PARRAMATTA BIKE PLAN

DRAFT

THE BIKE PLAN

CITY OF PARRAMATTA

DRAFT BIKE PLAN 2017-2037

CITY OF PARRAMATTA // APRIL 2017

Prepared By

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Safe Systems Solutions

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INTRODUCTION

1.1 BACKGROUND

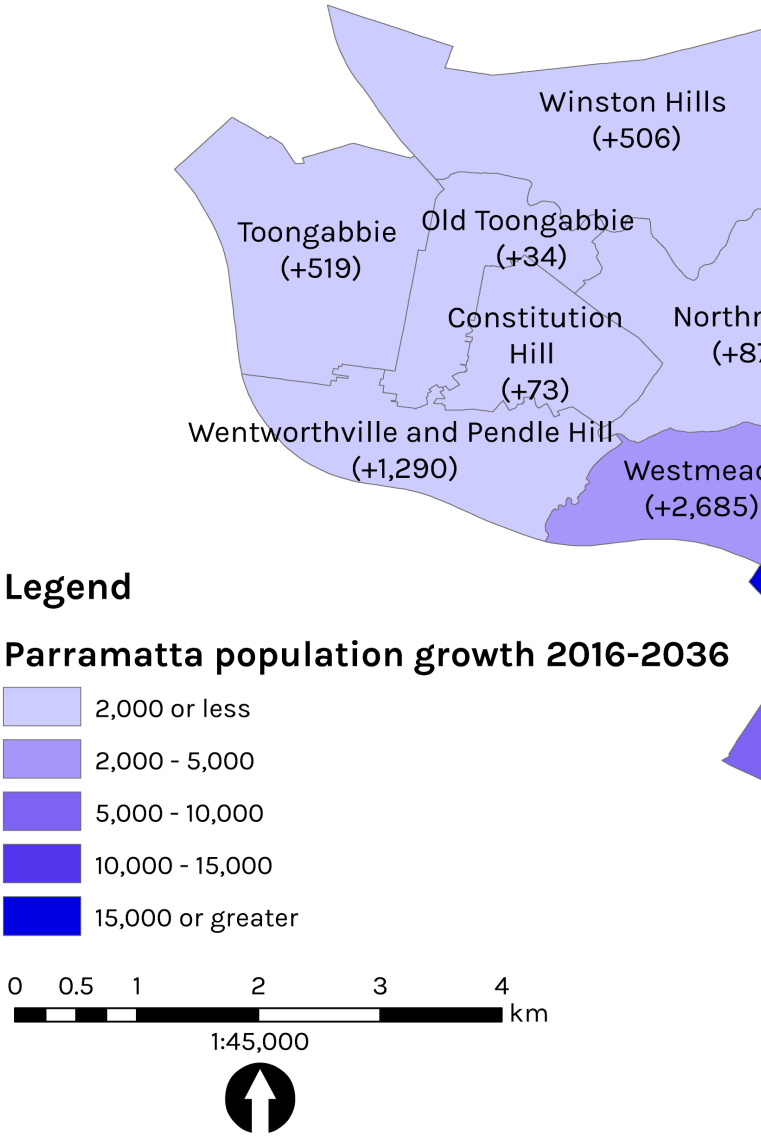
The City of Parramatta has developed the draft Parramatta Bike Plan 2017 – 2037, which has been informed by over 2,000 submissions from the community, either through the online map, in person through workshops or surveys. Combined with a comprehensive cycling audit, current population and jobs forecasts and the latest thinking in cycling infrastructure, the key themes from this engagement have been woven into a cycling network for the next 20 years and beyond. This draft Bike Plan supports the City of Parramatta's Vision to be Sydney's Central City, sustainable, liveable, and productive – inspired by our communities. We are now seeking broader community feedback to inform the final Plan, and demonstrate that an improvement in cycling infrastructure and increase in cycling will contribute to a more reliable and efficient integrated transport network for all users.

This plan is supported by three supplementary reports:

- Volume 1: Engagement
- Volume 2: Saddle Survey
- Volume 3: Detailed Route Descriptions

Figure 1: Population Growth in Parramatta, 2016 - 203

Source: ID Forecast

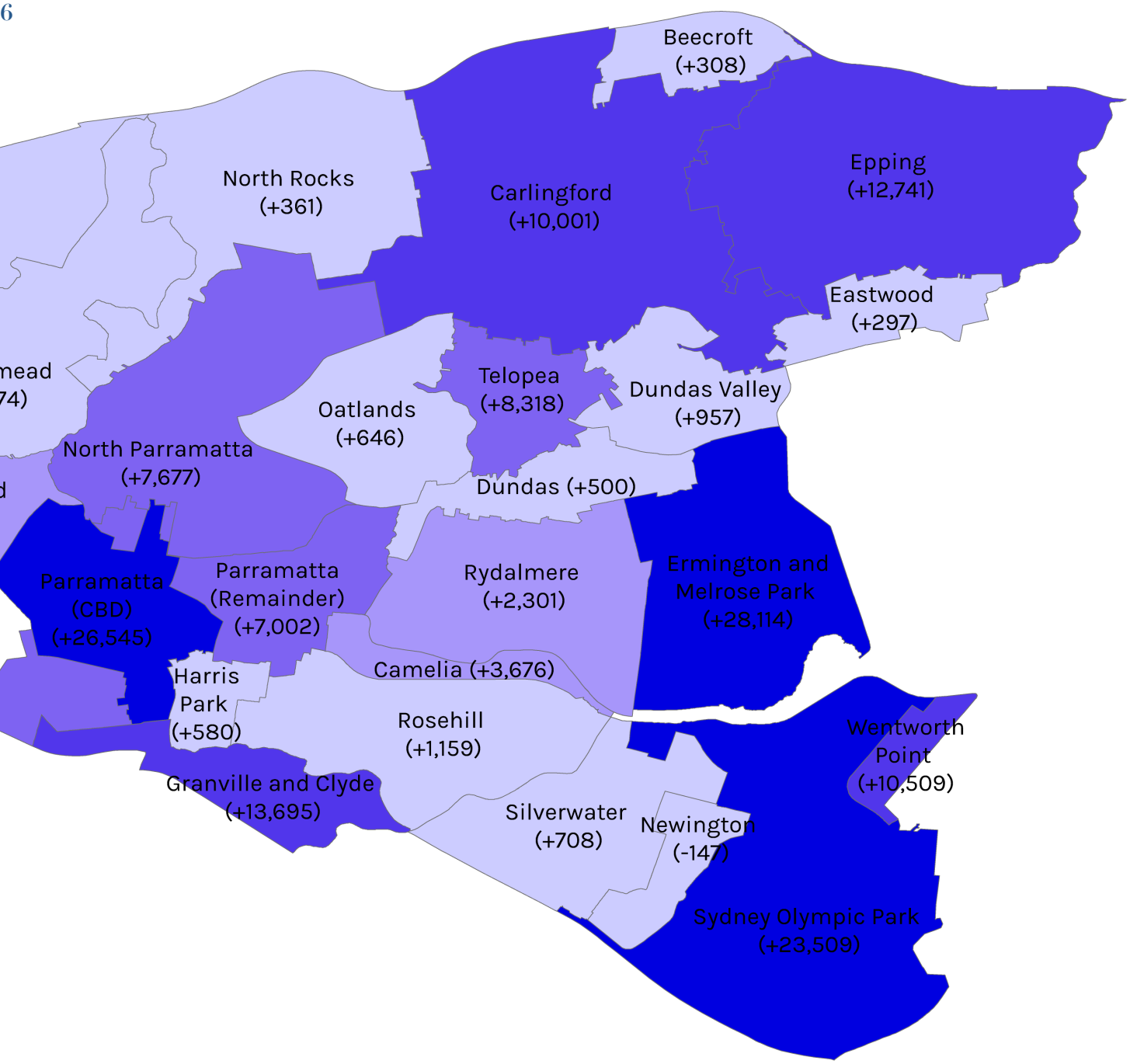


1.2 THE VISION FOR CYCLING

Cycling will play an important role in realising the vision for the Central City of Sydney. Cycling will support the liveability of Greater Parramatta through enabling residents, workers and visitors to have more transport choices as the city densifies. Cycling will support growth through helping people access jobs, shopping, education and recreation through a healthy and low-cost alternative that can help alleviate congestion.

The aspiration of the (draft) *Parramatta Bike Plan 2017 – 2037* is:

- To enhance the productivity and liveability of Parramatta through an increase in cycling, helping foster healthy and connected residents, workers and visitors
- For cycling to be safe, and perceived as a safe and attractive option for all members of the community, for those aged 8 to 80
- To increase the proportion of people cycling in Parramatta to 5% of all trips to work, and 10% for those ending in the CBD



1.3 A CITY IN TRANSITION

Parramatta's growth rate is unprecedented and changes over the coming two decades will transform Parramatta into the Central City of Sydney. The residential and employment growth will place enormous pressure on our transport infrastructure. Current levels of car use are incompatible with the densification underway.

> 'If the current travel habits do not change, we will face the saturation of (particularly road) infrastructure and a critical lack of space to build more capacity'
>
> Parramatta CBD Transport Study, 2016

Parramatta will be home to an additional 200,000 people by 2036, a growth rate twice that of NSW. The Parramatta CBD will experience a significant jump in residential population in addition to an extra 25,000 jobs. Population growth is not

restricted to the CBD and focussed along a corridor of urban renewal to the south and east. Substantial population growth will occur at Sydney Olympic Park, Telopea, Ermington-Melrose Park, Wentworth Point and parts of Granville. These growth rates are expected to occur on an unprecedented scale in Parramatta, which will place significant pressure on both the public transport and road network.

1.4 SUPPORTING GROWTH

Cycling will become a more important part of the transport mix as higher levels of development reduce trip distances and transport needs increase. The overwhelming proportion of trips to and from the Parramatta CBD will be less than 10km. The Parramatta CBD Strategic Transport Study recommends that cycling infrastructure will be needed within the CBD to ensure cycling becomes a more important contributor to the transport task in the future. Investing in connected, dedicated and direct cycling infrastructure to ensure Parramatta's liveability and productivity is protected and enhanced will help increase Parramatta's attractiveness as a place to live, work and invest. This Bike Plan recognises the need to shift the high levels of car use towards sustainable transport and does this by making it easier to cycle.

> A 5% reduction in the number of vehicles travelling at peak hour can reduce travel time by between 15-40%
>
> Victoria Transport Policy Institute http://www.vtpi.org/tdm/tdm96.htm

As Parramatta continues along its path of urban densification, the efficient use of scarce road space will become ever more important. Figure 2 shows how many people can travel down one lane within a one-hour period. Seven times more people can travel when on bicycles than in cars.

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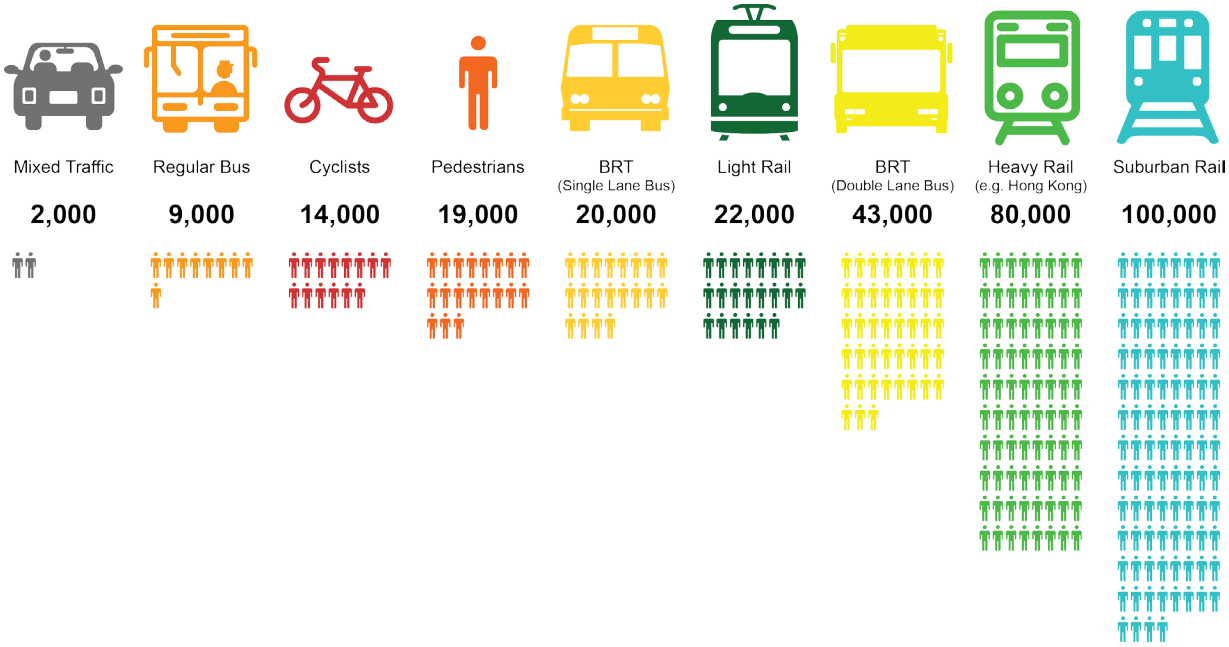
Figure 2: Carrying Capacity of Different Modes, for one 3.5m Lane (per hour)

Source: United Nations (2013)



The Parramatta Bike Plan 2017 – 2037 will support the City of Parramatta's broader Vision to be Sydney's Central City, sustainable, liveable, and productivity – inspired by our communities.

Parramatta's future bicycle network has been designed to connect people by bicycle both locally and regionally, and also connect areas slated for substantial population growth in the future, helping to make cycling an attractive option for both the Parramatta of today, and the future.

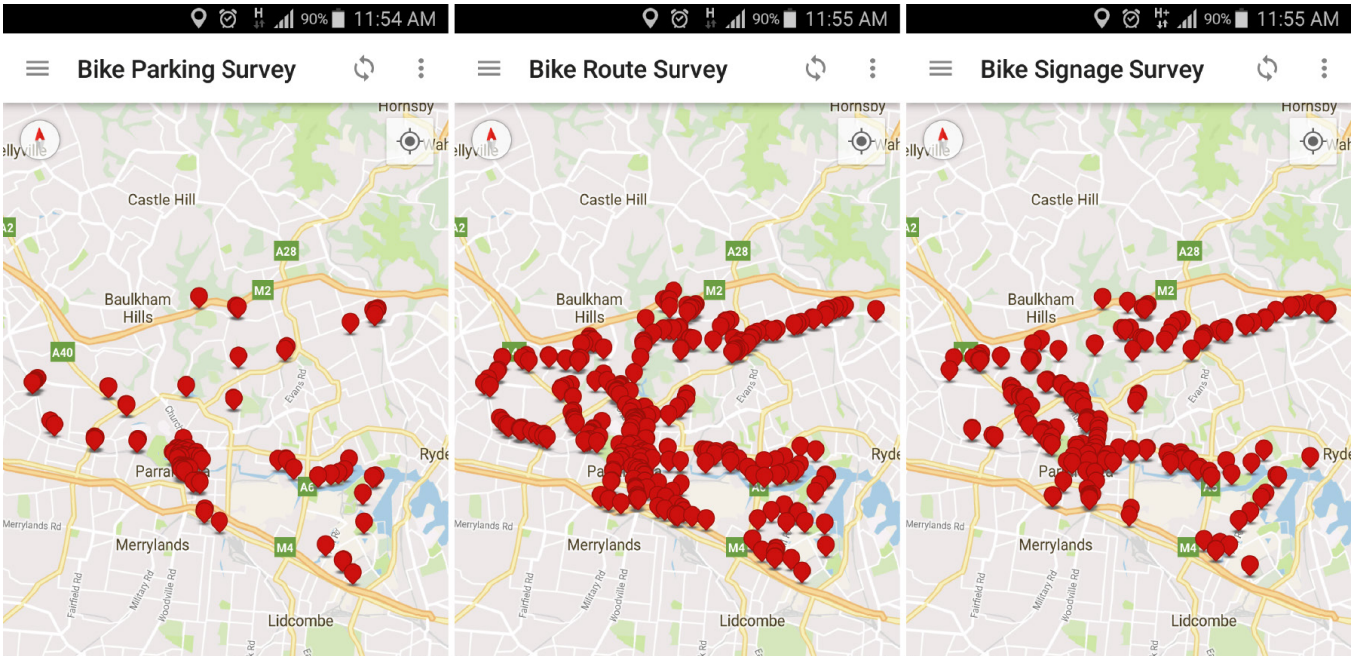
1.5 DEVELOPING THE DRAFT BIKE PLAN

The following activities were undertaken in the preparation of this Draft Bike Plan:

- Desktop review: including existing relevant policies and strategies, existing bicycle infrastructure, current and proposed land use controls, transport and safety data, bicycle parking and funding mechanisms
- Community engagement; including digital engagement platform (CrowdSpot), community survey questionnaires, and community workshops - see *Volume 2: Engagement* for detailed report
- Cycling infrastructure audit; five days of auditing existing and missing bicycle infrastructure using a customised mobile App: this included bicycle routes, bicycle parking and signage/wayfinding - see *Volume 2: Saddle Survey* for detailed report
- Draft bicycle network and presentation/ feedback session with professional stakeholders
- Issued summary of proposed bicycle infrastructure network for consultation
- Development and application of Multi-Criteria Analysis framework to prioritise network development plan

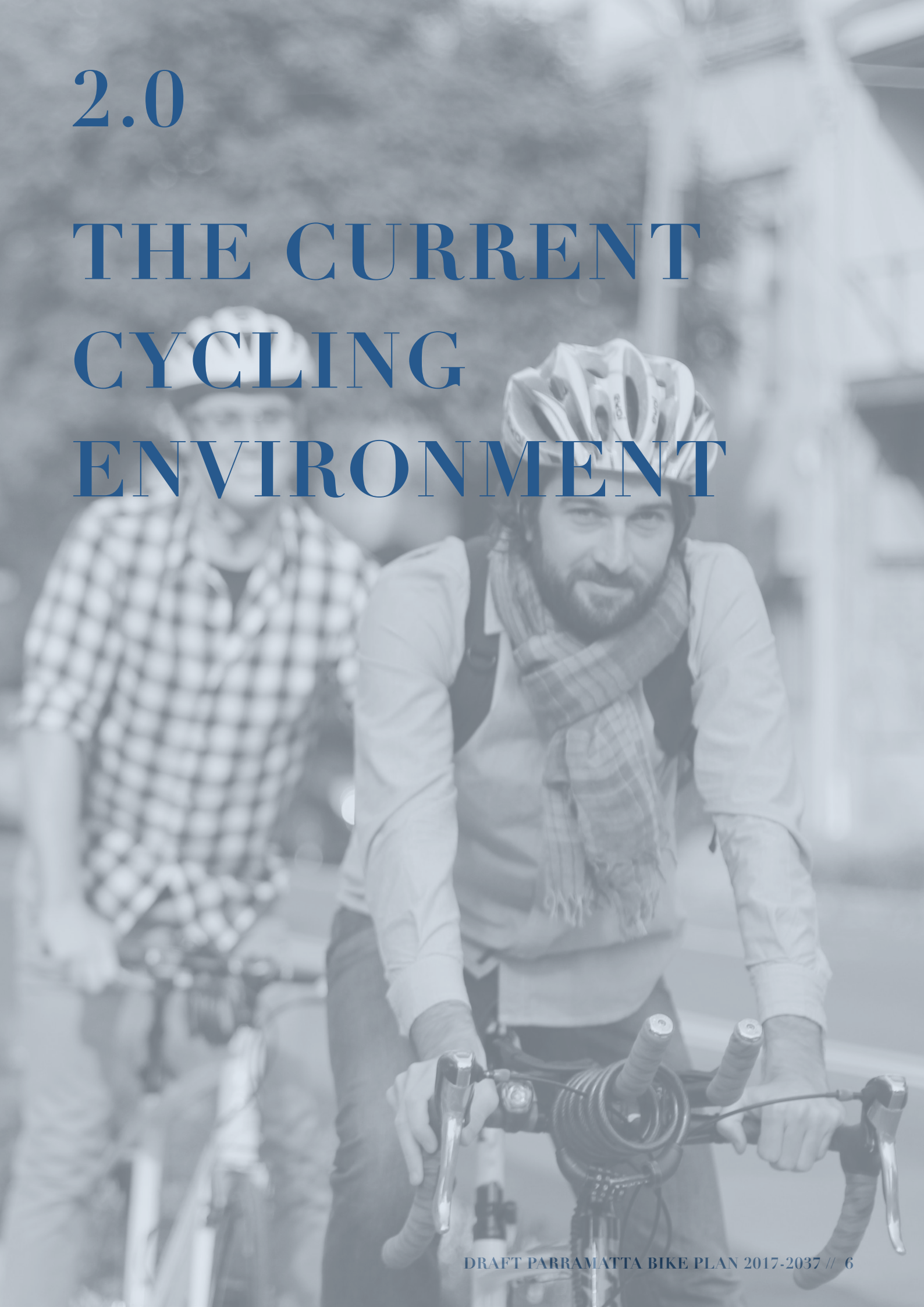
Figure 3 provides a snapshot of the data points collected using a customised mobile App during the cycling audit; identifying notable existing or missing infrastructure related to bicycle parking, bike routes and signage/wayfinding.

Figure 3: Cycling Audit Coverage; Bike Parking, Routes and Signage



2.0

THE CURRENT CYCLING ENVIRONMENT



2.1 STATE POLICY

NSW 2021 – STATE PLAN, 2011

NSW 2021 is a 10-year plan to guide policy and investment decisions in NSW. Boosting cycling for transport is identified as desirable in order to reduce congestion and increase population health. NSW 2021 includes a commitment to complete the Metro Sydney Bike Network, and work with local councils to make cycling an option within an integrated network. Specifically, *NSW 2021* commits to more than double bicycle trips across Greater Sydney, in the five years from 2011. *NSW 2021* includes a commitment to complete the *Metro Sydney Bike Network*, and work with local councils to make cycling an integration transport option.

A PLAN FOR GROWING SYDNEY, 2014

This strategic document outlines a 20-year plan for enhancing the economic competitiveness and liveability of Sydney. It highlights the importance of developing Parramatta as Sydney's dual CBD. It highlights the importance of developing Parramatta as Sydney's dual CBD.. Parramatta North is also earmarked for revitalisation, to create a vibrant, mixed use precinct. The importance of cycling as a sustainable form of mobility was highlighted throughout the report, including how integrating cycling into new developments can assist Sydney in growing sustainably.

GREATER PARRAMATTA AND OLYMPIC PENINSULA (GPOP)

The Greater Sydney Commission have created a vision for this area, now known as GPOP, with the key areas of focus being;

- Parramatta CBD and Westmead Health and Education Super Precinct
- Next generation Living from Camellia to Carlingford
- Essential Urban Services, Advanced Technology and Knowledge Sectors in Camellia, Rydalmere, Silverwater and Auburn
- Olympic Park Lifestyle Super Precinct

The Greater Sydney Commission's vision is for GPOP to be the very centre of Greater Sydney by 2036. Active transport links are a central feature of the vision, enabling travel both within and beyond the GPOP area.

NSW LONG TERM TRANSPORT MASTER PLAN, 2012

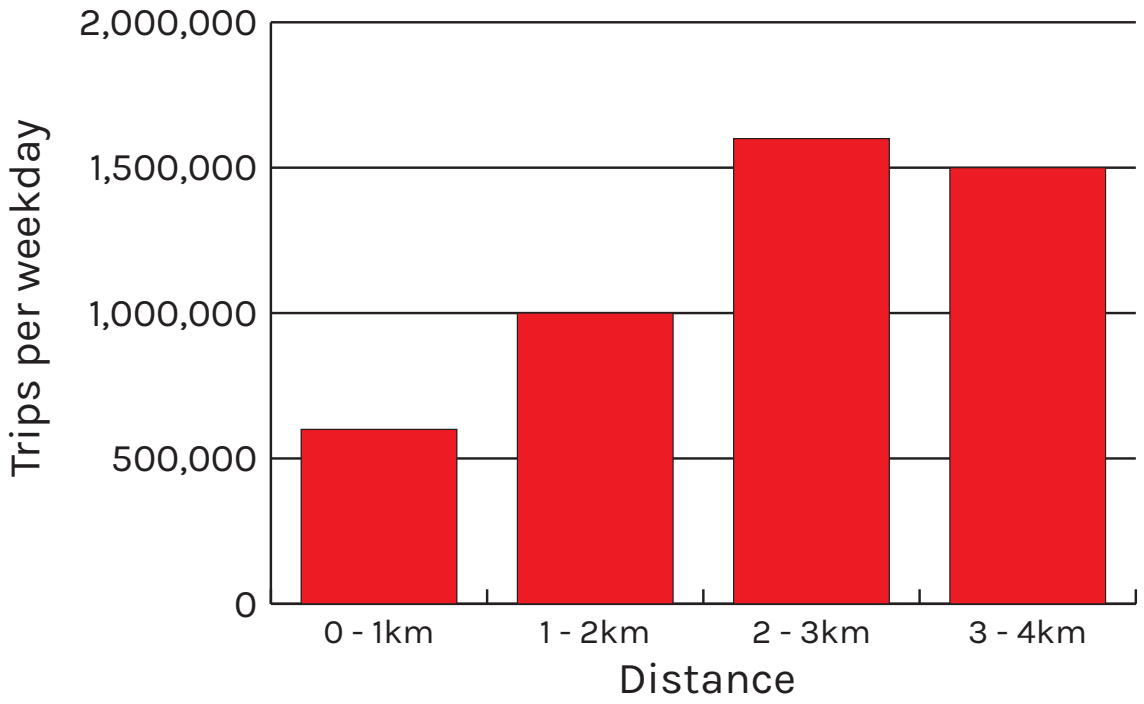
This 20-year Plan is intended to provide the long-term planning blueprint for enhancing integrated transport options across NSW. Naturally, Sydney is a key focus of this Plan and Parramatta is identified as an area requiring major transport upgrades. This Plan reiterates the commitment made in the *NSW 2021 Plan* to double the number of bike trips in Sydney between 2011 and 2016.

