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Ku-ring-gai Council

Ku-ring-gai Bike Plan

Final Report

23nd November 2012

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Contents

Table Index

Figure Index

Appendices

1. Introduction

1.1 The Commission

GHD Pty Ltd (GHD) was engaged by Ku-ring-gai Council to undertake the *Ku-ring-gai Bike Plan*. This report documents the outcomes of the study.

1.2 Study Background

Ku-ring-gai Local Government Area (LGA) is located 16 kilometres north of the Sydney central business district (CBD). The LGA is comprised of a number of isolated town centre connected by continuous urban development. Council has a long term focus on improving 'green' transport options, including bicycle facilities, to provide more transport choices for the community. Council is seeking to update the original adopted *Ku-ring-gai Bicycle Transport Plan* (Ku-ring-gai Council, 1995) and build on the adopted *Integrated Transport Strategy* (Arup, 2011).

This study forms the next step in providing new cycling facilities across Ku-ring-gai.

1.3 Why Promote Cycling?

Active transport, including walking and cycling, have a significant role in transport in Australia including providing Health, Environmental and Economic benefits. Key reasons why it is important to promote cycling include:

- Active transport provides health benefits and encourages a more active lifestyle;
- Walking and cycling provide an opportunity to reduce rising traffic congestion;
- Active transport modes provide environmental benefits including reducing greenhouse gas and noise emissions of transport; and
- Economic benefits of reduced investment in road infrastructure and maintenance.

1.4 Scope

The scope of this study is to provide Ku-ring-gai Council with a local-level understanding of:

- The existing cycling network across the entire LGA;
- The key issues of concern with regard to existing cycling activities, safety and demographics;
- Recommendations of potential improvements to the existing cycle network infrastructure, catering for various user groups; and
- Recommendations of behavioural change strategies to encourage an increase in cycling in Ku-ring-gai.

1.5 Objectives of the Study

The objectives of the study are to review the current cyclist needs in Ku-ring-gai and to provide a consistent standard of facilities for cyclists within the LGA. Through the implementation of the Bike Plan,

it is hoped that cyclist activity will increase and thereby improve the amenity for all local residents and visitors to Ku-ring-gai.

Cycling is also important from a sustainability perspective as it is a viable alternative to the use of private cars or public transport, and are emission free forms of getting from 'A' to 'B'. With walking, cycling is the only readily available mode of transport that produces no emissions. When considered in conjunction with the low cost of walking and cycling and the health benefits, there are several positive impacts.

The specific objectives for the Bicycle Plan are to:

1. Provide an overarching strategy for provision of cycle facilities within the LGA;
2. Increase use of bicycles within the community;
3. Encourage alternative methods of transport;
4. Improve community health and provide safer routes to school;
5. Reduce the number of missing links and severance within the existing bicycle network;
6. Reduce the number of bicycle crashes;
7. Improve connectivity of the cycle network with other transport modes, primarily bus, train and pedestrians; and
8. Complement existing and planned cycleways.

This study has focused upon reviewing the existing and proposed bicycle network with the aim of extending the existing network of bicycle facilities. As part of this report it is recommended that Ku-ring-gai Council develop a program for the maintenance of existing facilities. This study therefore aims to add greatest value to Council's strategies and works program by identifying the gaps in existing networks and extending the networks where appropriate.

Recreational routes have not been considered as part of this study as these are covered in Council's *Unstructured Recreation Strategy* (Ku-ring-gai Council, 2010).

1.6 The Study Area

Ku-ring-gai is located to the north of the Sydney metropolitan area, approximately 16 kilometres from the Sydney CBD, and has an estimated resident population of approximately 116,000 (2011)[1] based on preliminary information from the Australian Bureau of Statistics. Ku-ring-gai is predominantly an urban area, with six town centres. The LGA encompasses a land area of approximately 86 square kilometres, of which the vast majority is zoned for residential use.

The location of the Ku-ring-gai LGA and local town centres are shown in Figure 1.

[1] http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3218.02010-11

Figure 1 Study Area

1.7 Report Structure

This report details background information, site observations, recommended treatments and the likely cost of such treatments. Each are dealt with in detail in various sections of the report.

- Section 2 **Background Information**: provides a review of background information including existing local, state and national policy documents;
- Section 3 **Project Approach and Considerations**: provides some introductory guidance on planning for cyclists and describes the methodology used for identifying cyclist needs and an assessment of crash data;
- Section 4 **Consultation**: describes the consultation process undertaken and consultation outcomes for this project;
- Section 5 **Existing Facilities Audit**: outlines the existing status of cycling conditions and facilities in Ku-ring-gai;
- Section 6 **Proposed Cycle Improvements**: provides details of the proposed improvements to cycling facilities;
- Section 7 **Prioritisation and Funding**: prioritises the identified works and investigates funding sources for bicycle improvements;
- Section 8 **Supporting a Culture of Cycling**: outlines the recommended cycling promotion and behaviour change programmes to encourage cycling in Ku-ring-gai;
- Section 9 **Further Considerations**: outlines further considerations for bicycle users, such as maintenance, potential monitoring criteria, bicycle parking and other measures to increase cycle use in Ku-ring-gai; and
- Section 10 **Summary**: provides a short summary of the Bicycle Plan.

2. Background Information

2.1 Existing Travel Characteristics

Travel within the Ku-ring-gai LGA is currently dominated by the use of private cars. This largely as a result of limited public transport coverage, adverse topography, large distances between origins and destinations in the LGA and a large proportion of residents working outside of the LGA.

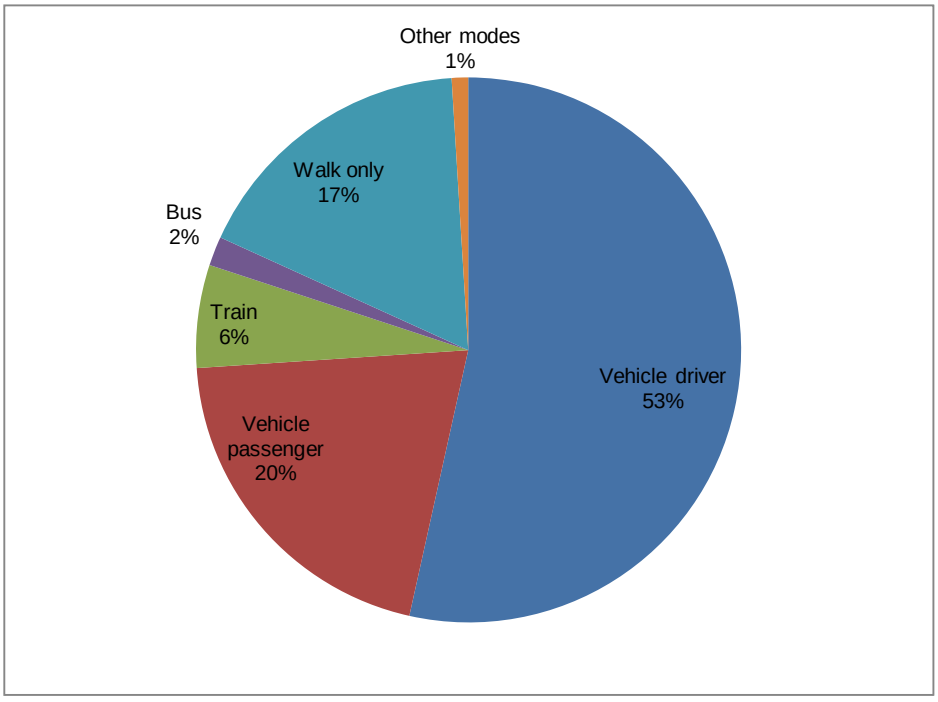
2.1.1 Household Travel Survey

Data from the *2007 Household Travel Survey* (HTS) was obtained from the Bureau of Transport Statistics (BTS) and was assessed for Ku-ring-gai LGA. The data provides estimates for journeys made on an average weekday. Figure 2 provides a summary of the travel mode shares in Ku-ring-gai.

The data indicates that 17% of trips are undertaken by walking only, compared to the Sydney-wide average of 20%. Journeys made by bicycle are included within the 'Other modes' category which accounted for 1% of journeys in Ku-ring-gai.

Seventy-three percent of travel is either via vehicle drivers or passengers.

Figure 2 HTS Data for Ku-ring-gai

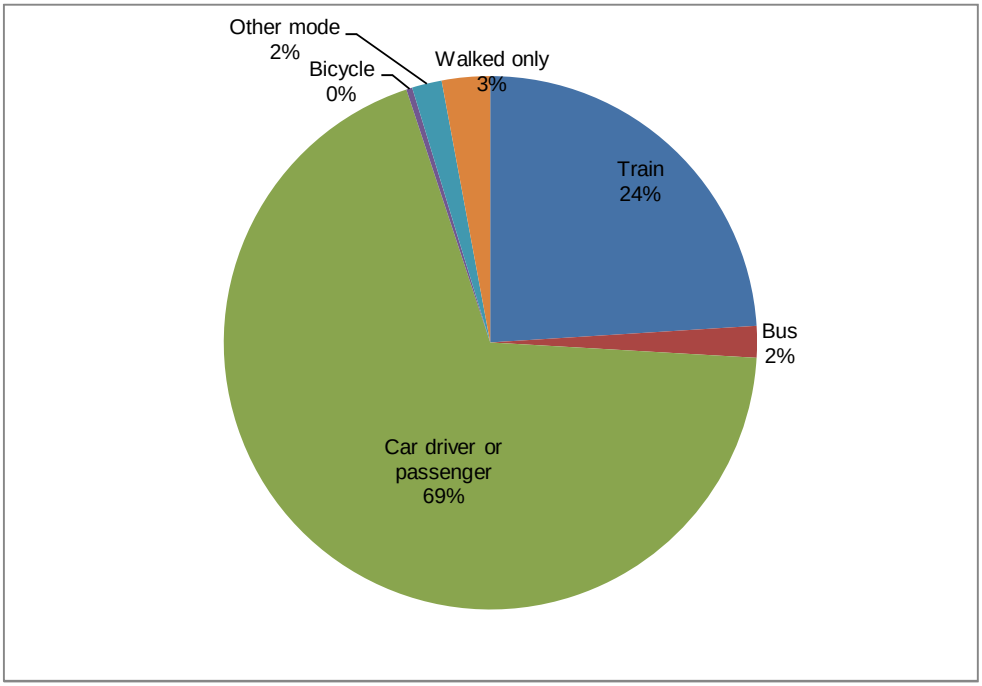


Source: 2007 Household Travel Survey (HTS), Transport Data Centre (TDC), 2009.

2.1.2 Journey to Work Data

Journey to Work (JTW) data from the *2006 TDC JTW Summary Tables by LGA* from BTS (2008), was assessed for the Ku-ring-gai LGA. A summary of the data can be seen in Figure 3.

Figure 3 JTW Data for Ku-ring-gai



Source: 2006 TDCJTW Summary Tables by Local Government Area, TDC, 2008.

Data for Ku-ring-gai indicates a high mode share for private vehicle travel, with 69% of all journeys to work taking place by motor vehicle. Walking and bicycle journeys accounted for 3% and 0.3% respectively. This is lower than the Sydney-wide averages of 5% and 1% for these respective modes.

2.1.3 Bicycle Crash Data Review

Cyclist crash data for the Ku-ring-gai LGA for the years 2005 to 2010 sourced from the NSW Roads and Maritime Services (RMS) was obtained from Council, and is illustrated graphically in Figure 4 and summarised in Table 1. The crash records indicate that there were 70 reported crashes involving cyclists over this period. Each of these crashes resulted in at least one injury, with one recorded crash resulting in the fatality of an individual.

Figure 4 Summary of Crashes Involving Cyclists

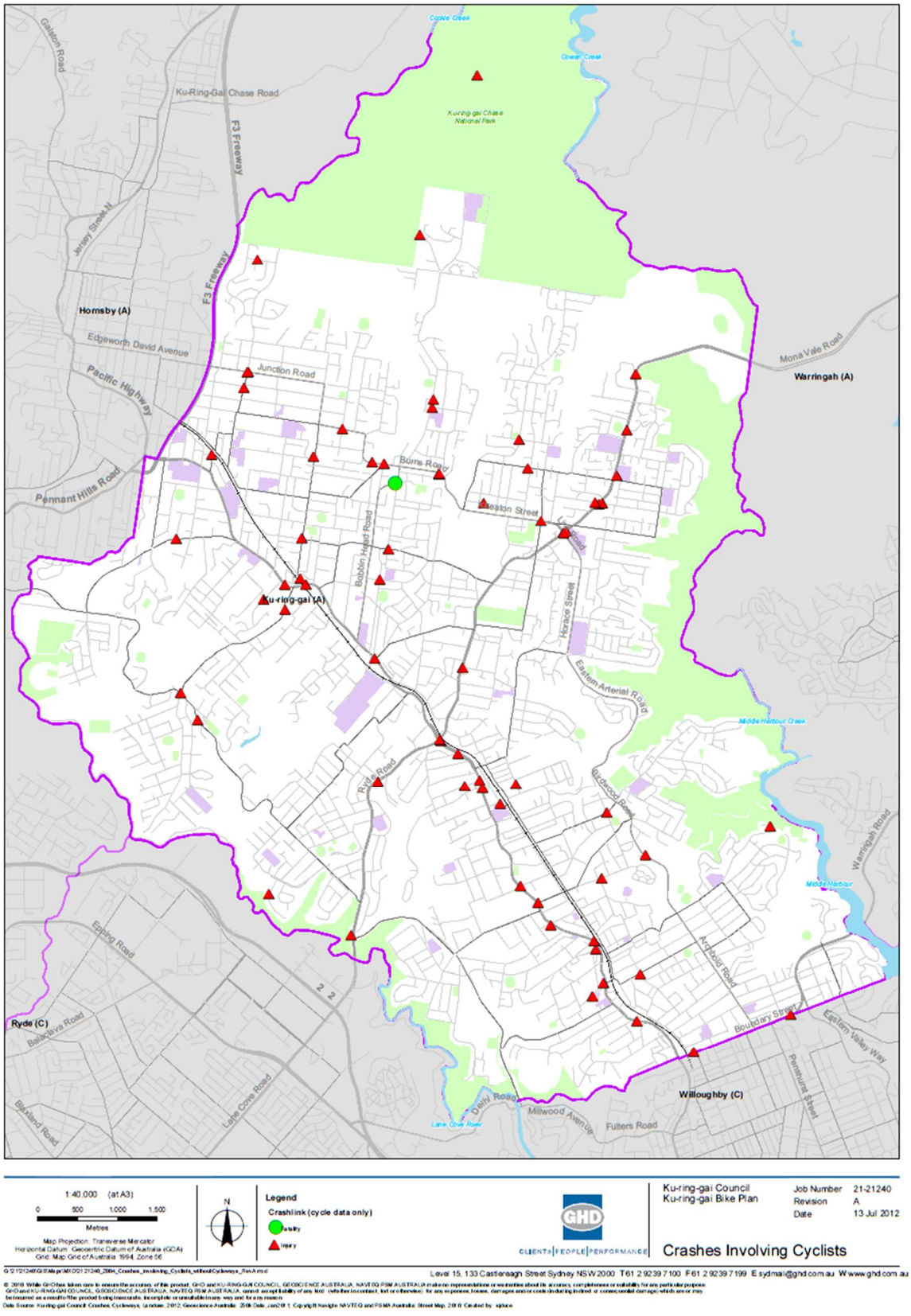


Table 1 Recorded Crashes Involving Cyclists in Ku-ring-gai LGA by Suburb (2005 – 2010)

Year	Cyclists Injuries	Cyclist Fatalities
EAST LINDFIELD	1 (1%)	0
GORDON	8 (11%)	0
KILLARA	5 (7%)	0
LINDFIELD	6 (9%)	0
NORTH TURRAMURRA	4 (6%)	0
PYMBLE	5 (7%)	0
ROSEVILLE	3 (4%)	0
SOUTH TURRAMURRA	1 (1%)	0
ST IVES	13 (19%)	0
TURRAMURRA	14 (20)	1 (1%)
WAHROONGA	7 (10%)	0
WEST PYMBLE	2 (3%)	0
TOTAL	69 (99%)	1 (1%)

Source: Ku-ring-gai Council (from RMS).

An analysis of the data in Table 1 and Figure 4 revealed the following general trends:

- 99% of crashes resulted in an injury, with one cycle crash resulting in a fatality; and
- 20% of crashes occurred in the suburb of Turramurra, 19% in St Ives, and 12% in Gordon. The remaining suburbs accounted for 47% of bicycle crashes.

A more detailed analysis of crash trends indicated the following:

- 61% of crashes (43) took place at intersections, with the remaining 39% (27) taking place at midblock locations;
- 89% of crashes (62) took place during daylight hours;
- 21% of crashes (15) took place along the Pacific Highway, with a further 14% (10) taking place along Mona Vale Road or at intersections with Mona Vale Road; and
- The only 'blackspot' (3 or more crashes in a 5-year period) for cyclists indicated by the data is the Mona Vale Road/Douglas Road intersection.

In addition, an investigation into Road User Movement (RUM) codes from the crash data revealed that 59% of bicycle crashes (41) could be attributed to one vehicle crossing or turning into the path of another. This suggests that there is a significant issue with bicycle visibility in terms of their visual and aural presence when other vehicles are present.

Cyclist safety at intersections was also noted to be a problem, with bicycle visibility and the awareness of cyclists by other vehicles likely to be an issue.

It should be noted that the crash data presented is based on NSW Police reports, which general under-represent the incidence of cyclist related crashes. This is due to the fact that many minor cyclist incidents do not result in tow-away crashes where police are called and the incident therefore goes unrecorded.

2.1.4 Vehicle Crash Data Review

A high level assessment was undertaken of vehicle crash data for the Ku-ring-gai LGA for the years 2005 to 2010, based on the RMS crash data obtained from Council.

The following key points were noted from the assessment of this data:

- Over the 5-year period, for which data was reviewed, 3,393 crashes took place in the Ku-ring-gai LGA:
  - 49% of crashes (1,666) took place on state roads (Pacific Highway, Mona Vale Road & Ryde Road);
  - 23% of crashes (764) took place on regional roads (Bobbin Head Road, Kissing Point Road, Burns Road etc.);
  - 28% of crashes (963) took place on Council administered roads and
- 51% of crashes (1,733) took place at intersections.

Whilst the majority of crashes in the LGA were noted take place on the higher order state and regional 'collector' roads, a significant numbers of crashes take place on the local Council road network. Crashes on the Council road network were noted on a number of existing and proposed cycle routes, which may indicate underlying road safety issues which exist in the network.

2.2 National, State and Local Reports and Strategies

The initial stages of this study included a document collation and review exercise, in order understand guidelines and outcomes from previous strategies and studies. The review of such studies serves two purposes:

- To ensure the Ku-ring-gai Bike Plan aligns with regional, state and national policy directions in relation to the development of not only bike plans but also the wider context of transport and urban planning; and
- To help the study team identify any deficiencies within the current network and strategy that may hinder its success.

These should ensure that the bike network succeeds in so far as it encourages and supports cycling activity within, to and from the region.

A brief summary of key points from existing reports has been provided below. These summaries are intended to be used a reference points throughout the project to ensure the bike plan remains focused on the strategic directions and addresses key deficiencies within the network.

2.2.1 National

National Cycling Strategy 2011-16 (AUSTROADS, 2010)

The strategy outlines an aspiration for step change in the future attitude to cycling. The strategy believes that the increased use of bicycles could dramatically increase the health benefits and therefore quality of life of many Australians. The benefits of cycling do not stop at personal health, they also include:

- Reduction in transport costs; and
- Reduction in road congestion leading to a cleaner environment.

Key statistics quoted from the Australian Bureau of Statistics show a decline in individuals using cycling a mode of transport to either work of study, which is why the strategy has outlined cycling promotion as a key priority of the strategy. It states that in conjunction with the promotion of cycling as a safe and viable method of transport the improvement of connectivity and end-of-route facilities should encourage a growth in regular cycling.

2.2.2 Regional

NSW Bike Plan (NSW Government, 2010)

The plan sets out an objective that by 2016, 5% of all journeys under 10 kilometres will be by bike. It commits $158 million over 10 years to fill gaps in Sydney's network of cycleways. This plan complements and builds on the *Metropolitan Transport Plan 2010* by looking at methods of implementation and delivery. The plan focuses on the need for education to support the development of such a network such as weekly cycling and ride to school groups. The plan emphasises the need of connectively not only to key community facilities but also within the network.

The plan indicates a number of strategic routes passing through the Ku-ring-gai LGA. These include routes running on or parallel to the following roads:

- The Pacific Highway;
- Boundary Street/Babbage Road/Warringah Road;
- Kissing Point Road; and
- Mona Vale Road.

