA this study aims to make the best of existing opportunities to overcome barriers to movement while attempting to preserve the unique character of the local street system.

Map 1 - Landform and barriers to movement


Crydon
Ashfield
Summer Hill
Lewisham
Petersham
Stanmore
Central
Redfern
Macdonaldtown
Newtown
Erskineville
St Peters
Kensington
Sydenham
Marrickville
Dulwich Hill
Hurlstone Park
Canterbury
Tempe
Wolli Creek
Turella
Bardwell Park
Arncliffe
Marrickville Bicycle Plan 2006
Cycling In and Around Marrickville
Map 1 Landform and barriers to movement
DRAFT July 2006
MARRICKVILLE council
Legend
50 metres
40 metres
30 metres
20 metres
10 metres
Sea level
Council boundary
Railways
State Roads (RTA)
Existing crossing (bridge or signals)
STC
Sustainable Transport Consultants Pty Ltd
Jamieson Foley Traffic & Transport Pty Ltd

Map 2 - Landform and existing street network


Crydon
Ashfield
Summer Hill
Lewisham
Petersham
Stanmore
Central
Redfern
Macdonaldtown
Newtown
Erskineville
St Peters
Kensington
Sydenham
Marrickville
Dulwich Hill
Hurlstone Park
Canterbury
Tempe
Wolli Creek
Turella
Bardwell Park
Arncliffe
Parramatta Rd
New Canterbury Rd
King St
Enmore Rd
Marrickville Rd
Illawarra Rd
Cooks River
Marrickville Bicycle Plan 2006
Cycling In and Around Marrickville
Map 2 Landform and existing road network
DRAFT July 2006
Legend
50 metres
40 metres
30 metres
20 metres
10 metres
Sea level
Council boundary
Railways
MARRICKVILLE council
STC
Sustainable Transport Consultants Pty Ltd
Jamieson Foley Traffic & Transport Pty Ltd

3.3 Existing bicycle network

The 1996 Marrickville Bicycle Strategy proposed a network of bicycle routes based on a two level hierarchy of regional and local routes. The Strategy identified the Roads and Traffic Authority of NSW as the agency responsible for the development of regional (cross-city) routes and included those listed in an earlier RTA study document.

Since 1996 RTA policy has shifted towards taking a greater responsibility for the provision of bicycle access and facilities on its own State Road projects and to developing a select number of regional routes across NSW as identified in its 1999 policy document: *Action for Bikes - Bikeplan 2010*. The only regional route affecting the Marrickville LGA identified in *Bikeplan 2010* is Penrith to CBD Rail Trail scheduled for completion in 2010. The RTA is not currently funding the development of its regional network though it has maintained its 50/50 funding of council bicycle initiatives.

During the past decade Council has proceeded with the development of its local routes (Map 3) while no progress has been made on the regional routes. This has resulted in an almost total lack of coherence and connectivity in the implemented 1996 network.

One of the first tasks of this study was to undertake a detailed technical assessment of the fifteen existing partly-implemented local bicycle routes. This was carried out by the consultants with assistance from Council staff and members of MASSBUG. A summary of this assessment is provided in Appendix C of this document.

Photo 1 - Existing route assessment surveys were carried out by the consultants assisted by MASSBUG members and Council staff. Maundrell Park, Petersham.

Map 3 - Marrickville Bicycle Network (existing)

Map 3 - Existing bicycle routes

4 Cycling in Marrickville in the coming decade

A key element in the development of the Marrickville Bicycle Strategy is the involvement and participation of the community. In July 2005 a workshop was held to exchange ideas on the "big picture" issues and to generally agree on broad principles that will guide the Strategy. Participants were asked to describe the kind of place they would like to see Marrickville become in 2010 with supportive sustainable transport policies in place and implementation of the latest Bicycle Strategy almost concluded. The following quotations are a selection of comments from this workshop:

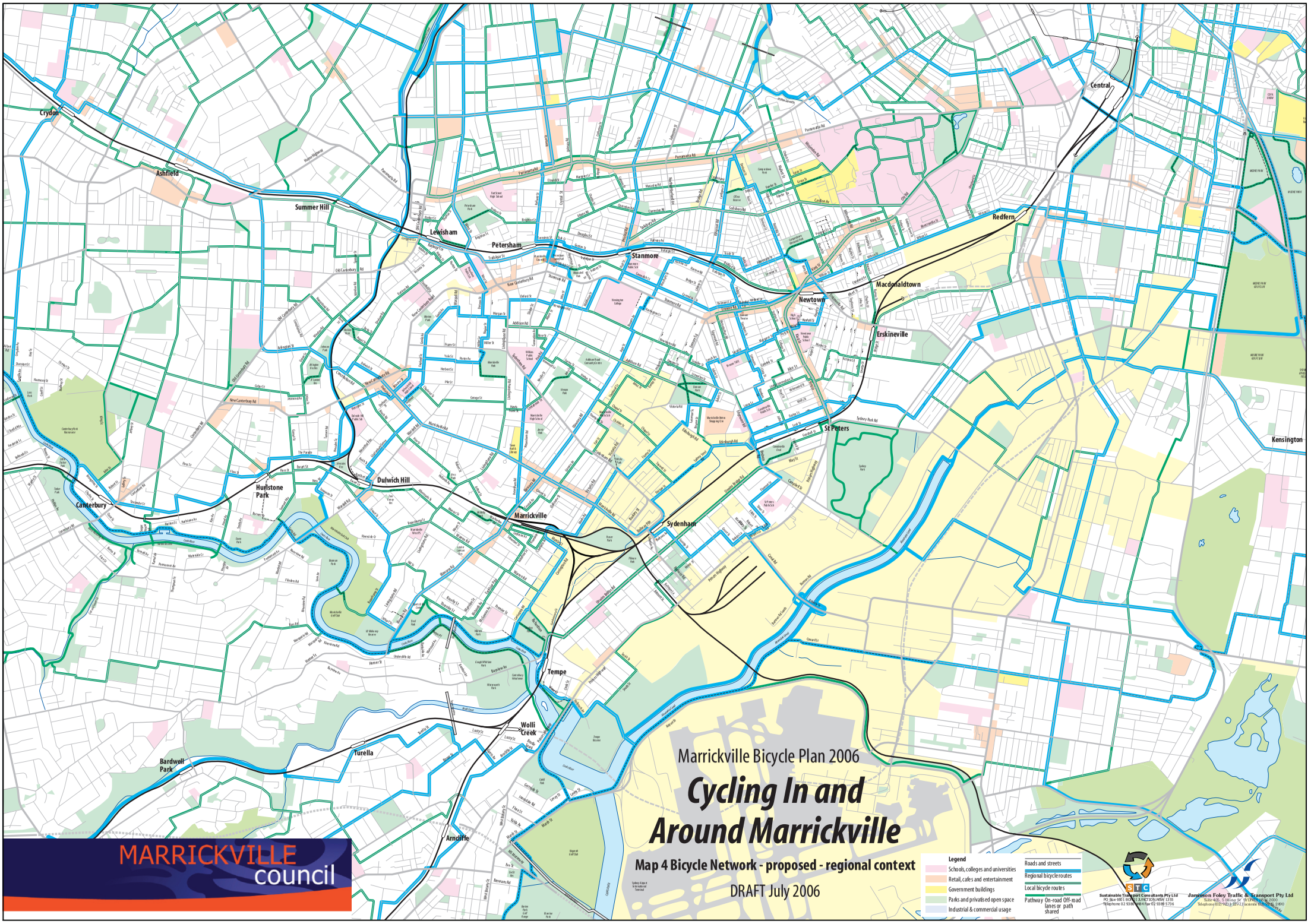
> *"In 2010 you will see people enjoying peace and quiet in their neighbourhoods because people are walking and cycling more and using their cars less. Imagine a line of cars and next to that is a wide bike lane, and you feel confident you could ride most of the routes with your children. You will see 12-year-olds riding to school and women in dresses riding slowly along the road. In addition to bicycles, there will be powered (but silent) two-wheeled vehicles. Cycling will involve the whole community, people will make a variety of trips by bike and it will be a normal activity."*
>
> *"Cycling will be safe. Cyclists will stop for pedestrians and would not need to wear helmets. You will see older people and people with various abilities on bikes. On most streets, people will feel comfortable to cycle at their level of ability rather than having to be as competitive as the other road users. The community overall will recognise the value of cycling and support it."*
>
> *"More people will work locally and facilities will in the one place. The cycling network will be made up of three radial spines comprising main roads with dedicated bike lanes that provide direct access to a most areas. There will be interconnected routes between the LGAs. Dedicated routes will link parks and suburbs and commercial areas. Cycling will increase to 5% of all trips. The Cooks River path will become a focal point for cycling in the region, representing best practice in cycling facilities and recreational cycling."*
>
> *"There will be separation between bicycles and motor vehicles via road closures and car free zones. There will be secure bicycle parking for everyday use, and major trip generators will be accessible by bicycle. Marrickville will be a green, bike-friendly, heritage suburb with strong links to Newtown and Sydney city. It would also be a place for bicycle tourism, with cyclists touring the Cooks River and other local points of interest."*

In order to realise the community's aspirations for safe, easy and convenient bicycle travel this Bicycle Infrastructure Development Strategy proposes a four point approach comprising the following elements:

1. Bicycle network plan
2. Bicycle parking plan
3. Integration with public transport
4. Bicycle friendly streets and neighbourhoods

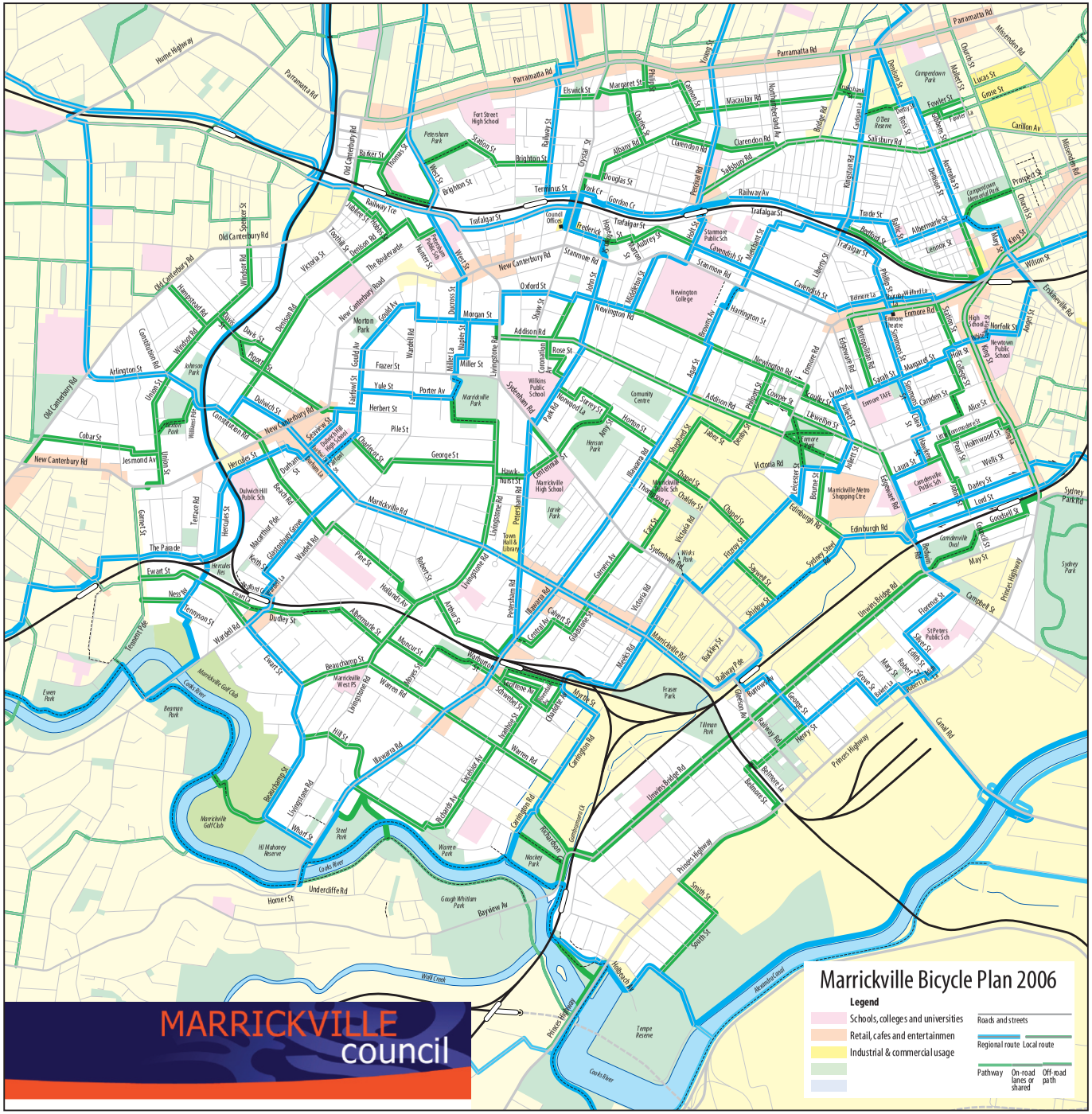
Each of these elements are covered in detail in the following sections of this document. Technical details and analysis are contained in the appendices.

Map 4 - Marrickville Bicycle Network – proposed – regional context


Crydon
Ashfield
Summer Hill
Lewisham
Petersham
Stanmore
Central
Redfern
Macdonaldtown
Newtown
Erskineville
St Peters
Kensington
Sydenham
Marrickville
Dulwich Hill
Hurlstone Park
Canterbury
Tempe
Wolli Creek
Turella
Bardwell Park
Arncliffe
Marrickville Bicycle Plan 2006
Cycling In and Around Marrickville
Map 4 Bicycle Network - proposed - regional context
DRAFT July 2006
MARRICKVILLE council
Legend
Schools, colleges and universities
Retail, cafes and entertainment
Government buildings
Parks and privatised open space
Industrial & commercial usage
Roads and streets
Regional bicycle routes
Local bicycle routes
Pathway On-road Off-road lanes or path shared
Sustainable Transport Consultants Pty Ltd
Jamieson Foley Traffic & Transport Pty Ltd

Map 5 - Marrickville Bicycle Network – proposed – local context

Map 5 - Bicycle network - proposed - local context



5 Developing the Marrickville bicycle network

The 2007 Marrickville Bicycle Strategy proposes a substantial upgrade of existing bicycle facilities to meet the future needs of the community. The proposed network is shown in Maps 4 and 5. Design principles for all construction work are provided in Appendix B.

5.1 Bicycle network route functions

The proposed Marrickville Bicycle Network consists of an interconnected set of marked bicycle routes providing access to residential areas and major trip generators within the Marrickville LGA and the Inner West region. There are three types of routes each with its own network function as shown in Table 1.

Specific details for the detailing, marking and engineering treatments for each route are provided in the following sub-sections and the appendices.

Table 1 - Bicycle routes and their network function

Parameter	Regional routes	Local routes	Bicycle friendly streets and neighbourhoods
Basic characteristics	High-quality, high-priority routes permitting quick unhindered travel between the major centres of the LGA and to key centres within the surrounding region	High quality routes connecting residential streets and trip generating locations to regional bicycle routes and providing circulation within the LGA	Providing easy local access to local residences and trip destinations in a 'low stress' environment
Transport function	Movement primary, access secondary	Movement and access equal	Access primary, movement secondary
Priority	High	Medium	Low
Place connections	Regional centres and major transport nodes	Urban centres, employment, schools, entertainment, cultural, transport	Individual homes, buildings and open space
Spacing of facilities	500 – 800m	300 – 500m	Integrated with local street system
Choice of route	Choice of two routes.	Choice of two routes	Less than 250m to a local or regional route
Continuity of movement	High	Medium	Low
Service linkage to major transport nodes	High priority. Primary linkage may be via connecting local route	High priority	Linked though network
Operation	30 km/h or more. Dual on-road and off-road travel paths through intersections	20-30 km/h	Less than 20 km/h
Target trip length	> 3km	0 – 3km	< 100m
User skill required	Low to high	Low to high	Low
Maintenance	Pavement maintenance similar to regional road standard	Pavement maintenance similar to local road standard	Depends on location and traffic load

5.2 Bicycle routes

Bicycle routes are normal streets and roads which have had engineering improvements made to them to enable bicycle riders to get to trip destinations more easily and with less stress than on the existing road network.

In most cases Marrickville bicycle routes tend to favour less trafficked roads where a mixed traffic environment is more compatible and vehicle speeds and volumes low. Where main

roads are unavoidable or the inevitable crossings of busy streets occur special intersection layouts will be devised to clearly guide the bicycle rider through these intersections.

The Marrickville Bicycle Network consists of three classes of route:

- Regional routes;
- Local routes and links (short linking routes or streets), and;
- Local streets.

Though bicycle routes are an essential component of a network, it is primarily the route junctions and intersections with busy roads which are given the most attention in this Strategy. For example, where a major bicycle route traverses a quiet residential street, there will usually be very little mid-block engineering treatment applied – apart from some local area traffic management (LATM) to ensure that vehicle speeds and volumes remain low.

Low-traffic volume, low traffic speed, residential streets will not be linemarked for local routes. On local routes only painted bicycle pavement symbols will be installed to denote the existence of the bicycle route. Some line marking will be used for regional routes, the 'main roads' of the bike network, to ensure a higher level of service and safety to users. A bicycle route passing through a local street is beneficial to residents because of the humanising influence and greater level of citizen supervision from people on bicycles as opposed to noisy polluting motor vehicle through traffic.

At the end of the street where the route crosses a regional arterial road, an engineered crossing point (ranging from painted lanes to traffic signals or bridges) will be provided. Marked bicycle operating space (lanes) will be fitted to all approaches. On regional routes both on-road and off-road paths will be provided for the bicycle rider at crossings or through intersections.

The Marrickville Bicycle Strategy will implement a number of engineering treatments recommended in the *NSW Bicycle Guidelines* (RTA 2003) which stresses the importance of separation as a key to providing much needed operating space for bicycles.

A discussion of the key principles guiding the development of the Marrickville bicycle network is provided in Appendix B. Details of proposed engineering treatments and works schedule costs are provided in Appendix A.

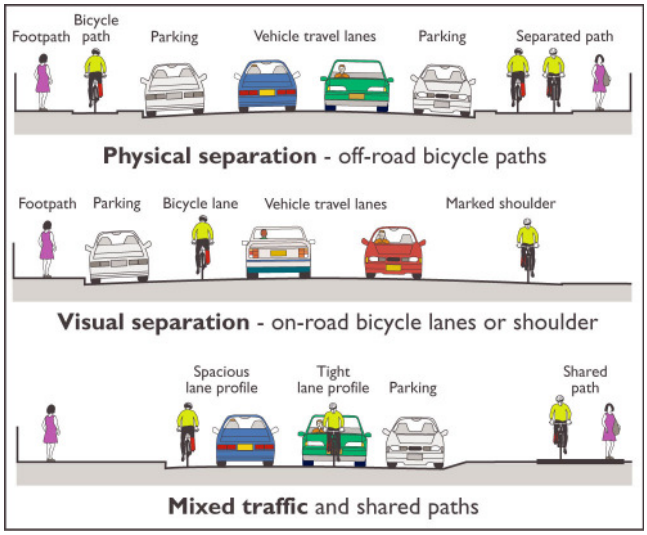


Figure 3 - Methods of separation (RTA 2003)

Figure 4 (overleaf) provides a pictorial summary of the key objectives of the Marrickville Bicycle Strategy's four point approach.

Figure 4 – Marrickville 2010: What will it look like?

Marrickville 2011: What will it look like?

Regional bicycle network routes

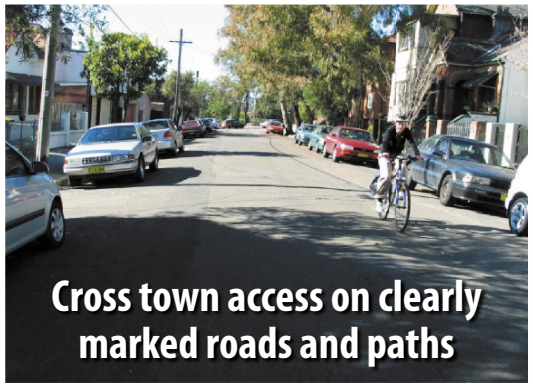
Cross town access on clearly marked roads and paths

Regional and local destinations sign posted

Clearly visible and easy to follow

Local bicycle network routes

Local access to regional routes. Only intersections marked



Cross town access on clearly marked roads and paths

Sympathetic low speed environment

Integration with public transport and parking

Plentiful parking (of all types) at railway stations

High level of access by marked routes and other facilities

Bike parking facilities at high volume bus stops

Bicycle friendly streets and neighbourhoods

Sympathetic local area traffic management schemes

Enthusiastic support from business and the community

Local streets safe enough for kids and adults to use

5.2.1 Regional routes

Regional routes are the 'main roads' of the bicycle network. These routes offer the highest level of facility and cater for cross-town trips and the widest range of trip purposes. Table 2 lists these routes most of which extend to points beyond the Marrickville LGA. North-south regional routes are shown on Map 6 and east-west regional routes are shown on Map 7.

Table 2 - Proposed Marrickville Bicycle Strategy regional routes

Route name	Code	Direction	Connecting
Cooks River to Iron Cove Greenway	RR01	North-south	Mostly off-road and paralleling the freight railway between Leichhardt, Dulwich Hill
Leichhardt to Earlwood via Dulwich Hill	RR02	North-south	Petersham Park, Petersham shops, Marrickville Park, Dulwich Hill station, the Cooks River cycleway
Balmain to Marrickville via Petersham	RR03	North-south	Norton St precinct, Petersham station, Marrickville Library and Town Hall, Marrickville station
Balmain to Earlwood via Stanmore	RR04	North-south	Stanmore shops and station, Addison Road Community Centre, Marrickville shops, Marrickville station, Cooks River Cycleway
Camperdown to Cooks River via Enmore	RR05	North-south	O'Dea Reserve, Enmore shops, Marrickville Metro shops, Enmore Park and pool, Marrickville industrial areas, Cooks River Cycleway
Annandale to Mascot via Newtown	RR06	North south	Glebe and Annandale, Camperdown Park, Newtown shops and station, Marrickville Metro shops, Camdenville Oval
Sydney to Parramatta via Newtown	RR07	East-west	Sydney CBD and Eastern Suburbs, Newtown shops, Stanmore shops and station, Petersham station and shops, Lewisham shops Summer Hill, Ashfield
Newtown to Canterbury via Dulwich Hill	RR08	East-west	Newtown shops and station, Enmore shops, Dulwich Hill shops, Hurlstone Park shops and station, Canterbury shops and station
Sydenham to Ashfield via Marrickville	RR09	East-west	Sydenham station, Marrickville shops, Dulwich Hill shops, Ashfield
Eastern Suburbs to Sydenham	RR10	East-west	Eastern Suburbs, Erskineville, St Peters station, Marrickville Metro shops, Marrickville industrial area, Sydenham station
Botany Bay to Ryde Cycleway	RR11	East-west	Brighton-le-Sands, Rockdale, Kyeemagh, Sydney International Airport, Wolli Creek station, Tempe Reserve and station, Steele Park, Earlwood, Canterbury, Strathfield, Ryde
Alexandria Canal Cycleway (North Bank)	RR12	East-west	Sydney CBD, southern Eastern Suburbs, Domestic and International Airport terminals, Sydney Park, Tempe Reserve and station, Wolli Creek station

5.2.2 Local routes

Local routes connect local streets to regional routes and extend the network 'web' further out into the LGA. Local routes do not extend beyond the LGA boundary.

A typical bicycle journey may start at a rider's residence. From there they would travel via local residential streets joining a local route which in turn deliver them to a regional route much as the road transport system works for motor vehicles.

Table 3 lists local routes and a number of shorter single-street connector routes called 'links'. North-south local routes are shown on Map 8. East-west local routes are shown on Map 9 and links are shown on Map 10.

Table 3 - Proposed Marrickville Bicycle Strategy local routes and links

Route name	Code	Direction	Connecting
Summer Hill to Hurlstone Park	LR01	North-south	Summer Hill shops, Dulwich Hill residential area, Johnson and Laxton Parks, New Canterbury Road shops, Cooks River Cycleway
Lewisham to Dulwich Hill	LR02	North-south	Petersham Park, Lewisham residential area and station, Dulwich Hill residential area and shops

Livingstone Rd (central)	LR03	North-south	Central and South Marrickville residential areas
Leichhardt to Stanmore	LR04	North-south	Leichhardt (Catherine St) to Stanmore Public School via Petersham Town Hall
South Marrickville	LR05	North-south	Marrickville Station to southern suburbs overlooking Cooks River
Enmore to Marrickville station	LR06	North-south	Enmore (Newington Rd to Marrickville Station via Marrickville Public School and shops
St Peters to Tempe	LR07	North south	St Peters, Sydenham and Tempe residential areas and stations, Camdenville Reserve, Marrickville Council Works Depot, Cooks River Cycleway, Mackey Park
Sydenham Station to Tempe Reserve	LR08	North south	Sydenham and Tempe residential areas, Tempe Reserve, Sydney Airport terminals, Wolli Creek station
Newtown to St Peters	LR09	North south	Newtown shops and station, South Newtown and St Peters residential areas, St Peters station, Sydney Park
King Street shops	LR10	North-south	Providing access to King St shops and Newtown entertainment precinct venues
Petersham to Lewisham	LR11	East-west	Northern Petersham and Lewisham residential areas, Petersham Park, Lewisham station
Camperdown to Petersham	LR12	East-west	Sydney CBD, Glebe, Sydney University, RPAH, Camperdown Park and residential area, North Stanmore residential area, Leichhardt
Salisbury Road	LR13	East-west	Sydney University, RPAH, Camperdown and Stanmore residential areas, Stanmore shops and station
Enmore Road shops	LR14	East-west	Providing access to Enmore Road shops and Newtown entertainment precinct venues
South Newtown to Petersham	LR15	East-west	Erskineville, southern Newtown, Enmore and Petersham residential areas, Enmore park and pool, Petersham shops
Addison Road	LR16	East-west	Marrickville Metro shops, Marrickville and south Petersham residential area, Addison Road Community Centre
Marrickville Industrial to Dulwich Hill	LR17	East-west	Marrickville Industrial Area, Henson Park, Marrickville and Dulwich Hill residential areas, Dulwich Hill shops
Marrickville station to West Dulwich Hill	LR18	East-west	Marrickville station and residential area, Dulwich Hill shops and residential area, Laxton Park, New Canterbury Road shops
Marrickville station to Hurlstone Park station	LR19	East-west	Marrickville Industrial Area (south), Marrickville station, Dulwich Hill station, Marrickville and Dulwich Hill residential areas, Hurlstone Park shops, station and residential area
Warren Road	LR20	East-west	Marrickville Industrial Area (south), Illawarra Road (south) shops, Marrickville residential area (south of the Bankstown rail line)
Clarendon Road	LL01	Link	Linking Salisbury Road and Camperdown to Petersham local routes
Camperdown Memorial Park	LL02	Link	Linking Sydney to Parramatta regional route to City of Sydney local route via Camperdown Memorial Park
Bedford Street	LL03	Link	Linking Newtown Bridge area to Sydney to Parramatta regional route
Watkins School	LL04	Link	Linking Petersham to Henson Park via Watkins School
Enmore Park North-South	LL05	Link	Linking the Camperdown to Cooks River regional route to the South Newtown to Petersham local route on a north-south path through Enmore Park
Bourne Street	LL06	Link	Linking Camperdown to Cooks River and Eastern Suburbs to Sydenham regional routes
Saywell Street	LL07	Link	Linking Fitzroy St regional route to Shirlow St regional route
Ness Avenue	LL08	Link	Linking Ewart St to Tennant Pde
Ewart Street	LL09	Link	Linking Leichhardt to Earlwood regional route to Marrickville station to Hurlstone Park station local route
Marrickville Golf Course bridge	LL10	Link	Linking Cooks River Cycleway and Earlwood residential area to south Marrickville residential area and Leichhardt to Earlwood regional route
Steel Park	LL11	Link	Linking the Cooks River Cycleway to the Balmain to Earlwood regional route and also the Recreational Centre in Steel Park

Mackey Park	LL12	Link	Direct route through park linking the Camperdown to Cooks River regional route to the St Peters to Tempe local route and Tempe station
Kendrick Park	LL13	Link	Direct route to Princes Highway bridge over Cooks River to Wolli Creek, Rockdale and beyond

5.2.3 Local residential streets

Local residential streets have an important function in the network as they are mostly the places where bicycle journeys begin or end. The Marrickville Bicycle Strategy proposes measures to ensure that these streets are maintained and reconstructed to 'bicycle friendly' standards. See the details in Section 8 – Bicycle Friendly Streets and Neighbourhoods and in Appendix F.

Map 6 - Marrickville Bicycle Network – proposed north-south regional routes

Map 6 - Regional routes (north-south)

Map 7 - Marrickville Bicycle Network – proposed east-west regional routes

Map 7 - Regional routes (east-west)

Map 8 - Marrickville Bicycle Network – proposed north-south local routes

Map 8 - Local routes (north-south)

Map 9 - Marrickville Bicycle Network – proposed east-west local routes

Map 9 - Local routes (east-west)

Map 10 - Marrickville Bicycle Network – proposed local routes (links)

Map 10 - Local routes (links)

6 Improving and expanding bicycle parking

People who ride regularly or casually need more than a network of bicycle routes. They also need secure places and parking facilities to store their bicycles at either end of the trip. Where riders use their bikes to get to work over longer distances they also need end of trip facilities such as change rooms and showers. Improving the availability of bicycle parking and end of trip facilities is a critical element in achieving the overall objectives of the Marrickville Bicycle Strategy.

Marrickville Council is responsible for parking within the public domain and within its buildings. It provides parking facilities for bicycle riders as a means of encouraging sustainable transport use and as a direct response to the unsustainable growth of on-street car parking demand.

Schools and business have a responsibility for providing parking for their staff, students and customers. Council has a role to promote cycling in the area and to assist them in developing positive parking programs.

This section of the Marrickville Bicycle Infrastructure Development Strategy deals with provision for bicycle parking in the public domain and in Council controlled buildings. The section following covers bicycle parking in relation to public transport infrastructure. Bicycle parking provision on private land is regulated by Marrickville Council's *Development Control Plan 19 – Parking Strategy* (MC-DCP19).

6.1 Bicycle parking plan objectives

1. Improve and expand the level and quality of bicycle parking in the public domain;
2. Enable wider community participation in Council's bicycle rack installation program;
3. Support the economic viability of private sector businesses, entertainment/food venues and residential developments by supporting the development of specially targeted parking facilities which provide security from theft and protection from the weather;
4. Require and encourage the private sector and government agencies to provide bicycle parking and end-of-trip facilities in and around their buildings; and,
5. Develop effective strategies to reduce bicycle theft.

6.2 Improving public domain bicycle parking

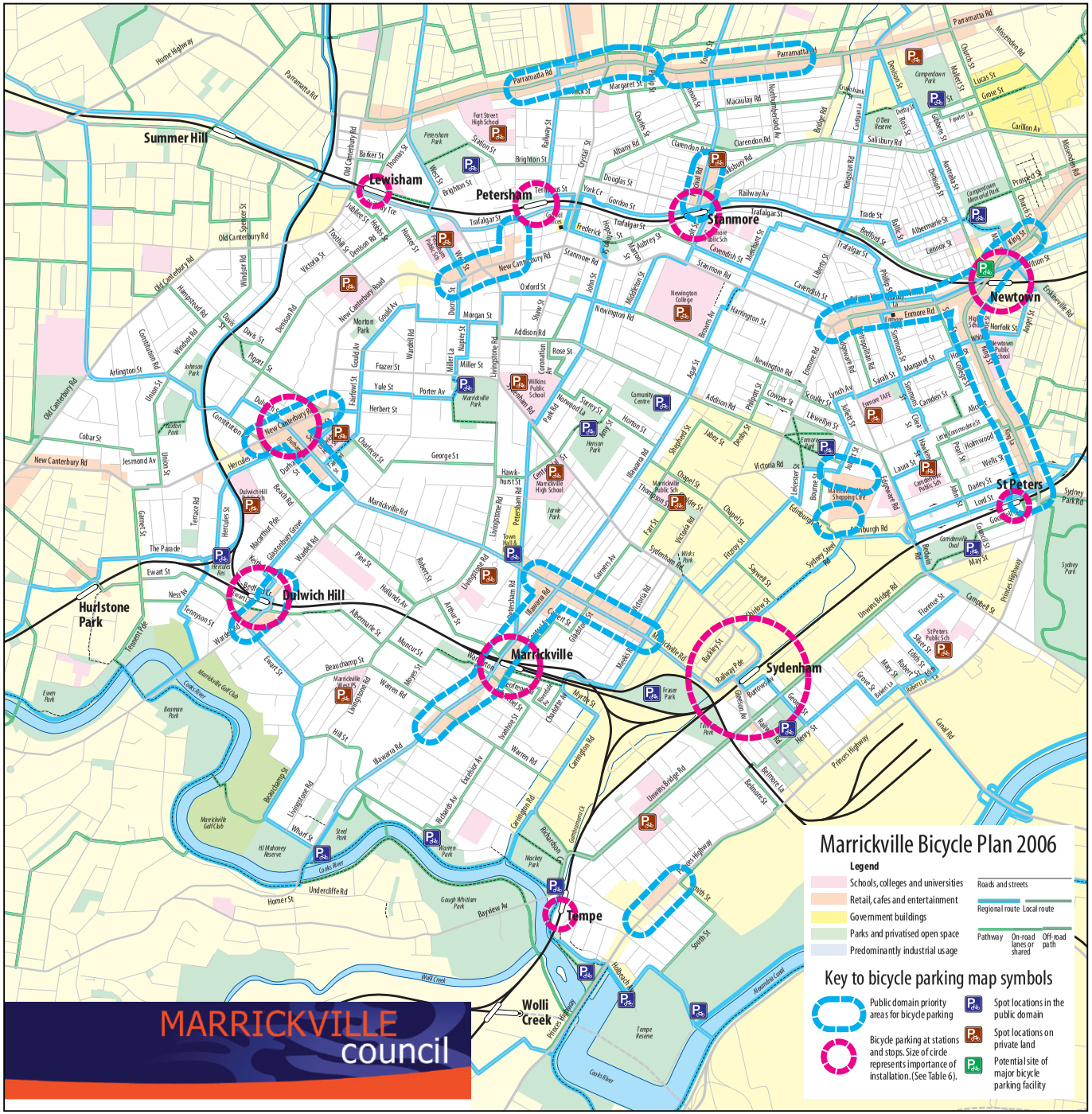
The table below lists proposed priority bicycle parking sites and their construction details. Parking plan priority areas are shown on Map 11 and in Table 5. These priority areas are high trip generating places with an already high demand for bicycle parking. Map 11 also shows additional spot locations. Detailed recommendations for bicycle parking installations are included in Appendix A.

Table 4 - Bicycle parking recommendations

Type	Location	Comments
Priority area	Main shopping, entertainment and commercial precincts	Survey existing and make recommendations for upgrade of facilities
Spot location in the public domain	Parks, pools, recreation centres, Council buildings	Survey existing and make recommendations for upgrade of facilities
Spot location on private land	Large schools, large workplaces	Encourage land owners to install racks and to encourage their students or employees to ride
Major bicycle parking facility	Newtown Bridge area	See section 6.4 below

Map 11 – Priority bicycle parking locations

Map 11 - Priority bicycle parking locations



6.3 Community participation in bicycle rack program

Marrickville Council has installed a large number of bicycle racks over the past decade. These have usually been installed as part of the Bicycle Strategy implementation process or as the result of direct requests from users – MASSBUG in particular.

In line with a number of proactive LGAs throughout the world, it is recommended that Marrickville Council establish a web-based application process which would enable a wider range of local businesses, residents, and community groups to request the installation of a bicycle rack in the public domain outside of the priority areas and sites listed in the preceding section of this document. Such a scheme is run by the City of Toronto in Canada. An example of the application form for this scheme is provided in Appendix D.

With an Internet based system, a web-generated email request would be sent to Council and evaluated by Council officers against an accepted criteria devised in conjunction with MASSBUG and subject to the availability of program funding.