A vision for Sydney in 2022 is identified, and this includes a Sydney in which more opportunities are available for people to cycle, by making it easier and safer. A '*hierarchy of cycling investments*' is identified. This Plan notes that the average distance of a Sydney bike trip as 3.2 km and 90% of all bike trips being under 10km.

The Plan points to the fact that cycling participation in NSW is significantly less than other Australian states, and that safety concerns are the key barrier to greater cycling. It also identifies the very large number of car trips each day that are very short, as shown in Figure 4 (overleaf). The fact that there are over 4.5 million

Figure 4 Number of Short Distance Car Trips (driver only) on a Typical Sydney Weekday

Source: Figures derived from Figure 4.44 of the NSW Long Term Transport Master Plan, 2012



car trips (as driver) everyday in Sydney that are under 4km serves to highlight the significant potential for enhancing Sydney's liveability and productivity by transferring even a small proportion of these trips to cycling.

The specific actions included in the *NSW Long Term Transport Master Plan* of relevance to the Draft Parramatta Bike Plan are:

- Build a connected cycling network within a 5km catchment of local centres, in the short term
- Provide bike parking at transport interchanges, in the short term
- Continue to extend the catchment of connecting cycling networks around local centres in the long term, including bicycle only spaces

SYDNEY CBD TO PARRAMATTA STRATEGIC TRANSPORT PLAN, 2015

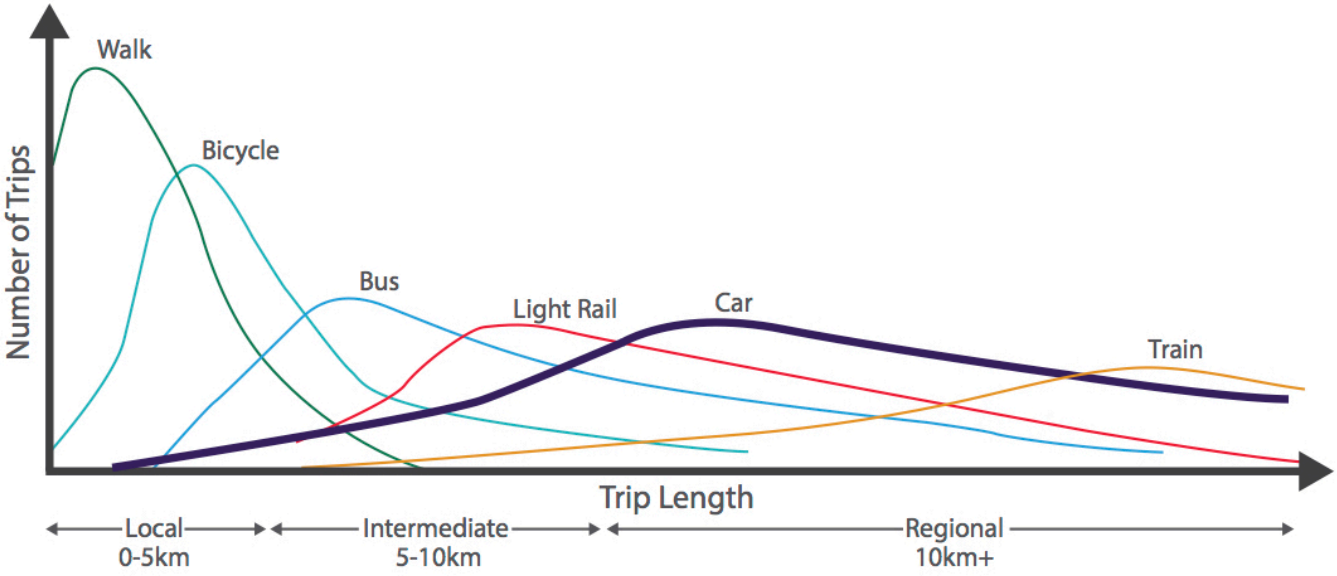
This Plan seeks to enhance connections between the Sydney CBD and Parramatta and recognises the importance of these two hubs for Sydney's future growth.

Cycling is identified as an efficient method of reducing congestion, especially for short trips. Supporting the creation of safe cycling links is identified within the Plan as a whole-of-government priority. One key desired outcome is an increase in the number of public transport journeys that are accessed by bike. Working with local councils to expand connected, accessible and safe cycling networks is frequently mentioned within the Plan. The need to improve sustainable mobility options along Parramatta Road was highlighted.

The opportunity for increasing cycling participation, which is a consistent theme among

Figure 5: Transport Mode Suitability and Distance

Source: Taken from Sydney CBD to Parramatta Strategic Transport Plan, 2015, Figure 16.



these NSW Government planning documents is highlighted when combining the data in Figure 4 with Figure 5. The large number of short car trips and the suitability of cycling for trips of this distance (see Figure 5 overleaf) highlights the clear opportunity to improve sustainable mobility outcomes.

SYDNEY'S CYCLING FUTURE: CYCLING FOR EVERYDAY TRANSPORT, 2013

Linking cycling to urban growth is a key principle of *Sydney's Cycling Future* and as one of the fastest growing areas in NSW, this is pertinent to Parramatta. The Draft Parramatta Bike Plan is consistent with this focus, and population growth hotspots are used to prioritise the bicycle infrastructure network set out in the Draft Bike Plan.

The key target market of this *Sydney's Cycling Future* strategy is the 70% of NSW residents who say they would cycle if it were made safe. Creating the conditions to encourage some of these people to begin using the bicycle as a mode of everyday transport is a focus of the *Sydney's Cycling Future* strategy.

Sydney's Cycling Future provides evidence to demonstrate that separated bicycle infrastructure (either on or off road) will be required for more than 75% of the population to feel safe while riding. Conversely, more than 75% of the population feel unsafe and uncomfortable riding in mixed traffic on a busy street. The Draft Parramatta Bike Plan supports these design principles by offering a step change in the quantity of separated bicycle infrastructure included in the proposed network.

Three pillars of *Sydney's Cycling Future* include:

- Safe, connected networks: Prioritising the catchments within 5km of major centres, extending to 10km in the future

- Better use of existing infrastructure: Promote and encourage people to cycle (behaviour change and marketing)
- Policy and partnerships: Integrate cycling into wider urban planning mechanisms

2.2 LOCAL POLICY

COMMUNITY STRATEGIC PLAN

Connectivity is one of six strategic objectives of Parramatta's Community Strategic Plan. Central to this is the aim to 'shift reliance on car use towards more sustainable transport options'. Works to improve cycle connectivity are identified as a priority of the Strategic Plan.

CORPORATE PLAN (2013/14 – 2016/17)

Improving transport connections is a crucial component of this Corporate Plan. Connecting the Parramatta CBD with Westmead, Parramatta North, Camellia and Rydalmere is a recognised priority in the Plan, as well as the State Government's 'A Plan for a Growing Sydney'. Parramatta Light Rail and urban renewal projects are highlighted as opportunities to enhance Parramatta. Activation projects that help to make Parramatta a destination of choice is something the Bike Plan will be able to support, by increasing human scale elements, boosting interaction and urban vitality. Urban renewal projects constitute are recognised in the Corporate Plan, including Parramatta Square. Parramatta's function as a dual CBD, on par with the City of Sydney is an important element of the Corporate Plan. The key opportunity for the Bike Plan is the role cycling can play in providing space efficient modes of transport and supporting Council's commitment to make Parramatta a destination of choice.

PARRAMATTA CITY CENTRE INTEGRATED TRANSPORT PLAN (2010)

The *Parramatta City Centre Integrated Transport Plan* was prepared to respond to future challenges related to road congestion, car dependence and the need to increase the use of sustainable transport. The development of a legible city centre in which walking, cycling and public transport are prioritised is central to this *City Centre Integrated Transport Strategy*. The Plan's policy statement for cycling reads; 'Cyclists will have a legible city centre that is safe and attractive. The access and amenity of the city centre encourages and promotes cycling.' An updated Parramatta CBD Integrated Transport Plan is currently being prepared.

PARRAMATTA BIKE PLAN (2009)

In 2009 Parramatta updated its 2001 *Bike Plan*. The 2009 *Bike Plan* documented existing routes and delivered an implementation plan for proposed routes. A stated goal of the 2009 Bike Plan is to '*encourage more people to take up cycling and use their cars less often, particularly for short distance trips*'.

The 2009 *Bike Plan* identifies that it is Council's objective to have 5% of the Parramatta population using the bicycle to travel to work in 2021. The 2011 mode share for cycling to work is around 0.5% for Parramatta residents.

PARRAMATTA CYCLE NETWORK AUDIT 2011

This audit included a comprehensive review of the bicycle network and consolidated the 2001 and 2009 Bike Plans, to provide a single, coherent network. This audit also included recommendations on signage.

2.3 THE CURRENT CYCLING ENVIRONMENT

The current picture of cycling in Parramatta has been developed through a comprehensive desktop and on site audit, including:

- A review of relevant plans and policies regarding cycling in Parramatta
- An analysis of transport patterns
- An examination of crash data involving people on bicycles
- A five-day cycling infrastructure audit, documenting existing conditions
- The development of a Bike Use Propensity Index, as a tool for estimating latent demand for cycling

STRENGTHS

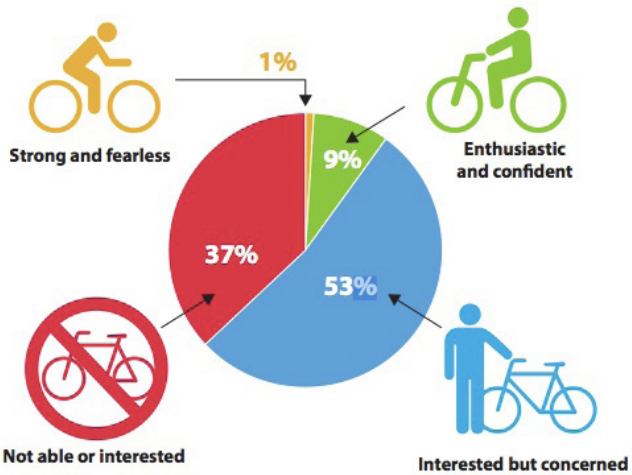
The quantity of bicycle infrastructure in Parramatta has grown significantly over the last two decades. This has resulted in some outstanding environments for riding, and the cycling audit identified the following areas as examples of high quality routes.

- The Parramatta Valley Cycleway (PVC) stands out as the premier cycling corridor in Parramatta:
  - offering a high level of amenity, connecting users with the natural environment
  - providing very high levels of safety, allowing riders of all age groups and abilities to cycle comfortably
  - the quality of the PVC is reflected in the current high level of use, with over 150,000 cyclists per year, and an estimated 120,000 walkers
- Parramatta Park offers a scenic, low traffic speed environment within a World Heritage listed setting
- M4 shared path offers an excellent route along Parramatta's southern border, although some areas of discontinuity reduce overall levels of service
- Very good shared path along Old Windsor Road
- Excellent network of bicycle lanes in Sydney Olympic Park
- High quality shared path parallel with Hill Road, Newington
- Excellent shared path alongside Epping Road

A little over half of Parramatta residents rode a bike more than a year ago, which suggests a significant proportion of the population are '*interested but concerned*' cyclists - see Figure 6 below.

Figure 6: Types of Bike Rider

Source: https://www.portlandoregon.gov/transportation/article/264746



BARRIERS

The analysis of travel patterns, the stakeholder consultation and the cycling audit results identified a number of barriers to cycling in Parramatta, summarised below:

- A lack of safety due to the limited number of streets with dedicated bicycle infrastructure
- A CBD limiting cycling opportunities and permeability, having a significant negative impact on cycling participation
- Bike lanes that end at intersections
- Challenging topography north of the Parramatta River, therefore all transport modes desire to use the ridge lines

These barriers are likely to be contributing to the low 0.5% of Parramatta residents using the bicycle for at least part of their work journey at the last Census in 2011. However, the Parramatta Valley Cycleway demonstrates a powerful argument for safe cycleway provision with consistent 10-20% year on year growth over the past four years.2.4

THE POTENTIAL FOR GROWING CYCLING

A *Bike Use Propensity Index* was developed to inform the proposed bicycle network - see Figure 7 overleaf.

The Index geospatially shows the Parramatta Local Government Area and the surrounding neighbourhoods, ranking these areas into five categories based on their relative propensity for cycling.

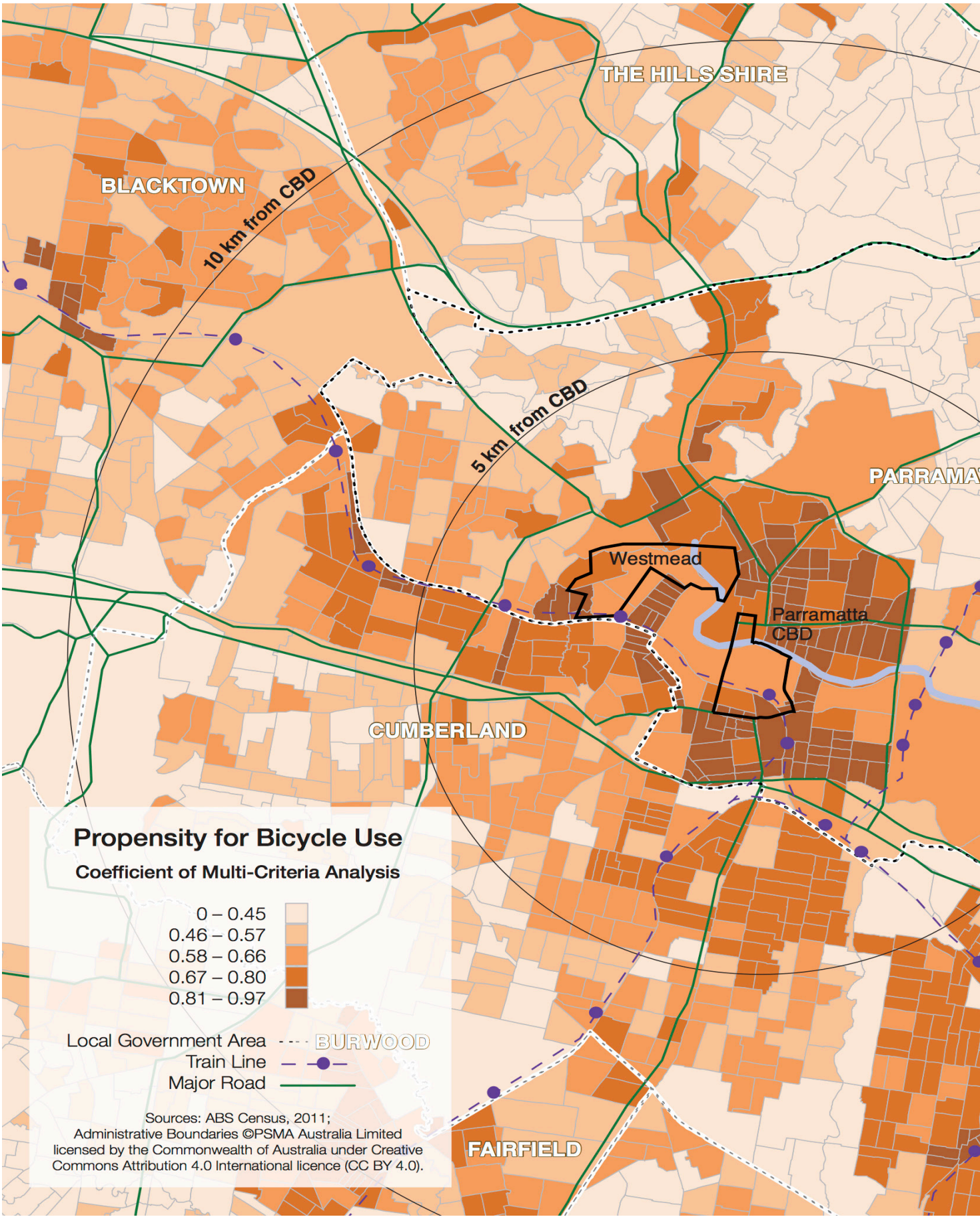
This information has been used to identify and prioritise cycling routes in Parramatta. This process is important because it enables investment decisions based on estimated relative demand for cycling.

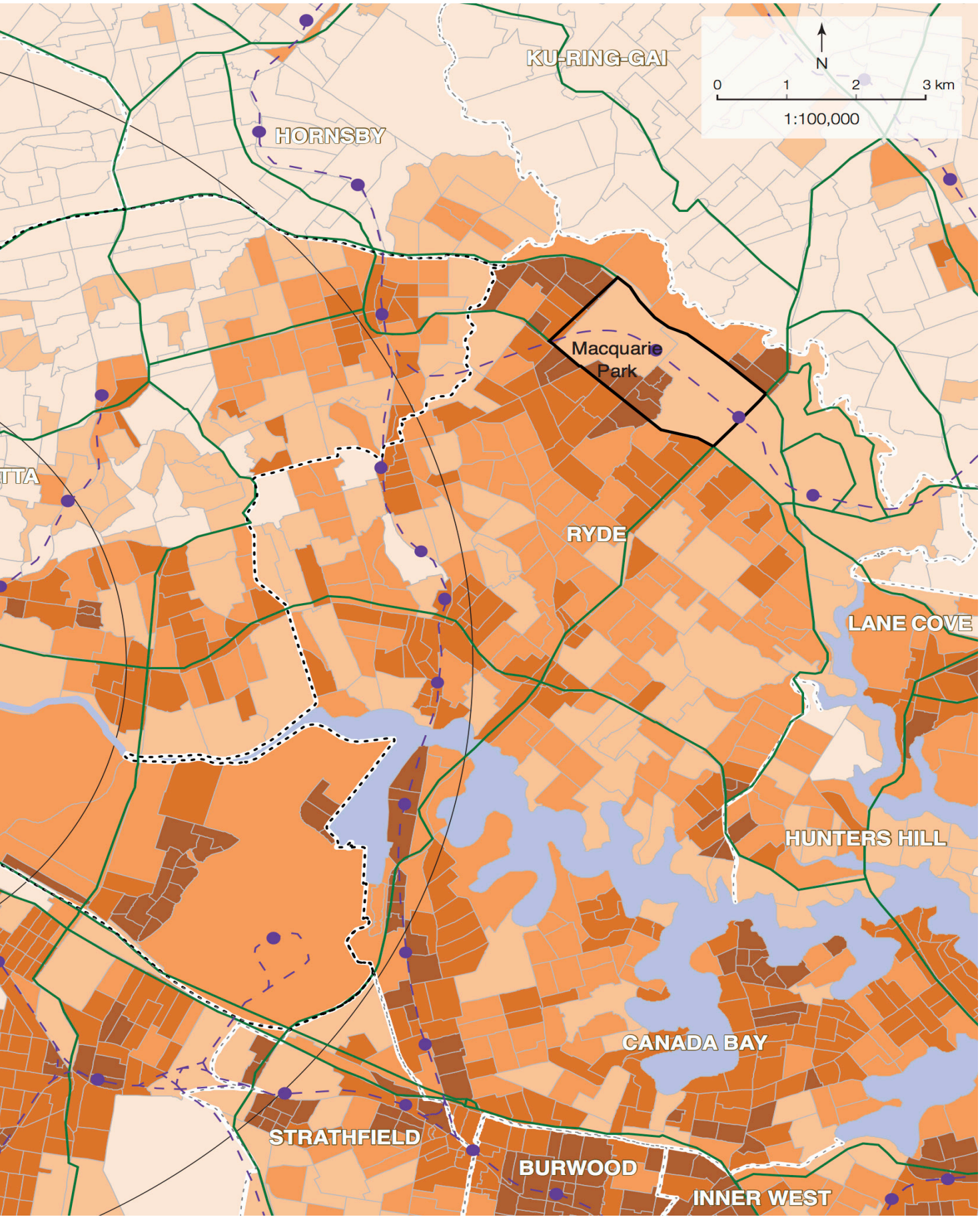
This will result in a bicycle network configured for maximum usage with resultant improvement in physical activity and reduction in emissions, congestion and transport costs.

The seven factors, drawn from the ABS Census (2011) that form the basis of the Bike Use Propensity Index are:

1. Residential population density
2. Employment density
3. Density of young adults
4. City based employment
5. Low motor vehicle ownership
6. Bicycle use - origin
7. Bicycle use – destination

Figure 7: Bike Use Propensity Index for Parramatta and Surrounding Region

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RYDE
LANE COVE
HUNTERS HILL
CANADA BAY
STRATHFIELD
BURWOOD
INNER WEST

2.5 COMMUNITY NEEDS & ASPIRATIONS

A comprehensive consultation process was delivered to inform the Draft Bike Plan. Respondents wanted more and better infrastructure, greater protection from general traffic and an improved sense of safety, especially through the CBD. A separate report on the outcomes of the consultation process is presented in Volume 1: Engagement.

THE ENGAGEMENT PROCESS

Survey Questionnaire

A web-based survey questionnaire was developed with the aim of gathering important qualitative information on current bike riding participation, including barriers to increasing participation in Parramatta. The questions explored a range of intrapersonal, sociocultural, regulatory and built environment related issues that enable and constrain bike riding in Parramatta. The survey was widely promoted by Council through a range of available channels including eNewsletters, email databases and social media. Promotion of the survey targeted residents, traders, workplaces, schools, and universities. A total of 488 responses were received, providing an excellent sample for analysis.

Spatial Mapping

The second element of the community engagement process involved the use of a web-based spatial mapping platform to enable the community to digitally map locations with known barriers for bike riding - see Figure 8, overleaf. This tool enabled the community to spatially map safety and infrastructure related issues. In addition, the platform enabled the community to review, rate and comments on these issues. Demographic data such as gender, age and cultural background was also collected to contextualise the information gathered. The outcomes of this process were used to identify a set of priority actions to be addressed in the first year of the delivery of the plan. A total of 1,473 submissions were received.

Community Workshops

The next element of the community consultation involved two workshops, which were held at Parramatta Town Hall on the 6th and 7th December, between 6-8pm. The workshops focused on route mapping exercises that enabled the participants to develop bicycle networks that suited their needs. Participants worked in groups based on experience, gender and if they had children who cycled. A total of 45 people participated in the workshops, with strong involvement from novice and female riders. In addition, one family attended with a young child.

Co-Design Workshop

A further workshop, with approximately 15 attendees, was held focusing on programs, events and activities to improve people's capacity, opportunities and motivations for cycling.