Metropolitan Plan for Sydney 2036 (NSW Government, 2010)

The *Metropolitan Plan* builds on the *Metropolitan Strategy* (NSW Government, 2005) 'City of Cities' approach and the *Metropolitan Transport Plan* (NSW Government, 2010) which focus on transforming Sydney from a single-centred city to a more connected, multi-centred city.

For the first time the Plan includes an active transport target to raise the mode share of bicycle trips in the greater Sydney region at a local and district level to 5% by 2016 (currently at 1%).

The Plan itself does not outline any specific plans for cycleway development in Ku-ring-gai. However it does identify the 'missing links' identified in the NSW Bike Plan (2010) as a priority for action.

North Subregion – Draft Subregional Strategy (NSW Department of Planning, 2007)

The draft strategy has been developed in part as an aid to local governments to help inform and guide them in the development of Local Environmental Plans (LEPs). The subregion incorporates Ku-ring-gai.

It sets out a number of key strategic directions for the North Subregion: These key directions are:

- Ensuring better access to a varied choice of housing;
- Strengthen Hornsby as the major centre in the North subregion;
- Enhance local centres in the subregion;
- Improve accessibility via public transport to, from and within the subregion; and
- Manage rural and resource lands by managing rural based industries.

The transport chapter contains a number of transport strategies including the desire to influence travel choices and encourage more travel by sustainable travel modes.

The strategy identifies that the active transport mode shares are lower that Sydney-wide averages and there is potential to encourage a shirt by improving of local and regional walking and cycling networks with a goal of increasing accessibility, amenity and community health.

Specific strategies identified, which are relevant to this bike plan are:

- The upgrade of walking and cycling infrastructure in local centres, including cycleway development in Turramurra by the RMS, in cooperation with local government; and
- Improve access to public transport by aligning walking and cycling routes with public transport routes.

Sydney Metropolitan – Regional Recreation Trails Framework Final Report (NSW Department of Infrastructure, Planning and Natural Resources, 2005) **and Sydney Metropolitan Regional Recreation Trails Framework Update 2010** (CLOUSTON Associates &GTA Consultants, 2010)

Trends have shown an increase in recreational cycling. This document was intended to identify missing links and develop them into opportunities and priorities for spending. The documents were developed as a strategic overview and recommended the use of guidelines to ensure consistent delivery of ground works in parallel with the promotion of cycling via a range of streams such as; brochures, internet sites and through government departments.

The document identifies a number of routes passing through the Ku-ring-gai LGA. These include:

- The Northern Suburbs Rail Trail, following the North Shore and Western Railway;
- The Great North Walk to Coastal Walkway;
- The Warrimoo Trail;
- The Middle Harbour Trail;
- The Harbour to West Head Trail; and
- The Chatswood to Dee Why via Middle Cove Trail.

Regional Sustainability Plan 2009 / 2014 (Northern Sydney Regional Organisation of Councils, 2008)

The Northern Sydney Regional Organisation of Councils (NSROC) Regional Sustainability Plan (RSP)was developed in response to projected growth and development with the primary aims of:

- *"present a shared Sustainability Vision for the Region;*
- *guide consistent regional alignment on key common issues;*
- *identify common goals and programmes;*

- *maximise collaborative learning opportunities and partnerships; and*
- *guide effective human, fiscal and other resource use by Councils across the Region".*

Transport related goals for the RSP include encouraging greater use of public transport, increase in the use of active travel and encouraging job retention and working from home. This includes:

- Encourage walking and cycling through improved infrastructure and implement DCP/LEP restrictions on development impacting on facilities;
- Develop a regional walking and cycling network and provide greater availability of bike parking at transport nodes; and
- Coordinate local cycling programs with the National Cycling Strategy.

2.2.3 Local

Ku-ring-gai Traffic and Transport Policy (Ku-ring-gai Council, 2010)

This report identifies the opportunity for dedicated cycleways to be implemented along some State/Regional roads, and also along the North Shore rail route. It also identifies the need for providing supplementary cycle amenities, such as bicycle racks and lockers, at key infrastructure developments, in order to augment any cycleways that are developed.

In addition, it identified that Council should:

- Pursue funding for the implementation of prioritised cycling amenities, such as cycleways, bicycle racks and lockers.
- Facilitate provision for cyclists and motor cyclists in future works undertaken on footpaths and roads within the LGA.

The Policy provides a framework for the prioritisation of funding of works planned to be undertaken. This prioritisation is based on crash history, traffic speeds, changes in traffic volume, pedestrian and cyclist usage, level of community concern and proximity to schools.

Community Strategic Plan 2030 (Ku-ring-gai Council, 2009)

This document briefly outlines Councils intention of developing an integrated transport and access plan including strategic bike plan for the whole of the Ku-ring-gai LGA by 2011.

Ku-ring-gai Integrated Transport Strategy Final Report (Ku-ring-gai Council, 2011)

This report contains a 'Walking and Cycling Action Plan' that provides a number of recommendations to increase active transport use within the LGA within a 10 year framework. These included:

- Within the short term, for the Ku-ring-gai Council to compile and gradually introduce a Ku-ring-gai bike plan with the assistance of the RMS.
- Within the medium term, for the RMS to establish regional bicycle routes within the LGA as defined in the NSW Bike Plan.
- For the council to continually pursue the implementation of end-of-trip cycling amenities, such as change rooms, bicycle racks and lockers, at key infrastructure developments.

The Ku-ring-gai ITS makes mention of existing 50/50 RMS funding set aside for the production of bike plans, implementation of cycleways and associated cycling amenities.

The strategy recommends that cycling targets and objectives be monitored through the use of counters placed along key cycling routes. This would ensure that goals afforded by improvements in cycling facilities could be actively and effectively measured.

Town Centres Parking Management Plan 2010 (Ku-ring-gai Council, 2010)

This plan recommends that at rail station entrances, bicycles should have precedence over private vehicles with respect to commuter access and immediacy of on-street parking. The plan also endorses the implementation of bicycle parking in town centres, in addition to supporting cycling amenities, such bicycle racks and lockers at locations either outlined in the Public Domain Plan or where appropriate.

Town Centres Public Domain Plan 2010 (Ku-ring-gai Council, 2010)

The Council Public Domain Plan outlines plans concerning the facilitation of bicycle infrastructure in and around the following town centres situated within the LGA:

- St Ives;
- Turramurra;
- Pymble;
- Gordon;
- Lindfield; and
- Roseville.

The plan aims to facilitate the provision of supplementary on-road marked routes and off-road shared pedestrian/cycleways in the aforementioned town centres in order to complement existing cycleway facilities.

Ku-ring-gai Bicycle Transport Plan – Volume 1 1995 (Ku-ring-gai Municipal Council)

The bicycle transport plan was established to address the shared intent of the Ku-ring-gai community to establish an LGA-wide cycleway network, with the intention of facilitating safe cycling practice throughout the locality. The plan stresses the importance of continual commitment from both the local and state government authorities in achieving the desired outcomes of the plan.

An amalgamation of the saddle surveys, survey results and cooperation with local bicycle user groups enabled the initiation of a strategy which outlined a distinct network of bicycle routes and supporting amenities throughout the LGA.

Ku-ring-gai Development Control Plans (Ku-ring-gai Council).

Part 43 of the Ku-ring-gai DCP recommends provision of bicycle parking where people are likely to cycle, such as car parks for students and commuters. Bicycle parking provision at a rate of 2% of the total parking provision is recommended. Bicycle parking in accordance with 'Australian Standard 2890.3-1993 – Bicycle Parking, Australian / New Zealand Standards, 1993' is recommended.

Part 55 of the Ku-ring-gai provides bicycle parking provision rates for development within the Pacific Highway / Railway corridor and St Ives town centre.

Ku-ring-gai Contributions Plan 2010 (Ku-ring-gai Council, 2010)

The Contributions Plan was developed by Council to enable Council to require a direct contribution in accordance with the Environmental Planning and Assessment Act, 1979 towards providing, improving or

extending public infrastructure, including traffic and transport improvements, town centre, pedestrian routes and cycleways.

The Contributions Plan identifies improvements at the major town centre in the LGA, including proposed bicycle and end of trip bicycle facilities within the town centre.

3. Project Approach and Considerations

This section presents the approach taken and factors considered in developing the Bike Plan.

3.1 Creating a Safe and Attractive Environment for Cycling

3.1.1 Background

Cycling is a highly efficient, environmentally benign form of transport. As with walking, cyclists are improving their health and contributing to an active environment at a human scale.

Cyclists move around the public domain in various ways, largely depending on the trip purpose and rider characteristics. For example, children will tend to use the footpath and cycle at low speeds, while an adult on the way to work will ride along the fastest and most direct route available (on- or off-road).

Cyclists therefore move through an “environment” in a similar way to pedestrians, although the speed and distance which they travel mean that they identify more with the concept of a network. Attention to cycling facilities should not be confined to one or two “routes” or “links” in an area, as trip origins and destinations are diverse. Every street must be a safe route for cyclists and be designed in accordance with the function, traffic volume and width of the street.

Infrastructure for cycling can be designed in a similar way to other vehicles, through consideration of speed, sight distance, priority at intersections etc. However, bicycles have a degree of manoeuvrability that makes them somewhat unpredictable to motorists and pedestrians. Therefore, the design of both on- and off-road facilities should aim to encourage predictability and clear priority at all conflict points.

3.1.2 Cyclist Needs

As for pedestrians, the provision of cyclist infrastructure should not only aim to fulfil the requirements of existing users, but to increase the number of cycling trips in the area. Such an outcome would likely result in fewer car trips (particularly for shorter travel distances), healthier residents and a more active (and safe) streetscape.

A number of elements are required in order to provide a high quality cycling environment. These include:

Coherence

Coherence refers to the extent of coverage and completeness of the bicycle facilities. Within built-up areas, coherence can be characterised by the completeness of the network. Outside built-up areas, it is characterised by the completeness of connecting routes.

Coherence also can refer to how the bicycle routes and network matches with the need to travel, offering a consistent quality across individual paths, continuity of paths and routes, and the ability to provide users with freedom of route choice.

Safety

Cyclists are particularly vulnerable road users. They are slower and smaller than the dominant vehicles in traffic, making them less likely to be seen. Furthermore, cyclists have little protection at times of collisions.

When approaching an intersection, cyclists are rarely in a position that motorists expect. Cyclists are positioned close to cars and are not often in view of drivers. This can lead to conflict.

Intersections present a danger for cyclists due to the many movements from different directions. Clear guidance is needed on the approach, through and exit from the intersection for both cyclists and motorised traffic.

Off-road paths reduce the risk of collision with vehicles, but still endanger cyclists at intersections with roads. Also, cyclists can collide with pedestrians with potentially fatal outcomes. The general principles of predictability and clear priority remain important for off-road paths, including directional segregation and high visibility for all users.

Personal security for cyclists is perhaps less critical than for pedestrians. However, narrow and dark areas remain dangerous for cyclists and should be avoided.

Directness

As for pedestrians, cyclists dislike significant deviations to their route. However, some flexibility can be expected where a better cycling environment is provided on a minor deviation from the most direct route. A careful balance must be found between providing a direct route and also one free of delays or safety concerns.

Amenity

People will more be likely to cycle in a pleasant environment. The route should be scenic, quiet, and free of heavy traffic and traffic travelling at high speeds. The best cycling environment is often found in areas that have been traffic calmed.

Suitable for all users

Cyclists cover a large range of user skill levels and trip purposes. While skill level often depends on age, other factors such as frequency of cycling and carrying heavy loads can affect a user's actions. Trip purposes often dictate the preferred cycling facility.

Best practice aims to provide for all users on a particular cycle route, ensuring that no users are excluded from using the facility. If one type of bicycle facility is unable to provide for all users of that route, a duplicate (both on and off-road facilities) facility should be provided.

End of trip facilities

As noted above, bicycle users need to know that their bike is safe from theft while it is not attended. This can be achieved through the provision of bike racks and lockers in areas that are well lit, in view of the public and protected from the weather. Where possible, Council should also encourage the provision of shower and change rooms in new buildings such as offices through planning controls.

3.1.3 Cycling Strategies

Council should support and encourage cycling through the following actions:

- Actively promote cycling through the provision of quality cycling facilities and the establishment of an attractive and amenable cycling environment;

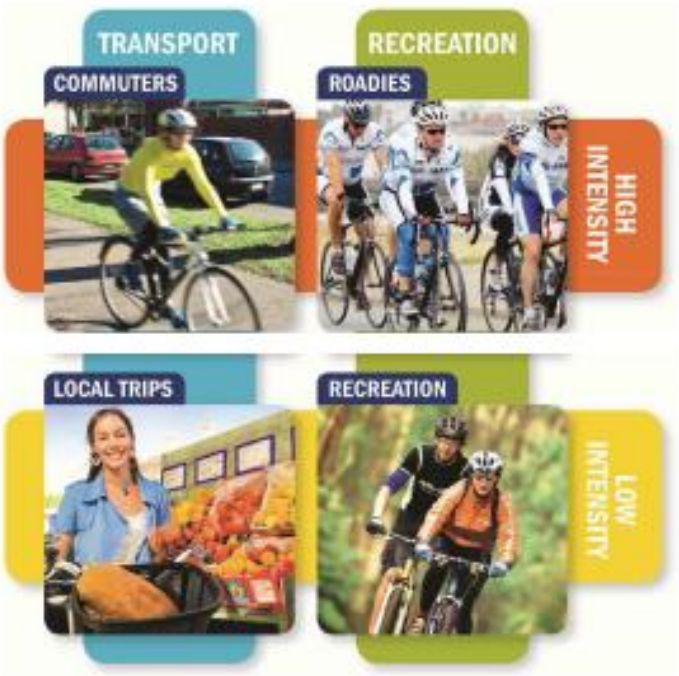
- Build a network of primary cycle routes within the LGA. These should serve key local and regional cycling demand and provide direct and convenient links between commuting, social and recreational destinations;
- Bicycle access to this network should be promoted through the establishment of an ambient traffic environment that makes local roads bicycle-friendly;
- Provide secure parking and 'end-of-trip' facilities for cyclists;
- Utilise traffic calming and reduction of speed limits (to 40-50 km/h) where necessary to lower the speed environment on local roads; and
- Develop policies, guidelines, training and assessment measures to ensure that the needs of cyclists are considered when planning and designing traffic facilities and other elements of the urban environment.

3.2 User Types

Cycling attracts a large variety of participants, a selection of which is outlined in Figure 5, many of which have very different motivations for participating. It is particularly important to recognise the needs of each user type to ensure facilities cater and encourage use of current, new and proposed routes.

Many non-cyclists lack the self-efficacy to cycle, even if they are willing to try it. There is a substantial body of evidence which reveals that there is also a difference in what non-cyclist and cyclists consider as the necessary "enablers" for cyclists, particularly for were infrastructure is concerned. For example, non-cyclists place more importance on segregated bicycle lanes, whereas regular cyclists, particularly males, are more willing to share the road with motorists (even if motorists do not share the same view).

Figure 5 Different Bicycle User Types



3.2.1 Recreational Cyclists

Recreational cyclists ride mainly for leisure and place a high value on enjoying the experience. They are usually less constrained by time and vary widely in skill and experience.

Popular recreation cycling destinations include routes along rivers, natural corridors and reserves, as well as attractive routes with low traffic volume and speed.

Recreational cyclists prefer:

- Comfort;
- Good surfaces;
- Minimal gradients;
- A high degree of safety and personal security;
- Routes that are pleasant, attractive and interesting;
- Circuitous routes with multiple route options;
- Screening from weather and wind; and
- Parking facilities where they dismount to use facilities or visit attractions along the journey.

3.2.2 Commuter Cyclists

Commuter cyclists ride mainly for as a mode of transport for journeys to and from a workplace, school or university. They prefer the fastest safe route between their origin and destination and are generally more skilled and experienced.

Commuter cyclists prefer:

- Directness;
- Minimal delays;
- Good surfaces;
- All-weather routes;
- Well lit routes for after-hours journeys; and
- Parking facilities and end of trip facilities at their destination.

3.2.3 Sport Cyclists

Sport cyclists ride mainly for fitness and leisure, but like recreational cyclists also place a value on enjoying the experience. They are also less constrained by time and have a high skill and experience.

Sport cycling destinations include off-road mountain bike trails in addition to areas which provide continuous on or off-road routes.

Sport cyclists prefer:

- Comfort;
- Good surfaces or off-road trails;
- Minimal conflict with other road users;

- A reasonable degree of safety and personal security;
- Routes that are pleasant, attractive and interesting; and
- Circuitous routes.

3.2.4 Local Trip Cyclists

Local trip cyclists ride mainly as a mode of transport for running errands, but may also include short commute cyclists. They may be constrained by time and vary widely in skill and experience.

Popular local trip cycling destinations include shops, shopping, schools and town centres.

Local trip cyclists prefer:

- Comfort;
- Good surfaces;
- Minimal gradients;
- A high degree of safety and personal security; and
- Parking facilities at their destination.

3.3 Methodology for Identifying Cyclist Needs

3.3.1 Identification of Activity Generators and Primary Routes

The following approach was adopted in developing a hierarchy of cyclist needs.

Primary Activity Zone

This is typically the main commercial street in the town centre. Throughout the day, pedestrians and cyclists are attracted to this zone from surrounding residential areas. It is therefore an important trip attractor. Also, there are high levels of activity occurring within this zone, making it an important area for short trips. The provision of bicycle parking should also be considered in primary activity zones.

Secondary Activity Generators

These include shops, schools, sporting facilities, clubs, hospitals and community facilities such as churches that are not located within the Primary Activity Zone. These land uses will attract people, but possibly only at certain times of the day or week.

Tertiary Activity Generators

These include the above land uses from the Secondary Activity Generators, but differentiate them based on a lower level of activity. Again, these are not located within the Primary Pedestrian Activity Zone.

Primary Cyclist Routes

These are routes from residential areas to the Primary, Secondary and Tertiary Activity Zones and Generators. They are trunk or collector level routes, which do not reach every property but instead form a network of routes that are accessible to a significant catchment of population. These routes take account the existing street network and topographical constraints, aiming to provide a direct and convenient route

to the major trip generators. The demographic use of connecting generators is considered when defining the routes (i.e. schools and playing fields, aged care facilities and return service league clubs).

3.3.2 Blackspots

Through the analysis of crash data and public and stakeholder consultation undertaken, the following 'Black Spots' have been noted. In general, these locations have been cited as being locations where cyclists feel particularly unsafe or vulnerable; or which have been noted from the crash investigation undertaken in Section 2.1.3. These are as follows:

- The Pacific Highway;
- Mona Vale Road;
- Kissing Point Road, between Boronia Avenue and the Pacific Highway;
- Bobbin Head Road, at the Bobbin Head Road/Burns Road Intersection; and
- The Boundary Street/Hill Street intersection.

3.3.3 Identification of Infrastructure Provision Goals

The hierarchy above provides a basis for applying standard treatments in each town centre, ensuring the development of a comprehensive and structured cycle network. Specific treatments may be required in some of these areas to accommodate the user needs or where other community suggestions are made.

These treatments form the basis of the proposed improvements. While this standard may not be achievable in the short-term due to the capital investment required, it is nevertheless a useful guide to work towards.

Desirable scenarios for potential infrastructure responses are outlined in Table 2.

Table 2 Infrastructure Provision Goals for Ku-ring-gai

Hierarchy Feature	Desirable Route Infrastructure	Minimum Route Infrastructure
Primary Cyclist Routes	Low speed cyclists to share 2-2.5m path with pedestrians (to be marked as two way with a centreline). Higher speed cyclists to use on-street cycle lanes (min 1.5m width).	Cyclists integrated into general traffic lane.
Primary Activity Zone	On-street cycle lane (min 1.5m width) in both directions in traffic calmed environment. Bike parking provided throughout the Primary Activity Zone.	Cyclists integrated into general traffic lanes in a traffic calmed environment.
Secondary Activity Generators	Low speed cyclists to share 2-2.5m path with pedestrians adjacent to the Activity Generators, to be marked as two way with a centreline. Higher speed cyclists to use cycle lanes or share general traffic lanes.	Cyclists integrated into general traffic lane.

Hierarchy Feature	Desirable Route Infrastructure	Minimum Route Infrastructure
	Cycle parking provided near the entrance of the Activity Generators.	
Tertiary Activity Generators	Cyclists integrated into general traffic lane.	Cyclists integrated into general traffic lane.