In the past five years the materials, equipment and techniques for manufacturing and installing U-racks has improved. Nowadays it is a relatively quick and simple operation to accurately drill the required two holes in the pavement and secure the rack in position with bonding material. It is recommended that Council investigate a suitable contracted service which would supply and install a preferred standard-design bicycle racks in this manner. Following the setting up of the web-based application process and the internal procedures the scheme could then be launched to the public.

6.4 Encouraging private sector parking initiatives

A concept that is now well established in the Netherlands, Germany, USA, Japan and now Australia is the full-service bicycle storage and rental facility. In the Netherlands these are usually set up at or adjacent to railway stations and consist of a bike storage area (usually with a fee for service) operated by a bicycle retail and rental business. Planning is currently underway to establish one of these facilities in Brisbane.

Modelled after European and Japanese examples, Bikestation Long Beach USA was the first facility of its kind to open in the U.S. in March of 1996. Bikestation Palo Alto and Bikestation Berkeley opened in 1999; Bikestation Seattle opened in May 2003. The newest Bikestation, Embarcadero, in San Francisco, opened in August of 2004.

Bikestation is the parent organization that serves as an information-clearinghouse and support system to the individual operators that are responsible for the day-

The Oregonian Metro/Clark County

THURSDAY • JUNE 23, 2005 CLARK COUNTY BUREAU CHIEF ANDRE MEUNIER • 360-6

Reena Kawal puts her commuter bike on a rack at the Bikestation in Seattle's Pioneer Square area earlier this week. Todd Boulanger, a city of Vancouver transportation senior planner who is a Bikestation board member, is laying the groundwork to bring a Bikestation – generically known as a bike-transit center – to Portland and then perhaps Vancouver.

MICK GUNDERSON/SPECIAL TO THE OREGONIAN

Official recruits Portland to build bike center

Todd Boulanger extends a helping hand on the theory that success in Portland would likely spill over into his city

By ALLAN BRETTMAN
THE OREGONIAN

VANCOUVER — A Vancouver transportation official wants Portland to become even more bicycle friendly — and in the process create a course for his city to follow.

Portland has a network of bike lanes, covered bike lockers, and a gold-level Bicycle Friendly Community award bestowed by the League of American Bicyclists.

But the city doesn't have a bicycle station, or bike-transit center.

Todd Boulanger, a senior transportation planner for Vancouver, is helping Portland get one with the assistance of Bikestation. He serves as a board member for the nonprofit organization.

Covered, secure bicycle parking near public transportation — sometimes with bike repairs, parts, rentals, showers, public transportation access, maybe a coffee shop — has become popular, though not necessarily profitable, in many U.S. cities.

All of them have a government subsidy of some sort, according to a Los Angeles Metropolitan Transportation Authority study. Some have more retailing than others.

Bikestation has designed commuter-friendly bicycle stations in Seattle and San Francisco. It has acquired equipment for the stations and helps manage them.

BOULANGER
Hopes for more bikes in his city

A $3.1 million Chicago center — the Millennium Park Bicycle Station — has emerged as the ultimate in bicycle stations. Partners in the 300-space downtown station include city departments and bicycle advocacy organizations.

The station, which is not affiliated with Bikestation, has all-hours access for members and also boasts personal lockers, showers, retail, repairs, air-conditioning, a cafe and bicycle- and car-sharing programs. It offers Internet access, and public transit is nearby.

It seems natural that Portland should have a similar station, Boulanger said.

His thinking is that once Portland has one, it would enhance the possibility that Vancouver would get one as well.

Vancouver's agenda

Vancouver, in the meantime, is taking smaller steps. They include placing on-street bicycle racks around the downtown and incorporating a bicycle park-

Please see BICYCLES, Page B2

BIKE TALK

Topic: "Bikeway Design Tips for Here From Europe"
When: 3:30 to 5 p.m. Friday
Where: Clark County Public Service Center, 1300 Franklin Ave., Vancouver
Speakers: Todd Boulanger, senior transportation planner for Vancouver, and Michael Ronkin, an Oregon Department of Transportation specialist in bicycle transit design, will discuss what works and what doesn't for bike transportation.
Information on the Web: Bikestation – www.bikestation.org; Lloyd District Transportation Management Association – www.ldtma.com; Millennium Park Bicycle Station, Chicago – www.chicagobikestation.com; Münster Radstation, Münster, Germany – www.muenster.de/stadt/radstation (enter address in Google, then click "translation")

Figure 5 – A Oregon newspaper announces the opening of Bikestation Portland USA.

to-day operations of each facility. Local operators vary per location and consist of non-profit, for-profit and advocacy organizations.

Bikestation has worked with a number of agencies and organizations in the planning, development and implementation of Bike-transit related projects. While each facility is sponsored by various agencies project partners have included the Los Angeles County Metropolitan Transit Authority, Flexcar, City of Los Angeles Community Redevelopment Agency, City of Pittsburgh, Regional Transit District of the City and County of Denver, Puget Sound Regional Council, City of Cambridge, MA, South Coast Air Quality Management District, and the Cities of Santa Monica, Norwalk, Pasadena, North Hollywood and Santa Barbara.

Photo 2 - A council operated free parking shelter in Apeldoorn, the Netherlands. This building is owned by council and is in a busy shopping street.

An area of great potential for this type of development in Marrickville would be at Newtown. This area has one of the highest observed cycling populations in Sydney and is the hub of a busy arts and entertainment precinct. Associated with an improved rail service and organised along similar lines to the European and US examples, the facility could be successful provided that the right combination of operator, investment, building and location be secured.

It is recommended that within the next five years Marrickville Council investigate the feasibility of operating a Bikestation type operation in Newtown or elsewhere in the LGA.

6.5 DCP requirements for bicycle parking

The provision of bicycle parking in new development approvals is regulated by Marrickville Council's *Development Control Plan 19 – Parking Strategy* (MC-DCP19). While this document is relatively recent and provides a very good coverage of bicycle parking the method of determining the rate of provision (bicycle parking spaces per square metres of floor space) is considered by sections of the planning and development industry to be a rather abstract way of determining possible bicycle demand.

The *NSW Planning guidelines for Walking and Cycling* (DOP 2004) uses a methodology based on the number of people using buildings – employees, customers, guests, students etc.

It is recommended that when the next revision of DCP 19 is undertaken that the calculation methodology be brought into line with DOP 2004.

6.6 Bicycle theft prevention

Although bicycle theft in the Sydney region and in Marrickville is not a major problem, bicycles do get stolen in Marrickville and particularly in high use areas such as Newtown and Enmore. The theft of a bicycle is a major disruption for a bike rider and in many cases can even result in that person giving up riding for some period of time.

There is very little data available on bicycle theft. Police records usually indicate that most bicycle theft occurs mostly from homes or workplaces as the result of burglaries. More detailed user surveys undertaken in the 'high-usage countries' such as the Netherlands shows that many riders seldom report street theft to the police.

Effective theft prevention consists of four key components:
1. Availability of secure bike parking facilities
2. The use of high security locking devices by bike riders
3. Effective stolen bike recovery system and policing
4. Lack of a ready market for stolen bikes

It is recommended that Marrickville Council in association with MASSBUG and the Police Service formulate an theft prevention action plan should bicycle theft become an issue of major concern for the community.

7 Improving integration with public transport

Public transport cannot function effectively without some other method of transport before and after transit as very few public transport patrons live right at their origin stop or travel to a destination next to their final stop or station. Currently in Marrickville the CityRail public transport system is almost entirely fed by walkers. State Transit bus routes (see Map 12) generally infill the areas not served by rail and are not coordinated with the rail system.

Though the bicycle is ideally suited for shorter trips of up to 5km, using it in conjunction with public transport can greatly extend the range and length of trips. The Marrickville Bicycle Plan aims to improve the connection to public transport by working closely with public transport operators to:

1. Improve bicycle network access to all railway stations;
2. Improve and extend (long term and short term) parking provision at all railway stations and selected high volume bus stops; and,
3. Improve station accessibility and rider and walker safety around station entrances in conjunction with Council traffic calming and CityRail station access programs.

Photo 3 – Council-installed racks in the public domain at Sydenham station. This station is surrounded by very busy roads but it has three rail lines and excellent service frequency.

7.1.1 Bicycle network access to stations

Table 5 provides an assessment of each CityRail station in the Marrickville LGA looking at potential Cycle 'n' Ride catchments and other factors such as the quality of service available at that station.

There is currently poor access for cyclists to many stations. The Marrickville Bicycle Strategy aims to improve the Cycle 'n' Ride system by:

- providing coherent and consistent connections with Marrickville bicycle network routes;
- ensuring all adjacent major arterial roads (60km/h speed limit and above) provide a shared footpath route alternative;
- providing smooth transitions from off-road paths to on-road lanes;
- ensuring routes are well lit, so as to improve levels of usage and personal safety;
- ensuring access is improved for the catchment of about 2.5km from stations (feeder routes to the network need to be reasonably fine-grained as they provide for relatively shorter trips. This sub-network should be on a grid of less than about 250m);
- providing safe crossing points for cyclists on all major arterials adjacent to station entrances; and,
- providing adequate parking facilities at stations in conjunction with the NSW Government.

Table 5 - Bicycle feeder mode potential at individual station/stops

Station	Rail network function	Land use function	Potential	Comments
Newtown	Local	Residential, commercial	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Cycling to Redfern for better services is possible. Good opportunity for bike access by Camperdown and South Newtown residents. Station access steps only.
Stanmore	Local	Residential	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Good walking access from surrounding residential area. Bike travel catchment to the south has hill to climb to station. Good potential catchment to the north and beyond Parramatta Rd. Station access steps only.
Petersham	Local	Residential	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Residential catchment to the south has hill to climb to station. Good potential catchment to the north and beyond Parramatta Rd. Station access steps only.
Lewisham	Local	Residential, educational	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Good potential catchment to the south into Dulwich Hill. Station access steps only.
St Peters	Local	Residential, industrial	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Surrounding residential area is limited and within easy walking distance. Station access steps only.
Sydenham	Junction	Industrial Residential	High	Good rail service with choice of 3 lines and express connections to city. Good access from small residential area east of the station and to the industrial area to the west. Offers best bike catchment potential servicing central Marrickville, an area poorly serviced by buses. Downhill ride to station. Station access steps only.
Tempe	Local	Residential	Low	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Cycling to Wolli Creek station for better services is possible. Good walking access from Tempe residential area. Princes Highway (east) and Cooks River (south) are barriers to access from further afield. Station access steps only.
Marrickville	Local	Residential	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Good walking access from surrounding residential area. Good bike travel catchment to the south where bus service is poor. Station access steps only.
Dulwich Hill	Local	Residential	Medium	Average rail service (15min off-peak service weekdays and 30min service weekends) Choice of only one line. Good walking access from surrounding residential area. Good bike travel catchment to the south where bus service is poor. Station access steps only.

7.1.2 Design principles for Cycle 'n' Ride parking installations

The first consideration of a successful Cycle 'n' Ride installation has to be the location of the bicycle parking area at the station and the ease of access. Pedestrians should always have the greatest advantage and ease of access to stations, but this access should not be at the expense of bicycle users as the two can easily coexist in busy and well designed areas. Bicycle users are actually pedestrian rail users who have travelled a little further to get to the station so, like walkers, it should be very easy for them to park and get into and out of the station.

Given a choice, bicycle users will always try to lock their machines under cover and in a bright, well lit and supervised location. There is nothing more off-putting than to get off a train and have to ride a sopping wet bicycle home through the cold winter air.

In all countries where bicycles are well used, theft is a major issue and a deterrent to increased use. The quality of the racks provided at rail stations should be carefully considered. High capacity racks (see RTA 2003 Section 11) which are designed to fit as many bikes as possible into a given space, are easy to use and, for the station managers, easy to keep clean, are preferred instead of the low volume street-type rack.

Vertical lockers, where the front wheel of the bicycle is lifted onto a hook and hung, offer the best solution for the more committed Cycle 'n' Ride traveller who wants to pay a longer-term rental fee for the ability to store personal belongings as well as their machine.

Bicycle users who prefer to use easy access racks (providing their own locking device) can store bulky belongings short term in conventional station lockers where these exist.

In most cases, where bicycle racks and lockers have been installed at railway stations in Sydney during the past decade, the hardware has been installed on land either owned in part or full by local councils. The success of any Cycle 'n' Ride program depends on the level of cooperation between the transport operator and Council. The operator gains the direct benefit of increased patronage but the community also benefits from fitter, healthier citizens and a reduction of car-induced traffic congestion and its associated problems – pollution, noise, crash trauma.

Technical requirements and information on hardware (racks, lockers etc) and their installation is provided in Appendix D.

7.1.3 Rack and locker recommendations for stations

It is difficult to ascertain an initial quantity of racks and lockers to be installed at stations in Sydney when the scarce available data indicates that Cycle 'n' Ride travel is low. This is largely a direct result of non-existent provision or lack of interest by the rail authorities during the past decades, combined with the low bicycle use in the 1960's and 70's. Until very recently the Sydney rail system has not promoted or facilitated Cycle 'n' Ride.

The CityRail system has traditionally depended on walkers and bus travellers (where connecting services exist) to feed its network. A 1995 CityRail survey used in the Parramatta Rail Link project EIS showed that 24% of rail customers through Parramatta station and 39% through Epping station walk to the station from their point of origin.

Table 6 - CityRail access modes for Parramatta and Epping stations

Station	% Bus	% Walk	% Car driver	% Car passenger	% Other (Bike/taxi)
Parramatta	54	24	6	14	2
Epping	12	39	8	36	5

Table 6 shows details of this survey. Access by car is low at both these stations as car parking facilities are not provided and in the case of Parramatta, direct access by car to the station entrances is very difficult. Epping provides better access for 'kiss-and-ride' patronage (car passenger). It is also much easier to get to by foot and is surrounded by a large medium density residential area. Parramatta station is well-served by feeder bus services.

A March 2000 study conducted for Transport NSW (SKM 2000) to evaluate the department's Secure Bicycle Locker Scheme surveyed public transport use at a number of CityRail stations and State Transit ferry wharves and found a similar low bicycle use. The highest level of bike travel was recorded at Woy Woy (station 7%) while most stations and ferry wharves recorded 1% or less. High levels of walking were recorded at all locations.

From the survey data currently available it is estimated that bicycle users currently account for 1-2% of patronage to the CityRail system. Until very recently the adoption and marketing of Cycle 'n' Ride has not been a priority for CityRail or other public transport operators. This 1-2% rate for rail access by bicycle is roughly comparable to the level of transport trips made by bicycle throughout Sydney though there is now evidence that cycle to work rates in the Inner West are much higher (CSAHS 2003).

Bicycle parking recommendations for CityRail's Marrickville stations, based on this usage rate (1%) are shown in Table 7. Lockers are recommended only at junction stations where a higher level of rapid services is likely to produce demand for longer term bicycle commuter use generally associated with lockers. Locker demand is estimated at 10% of rack numbers.

These recommendations are only intended to deliver a start-up quantity of racks and lockers. Space should be reserved for future rack or locker installations.

Table 7 - Recommended quantity of bike parking racks and lockers at stations

Station	Patronage	Racks	Lockers	Rack cost	Locker cost	Total	Comments
Newtown	5,760	30	12	23,040	9,216	$32,256	Good walking catchment. Bicycle catchment increase potential from Camperdown and South Newtown.
Stanmore	3,130	16	6	12,520	5,008	$17,528	Good walking catchment. Bicycle catchment increase potential from North Marrickville and Annandale.
Petersham	3,490	17	7	13,960	5,584	$19,544	Good walking catchment. Bicycle catchment increase potential from South Petersham and Leichhardt.
Lewisham	2,140	11	4	8,560	3,424	$11,984	Good walking catchment. Bicycle catchment increase potential from Dulwich Hill and Leichhardt.
St Peters	3,220	16	6	12,880	5,152	$18,032	Good walking catchment. Bicycle catchment increase potential from South Newtown.
Sydenham	4,800	24	10	19,200	7,680	$26,880	Good potential for bicycle access from residential areas further afield due to higher frequency rail services and multiple lines available at this station
Tempe	1,200	6	2	4,800	1,920	$6,720	Walking catchment from east of station only. Bicycle catchment increase potential from west of station.
Marrickville	3,930	20	8	15,720	6,288	$22,008	Bicycle catchment can increase access from areas further afield to north and south of station.
Dulwich Hill	1,870	9	4	7,480	2,992	$10,472	Bicycle catchment can increase access from areas further afield to north, south and northwest of station.
TOTALS	**29,540**	**148**	**59**	**118,160**	**47,264**	**$165,424**	

Note 1: Each bike rack takes two bikes.
Note 2: Day totals are calculated as an average of enter and exit figures.

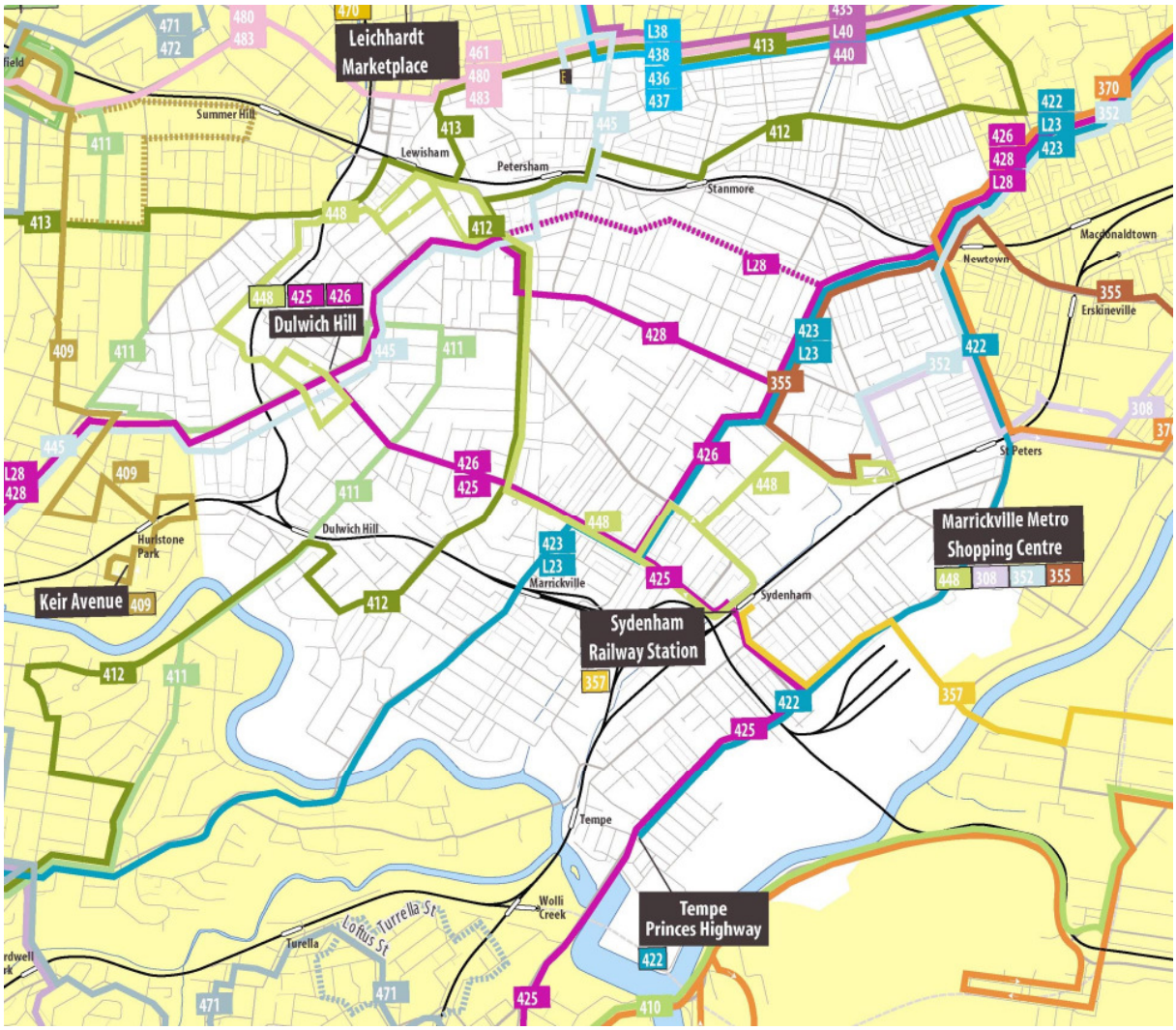
For the Cycle 'n' Ride concept to benefit Marrickville citizens there should be a strong coordinated promotion by the rail or bus operators and Council. It is recommended that the junction station Sydenham be initially targeted as a demonstration project while the scheme is progressively rolled out to the other non-junction stations.

7.1.4 Rack and locker recommendations for bus stops

Marrickville is well served by the State Transit bus route network (see Map 12) which covers most parts of the LGA not already serviced by the rail network.

As the aim of Cycle 'n' Ride is to make it possible for people to access public transport from further away than walking. The maximum trip for walkers is usually 800 to 1,000 metres. To take on the additional effort of riding and securing their bicycle, potential Cycle 'n' Ride bus passengers will only tend access services which offer them the best connection to their destination such as express services and those with a high service frequency. As the installation of Cycle 'n' Ride facilities also involves a cost and must be effectively marketed it is desirable to locate facilities at route hubs at suburban centres where a number of routes cross or connect so that there are multiple advantages in cycling to that point.

Map 12 - State Transit bus routes and CityRail stations in Marrickville



The suburban centre offering the best potential for a Cycle 'n' Ride scheme for bike-bus travel is the Dulwich Hill shops at the intersection of Marrickville and New Canterbury Roads which has a good mixture of express and high frequency city-bound and cross-regional services. It is recommended that a trial installation be undertaken and monitored before other locations are considered.

8 Bicycle friendly streets and neighbourhoods

Bicycles are vehicles and their riders will take them on any kind of road to access their destinations. Every street is a bicycle street.

Though the Marrickville Bicycle Strategy is focused on developing a workable network of routes which will help riders travel quickly, easily and safely within Marrickville and beyond, the bicycle network only covers a part of the streetscape – more needs to be done to make our streets and roads more bicycle friendly.

The Marrickville Bicycle Strategy proposes a number of measures to be undertaken by all Council departments to ensure that all new works and upgrades and maintenance of existing works provide a bicycle friendly environment throughout the LGA.

Recommended bicycle friendly measures to be adopted by Council as a matter of course for all its ongoing infrastructure works are:

1. Ensuring bicycle through-access is provided at all street closures, narrowings, traffic calming schemes and local car parking schemes;
2. Implicitly providing bicycle operating space on all road remarking by ensuring vehicle lanes are of adequate width at intersections and mid-block (wide kerbside lanes);
3. Providing bike friendly features on bridges, underpasses and other structures;
4. Developing a simple pavement repair reporting system to be used by cyclists and others;
5. Continuing Council's policy of replacing unsafe drainage grates;
6. The provision of plentiful bicycle parking is made ahead of all other parking provision;
7. Ensuring bicycle access is considered during road construction and maintenance;
8. Investigating a scheme for two-way bicycle access in all low-volume streets;
9. Supporting local government and community representations to the RTA to improve cyclist safety on state and regional roads; and,
10. Making representations to the RTA to include bicycle provision at all traffic signalised intersections within the LGA (including actuation of signals by bicycles).

These actions are implicitly included in the Marrickville Bicycle Strategy network works schedule. They should also be adopted by all council Departments as a matter of Council policy for implementation in all ongoing infrastructure construction and maintenance for all Council streets and roads.

The Marrickville South Sydney Bicycle Group (MASSBUG) is particularly interested in improving existing processes for addressing cycling issues in areas that lie outside designated Bicycle Strategy routes. In 2007, Council has been working with MASSBUG to improve reporting of cycling issues. At this stage, there are two main processes for this kind of reporting. The first is through phone, e-mail or mail correspondence to Council that highlights the issue(s) that need to be addressed. These matters are forwarded to relevant Council staff for attention as they are received. The second is by MASSBUG members raising issues directly at meetings of the Bicycle Working Group, a sub-committee of Council's Transportation Committee. These issues are reported to the Transportation Committee and forwarded to relevant staff for attention.

A third process has been proposed by MASSBUG that would involve auditing of areas, possibly on a ward-by-ward basis, to identify these issues. A model for this process is provided by the 2002 MASSBUG report Marrickville Council – Works for Bikes! This report identifies problem areas and suggests solutions, using photographs and written descriptions. MASSBUG has suggested that this process be revived and an updated version of this report be produced on a regular basis. Council will continue to work with MASSBUG to implement this process.

Appendix F provides further technical advice and recommendations on providing for cycling across the entire street network.

9 Implementation and evaluation

The implementation of this bicycle infrastructure development strategy will be closely coordinated with the implementation of the proposed Planning and Social studies. This coordination is essential to ensure that mutually supporting programs are delivered in a timely manner with an adequate level of funding and community support.

9.1 Monitoring and evaluation

A program to monitor implementation of the Bicycle Strategy is recommended. Such a program will feed back into the ongoing development of the Bicycle Strategy and ideally will permit improvements and cost savings. An investigation of bicycle strategy monitoring programs used elsewhere has determined that this process would be valuable and provide feedback for Council and the community. As good as monitoring programs may seem, they require effort, involvement and commitment from Council and the cycling community. Inevitably there are additional costs.

A number of international monitoring schemes were selected for evaluation. Common to all programs is the need to have a comprehensive scheme which will report on a range of issues covered by the Bicycle Strategy, such as:

- Engineering works programmes;
- Bicycle use;
- Modal share;
- Bicycle crashes;
- User satisfaction levels;
- Condition of bicycle facilities;
- Network implementation; and,
- Level of service improvements. (LTSANZ 2004)

Similarly a UK assessment process (ERCDT 2004) devised for local government recommends ten criteria for monitoring and assessment:

A. Local Transport Strategy and Cycling Strategy
B. Annual Progress Report
C. Council Commitment
D. Infrastructure
E. Cyclist Training
F. Marketing and Promotion
G. Stakeholder Engagement
H. Wider Engagement
I. Planning for Cycling
J. Targets and Monitoring

What many of these schemes have in common is that they have been designed as an evaluation methodology to fit the broadest range of situations, i.e. to monitor bicycle use in LGAs which often do not have a bicycle strategy in place.

In the Netherlands, where the development of networks and supporting programs is much more advanced, the national cycling organisation with substantial governmental support has developed its Cycle Balance scheme (FIETSERSBOND 2001) for providing an objective assessment of the physical network. The project involves riding a specially equipped bicycle fitted with sensors and recording equipment over the existing network and measuring the results.

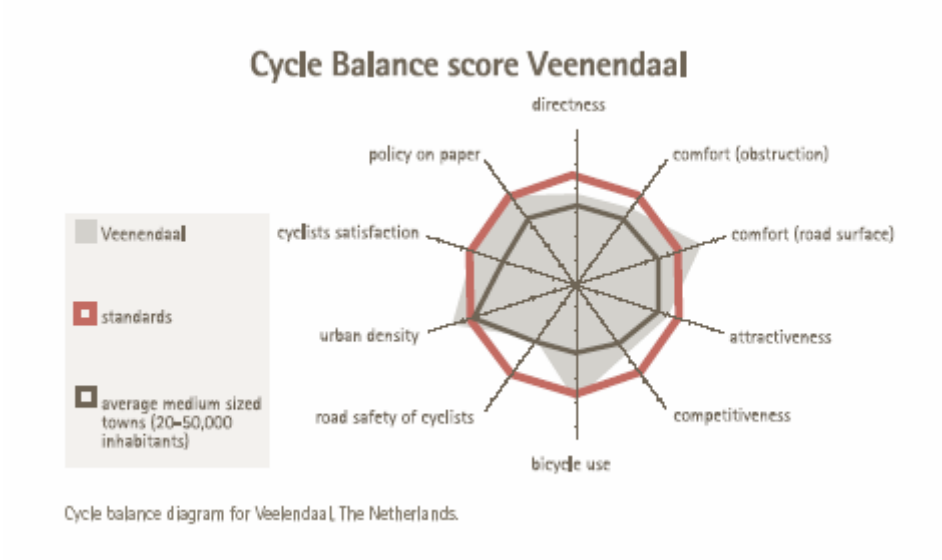


Figure 6 - Cycle Balance score for the Dutch town of Veenendaal

The UK methodology mentioned above, *Local Authority Assessment Progress Review 2004 – Guidelines and Matrices for Assessment* (ERCDT 2004) has the most relevance to the monitoring of Marrickville Bicycle Strategy implementation. It is recommended that this scheme be further assessed and modified to suit the direct needs of Marrickville.

10 Appendix A – Development of proposed routes

This section provides information on the detailed engineering treatments of each network route. Descriptions and costings of all proposed treatments is provided in a separate Excel spreadsheet.

10.1 Bicycle route engineering treatments

The maps on the following pages provide information on the engineering treatments proposed for regional and local bicycle routes. These maps are designed to be used in conjunction with the separate Excel spreadsheet: "MBP2007 Works schedule.xls".

Marrickville Bikeplan 2006 staged development - summary of estimates

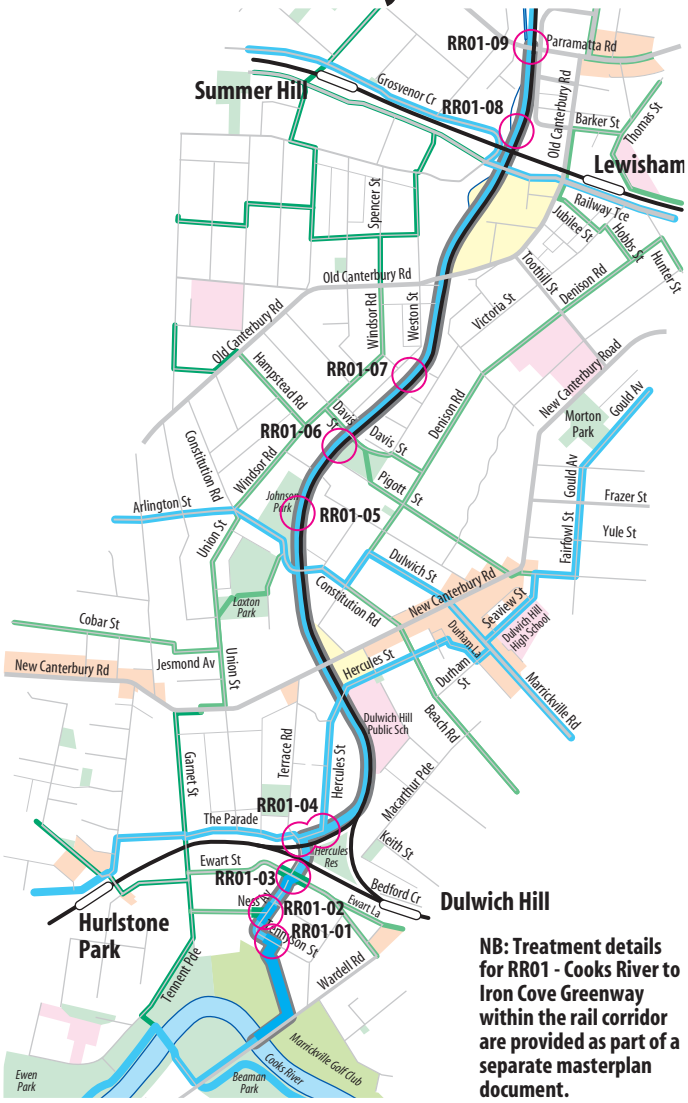
Route code	Route name	Location	Length km	Estimated cost	Stage 1 Years 1-2	Stage 2 Years 3-4	Stage3 Years 5-6	Stage 5 Years 7-8	Stage 5 Years 9-10
RR01	Cooks River to Iron Cove Greenway	Via the freight railway corridor between Dulwich Hill and Leichhardt	3.04	289,085	96,362	96,362	96,362		
RR02	Leichhardt to Ealwood via Dulwich Hill	Via Petersham Park, Petersham shops, Marrickville Park, Dulwich Hill station, the Cooks River cycleway	4.82	457,615		457,615			
RR03	Balmain to Marrickville	Via Norton St precinct, Petersham station, Marrickville Library and Town Hall, Marrickville station	3.09	293,835		146,918	146,918		
RR04	Balmain to Earlwood	Via Stanmore shops and station, Addison Road Community Centre, Marrickville shops, Marrickville station, Cooks River Cycleway	5.69	540,170		540,170			
RR05	Camperdown to Cooks River	Via O'Dea Reserve, Enmore shops, Marrickville Metro shops, Enmore Park and pool, Marrickville industrial areas, Cooks River Cycleway	6.39	606,955	606,955				
RR06	Annandale to Mascot	Via Glebe and Annandale, Camperdown Park, Newtown shops and station, Marrickville Metro shops, Camdenville Oval	5.50	522,785		522,785			
RR07	Sydney to Parramatta	Via Sydney CBD and Eastern Suburbs, Newtown shops, Stanmore shops and station, Petersham station and shops, Lewisham shops Summer Hill, Ashfield	3.74	355,490	355,490				
RR08	Newtown to Canterbury	Via Newtown shops and station, Enmore shops, Dulwich Hill shops, Hurlstone Park shops and station, Canterbury shops and station	5.77	547,675	547,675				
RR09	Sydenham to Ashfield	Via Sydenham station, Marrickville shops, Dulwich Hill shops, Ashfield	4.91	466,450			466,450		
RR10	Eastern Suburbs to Sydenham	Via Eastern Suburbs, Erskineville, St Peters station, Marrickville Metro shops, Marrickville industrial area, Sydenham station	2.81	267,140		133,570	133,570		
RR11	Botany Bay to Homebush Bay	Via Brighton-le-Sands, Rockdale, Kyeemagh, Sydney International Airport, Wolli Creek station, Tempe Reserve and station, Steele Park, Earlwood, Canterbury, Strathfield, Ryde	2.09	198,550	99,275	99,275			
RR12	Alexandra Canal	Via Sydney CBD, southern Eastern Suburbs, Domestic and International Airport terminals, Sydney Park, Tempe Reserve and station, Wolli Creek station	2.64	250,325			250,325		
		Sub total - Regional routes	**50.49**	**4,796,075**	**1,705,757**	**1,996,694**	**1,093,624**	**0**	**0**

LR01	Summer Hill to Hurlstone Park	Via Summer Hill shops, Dulwich Hill residential area, Johnson and Laxton Parks, New Canterbury Road shops, Cooks River Cycleway	1.36	61,290			61,290
LR02	Lewisham to Dulwich Hill	Via Petersham Park, Lewisham residential area and station, Dulwich Hill residential area and shops	2.15	96,750	96,750		
LR03	Livingstone Rd (central)	Via Central and South Marrickville residential areas	1.68	75,555			75,555
LR04	Leichhardt to Stanmore	Via Leichhardt (Catherine St) to Stanmore Public School via Petersham Town Hall	1.83	82,260	82,260		
LR05	South Marrickville	Via Marrickville Station to southern suburbs overlooking Cooks River	1.93	87,030	87,030		
LR06	Enmore to Marrickville station	Via Enmore (Newington Rd to Marrickville Station via Marrickville Public School and shops	2.27	102,015		102,015	
LR07	St Peters to Tempe	Via St Peters,Sydenham and Tempe residential areas and stations, Camdenville Reserve, Marrickville Council Works Depot, Cooks River Cycleway, Mackey Park	3.35	200,940			200,940
LR08	Sydenham Station to Tempe Reserve	Via Sydenham and Tempe residential areas, Tempe Reserve, Sydney Airport terminals, Wolli Creek station	1.87	84,285	84,285		
LR09	Newtown to St Peters	Via Newtown shops and station, South Newtown and St Peters residential areas, St Peters station, Sydney Park	2.10	94,275	94,275		
LR10	King Street shops	Via Providing access to King St shops and Newtown entertainment precinct venues	1.38	82,980			82,980
LR11	Petersham to Lewisham	Via North Petersham and Lewisham residential areas, Petersham Park, Lewisham station	1.16	52,380		52,380	
LR12	Camperdown to Petersham	Via Sydney CBD, Glebe, Sydney University, RPAH, Camperdown Park and residential area, North Stanmore residential area, Leichhardt	3.56	159,975	159,975		
LR13	Salisbury Road	Via Sydney University, RPAH, Camperdown and Stanmore residential areas, Stanmore shops and station	1.39	83,340		83,340	
LR14	Enmore Road shops	Via Providing access to Enmore Road shops and Newtown entertainment precinct venues	1.08	64,560			64,560
LR15	South Newtown to Petersham	Via Erskineville, southern Newtown, Enmore and Petersham residential areas, Enmore park and pool, Petersham shops	4.71	211,770	211,770		
LR16	Addison Road	Via Marrickville Metro shops, Marrickville and south Petersham residential area, Addison Road Community Centre	2.03	111,650		111,650	
LR17	Marrickville Industrial to Dulwich Hill	Via Marrickville Industrial Area, Henson Park, Marrickville and Dulwich Hill residential areas, Dulwich Hill shops	4.21	189,540	189,540		
LR18	Marrickville station to	Via Marrickville station and residential area, Dulwich Hill shops	3.18	143,100		143,100	