Stakeholder Workshop

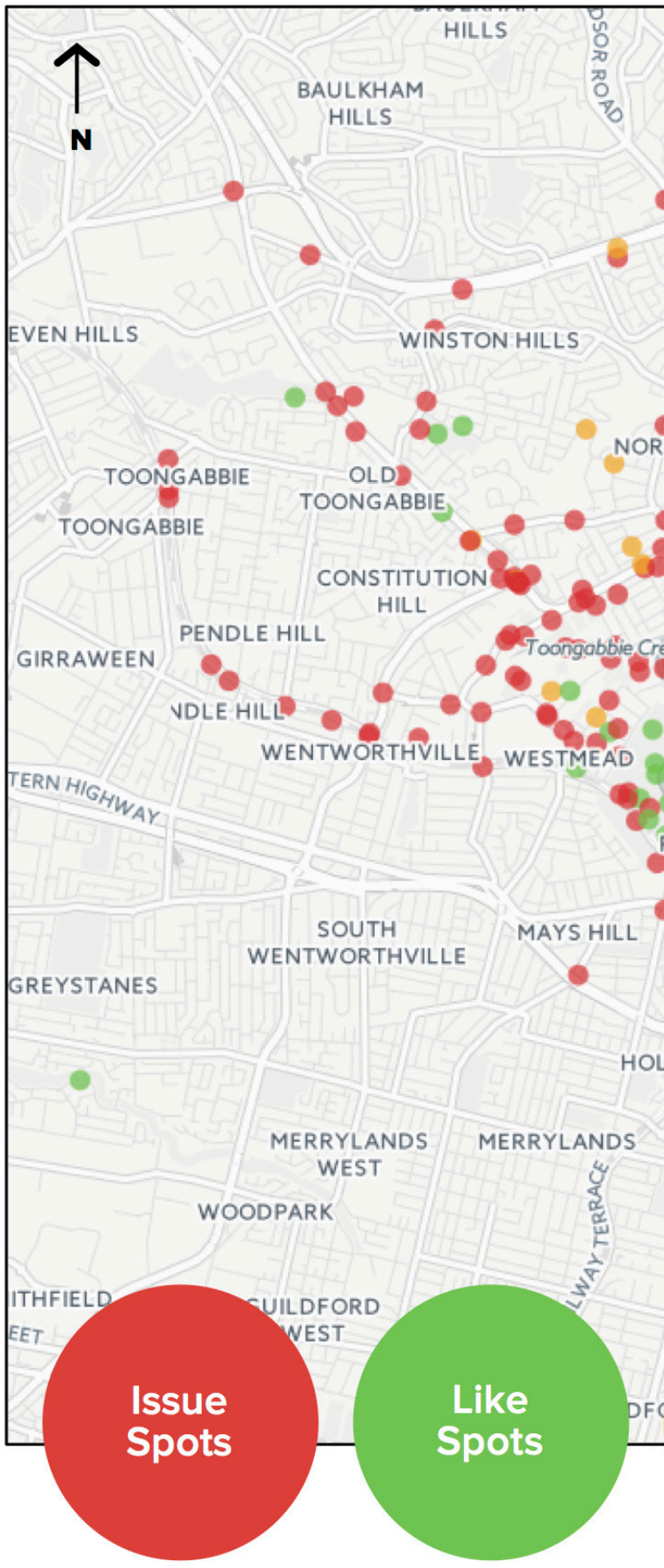
Key stakeholders were also consulted including RMS, TfNSW, NSW Health, Parramatta Park Trust, Sydney Olympic Park Authority, peak cycling groups and representatives from adjoining Councils.

Figure 8: Community Workshops

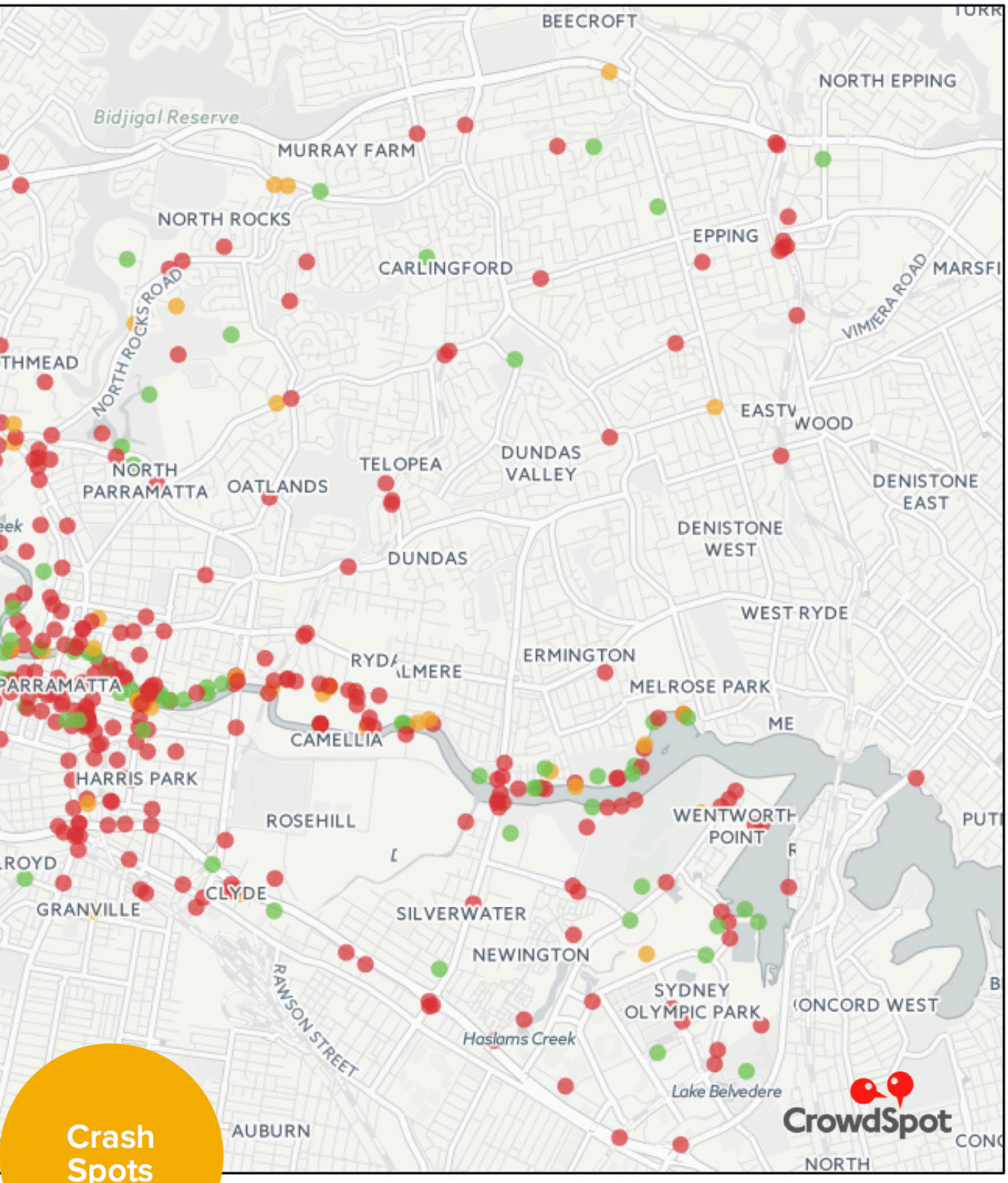
Figure 9 presents all of the bicycle issues, crash locations and spots rated positively by the community during the consultation phase.

The full analysis of the spatial mapping process can be found in *Volume 1: Engagement*.

Figure 9: Spatial Mapping of Community Bike Issues (C



CrowdSpot Platform)

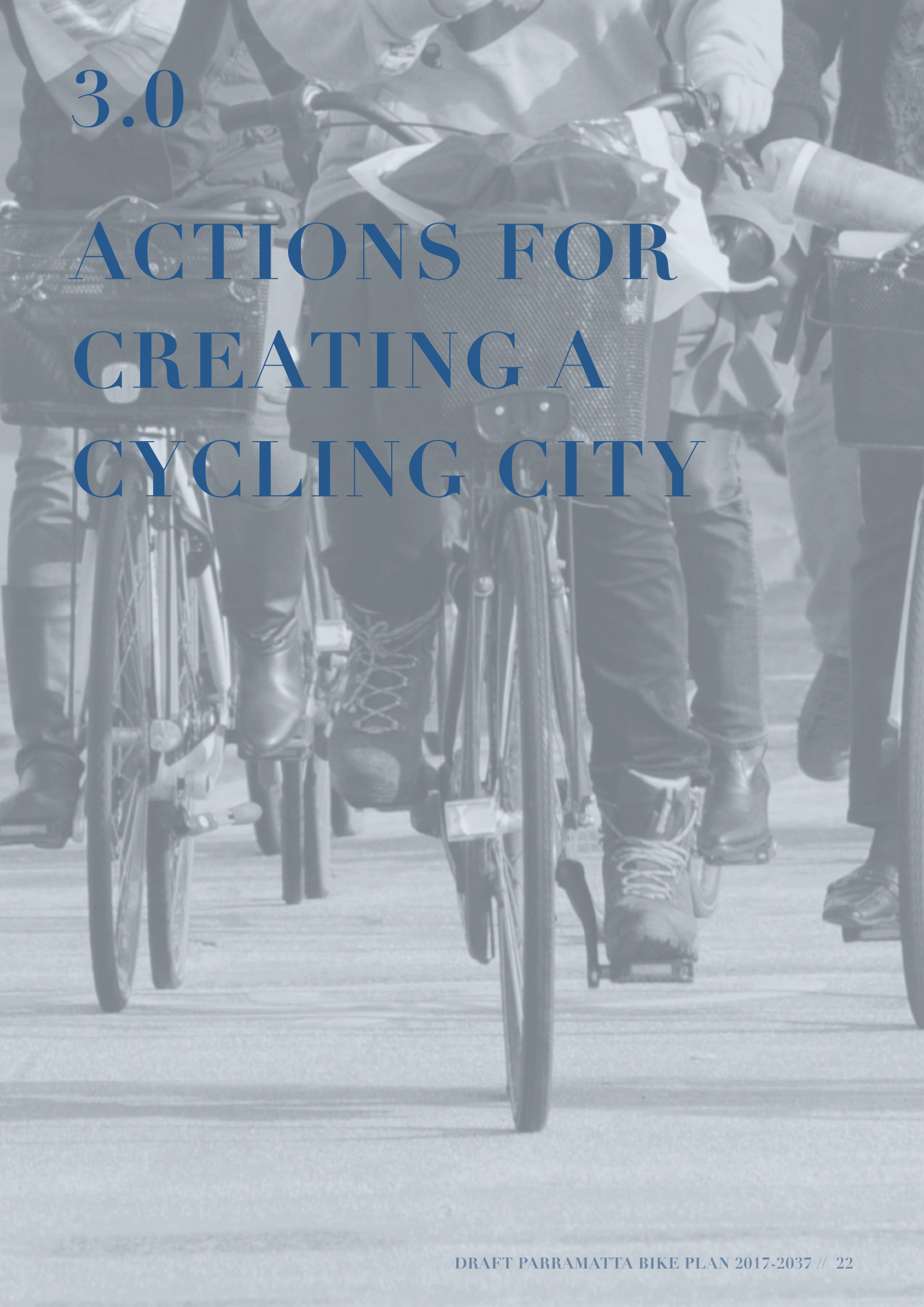


Crash Spots

KEY THEMES

Safety was of paramount importance and this was reflected in a clear hierarchy for routes that prioritised: (1) off-road paths, (2) physically separated on-road routes, and (3) quieter back streets

- It is important to continue connecting existing routes, improve north-south routes and connectivity to and within the CBD especially
- Integration with public transport: connections with stations/bus stops; access within/through stations; better facilities to carry bikes on trains
- Infrastructure is only part of the solution, a comprehensive package of measures are needed, including education and behaviour change
- Basic improvements can be made to significantly enhance the environment for cycling:
  - Widening narrow pathways (across bridges)
  - Smoothing uneven and poor surfaces
  - Improve connections between key destinations and the Parramatta Valley Cycleway
  - Ensure continuous riding along the Parramatta River corridor without difficulty
  - Adjusting signal phasing or providing priority signal crossing for bike riders
  - Providing additional space for bike riders to turn right
- Perceived lack of respect among road users to safely coexist on Parramatta's roads
- Increased amounts of higher quality, secure bike parking in the CBD and at key transport hubs



3.0

ACTIONS FOR CREATING A CYCLING CITY

3.1 THE APPROACH

The approach used in the development of the new Draft Parramatta Bike Plan focused on providing the necessary enabling conditions for bike riding to become an attractive mode of transport for a range of trips, across a range of ages, genders and cultural backgrounds. Infrastructure is considered as a means-to-an-end, rather than the end product itself. This means taking a broader view of the factors that influence and enable people to cycle.

Enabling people to cycle is to support them to adopt a new behaviour or to do more of an existing behaviour or practice. To create such a supportive environment for cycling it is necessary to put in place the skills required to perform the behaviour, a strong intention to perform the behaviour, and remove any environmental constraints that make it impossible to perform the behaviour.

This approach aligns with the needs of the community who expressed the need to address the current bicycle network and a number of important behavioural issues, and improving people's confidence and motivation to cycle or cycle more often.

The actions proposed here aim to improve the capability, opportunity and motivation of the community in Parramatta to cycle for a range of journeys.

Figure 10: The COM-B Model for Behavioural Change

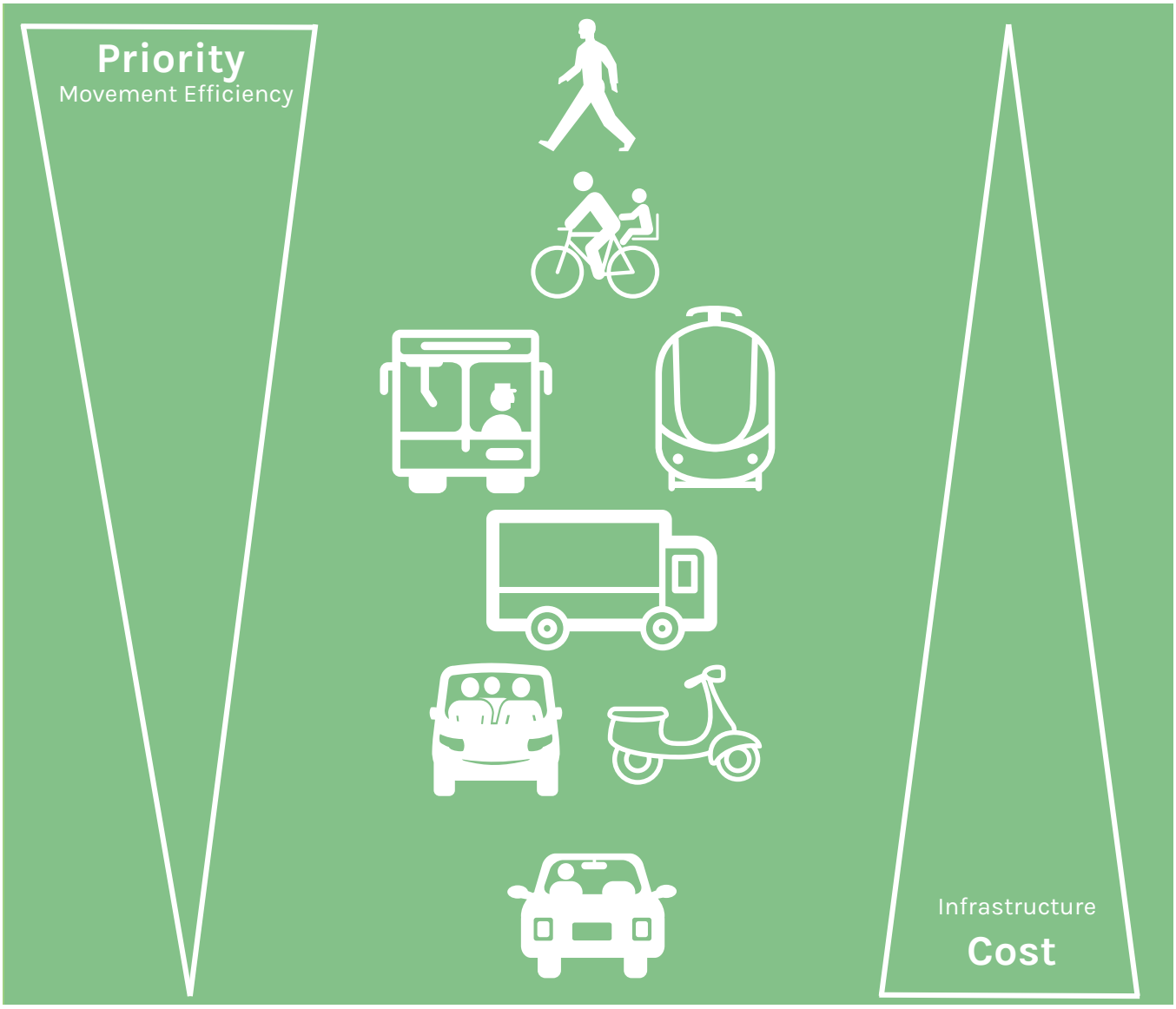
Source: Michie, S, et al (2011) The behaviour change wheel: A new method for characterising and designing behaviour change interventions, Implementation Science 2011, 6:42 doi:10.1186/1748-5908-6-42

A number of factors have been identified capable of acting as facilitators to increase the bicycle friendliness of Parramatta and therefore overall cycling participation. These facilitators are designed to overcome the key factors identified as barriers to cycling in Parramatta. By implementing these evidence-based measures to increase cycling, Parramatta will be able to meet its wider strategic objectives, as well as those identified by the NSW Government.

Over the next two decades Parramatta's transport network will evolve to meet the challenges associated with our rapid growth. The Road User Hierarchy shown in Figure 11 provides a road space allocation framework based on modal efficiency. Pedestrians receive the highest priority, followed by cycling, public transport, through to single occupant motor vehicles. Applying the Road User Hierarchy will help guide difficult decisions involving contested road space. This Draft Bike Plan is focused on creating a *door-to-door* experience that makes cycling the obvious choice for trips under 10km, with a focus for those under 5km.

Figure 11: Road User Hierarchy

Source: Created by the Institute for Sensible Transport, adapted from Jennifer Keesmaat, City of Toronto.



3.2 BUILDING THE BICYCLE NETWORK

The community have a strong preference for separated cycle facilities, with intersection treatments that prioritise the safety of people on bicycles. A continuous, coherent network will minimise the gaps that can reduce the safety and enjoyment of cycling, helping to make cycling an option for a greater spectrum of the Parramatta population.

> One kilometre of motorway would cover the cost of 110km of bikeway. One kilometre of road tunnel buys over 300km of bikeway
>
> (Department of Infrastructure and Transport, 2013)

NETWORK DESIGN PRINCIPLES

The following design principles have been used in the development of Parramatta bicycle network.

- Safety – addresses the key barrier to cycling
- Connecting centres (existing and future growth hot spots)
- Strengthen the existing network
- Directness – reduces travel time and increases likelihood of cycling being chosen
- Coverage – increasing the proportion of Parramatta population with access to network

Key facilitators to grow cycling participation in Parramatta include:

- A cycle friendly CBD: Creating a network of physically separated, protected bicycle lanes within the CBD, accompanied by lower speed limits in the core
- DDeveloping separated bicycle lanes that connect the CBD with other parts of Parramatta, linking key origins and destinations, as well as ensuring local connections are made
- Improving the efficiency of the road network through line marking enhancements that create dedicated bicycle lanes without any significant negative consequence for other road users - in many instances this can be achieved by tightening the width of car parking bays without a loss of car parking
- Creating lower speed, shared zones on streets too narrow to accommodate dedicated bicycle lanes
- Ensuring all schools and key public transport nodes are connected to the proposed bicycle network
- Connecting the Parramatta bicycle network to key destinations in adjoining local government areas

TYPOLOGIES

The following typologies have been used when developing the proposed network:

- On road, physically separated bicycle lanes (using raised kerbs)
  - Single direction each side (pairs) - Figure 12a
  - Bi-directional on side - Figure 12b
- On road, dedicated bicycle lanes (painted markings) - Figure 13
- Off road, separated paths for pedestrians and cyclists - see Figure 14
- Off road, shared paths - Figure 15
- Mixed traffic streets - Sharrows - Figure 16
- On road, dedicated bicycle lanes (buffer) - Figure 17

Figure 12a: On Road, Physically Separated - Single Direction Each Side

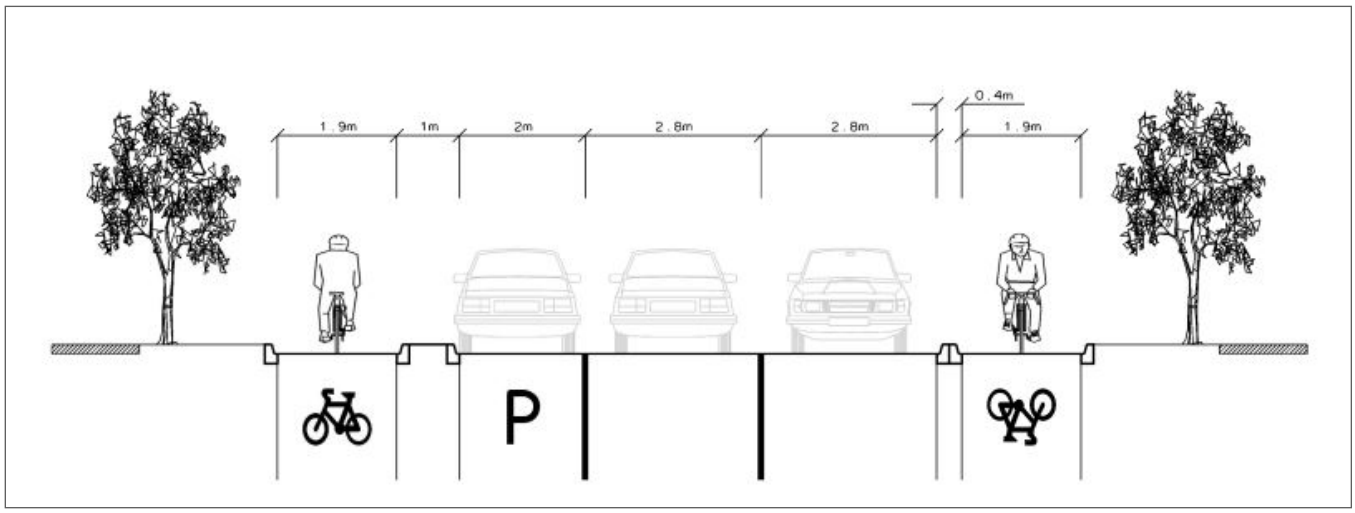


Figure 12b: On Road, Physically Separated - Bi-Directional On Side

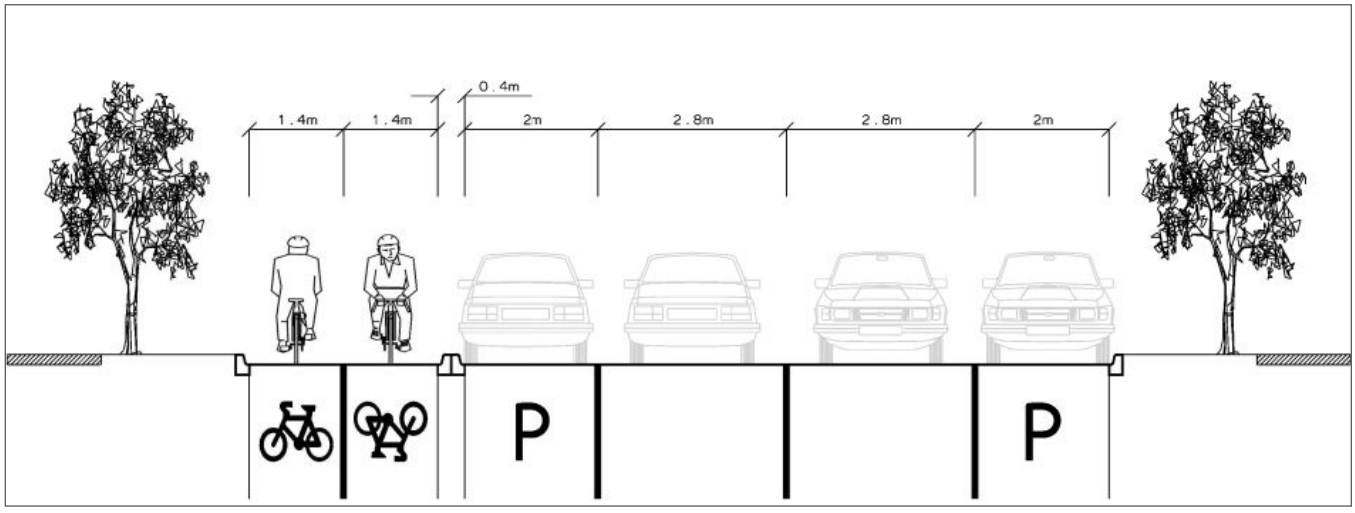


Figure 13: On Road, Dedicated Bicycle Lanes (Painted Markings)