3.3.4 Aims in the Development of Infrastructure Recommendations

Major aims of the proposed improvement works, in decreasing order of priority, are:

- Establish a network of key cycle routes in the LGA, connecting neighbouring LGAs and between major trip generators including schools. Prioritised routes are those that serve a wide range of community users and can remove pedestrians from unsafe environments;
- Fill any shortcomings in the Primary Activity Zone areas of each town centre through new cycle paths and footpaths;
- Broaden the extent of the network to areas outside of the Primary Activity Zones; and
- Provide additional cycle routes for primarily recreational or tourism purposes.

3.4 Selecting the Appropriate Path Type

3.4.1 Types of Cycle Paths

A number of path types have been described in various technical guidelines to assist decision-makers in selecting the appropriate treatment to suit local conditions. Bicycle paths can either be on-road, which are essentially “bicycle lanes” alongside motor vehicle traffic on a roadway within the road corridor, or off-road paths, which are separated from the road corridor.

The selection of the appropriate path type treatment depends on a combination of factors, which may include the level of demand for the cycle path, the conditions present in the surrounding environment, the availability of space in which to provide the path, and whether path usage is for exclusive cycle use or shared use with pedestrians.

3.4.2 Separation Treatment

A key concern in the design of bicycle facilities following the alignment of roads is whether warrants exist for providing bicycle paths separated from vehicular traffic, or whether a mix of bicycle and vehicular traffic may be acceptable.

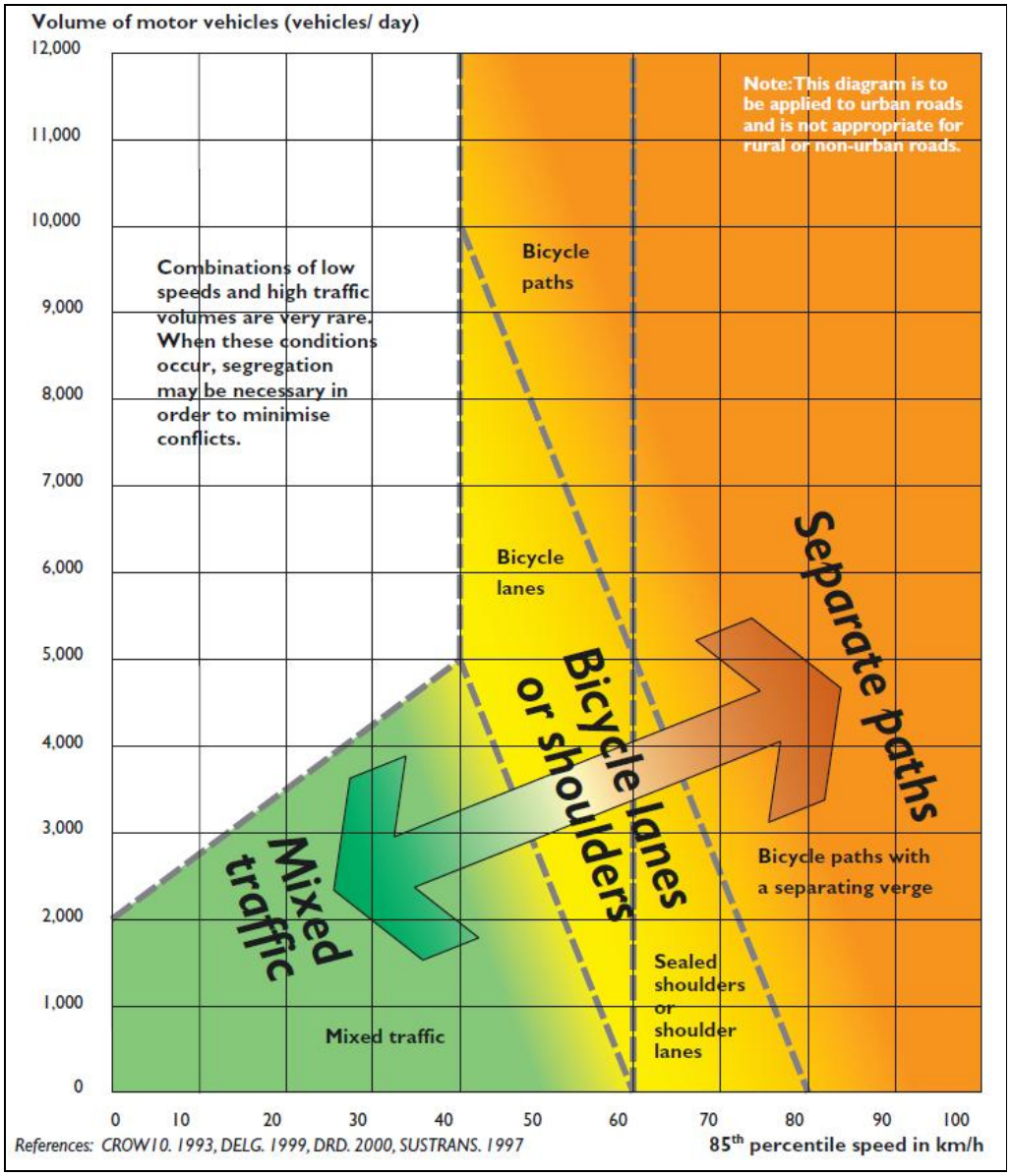
The *NSW Bicycle Guidelines*[2] provide for conditions when a separated cycle facility may be required, or when cycles operating in mixed traffic conditions may be acceptable. These are based on bicycle research in the Netherlands and other studies.

The traffic separation treatment will depend on the volume of vehicles on the road, and the vehicle speed environment.

[2] *NSW Bicycle Guidelines*, Roads and Traffic Authority (2005)

Figure 6 provides a general guide in determining traffic separation treatment. In essence, separated paths are needed when the vehicle speed environment is 80 km/hour or faster, or when vehicle volumes are high enough even at lower vehicle speeds (e.g. 10,000 vehicles per day, even at 40 km/hour, will require separated facilities).

Figure 6 Guide for Determining Separation of Bicycles and Motor Vehicles



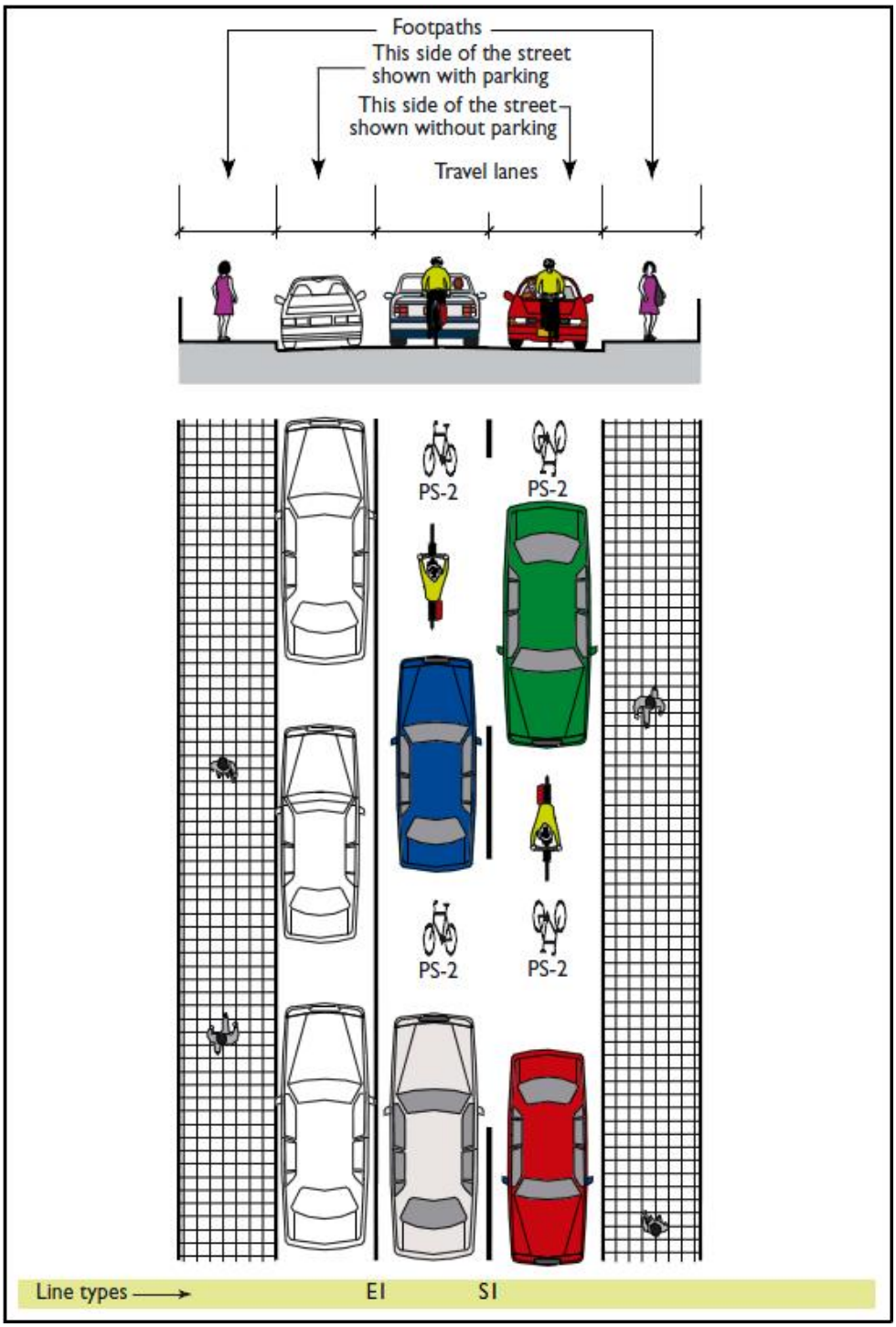
Source: *NSW Bicycle Guidelines*, Roads and Traffic Authority (2005).

3.4.3 On-Road Path Types

A number of different path treatments can be applied for on-road cycle facilities. These are presented and discussed in the *NSW Bicycle Guidelines* (NSW Roads and Transport Authority (RTA), now the RMS), 2005). The different on-road path types may provide physical or visual separation from the adjacent roadway, or allow for mixed bicycle-motor vehicle traffic.

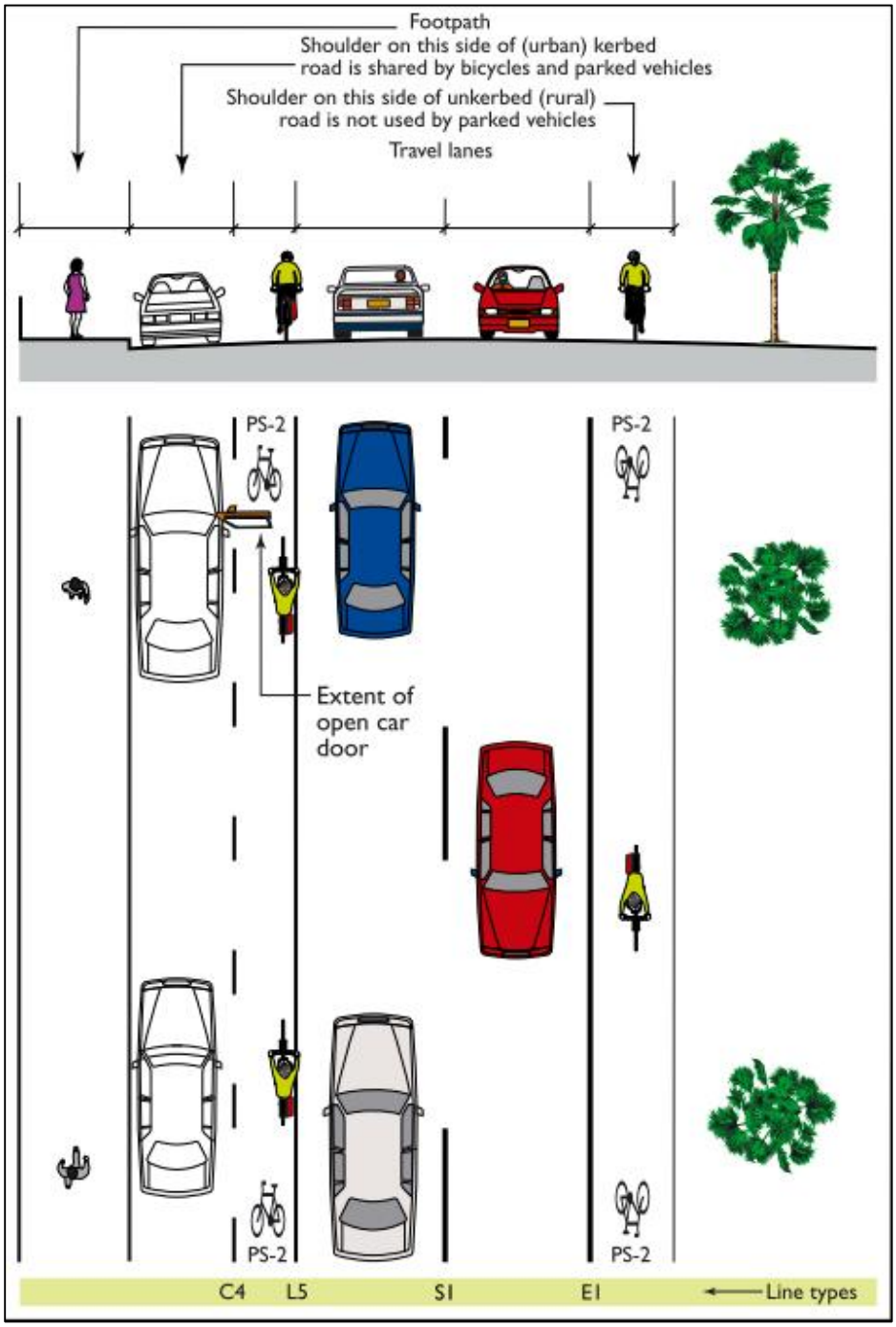
In the context of the Ku-ring-gai Bicycle Plan, on-road bicycle paths would typically be provided with some form of physical or visual separation from the adjacent traffic lane or by providing mixed traffic routes where bicycles and traffic share the road space. The on-road paths considered in this Plan are typically of the layout and cross section as shown in Figure 7 and Figure 8.

Figure 7 Typical Plan and Cross-Section for On-Road Mixed Traffic Bicycle Routes



Source: *NSW Bicycle Guidelines*, RTA 2005.

Figure 8 Typical Plan and Cross-Section for On-Road Bicycle Paths



Source: *NSW Bicycle Guidelines*, RTA 2005.

On-Road Bicycle Lane Widths

The width for bicycle lanes will vary depending on the number of cyclists, the speed of motor vehicles, the volume of large vehicles and the space available given the needs of other road user groups, physical constraints and budgetary constraints (AUSTROADS, *Part 14 – Bicycles*, 1999). Recommended widths are summarised below and shown in Table 3.

Overall, the following widths are recommended:

- 3.0 metres is the preferred width and is desirable where the motor traffic is moving at high speeds (100 km/h);
- At least 2.0 metres is desirable where the motor traffic is moving at high speeds (100 km/h) or where speeds are moderate (80 km/h);
- 1.5 metres is the desirable width to be used in 60 km/h speed zones; and
- 1.2 metres is the minimum recommended width which should be used along the length of the lane and should only be used where the provision of a wider lane is impractical.

Table 3 Recommended On-Road Bicycle Lane Widths

	Lane Width (m)		
Road Speed	60 km/h	80 km/h	100 km/h
Desirable	1.5 m	2.0 m	2.5 m
Accepted Range	1.2 – 2.5 m	1.8 – 2.7 m	2.0 – 3.0 m

Source: *Guide to Traffic Engineering Practice*, *Part 14 – Bicycles* (AUSTROADS, 1999).

A 1.0 metre width may also be acceptable where the speed environment is less than 60 km/h and space is severely restricted.

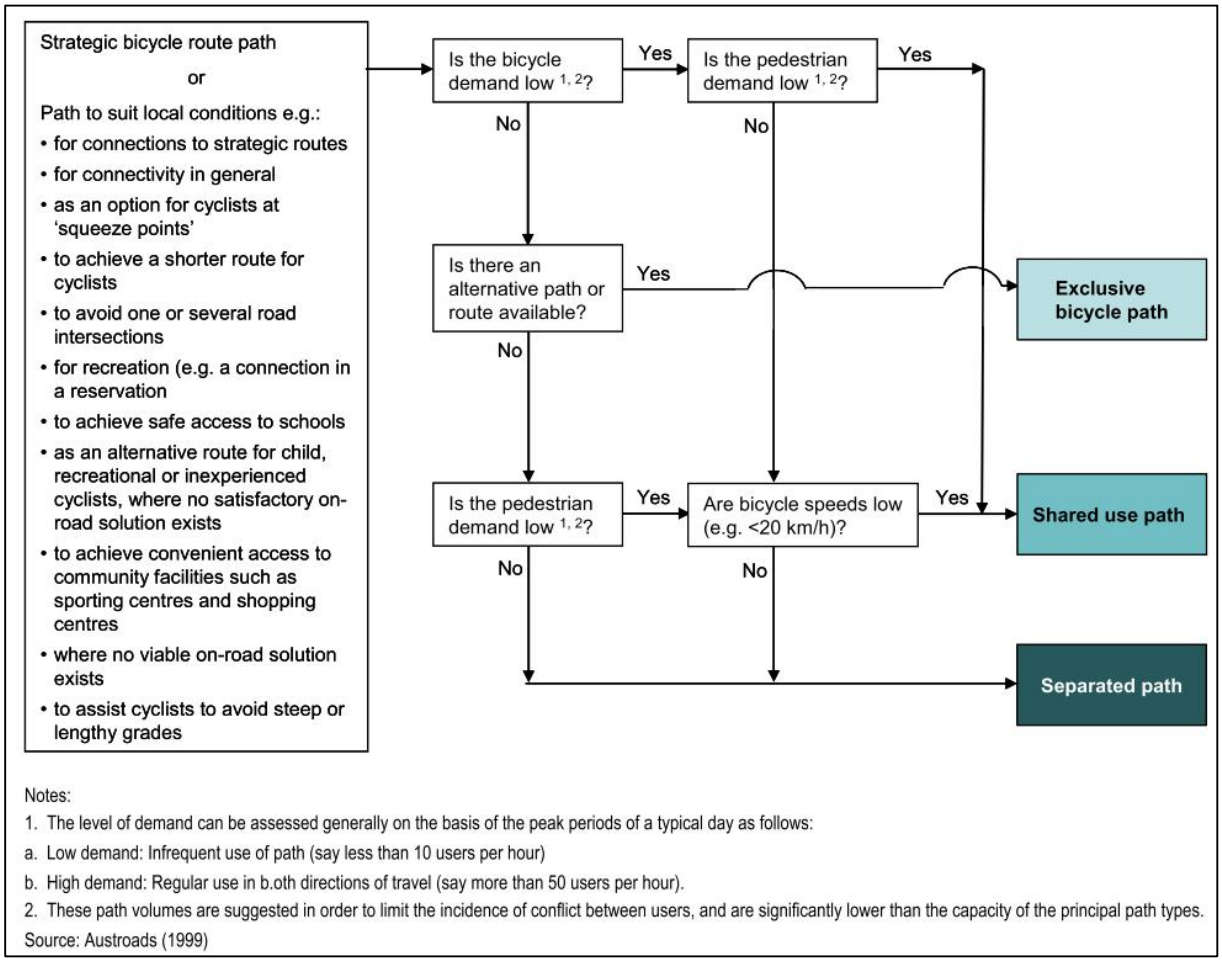
3.4.4 Off-Road Cycle Paths

Off-road cycle paths are typically physically separated from adjacent parking or traffic lanes. Off-road paths can be of three basic types:

- Exclusively for bicycle use;
- Shared cyclist and pedestrian use; and
- Separate paths provided for cyclists and for pedestrians.

The *Guide to Road Design Part 6A: Pedestrian and Cyclist Paths* (AUSTROADS 2009) presents a guide on selecting the treatment type for off-road paths. This is shown in Figure 9.

Figure 9 Selection Guide for Off-Road Path Types



Source: *Figure 2.1, Guide to Road Design Part 6A: Pedestrian and Cyclist Path (AUSTROADS 2009)*.