	West Dulwich Hill	and residential area, Laxton Park, New Canterbury Road shops							
LR19	Marrickville station to Hurlstone Park station	Via Marrickville Industrial Area (south), Marrickville, Dulwich Hill and Hurlstone Park residential areas and stations	2.13	95,850				95,850	
LR20	Warren Road, Marrickville	Via Marrickville Industrial Area (south), Illawarra Road (south) shops, Marrickville residential area (south of the Bankstown rail line)	1.41	63,450					63,450
		Sub total - local routes	**44.77**	**2,142,995**	**0**	**0**	**1,005,885**	**588,335**	**548,775**
		Sub total - links		**240,000**			**80,000**	**80,000**	**80,000**
		TOTAL - all routes	**95.26**	**7,179,070**	**1,705,757**	**1,996,694**	**2,179,509**	**668,335**	**628,775**

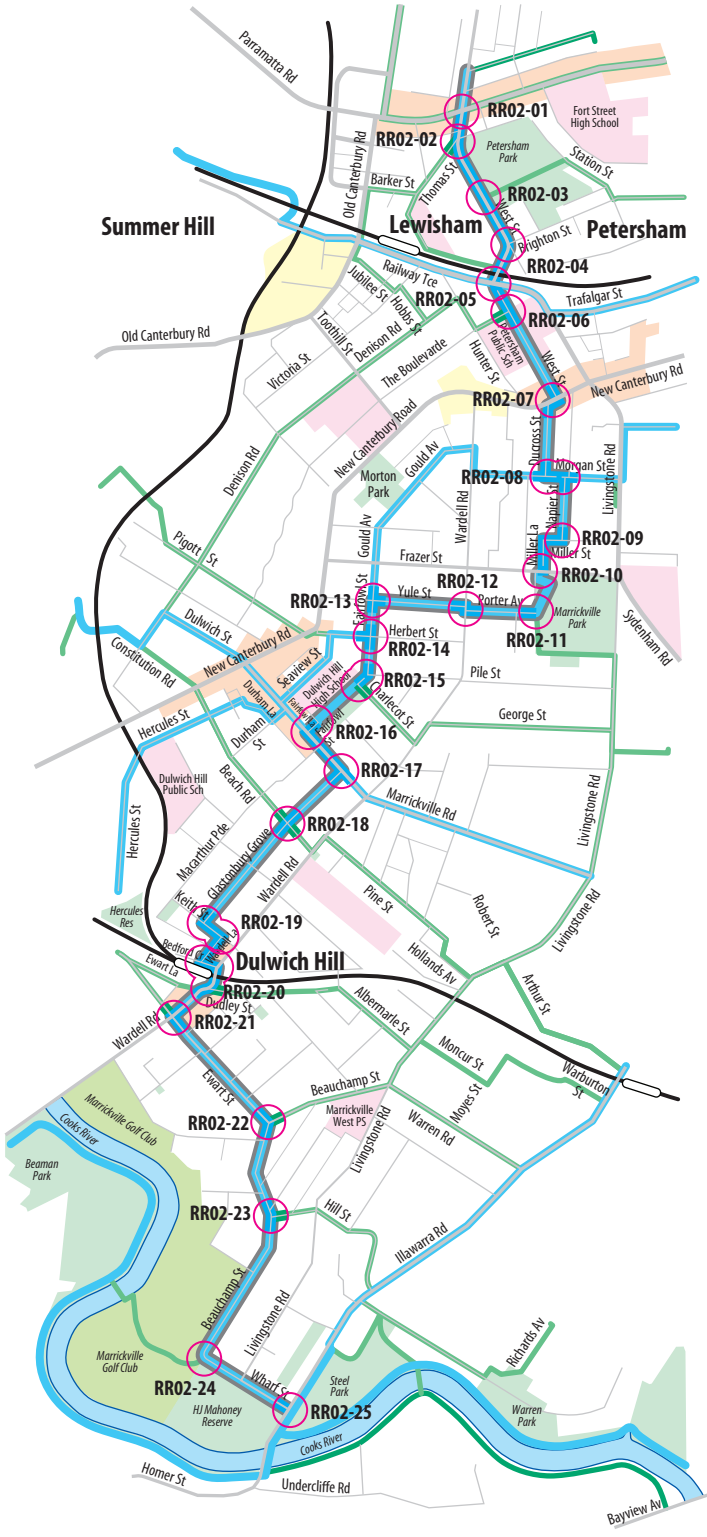
Marrickville Bikeplan 2006 Map RD01

Route RR01 detail - Cooks River to Iron Cove Greenway

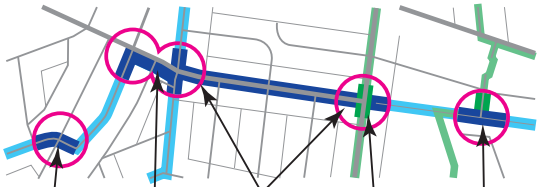


NB: Treatment details for RR01 - Cooks River to Iron Cove Greenway within the rail corridor are provided as part of a separate masterplan document.

Route RR02 detail - Leichhardt to Earlwood Regional Route



Key to route detailing map symbols



Intersection treatment with lanes | Off-road path along major road between intersections | Bicycle lanes along this section of road | Junction with local route with lanes | Junction with local route with lanes

Regional route on-road (no linemarking)

Regional route off-road
Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road
Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

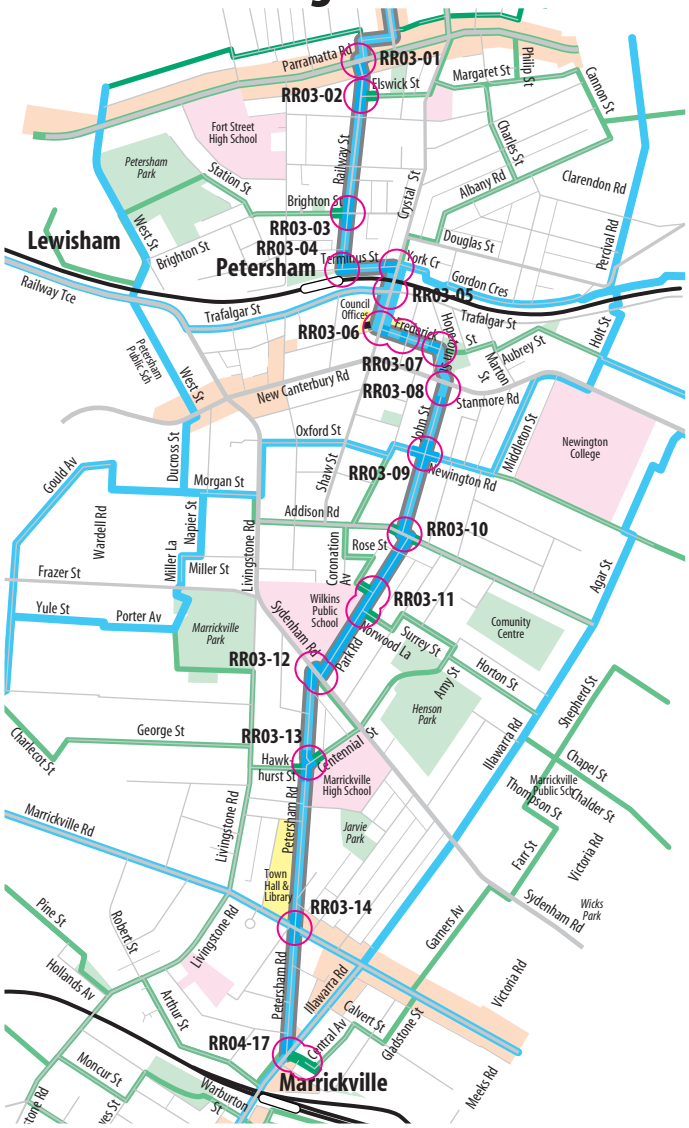
- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

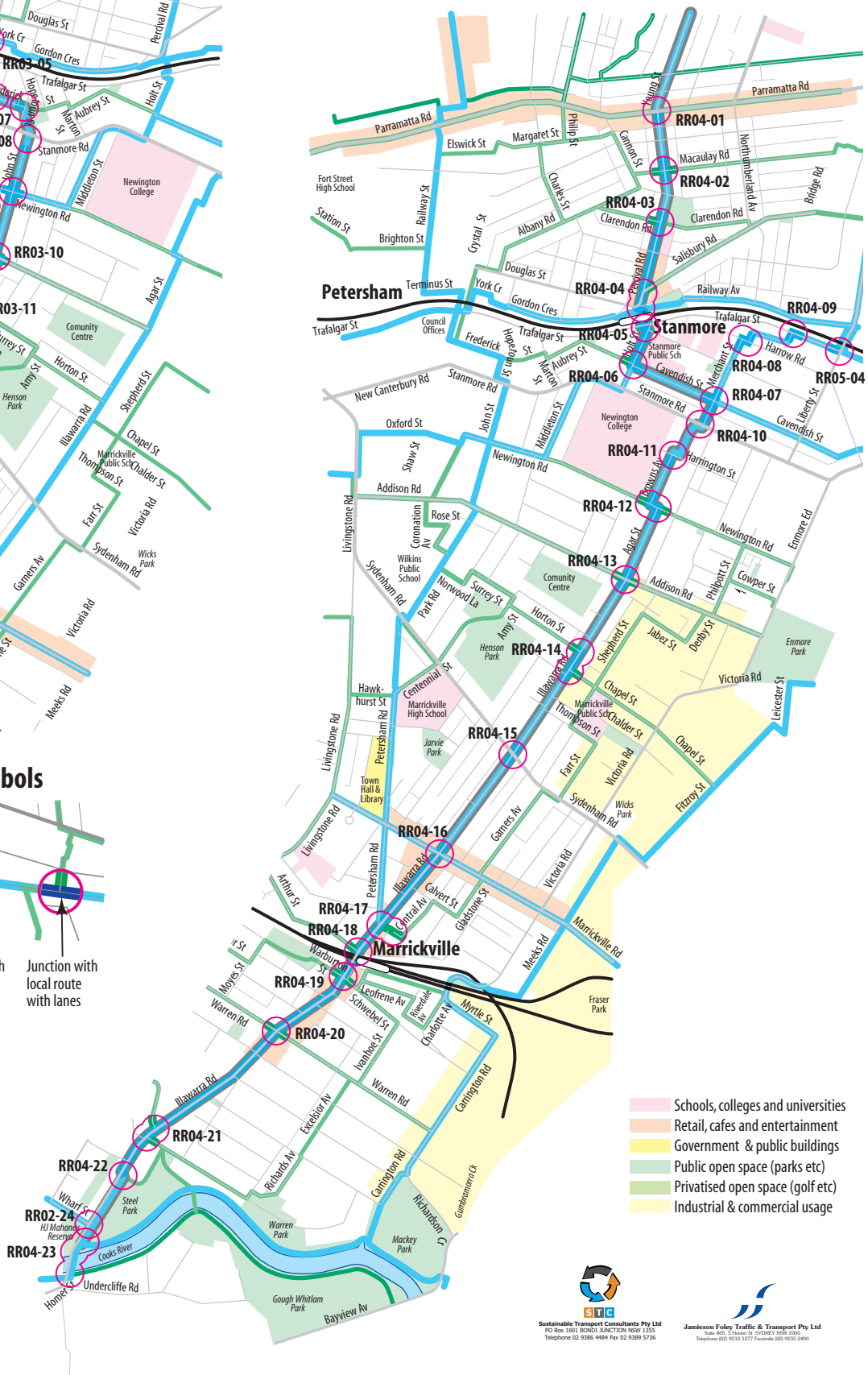
Jamieson Foley Traffic & Transport Pty Ltd
Suite 403, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD02

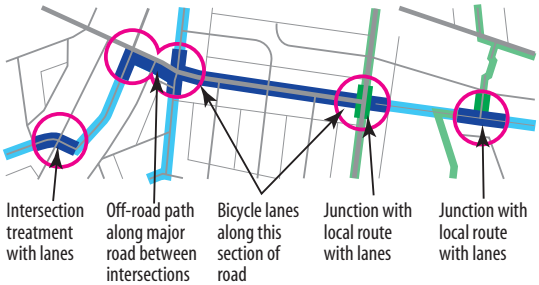
Route RR03 detail - Balmain to Marrickville Regional Route



Route RR04 detail - Balmain to Earlwood Regional Route



Key to route detailing map symbols



Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

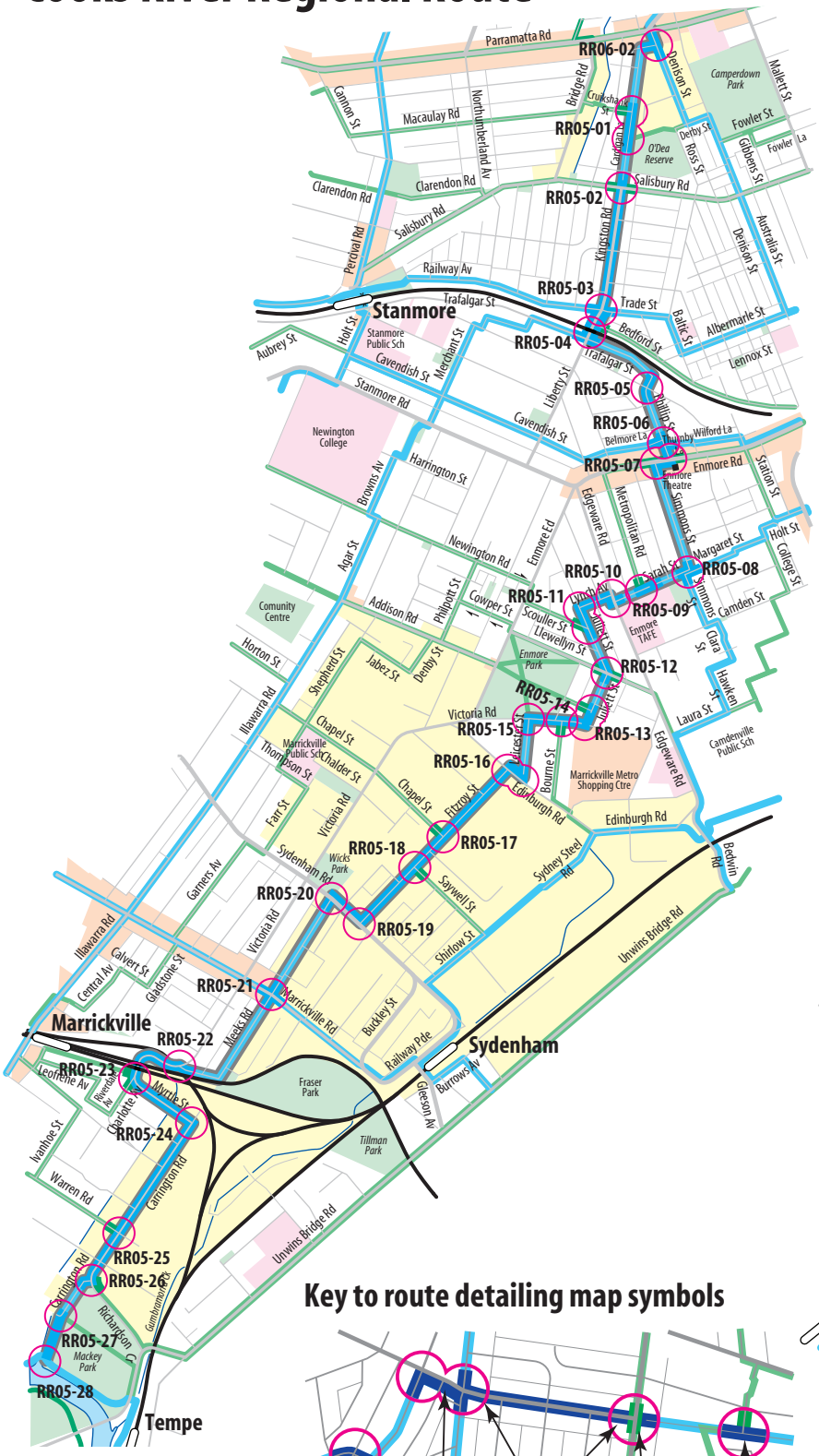
- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

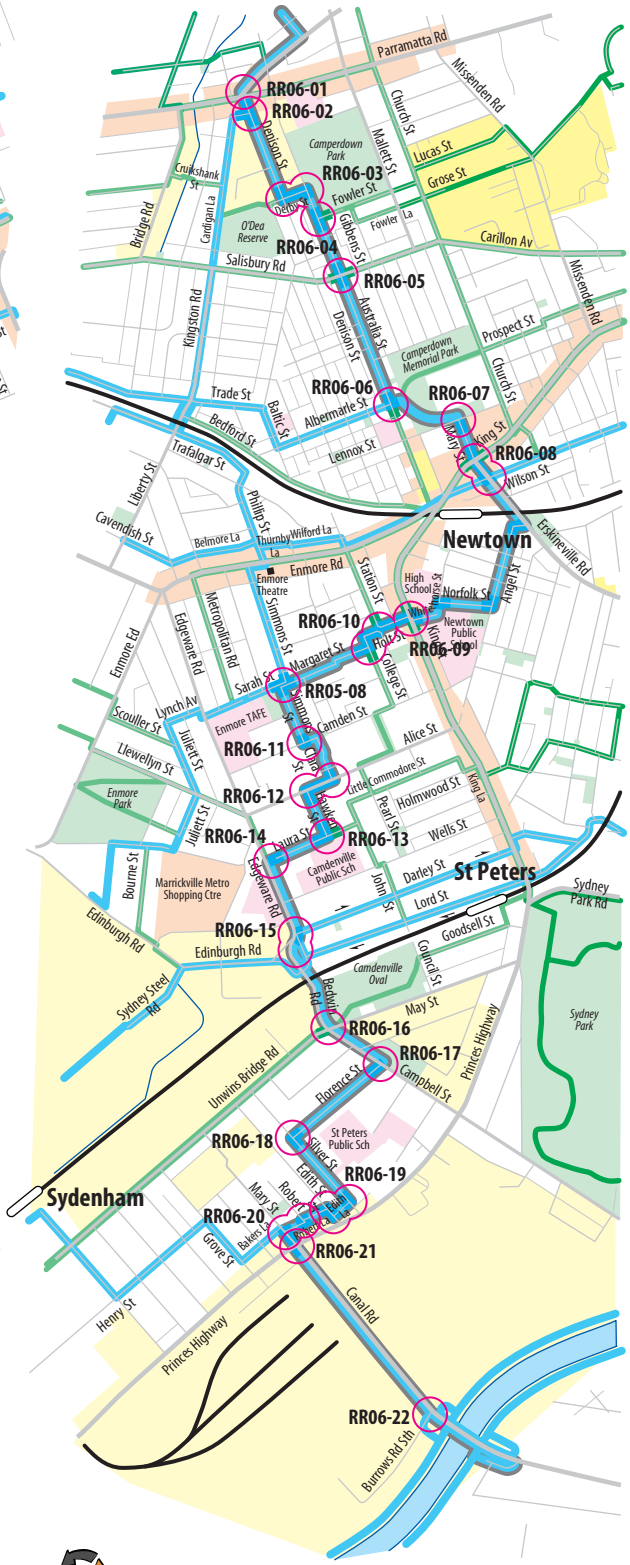
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD03

Route RR05 detail - Camperdown to Cooks River Regional Route



Route RR06 detail - Annandale to Mascot Regional Route



Key to route detailing map symbols

Regional route on-road (no linemarking)

Regional route off-road
Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road
Not near a road (park etc) — *Beside a road*

Local route on road with lanes

Schools, colleges and universities
Retail, cafes and entertainment
Government & public buildings
Public open space (parks etc)
Privatised open space (golf etc)
Industrial & commercial usage

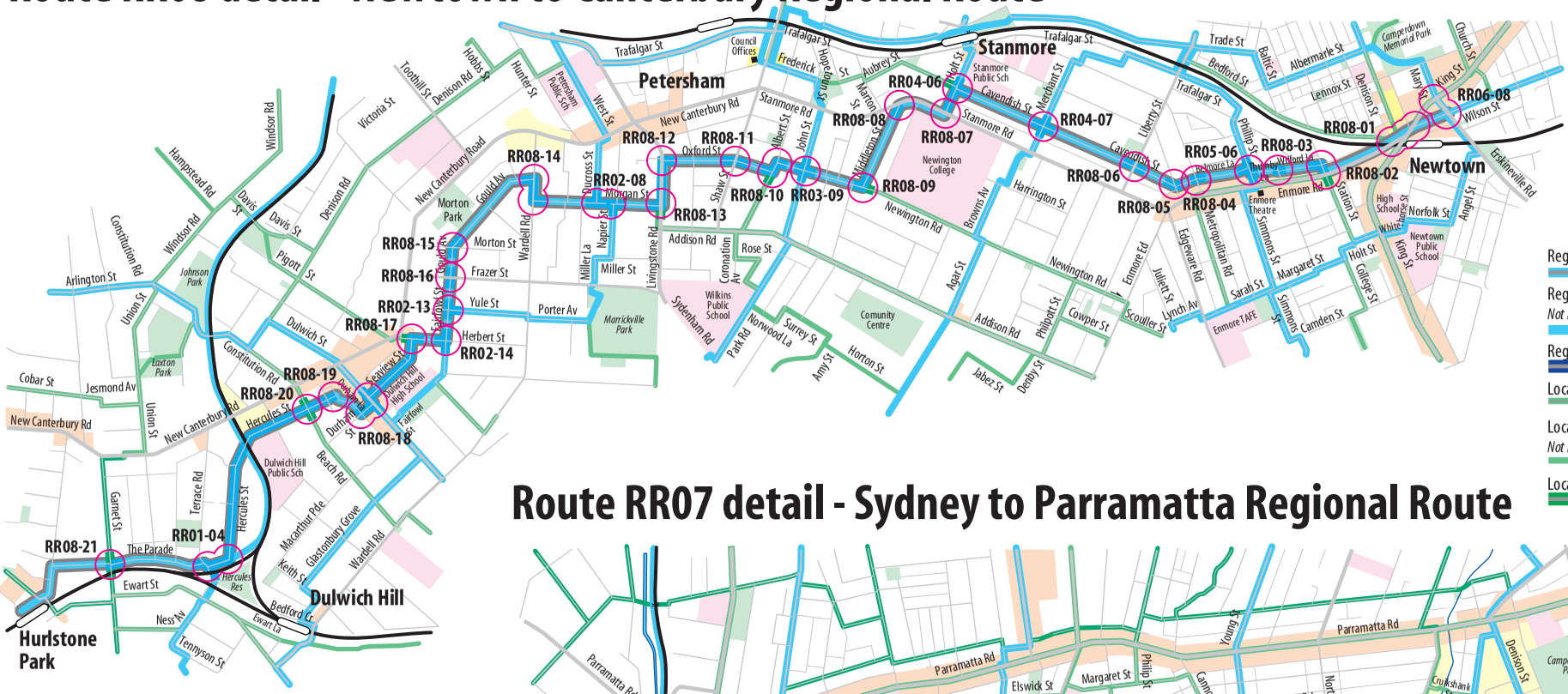
RR01-12
Proposed intersection treatment with construction code

STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD04

Route RR08 detail - Newtown to Canterbury Regional Route



Regional route on-road (no linemarking)

Regional route off-road
Not near a road (park etc) *Beside a road*

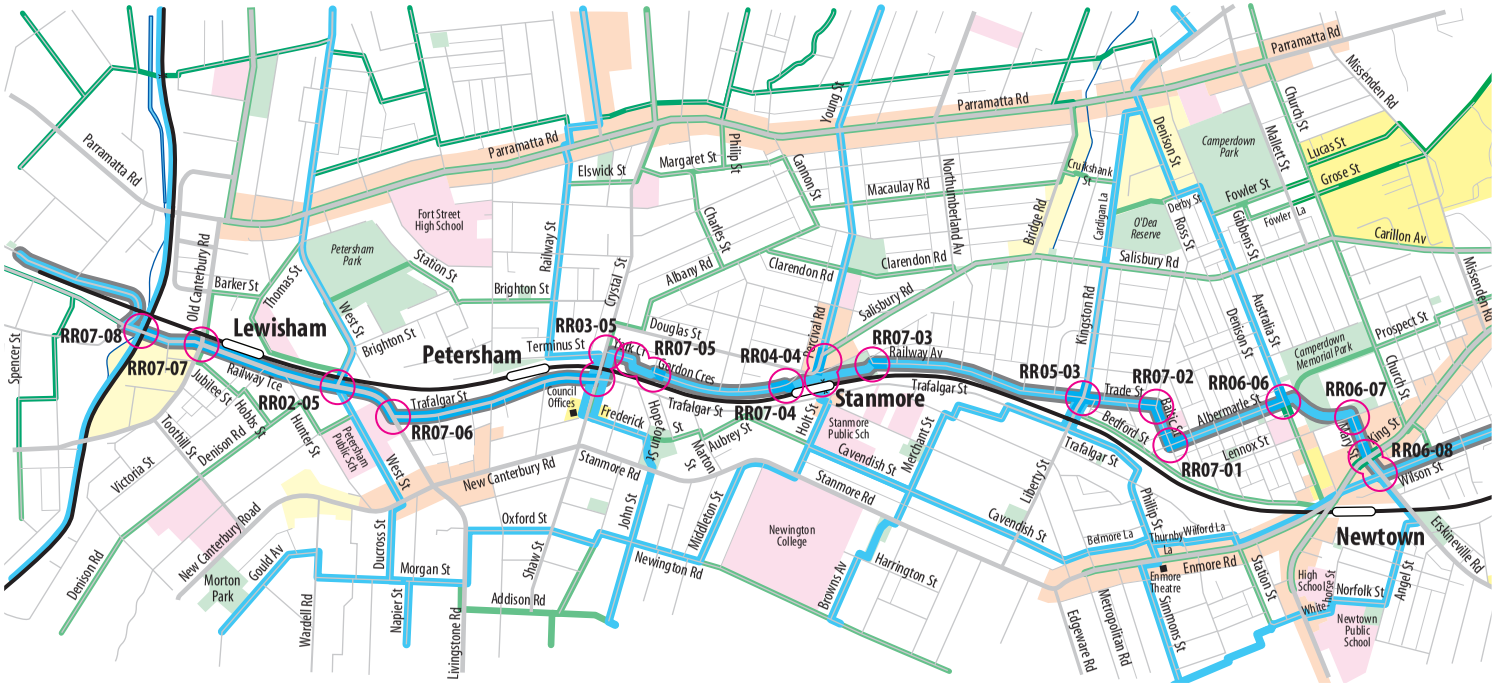
Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

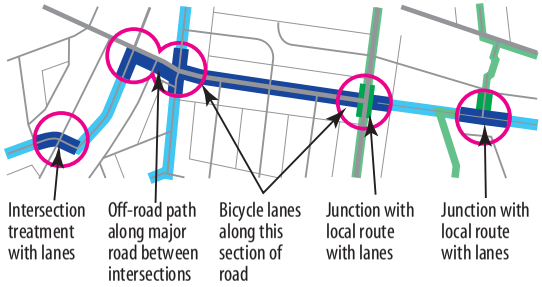
Local route off-road
Not near a road (park etc) *Beside a road*

Local route on road with lanes

Route RR07 detail - Sydney to Parramatta Regional Route



Key to route detailing map symbols



Intersection treatment with lanes

Off-road path along major road between intersections

Bicycle lanes along this section of road

Junction with local route with lanes

Junction with local route with lanes

Schools, colleges and universities

Retail, cafes and entertainment

Government & public buildings

Public open space (parks etc)

Privatised open space (golf etc)

Industrial & commercial usage

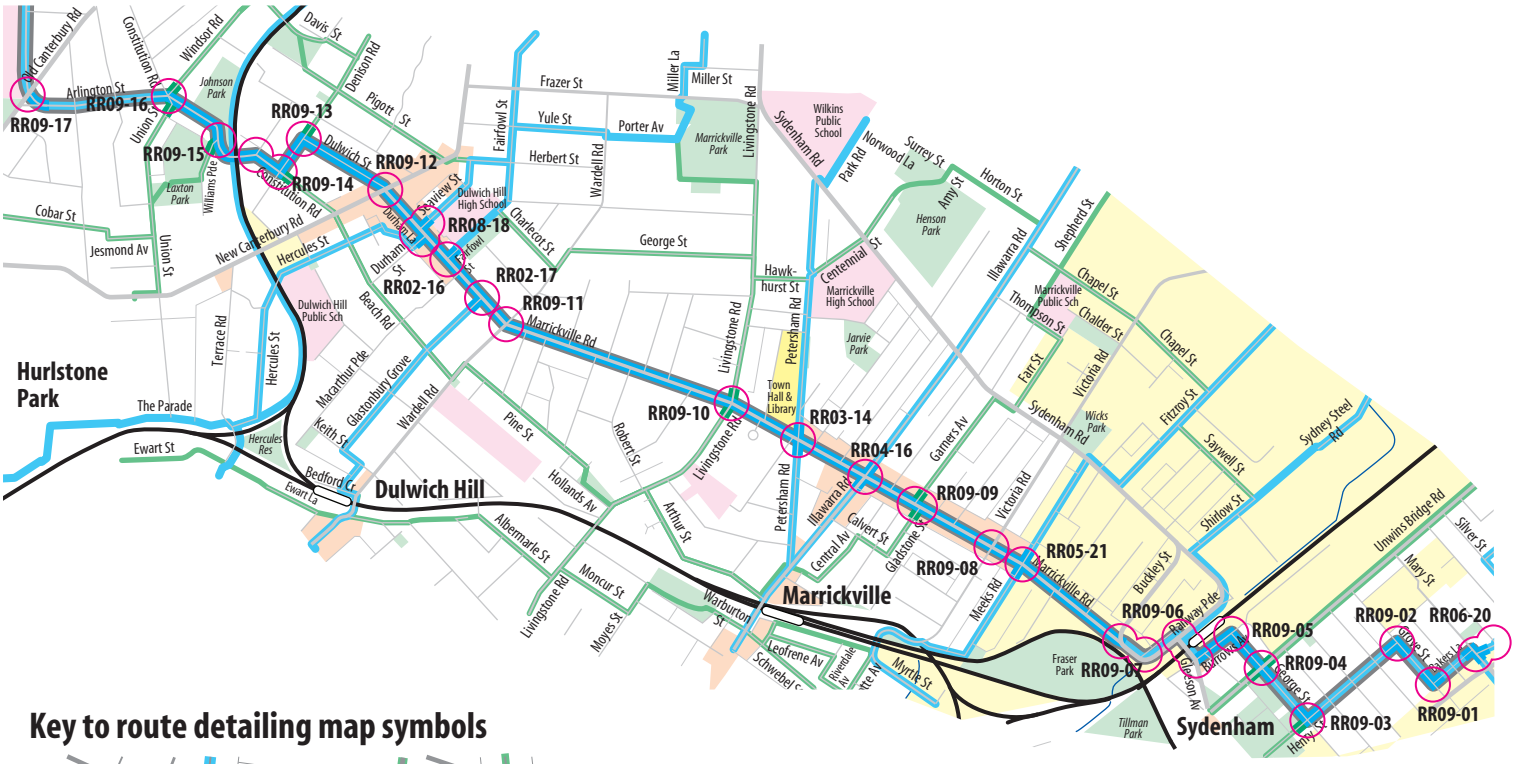
RR01-12

Proposed intersection treatment with construction code

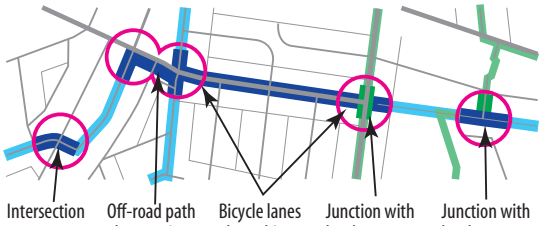
Marrickville Bikeplan 2006 Map RD05

MARRICKVILLE council

Route RR09 detail - Sydenham to Ashfield Regional Route



Key to route detailing map symbols



Intersection treatment with lanes

Off-road path along major road between intersections

Bicycle lanes along this section of road

Junction with local route with lanes

Junction with local route with lanes

Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 Proposed intersection treatment with construction code

Schools, colleges and universities

Retail, cafes and entertainment

Government & public buildings

Public open space (parks etc)

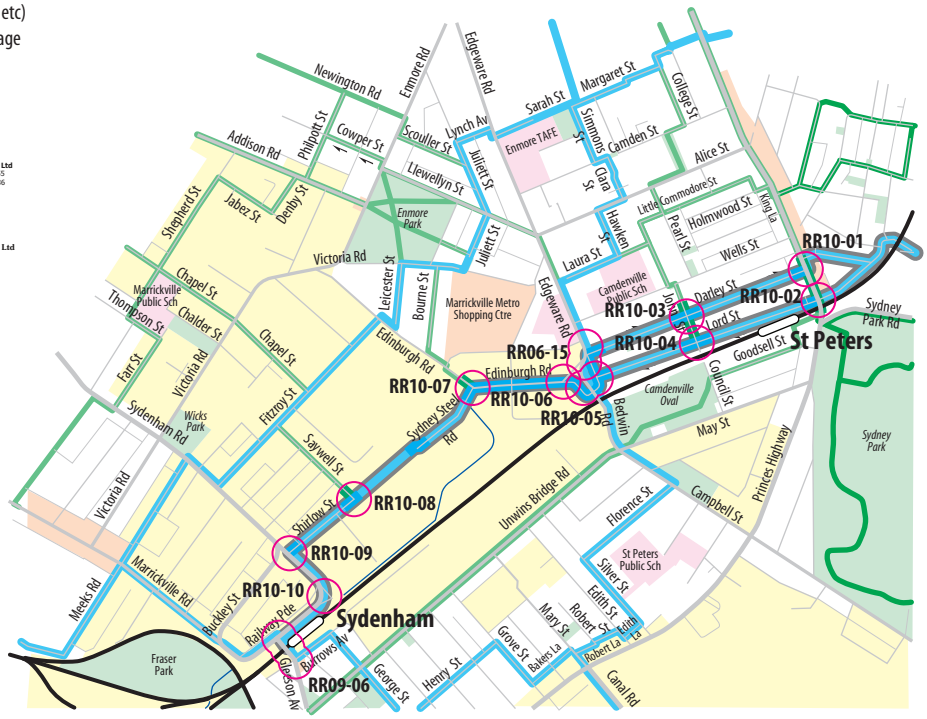
Privatised open space (golf etc)