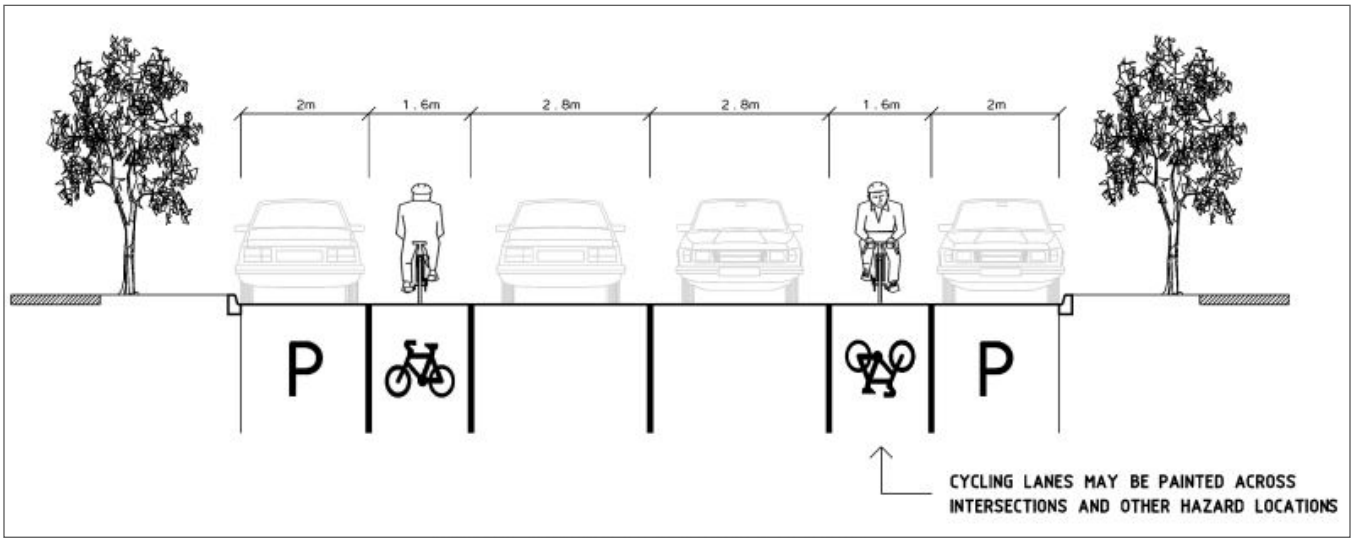


Figure 14: Off Road, Separated Paths for Pedestrians and Cyclists

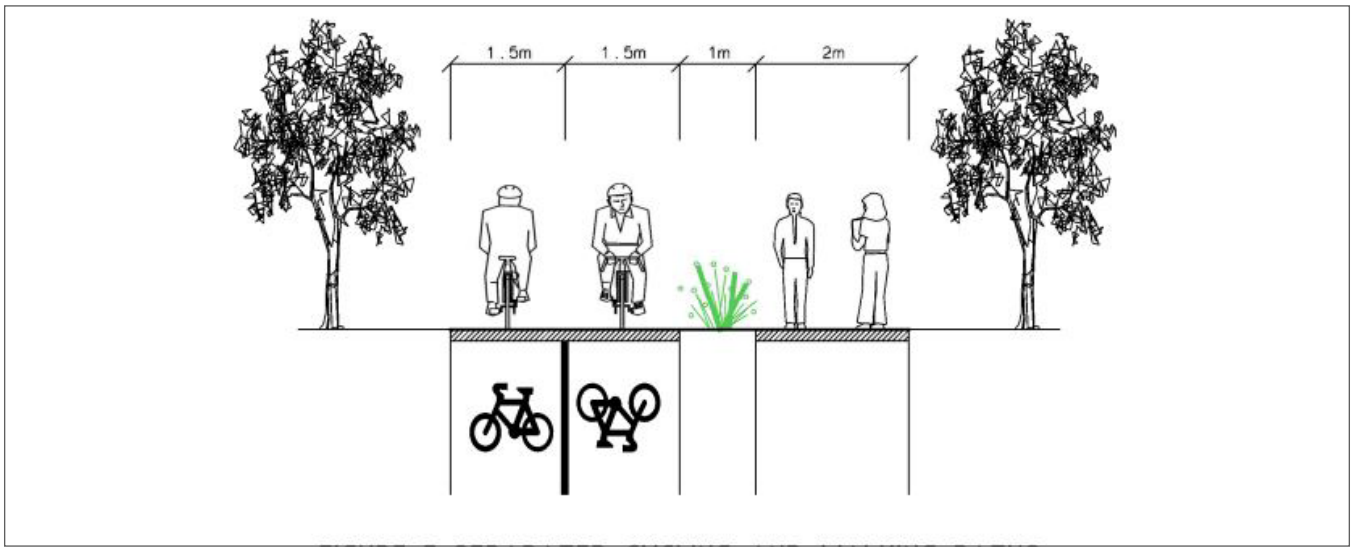
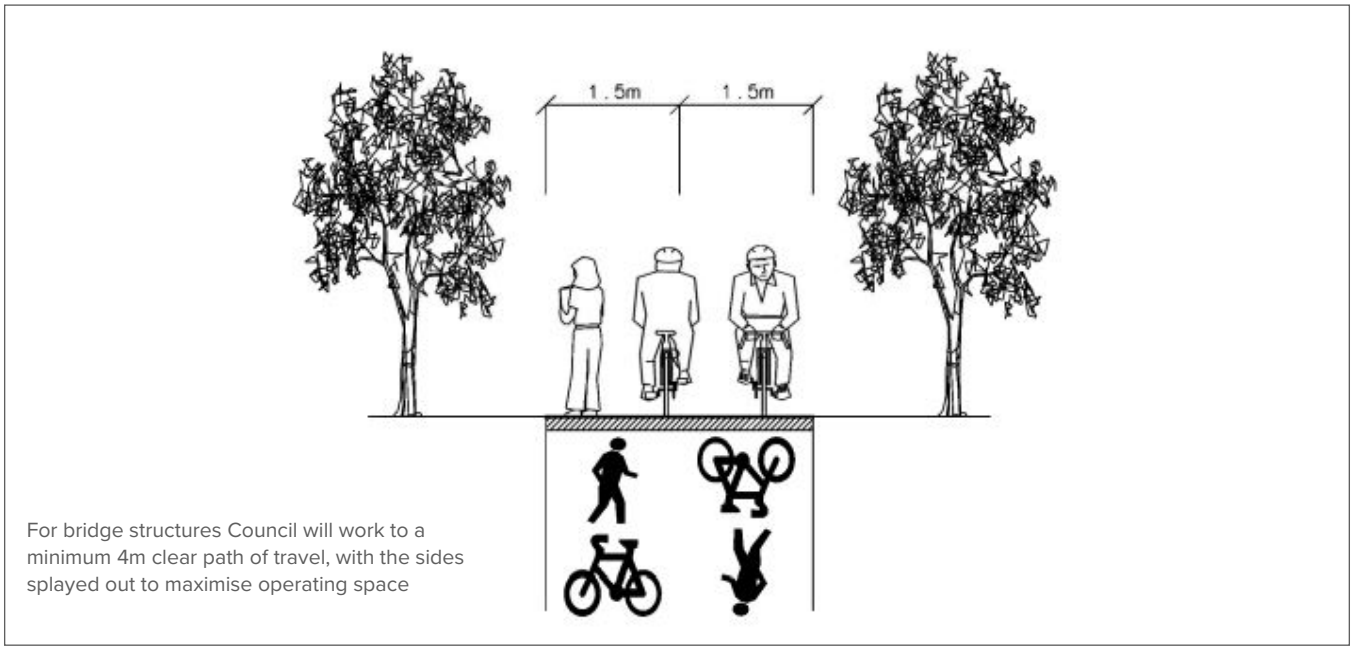


Figure 15: Off Road, Shared Path



For bridge structures Council will work to a minimum 4m clear path of travel, with the sides splayed out to maximise operating space

Figure 16: Mixed Traffic Streets - Sharrows

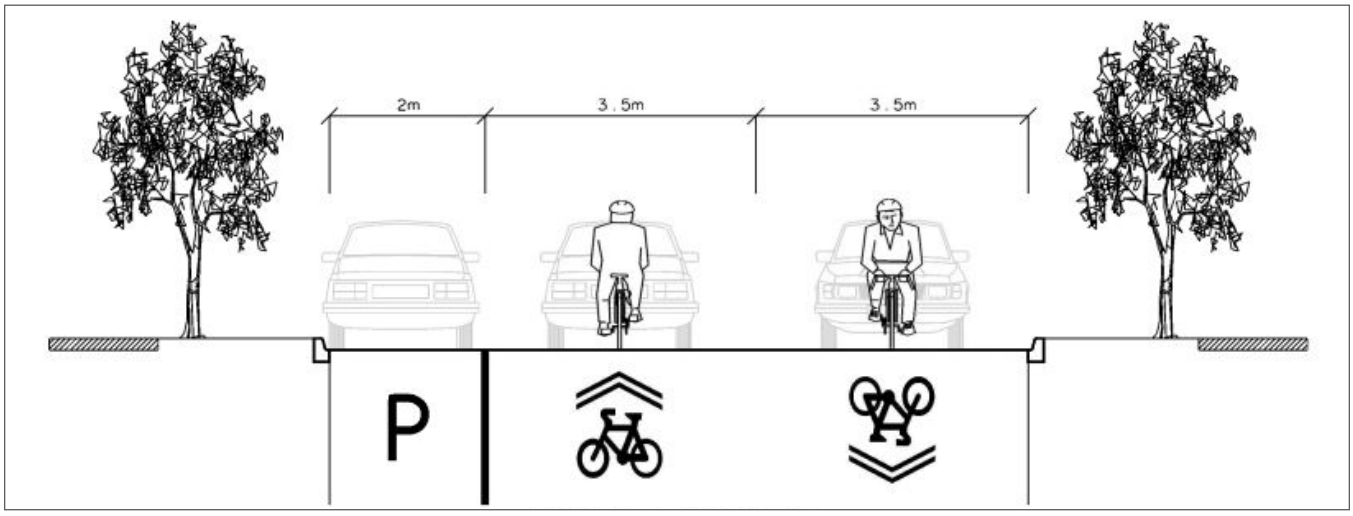
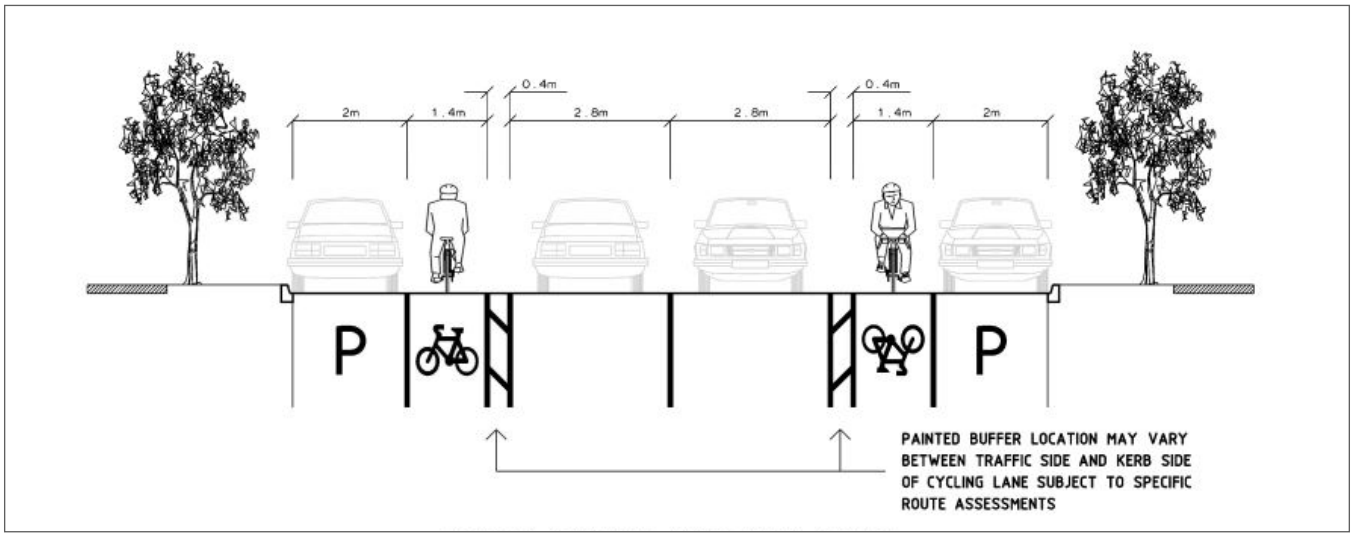


Figure 17: On Road, Dedicated Bicycle Lanes (Buffer)



The use of the buffer should vary depending on the characteristics of the street. For instance, on streets with high vehicle turn over from kerbside parking bays (e.g. shopping strips), the position of the buffer will be most useful between the parked car and the bicycle lane. This will encourage bicyclists to ride further from the 'door zone'. On streets in which car parking turn over is likely to be lower, the buffer may be more useful between the cyclist and the moving motor vehicle traffic lane.

On an ongoing basis, City of Parramatta will be exploring all options to provide a network with a greater extent of physically separated routes to maximise safety and amenity, should sufficient funding become available. Priority will generally given to routes currently identified for dedicated bicycle lanes (painted), for upgrade to Separated, particularly for regional routes, over local routes. Each of these routes will be assessed to ensure there is sufficient space within the road reserve and the design will be optimised for all users and subject to additional consultation at the detail design stage.

Additional work completed as part of this Draft Bike Plan included modelling the benefits and costs associated with a 'rapid action' scenario, in which the network was completed with largely separated infrastructure within a five year period.

The proposed bicycle network has been developed to achieve the vision set out in Chapter 1, by creating a street and path network that makes cycling an attractive, safe and convenient choice. The analysis of transport data, community and stakeholder consultation outcomes, evaluation of existing conditions and the Bike Use Propensity Index have all been used to inform the creation of the proposed network.

Ultimately, the network has been designed to connect people and enhance the diversity and safety of transport choices in Parramatta. As Parramatta continues to develop, this bicycle network will assist in achieving a productive, sustainable city by making it easier to get around without having to get in a car. This will help our community avoid the frustrations of traffic congestion and enhancing the overall desirability of Western Sydney.

3.3 THE PROPOSED BICYCLE NETWORK

This Draft Bike Plan lays out a set of routes that will transform the safety and attractiveness of cycling in Parramatta and does this in a manner with minimum disturbance to other road users. Table 1 provides a breakdown of the distances for each of the proposed infrastructure treatments that make up Parramatta's future bicycle network. See also *Volume 3: Detailed Route Description.*

Table 1: Bicycle Network Length by Typology

Typology	Regional routes (KM)	Local routes (KM)	Total (KM)
On road - Mixed traffic	10.5	19.4	29.9
On road - Dedicated bike lanes	38.6	69.3	107.8
On road - Separated bike lanes	30.9	0.3	31.2
Off road - Shared path	47.2	43.3	90.5
Off road - Separated cycleway	11.0	0.0	11.0
Total	**138.2**	**132.3**	**270.4**

Figures 18, 19 and 20 (pg. 30-35) present the spatial configuration of the proposed network.

Figure 18 Bicycle Network Typologies

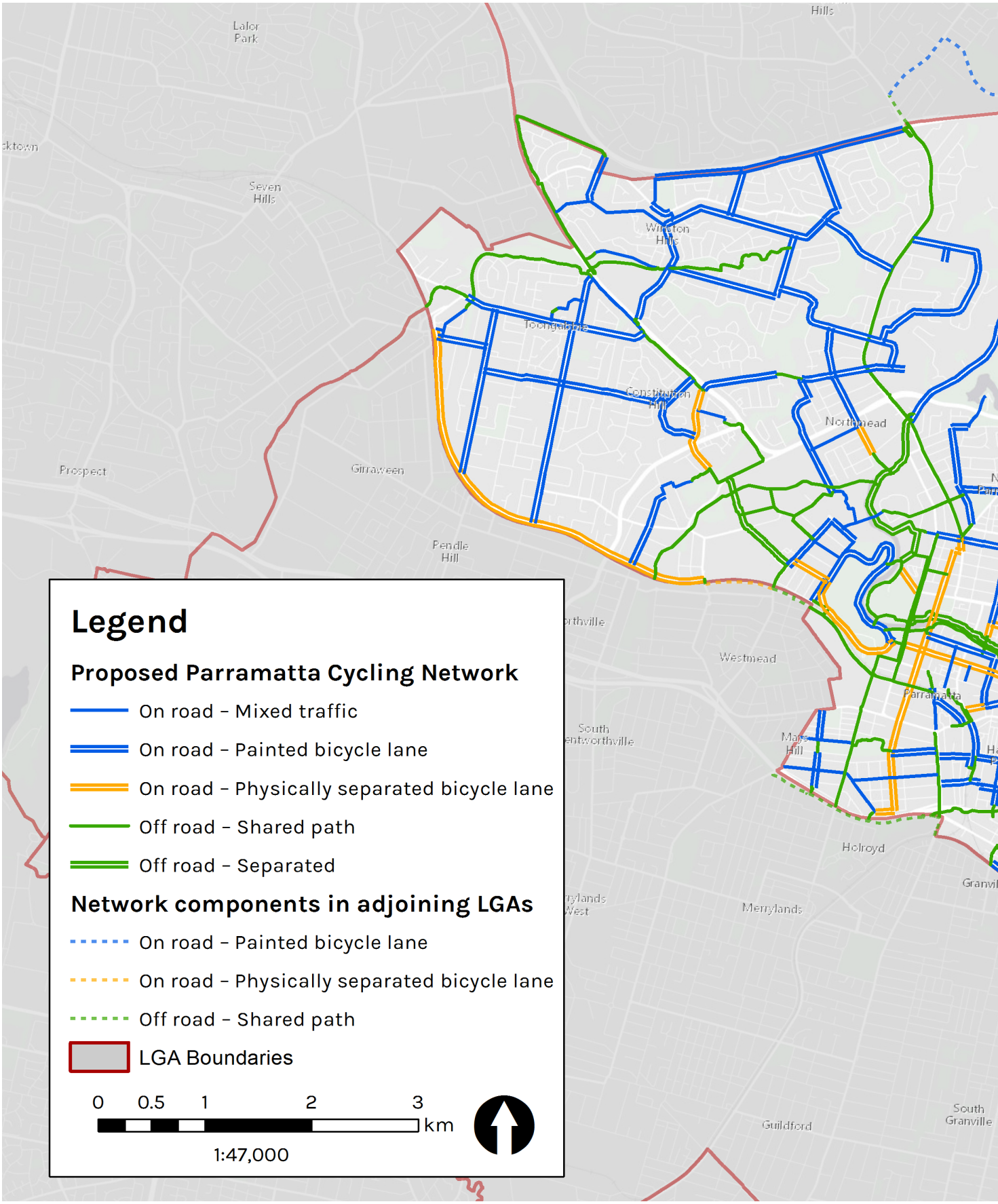


Figure 18 offers a snapshot of how the proposed network differs depending on the type of infrastructure proposed. The typologies vary from riding in mixed, lower speed traffic, through to fully separated paths and lanes. See Appendix A for zoomed in versions of this map.

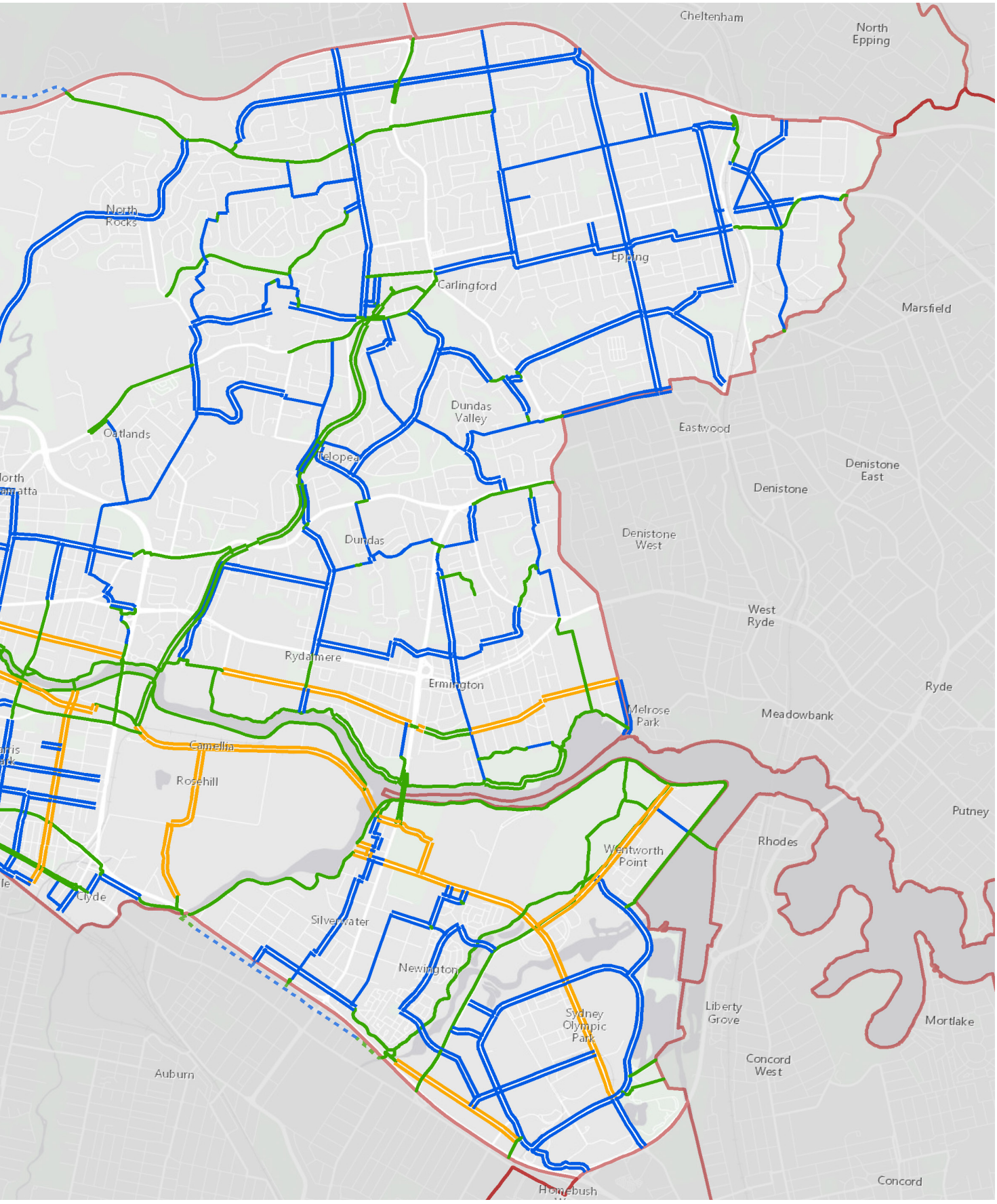


Figure 19: Existing Bicycle Network Status

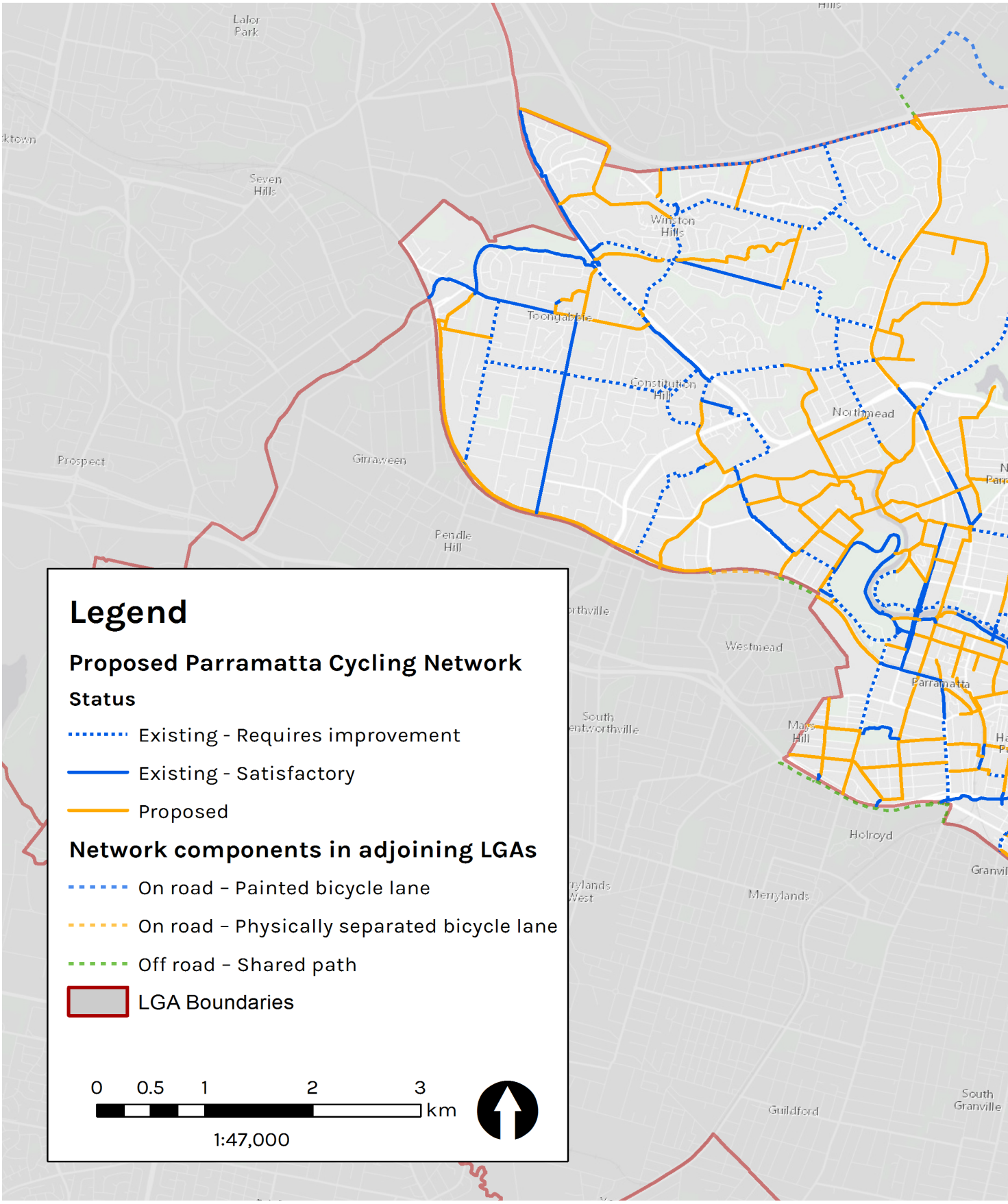


Figure 19 offers an illustration of the proposed network based whether the route is an existing route that is satisfactory, requires improvement or is a proposed route that does not exist yet.