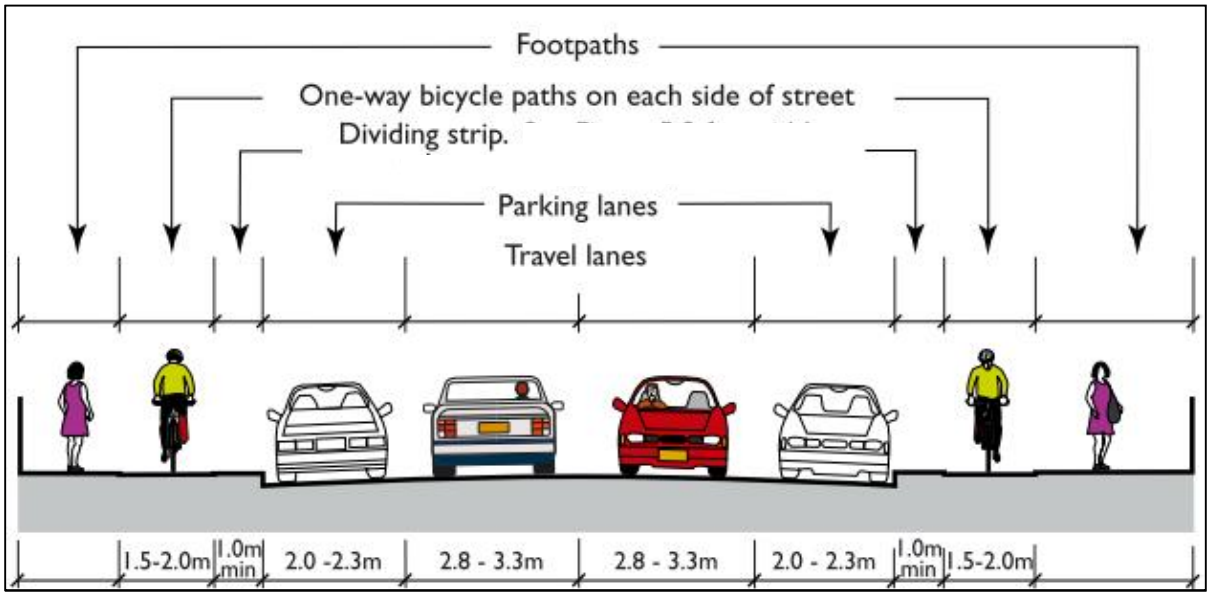
Exclusive Cycle Paths

According to the AUSTROADS Guide, exclusive bicycle paths are most appropriate under the following conditions:

- *There is a significant cycling demand and very few pedestrians desire to use the path or a separate footpath is provided;*
- *There is very limited motor vehicle access across the path; or*
- *It is possible to achieve an alignment that generally allows cyclists uninterrupted and safe travel at a relatively high constant speed (say 30 km/h).*

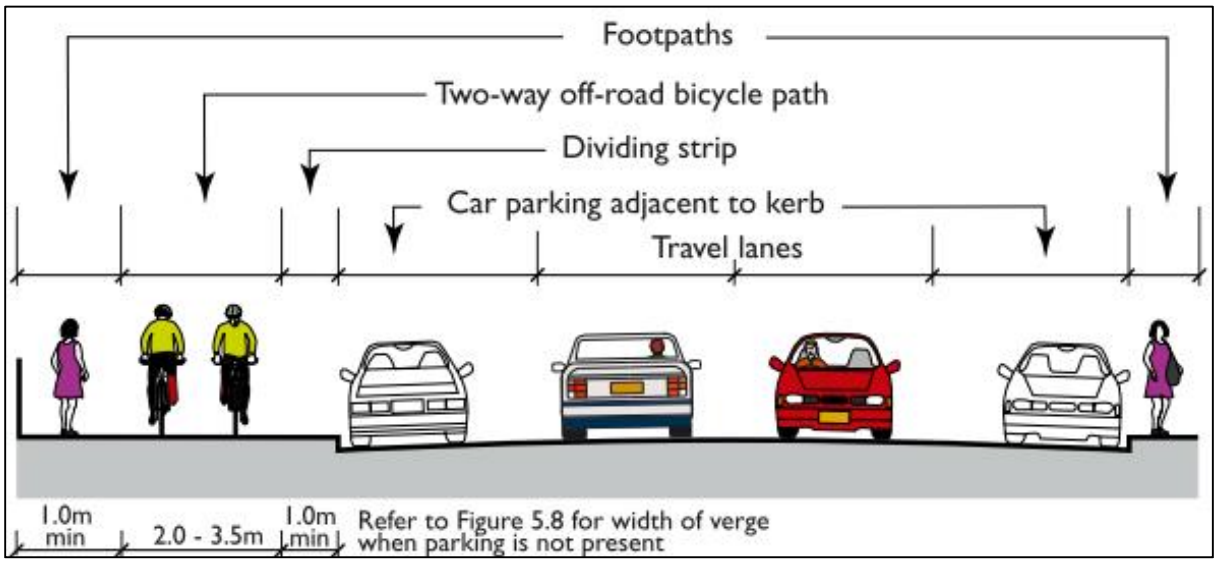
Figure 10 presents a typical road cross section for a one-way pair of off-road cycle paths, while Figure 11 shows the same for a two-way off-road exclusive cycle path on one side of the road. For local conditions where kerbside parking is not present, the dividing strip or separating verge would not be required.

Figure 10 Typical Cross-Section - One-Way Pair of Off-Road Bicycle Paths



Source: *NSW Bicycle Guidelines*, RTA 2005.

Figure 11 Typical Cross-Section - Two- Way Off -Road Bicycle Path on One Side of Road



Source: *NSW Bicycle Guidelines*, RTA 2005.

The AUSTROADS Guide also prescribes the design widths for exclusive cycle paths. These are shown in Table 4.

Table 4 Path Widths – Exclusive Bicycle Paths

	Path Width	
	Local Access Path	Major Path
Desirable Minimum Width	2.5 m	3.0 m
Minimum width – typical maximum	2.5 – 3.0 m [a]	2.5 – 4.0 m [b]

a: A lesser width should only be adopted where cyclist volumes and operations speeds will remain low.

b: A greater width may be required where the number of cyclists is very high.

Source: *Guide to Road Design Part 6A: Pedestrian and Cyclist Path (AUSTROADS, 2009)*.

Shared Use Paths

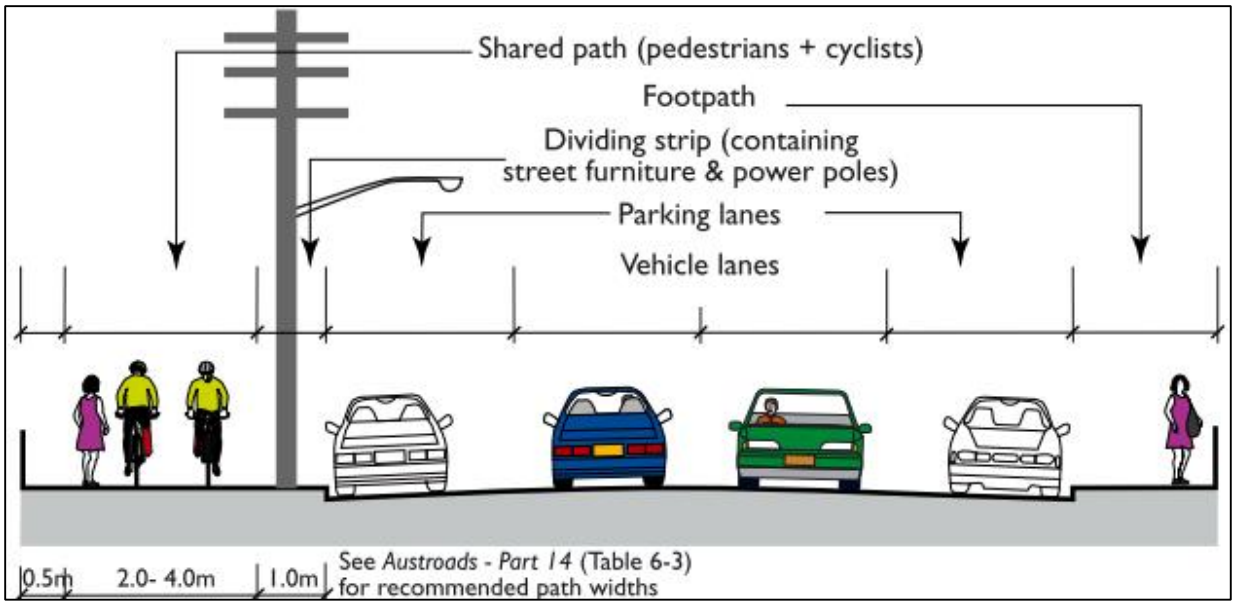
Shared use paths, or shared paths, are a type of off-road facility that allows common use of the facility by both cyclists and pedestrians.

According to the AUSTROADS Guide, a shared use path may be appropriate where:

- *Demand exists for both a pedestrian path and a bicycle path but where the intensity of use is not expected to be sufficiently great to provide separate facilities;*
- *An existing low-use footpath can be modified to provide for cyclists by satisfying legal requirements and as necessary upgrading the surface, width and kerb ramps; or*
- *There is an existing road nearby which caters well for faster cyclists (e.g. has on-road bicycle lanes), to limit the extent of user conflict on the shared path.*

A typical cross section of a shared path (two-way) is shown in Figure 12 (left hand portion of drawing).

Figure 12 Typical Cross-Section for a Two-Way Off-Road Shared Path



Source: *NSW Bicycle Guidelines*, RTA 2005.

Table 5 provides an indication of widths for shared paths.

Table 5 Shared Path Widths

	Path Width		
	Local Access Path	Commuter Path	Recreational Path
Desirable Minimum Width	2.5 m	3.0	3.5
Minimum width – typical maximum	2.5[a] – 3.0 m[b]	2.5[a] – 4.0 m[b]	3.0[a] – 4.0 m[b]

a: A lesser width should only be adopted where cyclist volumes and operations speeds will remain low.

b: A greater width may be required where the number of cyclists and pedestrians are very high or there is a high probability of conflict between users.

Source: *Guide to Road Design Part 6A: Pedestrian and Cyclist Path (AUSTROADS, 2009)*.

Separate Paths

Where there are significant volumes of both pedestrians and cyclists, separate paths for each may need to be provided to minimise conflict issues associated with shared use of paths. Typically, separate paths would require a minimum of 3.0 metres on each side of the road for one-way paths, and 4.5-metre wide off-road paths for separated two-way paths.

The AUSTROADS *Guide to Road Design Part 6A: Pedestrian and Cyclist Paths* notes that such separated paths are rarely provided. Such is the case in Ku-ring-gai, where pedestrian and cyclist volumes are still at levels which will not require separated paths to be provided.

3.5 Prioritisation Methodology

3.5.1 Bicycle Plan Prioritisation & Methodology

The RTA guidelines from *How to Prepare a Bicycle Plan* (NSW RTA, 2002) indicate that future bicycle routes should be based on a set of priorities, including:

- Safety;
- Community needs and expectations;
- Council commitment;
- Available funding and future planning opportunities; and
- Rectification / maintenance programs.

Overall, this set of priorities is considered to be rather general in nature and does not provide specific guidance on prioritising one route above another. However, specific guidance does exist from the related RTA publication *How to Prepare a Pedestrian Access and Mobility Plan* (PAMP) (NSW RTA, 2002), which can be adopted to suit a prioritisation methodology for bicycle routes.

3.5.2 PAMP Prioritisation & Methodology

As most of the general priorities from the *How to Prepare a Bicycle Plan* (NSW RTA, 2002) publication are covered in the PAMP guidelines, *How to Prepare a Pedestrian Access and Mobility Plan* (NSW RTA, 2002), GHD has adapted the PAMP Weighted Criteria Scoring System with slight modifications to enable them to be applied in prioritising the proposed cycling improvements.

Scores were derived for each of the recommended improvements for the purpose of prioritising works within the LGA. It should be noted that the prioritisation of works presented in this plan is intended to support decision making, not replace decision making.

Prioritisation of the proposed routes, based on a slight modification to the Weighted Criteria Scoring System, is covered in Sections 6.5 and 7.2.

3.5.3 Ku-ring-gai Traffic and Transport Policy Prioritisation & Methodology

The *Ku-ring-gai Traffic and Transport Policy* provides criteria for the prioritisation of funding new works. The criteria use:

- 5-year accident costs;
- 85th percentile speeds;
- Change in traffic volume per year;
- Community concern;
- Pedestrian/cyclist usage; and
- Proximity to schools.

Due to the nature of the roads on which much of the proposed bicycle network will be proposed, the applicability of these criteria are limited due to the lack of availability of 85th percentile speeds, change in traffic volume per year and pedestrian/cyclist usage.

3.5.4 Notes on Prioritisation

In general, the recommended prioritisation criteria and rankings are provided as a guide for Council in order to maximise the benefit obtained when choosing where to allocate funding for bicycle facilities. It should be noted that it remains Council's prerogative to allocate funding for the implementation bicycle facilities as it chooses and not necessarily in accordance with the prioritisation and ranking recommended.

4. Consultation

Community and key stakeholder consultation has been a crucial part of the development of the new Bike Plan for Ku-ring-gai to ensure the new Plan meets the needs of the community now and into the future. The complete Consultation Report is provided in Appendix A.

4.1 Aims

The overarching aims of the consultation process were to:

- Provide opportunities for the community to have input into the development of the new Bike Plan including the identification of gaps in the network, priority routes and changes that could be made to improve cycling in Ku-ring-gai;
- Allow the project team to better understand the community's cycling behaviours including barriers and enablers to cycling;
- Provide information about the project process to the community; and
- Involve the community in the planning process to increase the sense of ownership of the project outcomes.

4.2 Methodology

GHD conducted the following consultation activities to seek stakeholder and community input into the development of the Ku-ring-gai Bike Plan.

Bicycle User Group (BUG) Workshop

Council invited a range of stakeholders from bicycle user and community groups to a workshop on Wednesday 22 February 2012 at Council Chambers. The purpose of this session was to identify the overarching goals for cycling in Ku-ring-gai to inform and help shape the development of a vision for the plan and to identify gaps in the current network.

Stakeholder Workshop

Council invited a range of key stakeholders (such as Roads and Maritime Services) to a workshop on Tuesday 28 February 2012 at Council Chambers. The purpose of this workshop was to identify the key outcomes for the new Bike Plan and to identify the opportunities, constraints and priorities for bicycle route connections in Ku-ring-gai.

Community Survey

A community survey was developed to capture the views of the broader community about the current cycling conditions in the LGA; information about cycling behaviours (including barriers and enablers for cycling) and feedback on cycling facilities and routes that could be improved in Ku-ring-gai. Responses from cyclists and non-cyclists were sought to ensure the new bike plan addresses the needs of current and potential cyclists in the community. A total of 664 respondents took part in the survey which was made available from Friday 10 February 2012 until Wednesday 7 March 2012.

School Survey

A school survey was also developed to better understand the number of students and staff cycling to and from school; the enablers and barriers to cycling to school and the types of facilities available for those cycling to and from school (if any). The school survey was distributed to the Principals of 49 schools within the LGA on 10 February 2012, with a total of 29 completing the survey.

4.3 Outcomes

The consultation activities undertaken have allowed Council and the project team to better understand the cycling behaviours of the Ku-ring-gai community, the current enablers and barriers to cycling, gaps in the existing bike network and opportunities for improving cycling conditions, facilities and connectivity.

Some of the key outcomes of the consultation activities undertaken for the project have been summarised below.

4.3.1 More dedicated bicycle paths in the LGA

The community and key stakeholders expressed a desire for more dedicated bicycle lanes and paths to be installed around the Ku-ring-gai LGA. An interesting point to note about this key finding was that respondents identified as being either potential or non-cyclists stated that new bike paths and improved safety conditions could encourage them to cycle more. Similarly, a large proportion of regular and infrequent cyclists stated that they felt the available routes were unsafe or uncomfortable to ride on because there were no dedicated bicycle lanes.

Some members of the Bicycle Users Group (BUGs) indicated that the new bike plan should incorporate an alternative to shared paths as it has been noted through the Willoughby Bike Plan consultation that shared paths are unsuitable for commuters and result in conflicts. Other key stakeholders also advocated for separated bicycle-only paths as a way of providing enough space for confident cyclists both on and off road.

4.3.2 Improved safety conditions

Safety was identified as a key issue by key stakeholders, school survey and community survey respondents living and cycling in the Ku-ring-gai area. The main safety concerns were in relation to the number of cars on the road and the lack of facilities or signs that would alleviate existing safety issues. Frequent cyclists stated that the installation of bicycle-only lanes along main highways and local roads as well as the maintenance of existing paths would help to improve current safety conditions. Similarly, the installation of warning signs and imposed speed limits around popular cycling areas would work to alleviate current safety concerns.

Of the schools that responded to the school survey, it was observed that only a small proportion of student's cycle to school with 15 students being the greatest number of cyclists identified by a school. Safety was the greatest concern for schools, with 27 out of the 29 schools indicating that they perceived there to be dangerous routes or intersections for students and staff cycling to school. The high volume of traffic on the road was also a significant safety concern identified by respondents to the school survey.

BUGs also indicated safety as a key barrier for cyclists, particularly in relation to poorly maintained on-road paths. Key stakeholders, including representatives from adjacent Councils identified similar concerns but made particular mention of the lack of safe paths for children riding to school. These stakeholders suggested that the safety of paths needed to be improved to encourage greater participation in cycling by school aged children.

4.3.3 Better connectivity

A large number of stakeholders and survey respondents stated that better connectivity of cycling routes within the Ku-ring-gai network and with other bicycle networks adjacent to Ku-ring-gai was needed to encourage greater cycling in the area. Improved connectivity was seen by stakeholders and respondents as a key enabler for potential and non-cyclists to cycle, and for infrequent cyclists to cycle more often or extend their current trips. A large number of respondents to the community survey identified that a cycle path running parallel or within a corridor along the North Shore rail line would help to improve connectivity with other LGAs, in particular the City of Sydney LGA. In addition, a large proportion of respondents identified the Pacific Highway as a key gap in the Ku-ring-gai cycling network that needs to be prioritised in the new Bike Plan.

4.3.4 Improved driver awareness of cyclists

Improving driver awareness of cyclists was a common outcome across all consultation activities. BUGs, key stakeholders and survey respondents indicated that there was a need for improved driver awareness on the roads and around schools. This could be improved through the implementation of warning signs and notices around popular cycling areas or routes, as well as through education programs for cyclists. These programs would ensure that cyclists are aware of their rights on shared and on-road paths.

4.3.5 Summary

The findings from these consultation activities have indicated that there is significant interest in cycling in Ku-ring-gai and with improvements to safety and connectivity greater participation in cycling can be expected.

A draft of the new Bike Plan was placed on public exhibition during August and September 2012 to provide an opportunity for the community to submit comments and feedback, to ensure the plan is meeting their cycling needs. Following this consultation, comments from the community have been considered and taken into account in the Bike Plan.

5. Existing Facilities Audit

5.1 Process

An audit of existing cycle conditions across the LGA was undertaken for the study. The audit focused on identifying existing facilities currently provided in Ku-ring-gai and any shortcomings in relating to cycling facilities and potential safety issues. The audit was undertaken by means of a desktop review of Council provided data, a drive through with a Council Officer and saddle survey of the study area, carried out to ascertain the extent of the built cycle network and the general traffic environment and conditions.

5.2 Existing Facilities

Based on the desktop review and site assessment of existing facilities within the LGA, there are currently a variety of cycle facility types provided, in varying conditions. The following section provides an overview of those facilities along with examples of each facility type as found in the LGA.

5.2.1 On-Street Mixed Traffic Facilities

Existing on-street mixed traffic facilities are provided in roads such as Rosedale Road, Vista Road and Kulgoa Road. On-street mixed use bicycle routes were designated through the use of bicycle logos on the road surface. An example of on-street mixed traffic bicycle routes are provided below.

Kulgoa Road looking south

Vista Street looking east

5.2.2 On-Street Bicycle Paths

Existing on-street bicycle paths are provided on Kissing Point Road and Bobbin Head Road. On-street bicycle paths are designated through the use of solid white lines with bicycle logos on the road surface, and in the case of the bicycle path at the southern end of Kissing Point Road, with green surfacing in addition to white lines and bicycle logos.

Kissing Point Road looking south

Bobbin Head Road looking north

5.2.3 Shared Paths

Shared paths are provided across the LGAon Burns Road, Killeaton Street, Link Road, Horace Street, Nicholson Avenue, Acron Street, Kissing Point Road, Ryde Road, Yanko Road, Fiddens Wharf Road, Werona Road, Park Avenue and Rosedale Road. The provided shared paths vary in width and designation by way of signage and line marking.

Burns Road looking west

Park Avenue looking north

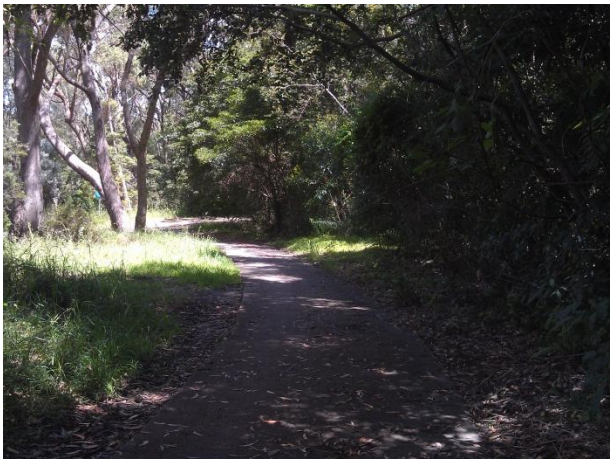
Ryde Road looking south

Fiddens Wharf Road looking south

5.2.4 Off-Street Paths

Off-Street paths are provided at Kissing Point Road, Bicentenary Park, between Kulgoa Road and Rosedale Road, between Kulgoa Road and Vista Street and between Warrawee Avenue and Brentwood Avenue. Off-street characteristics vary between the different locations.