Industrial & commercial usage

STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

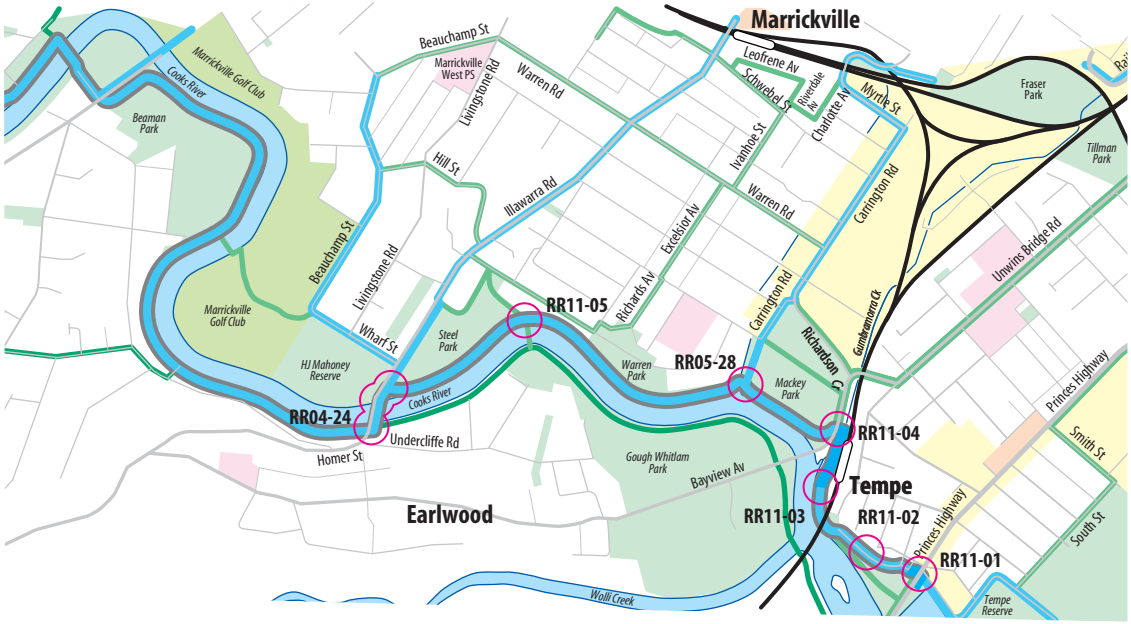
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Route RR10 detail - Eastern Suburbs to Sydenham Regional Route

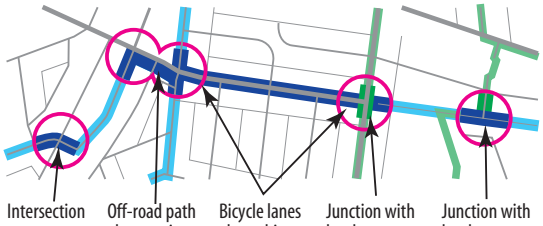


Marrickville Bikeplan 2006 Map RD06

Route RR11 detail - Botany Bay to Homebush Bay Regional Route



Key to route detailing map symbols



Intersection treatment with lanes

Off-road path along major road between intersections

Bicycle lanes along this section of road

Junction with local route with lanes

Junction with local route with lanes

Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

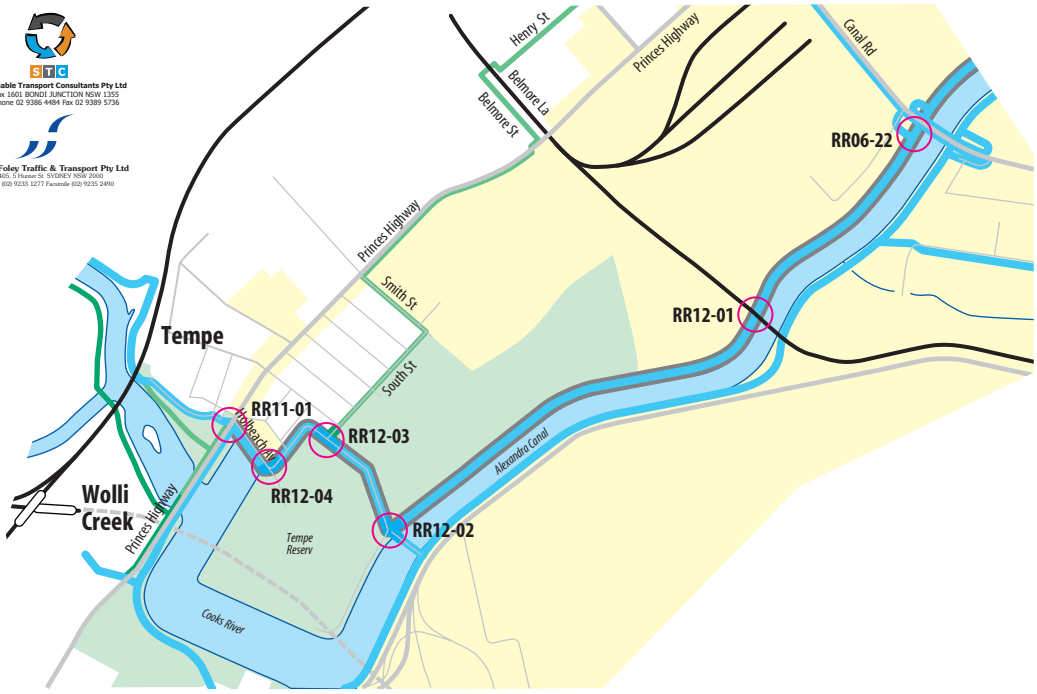
RR01-12 — Proposed intersection treatment with construction code

- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

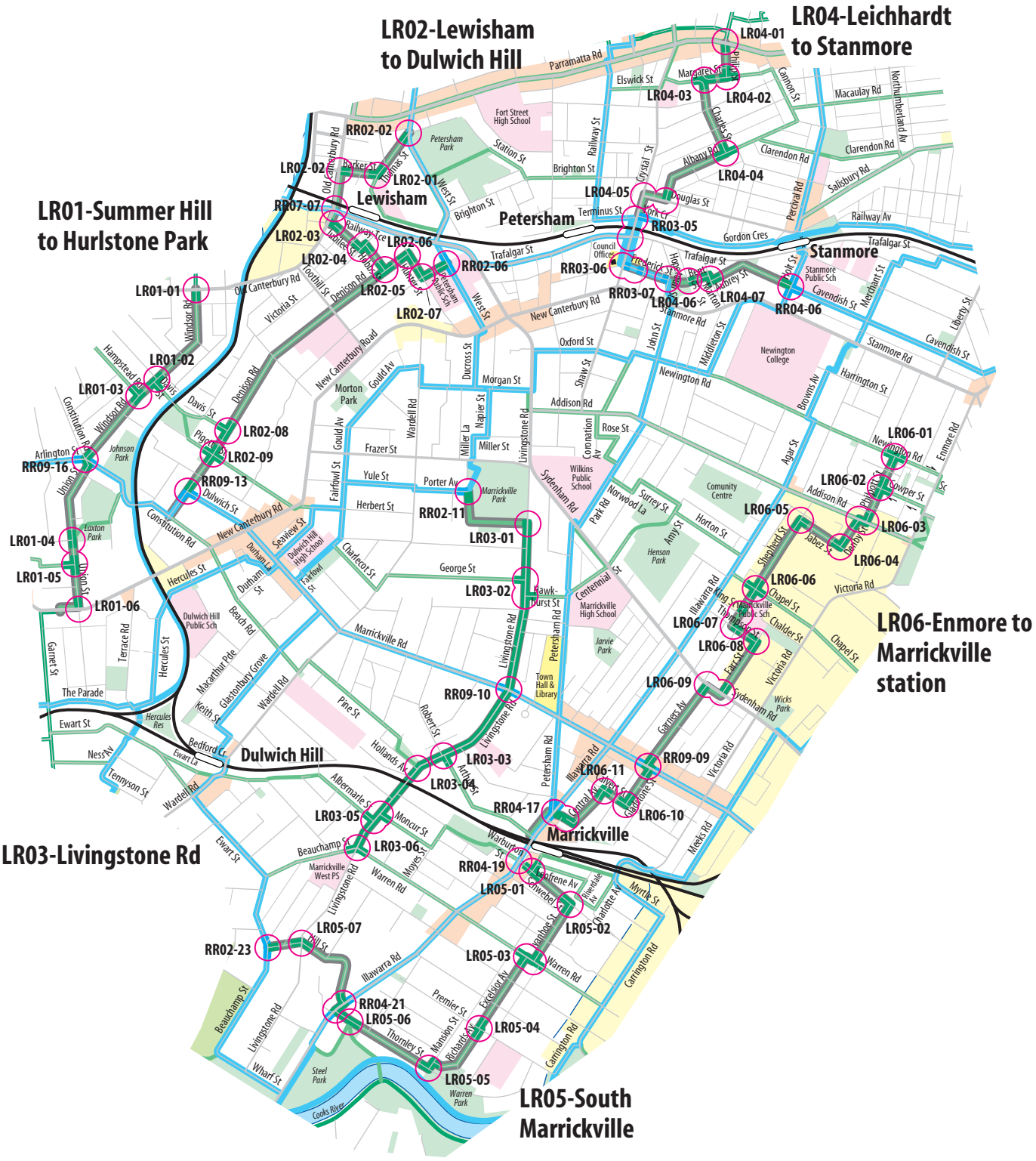
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Route RR12 detail - Alexandra Canal North Bank Regional Route

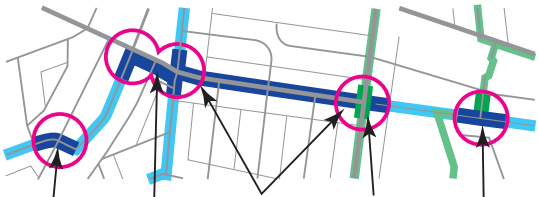


Marrickville Bikeplan 2006 Map RD07

Routes LR01-LR06 detail



Key to route detailing map symbols



Intersection treatment with lanes

Off-road path along major road between intersections

Bicycle lanes along this section of road

Junction with local route with lanes

Junction with local route with lanes

Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

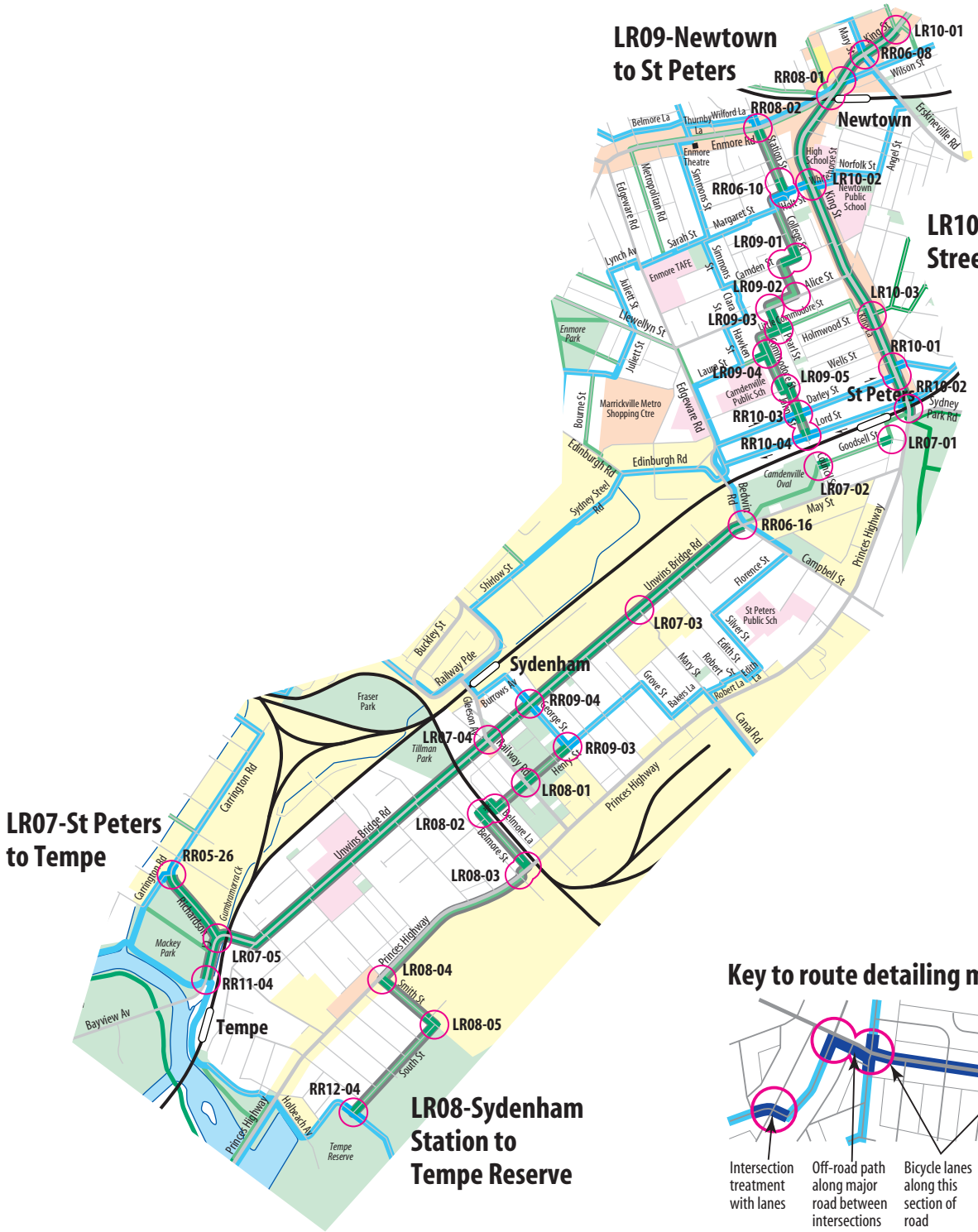
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD08

Routes LR07-LR10 detail

MARRICKVILLE council



Key to route detailing map symbols

Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

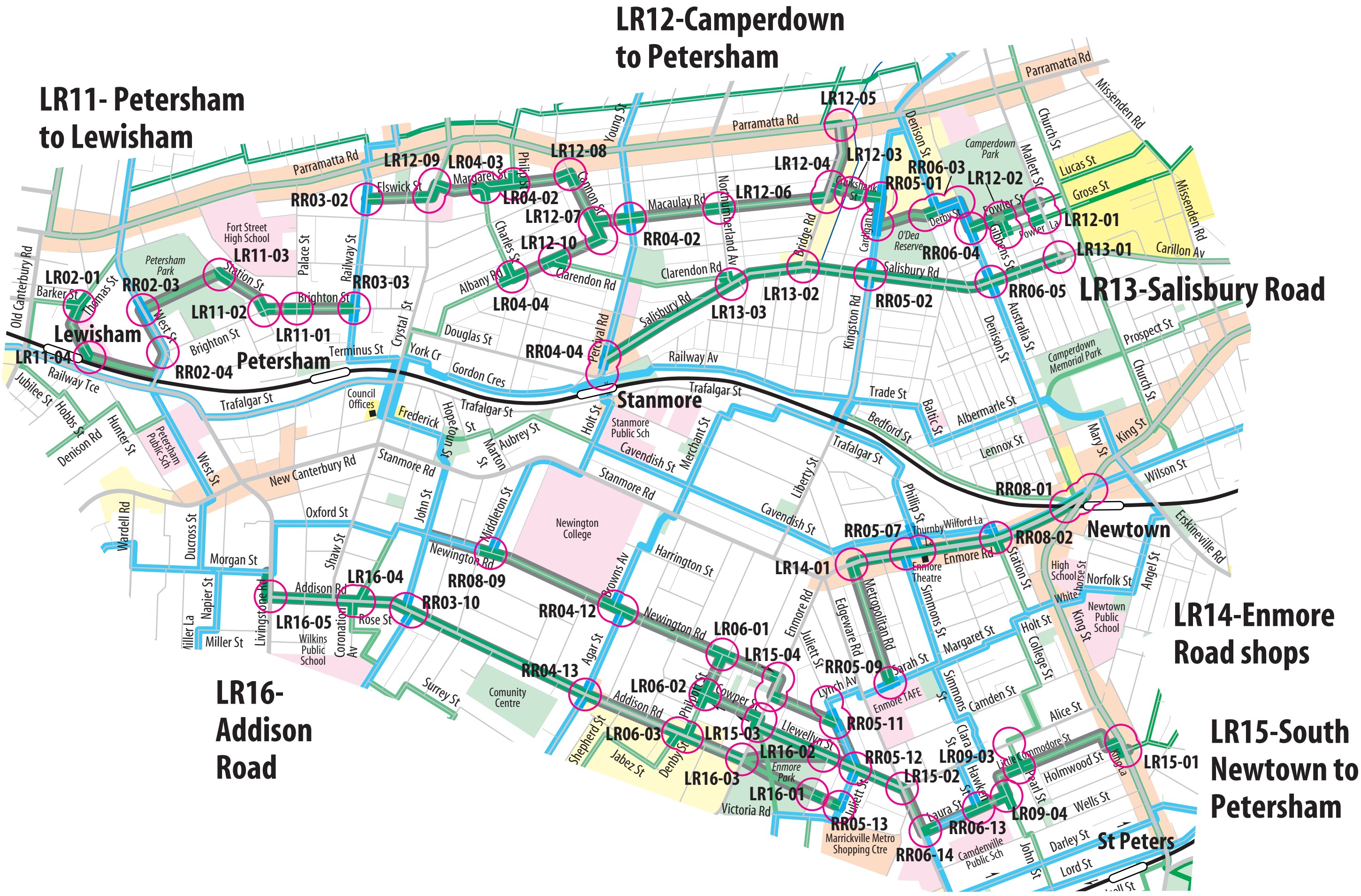
STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Pioneer St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9233 2490

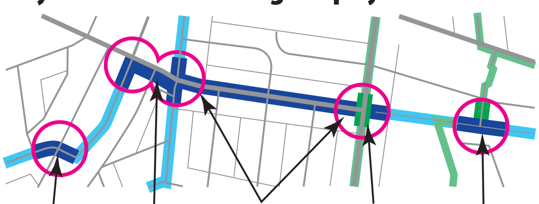
Marrickville Bikeplan 2006 Map RD09

Routes LR11-LR16 detail

MARRICKVILLE council



Key to route detailing map symbols



Regional route on-road (no linemarking)

Regional route off-road
Not near a road (park etc) *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road
Not near a road (park etc) *Beside a road*

Local route on road with lanes

RR01-12 Proposed intersection treatment with construction code

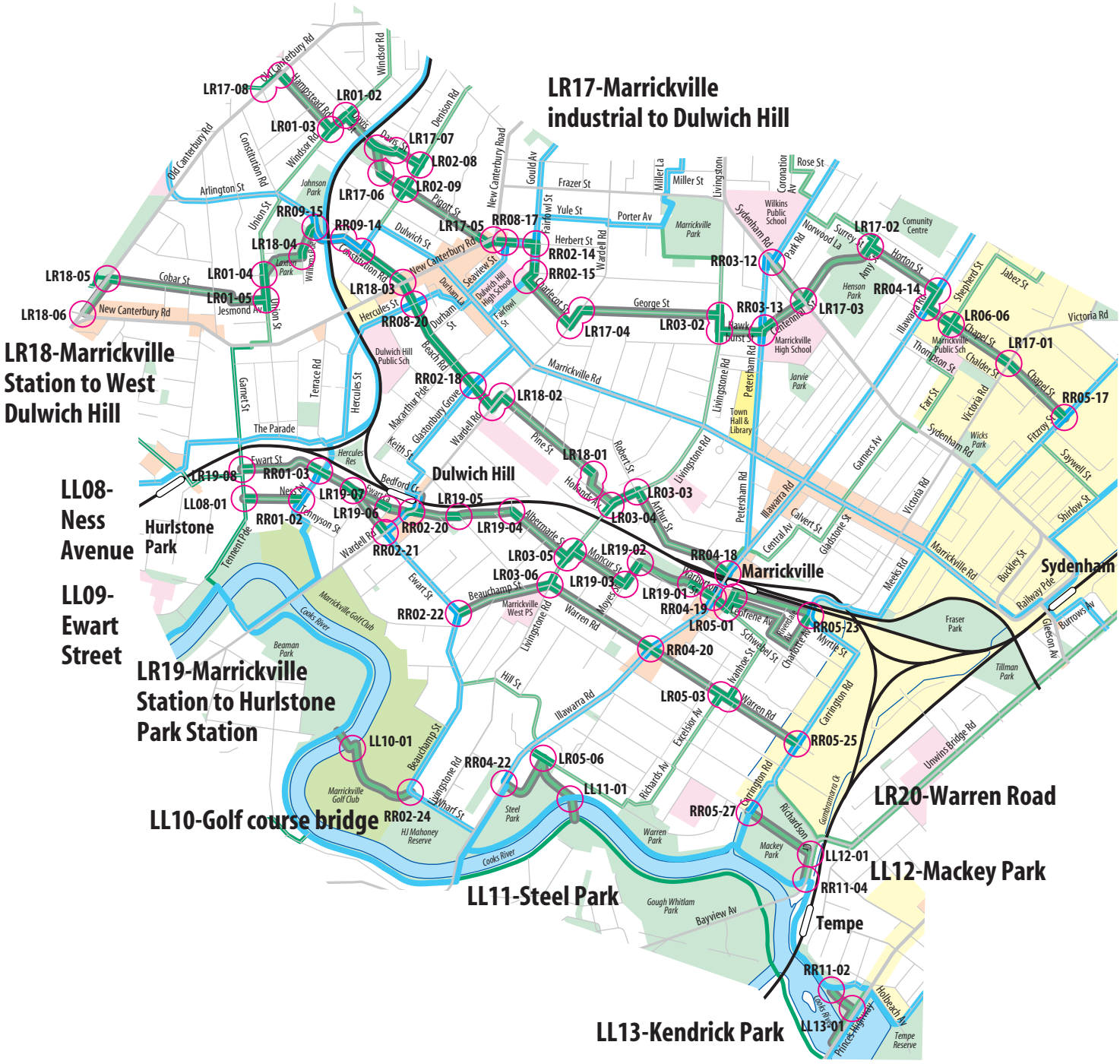
- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

STC Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

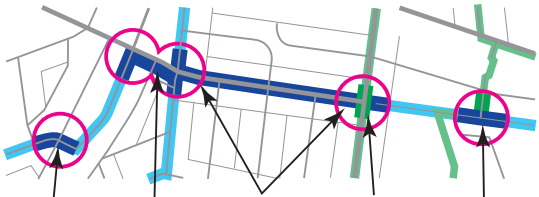
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD10

Routes LR17-LR20, LL08-LL13 detail



Key to route detailing map symbols



Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

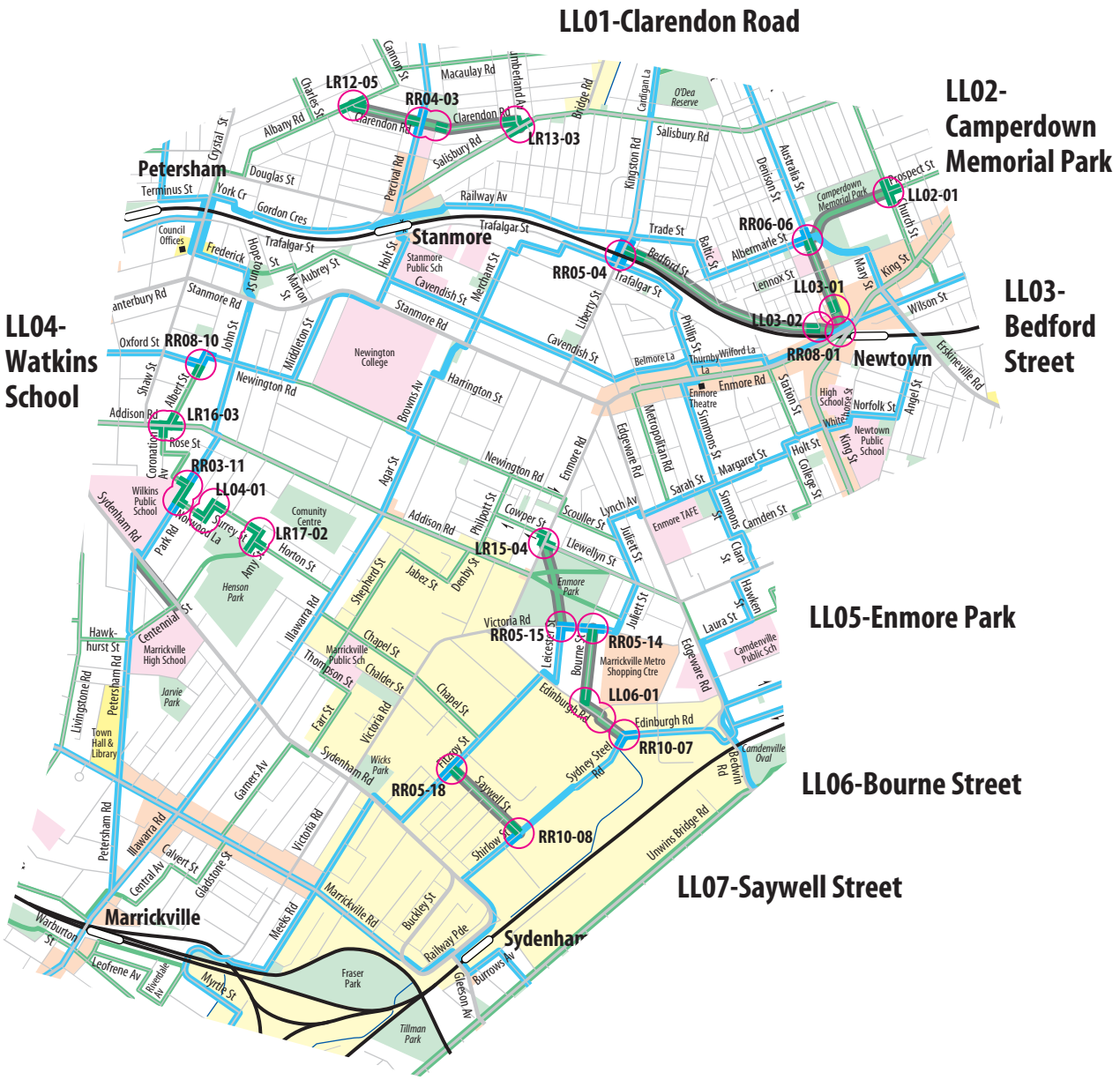
- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

STC
Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

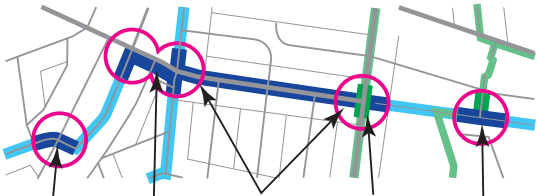
Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006 Map RD11

Routes LLL01-LL07 detail



Key to route detailing map symbols



Regional route on-road (no linemarking)

Regional route off-road

Not near a road (park etc) — *Beside a road*

Regional route on-road with bicycle lanes

Local route on-road (no linemarking)

Local route off-road

Not near a road (park etc) — *Beside a road*

Local route on road with lanes

RR01-12 — Proposed intersection treatment with construction code

- Schools, colleges and universities
- Retail, cafes and entertainment
- Government & public buildings
- Public open space (parks etc)
- Privatised open space (golf etc)
- Industrial & commercial usage

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

10.2 Route direction signage

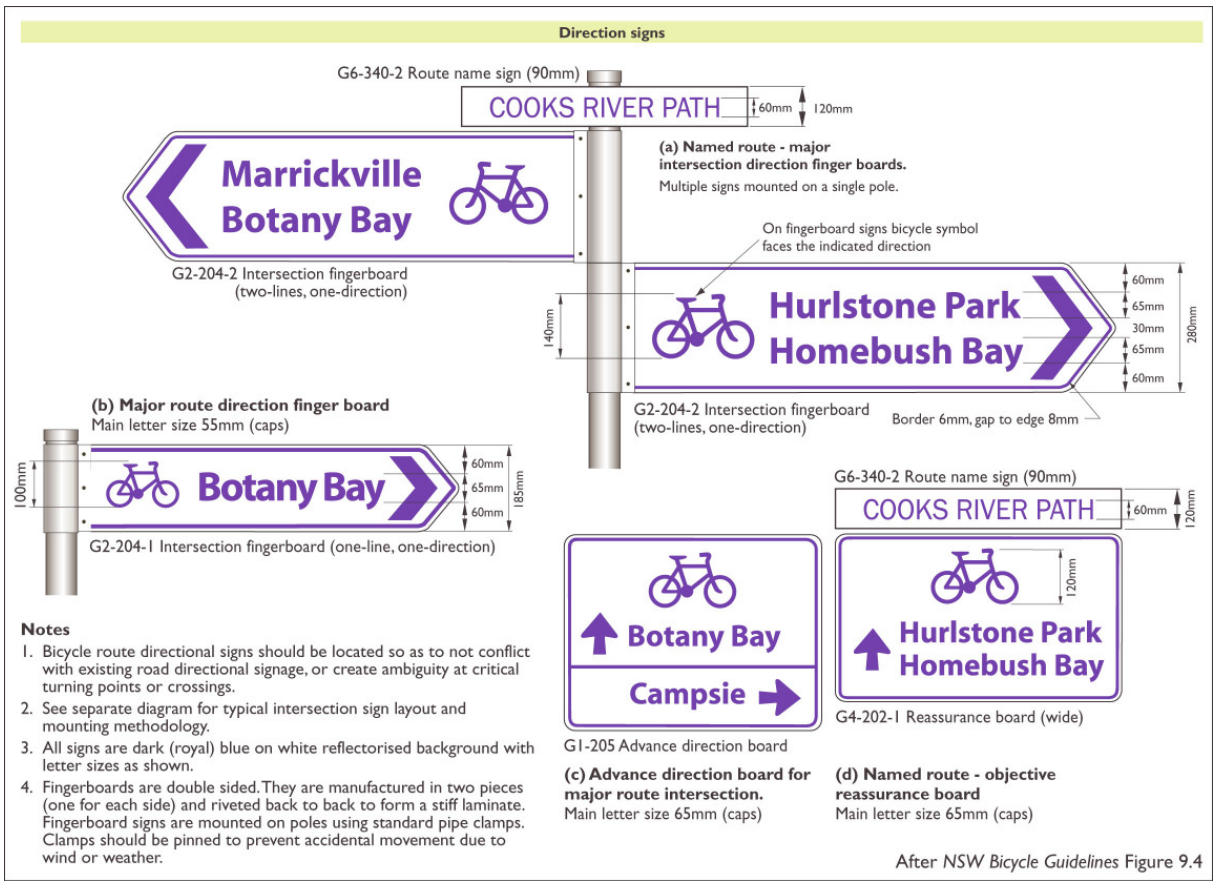


Figure 7 - Recommended directional signage system – (RTA 2003)

Regional routes and connecting local routes will use directional signage as specified in Section 9 of the *NSW Bicycle Guidelines* (see Figure 6). Route signage will indicate selected key destinations and sub destinations as shown in Map13.

For good route coherence, high visibility and overall consistency along the length of the route, RTA recommended bicycle linemarking treatments will be used (see Figure 7).

The minimum linemarking for dual-direction off-road paths is a dashed S5 centre line on straight sections becoming a S4 solid line on curves, steep gradients or where visibility is restricted. Stop and give-way holding lines will be used on off-road bicycle paths and on-road lanes in conjunction with regulatory signage at all bicycle network intersections.

Linemarking of on-street facilities will be kept to a minimum in residential streets where bicycle lanes will only be marked within 10 metres of intersections. PS-2 bicycle pavement symbols will be used on unlined sections of streets to indicate the presence of bicycle routes.

Bicycle lanes on regional and collector roads will be indicated by a combination of regulatory signs and linemarking as per the *NSW Bicycle Guidelines* depending on the type of facility.

Where off-road bicycle paths or shared paths cross local, low-volume, low-speed streets and are given priority over street traffic, TBC transverse markings will be used to indicate the crossing point. Cycleway priority will be supported by regulatory devices such as Give Way signs and holding lines on the street.

Green surface colouring will be used in limited situations to improve visibility, legibility and operating safety of bicycle facilities. This will particularly apply to facilities which permit cyclists to operate in ways different to other traffic such as:

- On-road lanes eg - contra flow lanes, bicycle lanes adjacent to bus lanes and on bicycle lanes through car parks and to improve the visibility of bicycle shoulder lanes in busy street environments where motor vehicle and bicycle rider volumes are high, and risk of car door opening conflicts is considered great;
- Mixed-traffic streets and at constructed road narrowings (i.e. mid block slow-points and street thresholds) to indicate the tracking path for bicycles; and,
- Inside head start, expanded, right-turn and hook-turn storage boxes at busy intersections where bicycle turning movements are significant.

10.3 User mapping and information

Safe and effective use of the network will be promoted in an accompanying educational and promotional campaign and by the production and distribution of a bicycle network map.

This mapping is also suitable for use on information kiosk columns erected at key junctions around the network (see Figure 8 for example proposed for Cooks River Pathway Improvement project).

Figure 9 - Recommended sign column design

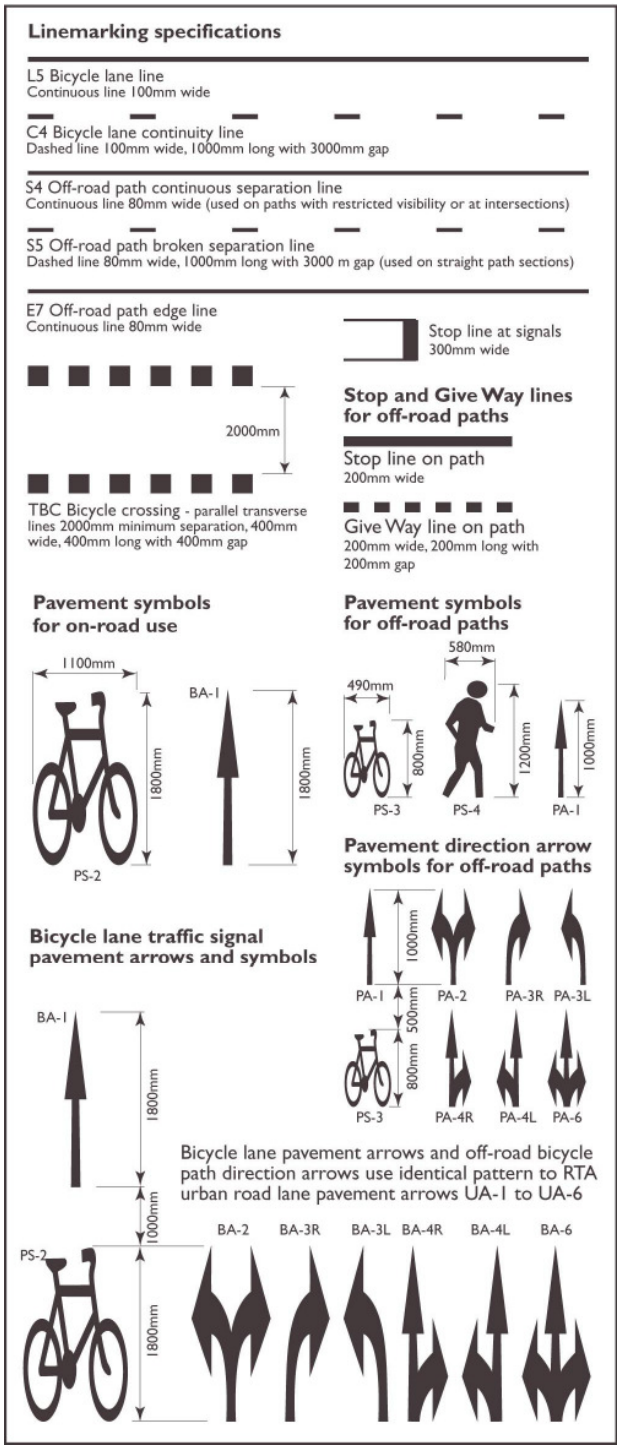


Figure 8 - Linemarking types (RTA 2003)

Map 13 - Marrickville Bicycle Network Signage – destination target scheme

Map 13 - Bicycle network signage - destination target scheme

11 Appendix B – Network design guidelines

This section is designed as a technical resource for Council officers to support the ongoing implementation of the physical infrastructure component of the Marrickville Bicycle Strategy.

11.1 Bicycle network objectives

Experience both in NSW and elsewhere has shown that for bicycle facilities to be of maximum benefit to, and fully utilised by, the community, the following objectives are recommended:

1. Routes connect to local and regional centres and other major trip generators;
2. Regional routes are fed by local routes which in turn provide access to and from local residential streets;
3. Routes are as direct as possible;
4. Routes are attractive both for users and residents;
5. Routes offer a high level of user safety; and,
6. Routes are easy and comfortable to use.

This section outlines the design issues necessary to achieve these objectives. In addition to these fundamentals a number of other important new issues are dealt with in this project specifically relating to the extensive use of low-traffic volume/low speed residential streets.

11.2 Design standards and guidelines

The principal guidelines to be used in the implementation of this Bicycle Strategy are:

- *NSW Bicycle Guidelines,* (RTA 2003);
- *Guide to Traffic Engineering Practice - Part 14 Bicycles*, (AUSTROADS 1999); and,
- *NSW Planning Guidelines for Walking and Cycling*, (DOP 2004).