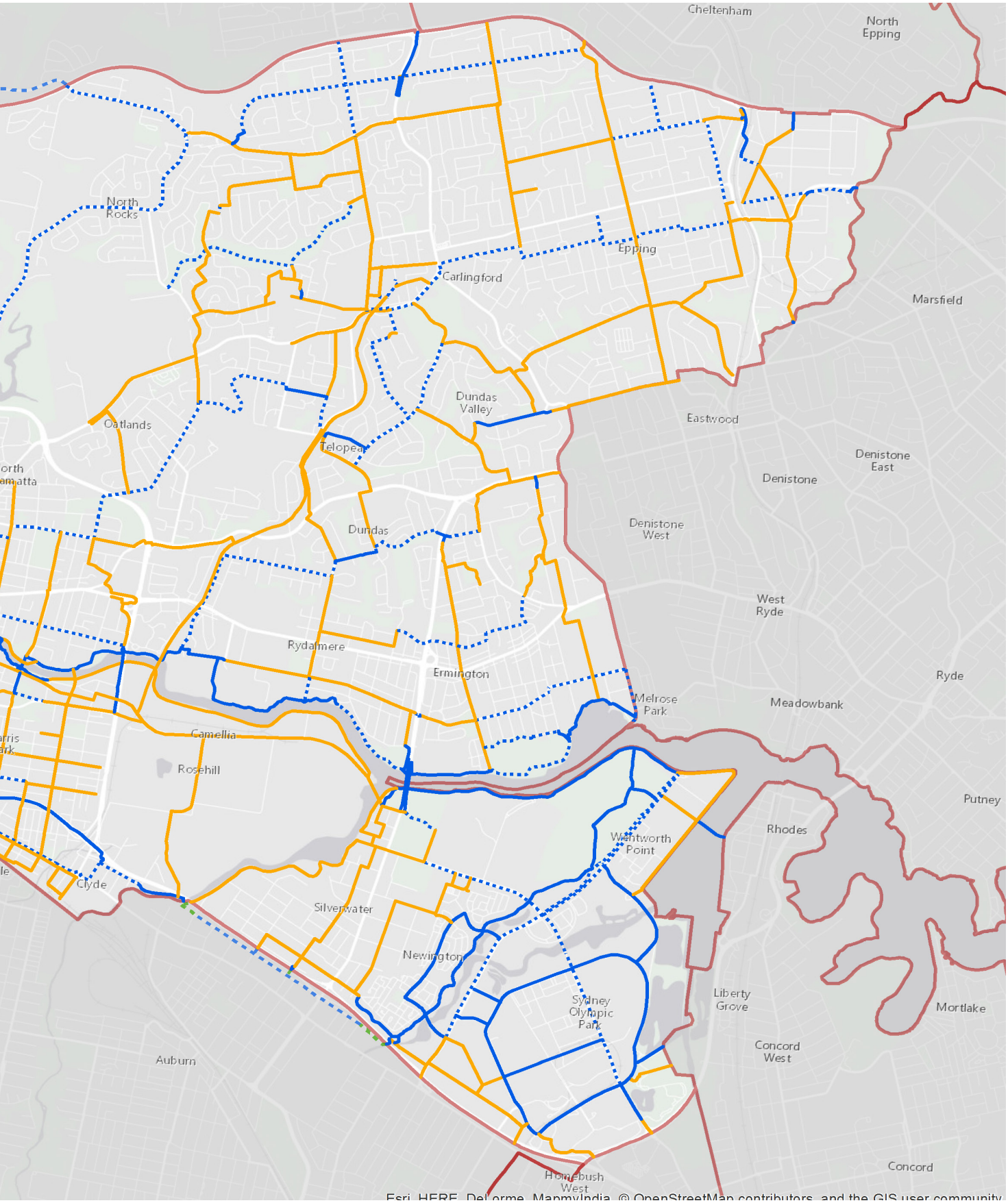


Figure 20: Local and Regional Bicycle Routes

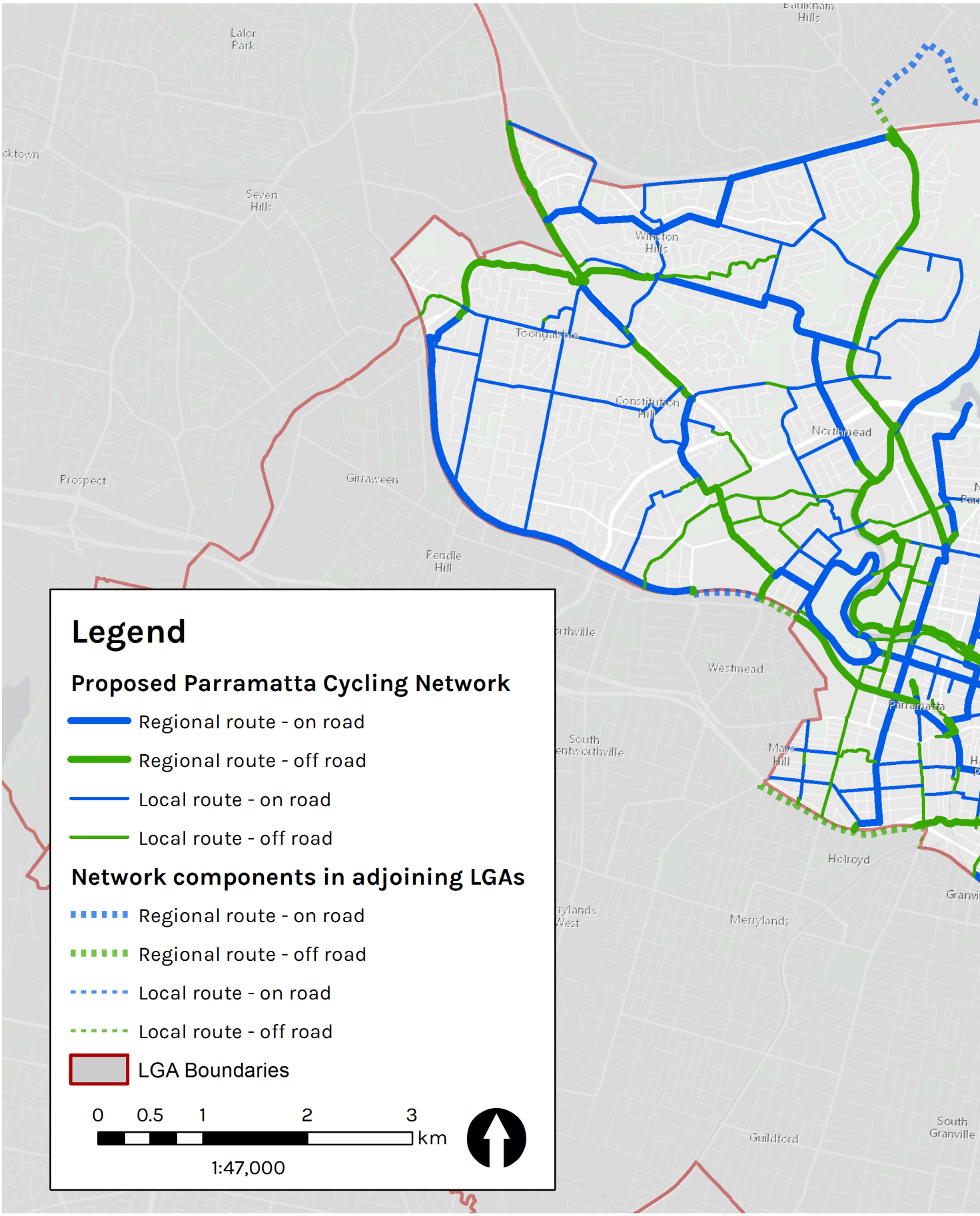
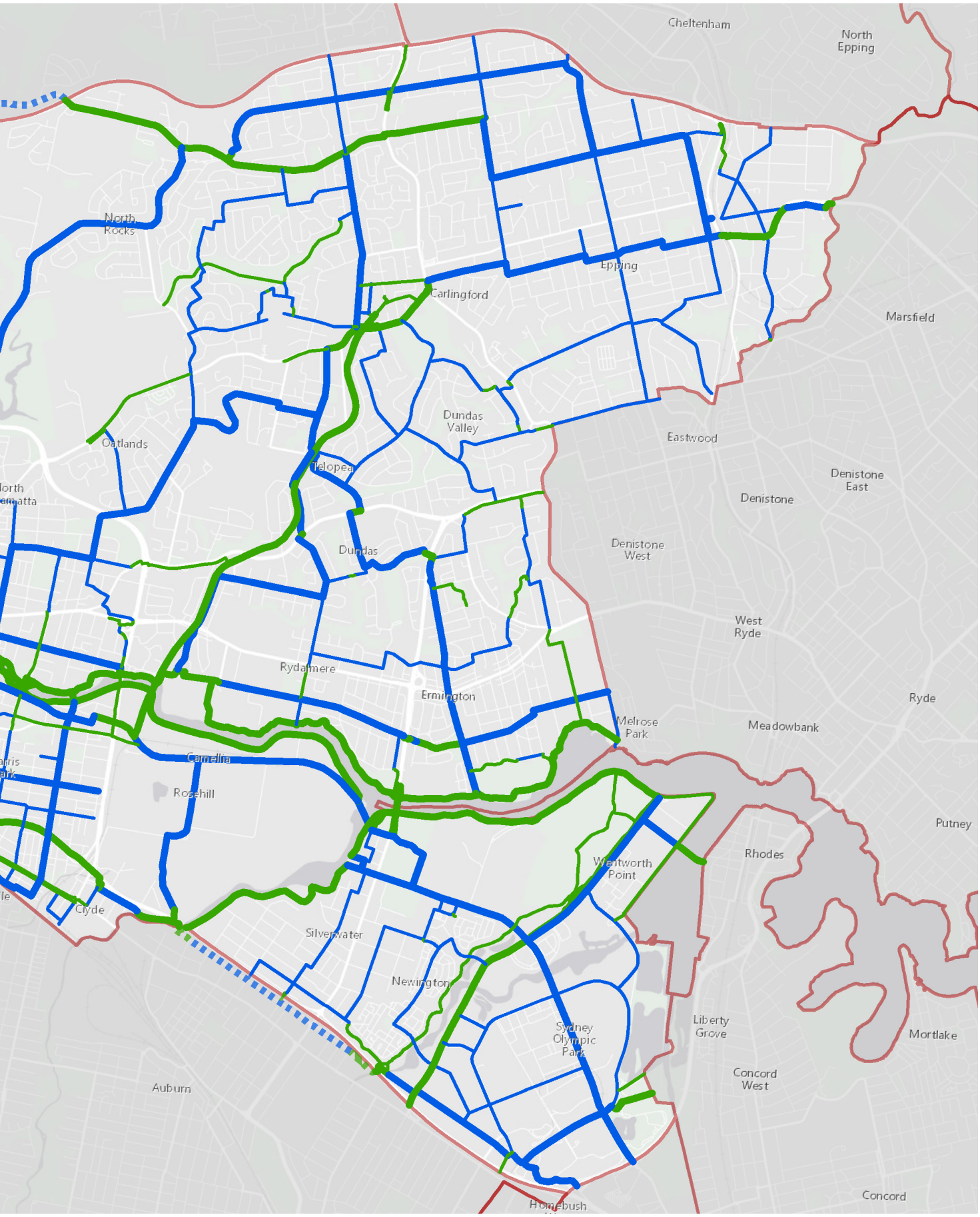


Figure 20 illustrates all the routes in the proposed bicycle network, based on whether they are regional or local routes.



3.4 POLICIES SUPPORTING THE TRANSITION TO A CYCLING CITY

PROPOSED LAND USE CONTROLS

The urban intensification occurring in Parramatta provides an important opportunity to build bicycle friendly design into the buildings (bike parking) and streets (separated bicycle infrastructure). This section outlines initiatives and land use controls which build on existing strengths within the City of Parramatta's land use controls, to achieve the vision set out in this Draft Bike Plan.

The following land use mechanisms are recommended:

- Local Environmental Plans include an aim of encouraging walking and cycling
- All land use zones will contain objectives which articulate a desire to encourage walking and cycling
- Development Control Plans (DCPs) include design principles to facilitate and encourage cycling as a primary mode of transport in all new developments will be included
- For all new office buildings with a floor space over 600m2 should include end of trip facilities including lockers and showers, to encourage and facilitate cycling to work
- Green Travel Plans to be submitted for all commercial developments with a floor space over 600m2; industrial developments over 1000m2, and all residential developments with 20 dwellings or greater
- Bicycle parking rates in residential flat buildings of one space per dwelling, plus visitor parking of one space for every ten units
  - Bicycle parking rates in commercial buildings of one per 150m2, one visitor space per 400m2
  - Bicycle parking rates for all other uses: -- as set out in Austroads (2008) Guide to traffic management: part 11: parking, (AGTM11-08); or -- of .2 space per car parking space which would normally be required under Guide to Traffic Generating Developments, whichever is greater
- For all Local Environmental Plans (LEPs), to contain parking space maximums for new developments within areas identified as Strategic Precincts within City of Parramatta DCPs
- To introduce incentives for developers to reduce car parking supply in new dwellings

CAR USE PRICING REFORMS

- Council will investigate the impacts of the 15 minute free period of kerbside parking in the CBD and other key centres, as the spaces may act to support short distance car trips within Parramatta
- Initiate discussions with other LGAs and the NSW Government regarding road user pricing reform to provide pricing signals to improve the management of road use

SPEED LIMITS

- Council will initiate discussion with RMS regarding a lowering of the speed limit within the Parramatta CBD
- Council will initiate discussion with RMS to reduce the speed limit on residential streets outside of the CBD where appropriate and in consultation with the community

NETWORK DEVELOPMENT POLICY

- Council will apply the Road User Hierarchy (see Figure 11) in road space allocation and transport investment decisions
- Whenever a road is resurfaced, consideration will be given to adding a dedicated bicycle lane, unless there is a compelling reason not to, from a safety or road width perspective
- Light rail: Council will explore the opportunity created by light rail developments to seek enhancements to the bicycle network, including routes running both alongside light rail and perpendicular to it
- Light rail: Council will investigate technology that reduces the risk of bicycle tyres catching the rails, as well as on road directional signage the encourages crossing at the correct angle
- Whenever a road treatment project is planned, consideration of the impact on cycling safety is required
- Whenever road works occur that involve the removal and replacement of road surface on a designated cycling route, any bicycle line marking or symbols that are disturbed must be replaced when the works have been completed
- PS2 logos will be used in accordance with the Safe Systems Approach:
  - Specifically, PS2 logos will only be used on streets with low speeds
  - The PS2 logo should be placed where the rider is intended to ride
  - Awareness raising signage for motorists regarding the presence of cyclists will be restricted to vertical signposts3
- Initiate a dialogue with other LGAs and the NSW Government regarding a Greater Sydney Cycling Wayfinding Strategy and Implementation Plan

TECHNOLOGY

- Develop an online tool for the community to suggest on street bicycle parking and register cyclist safety issues
- Update bicycle counter technology to improve reliability, increase the coverage of counters and ensure counters are resistant to stormwater damage
- Following significant improvements in bicycle infrastructure within the CBD, Council will investigate the feasibility of a bike share program, potentially linked to other LGAs, major employers (e.g. Westmead, Western Sydney University) and other key destinations

3.5 BEHAVIOUR CHANGE PROGRAMS

INTRODUCTION

The following section presents three core behavioural programs that have been based on the outcomes of the community engagement phase in the development of the Draft Bike Plan. Each of these programs proposes a series of initiatives or interventions to achieve a desired outcomes and a set of behavioural goals. A number of these initiatives / interventions naturally align with actions proposed in section 3.6 *Promotion, Marketing & Events.*

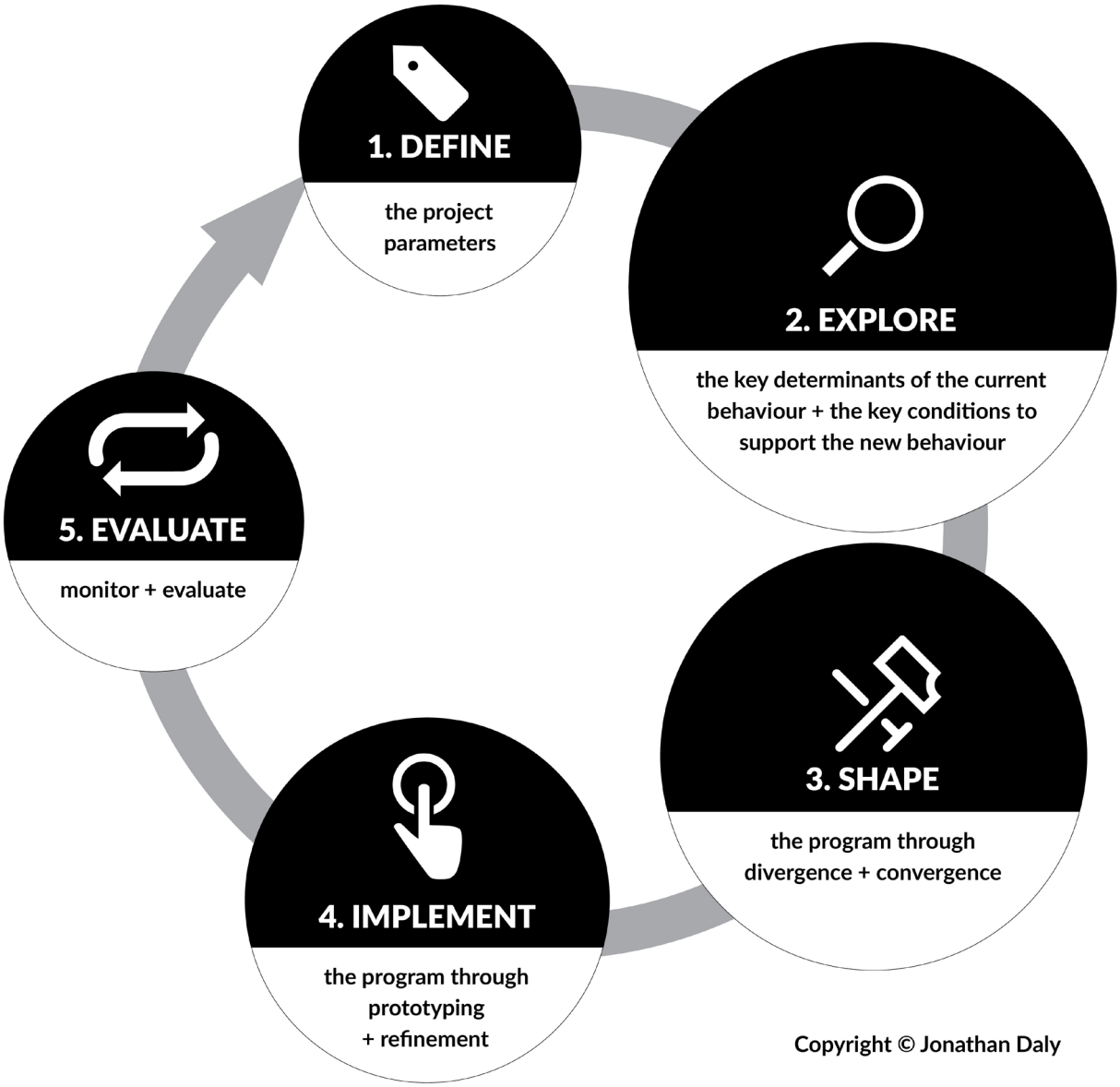
PROGRAM DESIGN

There are different tried and tested models and approaches for designing behaviour change interventions, what is most important is that Council ensure that the design is based on behavioural science, with creative aspects coming afterwards. One such approach is the Behaviour Change Design Framework ("BCDF"), as shown in Figure 21 opposite, which is based on a combination of behavioural science and design thinking. The first phase establishes the conditions that need to be in place for change to occur, while the second phase identifies how best to deliver these conditions.

There are five keys stages in the framework:

1. **Define:** The first step is to define the key parameters for the Draft Bike Plan - specifically who the plan is for; what the plan will do for them; and what difference will this make to the community.
2. **Explore:** The next step is understanding the current factors enable and constrain bike riding in Parramatta, and what conditions need to be in place to grow participation.
3. **Shape:** Then, we will explore what needs to be put in place to deliver these conditions, covering infrastructure, policy, behaviour change initiatives and broader communications and marketing.
4. **Implement:** The penultimate step, will refine the proposed actions through a process of prioritisation and costing.
5. **Evaluate:** The final step, involves the development of a monitoring and evaluation framework, which sets out what we hope to achieve; how we will measure this; how we will collect and analyse data; and how we will report the outcomes.

Figure 21: The Behaviour Change Design Framework



PROGRAM 1: SHARING THE ROAD

Basis

The provision of separated, or even dedicated, bicycle routes cannot always be accommodated for a number of reasons, including physical and financial constraints. On this basis, the interaction of bike riders and other road users will be commonplace. As such, it is important that steps are taken to improve the coexistence of all road users.

Desired Outcome

- To support the coexistence of bike riders and drivers of motorised vehicles on the roads and streets of Parramatta

Behavioural Goals

1. Drivers of motor vehicles leave appropriate space when driving in the presence of bike riders on all roads and streets of Parramatta
2. Drivers and passengers of motor vehicles properly look for bike riders and then safely exit their vehicle when parking parallel to moving traffic on the roads and streets of Parramatta
3. Bike riders, particularly new/inexperienced riders, understand and are able to ride defensively and confidently when sharing road space with motorised traffic
4. All road users, cyclists and drivers, understand the road rules that support their safety and the safety of others

Key Actors

- All road users - but engaged as communities of road users (e.g. truck drivers, bus drivers, taxi drivers, sports bike riders, everyday bike riders, commuter drivers etc.)