Kamilaroy Road path looking south



Kissing Point Road fire trail looking south

Kulgoa Road looking east

5.2.5 Bicycle Parking and End of Trip Facilities

End of trip facilities is are generally provided in the form of bicycle parking. From observations, bicycle parking is typically provided at rail stations within the LGA; however the quality differed across different train stations.

Bicycle Parking at Turramurra Station

6. Proposed Cycle Improvements

6.1 Introduction

The identified locations for cycle improvements are presented in and Appendix B. These recommendations have been developed through an iterative process between GHD, Council, stakeholders and the community.

6.2 Reference System

The recommendations are intended to guide the development of new cycling facilities to fit within the wider context of Council's aims, objectives and planning for anticipated future developments.

The recommended works conform to a referencing system as follows:

- Categorisation numbers for works within each suburb are preceded with the suburb name (i.e. Wahroonga1, Wahroonga2, etc. for works in Wahroonga).
- The various routes proposed in each suburb are classified by numbers (but are arranged in no particular order); and
- The proposed routes are prioritised later.

It is noted the Council may wish to alter the priority of some works depending on the timing and construction of future developments.

6.3 Strategic Cost Estimate Assumptions

This section provides the assumptions on which the following strategic cost estimates have been based, in addition to describing what the strategic costs include for the formalisation of the recommended cycle routes.

6.3.1 Assumptions

The strategic cost estimates are at a level of detail sufficient to inform and guide Council in securing appropriate funds to take the proposed routes forward to a more detailed level. The strategic cost estimates have been based on guidance from Council in relation to indicative unit rates, and would be subject to further refinement at a later stage.

The following assumptions were made as part of the strategic cost estimation process:

- No allowance has been made for any property acquisition;
- No allowance for contingencies are included;
- No allowance has been made for any kerbing works as part of the estimates. It has been assumed that where kerbing is required, the works will be undertaken prior to (or in tandem with) footpath works;
- No allowance has been made for implementation of wearing course across partially sealed carriageways where pedestrian crossings are proposed. It has been assumed that where bitumen is required, the works will be undertaken prior to (or in tandem with) footpath and drop kerb works;

- No allowance has been made for labour costs;
- Cycleway lengths have been measured from GIS information provided by Council and as such their accuracy is dependent on the accuracy of the GIS information provided;
- Where parking is currently permitted across existing and/or proposed pram ramps (or drop kerbs) and crossing points, it has been assumed the signage will be adjusted to ensure these areas are no standing zones. However, there has been no allowance for these works in the estimates;
- No allowance for tactile paving has been included;
- No allowance has been made for pathway lighting;
- Shared paths have been costed as being constructed with concrete, where appropriate; and
- On-road cycle path costs have been costed based upon line markings on-road shoulders. The costs do not include any allowance for construction of new shoulders for cycle paths. Many shoulders and streets are very rough and not necessarily suitable for cycles. There may be opportunities to profile and seal a specific narrow section before line marking a cycle path. The costs associated with these works, however, were excluded from the strategic cost estimates.

6.3.2 Cost Inclusions

For comparison purposes, a low-end and a high-end unit cost have been developed and used in the strategic cost estimates. These reflect relative construction difficulties and the inclusion of additional infrastructure components for the different cycle facility types. The infrastructure components included in the low-end and high-end cost estimates are described further below.

On Road Mixed Traffic Routes

For on-road mixed traffic routes, the low-end cost principally incorporates pavement symbols and signage, while the high-end cost allows for additional auxiliary pavement marking which may be required.

On Road Cycle Path Routes

For on-road cycle paths, the low-end cost principally incorporates line-marking, pavement symbols and signage, while the high-end cost allows for additional pavement surface upgrade works on the road shoulders.

Off Road Cycle Path or Shared Path Routes

For off-road cycle paths, the low-end cost principally incorporates concrete surfacing, line-marking, pavement symbols and signage, while the high-end cost allows for a wider path width with greater provision of line-marking, pavement symbols and signage.

6.4 Bicycle Support Facilities

6.4.1 Bicycle Parking

The provision of appropriate bicycle parking facilities will encourage people to ride to their destination. Bicycle parking needs to be safe, secure, convenient and meet the needs of a wide range of cyclists. It should ideally be placed in a highly visible location, with good passive surveillance. Two key factors to consider are the type of facility required and the location.

Table 6 identifies the most common locations where bicycle parking facilities are required and indicates an appropriate type of bicycle parking facility that should be provided.

Table 6 Bicycle Parking Facilities

Location	Appropriate Parking Facility
◗ Shopping centres or business districts.	◗ Individual and small clusters of bicycle parking rails.
◗ Shopping complexes. ◗ Swimming pools. ◗ Libraries. ◗ Markets.	◗ Clusters of bicycle parking rails at main entrances.
◗ Work places. ◗ Primary and Secondary schools.	◗ Groups of bicycle parking rails within an enclosure.
◗ Train stations.	◗ Groups of bicycle parking rails within an enclosure.
◗ Apartments or residential complexes.	◗ Groups of bicycle parking rails within an enclosure such as a car park.

To ensure the continued use of bicycle parking facilities, they must be maintained. Poorly maintained facilities will have an adverse effect on patronage and the wider use of bicycles as a means of transport. Maintenance costs should also be factored in to ongoing budgeting.

Section 10 of the *Guide to Traffic Engineering Practice, Part 14 – Bicycles* (AUSTROADS, 1999) provides further information on bicycle parking and end-of-trip facilities suitable for low volume parking locations, typically suitable for most main street and trip generating locations.

The *Guide to Traffic Engineering Practice, Part 14* also provides recommendations for the provision of bicycle parking within various land uses. This can be used in Council's DCP to ensure the provision on bicycle parking within new developments in the LGA.

6.4.2 Additional End of Trip Facilities

In addition to the provision of bicycle parking facilities to encourage and enable cyclists to make more journeys by bicycle, additional facilities such as showers, changing rooms and drinking water have been identified as desirable facilities by cyclists. Change room and showering facilities have been identified to be required when cyclists have travelled greater than 5km to reach their destination. In addition, lack of showers was identified through the consultation as a barrier to cycling within the LGA.

Provision of a requirement for end of trip shower and change room facilities should be included in Council's DCP to further encouraging cycling as a mode of transport through new development. End of trip change room facilities should also include toilets, basins, mirrors and lockers.

An additional advantage of providing shower and change room facilities is that they offer benefits to people pursuing other active fitness activities including running and walking.

6.5 Proposed Cycle Routes for Ku-ring-gai

The following section presents the proposed cycle routes for the Ku-ring-gai Bicycle Plan, which have been developed through an iterative process between GHD, Council, stakeholders and the community. A map corresponding to the proposed cycle routes shown in Table 7 are provided in Appendix B.

6.5.1 Routes on State and Regional Roads

The majority of the routes on the proposed Ku-ring-gai bicycle network, as part of this bike plan, are located on Council roads where Ku-ring-gai Council the Highway Authority responsible for maintenance and decision making related for the road.

However, a number of the proposed routes are located on Regional and State roads which are under the control of RMS, who are the responsible authority for these roads. In general, routes on Regional and State roads have been proposed where these are currently regularly used by cyclists, where they fill a gap in the network which there is no convenient alternative route or they fill a gap in the network where there is no alternative route available.

In the case of routes proposed on Regional and State roads, it is acknowledged that it will be necessary to for Council to consult, and work closely with, RMS in the completion of these routes.

6.5.2 The North Shore Rail Trail

It should be noted that the aspirational North Shore Rail Trail has not been included as a recommended route in the proposed Ku-ring-gai bicycle network as Council does not have significant power to influence the implementation of this route. The Rail Trail is seen a strategic regional route which is reliant on State Government policy and funding for implementation.

The route network proposed as part of this bike plan has generally been developed on the basis that these routes are achievable in the short to medium term with the resources available to Council.

Table 7 Proposed Cycle Improvements

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
Bobbin Head 1	On Road Bicycle Lane	Bobbin Head Road (between Burns Road - Pentecost Avenue)	RMS	703	$11,000	$88,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Bobbin Head 2	On Road Mixed Traffic	Bobbin Head Road (between Sir Frederick Scherger Drive - Empire Marina)	RMS	3,613	$29,000	$35,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Gordon 1	On Road Bicycle Lane	Werona Avenue (between Park Avenue - Nelson Street)	Council	339	$5,000	$43,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	Bridge	Werona Avenue (between Park Avenue - Nelson Street)	RailCorp/ Council	40	$320,000	$400,000	• Construction of new bicycle bridge	• Construction of new bicycle bridge
Gordon 2	Off Road Path	St Johns Avenue (between Lady Game Drive - Pacific Highway)	Council	675	$31,000	$37,000	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	St Johns Avenue (between Lady Game Drive - Pacific Highway)	Council	1,679	$13,000	$16,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Gordon 3	Off Road Shared Path	Rosedale Road(between Lennox Street - Amesbury Avenue)	Council	305	$12,000	$15,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Rosedale Road(between Lennox Street - Amesbury Avenue)	Council	1,469	$12,000	$14,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Gordon 4	Off Road Shared Path	Pacific Highway (between Park Avenue - Pymble Station)	RMS	1,483	$60,000	$72,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
Gordon 5	On Road Mixed Traffic	Dumaresq Street/Vale Street (between St Johns Avenue - Pacific Highway)	Council	954	$8,000	$9,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Killara 1	On Road Bicycle Lane	Stanhope Road/Fiddens Wharf Road/Springdale Road (between Highfield Road-Redgum Avenue)	Council	1,573	$25,000	$198,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Stanhope Road/Fiddens Wharf Road/Springdale Road (between Highfield Road-Redgum Avenue)	Council	393	$3,000	$4,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Killara 2	On Road Mixed Traffic	Rosedale Road /Arthur Street/McIntosh Street/Rosebery Street/Springdale Road (between Edward Street-Karranga Avenue)	Council	2,654	$21,000	$25,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Killara 3	On Road Mixed Traffic	Koola Avenue (between Rosebery Road-Bligh Street)	Council	664	$5,000	$6,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Killara 4	Off Road Shared Path	Werona Avenue (between McIntosh Street - Springdale Road)	Council	104	$4,000	$5,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Werona Avenue (between McIntosh Street - Springdale Road)	Council	1,469	$12,000	$14,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Killara 5	Off Road Path	Eastern Arterial Road (between Hunter Avenue and Koola Avenue)	Council	1,798	$83,000	$99,000	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs
Lindfield 1	On Road Mixed Traffic	Nelson Road/Russell Avenue (between Stanhope Road - Lindfield Avenue)	Council	1,871	$15,000	$18,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Lindfield 2	On Road Mixed Traffic	Lindfield Avenue/Strickland Avenue (between Havilah Road - Clanville Road)	Council	1,069	$9,000	$10,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
Lindfield 3	On Road Mixed Traffic	Shirley Road/Aringdon Road (between Pacific Highway-Winchester Avenue)	Council	2,894	$23,000	$28,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Lindfield 4	On Road Mixed Traffic	Kochia Lane (between Pacific Highway-Nelson Road)	Council	352	$3,000	$3,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Lindfield 5	On Road Bicycle Lane	Lady Game Drive (between Ryde Road - Moore Avenue and Grosvenor Road - Millwood Avenue)	RMS	2,577	$41,000	$324,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Lindfield 6	On Road Mixed Traffic	Grosvenor Road/Austral Avenue/Eton Rd (between Lady Game Drive - Abingdon Road)	Council	1,621	$13,000	$16,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Lindfield 7	On Road Mixed Traffic	Max Allen Drive/Bradfield Road (between Lady Game Drive - Moore Avenue)	Council	2,883	$23,000	$28,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Pymble 1	On Road Bicycle Lane	Telegraph Road/Mona Vale Road (between Merrivale Road-Pentecost Avenue)	RMS/Council	645	$10,000	$81,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Pymble 2	On Road Mixed Traffic	Station Street (between Pentecost Avenue – Grandview Street)	Council	1,732	$14,000	$17,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Pymble 3	On Road Mixed Traffic	Livingstone Avenue/Andrew Avenue/YankoRoad(between Pacific Highway-Kooloona Crescent)	Council	2,552	$20,000	$25,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Pymble 4	On Road Mixed Traffic	Pymble Avenue (between Livingstone Avenue-Everton Street)	Council	561	$4,000	$5,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Roseville 1	On Road Mixed Traffic	Addison Avenue/ Babbage Road (between Archbold Road-Healey Way)	Council	1,825	$15,000	$18,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
	On Road Bicycle Lane	Addison Avenue/ Babbage Road (between Archbold Road-Healey Way)	Council	96	$2,000	$12,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Roseville 2	On Road Mixed Traffic	Trafalgar Avenue/Bancroft Avenue (between Boundary Street-Clanville Road)	Council	2,327	$19,000	$22,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Roseville 3	On Road Mixed Traffic	Clanville Road/Shirley Road /Abingdon Road (between Trafalgar Avenue- UTS)	Council	2,773	$22,000	$27,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Roseville 4	Off Road Shared Path	Hill Street/Strickland Avenue (between Chelmsford Avenue-Boundary Street)	Council	93	$4,000	$5,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Hill Street/Strickland Avenue (between Chelmsford Avenue-Boundary Street)	Council	1,684	$13,000	$16,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Roseville 5	On Road Mixed Traffic	The Rifleway/Roseville Avenue (between Shirley Road-Trafalgar Avenue)	Council	415	$3,000	$4,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	Off Road Shared Path	The Rifleway/Roseville Avenue (between Shirley Road-Trafalgar Avenue)	Council	138	$6,000	$7,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
St Ives 1	On Road Mixed Traffic	Hunter Avenue (between Horace Street - Melaleuca Drive)	Council	1,060	$8,000	$10,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
St Ives 2	Off Road Path	Garigal National Park	National Park	1,455	$67,000	$80,000	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (2.5m) • Line marking • Bicycle symbols • Bicycle route and direction signs
St Ives 3	On Road Mixed Traffic	Douglas Street /Woodbury Road /Roma Road (between Mona Vale Road-Killeaton Street)	Council	3,545	$28,000	$34,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
St Ives 4	On Road Mixed Traffic	Mona Vale Road (between St Ives Showground - Pentecost Avenue)	RMS	4,126	$33,000	$40,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
St Ives 5	Off Road Shared Path	Cowan Road/Shinfield Avenue/Kulgoa Road (between Killeaton Street-Woodlands Avenue)	Council	671	$27,000	$33,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Bicycle Lane	Cowan Road/Shinfield Avenue/Kulgoa Road (between Killeaton Street-Woodlands Avenue)	Council	354	$6,000	$45,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Cowan Road/Shinfield Avenue/Kulgoa Road (between Killeaton Street-Woodlands Avenue)	Council	718	$6,000	$7,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
St Ives 6	Off Road Shared Path	Burns Road/Killeaton Street (between Bobbin Head Road-Mona Vale Road)	Council	517	$21,000	$25,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
Turramurra 1	On Road Bicycle Lane	Kissing Point Road (between The Comenarra Parkway-Pacific Highway)	RMS	952	$15,000	$120,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Turramurra 2	On Road Mixed Traffic	Catalpa Crescent (between Kissing Point Road-Pacific Highway)	Council	1,366	$11,000	$13,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	Bridge	Catalpa Crescent (between Kissing Point Road-Pacific Highway)	RailCorp/Council	40	$320,000	$400,000	• Construction of new bicycle bridge	• Construction of new bicycle bridge
Turramurra 3	On Road Mixed Traffic	Eastern Road (between Boomerang Street - Pacific Highway)	Council	619	$5,000	$6,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
Turramurra 4	On Road Bicycle Lane	Boomerang Street/Pentecost Avenue(between Mona Vale Road-Eastern Road)	Council	624	$10,000	$79,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Boomerang Street/Pentecost Avenue(between Mona Vale Road-Eastern Road)	Council	1,873	$15,000	$18,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Turramurra 5	On Road Mixed Traffic	Turramurra Avenue/Womerah Street/Wonga Wonga Street (between Boomerang Street-Pacific Highway)	Council	868	$7,000	$8,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Turramurra 6	On Road Bicycle Lane	The Comenarra Parkway (between Kissing Point Road - Ryde Road)	Council	3,458	$55,000	$435,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Wahroonga 1	On Road Mixed Traffic	Ada Avenue/Cleveland Street (between Fox Valley Road-Burns Road)	Council	1,950	$16,000	$19,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Wahroonga 2	On Road Mixed Traffic	Millewa Avenue (between Sydney-Newcastle Freeway - Cleveland Street)	Council	578	$5,000	$6,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Wahroonga 3	Off Road Shared Path	Junction Road/Cleveland Street (between Edgeworth David Avenue-Water Street)	Council	512	$21,000	$25,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs
	On Road Mixed Traffic	Junction Road/Cleveland Street (between Edgeworth David Avenue-Water Street)	Council	520	$4,000	$5,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Wahroonga 4	Off Road Shared Path	Burns Road (between Grosvenor Street - Bobbin Head Road)	Council	599	$24,000	$29,000	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs	• Concrete path (3m) • Line marking • Bicycle symbols • Bicycle route and direction signs

Route Name	Type	Description	Authority	Length (m)	Low End Cost	High End Cost	Low End Cost Inclusions	High End Cost Inclusions
	On Road Mixed Traffic	Burns Road (between Grosvenor Street - Bobbin Head Road)	Council	1,046	$43,000	$51,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Warrawee 1	On Road Mixed Traffic	Millewa Avenue (between Cleveland Street-Eastern Road)	Council	1,801	$14,000	$17,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Warrawee 2	On Road Mixed Traffic	The Comenarra Parkway/Fox Valley Road (between Pennant Hills Road-Pacific Highway)	RMS/Council	3,081	$25,000	$30,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs
Warrawee 3	On Road Bicycle Lane	The Comenarra Parkway (between Fox Valley Road-Kissing Point Road)	RMS	2,223	$36,000	$280,000	• Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs	• Resurfacing of bicycle lane (1.5m wide x 2) • Carriageway line marking • Carriageway bicycle symbols • Bicycle route and direction signs

7. Prioritisation and Funding

7.1 Route Prioritisation

As described earlier in the study, the proposed cycle facilities were prioritised based on modifying the weighted criteria scoring system outlined in Section 3.5.

Table 8 presents an overview of the criteria used in Table 9. Routes which receive the highest score are considered to be the highest priority.

Table 8 Weighted Criteria Scoring System

Category	Criteria	Score
Land Use [maximum of 35]	Number of Attractors/Generators	More than 5 locations [10] 3-5 locations [8] 1-2 locations [5] 0 locations [0]
	Land Use Type	Schools [10] Commercial / retail [8] Residential [5] Other [0]
	Proximity to Attractors/Generators	Less than 250 metres [10] >250-500 metres [8] >500-1000 metres [5] >1000 metres [0]
	Future Development with Attractors/Generators	High [5] Medium [3] Low [1]
Traffic Impact [maximum of 15]	Road Hierarchy	State Road [15] Regional Road [10] Local Road [8] Special use [5] Other [0]
Safety [maximum of 25]	Identified as Hazardous Area (from Audit and Consultation)	High [10] Medium [8] Low [5] None [0]

Category	Criteria	Score
	Identified Cyclist Crashes	>3 reported crashes per year [15] 3 reported crashes per year [10] 2 reported crashes per year [8] 1 reported crash per year [5] 0 reported crashes per year [0]
Facility Benefits [maximum of 10]	Demonstrated Path	High use [10] Medium use [8] Low use [5] No demonstrated use [0]
Continuity of Routes [maximum of 10]	Addition to Existing Facility	Link existing facilities [10] Extension of facilities [8] Addition to facilities [5] Other [0]
Priority [maximum of 5]	Route Hierarchy	High use [5] Medium use [3] Low use [1]

Note: Modified from RTA publication *How to Prepare a Pedestrian Access and Mobility Plan* (2002).

7.2 Priority Levels for Cycle Improvements

Table 9 ranks the proposed bicycle routes for Ku-ring-gai based on the modified Weighted Criteria Scoring System.

As discussed in Section 3.5, the priorities are based on a slightly modified PAMP methodology which generally incorporates the key prioritisation criteria Council's Traffic and Transport Policy.