Additionally, a number of other Australian and overseas design manuals and guidelines have been consulted in the planning of the network and the formulation of detailed treatment designs. These documents are:

- *Australian Standard AS1742.9 – Manual of Uniform Traffic Control Devices, Part 9 Bicycle Facilities.* Standards Australia;
- *Guide to Traffic Engineering Practice - Part 13 Pedestrians.* Austroads;
- *Australian Standard AS1742.10 – Manual of Uniform Traffic Control Devices, Part 10 Pedestrian Control and Safety Facilities.* Standards Australia;
- *Sign Up For The Bike – Design Manual For A Cycle Friendly Infrastructure* (CROW 10 1993), Centre for Research and Contract Standardisation in Civil and Traffic Engineering, The Netherlands;
- *Toronto Bike Plan*, City of Toronto, Canada (TORONTO 2001); and,
- *Collection of Cycle Concepts,* Danish Road Directorate, Denmark 2000 (DRD 2000).

11.3 Designing for the bicycle user and their machines

In planning for the bicycle, its human (user) and mechanical (vehicular) operating characteristics should be taken into account:

- **Bicycles are powered by human muscle.** This means that power loss due to loss of momentum is an important consideration. This is why bicycle riders dislike having to come to a full stop at the bottom of a hill as the loss of momentum has to be replaced with physical effort to climb the opposing slope.

- **Bicycles need space to manoeuvre.** As a two wheeled, light-weight vehicle powered by human muscle power the machine often requires additional space to manoeuvre and is sensitive to surface condition (cracks and joints). On steep climbs generous road operating space is very important as it is often difficult, when applying considerable pedalling force, to track a precise line.
- **Bicycles need clearly marked operating space.** In the past bicycle users have been expected to share operating space with other road users. While this can work well in low-volume, low-speed road environments the bulk of arterial roads (which provide important access to most destinations) give very hazardous and unpleasant cycling conditions. The RTA, the planning and engineering professions and road authorities both interstate and overseas, now recognise that for cyclists to be provided access to travel destinations operating space needs to be adequately provided.
- **Bicycles are vulnerable.** As bicycle users have no "crumple zone" it is important for facilities to be designed to compensate for this factor. In road lanes past parked cars the extra space to avoid a suddenly opened car door can be a life-saving provision.
- **Most bicycles do not have suspension.** Therefore bicycle users are very sensitive to road surface conditions. In swift down-hill runs poor surface conditions can cause crashes.
- **Bicycle users are open to the weather and the environment.** Wind and wet weather are often seen as negatives but these are balanced by the positives of being in better contact with the experience of pleasant surroundings.
- **Bicycle users are social beings.** It is legal to ride two abreast and this very human of needs should be recognised. This is especially important with parents as it gives them the important opportunity to safely supervise their children.
- **The bicycle rider has "human limitations".** Humans have cognitive limitations so the important goals of clarity and simplicity in intersection design and the overall signage scheme will help users to use these facilities safely and comfortably regardless of their level of technical competence or ability to cope with often complex environments.

11.4 Bicycle network design

The needs of bicycle users and their requirements for an efficient and usable network can be best summed up in the five key principles of good bicycle network design:

- **Coherence.** The network "hangs together" and links popular destinations. It is also continuous – when riding on any of the main 'regional routes' it is very clear where the route is designed to take you. All intersections on the network will provide a clear path for cycle users as well as other modes. The network will be easy to find and very easy to follow. Links will also be provided to other transport modes and the bicycle network will mesh seamlessly with the urban street system.
- **Directness.** The network will be as direct as possible. Long detours will be avoided as human energy is required to propel the vehicle. This will be balanced against the problems of topography – a slightly longer route may work better because it contours around a hill rather than tackling it at its steepest climb. Network design will also take into account both the slowness in operating speed of bicycles up-hill and the relative speeds when descending.
- **Attractiveness.** The bulk of the community say that cycling is and should be an enjoyable activity. Network infrastructure will be fitted into the surrounding environment so that the enjoyment of the experience is enhanced. Clear well-placed signposting will indicate major destinations. Centrelining and edge marking of off-road routes will indicate the serious transport intent of these types of facilities. The cycle network will also feel like a

socially "safe" place to be as the community prefers well-lit, open-to-view routes to dark and dingy surroundings.

- **Safety.** Well designed cycle network infrastructure improves the road safety of bicycle users, pedestrians and motor vehicle users. Intersections will be designed to include bicycles as well as other types road user. Mid-block treatments will take into account urban amenity and resident access.
- **Comfort.** The bicycle network will be easy to use for all types of bicycle use. Depending on the speed and volume of other traffic (motor vehicles or pedestrians) some level of separation is often needed. The community regularly indicates its preference for off-road routes in high traffic locations. Where routes are chosen through quiet suburban streets separation is not needed.

Figure 10 - Key design principles (RTA 2003)

Principle	Criteria	Design considerations		
		Regional routes	Local routes	Mixed traffic streets
Coherence	Continuity of routes	No breaks in route	Connect to regional route	Easy access to local routes
	Consistent quality of routes and facilities	Minimal quality changes	Minimal quality changes	N/A
	Easy to follow	Regional route signage	Local route signage	All street signs visible
	Freedom of choice of routes	Choice of at least two	Choice of at least two	Less than 250m to a route
Directness	Efficient operating speed	50 km/h design speed	30 km/h design speed	Consistent with street design
	Delay time	15 sec/km	20 sec/km	20 sec/km
	Detour factor * Detour factor is the relationship between the most direct distance between origin and destination and the distance taken by the actual route taken. A detour factor of 20% means that the route will be 20% longer than the distance as the crow flies.	20%*	30%*	40%*
Safety	Minimum risk of accident on routes Minimum risk of conflict with car traffic Minimum risk of unsafe infrastructure	Monitor use of facility and investigate any links between accidents and design.	Monitor use of facility and investigate any links between accidents and design.	Monitor use of facility and investigate any links between accidents and design.
Attractiveness	Support for the system	Public support and ownership	Public support and ownership	N/A
	Attractiveness of environment	Well lit and open appearance	Well lit and open appearance	N/A
	Perception of social safety	Minimum reports of vandalism & harassment	Minimum reports of vandalism &harassment	N/A
	System attractiveness	Coordination of all supporting system elements (maps, fittings, signage etc)	Coordination of all supporting system elements (maps, fittings, signage etc)	N/A
Comfort	Smoothness of ride *(Refer to Austroads - Part 14 Section 8.5)*	Smooth riding surface	Smooth riding surface	Smooth riding surface
	Comfortable gradient	Steep climbs minimised	Steep climbs minimised	N/A
	Minimum obstruction from vehicles	Minimise illegal parking	Minimise illegal parking	N/A
	Reduced need to stop - number of stops (average per km)	0.5	1.0	1.5
	Protection from adverse climate	Shade trees and wind breaks	Shade trees and wind breaks	N/A

11.4.1 Bicycle network design objectives

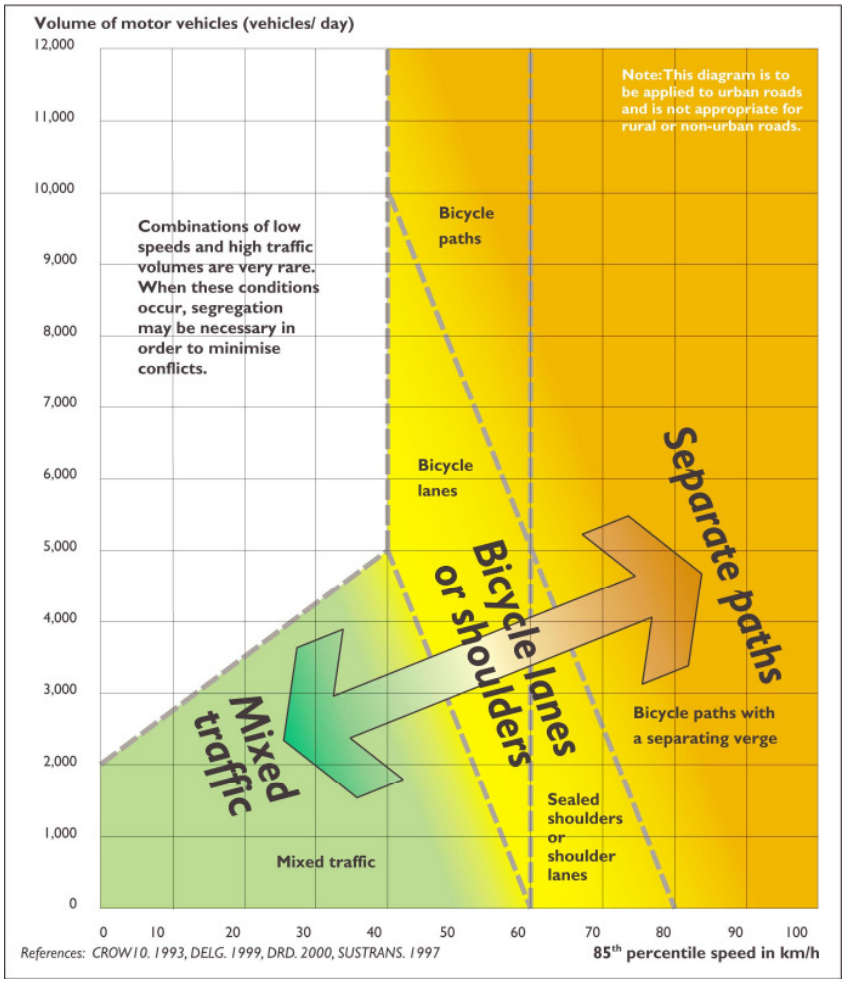
A. Reduce encounters between cyclists and fast-moving traffic

When members of the general public are asked what kind of bicycle facility they would most like to ride they invariably answer: a separated cycleway. Though most roads in the urban environment are not considered unsafe to use in a car, bus or truck, many cyclists comment that on a bicycle they are decidedly unsafe.

The issue of physical separation is uppermost in the minds of the existing users, as well as the large numbers of cycle owners who seldom venture out onto the roads on their bikes. The application of bicycle lanes, marked bicycle-use road shoulders and bicycle/parking lanes has only been a recent experience for most NSW road users, and though this system has provided a good beginning, it falls apart when the bicycle facility reaches an intersection. This is because at the place of most potential conflicts, the intersection, space is not provided for bike use, or there is no clear indication given to the bicycle user as to where the road builders and managers would like them to travel.

Some degree of separation is always desirable because of the often conflicting needs of the motor-vehicle and bicycle networks. At low traffic speeds and volumes however, it is possible to plan and construct a successful shared road environment provided that the transitions from separated space to shared space are safely handled. The best-practice method of achieving separation is by marked lanes, intersection treatments or by off-road bicycle paths. Figure 10 (from the *NSW Bicycle Guidelines*) shows the relationship between the degree of separation required given the prevailing traffic speed and volume.

Figure 11 - Separation calculator (RTA 2003)



There are three methods of separation: **physical separation** (paths, shared or exclusive-use, separated from the roadway); **visual separation** (line marked space on roads – bicycle lanes or shoulders); and **mixed traffic** (riders share lane space on the road with motor vehicles and off-road with pedestrians).

There are two categories of shared space. **Spacious profile -** shared space is where there is a consistently wide kerb lane to allow riders and drivers to comfortably share space according to the prevailing road speed.

In very low speed environments such as residen-

tial areas and on very narrow inner-city streets, where the aim is to keep all vehicle speeds low, it is preferable to restrict the lane width so that vehicles cannot pass riders and must follow each in turn. This is **tight profile** shared space and can be used for bicycle routes in low-speed, low volume environments such as residential streets and laneways.

In deciding on the need for separation of operating space for bicycles it should be recognised that there are equally great benefits to the motor-vehicle network when this is done. Where bicyclists are required to share normal road lanes, they often find themselves in the very unpopular position of travelling much slower than the normal traffic which can create disruption to the motor-vehicle flows. By allocating road space to bicycles, road designers/builders can improve safety for all user types and increase the efficiency of the facility.

In places where separation is impossible or undesirable the most effective means of crash prevention is to reduce the speed difference between bicycle riders and cars. This also applies to paths shared with pedestrians.

B. Treat bike route crossings of streets or roads as intersections

Intersection treatments are the major component of this strategy. In the many instances where bicycle routes use local residential streets, linemarking or mid-block engineering treatments will seldom be used. Intersections, however, will always be treated using clear and simple linemarking on approaches to show each road user where to position themselves in order to safely negotiate the intersection. The priority assigned to each arm of intersections will be clearly indicated by regulatory signage (STOP or GIVE WAY) or traffic signals. Priority will be allocated in accordance with normal traffic management methods.

In instances where the bicycle and main road networks intersect, priority is usually assigned according to the function of the road and the bicycle facility. For instance in the case of a local bicycle route crossing a regional road the latter would obviously have priority and give-way signage or traffic signals would be fitted to the cycleway approaches.

C. Designed bicycle facilities to include al types of bicycle user

The Marrickville Bicycle Network will cater for a broad range of riders in the community providing efficient, well-connected facilities that offer consistent quality throughout. This approach focuses on the comfort of the rider and aims to create a riding environment which allows the maximum possible mobility with the minimum stress and risk.

Bicycle riders have no standard characteristics. The way a destination is accessed by them depends on what type of rider they are. This depends on a number of factors such as age, level of experience, riding proficiency, their vehicle (bicycle type), fitness, motivation for travel, comfortable travel speed etc.

For example the type of facility providing direct access to a primary school needs to take into account the operating characteristics of young and vulnerable riders whereas a regional bicycle route would cater for adult riders with a broad range of cycling skills, operating speeds and trip motivations.

Austroads *Guide to Traffic Engineering Practice, Part 14 – Bicycles* (AUSTROADS 1999) lists seven broad categories of bicycle rider which it urges bicycle facilities designers to take into account. This broad categorisation is unwieldy and impractical and has often resulted in major facilities which are usable for one distinct category but do not adequately cater for others.

The Marrickville Bicycle Strategy proposes a user-oriented categorisation. This approach is used with great success in countries with high levels of cycling such as the Netherlands and Germany (TU-DELFT 2000) as a method for including the broadest range of users. The three user groups listed in Table 9 encompass the Austroads *Part 14* categories.

Table 8 - Bicycle user group categories and their operating characteristics

Group	Description	Characteristics
A	Vulnerable to traffic	Children between 10 and 16, the elderly, the hard of hearing, very short trips, slow speeds (less than 15 km/h), traffic shy, slower reaction times
B	Active adults	Speeds between 15 and 30 km/h, alert and 'road aware', average to high level of riding skill and proficiency, all trip purposes,
C	Sports and fitness	Speeds higher than 30 km/h, prefers 'main road' environments,

In low-volume, low-speed residential streets groups A, B and C will operate in a mixed environment while ensuring that the special needs of group A, the most vulnerable, are met. For this reason bicycle network intersection treatments will pay particular attention to the needs of this group with physically separated facilities while in many cases B and C riders will be provided with a visually separated alternative.

On busier roads, especially at or near major trip attractors such as strip shopping centres, A and B groups will share bicycle facilities while group C riders will use the normal street infrastructure.

Group C's major needs will be met by the development of the Marrickville Road Riders' Circuit – a 15km loop using existing roads and streets and with directional signposting and intersection provision.

11.4.2 Integration to adjoining regional and local networks

The Marrickville Bicycle Network is designed to give users maximum connectivity to popular trip generators and destinations within the Marrickville LGA and adjoining council areas. Though the future routes shown on Map 4 have yet to be developed to final design, whether neighbouring routes exist or not every attempt will be made to achieve a smooth connection to adjoining LGAs.

It is important that regional bicycle routes (the 'main roads' of the bicycle network) have high continuity and connectivity with all other elements of the network both existing and proposed.

For good route coherence, high visibility and overall consistency along the length of regional routes, RTA recommended bicycle lanemarking and line marking treatments will be used. On high-volume, high-speed, multi-laned state roads, off-road paths will provide a safe and usable facility for the broadest range of bicycle users and walkers.

11.4.3 Signage and linemarking

It is essential that bicycle routes, whether on-road or off-road, shared or exclusive use, be clearly identified for the public as a transport facility where normal road rules apply. Where off-road shared-use is declared these paths will be signposted with regulatory signage, linemarked with a centreline to separate opposing flows and marked with pavement symbols and directional arrows to reinforce correct path usage. Specific recommendations for bicycle network signage are included in Appendix A.

12 Appendix C – Evaluation of existing routes

Each of the fifteen existing routes was surveyed in detail and evaluated on the basis of the project design principles as outlined in Section 5 of this document. Table 9 provides a summary of route evaluations and recommends their feasibility for inclusion in the 2007 network plan. Table 9 should be red in conjunction with Map 3 – Existing Routes. A full photographic record of existing route facilities and conditions is supplied as part of the supporting materials.

Table 9 - Summary of existing routes technical evaluation

No	Opportunities	Constraints	Recommendation
L1	Route is good alternative to busy Parramatta Rd with good grades but could benefit from some straightening. Route has good possibilities for continuance through to the Sydney CBD via RPA Hospital and Sydney University.	Route too circuitous and lacking the directness of parallel main roads. Only available controlled crossing of busy Crystal St is at Petersham TAFE (Elswick St). Directional signage incomplete.	Route be retained as a local route and straightened. Busy road crossings improved at Bridge Rd, Crystal St and West St.
L2	A generally low-stress route. Reasonable grades. Could be linked with other routes to provide good east west route of regional significance.	Improved crossing of Salisbury Rd needed. Bedford St is good route to Newtown Bridge but through access in that area is problematic in the short term. Directional signage incomplete.	The Stanmore Station to Camperdown Memorial Park become part of a new E-W regional route paralleling the railway between Sydney and Parramatta. Improve crossing of Salisbury Road.
L3	Links to Young Street which is a good N-S route through Annandale to Balmain. Good connections to destinations south of the railway line.	Steps at southern end of Stanmore Station underpass. Difficult intersection at Salisbury & Percival & Douglas Sts. Directional signage incomplete.	This route become part of a north-south regional route
L4	Good local access though the area in a NE-SE direction. Access through street closure on Jubilee St. Connects with L10 at Hoskins Park.	Route serves only a short distance (Victoria St has poor connections as part of a longer local route) Directional signage incomplete.	Move local route to Denison St which has better connections at the southern end. Retain link to northern side of Petersham Station via Old Canterbury Rd.
L5	Good N-S route through central Marrickville. Reasonably direct and using moderate to low-trafficked roads.	Addison Road section is difficult. Some crossing points of busy roads need extra treatment. Directional signage incomplete.	Join this route to L3 route to form new regional N-S route servicing central part of LGA.
L6	Good connection to points north and south. Should form part of new regional route.	Route needs improved treatment at intersections. Directional signage incomplete.	This route should form part of a new N-S regional route.
L7	Route passes significant trip generators. This route would work more effectively if extended to link other trip generators and important destinations.	Route meanders (significant detours). Route ends short of Sydenham station. Some difficult uncontrolled intersections in need of treatment. Directional signage incomplete.	Parts of this route should be included in regional bicycle routes servicing the southeast segment of the LGA.
L8	This route is the best alternative to heavily trafficked roads in this area.	Route is circuitous due to lack of permeability in the local street network. Directional signage incomplete.	Include this route in network.
L9	Good route between Dulwich Hill and Marrickville stations south of rail line. Low traffic streets.	Route has no network connection at eastern end. More logical connection would be Marrickville station and surrounding shops. Directional signage incomplete.	Should form part of new local route joining stations to the south of rail line.
L10	Low traffic-volume streets and roads. Crosses central Marrickville in an E-W direction.	Route is circuitous and hilly. Some difficult crossing points on busy roads. Directional signage incomplete.	Parts of this route should form sections of regional and local routes along the central E-W corridor.
L11	Good N-S connection between Dulwich Hill and cooks River path using low traffic-volume streets.	Mid block and intersection in need of improvement. Garnet St shared with Ashfield Council. Directional signage incomplete.	Include in new local network route to service western part of LGA.

L12	Meeks Road is a better alternative performing the same network function but with far less traffic.	Victoria Road is heavily trafficked and its part concrete surface makes it difficult to treat as a popular cycle route. Many difficult and untreated intersections. Directional signage incomplete.	This route is to be moved to Meeks Rd and will form part of a N-S regional route providing access to the Cooks River Path.
L13	Good local route servicing the Tempe residential area and linking it to Sydenham station and Marrickville.	Shared path along Princes Hwy in need of upgrade.	Retain as local route.
CR-ICG	Proposal to locate route inside rail corridor would create a high quality N-S regional route for transport and recreation.	On-street route is circuitous. Some difficult crossing points of busy roads.	Greenway proposal in corridor supported. Development as per separate master planning process. Sections of existing on-road alternative routes included in new network routes.
R-BBC	Existing Cooks River Path has a good alignment and is well used for transport and recreation.	Route meanders. Access points are limited and sections of path need widening.	Retain as E-W regional route. Improvements recommended by recent Cooks River Path Improvement Study.

13 Appendix D – Bicycle parking details

This section provides a technical resource for Council officers to support the ongoing implementation of the bicycle parking component of the Marrickville Bicycle Strategy.

13.1 Technical details and recommendations

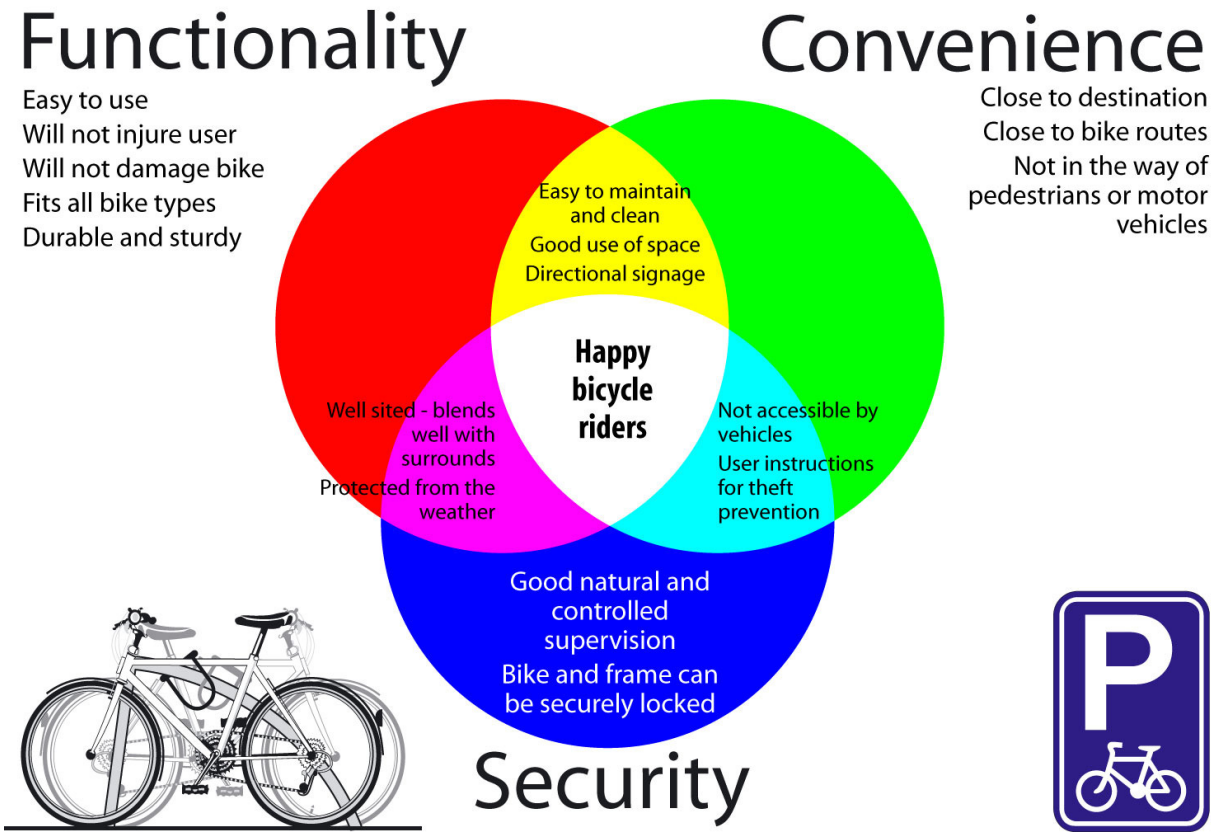


Figure 12- Bicycle parking criteria

13.1.1 Reference guidelines for bicycle parking

Where bicycle parking provision is made or recommended by Marrickville Council, the following guidelines should be used (in priority order):

- *Marrickville Council Development Control Plan 19 – Parking Strategy.* (MC-DCP19);
- *NSW Planning Guidelines for Walking and Cycling*, (DOP 2004);
- *Guide to Traffic Engineering Practice - Part 14 Bicycles*, (AUSTROADS 1999); and,
- *NSW Bicycle Guidelines,* (RTA 2003).

13.1.2 Trip purpose and parking needs

Collection and delivery of items: Providing "ride-in" facilities may reduce the risks caused by bikes clustered around entrances to buildings or lying on pavements. Parking for such short stay users does not necessarily need to be very secure, but it does need to be near the entrance of, or inside, the place visited.

Photo 4 - Bike racks near Newtown Neighbourhood Centre have a high use

Shopping type visits: The rider may be away from the bike for as much as an hour, and ideally should be able to observe the bike. Groups of cycle stands should be located at regular intervals, so that the bike does not have to be parked more than a short walk from the final destination.

Extending trip range with public transport: Use can be regular (commuter) or casual for a wide variety of purposes. Regular use requires a higher level of security (lockers) while casual use prefers rapid access racks and stands.

Meetings and appointments: Use is often irregular and can be for long periods, up to a whole day. Users favour locations where lighting and surveillance are perceived to be good - usually at or near to main building entrances.

Workplace: This is all-day use on a regular basis. Demand for such parking is more likely to justify grouping of racks, often within areas where there is controlled access, CCTV, monitoring, or individual lockers.

Domiciliary parking: This requires high standards of security for parking, and should aim to avoid the need to take bikes a long way into the building. This category includes locations such as university halls of residence, or at hospitals for staff who live on-site.

13.1.3 Hardware for bicycle parking

Bicycle parking installations usually consist of two types of device: a rack or locker to secure individual bicycles and an enclosure to store many bikes.

Table 10 - Bicycle parking types (from Austroads Part 14)

Class	Security level	Description	Type of use
1	High	Bicycles stored within fully enclosed individual lockers fitted with high security door locks.	Transport interchanges commercial buildings and remote (unsupervised) public locations. Recommended for regular and longer term storage.
2	High to medium	Bicycles locked to rack within a security room, enclosure, compound or cage.	Regular use by company employees. Users need to have a key to the enclosure and provide their own lock to secure the bike to racks within the enclosure.
3	High to Low	Bicycles locked to high quality racks in public area. Users provide their own locking device. Level of security dependent on level of supervision.	Casual and medium term use by staff, customers and the general public.

Bicycle parking racks

The bicycle rack is the basic parking device. Provided it is permanently fixed to its base, it can provide an acceptable level of security according to the type and quality of the locking device used by the bicycle rider. Bicycles stored in unsupervised racks in public places are still susceptible to malicious and accidental damage. Lockers or enclosures can be used to overcome these security issues and are typically used for longer-term parking.

The level of security is dependent on not just the bicycle rack or lock but the sum of the devices and systems used to protect the parked bicycle. For example, an installation consisting only of bicycle racks may offer a high level of security if the bicycle parking installation is within a physically supervised area.

The key user requirements of a well designed rack are that it should:

- Support the bicycle upright by its frame in two places;
- Prevent the wheel of the bicycle from tipping over;
- Enable the frame and one or both wheels to be secured;
- Have a maximum securable (tube) width of 100mm to permit use by high security U-type locks;
- Support bicycles without a diamond-shaped frame with a horizontal top tube (e.g. a compact or women's style frame);
- Allow front-in parking: the front wheel and the bicycle down tube should be able to be secured with a U-type lock; and,
- Allow back-in parking: the rear wheel and the bicycle seat tube should be able to be secured with a U-type lock.

Table 11 - Design principles and specifications for bicycle racks and hardware

Design principle	Minimum specifications
Proximity	Convenient – near entrance(s) to building - Bicycle parking located within 50m of the destination it is intended to serve (based on DoT, UK, 1997). Rack installations as close or closer than the nearest car parking space. Local BUGs consulted on the precise location of bicycle parking.
Secure/safe (situation, lighting, rack security)	Bicycle parking facilities situated where there is active and passive surveillance (i.e. people passing the facilities, and where possible, people overlooking the facilities). Good lighting (see Austroads Part 14). Racks securely anchored to ground and non-removable (shear-head bolts or concreted in-situ). A level of security appropriate to the location and expected usage.
Access/ Comfort	Easily accessible from the road or dedicated bicycle path. Larger installations should be well connected and signposted to regional and local bicycle routes. Access and egress designed to minimise conflict with flows of pedestrians and/or vehicles. Bicycle parking on private land located so that the minimum clearance between a parked bicycle and the edge of a motor vehicle traffic lane is 600mm, and 1000 mm where the average traffic speed exceeds 60 km/h. Bicycle parking facilities located so that the minimum clearance (for a pedestrian to pass) between a parked bicycle and any other obstruction is 1200 mm. Rack installation protected from rain – if more than 10 spaces, at least 50% covered. Where an access path to a bicycle storage or parking facility includes stairs, such stairs include a bicycle wheeling ramp in accordance with figure 7.12 in Austroads Part 14. The gradient of access ramps not more than 25%.
Visible	Bicycle rack area clearly visible from the entrance it serves. Well positioned signs provided for all bicycle parking facilities, including visitor parking Bicycle parking facilities included on any relevant maps.
Attractive	Quality racks harmonious with their environment in both colour and design. Siting sensitive to both user needs and the design and management of surrounding area. Sited to encourage people to use the facility and feel like they are respected transport users.

Rack and rack element	Bicycles supported upright by the rack in two places with the front wheel prevented from turning and thus tipping over the bicycle. Bicycle locked to rack by the frame and at least one wheel using either a U-type or cable lock. Both front-in or back-in parking permitted. Maximum piping size for U-lock = 100mm The rack fits all types and sizes of bicycles and is durable and resistant to heavy use and attack by thieves and vandals. Racks use quality materials, finish (coating/plating) and fixing methods. Parking facilities easy to use and find (signposting and user instructions etc) and attractively designed and sited to fit in with surrounding environment. Durable and resistant to vandalism. Easy to clean and service the rack and its 'footprint'.
Facilities - showers and lockers	Complementary showers and lockers (and where appropriate, changing rooms) provided in close proximity to bicycle parking.

Enclosures and lock-up cages

Enclosures with racks inside them provide a high level of security to the system, provided that access to the enclosure is controlled and restricted to the actual users. In single company workplaces access to the enclosure can be controlled by means of security keys, digital passwords and visual identification by security staff.

Supervised public access enclosures work well along the lines of a standard carpark where users must present a matching ticket butt in order to remove their bike from the area. This type of public enclosure is common in the centres of some European cities. Unsupervised enclosures seldom work in public areas as it is almost impossible to restrict casual access to the enclosure to immediate users.

Building carparks can be considered as a form of enclosure provided that the access to these areas is tightly controlled and restricted to residents and/or staff. The level of security offered by such places is usually low as entry/exit control is usually based on motor vehicle access which can easily permit unobserved access by pedestrians.

Bicycle lockers

Lockers combine speed of parking with weather protection and high levels of security. Of all cycle parking provision, lockers require the greatest level of management commitment and organisation. Good lockers can be expensive both to buy and install, and the opportunities for abuse are greater, so controls must be stronger. Ideally lockers are available 24 hours a day so installations need to be well lit and supervised.

Liabilities for securing contents needs to be more clearly defined than for open parking. The ability to search a locker and to trace a user is important for security reasons. People are likely to be willing to pay for their use, but unless payment systems and access are relatively simple users will choose an easier method.

The widely preferred system for lockers is a medium/long term hire regime. However, such a regime requires an explicit agreement with users to:

- Define the user's responsibilities in keeping the door shut at all times when leaving the locker, storing only bikes and related accessories, and reporting any problems with a minimum of delay;
- Set penalties for misuse and termination conditions;
- Provide rules for the return of keys; forfeit or refund of deposit; fines for ending an agreement before term;
- Obtain user contact details, waivers for inspections and set out provider's liabilities;
- Set out the "locker owners" obligations to provide a secure locker, including transfer in the event of damage to the locker; and,

- Offer added value incentives, such as options of insurance cover for parked bikes and locker users (eg block third party liability assured through national cycling organisations).

Parking information and signage

Signage at key approaches directs riders to bicycle parking areas. Signs indicating bicycle parking are as important as signage for car parking. The location of major rack installations will be shown on bicycle network mapping.

Even though most U-rail bicycle racks and lockers are relatively easy to use it is recommended that clear signage be affixed to an adjacent pole, wall or pavement to identify the racks and lockers for regular, casual and potential riders. Good system information is essential to the successful operation of any transport system. Graphical sign boards are useful to show bicycle users how to lock their bikes to more complicated parking racks (sometimes necessary in high volume situations).

13.1.4 Management and maintenance

The management of bicycle storage and parking facilities is an important though often overlooked aspect of bicycle parking provision. Bicycle racks need little management. Once installed they are available at no cost to the user and apart from cleaning and access considerations (if they are located in a security area) they require very little intervention by the building owners/managers.

Cages and permanent compounds, usually containing U rails or similar devices for locking bicycles usually have a lockable door and present serious security and management issues. They are usually provided to closed groups of people such as employees of a single organisation. Enclosures for the general public are usually unworkable as it is very difficult to maintain good security on access to the compound. Cleaning, lighting and safe access issues need to be addressed on a more regular basis.

Magnetic swipe cards or reprogrammable combination door locks can provide a good level of security and be relatively easy to maintain and operate among a group of employees. Buildings often already have their own access controls - and an extra card reader may be relatively easily installed. Magnetic card readers are often set for access to work places and can be adapted for bike storage at the same building. Casual use and obtaining cards in the first instance can be an issue for both users and managers.

Bicycle lockers can require minimum management once users have been issued with their key. Key systems commonly in use are high-security (non-copyable) types and usually require the user to pay a fee to cover the costs of administering and maintaining the system.

Short term coin-in-the-slot key operated lockers similar to airport and swimming pool lockers are rare, as this type of storage device is difficult to maintain. Lost or stolen keys require time-consuming staff attention and costly maintenance to repair lockers and locks.

Modern cashless electronically operated lockers can be set up for use with a credit card but this type of device is costly to install and is only suited to high volume, high-turnover locations.

- Supervision of the bicycle parking installation should be considered as an integral part of overall building and precinct security.
- parking should be promoted as a key element in the bicycle transport system and cycling as an attractive and ‘smart’ method of personal transport.
- Staff and visitor access and transport information for the building or public space (maps, signs, brochures etc) should show the site location of bicycle parking facilities. Signage

showing how to reach the bicycle parking should be visible from the car park and building entrances. On or near the racks themselves a brief explanation of how to use these facilities should be displayed.

- During the initial 'ramp-up' operational period the use of bicycle parking facilities should be monitored and additional demand met quickly if this is within predicted future capacity.
- Regular monitoring, cleaning and maintenance of bicycle facilities should be undertaken as part of the normal security and upkeep operations of the building and its environs.