Program Components

- Council will support and collaborate with external agencies who already run relevant initiatives, such as the Amy Gillett Foundation's 'A Metre Matters' campaign
- Council will provide and promote easily accessible information on road rules for interactions between bike riders and drivers of motor vehicles, tailored to different categories of drivers (e.g. truck drivers and taxi drivers) and cyclists themselves
- Council will develop - separately or in collaboration with external stakeholders - an intervention to create empathy and understanding among road users by providing opportunities to experience the road from each other's perspective, by:
  - bringing people together at existing community wide events and activities hosted by Council
  - sharing personal stories of the real impact on bike riders who have been involved in crashes and near misses with motor vehicles
- Council will develop an intervention to humanise bike riders through:
  - the personal stories of the diversity of riders in Parramatta (by age, gender, ethnicity, motivations for riding etc.)
  - local people who cycle and drive
  - the 'norming campaign' proposed in section 3.6
- Council will investigate opportunities to address the issue of 'car-dooring', targeting locations identified through Crash Stats and from the CrowdSpot analysis - with a focus on:

- empathy towards drivers who most likely have limited experience interacting with and awareness of bike riders
- making safe practices for existing vehicles practical and habitual

- Support or provide defensive cycling and confidence building training courses - see section 3.6

Behaviour Change Principles

- Improving capacity:
  - Train in cognitive, physical or social skills required for the desired behaviour or avoid the undesired one
  - Educate about ways of enacting the desired behaviour or avoiding the undesired one, including how to do it and why to do it (i.e. the outcomes or benefits from doing it - social, environmental and economic)
- Improving social opportunity:
  - Restructure the social environment or use modelling to shape people's ways of thinking
- Improving motivation:
  - Educate, train to form clearer personal rules / actions plans, and train to remember and apply the rules when needed
  - Educate or persuade to create more positive beliefs about desired behaviour, and negative ones about undesired behaviour (e.g. comparison of costs and benefits)
  - Train or enable to strengthen habitual engagement in the desired behaviour or weaken the undesired ones

Figure 22: 'A Metre Matters' Campaign, NSW

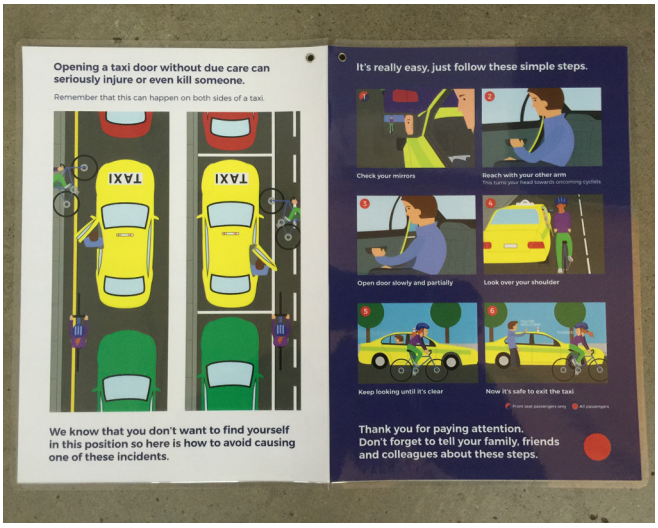


Figure 23: Car-Dooring Campaign, VIC

Figure 24: 'Road Coexistence' Campaign NZ

PROGRAM 2: SHARED PATHS

Basis

Shared paths accommodate a number of users who have different needs that sometimes come into conflict. During the community consultation phase it was reported that many people experience negative situations with other users because of a lack of understanding for how this type of facility should be used. Parramatta has a number of such paths and more are planned in the future.

Desired Outcomes

- Raise awareness among all users of being on a shared path
- Improve relations between people riding and people walking on shared paths
- Increase sense of safety especially for vulnerable users

Behavioural Goals

1. Bike riders to give way to pedestrians
2. Bike riders to slow down and pass at a safe distance
3. Increase and normalise the use of bike bells
4. Walkers and bike riders keep left

Key Actors

- All road users - but engaged as communities of road users (e.g. truck drivers, bus drivers, taxi drivers, sports bike riders, everyday bike riders, commuter drivers etc.)

Program Components

- Engage with the key actors in time and space, i.e. at the sites where and when conflict is most prevalent, with the aim of bring walkers and riders together in conversation to negotiate a new etiquette (social norms)
- Create an activation space on shared paths to facilitate conversations between different users:
  - The space should be attractive, friendly and fun - and located in known problem locations
  - Pair walkers and bike riders and task them to negotiate one thing they each can do (social norms) to make the experience of using the shared path better for everyone - the actions can be general and also site-specific
- Share the negotiated etiquette with the wider community:
  - The photos will be shared using social media - participants will be encouraged to share the photos using their own social media accounts to promote their involvement among their own social network
- Use various media to share the outcomes with the wider community:
  - Utilise Council and community social media to share the outcomes from the on-site activations
  - Invite the community to contribute to to etiquette online and to rate the outcomes of the activation
- Use behavioural signage to communicate the new shared path etiquette with users of the shared path and with the wider community:
  - Place the messages at site specific locations, such as where people make turns off the path or where riders interact with people crossing the path
  - Utilise empathetic messaging techniques in the design

- Share the communication online

Behaviour Change Principles

- Improving capacity:
  - Educate about ways of enacting the desired behaviour or avoiding the undesired one, including how to do it and why to do it (i.e. the outcomes or benefits from doing it - social, environmental and economic)
- Improving social opportunity:
  - Restructure the social environment or use modelling to shape people's ways of thinking
- Improving motivation:
  - Educate, train to form clearer personal rules / actions plans, and train to remember and apply the rules when needed
  - Educate or persuade to create more positive beliefs about desired behaviour, and negative ones about undesired behaviour (e.g. comparison of costs and benefits)
  - Train or enable to strengthen habitual engagement in the desired behaviour or weaken the undesired ones
  - Persuade, incentive, model or enable to feel positively about the desired behaviour and negatively about the undesired one

Figure 25: Shared Path Etiquette Program, VIC

Figure 26: 'Share Our Streets' Program, VIC

PROGRAM 3: SUPPORTING UNDERREPRESENTED GROUPS

Basis

There is a significant proportion of the community who fall into the 'interested but concerned' category, many of whom are underrepresented among current bike riders in Parramatta. They include women, young people and people from ethnic minorities. Parramatta is a very ethically diverse part of Australia and there is significant potential for growing participation in bike riding among these groups.

Desired Outcomes

- To improve the confidence, skills and knowledge of underrepresented groups to cycle in Parramatta

Behavioural Goals

1. New bike riders have the confidence to cycle in Parramatta
2. New bike riders have the skills and knowledge to cycle safely and to undertake basic maintenance on their bicycles
3. New bike riders can easily access a variety of resources to start cycling and keep cycling in Parramatta

Key Actors

- Families, Women, Children, Youth, People from a diverse backgrounds

Program Components

- Explore options to run or outsource programs to engage these groups in events and activities that have a strong social focus, which aim to:
  - Build their confidence to cycle
  - Provide the skills and knowledge to cycle, covering road rules, safety and bike maintenance
  - Provide access to a bicycle to learn to ride
  - Provide access to people similar to them who already cycle
  - Integrate with general cycling training services - see section 3.6
- Explore the potential of providing a 'bicycle library (such as the one provided by Marrickville) to enable people in the community to borrow and try different types of bicycles (eg. cargo bikes)
- Liaise with local businesses to run a series of events that connect them with people who are new to cycling
- Explore running a pilot Ciclovia event in Parramatta CBD on a Sunday, closing off an area of the CBD to all motorised traffic - combine with the promotion of local businesses
- Develop a central source of information and resources on Council's website aimed at these groups
- Integrate with the proposed norming campaign - see section 3.6 - to promote personal stories from people in these groups who can provide inspiration for others

Behaviour Change Principles

- Improving capacity:
  - Train in cognitive, physical or social skills required for the desired behaviour or avoid the undesired one
  - Train or enable development of mental or physical strength required for the desired behaviour or avoid the undesired one

- Train or enable endurance required for the desired behaviour or avoid the undesired one
- Educate about ways of enacting the desired behaviour or avoiding the undesired one, including how to do it and why to do it (i.e. the outcomes or benefits from doing it - social, environmental and economic)

- Improving social opportunity:
  - Restructure the social environment or use modelling to shape people's ways of thinking

- Improving motivation:
  - Educate, train to form clearer personal rules / actions plans, and train to remember and apply the rules when needed
  - Educate or persuade to create more positive beliefs about desired behaviour, and negative ones about undesired behaviour (e.g. comparison of costs and benefits)
  - Persuade, incentive, coerce, model or enable to feel positively about the desired behaviour and negatively about the undesired one
  - Train or enable to strengthen habitual engagement in the desired behaviour or weaken the undesired ones
  - Model desired behaviour to induce automatic imitation
  - Persuade, incentive, model or enable to feel positively about the desired behaviour and negatively about the undesired one

Figure 27: Training for Young Women, VIC

Figure 28: Safety Training for Refugees, VIC

Figure 29: 'Pushy Women' Rides, VIC

3.6 PROMOTION, MARKETING & EVENTS

SUPPORT LOCAL BUSINESSES TO ENABLE CYCLING AMONG STAFF

- Explore options to support local businesses who invest in bicycle parking and changing facilities for staff (eg. reduced rates)
- Explore running a workplace cycling competition to encourage competition among local businesses
- Help local businesses with information and guidelines on creating a salary sacrifice or discount program for staff to support the purchasing and up-keep of bicycles

SUPPORT EXISTING & PROMOTE NEW COMMUNITY INITIATIVES

- Promote and support events, such as the Ride2Work and Ride2School days and activities
- Explore creating a small grants program for local groups who want to support cycling in Parramatta, particularly those focused on underrepresented groups in the community

SUPPORT INTEGRATING CYCLING WITH LOCAL EVENTS

- Explore options to provide bicycle parking at all major local events (eg. make it a mandatory requirement for event organisers, as currently practiced by the City of Melbourne in Victoria)
- Ensure the promotion of these facilities in associated events

SUPPORT THE PROMOTION OF A MORE INCLUSIVE CYCLING CULTURE

- Create a campaign promoting a cross section of local bike riders who already cycle to challenge currently held beliefs and attitudes that limit participation and stereotypes
- Ensure a cross section of age, gender, and ethnicity are covered in the campaign
- Maximise use of different channels, such as social media, print and online video
- Showcase personal stories that demonstrate the potential to cycle for everyday journeys in everyday clothes and using a range of bicycle:
  - Avoid sports cycling and other leisure pursuits in favour of short, local everyday transport journeys

SUPPORT NEW CYCLISTS DEVELOP SKILLS AND CONFIDENCE TO CYCLE

- Explore options to provide regular classes for novice riders
- Provision should be made for female-only classes, as evidence shows that some women feel more comfortable and confident when learning physical skills with other women
- Provision should be made for on-road training to ensure practical experience is gained in real-life conditions

PROVIDE A CENTRAL SOURCE OF KEY INFORMATION

- Develop and maintain a section of the current Council website dedicated to cycling, including::
  - the provision of cycling network maps
  - guidelines for using facilities

Figure 30: Sydney Rides Challenge Launch

This event runs for one month every year and engages a range of workplaces across the City.

Figure 31: Ciclovia in Belfast, Northern Ireland

Ciclovias are now a global phenomenon. This one was held for the first time in Belfast - not traditionally a cycling city - and was led by the Lord Mayor.

Figure 32: BikeWise Training Services

BikeWise are a nationally accredited provider of cycling training services covering schools, workplaces and the wider community.

  - road rules for cyclists & cyclist's legal rights: including the process and sources of help with crashes, injuries and other incidents
  - calendar of local events
  - contact details for all local organisation promoting or supporting cycling
  - information should be provided in a range of language options
- Develop mapping to cater for a range of journey types (eg. work with local businesses to promote cycling to shops)

SUPPORT CYCLING GROW THROUGH LEADERSHIP IN THE COMMUNITY

- Council will explore options for staff with transport and city design responsibilities to attend a bicycle planning and design course, either provided through RMS/Transport for NSW or another accredited provider, to ensure they have the skills and awareness to build bicycle friendly design into their work
- Provide a range of bicycle types for staff to use for a variety of journey types (including cargo bicycles and power-assisted bicycles), at workplaces across Parramatta
- Develop and make available maps of safe and convenient routes between regular destinations for staff – build up a database of routes which can be accessed by staff
- Run an annual workshop with staff who cycle to gather feedback on issues associated with cycling for business journeys and plan to address these barriers – many will also be important issues for the wider community
- Run bicycle skills and maintenance training classes for staff
- Integrate the promotion of new facilities, the bike pool and training classes with the existing annual Sustainable Transport Week
- Develop a promotional pack to be included with the paperwork of new staff
- Develop an introduction to 'Cycling at Work' as part of staff inductions
- Regularly promote cycling facilities and activities through existing internal communications mediums – include profiles of staff who have taken up cycling, covering their personal experiences

SUPPORT NEW HOUSEHOLDS / RESIDENTS RELOCATING TO PARRAMATTA

- Consider providing new dwellings and residents with a Travel Smart in Parramatta Welcome Pack: this should include information on local public transport services, bicycle routes and shops, and car share services available locally
- Households with driveways crossing a shared path should be provided with guidelines for safely exiting their property

Figure 33: Roll Up Valet Bike Parking

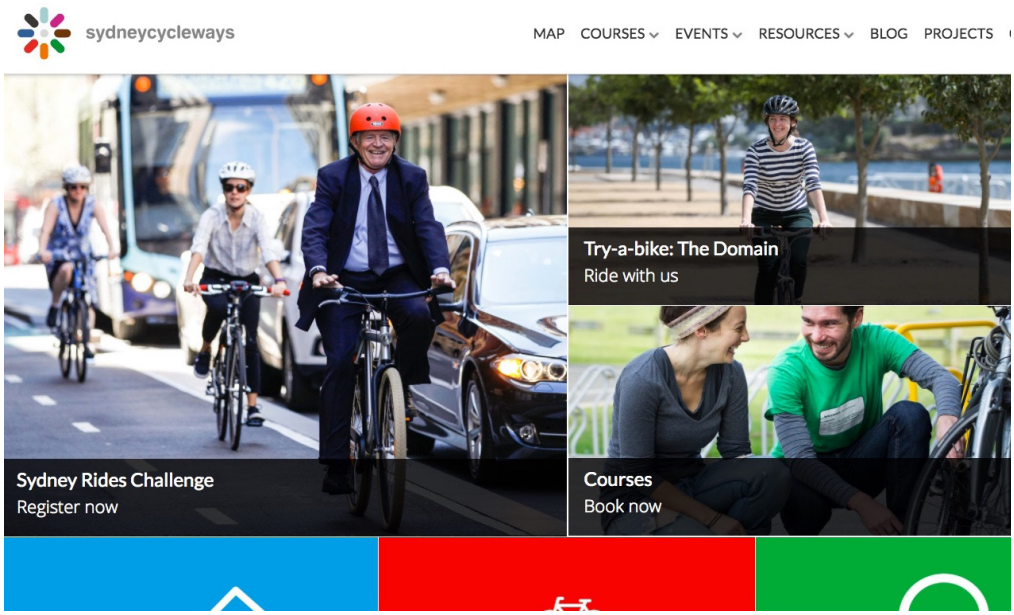
This service is currently provided by the local bicycle user groups for to Council at a number of Parramatta events.

Figure 34 New Bike Facilities at RMIT University in Victoria

This is one of the largest bike parking and changing facilities in Australia, complete with workshop and maintenance facilities.

Figure 35: City of Sydney's Dedicated Cycling Website

The City of Sydney host all of their projects, events, information and communications for cycling on a dedicated website, providing a one-stop-shop for the community.



4.0

BICYCLE NETWORK DELIVERY

4.1 NETWORK PRIORITISATION

Routes will be delivered in stages when funding and opportunities become available However, a multi-criteria analysis framework was developed to form strategic priority groups. This framework incorporated seven factors, with each route (or part thereof) given a rating out of five, determining its importance against that criteria. GIS software was utilised to code each route section with its score in each of the seven criteria, with the totals added to provide a comparable score across the network.

The multi-criteria analysis provides a good framework for assessment, but professional judgement was required to fine tune the works schedule. In cases where the multi-criteria analysis recommended two parallel routes in the same construction phase, the regional route was prioritised, if both are regional only the higher rating route was included, with the lower rank route deferred to the next phase. In some cases short sections were pushed forward if they provided connectivity and cohesion throughout the network, or provide connectivity to a school. Conversely, isolate routes were deferred to reduce fragmentation of the system. Prioritisation was also based upon *Sydney's Cycling Futures* and realising State Government funded routes. Routes that require substantial third party involvement have also been adjusted to coincide with larger works programmes (eg. the path adjoining Parramatta Light rail and proposed route east of Parramatta Station are timed to coincide with Parramatta Light Rail and Metro West opening dates, respectively).

Table 2: Multi-Criteria Analysis for Network Prioritisation

Criteria	Rating 5	Rating 4	Rating 3	Rating 2	Rating 1
Proximity to a school.	0-150 metres	150-300 metres	300-450 metres	500-750 metres	750+ metres
Proximity to public transport	0-200 metres	200-500 metres	500-1000 metres	1000-1500 metres	1500+ metres
Safety	Accident reported to police reported within 25 metres	Accident reported via CrowdSpot within 25 metres	Nearmiss reported via CrowdSpot within 25 metres		No reported incidents
Route classification	Regional route				Local route
Population growth 2016-2036	15,000+ new residents	10,000-15,000 new residents	5,000-10,000 new residents	2,000-5,000 new residents	Below 2,000 new residents
Propensity for Bicycle Use score	0.81-0.97	0.67-0.80	0.58-0.66	0.46-0.57	0-0.45
Connectivity with existing infrastructure	Within 25 metres of existing infrastructure at both ends or two points (route length of under 500 metres)	Within 25 metres of existing infrastructure at both ends or two points (route length of over 500 metres)	Within 25m of existing infrastructure at one point (route length of under 500 metres)	Within 25m of existing infrastructure at one point (route length of over 500 metres)	Not near existing infrastructure

GIS software was utilised to code each route section with its score in each of the seven criteria, with the totals added to provide a comparable score across the network. The route sections are divided into four delivery phases. Professional judgement was required to fine-tune the works schedule. In cases where the multi-criteria analysis recommended two parallel routes in the same construction phase, the regional route was prioritised, if both are regional only the higher rating route was included, with the lower rank route deferred to the next phase. In some cases short sections were pushed forward if they provided connectivity and cohesion throughout the network, or provided connectivity to a school. Isolated routes were deferred to reduce fragmentation of the system. Routes that require substantial third party involvement have also been adjusted to coincide with larger works programmes. For example, the path adjoining Parramatta Light Rail is in Phase 2 and the proposed route east of Parramatta Train Station is in Phase 3 to coincide with Parramatta Light Rail and Parramatta Metro opening dates, respectively. Routes with identified third party funding opportunities were also prioritised.

OVERVIEW

The proposed network comprises:

- 54 kilometres of existing, satisfactory quality, bike infrastructure
- 217 kilometres of upgraded or proposed bike infrastructure

Table 3 below present the schedule for the delivery of the proposed network.

Table 3: Bicycle Network Route Descriptions

Route Name	Route Description	Distance (Metres)
North Rocks to Parramatta CBD	New North Rocks Road (dedicated bike lane); New North Rocks Road (dedicated bike lane); Church Street (shared path); Church Street (bi-directional separated bike lane); Harold Street (separated bike lane); Villiers Street (separated bike lane); Marist Place (separated bike lane); and Marsden	7,374
Epping to Macquarie University and Macquarie Park	Epping to Macquarie University and Macquarie Park	1,347
Melrose Park to Parramatta CBD via Ermington and WSU	Hope Street (separated bike lanes); Atkins Street (separated bike lanes); Boronia Street (separated bike lanes); new shared path connecting Boronia Street to South Street; South Street (separated bike lanes); Parramatta Valley Cycleway (shared path); Thomas Street (separated bike lanes); Elizabeth Street (separated bike lanes); and shared bridge over Parramatta River.	6,748
Duck River	Shared path on the south-eastern bank of Duck River; River Street (bi-directional separated bike lanes); Shaft Street (bi-directional separated bike lanes); Holker Street (bi-directional separated bike lanes); and a shared path on the south-eastern bank of Duck River.	2,865

Route Name	Route Description	Distance (Metres)
Carlingford Light Rail	New shared or segregated active transport path adjacent to Parramatta Light Rail from Rose Hill to Carlingford	5,010
Parramatta CBD Regional Routes	Regional routes which permeate and act to connect neighbouring regional routes: Philip Street; Charles Street; Hassall Street; Station Street East; Centenary Square; Church Street; Fitzwilliam Street; Valentine Street; Parkes Street	1,818
George Street regional connector	George Street (separated bike lane).	1,895
Marsden Street regional connector	Marsden Street (separated bike lane); Marist Place (separated bike lane); and Railway Street (separated bike lane).	2,389
Rouse Hill to Parramatta CBD via Westmead	Old Windsor Road (shared path and mixed traffic in service lane); Ferndale Close (bi-directional separated bike lane); Harris Road (bi-directional separated bike lane); new shared path across Toongabbie Creek; Briens Road (shared path); Mons Road (shared path); Darcy Road (separated off-street cycleway); Hawkesbury Road (shared path); Queens Road (bi-directional separated bike lane); and Parramatta Park (separated bike lane). Hawkesbury Road (shared path) acts as a southern spur, increasing catchment of the route and permeability of Westmead	9,619
Parramatta Valley Cycleway	Shared or segregated active transport path running adjacent to the Parramatta River.	12,605
M4 shared path	Shared path running parallel to the M4 Motorway; Martha Street (dedicated bike lanes); Shared path running parallel to the M4 Motorway; new shared active transport bridge across Haslams Creek; Carter Street (separated bike lanes); Edwin Flack Avenue (dedicated bike lanes); Rod Laver Drive (dedicated bike lanes).	5,130
Toongabbie to Northmead	Cooyong Crescent (mixed traffic); a new shared path between Cooyong Crescent, Pendle Creek and Fitzwilliam Road; Pendle Creek shared path; Old Windsor Road (shared path); a new shared path adjacent to Toongabbie Creek; shared path linking Goliath Avenue and Barnetts Road; Barnetts Road (dedicated bike lanes); Reilleys Road (dedicated bike lanes); and Moxhams Road (dedicated bike lanes).	5,330
Harris Park to Parramatta CBD	Station Street East (shared path and dedicated bike lanes); Marion Street (dedicated bike lanes); Harris Street (dedicated bike lanes); Crown Street (dedicated bike lanes); and Prospect Street (dedicated bike lanes)	1,834

Route Name	Route Description	Distance (Metres)
Carlingford to Epping	Pennant Hills Road (shared path); Keeler Street (dedicated bike lane); Pennant Parade (dedicated bike lane); Willoughby Street (dedicated bike lane); Ryde Street (dedicated bike lane); Boronia Avenue (dedicated bike lane); Kent Street (dedicated bike lane); Bridge Street (dedicated bike lane); Rawson Street (dedicated bike lane); and shared zone to Epping Station/Beecroft Road.	4,154
M2 Alternative route	Buckleys Road (shared), Lanhams Road (dedicated), Hillcrest (dedicated), Junction Road (dedicated bike lanes); Windsor Road (shared path); Barclay Road (shared path); North Rocks Road (shared path); shared path between North Rocks Road and Jennie Place; Jennie Place (mixed traffic); Haines Avenue (dedicated bike lane); Murray Farm Road (dedicated bike lane); Midson Road (dedicated bike lane); Ray Road (mixed traffic and dedicated bike lane); Rawson Street (dedicated bike lane); Bridge Street (dedicated bike lanes); Beecroft Road (shared path); Epping Road (shared path); Pembroke Street (mixed traffic); and Epping Road (shared path).	13,384
Sydney Olympic Park Regional Routes	Regional routes which permeate Sydney Olympic Park, running along: Hill Road (shared path and separated bike lanes); Australia Avenue (separated bike lanes and dedicated bike lanes); Holker Street (separated bike lanes and dedicated bike lanes); Carter Street (separated bike lanes); River Way (shared path); Clyde Street (separated bike lanes); Newington Road (separated bike lanes); Bennelong Bridge (mixed traffic); Footbridge Boulevard (shared path); Sarah Durack Avenue (dedicated bike lanes); Bennelong Parkway (dedicated bike lanes); Edwin Flack Avenue (dedicated bike lanes)	17,329
Carlingford to UWS	Pennant Hills Road (shared path); Charles Street (mixed traffic); Telopea Street (mixed traffic); Adderton Road (dedicated bike lanes and mixed traffic); Kissing Point Road (shared path); Park Road (dedicated bike lane); Calder Road (dedicated bike lane); Dudley Street (dedicated bike lane); Brodie Street (dedicated bike lane); and Parramatta Valley Cycleway (shared path)	6,031
Carlingford to Parramatta CBD	Pennant Hills Road (shared path); Charles Street (mixed traffic); Telopea Street (mixed traffic); Wilkinson Lane (mixed traffic); Tintern Avenue (dedicated bike lane); Wesley Street (dedicated bike lane); York Street (dedicated bike lane); Bettington Road (mixed traffic); Belmore Street East (mixed traffic); Webb Street (mixed traffic); Isabella Street (dedicated bike lane); and Brickfield Street (dedicated bike lane); Elizabeth Street (separated bike lane); and mixed use bridge over the Parramatta River.	6,893
Northmead to Parramatta CBD	Windsor Road (shared path); Church Street (shared path); Church Street (bi-directional separated bike lane); Harold Street (separated bike lane); Villiers Street (separated bike lane); Marist Place (separated bike lane); and Marsden Street (separated bike lane).	6,197
Toongabbie to Parramatta CBD	Wentworth Avenue (bi-directional separated bike lane); Bridge Road (shared path); and Alexandra Avenue (shared path).	5,685
Parramatta River to Granville	Alfred Street (separated bike lane); Bridge Street (dedicated bike lane); and East Street (dedicated bike lane)	2,428

Route Name	Route Description	Distance (Metres)
Camellia to Duck Creek	Colquhoun Street (separated bike lanes); Unwin Street (separated bike lanes); Shirley Street (separated bike lanes); and a new shared path bridge across Duck Creek.	1,737
Carlingford to Sydney Olympic Park via Ermington	Pennant Hills Road (shared path); Charles Street (mixed traffic); Telopea Street (mixed traffic); Adderton Road (dedicated bike lanes); Telopea Station (shared path); Sturt Street (dedicated bike lanes); Kissing Point Road (shared path); Kirby Street (dedicated bike lanes); Paul Street (mixed traffic); Ronald Avenue (mixed traffic); Dorothy Street (mixed traffic); shared path under Silverwater Road; Spurway Street (mixed traffic and dedicated bike lanes); Broadoaks Street (mixed traffic); Parramatta Valley Cycleway (shared path); Silverwater Bridge (shared path); Clyde Street (separated bike lanes); Newington Road (separated bike lanes); Holker Street (separated bike lanes) and Australia Avenue (separated bike lanes and dedicated bike lanes)	11,999
Wentworth Point to Parramatta CBD via Parramatta River	River Way (shared path); new shared path along the southern bank of Parramatta River; Parramatta Valley Cycleway (shared path).	7,424
Northmead to Epping	Windsor Road (shared path); Barclay Road (shared path); North Rocks Road (shared path); Pennant Parade (mixed traffic); Ray Road (mixed traffic); and Rawson Street (dedicated bike lanes).	9,935
Northmead to Carlingford	Windsor Road (shared path); Barclay Road (shared path); North Rocks Road (shared path); and Jenkins Road (dedicated lanes)	6,869
Kleins Road regional connector	Kleins Road (dedicated bike lane, separated bike lane, and shared path)	1,544
Lake Parramatta to Parramatta CBD	Lake Parramatta access road (mixed traffic); Lackey Street (mixed traffic); Bourke Street (dedicated bike lane); Iron Street (dedicated bike lane); Castle Street (dedicated bike lane); Pennant Hills Road (shared path); Church Street (bi-directional separated bike lane); Harold Street (separated bike lane); Villiers Street (separated bike lane); Marist Place (separated bike lane); and Marsden Street (separated bike lane).	3,349
Camellia to Parramatta CBD via Grand Avenue	Grand Avenue (separated bike lane); Grand Avenue North (shared path); Arthur Street (separated bike lane); and George Street (separated bike lane).	4,772

There are some instances, particularly around SOP and Parramatta CBD where there are a number of routes that play regional importance, but are not easily classified in terms of their route name. They aid the permeability of the network and are still therefore of regional importance. Every section of the network that is classified as a regional route is included in Table 5. In some instances, the same section will necessarily appear in different routes.