It is noted that this prioritisation is a recommendation to Council only.

Table 9 Priority Levels for Proposed Cycle Improvements

	Land Use				Traffic Impact	Safety	Facility Benefits		Continuity of Routes	Priority		
Route	No. of generators	Land use type	Proximity to generators	Future development	Road hierarchy	Hazardous area	Cycle crashes	Demonstrated path	Addition to existing facility	Route hierarchy	Total Score	Priority Rank
St Ives 4	8	10	10	3	10	10	5	8	10	5	79	1
Turramurra 1	8	10	8	1	10	10	8	8	10	5	78	2
Pymble 4	8	10	8	1	8	8	5	8	8	5	69	3
Bobbin Head 1	8	10	10	1	8	8	5	5	8	3	66	4
Roseville 4	5	5	5	1	10	10	8	8	8	5	65	5
Gordon 4	5	5	8	1	10	8	5	8	8	5	63	6
Lindfield 5	8	10	8	1	10	8	0	8	5	3	61	7
Lindfield 7	8	10	8	1	10	8	0	8	5	3	61	8
St Ives 3	5	10	10	5	8	0	0	8	10	5	61	9
Gordon 1	5	10	8	1	8	5	0	10	8	5	60	10
Wahroonga 4	5	10	10	1	8	8	0	5	8	3	58	11
Killara 5	5	10	10	1	10	5	0	5	8	3	57	12
Gordon 3	8	10	8	1	8	0	0	8	8	5	56	13
Lindfield 3	8	10	8	3	8	0	0	8	8	3	56	14
Lindfield 6	8	10	10	3	8	0	0	8	8	1	56	15

Land Use					Traffic Impact	Safety	Facility Benefits		Continuity of Routes	Priority		
Route	No. of generators	Land use type	Proximity to generators	Future development	Road hierarchy	Hazardous area	Cycle crashes	Demonstrated path	Addition to existing facility	Route hierarchy	Total Score	Priority Rank
Warrawee 2	5	5	8	1	8	8	0	5	8	8	56	16
Warrawee 3	5	5	8	3	8	8	5	5	8	1	56	17
Gordon 2	5	10	5	1	8	8	0	5	8	5	55	18
Roseville 3	5	10	10	1	8	0	0	8	8	5	55	19
Turramurra 6	8	10	0	3	8	8	5	5	5	3	55	20
Turramurra 2	5	5	8	1	8	8	8	5	5	1	54	21
Killara 4	5	10	8	1	8	0	0	8	8	5	53	22
Pymble 3	5	10	5	1	8	8	0	5	8	3	53	23
St Ives 1	5	10	10	1	8	0	0	8	8	3	53	24
Wahroonga 1	5	10	10	1	8	0	0	8	8	3	53	25
Wahroonga 2	5	10	10	1	8	0	0	8	8	3	53	26
Warrawee 1	5	10	10	1	8	0	0	8	8	3	53	27
Roseville 2	5	10	5	1	8	0	0	10	10	3	52	28
Bobbin Head 2	5	5	5	1	8	5	5	5	8	3	50	29
Lindfield 2	5	5	8	3	10	0	0	8	8	3	50	30
Pymble 1	5	8	8	3	10	0	0	5	8	3	50	31

Land Use					Traffic Impact	Safety	Facility Benefits		Continuity of Routes	Priority		
Route	No. of generators	Land use type	Proximity to generators	Future development	Road hierarchy	Hazardous area	Cycle crashes	Demonstrated path	Addition to existing facility	Route hierarchy	Total Score	Priority Rank
St Ives 5	5	8	8	3	8	5	0	5	5	3	50	32
St Ives 6	5	8	8	3	8	5	0	5	5	3	50	33
Killara 3	1	10	10	1	8	0	0	8	5	5	48	34
Roseville 1	5	10	8	1	8	0	0	8	5	3	48	35
Lindfield 4	5	8	8	1	8	5	0	5	5	1	46	36
Gordon 5	5	10	5	1	8	5	0	5	5	1	45	37
Lindfield 1	5	10	5	1	8	0	0	5	5	3	42	38
St Ives 2	5	0	10	1	5	0	0	10	10	1	42	39
Roseville 5	5	8	8	1	8	0	0	5	5	1	41	40
Wahroonga 3	5	5	8	1	8	0	0	5	8	1	41	41
Killara 2	5	10	0	1	8	0	0	5	8	3	40	42
Turramurra 3	5	5	8	3	8	0	0	5	5	1	40	43
Turramurra 4	5	5	8	1	8	0	0	5	5	3	40	44
Turramurra 5	5	8	10	2	8	0	0	0	5	1	39	45
Pymble 2	5	5	8	1	8	0	0	5	5	1	38	46
Killara 1	1	10	0	1	8	0	0	5	5	5	35	47

7.3 Sources of Funding

7.3.1 Council Funding

Data provided by Council indicates that the primary funding mechanism for bicycle improvements within the LGA will be based on the State Government's Environmental Levy which has allocated *"$900,000 for sustainable transport initiatives including cycle ways*" according to information provided on Council's website. It is understood that this funding is available to Council for eight-years from June 2011, offering approximately $112,500 per annum for use on the development of Council's cycleway network.

There is potential for the extension of the Environmental Levy beyond the current 8-year extension to support the 10-year infrastructure implementation plan.

In addition, there is potential for bicycle facilities to be constructed by coupling the works onto planned and reactive maintenance works under taken by Council.

7.3.2 RMS Funding

A number of funding sources exist through which funding for the provision of bicycle facilities can be obtained, these include:

RMS Contributions

Funding from the RMS is available in the following forms:

- Funding from an Environmental Levy can potentially be doubled through RMS grants for the 50/50 funding works, with funding available for:
  - Bicycle Facilities: improvement of existing bicycle facilities;
  - Bicycle User Support: supporting cycling through research, training and promotion; and
  - Cycleways: design and construction of on and off-road cycleways which are in line with the NSW Bike Plan and Council's Bike Plan.

Blackspot Funding

There is potential to construct cycle facilities and fund cycling improvements to the road network by providing upgrades at existing intersections being upgraded as part of the RMS Blackspot program, who fund safety improvements at identified blackspots through their own RMS Blackspot Program and the Federal Government's Nationbuilding Blackspot Program.

A review of existing crash data against the proposed cycle network has indicated that funding may be available at a number of locations on the proposed cycling network. These should be prioritised and applications made for funding on a site by site basis.

7.3.3 Other Funding Sources

Funding for cycling infrastructure and promotion is also available from the following sources:

- NSW Bike Week event funding for the purpose of raising the profile of cycling as a mode of transport;
- Sport & Recreation Participation Program which funds projects designed to increase participation in sport and recreation; and

- The Liveable Cities Program which funds projects which tackle the high level of car dependency in cities as a way to address the challenges of climate change, among others.

8. Supporting a Culture of Cycling

8.1 Introduction

The following chapter presents a strategy to support the development of a culture of cycling in Ku-ring-gai. The programs and activities proposed are informed by insights drawn from a combination of community engagement and the outcomes of a series of workshops undertaken with a group of Council officers and members of the community.

8.1.1 The approach

This strategy adopts a behavioural model consisting of motivating factors and enabling factors. For a group of actors to adopt a particular behaviour both factors need to be active in their lives.

Motivating factors are understood to be intrinsic desires, connected to peoples' identities that attract them to certain behaviours. Motivations for cycling include being fit and looking good and the pleasure of cycling. Because motivating factors are intrinsic to peoples' identities they are generally not within the power of agencies to influence. Hence when motivations are weak it's necessary to rely primarily on infrastructure measures.

Enabling factors are changes to:

- Peoples' environments; and
- Their self-efficacy that lowers the perceived risks of acting.

In the case of cycling these include the existence of safe, efficient cycle routes, the personal confidence to cycle safely, knowledge of suitable routes, and bicycle facilities at destinations. In principle, enabling factors are within the power of agencies to influence, so they are the primary focus of this behaviour change strategy.

The enabling factors for Ku-ring-gai are presented in Section 8.2.

8.2 The Enablers for Cycling in Ku-ring-gai

Table 10 and Table 11 present summaries of the key enabling factors or conditions that need to be in place to support the goal of enabling more people to cycle more regularly for all purposes in Ku-ring-gai. Table 10 focuses on the needs of young people and adults, whereas Table 11 focuses on the needs of young children.

Table 10 The Behavioural Model for Increasing Cycling Among Adults and Young People in Ku-ring-gai

Components of the Model	Enabling Factors (the conditions that need to be in place for the goal to be achieved)
Pre-trip / Individual Enablers A combination of intrapersonal and social factors that influence one's self-efficacy to and acceptance of cycling	**If Feasible** 1. Better skills and confidence to ride with vehicular traffic on the road. 2. The basic skills and confidence to ride a bicycle. 3. The opportunity to ride as part of a group of cyclists. 4. A greater level of awareness of the rights and needs of cyclists among motorists. 5. Access to a bicycle to "try before buying".
The Trip / Trip Enablers A combination of cycling infrastructure, wayfinding and relationships with other road users	**If Present** 1. The provision of safe and comfortable bicycle routes. 2. Bicycle routes that connect where people live with a range of destinations across the LGA. 3. The provision of physically separated bike paths.
End of Trip / Destination Enablers Primarily concerned with the provision of appropriate facilities at destinations	**If Present** 1. More and better shower, changing and storage at key destinations, particularly workplaces. 2. More and better bicycle parking at key destinations across the LGA.
GOAL: More adults and young adults cycling more regularly for all purposes	

Table 11 presents the key enabling factors to support more young children in Ku-ring-gai to cycle.

Table 11 The Behavioural Model for Increasing Cycling Among Young Children in Ku-ring-gai

Components of the Model	Enabling Factors (the conditions that need to be in place for the goal to be achieved)
Pre-trip / Individual Enablers A combination of intrapersonal and social factors that influence one's self-efficacy to and acceptance of cycling	**If Feasible** 1. The provision of basic bicycle skills training at schools. 2. A greater level of awareness of the rights and needs of cyclists among motorists.
The Trip / Trip Enablers A combination of cycling infrastructure, wayfinding and relationships with other road users	**If Present** 1. The provision of separated, safe and comfortable bicycle routes connecting residential areas with schools.
End of Trip / Destination Enablers Primarily concerned with the provision of appropriate facilities at destinations	**If Present** 1. Bicycle parking at all schools across the LGA.
GOAL: More young children cycling more regularly	

The remaining sections of this chapter propose a number of behaviour change programs and activities that address the key enabling factors presented in Table 10, and seek to activate the key motivating factors identified through the community engagement process.

The key motivating factors identified through the community engagement process are:

- Health, fitness and to exercise.
- Fun and enjoyment.
- To reduce stress / improve relaxation.
- To save money on the cost of owning and maintaining a car.
- To help the environment.

The decision to cycle is rarely made in private without outside influence. It usually depends on an interaction between individual desires and abilities, social influences and the physical environment. Much attention has been given to getting the cycling infrastructure right. However as a result, social influences are often neglected. As a result, a number of the initiatives seek to mobilise social influence.

8.3 Behaviour Change Programs

The following section presents a number of behaviour change programs to address the enabling factors (outlined in Table 10 and Table 11), specifically those related to the Pre-Trip component of the behavioural model.

Program 1: Capacity Building Classes for Beginners

Purpose	The purpose of this program is to provide people within the community who would like to take up cycling with the skills, knowledge and confidence to cycle.
Objectives	The key objectives are: 1. to provide training in how to ride a bicycle on the road and on shared paths (including guidance on the rules of using shared paths) 2. to provide people with the knowledge to buy a bicycle and associated equipment that are appropriate for their needs 3. to provide people with the skills and knowledge to maintain a bicycle 4. to provide people with the knowledge to plan a journey (including where to find information on routes)
Partners	• Bike North • Transport NSW approved cycling training providers (e.g. Austcycle) • Police
Audience	• Young children and their parents • Senior citizens • Women (women only groups) • All members of the community predisposed to cycling
Activities	The key activities for this program include: 1. Develop a curriculum for bicycle training in collaboration with a professional training body or service provider; 2. Determine frequency of classes: run one class as a permanent fixture in the council calendar of events, and then run additional classes based on demand; 3. Explore opportunities to run events with adjacent LGAs to manage demand; 4. Determine appropriate facilities for classes, taking into account accessibility for the wider community; 5. Widely advertise classes through a range of mediums and maximize exposure to members of the community who would not normally participate in cycling events, groups etc.; 6. Establish a system for capturing information on why people attended, their

	experience and what happened to their participation in cycling after attending (document some stories of change from participants for promotion through Council website and newsletters); 7. Explore opportunities to provide classes specifically for school children, within schools; 8. Develop a resources pack for people to download directly from council website, providing basic guidance on bicycle skills, knowledge and awareness for people who are unable or initially unwilling to attend the classes.

Program 2: Shared Path Coexistence Campaign

Purpose	The purpose of this program is to improve the relationship between users of shared paths by normalizing a code of conduct that provides for all users needs.
Objectives	The key objectives are: • Improve the awareness of the rules and etiquette for using shared paths; • Normalise the proper use of, and reaction to, bicycle bells on shared paths; and • Reduce the perception of risk associated with using shared paths.
Partners	• Bike North • RMS • Local sports cycling clubs • Police
Audience	• All users of shared paths

Activities	The key activities for this program include:
	1. Develop a code of conduct for the use of shared paths (drawing on the availability of existing resources – see City of Sydney);
	  • Ensure that materials only use images of people in normal clothes riding sit-up or cargo bicycles.
	  • Ensure the brochure is concise, engaging and uses non-dictatorial language.
	  • Should be inclusive of all shared path users.
	2. Develop and test a range of signage for shared paths, that complement the code of conduct and focuses on three main rules only – avoid slogans, ensuring the rules are the focus of the signs.
	3. Run a series of events targeting shared paths across the LGA, distributing the code of conduct to all shared path users – include rewards for people who are displaying positive behaviours in-line with the code of conduct;
	  • Use these events to gather information, through interaction and observation, on the issues that are influencing behaviour on the shared paths – document this data and information and use it to develop further initiatives to improve how people share the paths.
	4. Run a series of workshops involving sports cyclists and non-sports cyclists to raise awareness of needs and motivations in a friendly and fun environment: work with local cycling clubs and advocacy groups – engage participants in exercises where they take the other persons' perspective
	  • This workshop must be carefully planned and professionally

	facilitated to avoid tensions to surface and conflict to emerge. • The participants selected for the workshops should be interested in finding common ground, as a starting point for their involvement. • Careful attention should be paid to documenting the workshops, capturing anecdotal evidence of changing attitudes. • The workshops should be followed up with a promotional campaign to disseminate the stories of change that emerge from the workshop.

Program 3: Cycling Legitimisation Campaign

Purpose	The purpose of this program is to raise awareness of the presence and rights of cyclists on the road in Ku-ring-gai.
Objectives	The key objectives are: • To trial a range of stencils, signs and markings that raises the expectation of the presence of cyclists on the road. • To encourage motorists to drive more carefully in the presence of cyclists, specifically to drive slower and provide more space when overtaking / passing by cyclists.
Partners	• RMS • Police
Audience	• Motorists
Activities	The key activities for this program include: 1. Undertake a review of best practice in signing, stencils and imagery for promoting the presence of cyclists on the road; 2. Run a workshop with input from a communication designer to develop a set of concepts to trial in a targeted location in the LGA; 3. Pilot and document the impact of the concepts over a 1 weeks period; 4. Refine the concepts based on the learnings from the prototyping phase and roll out the signage to other locations. 5. Engage with the RMS and the local police to promote the program and capture feedback from the public – use social media (both Council and RMS Facebook and Twitter) to drive a conversation about the program, the issue and to capture insights for developing the program further; 5. Follow up the conversation phase with a series of workshops involving cyclists and motorists to enable road users to share needs and motivations in a friendly and fun environment: continue working with RMS – engage participants in exercises where they take the other persons' perspective. Ensure: • This workshop is carefully planned and professionally facilitated to avoid tensions to surface and conflict to emerge. • The participants selected for the workshops are interested in finding common ground, as a starting point for their involvement. • Careful attention is paid to documenting the workshops, capturing anecdotal evidence of changing attitudes. • The workshops are followed up with a promotional campaign to

	disseminate the stories of change that emerge from the workshop.

Program 4: Power-assisted Bicycle Trial Scheme

Purpose	The purpose of this program is to provide members of the community with the opportunity to experience a power-assisted bicycle to help reduce the perception that hills and distance are a major barrier for cycling.
Objectives	The key objectives are: • To raise awareness of the benefit of power-assisted bicycles for all members of the community, particularly senior citizens and those with physical impairments that would limit the distance they could travel on a normal bicycle. • To raise awareness of the variety of bicycles available on the market.
Partners	• Bike North • Local bicycle shop or retailor of power-assisted bicycles
Audience	• The wider community, but it is recommended that some senior citizens are encouraged to participate.

Activities	The key activities for this program include:
	1. Explore the provision of a number of power assisted bicycles (ranging in type) for the scheme: sponsorship may be an option in some cases;
	2. Develop a structure for the program:
	  • Participants should commit to a minimum level of use of the bicycle over an agreed period of time.
	  • Participants should commit to maintain a diary to document their experience.
	  • Participants should meet each other at the outset and the end of the program, to firstly establish a network and foster social interaction and secondly to compare and contrast their experiences.
	  • Participants should be rewarded for their involvement but care needs to be taken to how the rewards are structured i.e. to ensure they sustain their involvement.
	3. Establish a system to document the scheme and ensure that all outcomes (expected and unexpected) are captured.
	4. Promote the results of the scheme widely and set up a process for people to report purchases of power-assisted bicycles.

8.4 Promotion and Marketing

The following recommendations are proposed for the promotion and marketing of cycling in Ku-ring-gai:

- In order to normalize cycling among the community, all cycling related marketing material (posters, brochures, fliers, website content etc.) should use images:
  - Of normal people riding in normal clothes;
  - Of people riding sit-up, electric / power assisted and cargo bicycles
  - Of both genders but focus more on women; and
  - Of senior citizens.
- Create an easily accessible map of the bicycle network, to include the location of bicycle facilities, and highlighting specific routes for transport and/or leisure trips – propose some easy routes for beginners to try;
- Promote cycling for travel to all Council run and sponsored events: provide bicycle parking at major events, including (but not limited to):
  - Australia Day Concert
  - Festival on the Green
  - Festival of Wildflowers
  - Twilight Concerts in the Park
- Create a one-stop-shop cycling webpage on the Council website.
- Promote all cycling activity in Council newsletters, including the outcomes of behaviour change programs and progress on developing the bicycle network.
- Explore running 2 residential street programs, closing off a section of the street to motorized traffic and providing a range of cycling related services and activities for local residents, including (but not limited to):
  - Bicycle maintenance
  - Skills training
  - Route planning advice
  - Distribute maps and promotional goods
  - Document feedback from residents on cycling in the community / LGA
- Participate in NSW Bike Week – explore integrating with residential street engagement proposal.

9. Further Considerations

9.1 Maintenance

9.1.1 Maintenance Considerations

Maintaining bicycle paths to be in a suitable condition is a key requirement to ensuring the plan's objectives are achieved. If the bicycle facilities are not adequately maintained to a suitable level of service, cyclists are discouraged from using them. Worse, cyclists may have the tendency to swerve into the path of vehicular traffic in order to avoid sections of deteriorated surface conditions, posing a safety hazard to both themselves and general traffic.

The importance of maintaining road assets and the financial impacts of not doing so is well known to most road authorities, including Councils. However, maintenance of bicycle paths after construction is less commonly incorporated into asset management programs.

At a minimum, Council's maintenance program for its bicycle network infrastructure should follow the standards it keeps for maintaining its road assets. An important consideration to make is to incorporate bicycle path maintenance within the overall road network asset management program.

9.1.2 Maintenance Items

As indicated in the *Guide to Traffic Engineering Practice, Part 14: Bicycles* (AUSTROADS, 1999), regular maintenance activities on bicycle paths should include:

- Filling of cracks;
- Trimming or removal of grass;
- Sweeping of paths;
- Re-painting of pavement markings;
- Cleaning of signs; and
- Trimming of trees and shrubs to maintain safe clearances and sight distances.

Other considerations may include regular audits of railroad crossings and storm drain grates to ensure they are safe for cyclists.

9.2 Monitoring

The success of a plan or strategy can only be assessed if adequate monitoring or performance measures are included. The monitoring process will identify if the plan is achieving the desired behaviour change or facilitating the increased use of bicycles in the LGA. Such indicators also ensure that throughout the development of the plan, or program of works, the initiatives align with national, state and local planning objectives.