Maintenance

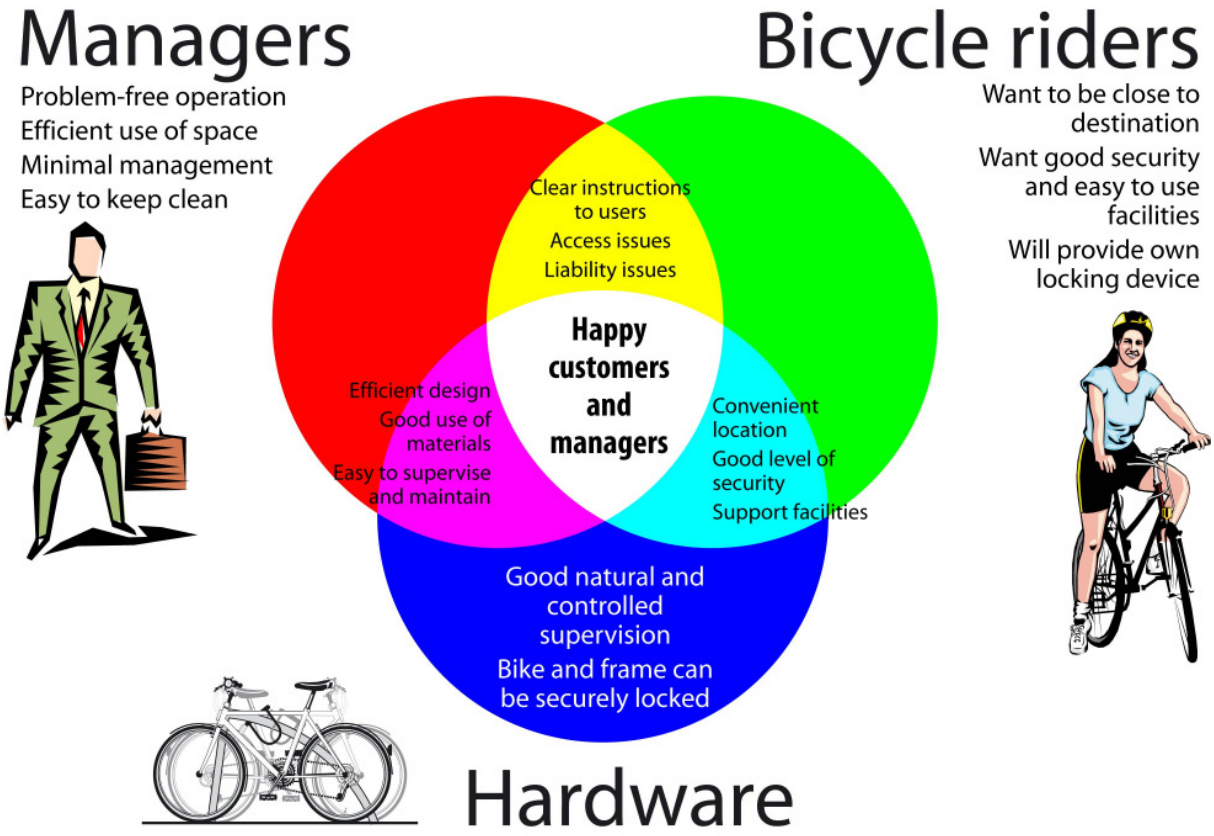
The design and siting of racks, lockers and enclosures should easily permit regular inspection, maintenance and cleaning. Racks sited in difficult corners are not only difficult to use but are hard to keep clean and can often lead to an accumulation of rubbish and debris.

Galvanised or stainless tubing racks are very durable and under cover may require little or no maintenance. Powder-coated (painted) racks and lockers should be inspected annually and repainted to prevent base metal corrosion. Vandalism and graffiti are serious issues for all types of parking device and should be considered both in the selection of device materials, surface finishes and siting.

Evaluating use and upgrading

Parking installations should be monitored by the owner/manager on a regular basis. A brief annual survey of users can collect data and information which will assist with the effective management of the parking installation. When installing racks, enclosures and lockers it is always important to consider future as well as current usage. The most effective method is to design the installation with space to install more parking if and when demand increases.

Figure 13 - Bicycle parking management issues



City of Toronto (Canada) bicycle rack installation application form

TORONTO Transportation Services

Post & Ring Bike Stand Request

Applicant's Name	Daytime Telephone Number		Date
Address	**City**	**Province**	**Postal Code**

Number Requested	Proposed Location (street address and nearest cross-street)

Sketch of Location(s)

Post & Ring Stand

Approximately 2000 post-and-ring bike stands will be installed on City sidewalks and boulevards this year. Installation will begin in the spring and continue into the fall. The stands are provided free of charge in response to requests received from businesses, residents and cyclists. Transportation Services staff performs site inspections at all requested locations.

mail to: **Pedestrian and Cycling Infrastructure Unit**
City of Toronto, Transportation Services
100 Queen St., West, City Hall, 22E
Toronto, Ontario
M5H 2N2

or Fax to: **416-392-4808,** Attention: Pedestrian & Cycling Infrastructure Unit

For additional forms, or to report a damaged post-and-ring, please call **39CYCLE** (416-392-9253).

The personal information on this form is collected under the authority of the City of Toronto Act, 1997 (No.2) and By-law 34-1998, and is used to process your application for a Post and Ring Bike Stand. Questions about this collection can be directed to the Planning Technician at the above address, or at 416-392-8400.
Sending personal information by fax is not a secure means of transmission. It is recommended you return the Post & Ring Bike Stand Request by regular mail.

W002056R 09/05

14 Appendix E – Cycle 'n' Ride details

This section provides a technical resource for Council officers and transport operators to support the ongoing implementation of the Cycle 'n' Ride component of the Marrickville Bicycle Strategy.

14.1 Key factors affecting mode of choice

The critical aim in facilitating bicycle-train/bus travel (Cycle 'n' Ride) is to make it easier for a person to access a station or stop from a greater distance than by walking. People living within a comfortable walking distance are unlikely to use a bike as their trip is quicker and simpler without one.

Using a bicycle for the shorter trips (say under 5 minutes) involves comparatively extra effort (adjusting clothing for riding, securing luggage, fitting helmet, lights at night, wheeling out of garage or house, getting into parking area, finding vacant rack or locker, locking bike and securing belongings etc) compared with walking.

Riding a bicycle over about 5 minutes to a station involves less physical effort than walking, so the decision to ride to the station is a trade-off and is only made when the advantage of travelling extra distance for less physical effort outweighs the other aspects of bicycle usage.

Photo 5 - Short-term bicycle parking at Apeldoorn station in the Netherlands

Key factors affecting mode of choice are:

- **Cost.** The up-front costs (price of bus or train tickets or car parking and tolls) are the prime concern – seldom is the cost of running a motor vehicle factored into the decision;
- **Distance.** Distance is often the first concern when choosing the travel mode to get to public transport. For short trips (less than 1km) distance is not so important. The most comfortable distance to ride is between 1 and 2.5km. Beyond that most people will consider the distance too far to travel by anything other than car or local feeder bus;
- **Convenience.** Human-centred issues such as effort and convenience in getting to the station eg: quality of the route; the way one has to dress; and the impact of weather and other environmental factors;

- **Time.** The time taken for any leg of a journey has a significant impact on the choice of mode. If it takes too long to walk, cycling or driving become the preferred options. Time is more of an issue with shorter journeys to station or stop as the time taken to park a car or bike is often greater than the total walk time. Up to 250m it is always quicker to walk;
- **Safety.** The lack of a safe and stress-free route to the station is a key factor in discouraging cycling and walking. Personal safety concerns influence mode choice decisions particularly in places where 'street life' is diminished or when the traveller has to make the connecting journey at night time;
- **Existing car or bike ownership.** The availability of a bike, car or very convenient connecting bus will often influence the choice of feeder mode. If a person does not own or ride a bike then it is unlikely they will purchase one specially unless influenced by interventionist marketing programs; and,
- **Quality of service.** Often the frequency, speed or reliability of service is a determining factor in the decision to go to a particular station. For example a person will quite often decide to travel further in order to use a station (such as Sydenham) which offers more frequent or express services and a better selection of destinations. This may mean that they will travel to a station which is not the closest one to them on the line.

If the above factors can be satisfied, the decision to cycle to a rail station or bus stop can still be influenced by infrastructure provision or physical issues such as: the availability of easy-to-use, secure and attractive parking facilities; an easy, attractive and safe route to the station (not perceived as too dangerous or too heavily trafficked); and, not too hilly.

14.2 Design and development of Cycle 'n' Ride travel

This subsection provides details on key technical issues designed to assist public transport operators and Council, as owner/manager of the public domain, to provide improved bicycle user access and connection to transport services.

Table 12 - Recommended technical guidelines

Guidelines	Coverage
NSW Bicycle Guidelines, (RTA 2003)	• Local and regional bicycle network facilities • Medium- and high-volume parking installations at stations
Guide to Traffic Engineering Practice - Part 14 Bicycles, (AUSTROADS 1999)	• Bicycle parking provision – racks and siting
AS2890.3 *Parking facilities Part 3: Bicycle parking facilities*	• Bicycle parking provision – racks and siting (more comprehensively covered in the two documents listed above)
NSW Planning Guidelines for Walking and Cycling, (DOP 2004)	• Planning and policy context and resources

14.3 National and international experience

Providing high quality access and parking facilities at stations for bicycle riders is an important way of increasing the level of usage by that mode, but there are other factors which need to be considered if bicycle transport is to achieve the spectacular levels of use as demonstrated in other parts of the world.

In other places where bicycle transport as a feeder mode has been energetically promoted, patronage rates have increased for the systems they feed. Research carried out by Peter De Leeuw and Herman Weijers of the Technical University of Delft in the Netherlands (TU-DELFT 1999) showed that bicycle parking improvements promoted at rail stations in The Netherlands have resulted in a significant increase of the number of people travelling by train.

Elsewhere in Europe, facilities have generally been installed as a reaction to local demand for bicycle parking facilities which greatly exceeded existing capacity. It is common throughout the Dutch, Swiss and German rail systems to see many thousands of bicycles parked around stations. Japan has a similarly high level of bicycle parking at stations in urban areas.

In the ten years leading up to 1995 the Dutch Government invested $A2.5 billion on bicycle infrastructure as part of the national Dutch Bicycle Masterplan. During that period bicycle park 'n' ride facilities were improved both in providing routes to stations as well as racks, lockers and "bike stalls" (cloak room type facilities for bikes often as part of bicycle repair shops). As a direct result of this substantial national investment in bicycle infrastructure bicycle usage has increased particularly as a feeder mode to rail and bus public transport. In response to this increase, the Dutch Railways announced in 2000 a DFL460 million five-year investment program to improve and upgrade its system of *fietsenstalling,* or guarded bicycle sheds, at major rail interchanges.

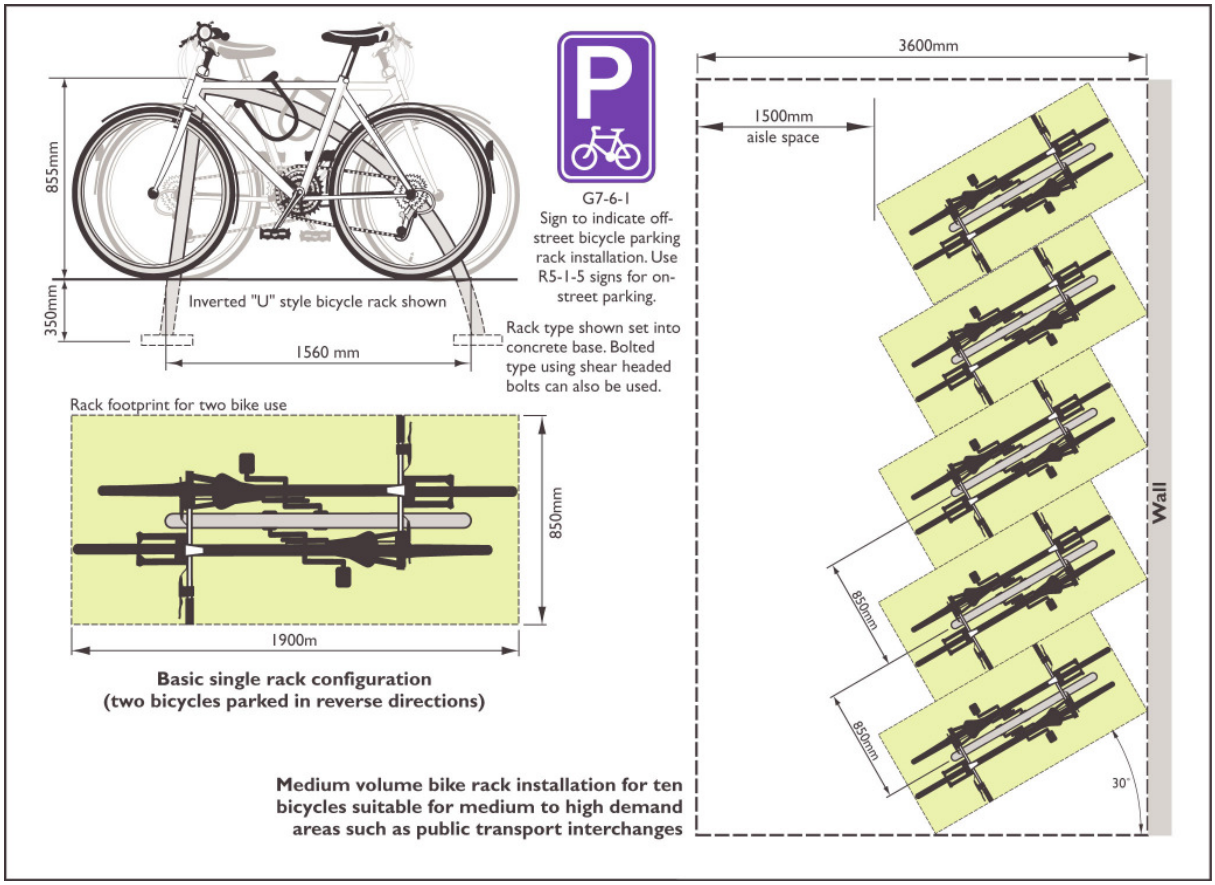


Figure 14 - Medium volume bicycle parking installation *(Figure 11.1 - NSW Bicycle Guidelines)*

Table 13, from the Dutch Ministry of Transport, Public Works and Water Management (1995) publication: *Cycling in figures – Facts about cycling in the Netherlands,* shows the growth of mode share in bicycles as a feeder to and from the surface rail system.

Table 13 - Mode of choice connecting with public transport in The Netherlands

Mode of transport before transit	1975	1978	1979-83	1988
Cycling/moped	30	39	35	45
Walking	35	25	27	25
Car driver	15	12	7	5
Car passenger				6
Bus/ tram/ underground	20	21	20	18
Other	0	3	4	1
All modes	100	100	100	100

The average distance for bicycle trips before transit in The Netherlands in 1990 was 3.3 km (trips after transit were 2.7km) whereas the before transit trip average in the same year for walking was 0.9 km and for cars 11.3 km.

In the USA coin operated bike lockers were installed from 1972 on the Bay Area Rapid Transit system in San Francisco. Over the succeeding years BART has installed 600 lockers and 1,368 racks in response to demand. Lockers are rented for a three monthly period (similar to the NSW CityRail lockers) and are used close to capacity.

Japan has a heavy investment in providing bicycle parking spaces at its transit stations. 10% of all Japanese rail customers use a bicycle to get to the station. In some centres this can be as high as 50%. Japan has pioneered the development of the fully-automated multi-level bicycle parking stations located at the most popular stations on the commuter rail network. Over 3 million bicycle parking spaces are now provided for Japanese rail users.

In NSW through its Secure Bicycle Locker scheme, Transport NSW has provided 534 lockers at 25 CityRail stations and 5 Sydney Ferries wharves. Lockers are rented to the travelling public and the scheme is managed by Bicycle New South Wales. A three month rental fee and a key deposit are charged. A recent study of the scheme's operation (SKM. 2000) found that the scheme had a 34% take-up level compared to between 50% and 60% elsewhere.

Over the past eight years Queensland Rail has installed over 1,400 lockers on its Brisbane City Train network. Queensland Transport advises that these are used to capacity. Demand for increased installations has used up all available vacant space. At some stations existing car parking places are being replaced with bicycle lockers. Lockers are provided free with users signing a three month contract and paying a key deposit.

The only other locker rental schemes elsewhere in Australia are in Victoria and West Australia. A small number of lockers was installed on the Melbourne rail system during the 1980's. A locker scheme was established in West Australia in the early 1990s. Each station's locker installation was managed by a different community organisation. This scheme has largely folded due to difficulties and differences in the management of the system and its component installations.

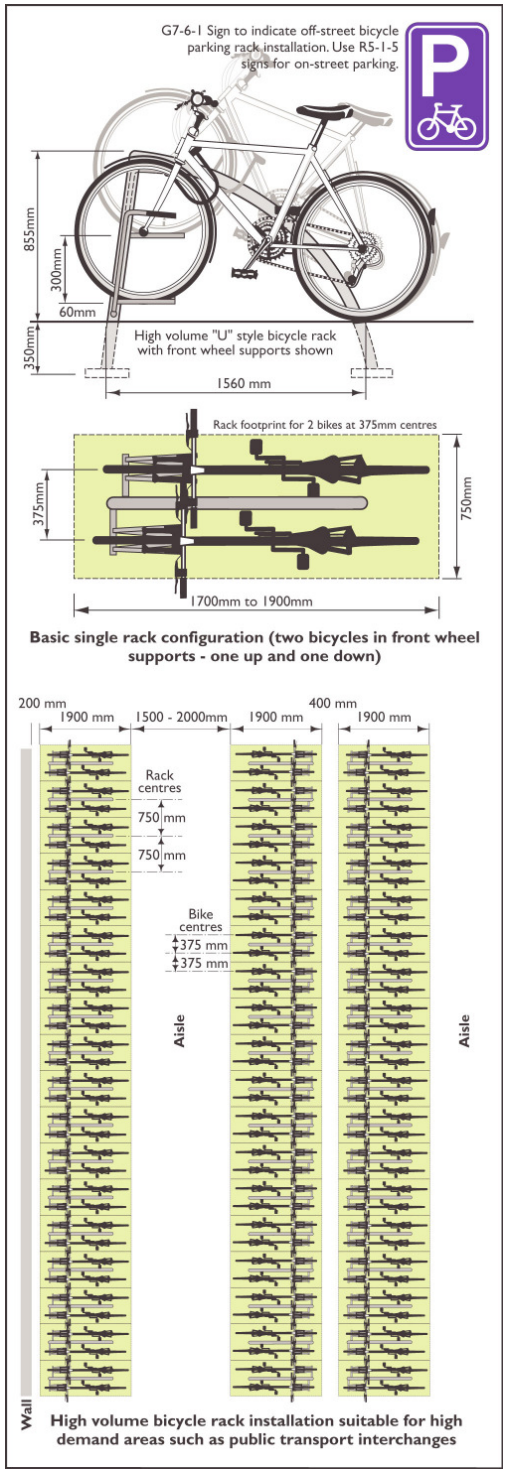


Figure 15 - High volume bicycle parking installation *(Figure 11. 2 NSW Bicycle Guidelines)*

15 Appendix F – Bicycle friendly streets details

Methods for providing bicycle access on all streets

Shared lanes

On roads where exclusive space is not marked for bicycle route facilities, safe operating space may be provided by widening the travel lanes thus allowing a vehicle to pass a rider without the need to leave the lane. This is particularly important in the kerbside lane where most riders will tend to travel. *Austroads Guide to Traffic Engineering Practice, Part 14 – Bicycles* Section 4 provides recommendations on lane widths suitable for motor vehicle/bicycle sharing.

Shared shoulders

On rural type roads and in some urban environments it is a common practice to mark the road shoulder by means of an E1 edge line. As bicycles are the only vehicles permitted to travel using road shoulders it is possible to provide good bicycle route access by sharing these shoulders with parked motor vehicles provided that there is adequate space. *Austroads Guide to Traffic Engineering Practice, Part 14 – Bicycles* Section 4 includes recommendations on widths for shoulders for sharing by bicycle riders. Adequate shoulder width should allow for clearance between parked vehicle car door openings and bicycle riders.

Bus lanes

Unless signed otherwise bicycle riders may legally operate in bus lanes. In order to accommodate both bicycles and buses in a comfortable shared situation it is important that bus lanes be of an adequate width to allow for passing. *Austroads Guide to Traffic Engineering Practice, Part 14 – Bicycles,* Section 4 and the *NSW Bicycle Guidelines* – Section 5 make recommendations for adequate lane widths and issues related to shared bus lanes.

Table 14 - Methods for retro-fitting bicycle facilities during street upgrades

No	Method	Application	Comments
1	Remarking traffic and/or parking lanes	Resizing road lanes to provide either visually separated bicycle lanes or kerbside lanes wide enough for sharing	Positioning of linemarking in relation to existing conditions (road joints, drainage, parking restrictions, sightlines etc)
2	Upgrading service roads	Marking service roads to include visually separated bicycle operating space	Special attention to parking, driveway access and entry/exit points to maintain bicycle facility continuity
3	Sealing shoulders	On rural roads and unkerbed urban roads.	Bicycle shoulder lanes can also be fitted to kerbed urban roads with parking provision
4	Converting footpaths to shared paths	For off-road bicycle/pedestrian route within the road corridor	Suitable for off-road one-way pairs or two-way shared path on one side only
5	Indenting car parking	Where footpath space is available	Preserves parking and permits straight through kerbside bicycle lanes at intersections.
6	Car parking on one side of road only	By removing a parking lane from one side of road only to create bicycle operating space	Reduces parking. Can be used in conjunction with angle parking schemes in adjoining side streets to preserve existing parking space availability.
7	Road-widening at median	Where median space is available	Move other lanes in to median to create bicycle operating space at kerb
8	Road-widening at the kerb	To add bicycle operating space in the form of increased width of the kerbside lane or by adding a bicycle lane.	Best used where number of driveways and side streets is at a minimum to reduce overall costs.
9	Removing a traffic lane	Other lanes markings may have to be readjusted to include bicycle lanes or widened kerbside lane	Best done when resheeting
10	Creating an off-road bicycle path	Two way on one side only or one-way pairs	Recommended option where traffic speeds and volumes are high

Table 15 – Methods for including bicycles at intersections

Facility type	Use	Issues
Kerbside lane widths to include bicycle operating space	Signalised and unsignalised intersections	Turning movements of motor vehicles, level of difficulty for rider
Turning provision	Signalised and unsignalised intersections	Turn from centre (bicycle lane or shared lane), turn from left (right turn or left turn)

Table 16 - Methods for retro-fitting bicycle facilities to intersections

Facility type	Use	Comments
Remarking traffic lanes	To provide bicycle route continuity and operating space	Turning movements of other vehicles
Including a right turn from the left bay or hook turn box	To provide bicycle route continuity and operating space	Turning movements of other vehicles

16 References

AS2890.3 1993. *Parking facilities Part 3: Bicycle parking facilities AS2890.3*. Standards Australia, Sydney, Australia.

AUSTROADS 1999. *Guide to Traffic Engineering Practice, Part 14 – Bicycles*. Austroads. Sydney, Australia.

CROW10 1993. *Sign up for the Bike. Design Manual for a Cycle Friendly Infrastructure.* Centre for Research and Contract Standardisation in Civil and Traffic Engineering. The Netherlands.

CROW 1997. *Bicycle Parking in the Netherlands.* Centre for Research and Contract Standardisation in Civil and Traffic Engineering. The Netherlands.

CSAHS 2003. *Cycling to work in Sydney: analysis of journey-to-work Census data from 1996 and 2001*. Telfer B, Rissel C. Central Sydney Area Health Service, Health Promotion Unit, Sydney, Australia.

DOP 2004. *Planning Guidelines for Walking and Cycling.* NSW Department of Planning. Sydney, Australia.

DRD 2000. *Collection of Cycle Concepts.* Danish Road Directorate. Copenhagen, Denmark.

GEOPLAN-ARUP 1996. *Marrickville Bicycle Strategy 1996*. Marrickville Council. Sydney, Australia.

ERCDT 2004. *Local Authority Assessment Progress Review 2004 – Guidelines and Matrices for Assessment.* AEA Technology for the National Cycling Strategy. London UK.

FIETSERSBOND 2001. *Cycle Balance – Objective Assessment of Local Cycling Conditions.* Fietsersbond (Dutch Cycling Union) Utrecht, The Netherlands.

LTSANZ 2004. *Cycle Network and Route Planning Guide.* Land Transport Safety Authority of New Zealand. Wellington, NZ.

MC-DCP19. *Marrickville Council Development Control Plan 19 – Parking Strategy.* Marrickville Council. Sydney, Australia.

RTA 1999. *Action for Bikes – Bikeplan 2010*. Roads and Traffic Authority of NSW. Sydney, Australia.

RTA 2003. *NSW Bicycle Guidelines.* Roads and Traffic Authority of NSW. Sydney, Australia.

RTA-NRTC 1999. *NSW Road Rules (Incorporating the Australian Road Rules).* Roads and Traffic Authority of NSW/National Road Transport Commission. Sydney/Canberra, Australia.

SKM 2000. *Review of Secure Bicycle Locker Rental Scheme.* NSW Department of Transport - Sinclair Knight Mertz. Sydney, Australia

TORONTO 2001. *Toronto Bike Plan – Shifting Gears*, City of Toronto, Canada.

TPDC 2003. *Cycling in Sydney – Bicycle Ownership and Use.* NSW Transport and Population Data Centre. Sydney, Australia.

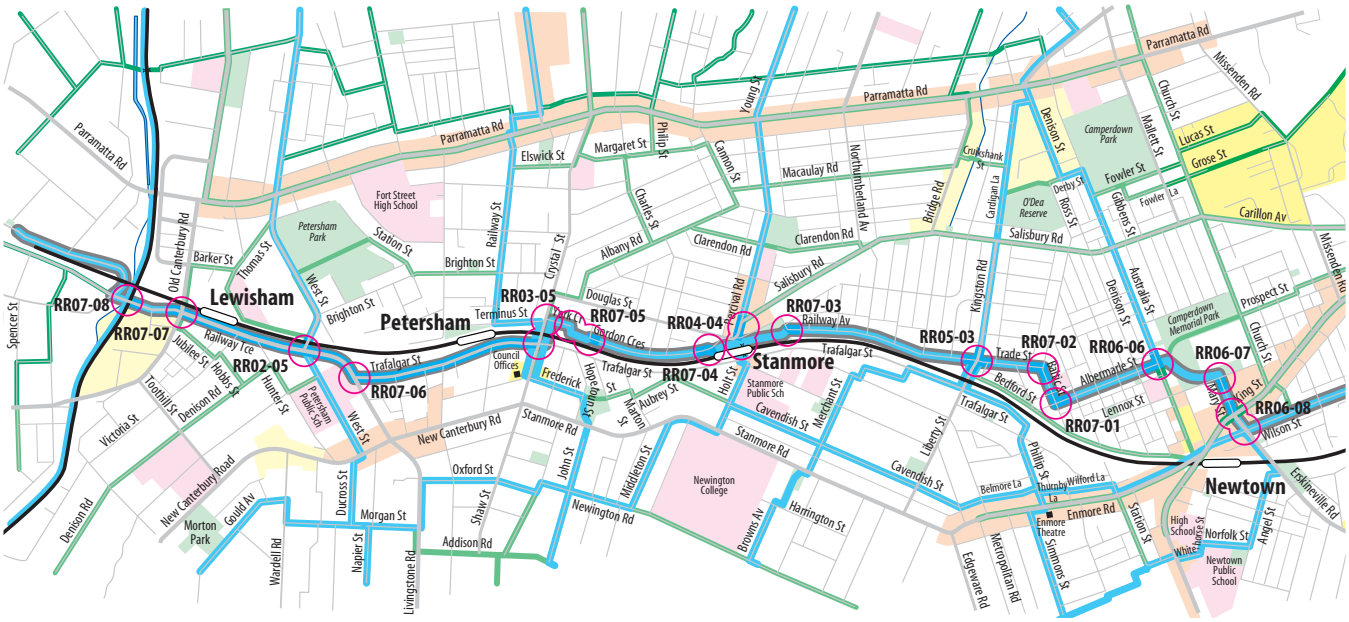
TU-DELFT 1999. *Trains Buses and Bikes: Dutch Policy, Dutch Practice*. De Leeuw, Peter. & Weijers, Herman. p112-117. In Velo-city 11th International Conference Proceedings 1999

TU-DELFT 2000. *International Handbook for User-Group Based Bikeway Design*. Bach B, Diepens J. Technical University of Delft. Netherlands.

MARRICKVILLE council

Marrickville Bikeplan 2006

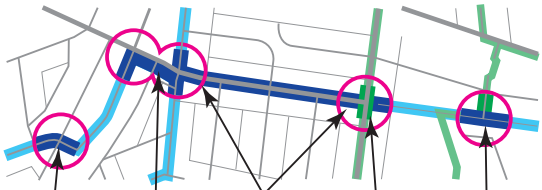
Route RR07 - Sydney to Parramatta Regional Route
Newtown to Petersham Sector - Detail Design Package



Comprising the following drawings:

MBP2006 RR07 Works estimate
MBP2006 RR06-08 King and Mary Streets
MBP2006 RR06-07 Mary and Lennox Streets
MBP2006 RR06-06 Australia and Albermarle Streets
MBP2006 RR07-B Baltic Street
MBP2006 RR05-03 Trade St and Kingston Rd
MBP2006 RR07-04 Douglas and Gordon Streets
MBP2006 RR07-05 Gordon and York Crescents
MBP2006 S03 Contraflow unmarked in narrow streets
MBP2006 S04 Route linemarking 1
MBP2006 S05 Route linemarking 2
MBP2006 R01 Bicycle network signage
MBP2006 R02 Network direction signing methodology

Key to route detailing map symbols



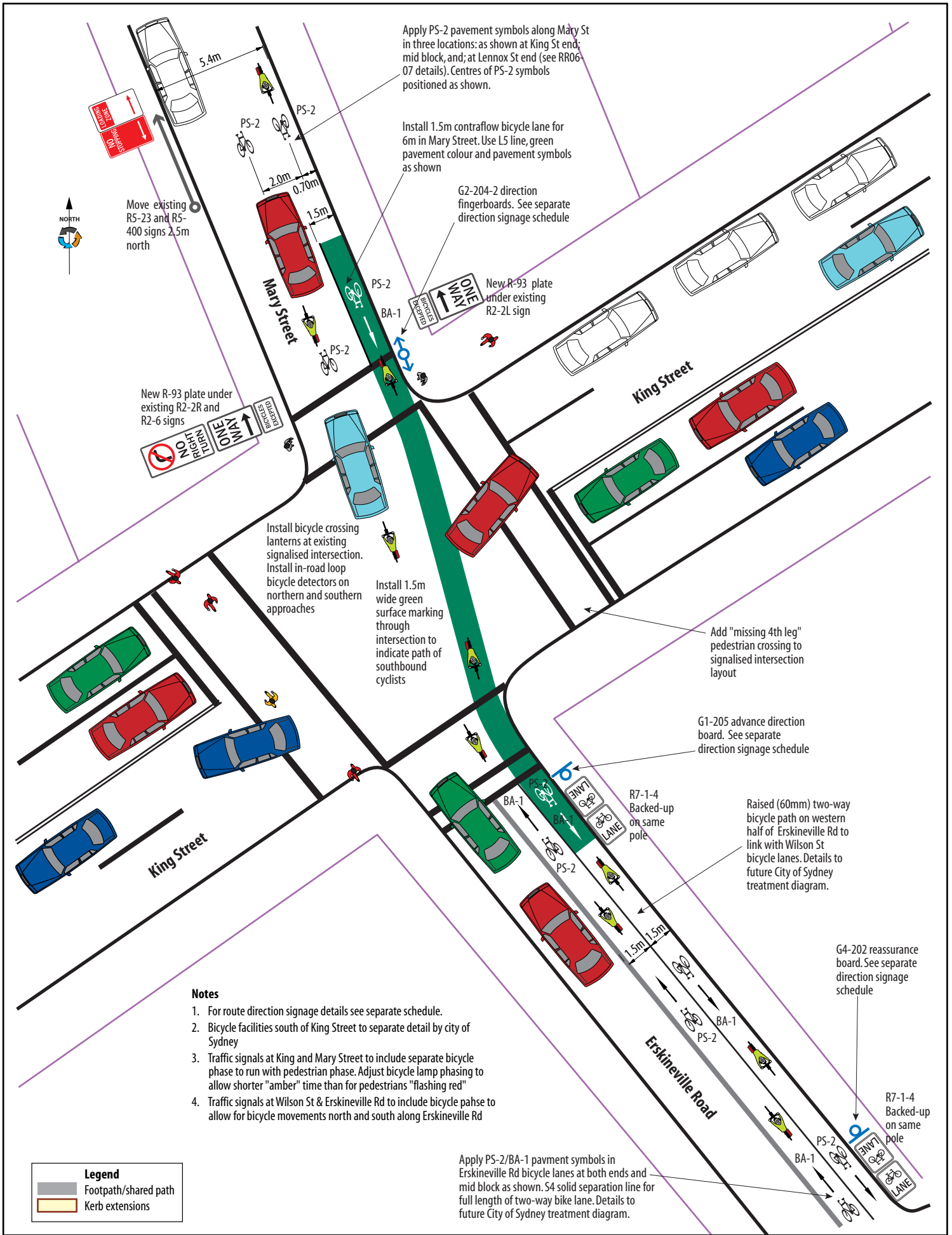
Schools, colleges and universities
Retail, cafes and entertainment
Government & public buildings
Public open space (parks etc)
Privatised open space (golf etc)
Industrial & commercial usage

RR01-12
Proposed intersection treatment with construction code

Regional route on-road (no linemarking)
Regional route off-road
Not near a road (park etc) *Beside a road*
Regional route on-road with bicycle lanes
Local route on-road (no linemarking)
Local route off-road
Not near a road (park etc) *Beside a road*
Local route on road with lanes

Code	Location	Treatment details and recommendations	Estimated cost	Length km	Path & road	Kerb & median	Line marking	Signage	Struct & misc	Design 3%	Conting 10%
RR07	**Sydney to Parramatta via Newtown**	**Via Newtown shops, Stanmore shops and station, Petersham station and shops, Lewisham shops and Summer Hill**	**314,171**	**3.742**	**132,215**	**42,050**	**45,066**	**57,960**	**0**	**8,319**	**28,561**
RR06-08	King St & MarySt & Erskineville Rd	Intersection treatment as per Standard Diagram S02 Figure B (grren colour in first 10m of Mary St bike lane). Signals modified incl bike lamps. Linemarking in Erskineville Rd & Mary St legs	8,826		0	0	510	7,280	0	234	802
RR06-D	Mary St	Contraflow lane as per Standard Diagram S02 - Figure A (splitter island Lennox St end - Type B (no island) King St end.	4,203	0.105	0	0	930	2,780	0	111	382
RR06-07	Mary St & Lennox St	Remove existing island. Construct new splitter island. Construct new 3.0m kerb ram on northern side of Lennox St	15,964		1,150	7,540	420	4,980	0	423	1,451
RR06-C	Path through Campersown Memorial Park	Widen path by 1.0 metre. Linemarking. Direction signs (3) at path branch (LL02). Shared path signage	39,156	0.201	30,490	0	2,010	2,060	0	1,037	3,560
RR06-06	Australia St & Albermarle St	Construct new kerb extension with drainage cover (2.5x6m). Replace kerb ramp with new 3m ramp. Give way sign and linemarking on path. Direction signs (2). Parking restriction signs.	18,581		740	9,710	650	5,300	0	492	1,689
RR07-A	Albermarle St	Parking lines (C4) and PS-2 bike symbols	4,602	0.331	0	0	4,062	0	0	122	418
RR07-01	Albermarle St & Baltic St	Linemarking at intersection (10m approaches). Direction signage (group of 6)	3,048		0	0	410	2,280	0	81	277
RR07-B	Baltic St	Parking lines (C4) and PS-2 bike symbols	1,747	0.121	0	0	1,542	0	0	46	159
RR07-02	Baltic St and Trade St	Linemarking at intersection (10m approaches). Direction signage (group of 6)	3,048		0	0	410	2,280	0	81	277
RR07-C	Trade St	Parking lines (C4) and PS-2 bike symbols	2,590	0.183	0	0	2,286	0	0	69	235
RR05-03	Trade St & Salisbury Rd & Railway Av	Enlarge traffic island. Construct two new 3.0m kerb ramps. Mark roundabout approches for bikelanes. Diretion signage. (set of 6). Roundabout GW sign. Linemarking.	22,218		950	10,910	970	6,780	0	588	2,020
RR07-D	Railway Av	Parking lines (C4) and PS-2 bike symbols	8,124	0.590	0	0	7,170	0	0	215	739
RR07-03	Railway Av & path into Stanmore Res	Use existing kerb ramp. Linemark intersection approaches (10m). Direction signage (group of	3,161		0	0	510	2,280	0	84	287
RR07-E	Path through Stannmore Res to Underpass/Signal crossing	Resurface path. Linemarking. Shared path signage.	66,054	0.148	55,840	0	1,480	980	0	1,749	6,005
RR04-04	Douglas St & Percival Rd crossing	New kerb ramp. Path linemarking. Direction signage (2).	2,912		0	1,360	410	800	0	77	265
RR07-F	Path from underpass to Gordon Cres	Realign path to terminate in Gordon Cres behind bus shelter. Linemarking. Direction signage (group of 6)	28,739	0.065	24,715	0	650	0	0	761	2,613
RR07-04	Path transition to Gordon Cres	New 3m kerb ramp behind bus shelter. New 2m splitter/refuge islands near entrance to Gordon	16,961		0	7,540	650	6,780	0	449	1,542
RR07-G	Gordon Crescent	Parking lines (C4) and PS-2 bike symbols	6,179	0.447	0	0	5,454	0	0	164	562
RR07-05	Path between Gordon Cr and York Cr and transitions	New 3.0m kerb ramps. Repaving footpath surface at Gordon Cr. Directional and parking restriction signage.	8,464	0.056	1,180	2,560	730	3,000	0	224	769
RR07-H	York Cr	Parking lines (C4) and PS-2 bike symbols	1,217	0.082	0	0	1,074	0	0	32	111
RR03-05	Crystal St intersections with York and Trafalgar St	Resurface path on eastern side of Crystal St. Realign lanes in Trafalgar St to include green bicycle lane (between L-turn and strait lanes). Bicycle signal lamps. Extend kerb on SE corner. Direction signage (group of 6).	40,362	0.074	17,150	2,430	5,664	10,380	0	1,069	3,669
RR07-I	Trafalgar St	Parking lines (C4) and PS-2 bike symbols	8,015	0.582	0	0	7,074	0	0	212	729