Table 4: Delivery Priority

Priority One	Priority Two	Priority Three	Priority Four
North Rocks to Parramatta CBD	Toongabbie to Parramatta CBD	Kleins Road regional connector	Camellia to Parramatta CBD via Grand Avenue
Epping to Macquarie University and Macquarie Park	Parramatta River to Granville	Lake Parramatta to Parramatta CBD	Sydney Olympic Park Regional Routes (partial)
Melrose Park to Parramatta CBD via Ermington and WSU	Camellia to Duck Creek	M2 Alternative route (partial)	Complementary local networks
Carlingford to Epping	Carlingford to Sydney Olympic Park via Ermington	Carlingford to UWS (partial)	
Duck River	Rouse Hill to Parramatta CBD via Westmead (partial)	Carlingford to Parramatta CBD (partial)	
Carlingford Light Rail	Parramatta Valley Cycleway (extension)	Northmead to Parramatta CBD (partial, northern section)	
Parramatta CBD Regional Routes	M4 shared path (partial)	Wentworth Point to Parramatta CBD via Parramatta River (partial)	
George Street regional connector	Toongabbie to Northmead (partial)	Northmead to Epping (partial)	
Marsden Street regional connector	Harris Park to Parramatta CBD (partial)	Northmead to Carlingford (partial)	
Rouse Hill to Parramatta CBD via Westmead (partial)	M2 Alternative route (partial)	Complementary local networks	
Parramatta Valley Cycleway (separation)	Sydney Olympic Park Regional Routes (partial)		

Priority One	Priority Two	Priority Three	Priority Four
M4 shared path (partial)	Carlingford to UWS (partial)		
Toongabbie to Northmead (partial)	Carlingford to Parramatta CBD (partial)		
Harris Park to Parramatta CBD (partial)	Wentworth Point to Parramatta CBD via Parramatta River (partial)		
M2 Alternative route (partial)	Northmead to Epping (partial)		
Sydney Olympic Park Regional Routes (partial)	Northmead to Carlingford (partial)		
Carlingford to UWS (partial)	Complementary local networks		
Carlingford to Parramatta CBD (partial)			
Northmead to Parramatta CBD (partial, southern section)			
Complementary local networks			

4.2 FUNDING

COSTS AND BENEFITS OF THE PROPOSED NETWORK

The network consists of 270km, of which 216km is upgraded or proposed bicycle infrastructure, while the remaining 54km is existing, satisfactory quality bicycle infrastructure.

The price per linear kilometre for the different typologies is shown in Table 5. It should be noted that these are estimates and there is expected to be many instances in which the actual cost for particular sections are likely to be substantially less than those identified in Table 5. There will also be some instances in which certain challenges may mean the actual cost per km may be higher than those shown in Table 5. The costs below take intersection and traffic light modifications into account, which can have a significant impact on cost. Building a connected bicycle network will improve the resilience of the transport system, and help protect and enhance Parramatta's liveability.

Table 5: Estimated Infrastructure Costs

Route Typology	$ per linear Km
5m wide (off road, segregated walking and cycling)	$4,000,000
5m wide (off road separated) (upgraded from existing shared path	$2,000,000
3m wide (off road shared path)	$3,000,000
3m wide (off road shared path) Boardwalk	$4,000,000
On Road - Physically Separated	$5,300,000
On Road - painted dedicated bike lane	$500,000
On Road - Mixed Traffic (Sharrows or Advisory Lanes)	$200,000

It is acknowledged that a higher standard of cycling infrastructure will result in higher operating costs for Council, especially for maintenance, and this will need to be factored into any budgeting. There are a number of current and potential funding options available for the construction of bicycle infrastructure. Many of the bicycle infrastructure options contained in this Draft Bike Plan are unlikely to be financed by local government alone, and substantial portions of the network, particularly along regional routes that include physical separation from motorised traffic will need State and/or Federal Government funding, in addition to potential developer contributions and delivery through development. Additional work completed as part of this Draft Bike Plan included modelling the benefits and costs associated with a 'rapid action' scenario, in which the network was completed with largely separated infrastructure within a five year period.

NSW GOVERNMENT FUNDING PROGRAMS

For the 2016-17 financial year, the NSW Government earmarked $39m for walking and cycling projects across, NSW, with an average of $130,000 per project. Programs financed by the NSW Government[1] for cycling include:

- Connecting Centres Council Partnership program: This can include local bicycle infrastructure projects that connect key destinations as well as projects, such as active travel maps
- Priority Cycleways Program: For projects along routes designated as *Priority Cycleways* within a NSW Government plan. These projects must connect with major trip generators
- Cycling Towns Program: Proposals that contribute to the completion of a safe network of cycleways within a 5km catchment of town centres can be considered under the Cycling Towns Program: it is important that councils demonstrate cycling promotion activities that complete the infrastructure works

DEVELOPMENT CONTRIBUTIONS

Section 94 of the *Environmental Planning and Assessment Act 1979* provides an opportunity for Parramatta to charge a development levy to provide funds for public amenities and services. City of Parramatta, due to the recent merger, has multiple different Section 94 levies, based on which municipality an area was previously in.

The *Parramatta City Council Section 94A Development Contributions Plan* charges a sliding levy of up to 1% on developments, based on total cost of the development, although there are some exceptions. A total of $7,800,000 is allocated to roads and shared paths, with $2,750,000 dedicated towards upgrading and building shared 'pedestrian and cycleway connections through the LGA to improve walkability and create a network of high quality interconnected public spaces, including possible bridges at Westmead.'

The *Parramatta Civic Improvement Plan (Amendment No. 4)* charges a flat 3% levy on all developments. The plan proposes $169,000,000 in funding for City Centre Projects, and a further $42,000,000 for Parramatta Square Projects. City Centre Projects are divided into public domain projects, and a series of Special City Centre Projects. Of the public domain projects, Section 2.9, Figure 6, shows the middle of the CBD as a 'pedestrian and cycle amenity zone', with a ring road, diverting traffic around the CBD. There is a comprehensive pedestrian network strategy, with a complementary strategic of improving street scapes. Further, there are a few actions which improve the foreshore, and connections to it, including for access to be improved from pedestrians and cyclists from Lennox Bridge/ Church Street, to the north bank and for the Foreshore park (which will include shared paths along the river and a potential new shared bridge crossing the river).

There is scope to better address cycling infrastructure needs by including specific funding commitments to cycling infrastructure, including on-street cycle lanes. Reference should also be made to a preferred cycle plan, giving Council clearer guidance in how to prioritise spending to

1 For more information see http://www.rms.nsw.gov.au/documents/business-industry/partners-and-suppliers/lgr/walking-cycling-program-guidelines.pdf

build a comprehensive, cohesive cycle network in Parramatta.

4.3 MONITORING & EVALUATION

MONITORING METHODS

The following methods of data collection should be considered:

Super Tuesday Counts

Super Tuesday Bike Counts are undertaken by Bicycle Network Victoria in collaboration with municipalities and local volunteers. The project aims to answer two questions:

- How many riders are there?
- Which routes are riders using?

The City of Parramatta should liaise with Bicycle Network Victoria to ensure that newly delivered bicycle routes are covered by the surveys.

Automated Counters

Automated counters can be placed on bicycle routes to measure the level of usage of that route. It is recommended that council use this approach (or undertake manual counts) before and after the implementation of new schemes. This must also include a count along major cordons, so that diversion rates can also be estimated.

Furthermore, intercept surveys should be undertaken to determine the number of people diverting from an existing route to the new bicycle route. The surveys should capture the mode of transport these riders were using before diverting, and the key reasons why they are now cycling.

Bicycle Facilities Audit

Bicycle facility audits conducted every two years, combined with feedback from the public and the local advocacy groups, will provide regular updates on condition, utilisation and provision. These methods can be supplemented from information collated from officers with responsibility for asset management and capital works.

On-Road & Off-Road Audits

The City of Parramatta commissioned formal road safety audits of all on-road and off-road bicycle facilities in 2012. The audits provide an important assessment of the condition of these facilities. Section 5.3 provides recommendations on the continuing use of these audits to monitor the condition of bicycle facilities in Parramatta.

Intercept Surveys

Intercept surveys are useful for capturing data on the performance of site-specific interventions, such as the installation of a new bike path. The number of intercept surveys done needs to be proportional to the budget for the project, as small projects may merit less investigation as this is a more costly process.

Observational Surveys

For selected routes or locations (e.g. where a specific behavioural issue is commonplace) observational surveys should be undertaken to collate both quantitative and qualitative data. The surveys should quantify a behaviour(s) and also attempt to contextualise these observations by examining the impact of the physical environment, and interviewing users of the bicycle facility.

Media Monitoring

Some basic media monitoring of references to key words such as 'Parramatta' and 'Bike Plan', and the negative or positive sentiments linked to the terms will provide information on the positions taken by opinion leaders in the wider community. It is suggested that the terms monitored be aligned to the key themes identified in the community consultation process.

'Test squad' Participant Observations

It is recommended that the City of Parramatta engage with local Bicycle User Groups (BUGs) in the assessment of new bicycle infrastructure. BUG members could ride bicycle routes together with Council officers and:

- Make a note of all barriers encountered
- Rate the surface quality
- Rate adequacy of the route to deal with number of users, including any actual or near conflicts
- Record any other observations

Most Significant Change (MSC)

MSC is a form of participatory monitoring and evaluation. It is participatory because project stakeholders are involved both in deciding the sorts of change to be recorded and in analysing the data. It is a form of monitoring because it can occur throughout the program cycle and provides information to help people manage the program. It contributes to evaluation because it provides data on impact and outcomes that can be used to help assess the performance of the program as a whole. Whilst MSC is a very powerful tool, it is not used as a standalone tool for monitoring and evaluation for accountability purposes. It is best seen as a very powerful supplementary tool for accountability based systems. Unlike conventional approaches to monitoring, the MSC approach does not employ quantitative indicators, and, because of this, is sometimes referred to as 'monitoring without indicators'. MSC is an effective tool for monitoring and evaluating the impact of behavioural programs.

EVALUATION

Three levels of evaluation are proposed for the Draft Bike Plan

Self-Evaluation

Self-evaluation is proposed for small / short projects (e.g. promotional activities and some behavioural programs) that are delivered over a short timeframe (e.g. 1 day to 1 week). It is recommended that this level of evaluation is undertaken on a project-by-project basis.

Participatory Evaluation

This is a form of internal evaluation. The intention is to involve as many people with a direct stake in the work as possible. This may mean project staff and beneficiaries working together on the evaluation. This form of evaluation is recommended where projects are undertaken in collaboration with other external stakeholders, such as TNSW and adjoining local government areas. This level of evaluation would also be undertaken on a project-by-project basis. However, given such projects will involve other agencies, this level of evaluation is expected to occur very infrequently.

Annual Reflection Workshop

The key purpose of the workshop is to enable a review of the Plan performance and impact, and to identify key findings and learnings to inform ongoing or future Bike Plan actions and delivery. Such workshops will include a range of officers

from across the City of Parramatta but should, where possible, also include external stakeholder and the Cycling Reference Group.

The main outcomes of this evaluation process will be a revised annual delivery program.

REPORTING

To report on the Bike Plan outcomes to different stakeholders, at regular intervals throughout the twenty-year timeframe, the following system is recommended:

Project-Level Reporting

For projects undertaken as collaborations with external stakeholders (including bicycle infrastructure, behavioural programs and promotional campaigns), an end of project performance summary report should be produced. These reports can be summarised as news stories and published on the City of Parramatta's website and newsletters to communicate progress with the community.

Plan-Level Reporting

An overall evaluation should be conducted on at least biannually. It is suggested that the project-level outcomes are combined to create a whole of Plan performance report.

Steering Committee Reporting

Quarterly reports should be prepared and issued to the Cycling Reference Group in advance of the quarterly meetings. These reports will summarise: the project-level reports; progress on the delivery of the implementation plan; projects to be delivered in the next quarter, and a budgetary review. Project-level reports can be included in the appendix.

DATA MANAGEMENT

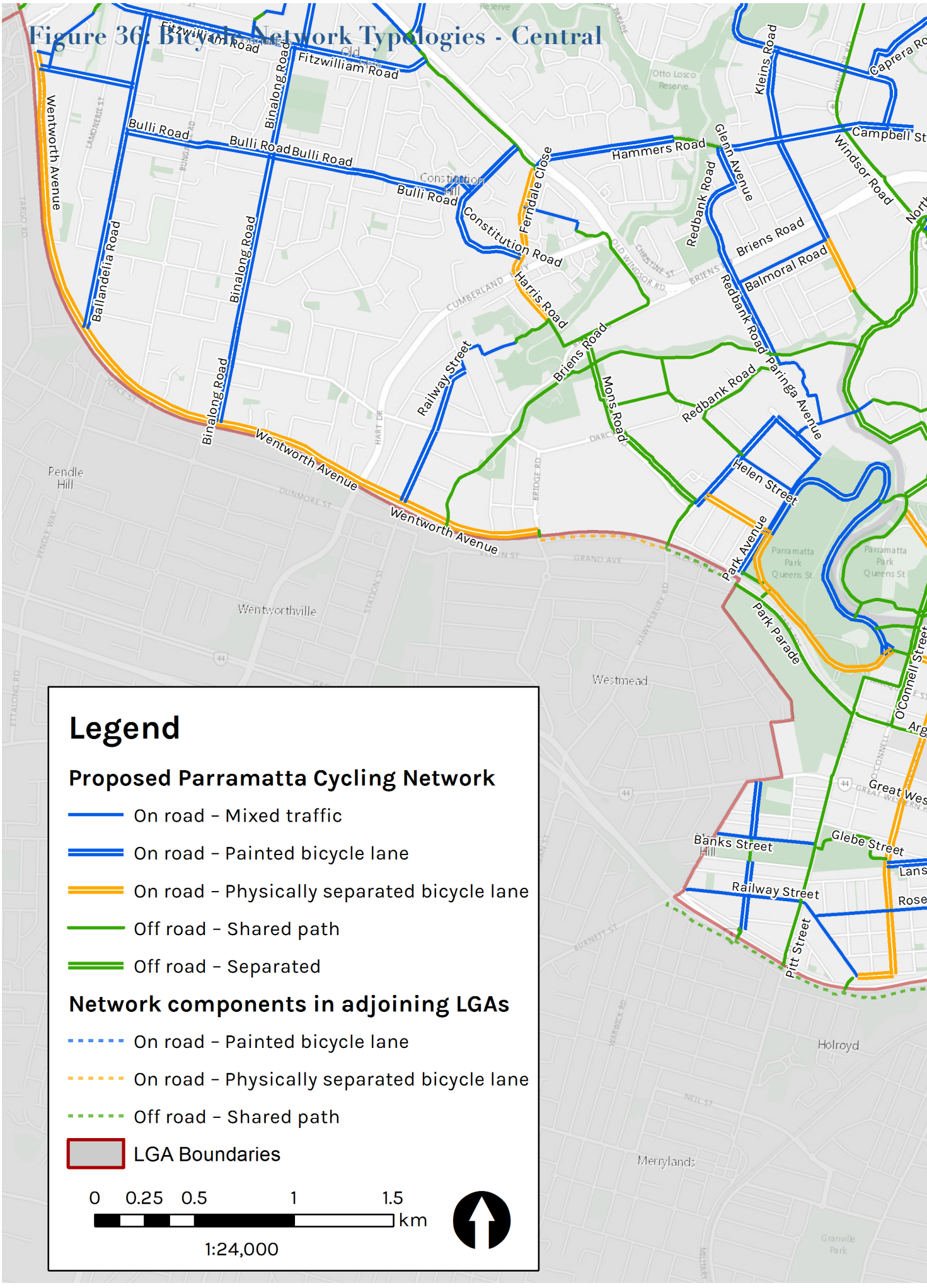
A central database should be created for the systematic storage of data and information relating to the monitoring and evaluation of all projects and the program.