Identifying a monitoring method appropriate to a plan or strategy is critical to ensure time and resources are not misspent on processes that result in un-useful or irrelevant data collection and/or analysis. The measures outlined below present a range of options that could be easily tracked by Council officers and have been successfully used in previous Bicycle Plans.

Council have recently installed bicycle counting equipment at three locations within the LGA for the purpose of monitoring cycling flows on a number of key routes. In addition to monitoring this data, it is considered that some other forms of monitoring may be required to measure the success of the Bike Plan.

9.2.1 Modal Split

This measure provides an indication of demand for various modes of transport at an aggregate level. Typically modes would be broken down into; private vehicle; train; bus and other (which would include cyclists).

This type of data can provide an indication of the overall level of cycling use in the LGA. The percentage of cyclists can be obtained from the journey to work component of the Census or through the Household Travel Survey.

9.2.2 Vehicle Kilometres Travelled (VKT)

This measure also provides an indication as to the quality of the transport system within the region. Less vehicle kilometres travelled would imply that more residents utilise either active transport or public transport services in the LGA.

9.2.3 Road Injuries

Road injury monitoring, and in particular for cyclists and pedestrians, provides a reasonably accurate indication as to the levels of safety that new strategies and plans have instigated, and as to whether targets are being achieved. Such statistics also highlight high risk zones that require further attention and planning.

9.2.4 Cycleway Usage

Performing regular cyclist counts is a highly effective way of determining the usage of cycle ways. Measurement methods would have to be standardised to ensure valid data is collected and is comparable across time periods. Consistent increases in usage would imply new cycle routes and improved conditions have provided a more efficient, safer network which is suitable for a larger proportion of the population.

Cycleway usage should be monitored through Council's monitoring program in addition to obtaining data from state authorities and participating in Super Tuesday counts and other monitoring activities.

9.2.5 Data Availability

It should also be noted that data availability is one of the key criteria for evaluating a projects success. Before one or more monitoring methods are adopted, the quality and quantity of data required must be carefully considered in the context of existing data sets and potential data sets.

9.3 Signage

Signage for the bicycle network should be provided in conjunction with all new facilities. The main functions of signage for bicycle network facilities are:

- To assist users to find their way around the network; and
- To warn users of identifiable potential hazards within the riding environment.

The most important function of directional signage is to help users find their way around the network. Directional signage reinforces network connectivity and coherence and provides high visibility and recognition to the collection of routes which make up the wider cycle network.

In order to avoid ambiguity and conflict with motorised road users and bicycle riders, a completely independent system of signage for cyclists should be used. It is recommended that Council consult with bicycle network officers from the RMS and adjacent councils, or make use of regional forums such as the North Shore Regional Pedestrian and Bicycle Committee, to ensure a consistent, logical and useable set of destinations are selected.

Yellow diamond shaped warning signs are used to alert riders to changed or potentially hazardous path or road conditions. This type of signage is similarly used to alert other road users of intersecting or merging bicycle movements.

Bicycle signage should be provided in accordance with Australian Standard AS1742 – Manual for Uniform Traffic Control Devices Part 9 – Bicycle Facilities and Part 2 Traffic Control Devices for General Use (Australian/New Zealand Standards, 2000 & 1994).

10. Summary

GHD has undertaken this Bicycle Plan for Ku-ring-gai Council. Based upon a review of existing facilities and conditions, consultation with various bicycle user groups and an investigation into planned and proposed developments, the Bicycle Plan has recommended potential improvements to the existing cycle facilities across the LGA.

The proposed improvements have also incorporated comments received from an extensive consultation process with the local community and have been based on indications of Council's available budget over a 10-year timeframe.

The Bicycle Plan also provides guidance on additional measures to support increased bicycle use in the LGA including maintenance, potential monitoring criteria, end of trip facilities, bicycle parking, behaviour change and cycling promotion strategies and other 'softer' initiatives.

Appendix A

Consultation Report

Ku-ring-gai Council

Ku-ring-gai Bike Plan

Community Consultation Report

March 2012

This Community Consultation Report *("Report"):*

1. *has been prepared by GHD Australia Pty Ltd ("GHD") for Ku-ring-gai Council;*
2. *may only be used and relied on by Ku-ring-gai Council;*
3. *must not be copied to, used by, or relied on by any person other than Ku-ring-gai Council without the prior written consent of GHD;*
4. *may only be used for the purpose of assisting with the development of the new Bike Plan for Ku-ring-gai (and must not be used for any other purpose).*

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than Ku-ring-gai Council arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- *were limited to those specifically detailed in section 2 Consultation Methodology of this Report.*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- *interpretation of feedback received;*

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on until 3 months, after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

Contents

Table Index

Figure Index

Appendices

1. Introduction

Ku-ring-gai Council is developing a new Bike Plan for the Ku-ring-gai Local Government Area (LGA) to update the plan adopted by Council in 1995. This plan aims to address a number of the changes to technical specifications and government policies as well as changed community expectations.

GHD was engaged to consult with key stakeholders and the community to ensure the new Bike Plan addresses the current and future cycling needs of the community.

The purpose of the stakeholder and community consultation process was to gather information from a broad range of stakeholders including cyclists and non-cyclists about their current cycling behaviours in the LGA, the barriers to cycling, identifying gaps and opportunities for improving the cycling network and understanding what might be required to further encourage cycling.

The focus of this report is to record the outcomes of the consultation activities including the community survey, stakeholder workshops and the schools survey. The report highlights the key outcomes from these activities to assist the technical team to develop a new Bike Plan for the LGA that addresses the concerns and leverages off the opportunities identified by stakeholders and the community.

The survey results also assist in the development of a behaviour change strategy which addresses a number of the barriers to cycling for the community and provides suggestions for enabling more people to cycle in the LGA.

2. Consultation Methodology

GHD conducted the following consultation activities to seek stakeholder and community input into the development of the Ku-ring-gai Bike Plan.

2.1 Bicycle User Group (BUG) Workshop

Council invited a range of stakeholders from bicycle user and community groups to a workshop. Representatives from Bike North, Northern Beaches Bikers, Sydney North Off Road Cyclists, Easy Riders, representatives of the Ku-ring-gai Bicycle Reference Committee, Kranks' cycle group and Cycle Sydney attended the workshop on Wednesday 22 February at Council Chambers.

The purpose of this session was to provide an overview of the development of the new bike plan for Ku-ring-gai and identify the overarching goals for the new plan to inform and help shape the development of a vision for the plan. In addition this workshop provided an opportunity to identify and prioritise the missing links in the existing on-road and off-road cycle network.

A copy of the BUGs Workshop Agenda is in Appendix A.

2.2 Stakeholder Workshop

Council invited a range of key stakeholders to a workshop on Tuesday 28 February 2012 at Council Chambers. Attendees included representatives from Roads and Maritime Services (RMS), NSW Office of Environment and Heritage (OEH), Northern Sydney Local Health District and representatives from Willoughby, Hornsby and Warringah Shire councils.

The purpose of this workshop was to understand the current cycling conditions for each stakeholder within their jurisdiction, including the current cycling facilities, any bike plans and bicycle user groups. In addition this workshop sought input from stakeholders about the current regional connections including external links with the Ku-ring-gai LGA, East-West and North-South connections through the LGA and identifying the key opportunities, constraints and priorities for improving the cycling network in Ku-ring-gai.

A copy of the Stakeholder Workshop Agenda is in Appendix B.

2.3 Community Survey

A community survey was developed by GHD to capture the views of the broader community about the current cycling conditions in the LGA; information about cycling behaviours including barriers and enablers for cycling and feedback on cycling facilities and routes that could be improved in Ku-ring-gai. Responses from cyclists and non-cyclists were sought to ensure the new bike plan addresses the needs of current and potential cyclists in the community.

The survey was developed in both online and hard copy formats and was made available from Friday 10 February 2012 until Wednesday 7 March 2012. The online survey was developed using Survey Monkey and a link to the survey was available from Council's website. The survey has 22 questions and included both qualitative and quantitative questions. Hard copies of this survey were distributed to key locations including Council's four libraries (Turramurra, St Ives, Gordon and Lindfield), Council's Customer Service Centre,

Ku-ring-gai Wildflower Garden, Ku-ring-gai Art Centre, St Ives Cyclery, The Bicycle Shop Roseveille and Turramurra Cyclery.

A number of promotional activities were also undertaken to encourage participation in the survey. Posters were distributed and hung in the locations where hard copy surveys were available and additional posters were hung in bus shelters across the LGA. A copy of the poster is in Appendix C.

Council's Facebook page was also used to promote the survey. A status update, including a link through to the survey was posted on February 13 and February 19, 2012 encouraging community members to participate in the survey.

In addition, the community survey was promoted in Council's eNews publication.

To further encourage participation in the survey, each participant was offered the chance to go in the running to win one of 10 double movie tickets.

A copy of the survey can be found at Appendix D.

2.4 School Survey

A school survey was also developed by GHD to better understand the number of students and staff cycling to and from school; the enablers and barriers to cycling to school and the types of facilities available for those cycling to and from school (if any).

The purpose of this survey was to better understand the enablers and barriers to cycling to and from school and to understand the attitudes towards cycling by both staff and students.

The school survey was distributed to the Principals of 49 schools within the LGA on 10 February 2012 and schools had until Wednesday 7 March 2012 to complete the survey. Follow up phone calls with Principals were made by GHD to those who had not completed the survey to offer assistance in completing the survey.

The Principal was asked to complete the 13 survey questions on behalf of the school. Question 11 asked how many students (approximately) ride bicycles to and from school and Question 12 asked for reasons why students didn't ride their bicycles to school. The survey prompted these questions to be asked to all students by teachers on a nominated day and time to try and capture as many responses as possible.

A copy of the school survey is in Appendix E.

3. Results

3.1 BUG workshop outcomes

The workshop with Bicycle User Group (BUGs) members and other community representatives was facilitated by GHD.

The participants were tasked with two group exercises.

Group Exercise 1:

Participants were asked to brainstorm and create a mind map of their aims for cycling in Ku-ring-gai. At the end of the brainstorming session, each participant was asked to identify their top 5 goals which they considered to be the highest priority.

The goals which were identified as the highest priority included:

- Fully connected routes within Ku-ring-gai, other local government areas and National Parks
- Networks that are safe for all cyclists
- Increasing car driver awareness of cyclists
- Improving cyclist safety
- Making Ku-ring-gai a destination of choice for cyclists

Group Exercise 2:

Maps of the LGA were set up at three different tables with two GHD representatives and Council's Strategic Transport Engineer each sitting at a different table as the scribe. The tables were themed 'Missing On-Road Connections', 'Missing Off-Road Connections' and 'missing Public Transport Connections'. Stakeholders were asked to identify missing connections in each of the three categories. In addition, they were asked to note 'hot spots' which presented particular challenges to cyclists.

The missing connections which were identified as being the top priorities were:

Most Important On-Road Connections:

- Hornsby to Chatswood & North Sydney
- Across the Pacific Highway at Gordon
- Macquarie Park to Terrey Hills

Most Important Public Transport Connections:

- Gordon
- Turramurra

Most Important Off-Road Connections:

- Mona Vale Road
- Burns Road / Killeaton Street

3.2 Key Stakeholder Workshop Outcomes

A workshop with key stakeholders including representatives from RMS, OEH, Willoughby City Council, Hornsby Shire Council, Warringah Shire Council and Northern Sydney Local Health District was facilitated by GHD.

Participants were tasked with two group exercises which are outlined below.

Group Exercise 1:

Participants were asked to spend 2-5 minutes talking about the status of other Bike Plan's in surrounding LGAs or discuss their involvement with other bicycle planning initiatives.

The following outcomes were noted as being important to stakeholders:

- Improving safety for children cycling to schools;
- Promoting end of trip facilities as a way to promote cycling;
- Improving north-south connections;
- Finding an alternative to shared paths for commuters as it has been noted through the Willoughby Bike Plan consultation that they are unsuitable for commuters and result in conflicts;
- Using DCPs to encourage provision of bicycle parking and end of trip facilities; and
- Advocating separated cycleways.

Group Exercise 2:

Two LGA maps were set up and participants were asked to identify links which complemented their own Bicycle Planning in addition to highlighting routes through Ku-ring-gai which they felt were of regional importance. State government stakeholders were asked to highlight opportunities, constraints and priorities for bicycle route connections in Ku-ring-gai.

The following routes were noted as being important by attendees:

- The north-south connection along (parallel) to the Pacific Highway;
- Warringah Road and Mona Vale Road were noted as being important connections from Warringah to both Ku-ring-gai and Willoughby LGAs, in addition to a better connection between Frenchs' Forest and St Ives across Middle Harbour Creek;
- The Kissing Point Road connection to Ryde; and
- Improved connections across Boundary Street, Roseville, specifically at the Boundary Street / Archbold Street / King Edward Street intersection.

3.3 Community Survey

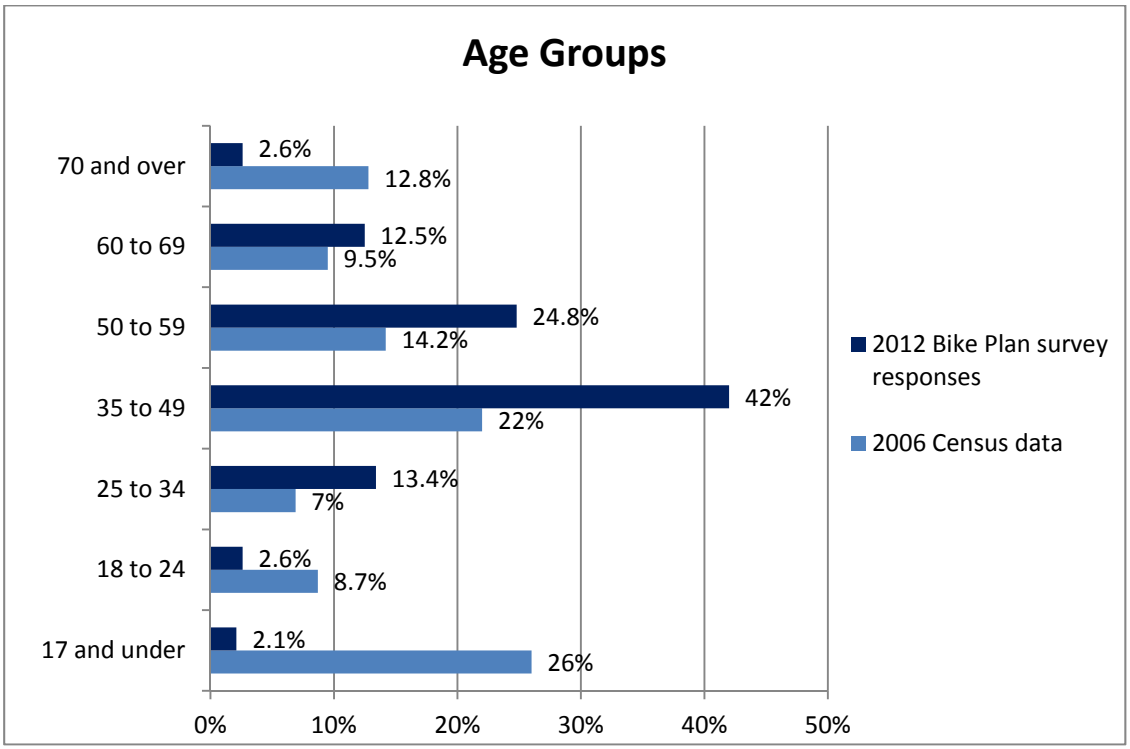
The survey

The survey received a total of 664 responses from people within and outside the Ku-ring-gai Local Government Area (LGA). While 52 of these surveys were considered to be 'incomplete', they were not excluded from the overall analysis.

Age and Gender representation

The demographic results of the survey respondents have been compared to the overall 2006 Census data for the Ku-ring-gai LGA. The results are presented in Figure 1 and Figure 2 below.

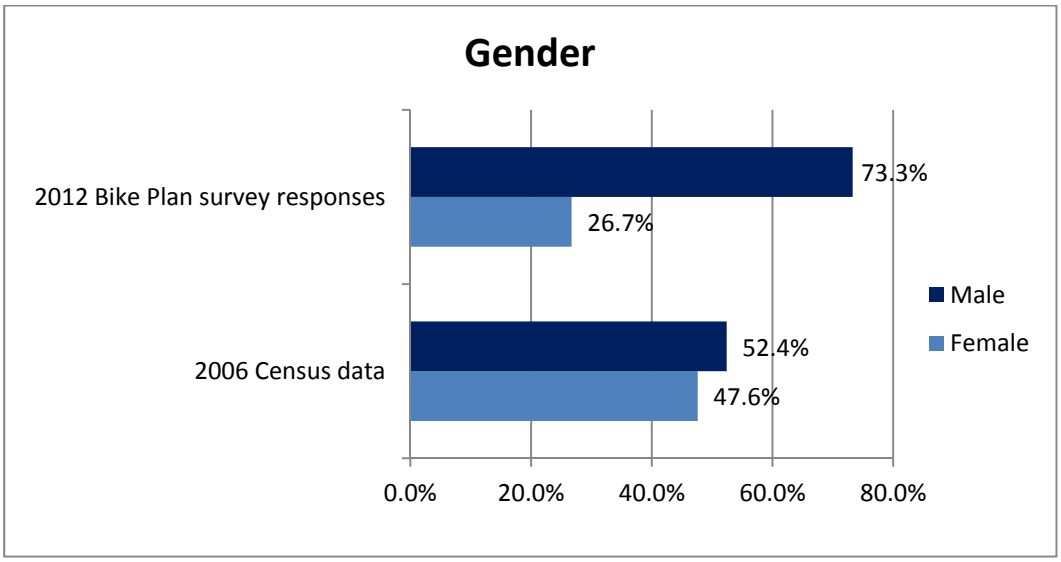
Figure 1 - Age groups represented



As indicated in the figure above, there were some age groups that were over or under represented in the community survey. The main age groups under represented included the 17 and under (2.1%), 18-24 (2.6%) and 70 and over (2.6%). In contrast, the 35 to 49 age group was over represented, making up 42% of respondents.

To ensure a broader representation of age groups, GHD carried out a separate school survey aimed at targeting students aged between 5 and 18. The responses to this survey are included in section ***3.4 'School Survey'***.

Figure 2 - Gender division



As indicated in the figure above, the survey results indicate an evident over representation of male respondents (73%) compared with the 2006 Census data figures.

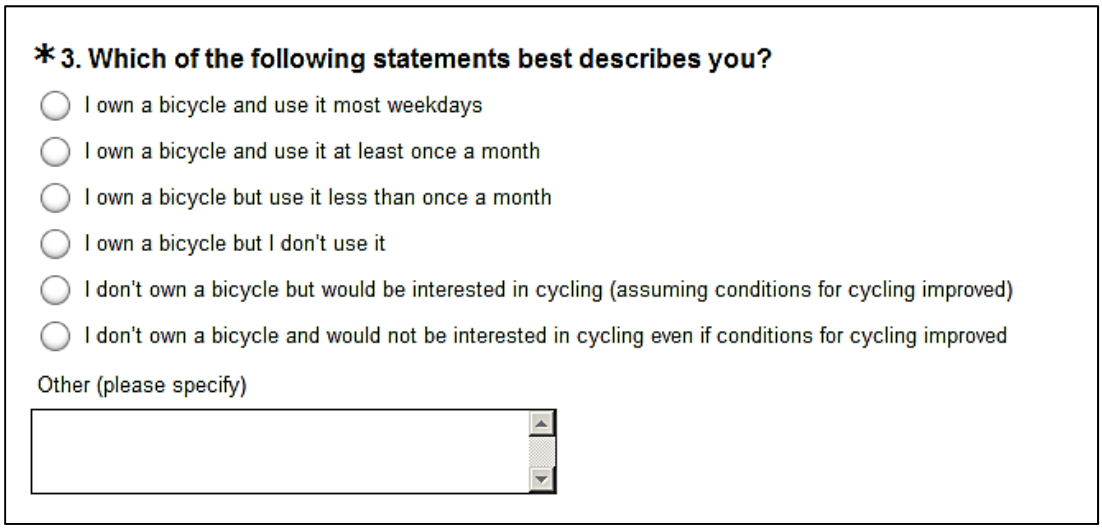
Limitations

There are a number of limitations to consider with respect to the results of the survey. A significant amount of effort was taken to mitigate these limitations during the development and distribution of the survey instrument. The limitations of the survey are:

Interpreting response options

Evident throughout the survey was the high level of interpretation that could be implied to the answer options for each question. This was particularly the case for quantitative questions whereby respondents could interpret the answer options differently.

Figure 3 - Example question



In order to ensure that the options provided were not restrictive, an ‘other’ option was provided for most quantitative questions (see Figure 3). This open-ended answer option allowed respondents to accurately specify their response if they felt the options available did not suit them. By not framing a response, participants were able to state their views or provide an elaborated response to the question.