RR07-06	Trafalgar St & Railway Tce	0		0	0
RR07-J	Railway Tce Trafalgar St to West St	0	0.200	0	0
RR02-05	Railway Tce & West St	0		0	0
RR07-K	Railway Tce West St to Old Canterbury Rd	0	0.372	0	0
RR07-07	Railway Tce & Old Canterbury Rd & Longport St	0		0	0
RR07-L	Longport St	0	0.185	0	0
RR07-08	Longport St & Rail bridge	0		0	0



Notes

1. For route direction signage details see separate schedule.
2. Bicycle facilities south of King Street to separate detail by city of Sydney
3. Traffic signals at King and Mary Street to include separate bicycle phase to run with pedestrian phase. Adjust bicycle lamp phasing to allow shorter "amber" time than for pedestrians "flashing red"
4. Traffic signals at Wilson St & Erskineville Rd to include bicycle pahse to allow for bicycle movements north and south along Erskineville Rd

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

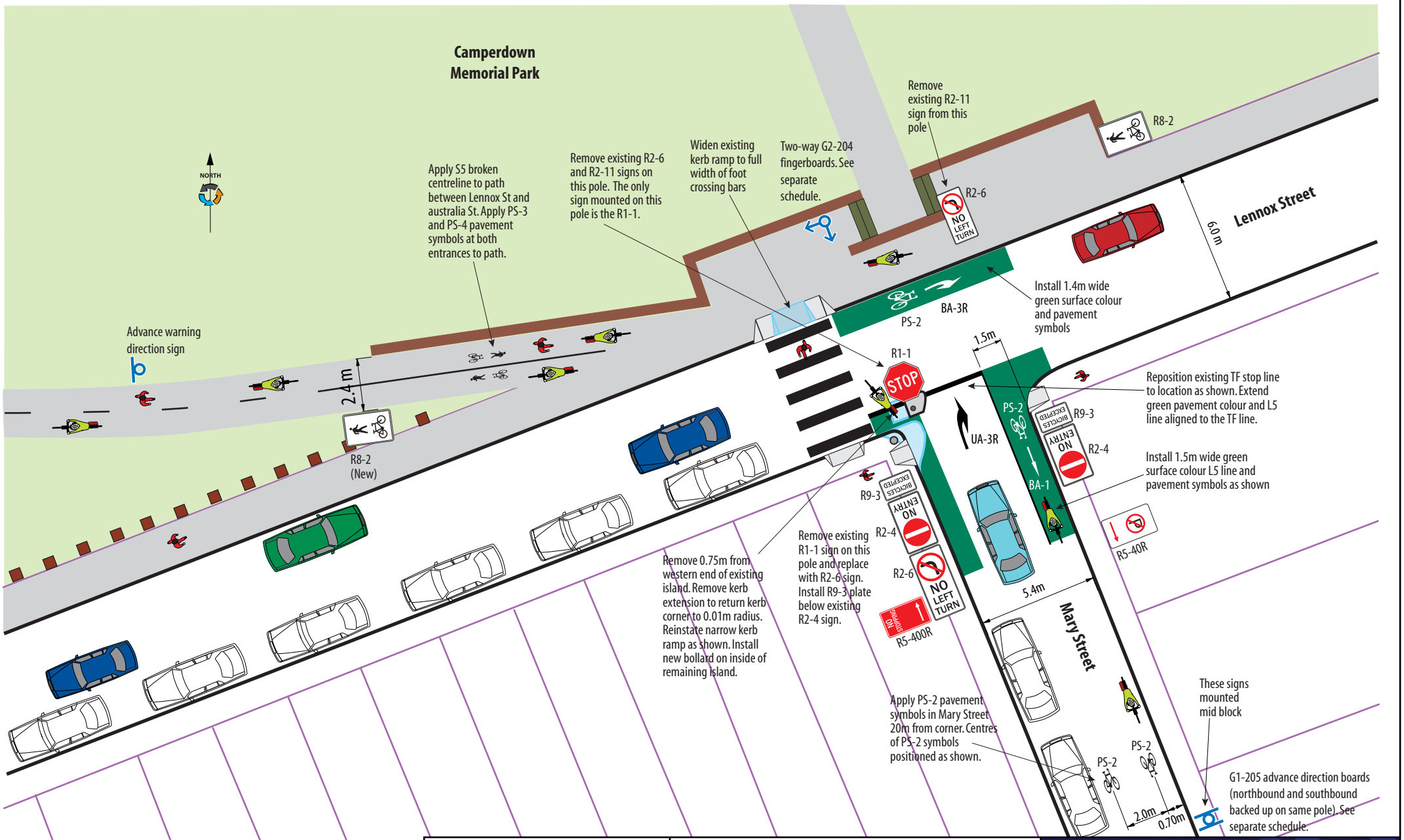
23/9/2006 - Version 1

Scale 1:225

MARRICKVILLE council

RR06-08 Detail treatment diagram

King and Mary Streets, NEWTOWN



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

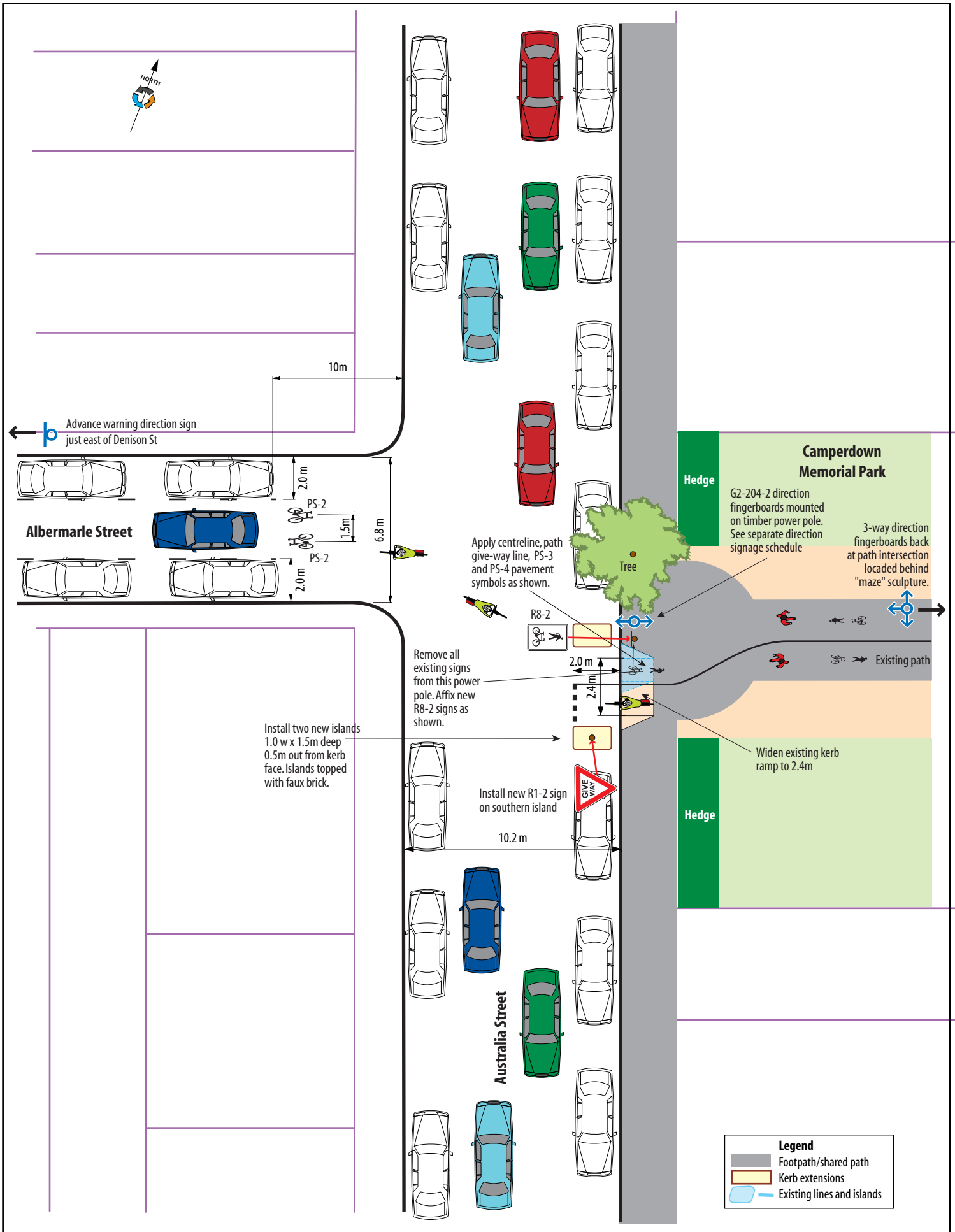
23/8/2006 - Version 1

Scale 1:225

MARRICKVILLE council

RR06-07 Detail treatment diagram

Mary and Lennox Streets, NEWTOWN



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

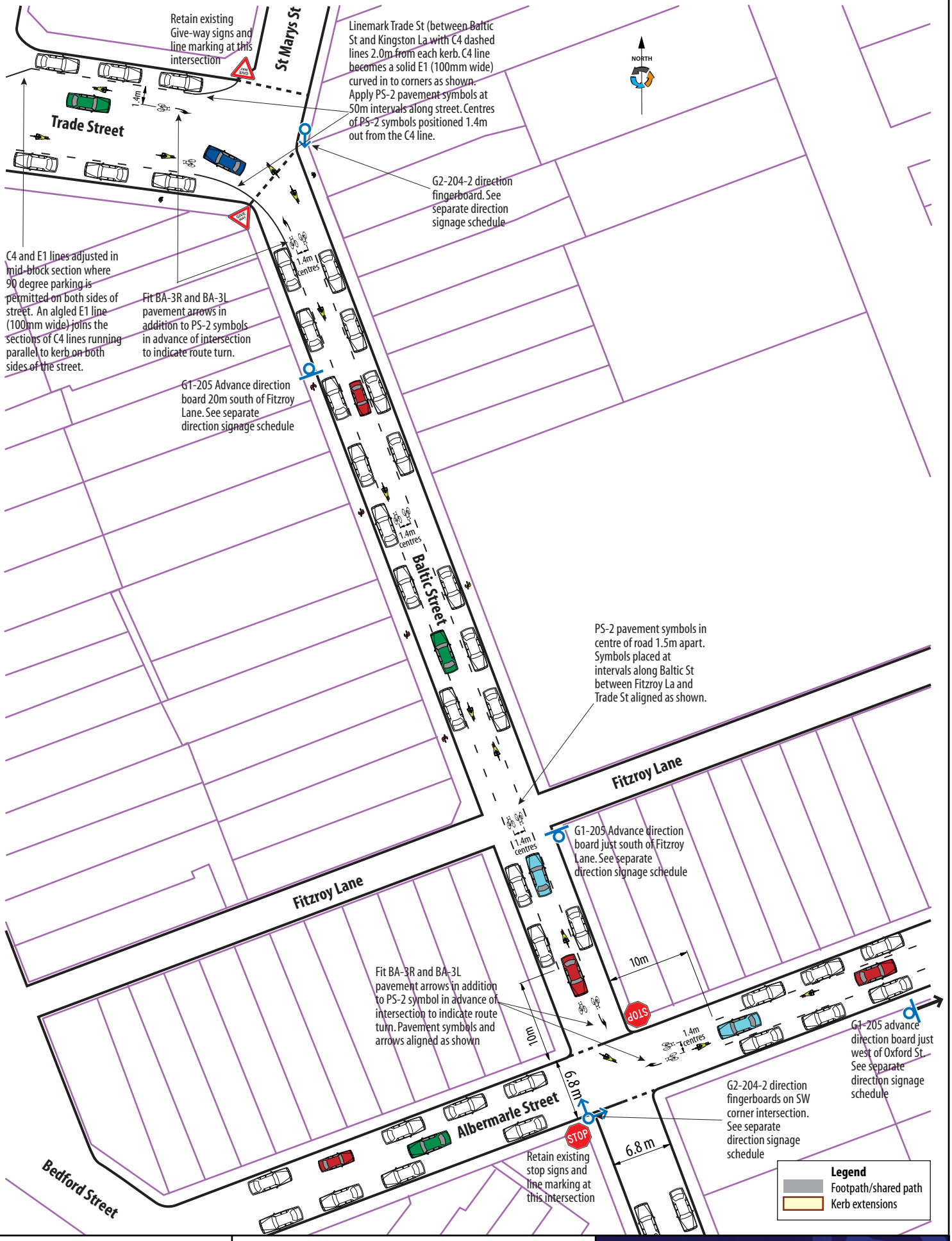
3/5/2006 - Version 1

Scale 1:225

MARRICKVILLE council

RR06-06 Detail treatment diagram

Australia and Albermarle Streets, NEWTOWN



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

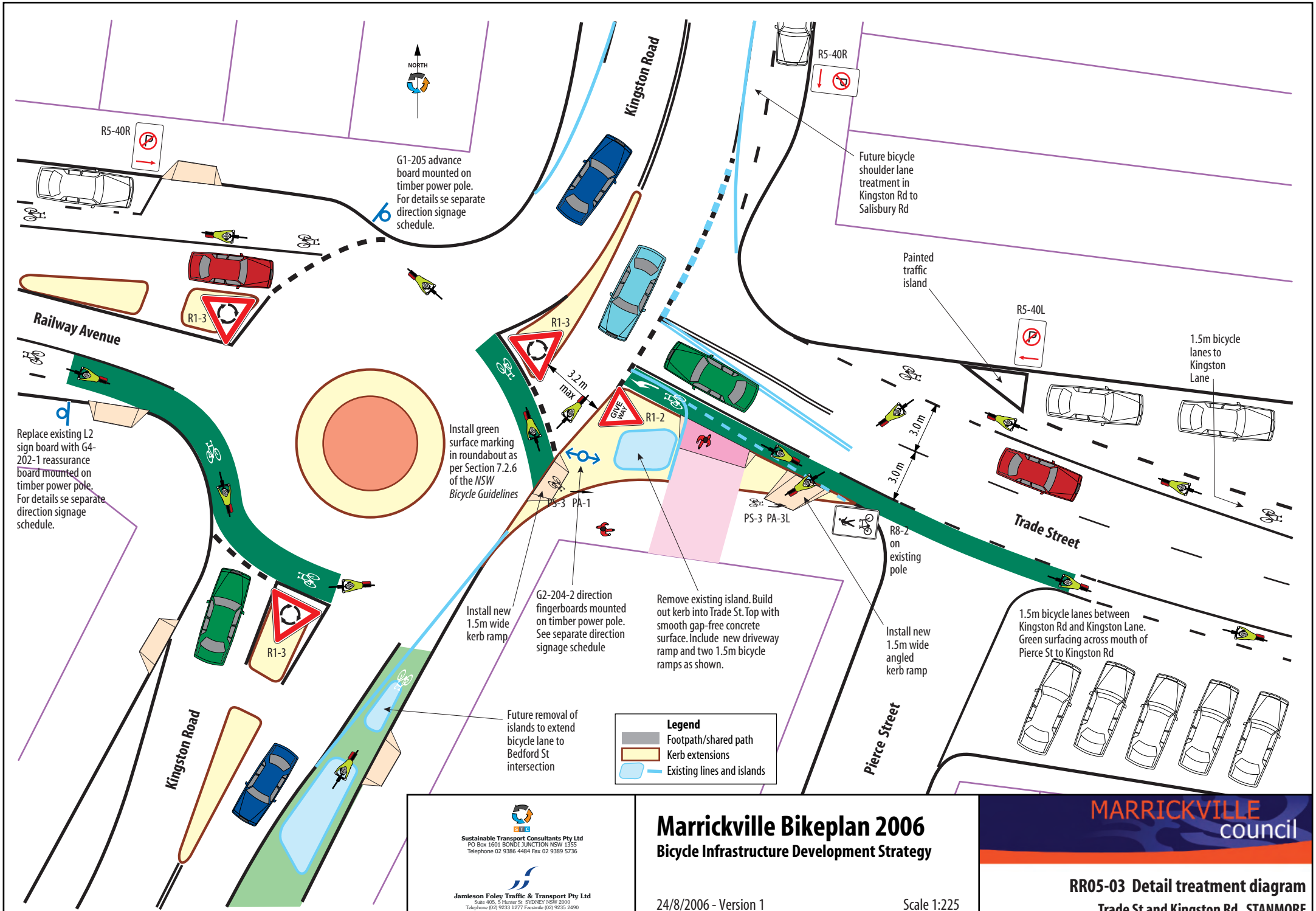
24/9/2006 - Version 1

Scale 1:550

MARRICKVILLE council

RR07-B Detail treatment diagram

Baltic Street, NEWTOWN



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

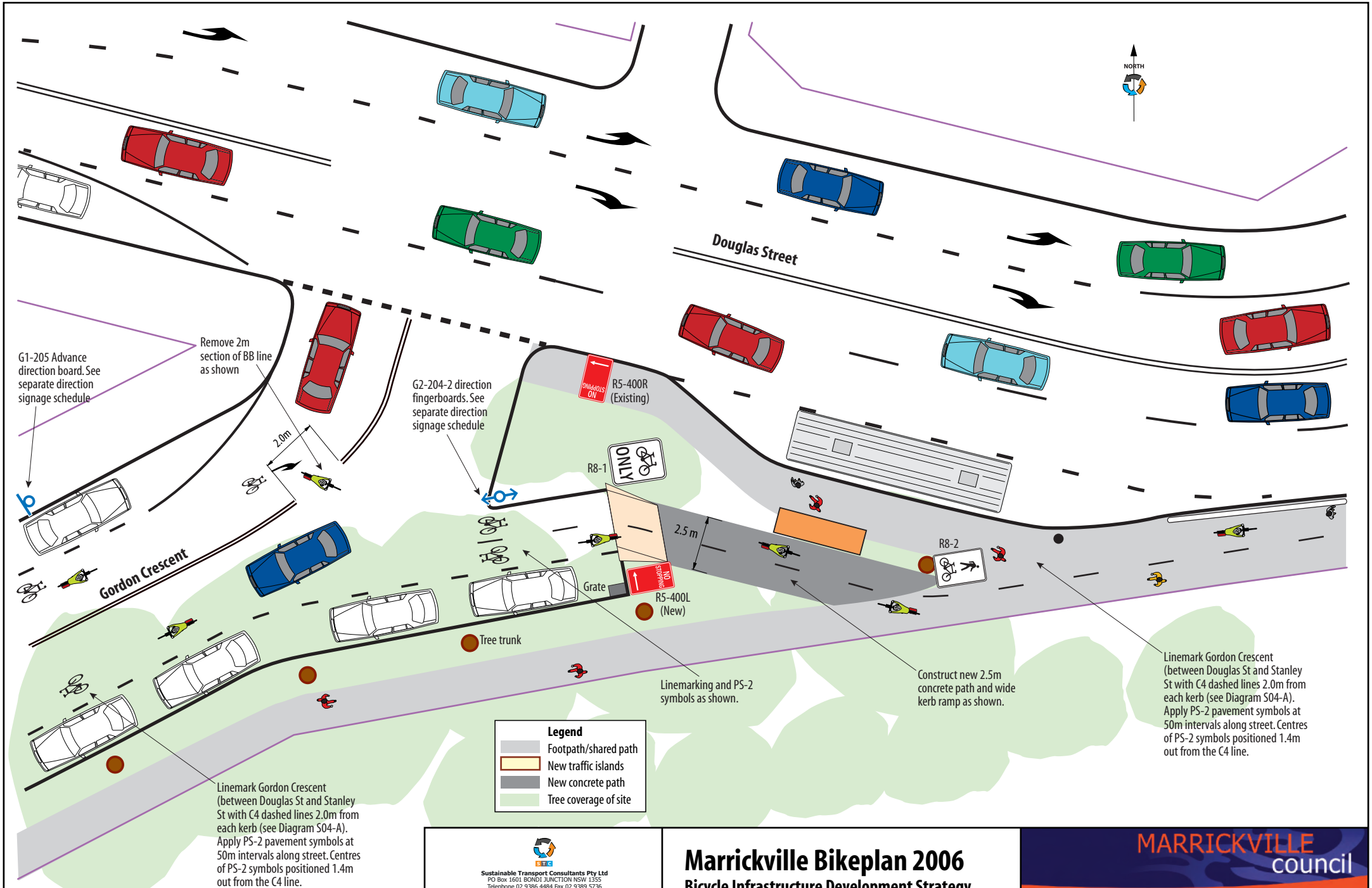
24/8/2006 - Version 1

Scale 1:225

MARRICKVILLE council

RR05-03 Detail treatment diagram

Trade St and Kingston Rd, STANMORE



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

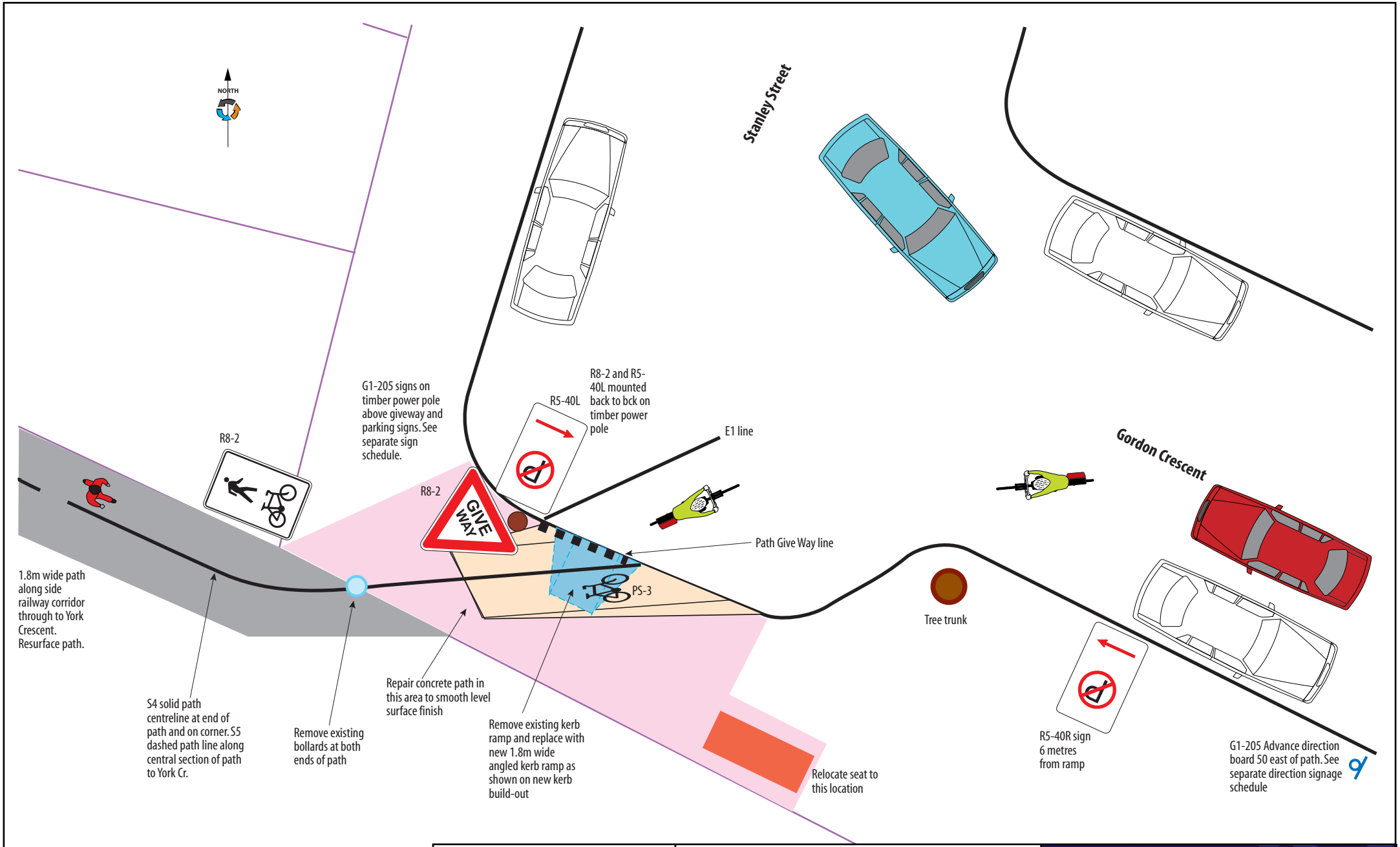
23/8/2006 - Version 1

Scale 1:225

MARRICKVILLE council

RR07-04 Detail treatment diagram

Douglas Street and Gordon Crescent, STANMORE



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

23/8/2006 - Version 1

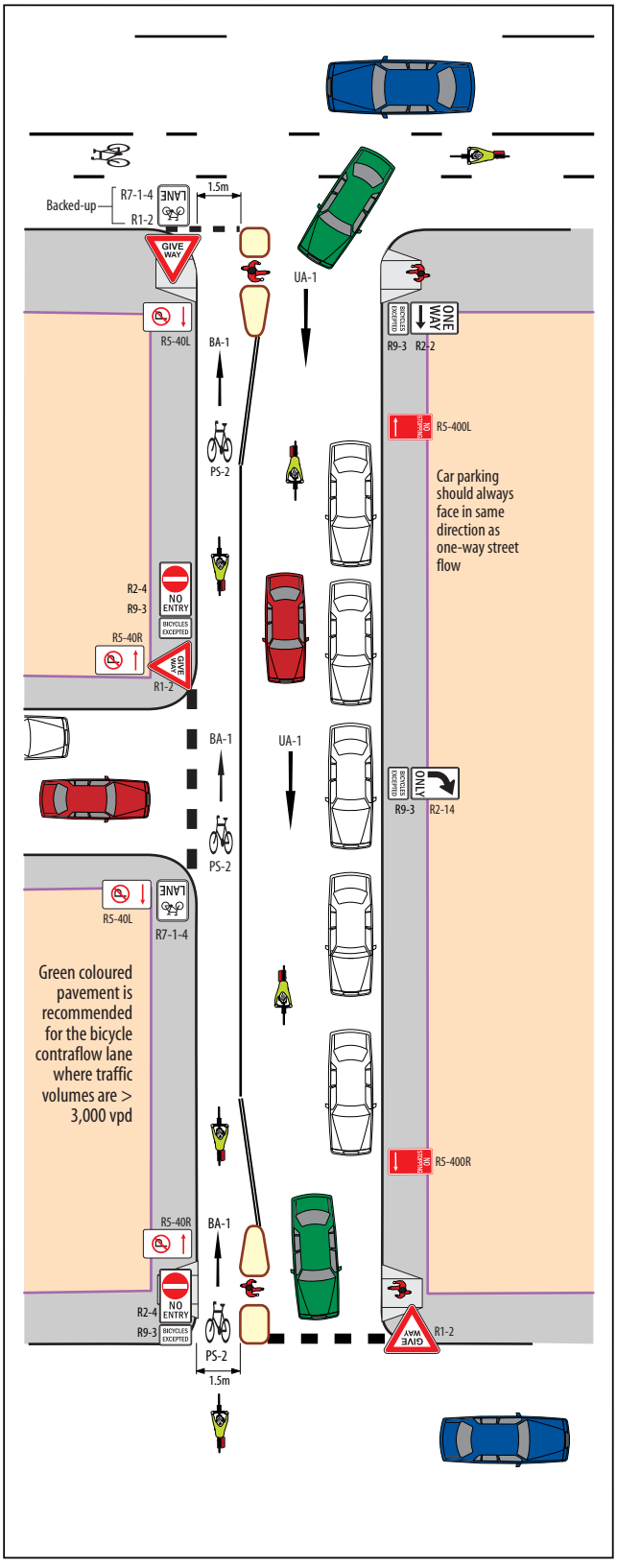
1:450

MARRICKVILLE council

RR07-05 Detail treatment diagram

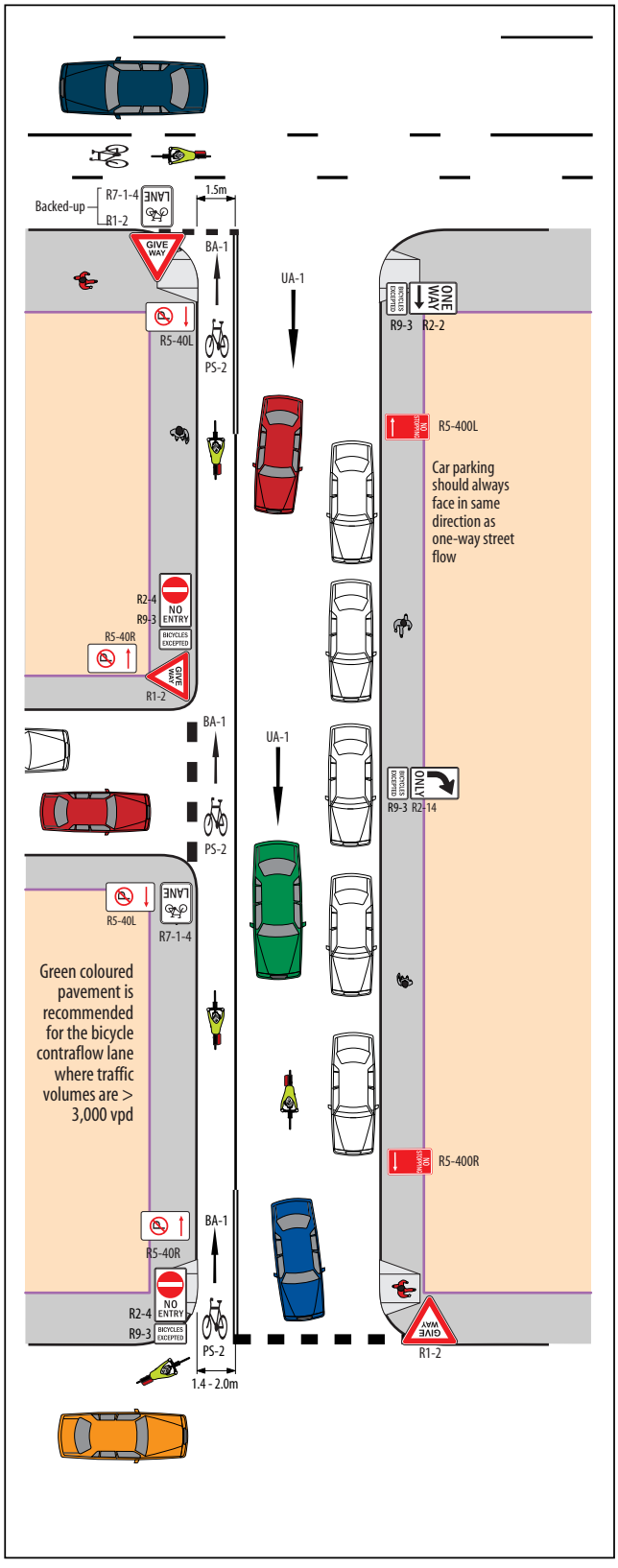
Gordon Crescent & Stanley St, PETERSHAM

Figure A - Contraflow bicycle lane in narrow street with entry/exit islands



After Figure 5.8 *NSW Bicycle Guidelines*

Figure B - Contraflow bicycle lane in narrow street without entry/exit islands



After Figure 5.8 *NSW Bicycle Guidelines*

Legend
Footpath
Median strip/splitter island

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006
Bicycle Infrastructure Development Strategy

12/5/2006 - Version 1

Not to scale

MARRICKVILLE council

S02 Standard engineering treatment diagram
Bicycle contra-flow lanes in narrow streets

Figure S04-A Parking advisory lanes with shared travel lanes and no centre line

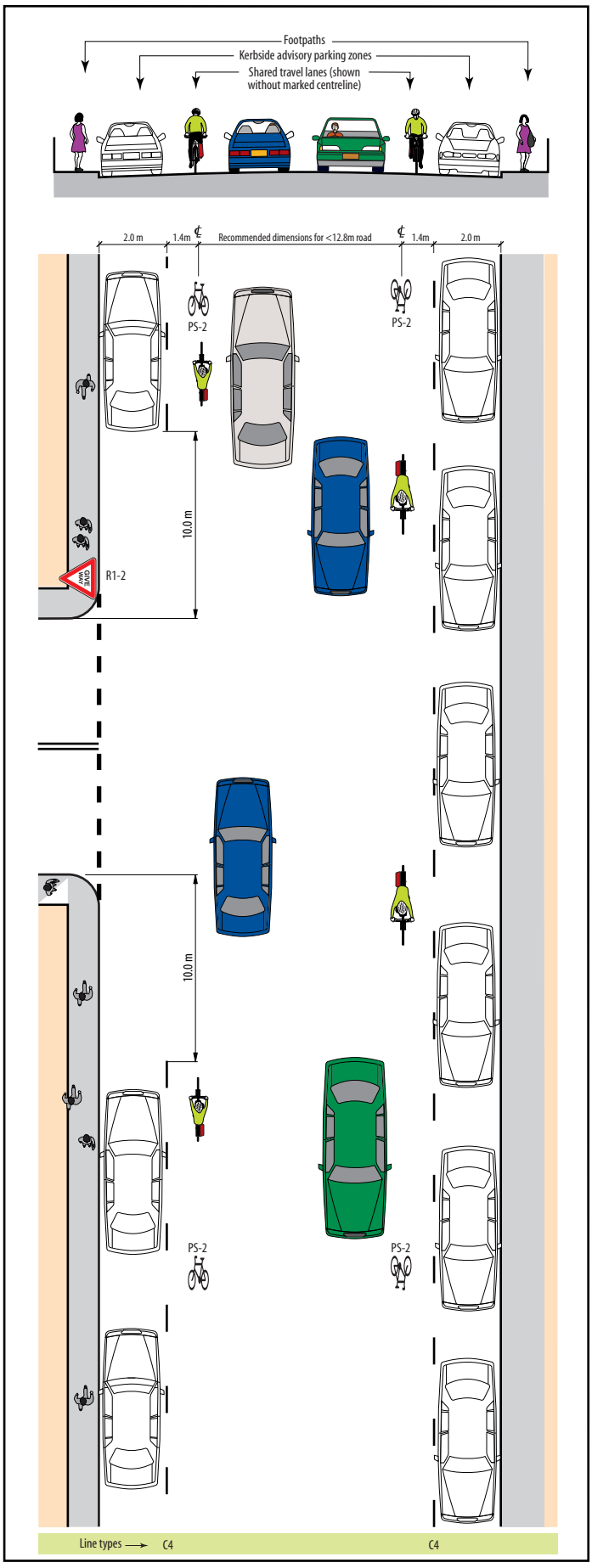
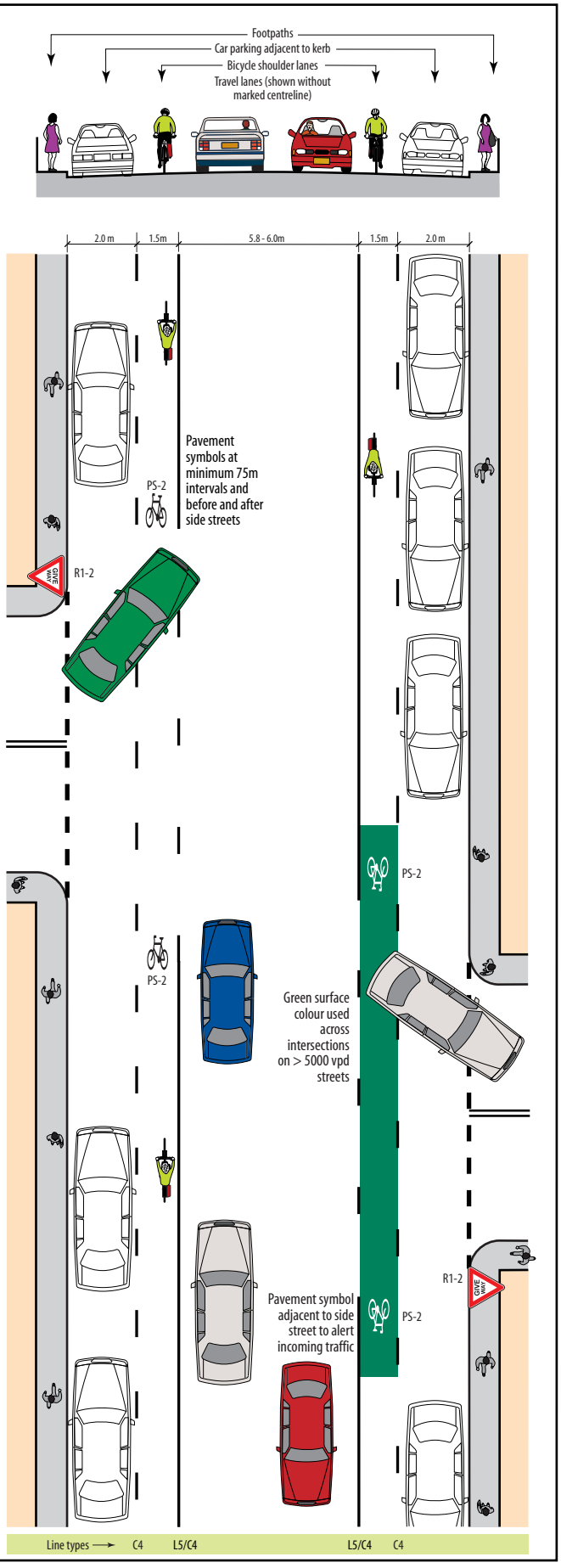