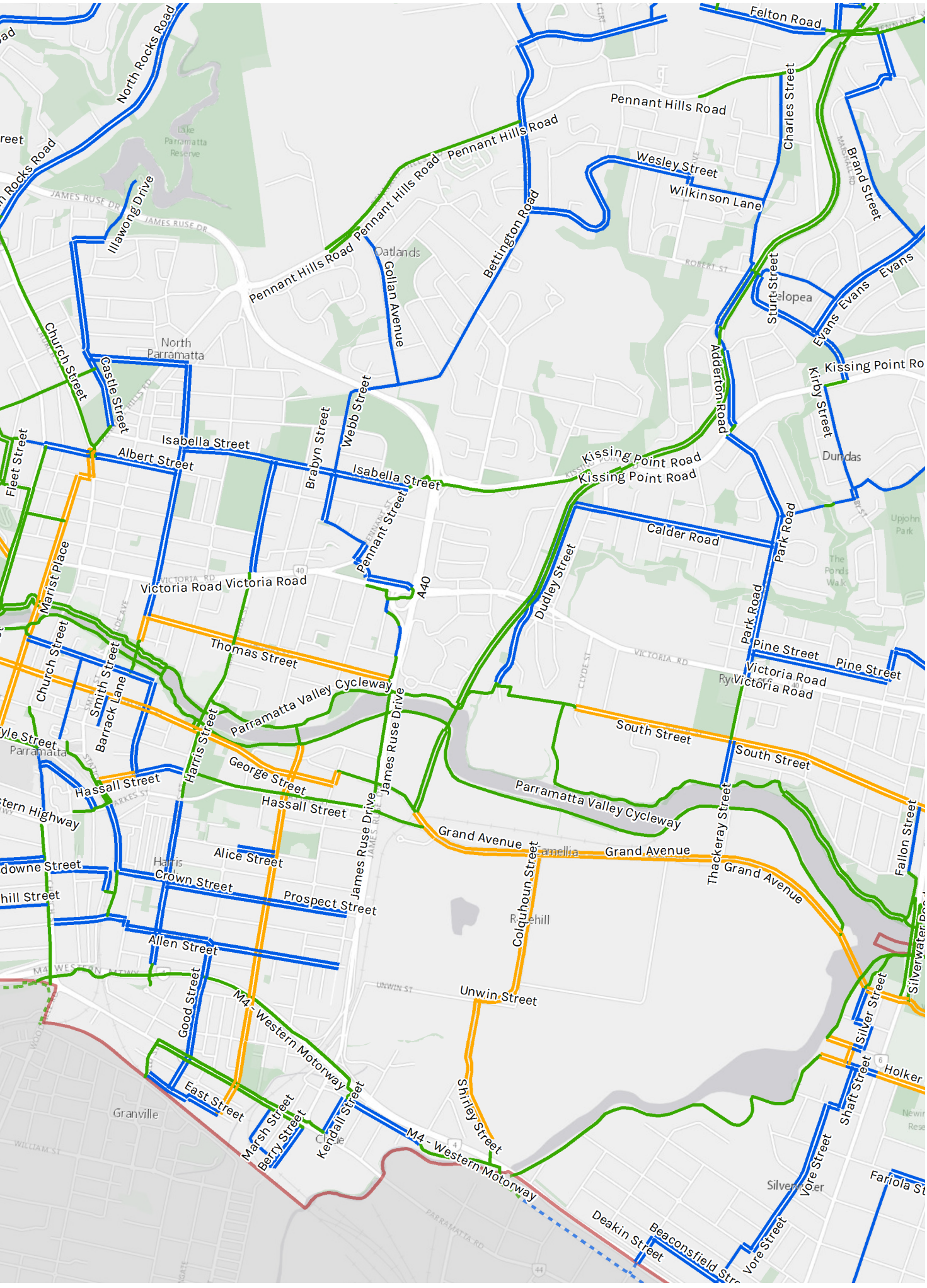
APPENDIX A

BICYCLE NETWORK TYPOLOGY MAPPING

List of maps

Figure 36: Bicycle Network Typologies - Central

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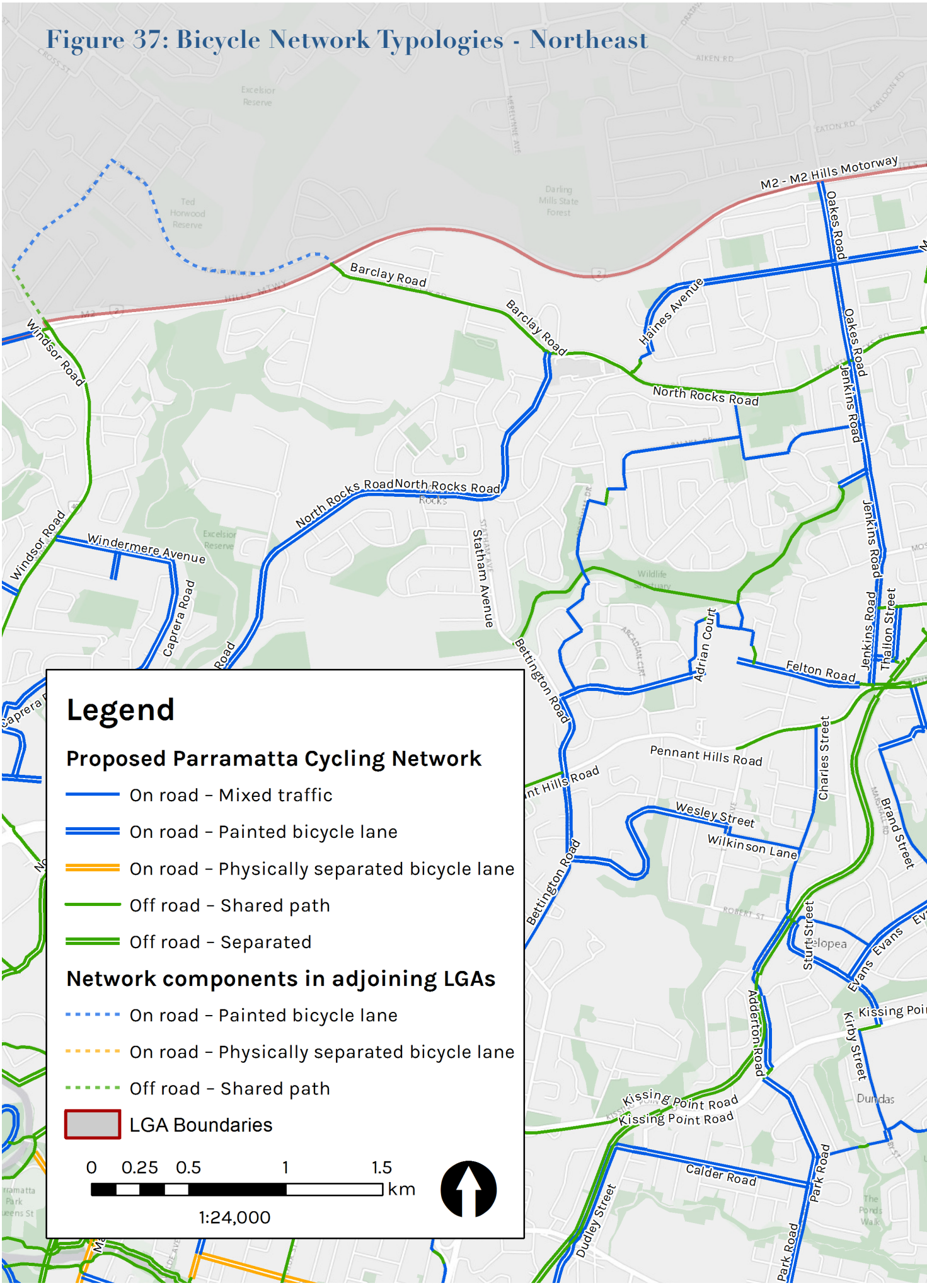
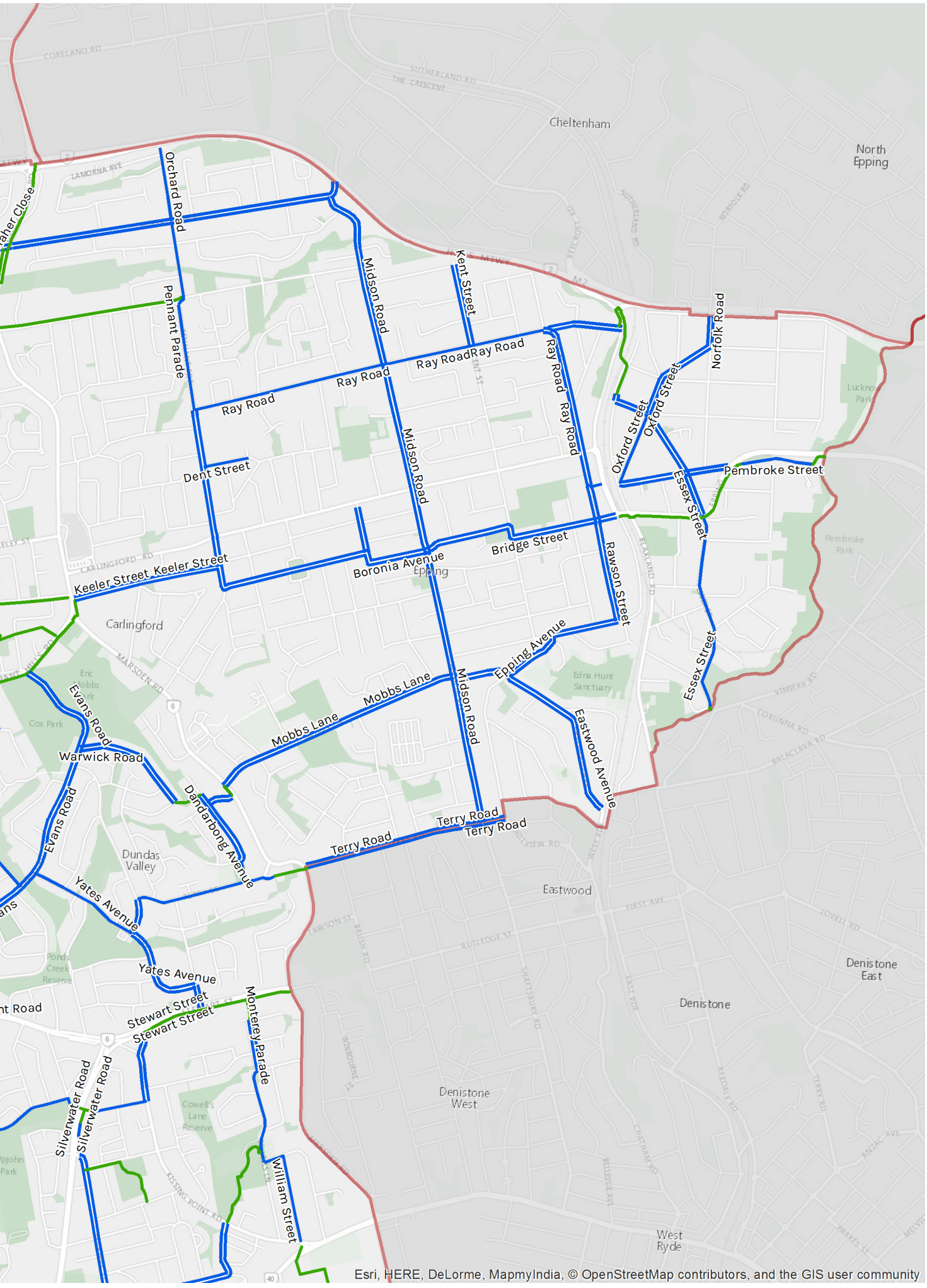
Sturt Street
Evans
Evans
Evans
Illawong Drive
JAMES RUSE DR
JAMES RUSE DR
North Rocks Road
North Rocks Road
Church Street
Castle Street
North Parramatta
Addertton Road
Kissing Point Ro
Kirby Street
Dundas
Webb Street
Brabyn Street
Isabella Street
Albert Street
Isabella Street
Fleet Street
Kissing Point Road
Kissing Point Road
Pennant Street
A40
Calder Road
Park Road
Dudley Street
Victoria Road Victoria Road
Marist Place
Thomas Street
Church Street
Smith Street
Barrack Lane
Parramatta Valley Cycleway
James Ruse Drive
Harris Street
Pine Street
Pine Street
Victoria Road
Victoria Road
South Street
South Street
Parramatta
George Street
Hassall Street
Hassall Street
Parramatta Valley Cycleway
Thackeray Street
Fallon Street
Grand Avenue
Grand Avenue
Grand Avenue
Alice Street
Harris
Crown Street
Prospect Street
James Ruse Drive
Colquhoun Street
Allen Street
Unwin Street
Good Street
M4 - Western Motorway
Silver Street
Holker
Shirley Street
East Street
Granville
Marsh Street
Berry Street
Kendall Street
M4 - Western Motorway
Shaft Street
Vore Street
Vore Street
Deakin Street
Beaconsfield Stre

Figure 37: Bicycle Network Typologies - Northeast

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North Epping
Orchard Road
Midson Road
Kent Street
Pennant Parade
Ray Road
Ray Road
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Pembroke Street
Essex Street
Dent Street
Midson Road
Bridge Street
Boronia Avenue
Epping
Keeler Street
Keeler Street
Rawson Street
Carlingford
Epping Avenue
Essex Street
Mobbs Lane
Mobbs Lane
Midson Road
Eastwood Avenue
Evans Road
Warwick Road
Dandaroo Avenue
Terry Road
Terry Road
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Evans Road
Dundas Valley
Yates Avenue
Eastwood
Yates Avenue
Denistone East
Denistone
Stewart Street
Stewart Street
Monterey Parade
Silverwater Road
Silverwater Road
Denistone West
William Street
West Ryde
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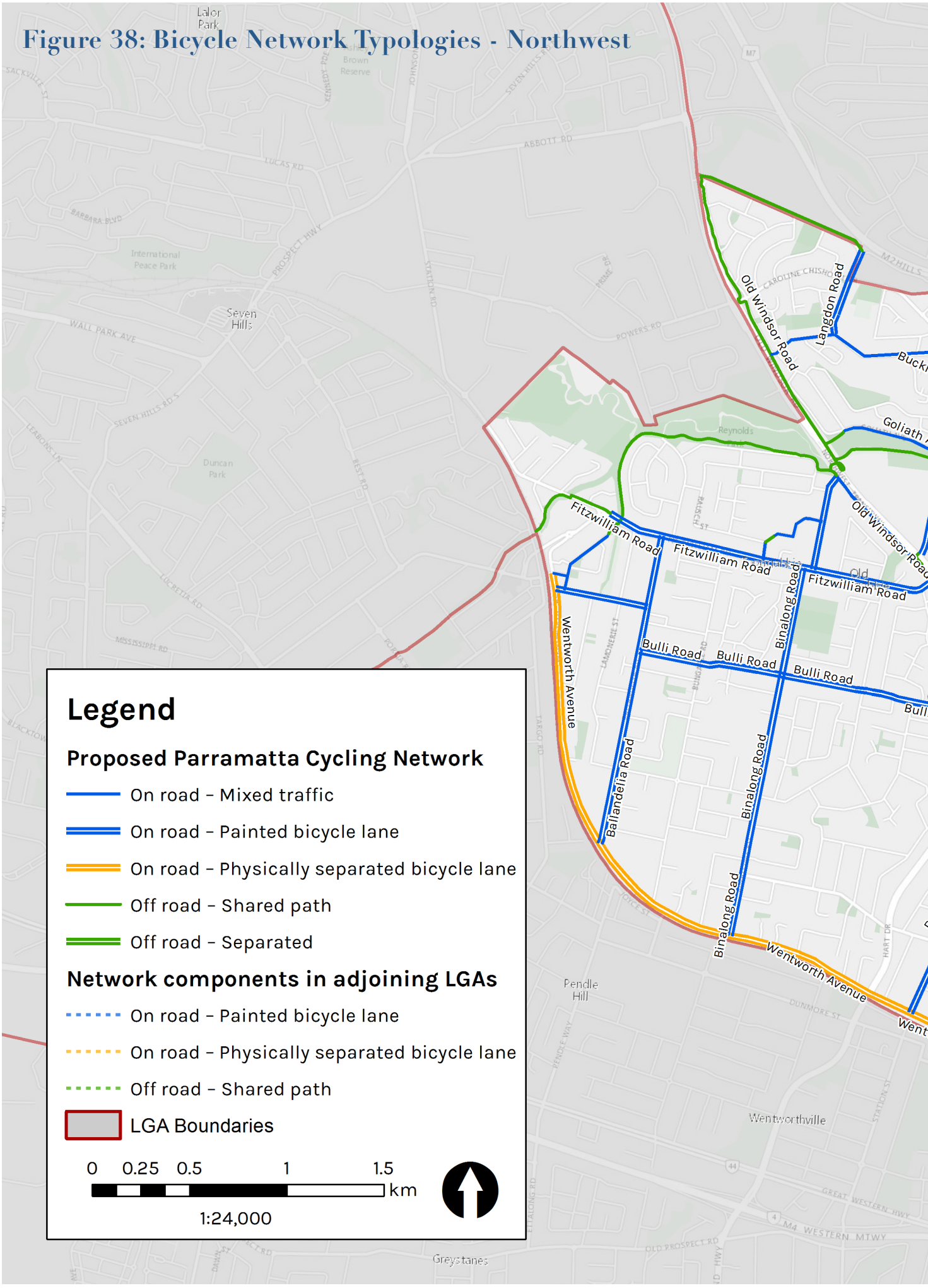
Figure 38: Bicycle Network Typologies - Northwest



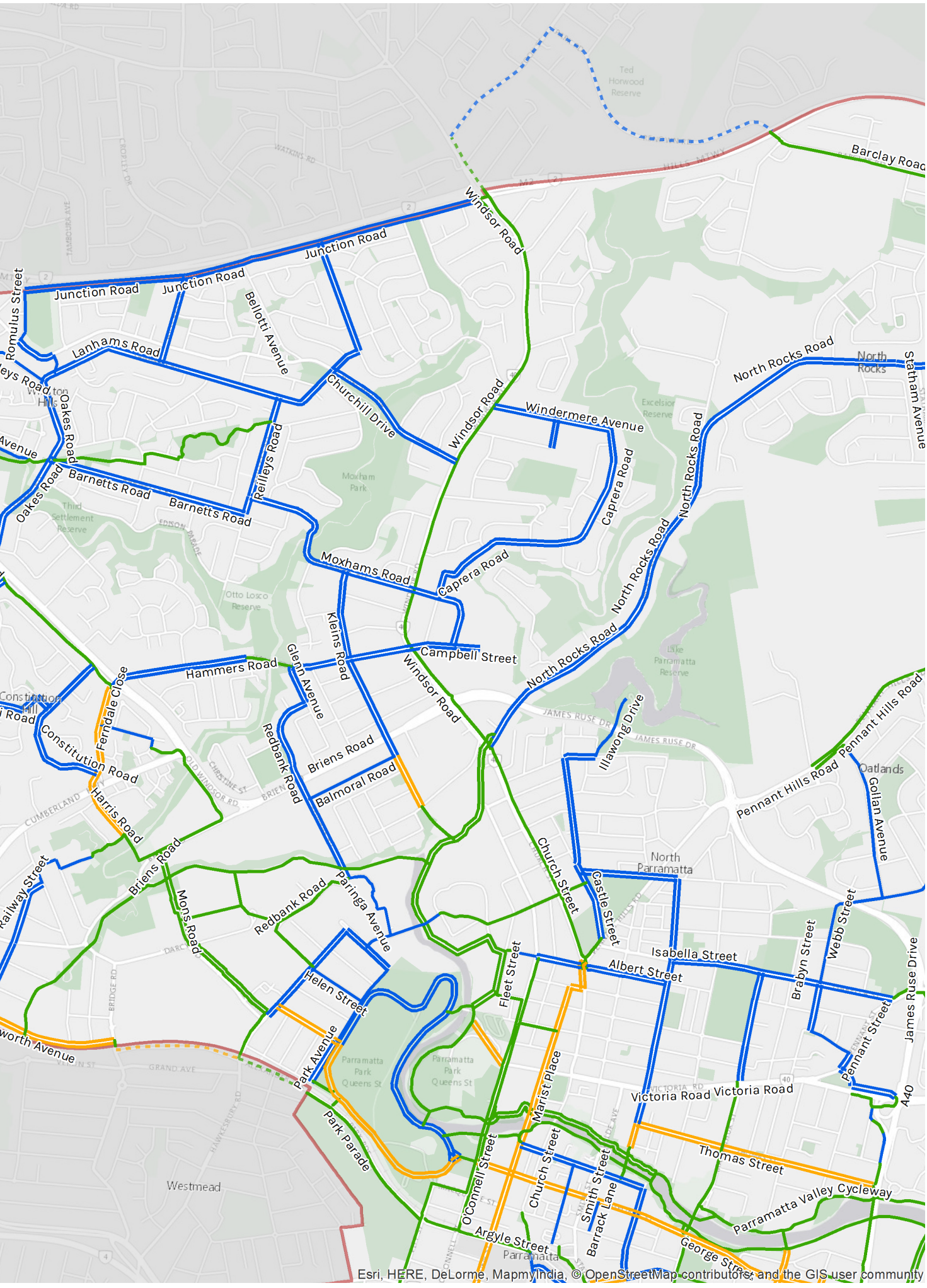

Barclay Road
Windsor Road
Junction Road
Junction Road
Junction Road
Romulus Street
Bellotti Avenue
Lanhams Road
Churchill Drive
Windsor Road
Windermere Avenue
North Rocks Road
North Rocks
Statham Avenue
Caprera Road
North Rocks Road
Oakes Road
Oakes Road
Barnetts Road
Barnetts Road
Reilleys Road
Moxham Park
Excelsior Reserve
Third Settlement Reserve
Moxhams Road
Caprera Road
Otto Losco Reserve
Kleins Road
Campbell Street
North Rocks Road
Hammers Road
Glenn Avenue
Windsor Road
Lake Parramatta Reserve
Ferndale Close
Constitution Road
Redbank Road
Briens Road
Balmoral Road
Illawong Drive
Pennant Hills Road
Pennant Hills Road
Oatlands
Gollan Avenue
Harris Road
Briens Road
Church Street
North Parramatta
Castle Street
Railway Street
Mons Road
Redbank Road
Paringa Avenue
Webb Street
Brabyn Street
Isabella Street
Albert Street
Fleet Street
Helen Street
James Ruse Drive
Pennant Street
Park Avenue
Parramatta Park Queens St
Marist Place
Victoria Road
Victoria Road
A40
Park Parade
Thomas Street
O'Connell Street
Church Street
Smith Street
Barrack Lane
Parramatta Valley Cycleway
Argyle Street
Parramatta
George Street
Westmead
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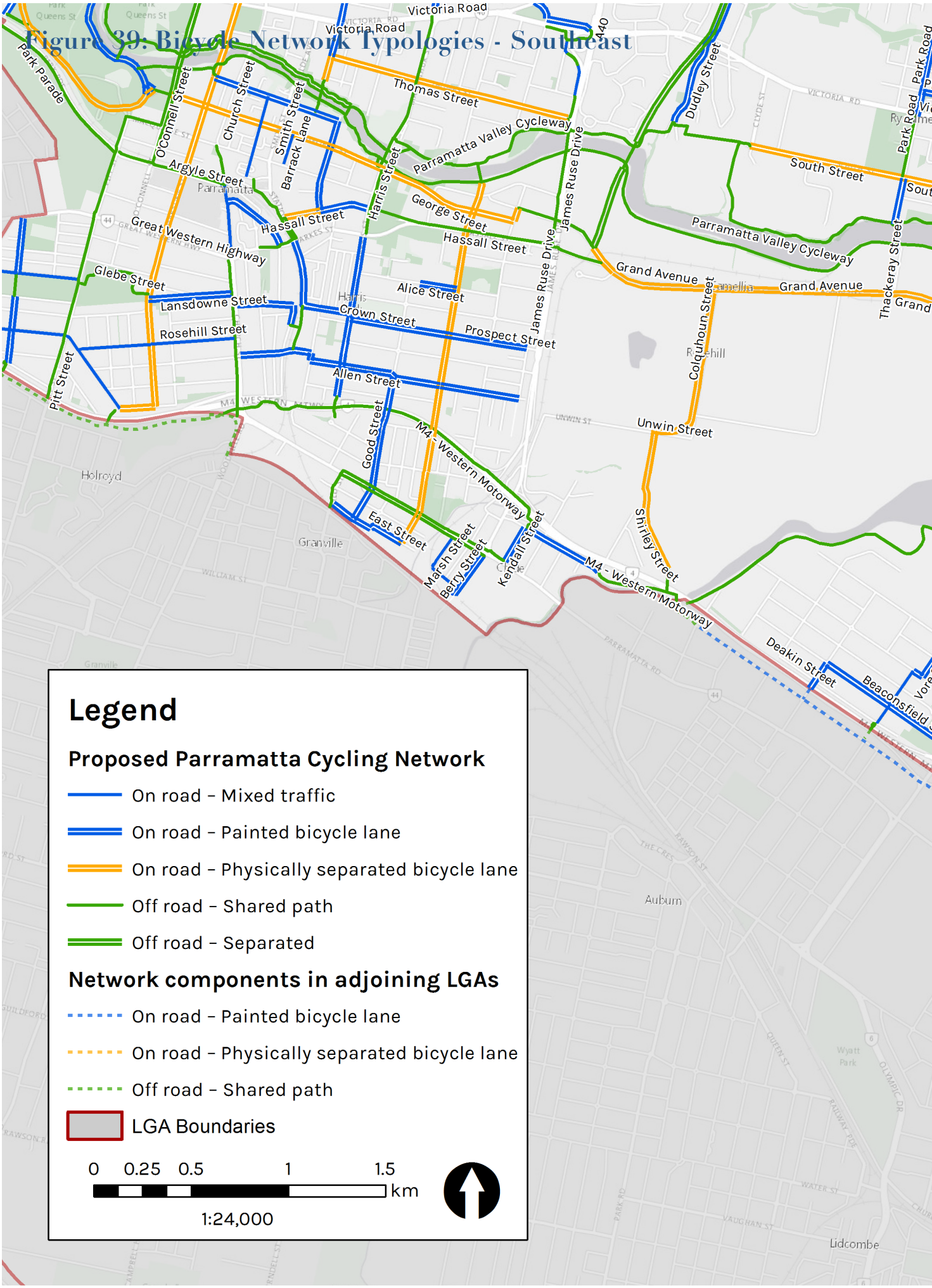
Figure 39: Bicycle Network Typologies - Southeast



Legend

Proposed Parramatta Cycling Network

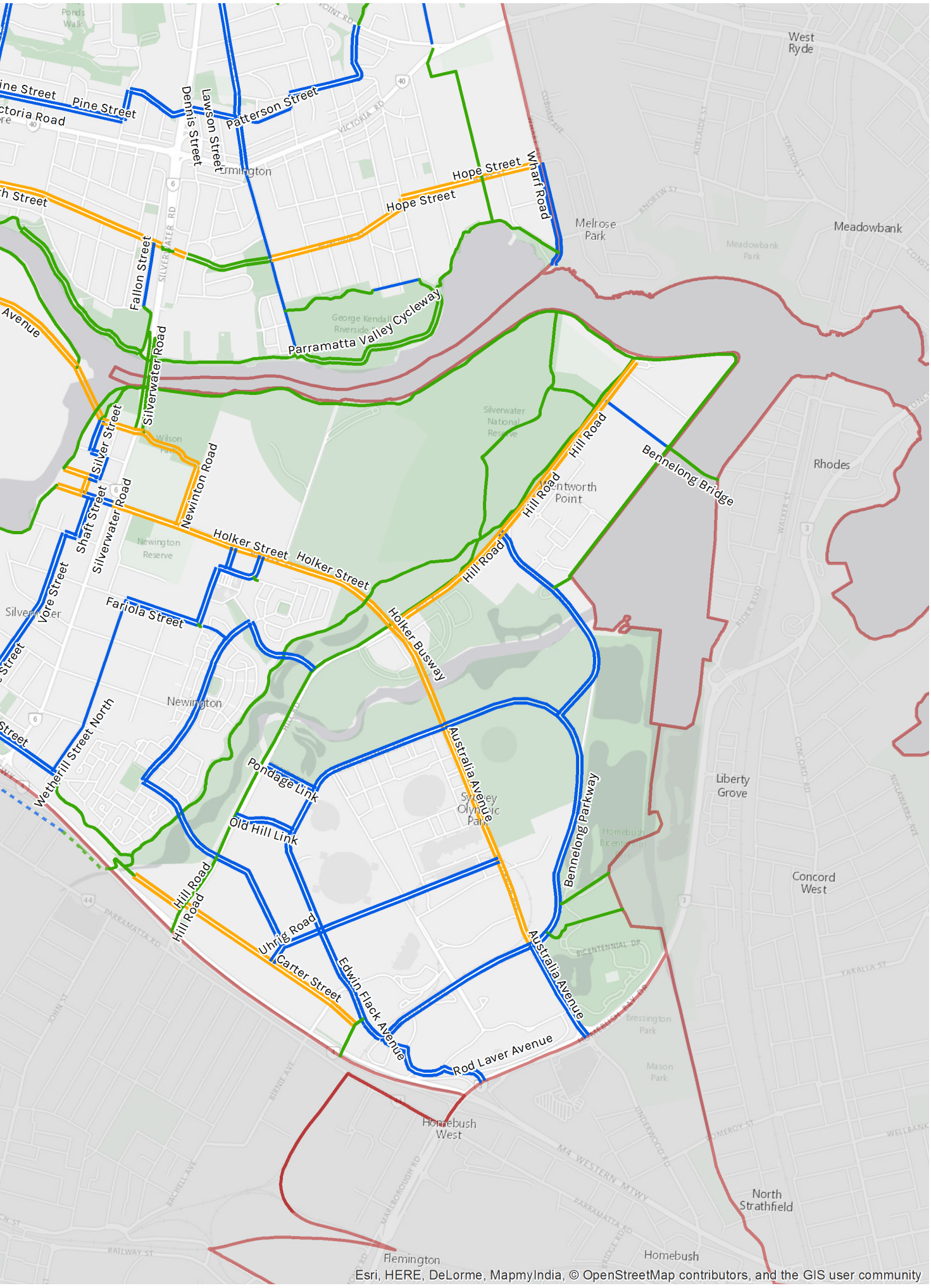
- On road – Mixed traffic
- On road – Painted bicycle lane
- On road – Physically separated bicycle lane
- Off road – Shared path
- Off road – Separated

Network components in adjoining LGAs

- On road – Painted bicycle lane
- On road – Physically separated bicycle lane
- Off road – Shared path
- LGA Boundaries

0 0.25 0.5 1 1.5 km

1:24,000


Pine Street
Victoria Road
Dennis Street
Lawson Street
Patterson Street
Ermington
Hope Street
Wharf Road
West Ryde
Melrose Park
Meadowbank
Fallon Street
Parramatta Valley Cycleway
Silverwater Road
Silver Street
Newington Road
Shaft Street
Holker Street
Vore Street
Fariola Street
Newington
Wetherill Street North
Pondage Link
Old Hill Link
Hill Road
Uhrig Road
Carter Street
Edwin Flack Avenue
Holker Busway
Australia Avenue
Bennelong Parkway
Bennelong Bridge
Rhodes
Liberty Grove
Concord West
Rod Laver Avenue
Homebush West
North Strathfield
Flemington
Homebush
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