Figure S04-B Bicycle shoulder lanes and no street centre line



After Section 5, *NSW Bicycle Guidelines*

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

25/9/2006 - Version 1

Not to scale

MARRICKVILLE council

S04 Standard engineering treatment diagram

Recommended bicycle lane treatments

A- Parking advisory and shared travel lanes B-Bicycle shoulder lane, no centre line

Figure S05-A Bicycle shoulder lanes standard treatment (12.8m road)

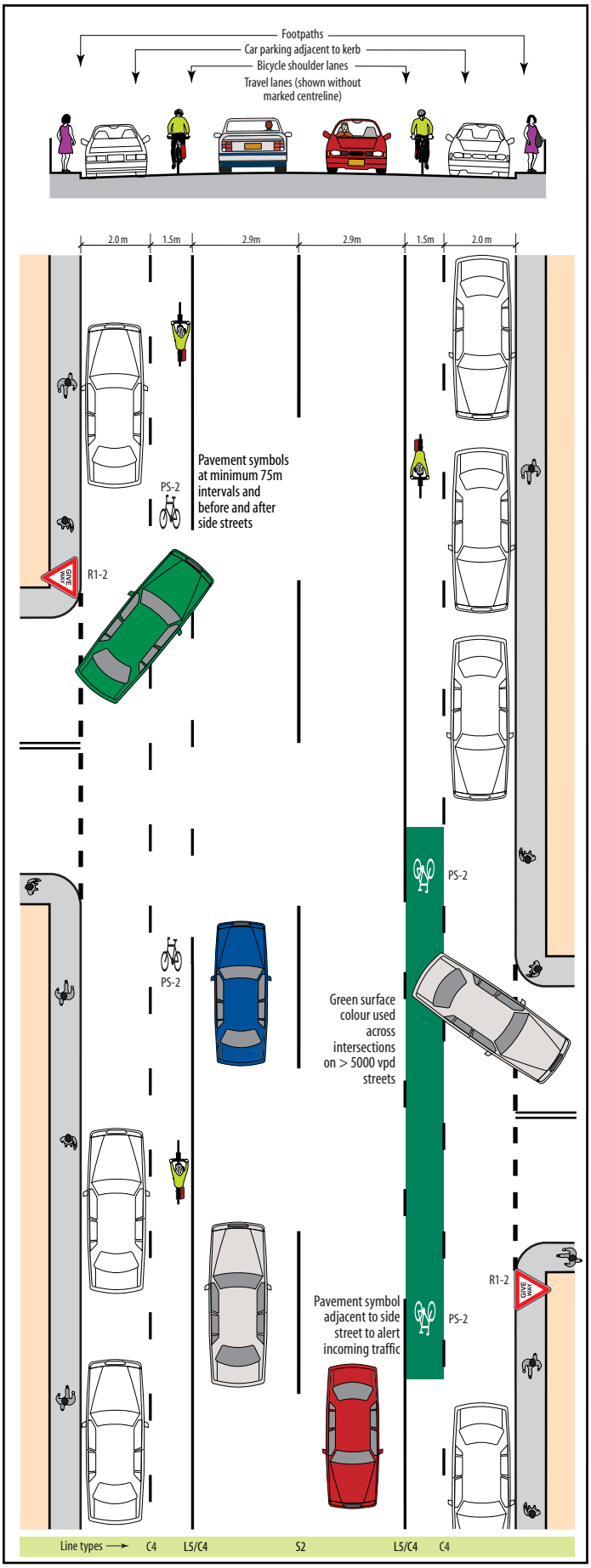
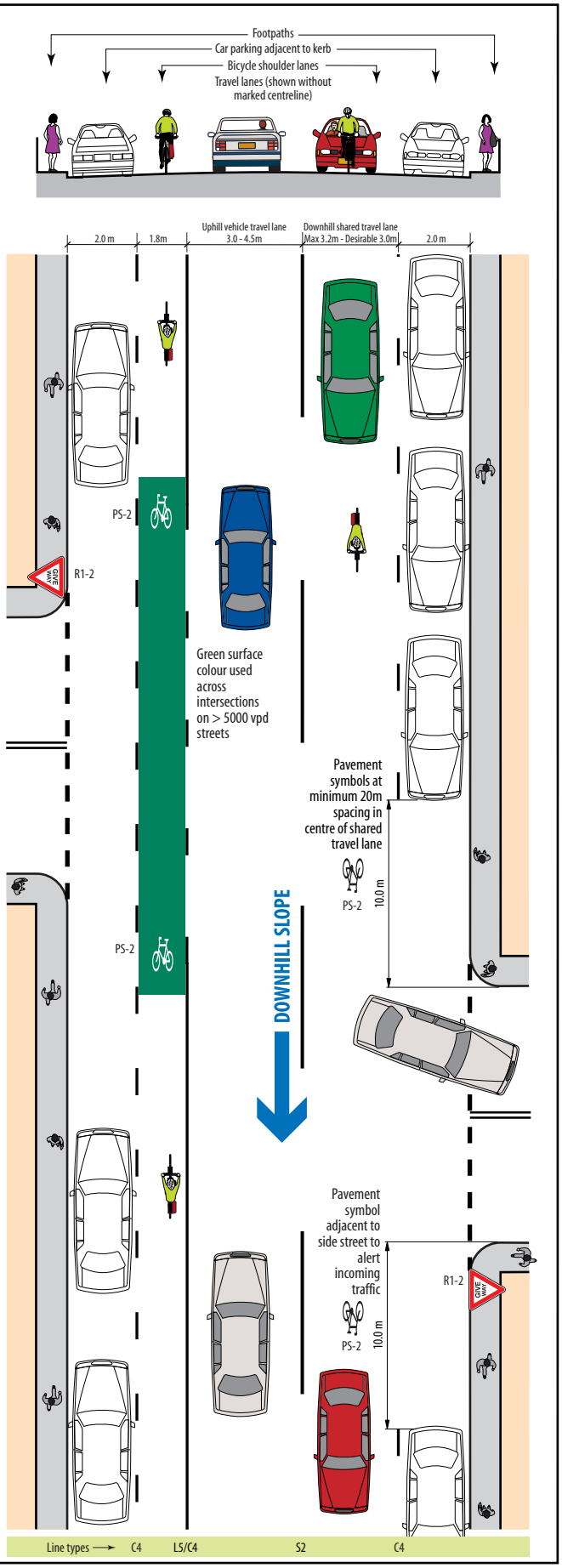


Figure S05-B Bicycle shoulder lanes on uphill side with shared travel lane on the downhill side



After Section 5, *NSW Bicycle Guidelines*

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

25/9/2006 - Version 1

Not to scale

MARRICKVILLE council

S05 Standard engineering treatment diagram

Recommended bicycle lane treatments

A- Standard bicycle shoulder lanes B-Bicycle lane uphill/shared lane downhill

Regulatory signs

R7-1-4
Bicycle lane

R8-1
Bicycle path

R8-2
Shared path

R8-3
Separated path

R6-10-3
Bicycle prohibition

R2-22
No hook turn by bicycles

R5-1-5L
Bicycle parking

R5-1-5R
Bicycle parking

R7-4
End of regulatory zone

R7-2
Optional advance notice

R9-3
Bicycles excepted

For full details on these signs refer to the *NSW Bicycle Guidelines* Section 9 and *AS1742 Manual of Uniform Traffic Control Devices - Part 9 Bicycle Facilities* and *Part 2 General Use.*

Warning signs

W6-8
Road crossing ahead

W6-1
Pedestrian path ahead

W6-212
Slippery for bicycles

W6-7
Bicycle warning

W6-210
Steep descent

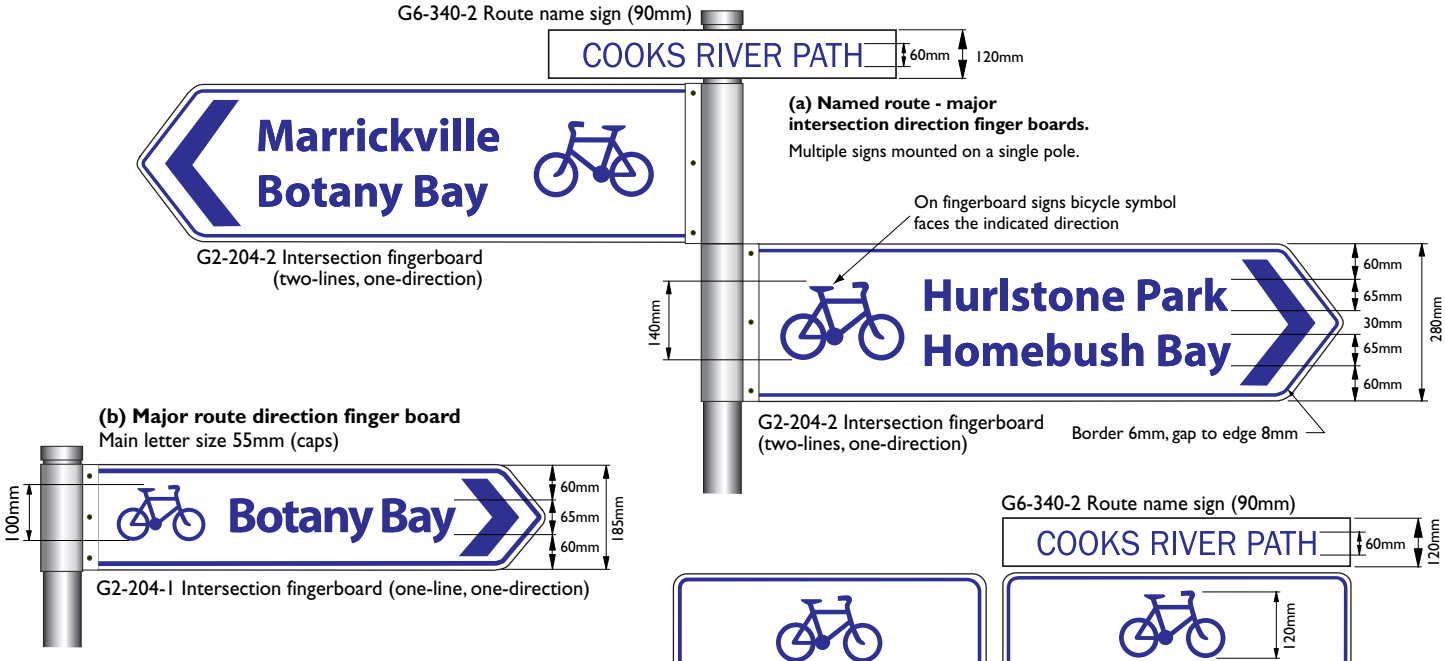
W6- 211
Steep climb

W6-9
Shared path warning

W8-200
Parallel bicycle path turn warning.

W6-214
Share the Road sign

Direction signs



Notes

1. Bicycle route directional signs should be located so as to not conflict with existing road directional signage, or create ambiguity at critical turning points or crossings.
2. See separate diagram for typical intersection sign layout and mounting methodology.
3. All signs are dark (royal) blue on white reflectorised background with letter sizes as shown.
4. Fingerboards are double sided. They are manufactured in two pieces (one for each side) and riveted back to back to form a stiff laminate. Fingerboard signs are mounted on poles using standard pipe clamps. Clamps should be pinned to prevent accidental movement due to wind or weather.

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

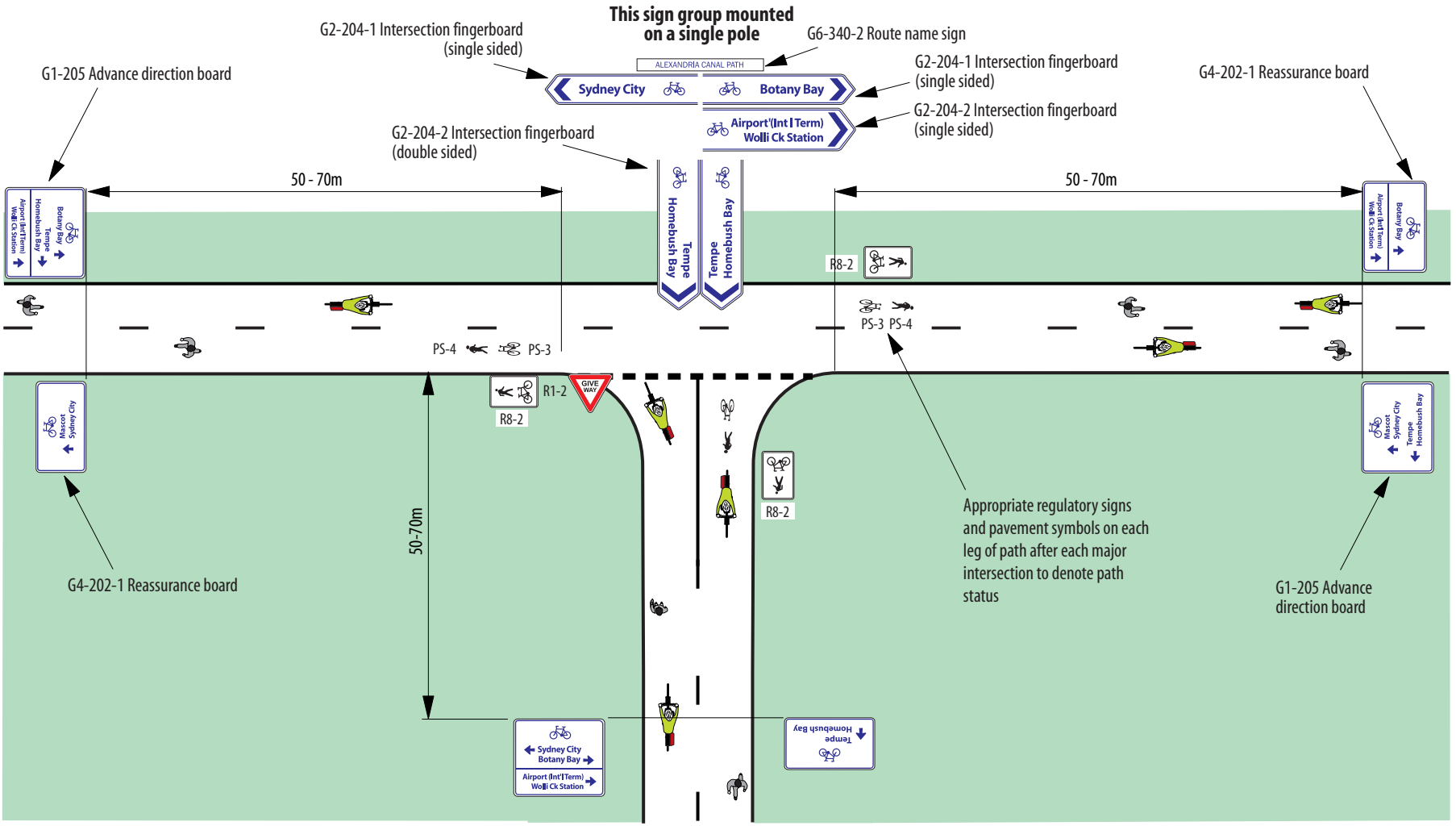
24/9/2006 - Version 1

Not to scale

MARRICKVILLE council

Reference diagram 01

Bicycle network signage - *NSW Bicycle Guidelines*



Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006

Bicycle Infrastructure Development Strategy

25/9/2006 - Version 1

Not to scale

MARRICKVILLE council

Reference diagram R02

Bicycle network direction signing methodology

Figure A - Contraflow bicycle travel in a narrow street with entry/exit islands

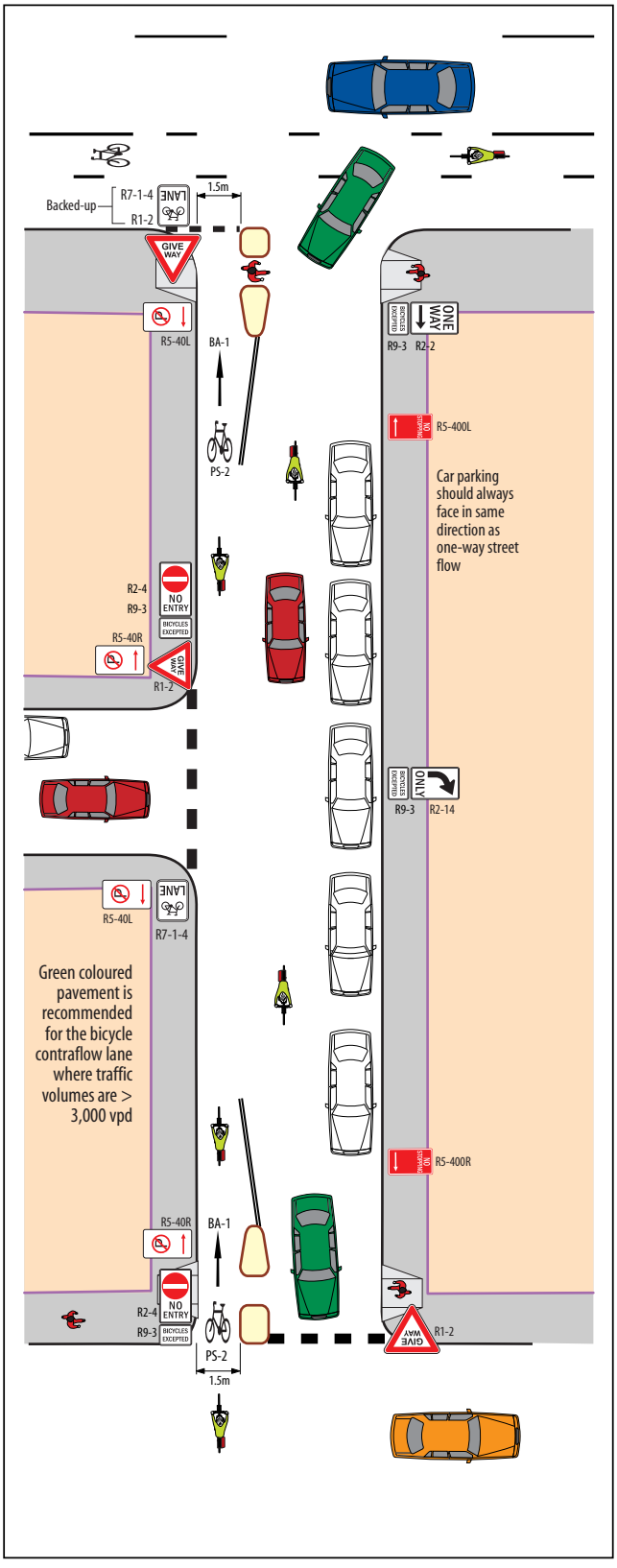
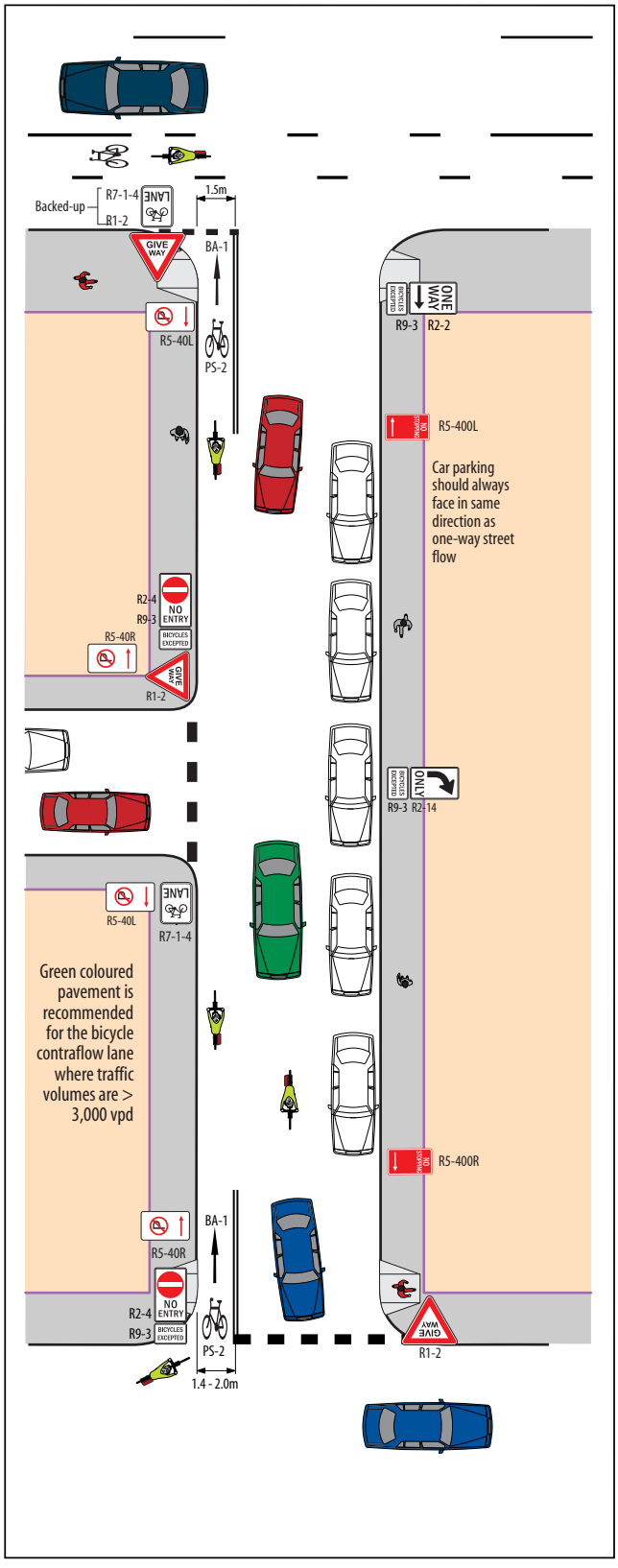


Figure B - Contraflow bicycle travel in a narrow street without entry/exit islands



Both treatments are recommended only in low traffic-volume (>3,000vpd) streets. Recommended speed limit >50km/h.

Legend
Footpath
Median strip/splitter island

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006
Bicycle Infrastructure Development Strategy

12/5/2006 - Version 1

Not to scale

MARRICKVILLE council

S03 Standard engineering treatment diagram
Bicycle contra-flow in narrow streets without lanes

Figure A - Contraflow bicycle lane with parking both sides of street

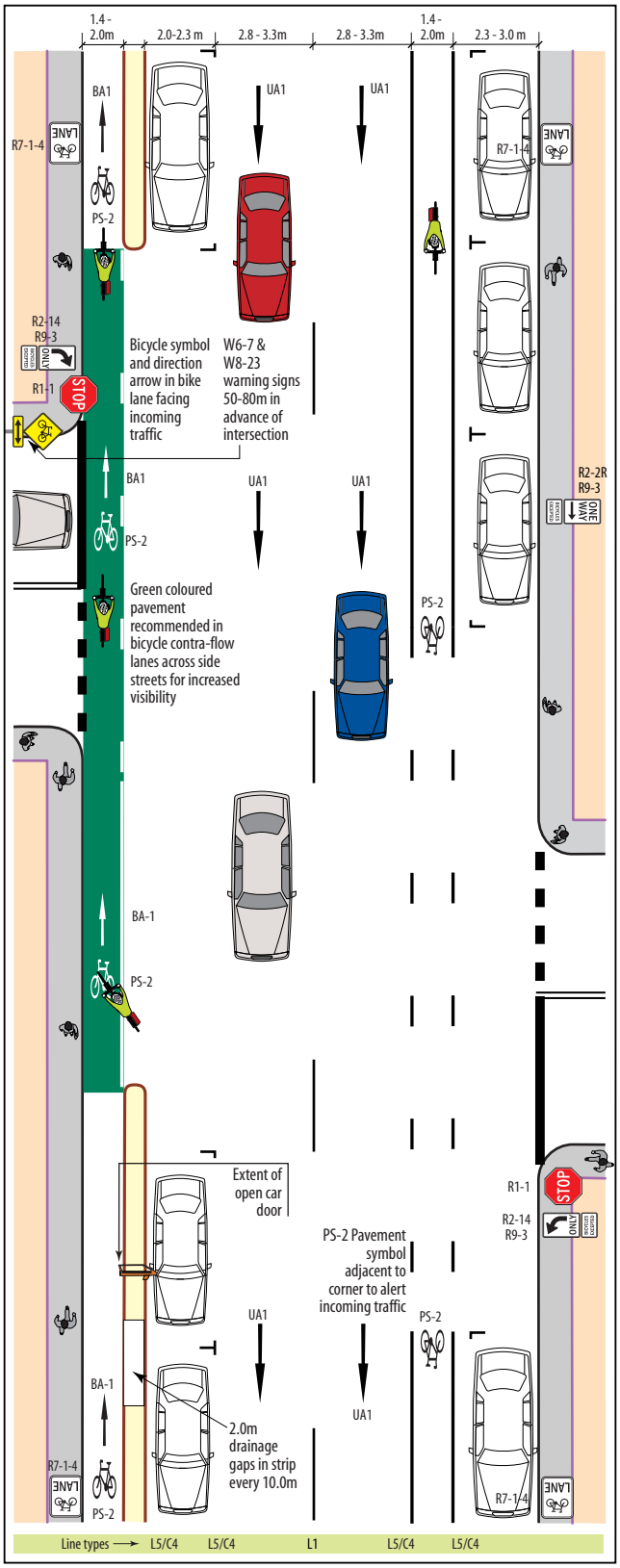
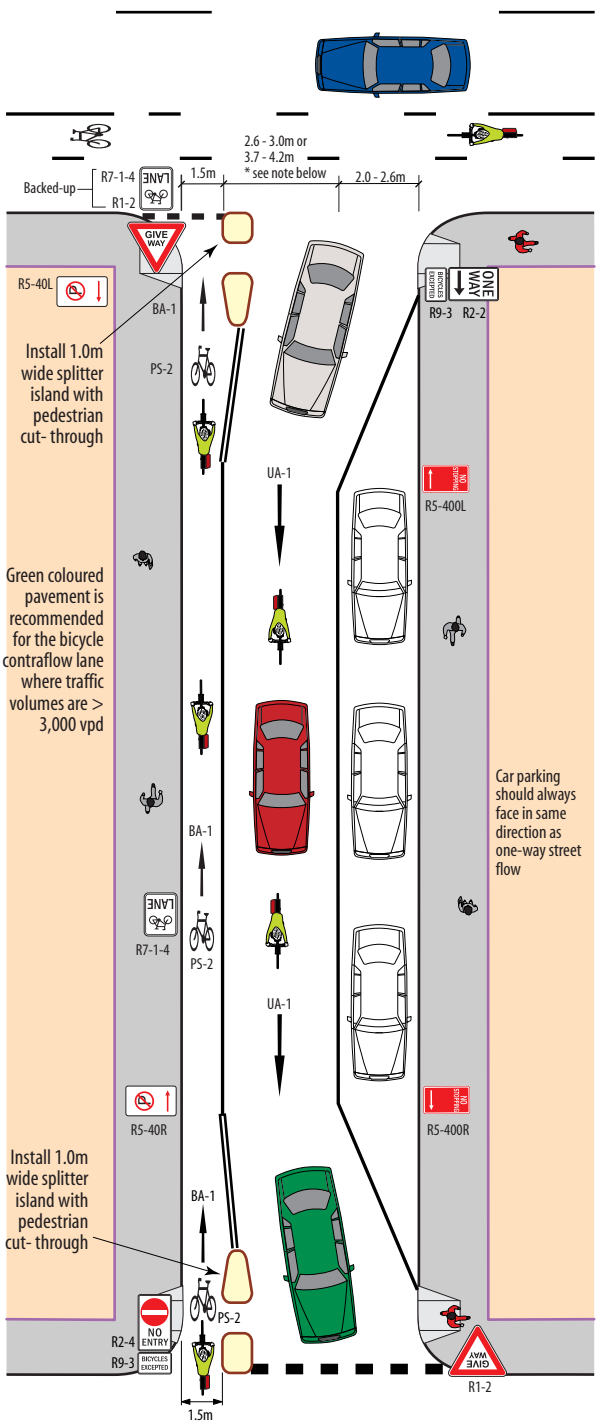


Figure B - Contraflow bicycle lane with parking on one side of street



***Travel lane width:** It is recommended that the width of the shared travel lane be 2.6 - 3.0m (tight profile) or 3.7 - 4.2m (spacious profile). Lanes between 3.0m and 3.7m (critical profile) are too wide for cyclists to comfortably queue with other vehicles and too narrow to provide adequate clearances to passing vehicles. See *Austroads Guide to Traffic Engineering Practice - Part 14 Bicycles*, Section 4.4.7 (page 32), for details.

After Figure 5.7 *NSW Bicycle Guidelines*

Legend
Footpath
Median strip/splitter island

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006
Bicycle Infrastructure Development Strategy

15/5/2006 - Version 1

Not to scale

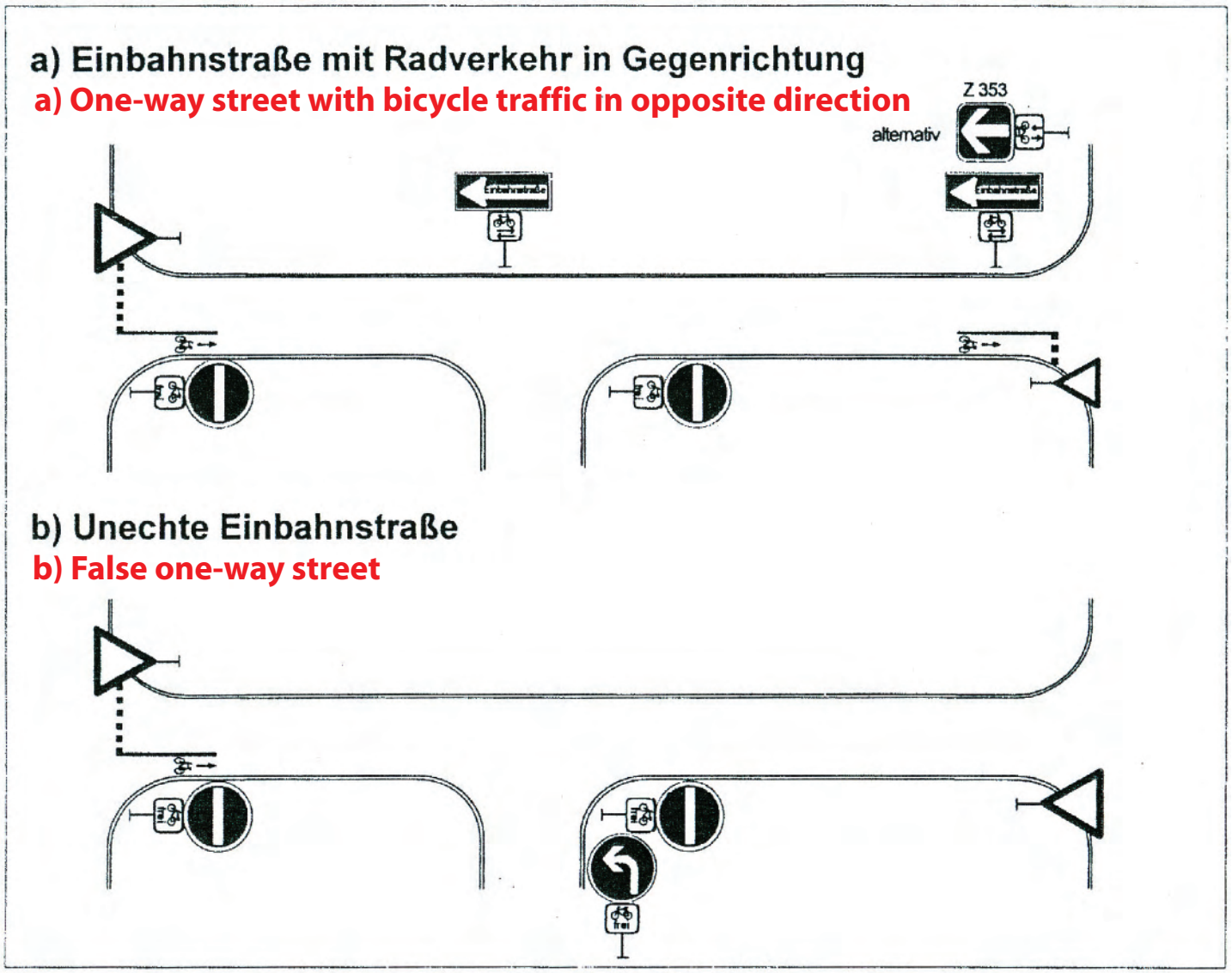
MARRICKVILLE council

S01 Standard engineering treatment diagram
Bicycle contra-flow lanes in wider streets

Standard treatment for two-way bicycle travel in one-way and false one-way streets

Translation from the Gernman Design Manual shown in red

Source: *Hinweise zur Beschilderung von Radverkehrsanlagen nach der Allgemeinen Verwaltungsvorschrift zur Straßenverkehrs-Ordnung*. Forschungsgesellschaft für Straßen- und Verkehrswesen Arbeitsgruppe Straßenentwurf. 1998. (*References to the sign-posting of bicycle traffic facilities after the general administrative regulation to road traffic regulations.* Research Association for Roads and Traffic - Road Design Working Group 1998.)



22: Beschilderung einer Einbahnstraße mit Radverkehr in Gegenrichtung sowie einer unechten Einbahnstraße

22. Sign-posting of a one-way street with bicycle traffic in opposite direction as well as a false one-way street

Sustainable Transport Consultants Pty Ltd
PO Box 1601 BONDI JUNCTION NSW 1355
Telephone 02 9386 4484 Fax 02 9389 5736

Jamieson Foley Traffic & Transport Pty Ltd
Suite 405, 5 Hunter St SYDNEY NSW 2000
Telephone (02) 9233 1277 Facsimile (02) 9235 2490

Marrickville Bikeplan 2006
Bicycle Infrastructure Development Strategy

3/5/2006 - Version 1

Scale 1:250

MARRICKVILLE council

Reference diagram R01
Two-way bicycle access in one-way streets in Germany