Categorisation of qualitative responses

For the open ended question responses a thematic analysis was undertaken. The biggest limitation with this approach was the high level of interpretation required to allocate a category to each response. A total number of comments for each theme was then calculated based on the frequency of the statement being raised within each individual response. This figure does not imply that one theme is more important than another, but instead provides an indication of prevalence of the statement amongst the survey respondents. Where specific comments are referred to in this report, the comments have been recorded as they were expressed by the respondent.

Survey logic and targeted questions

In order to ensure a broad range of opinions were captured and for the survey to make sense, it was important for the survey to contain logic whereby responses were filtered. For example, respondents that identified themselves as non-cyclists would be taken to questions that asked them why this was the case. While great care was taken to ensure the logic filtered respondents accurately, another limitation was identified following question 3 (*which of the following statements best describes you?*).

Because the first logic appears at this point in the survey, respondents were filtered based on what cyclist type they were. However, if respondents selected the ‘other’ option, they were automatically taken to question 4 (*why do you ride your bicycle*), regardless of their response. This means that a small number of non-cyclists may have been captured in the questions intended for regular/infrequent cyclists.

Distribution and promotion of the survey

The community survey was broadly promoted both online and in hard copy format. A link to the online survey was provided on the Ku-ring-gai Council website and Facebook page. Hard copies were made available at key community locations and letters were sent out to a selection of existing bicycle riding clubs and stakeholders to encourage participation in the consultation activities. As a result of the numerous responses received from members of cycling groups, clubs and networks, there is a higher representation of regular cyclists. The limitation this presents is that the survey responses over represent regular cyclists in the community and under represent responses from infrequent, potential and non-cyclists.

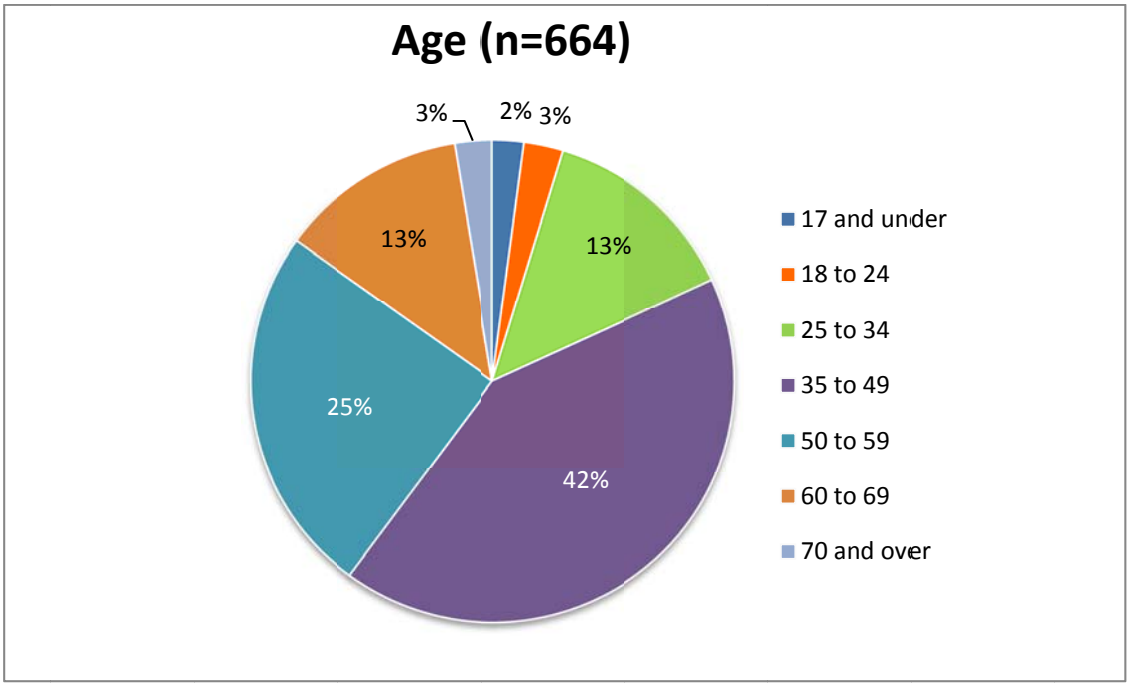
Survey Question Responses

The following section is an analysis of the responses collated from the community survey broken down into the individual questions asked. Each survey question contains a detailed analysis of the responses.

Question 1: Which age category do you belong to?

Figure 4 indicates the age category for each of the survey respondents and the number of respondents that answered the question (i.e. n=664).

Figure 4 - Age representation



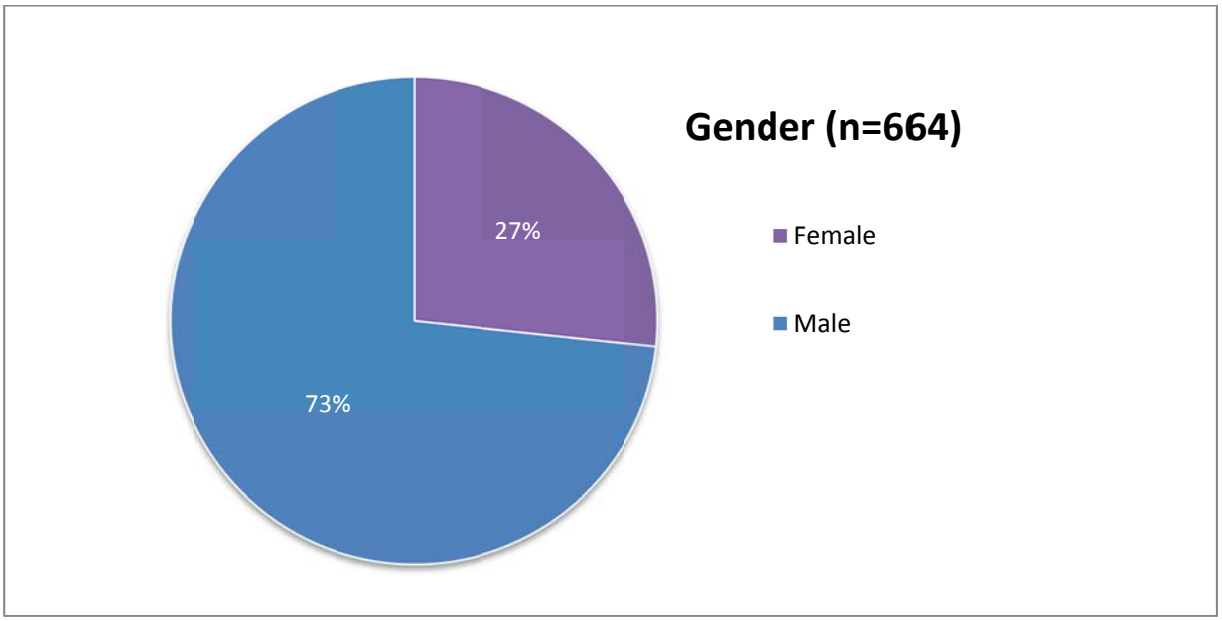
As demonstrated in the figure above, the largest majority of respondents were aged 35 to 49, representing 42 per cent of all 664 respondents. The groups that were under represented included the 17 and under (2%), 18-24 (3%) and 70 and over (3%) age groups.

In order to try and alleviate this over representation, a school survey was also conducted in conjunction with the community survey. The results of this survey can be located in ***Section 3.4.***

Question 2: What gender are you?

As demonstrated in Figure 5 below, the community survey drew more male respondents (73%) than female (27%). As a result, an overall overrepresentation of male respondents has been noted in the analysis of the community survey data.

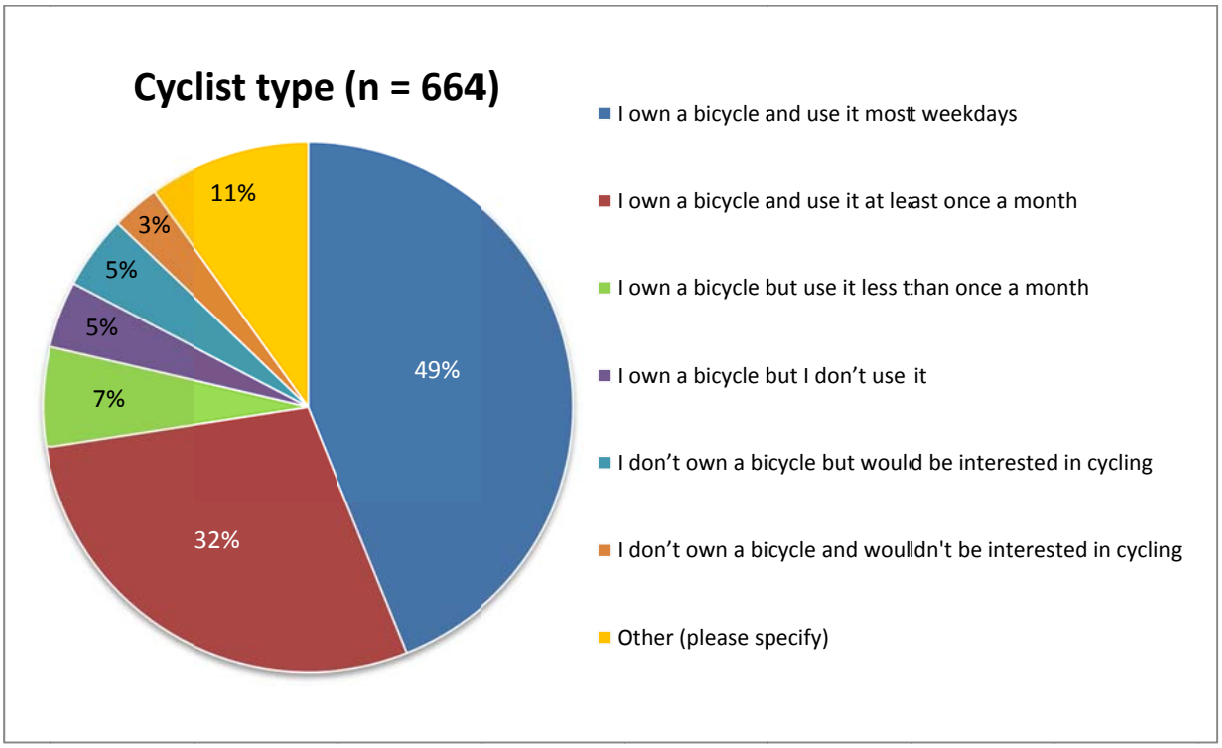
Figure 5 - Gender representation



Question 3: Which of the following statements best describes you?

Figure 6 is a representation of the different cyclist types identified by the survey respondents. These cyclist types have been divided based on the definitions provided in the answer options and have consequently split the survey respondents (as explained below).

Figure 6 - Cyclist types



As indicated in Figure 6, the greatest number of respondents owned a bicycle and used it

most weekdays (49%) or at least once a month (32%).

As a single answer question only, respondents were given the option to select 'other' if they felt the options provided did not suit them. 11 per cent (n=73) of respondents chose to select 'other' as their option. The two key categories that describe the cycling habits used by these respondents included:

- I own a bicycle and I use it more than once a week (48%)
- I own a bicycle and I use it only on weekends/public holidays (28%)

Other categories identified in the open-ended response option included:

- Use bicycle once a week
- Would like to use bicycle more
- Too unsafe to use my bicycle
- Use bicycle more than once a day
- Don't use my bicycle

What these additional open-ended responses indicate is that respondents interpreted the answer options in different ways. This has resulted in some of the categories created as part of the analysis of the open-ended responses to be similar to those already provided as an answer option. In addition, because this question was a single answer option only, respondents that selected 'other' may have also wanted to identify more than one category. For example, one respondent stated:

> "I use my bike four times per week, on a combination of week days and weekends".

What this response indicates is that the respondent felt that option one – *I own a bicycle and use it most weekdays* – did not accurately represent their cycling habits. This has resulted in the need to identify similar categories for the open-ended responses.

Survey Split

From this section onwards, the survey splits into questions targeting specific respondents. These respondents have been categorised into the following:

Figure 7 - Process undertaken to filter responses

Cyclist type	Classification	Targeted Questions*
Regular cyclists	Who ride their bicycles at least once month	4-14
Infrequent cyclists	Who ride less than once a month	4-14
Potential cyclists	Who own a bicycle and don't ride or who don't own a bicycle but would be interested in cycling	15-17
Non-cyclists	Who don't ride and would not be interested in cycling even if conditions for cycling improved	15-17

Please note: Questions 18 to 22 were intended for all respondents, regardless of cycling type.

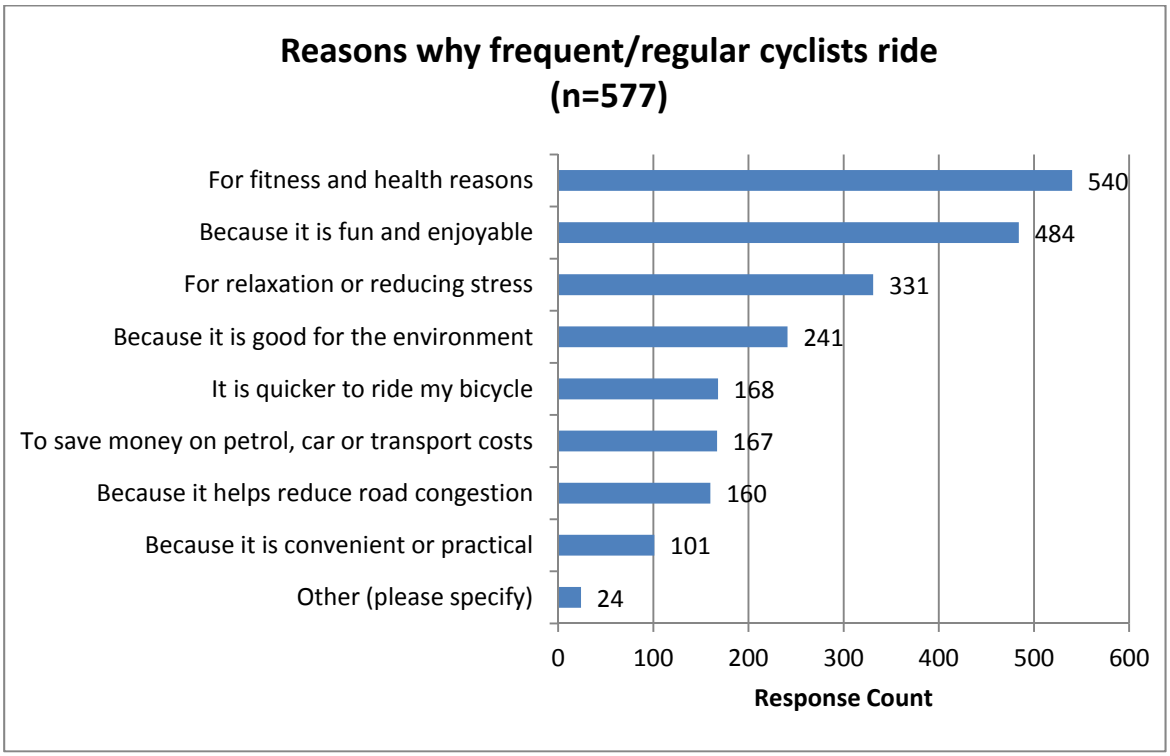
While the survey was split to ensure that the correct cyclist type was given the appropriate question, respondents that selected 'other' were taken to Question 4, regardless of their answer. As mentioned above, this presented another limitation whereby a small number of non-cyclists may have been captured in the questions intended for regular/infrequent cyclists.

Question 4: Why do you ride your bicycle? (Please select all that apply)

Figure 8 is a representation of reasons why regular and infrequent cyclists ride their bicycles. A total of 577 respondents answered this question, which allowed multiple answer responses (i.e. respondents could select more than one reason for riding their bicycle).

As a result, while 577 respondents answered the question (i.e. n=577), a total of 2,216 responses were received. Therefore, the numbers on Figure 8 indicate the number of respondents that selected that option (e.g. 101 respondents chose "because it is convenient or practical").

Figure 8 - Reasons for using a bicycle



As indicated in the graph, the two most common reasons for riding a bicycle were “for fitness and health reasons” (540 respondents) and “because it is fun and enjoyable” (484 respondents). Of the 24 respondents that selected ‘other’ as an option, the following reasons were identified for riding their bicycles:

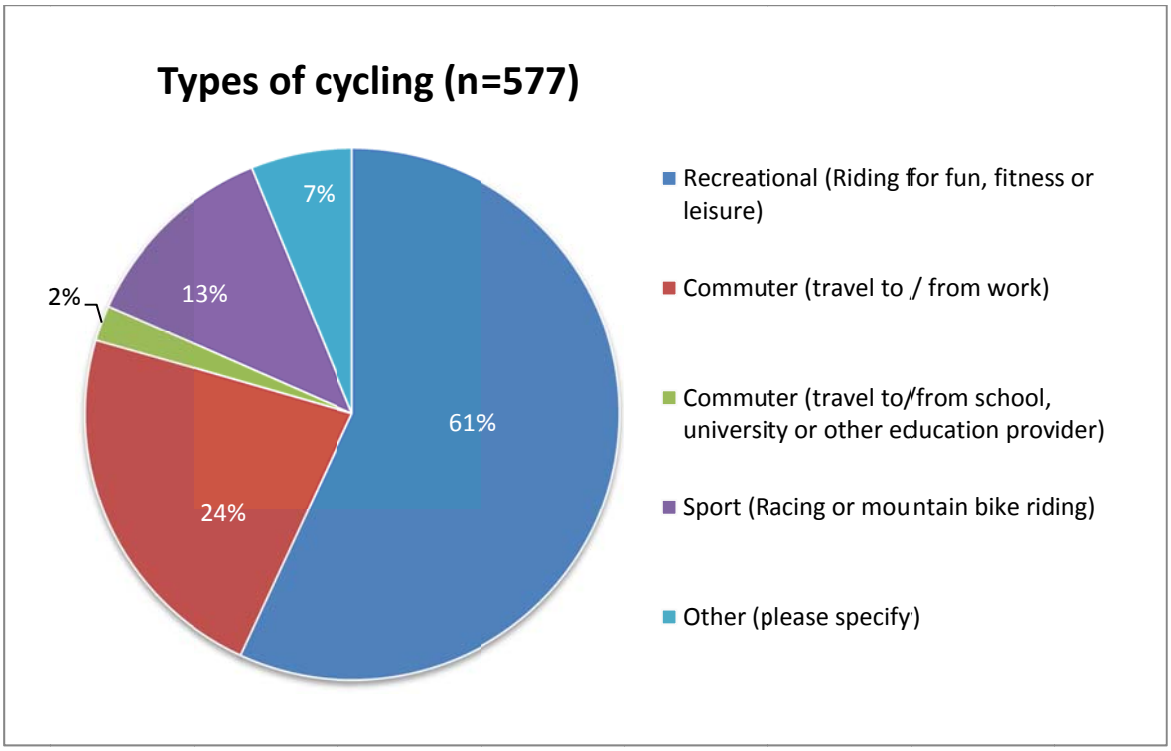
- More reliable than other modes of transport
- Good family activity
- It is fun and enjoyable
- I would use it more if it was safer
- Social activity
- Training for competitions
- More cost-efficient
- There are great places to ride

These open-ended answer responses are closely correlated with some of the answer options already provided. While some new ‘categories’ were identified, the responses provided here indicate the different interpretations made by respondents.

Question 5: What type of cycling do you take part in most often?

Figure 9 indicates they type of cycling undertaken by regular and infrequent cyclists. A total of 577 respondents (n=577) answered this ‘single response only’ question and were given five options (as listed on the pie chart).

Figure 9 - Types of cycling identified by regular and infrequent cyclists



As indicated above, the vast majority of respondents rode their bicycles for recreational purposes (61%). This includes, but is not limited to, riding for fun, fitness or leisure. Of the 7 per cent (n=38) of respondents that selected 'other' as an option, the following two 'categories' were identified as the main reasons for riding a bicycle:

- Commuting (26%)
- Social and recreational (25%)

Other categories identified were:

- Sport / fitness
- Errands / shopping
- For charity
- I don't ride because I feel unsafe
- None of the above

It was evident that, while some of the 'new' categories identified from the open-ended statements were similar to those already provided, the reasons for them reappearing can be attributed to individual interpretation and a desire to choose more than one category.

Because the question allowed for only single responses, respondents that chose 'other' as their response identified that they associated their cycling habits with more than one of the options available to them. For example, one respondent stated:

> "I belong to more than one category. I ride for sport, recreation and as a commuter".

Similarly another respondent stated:

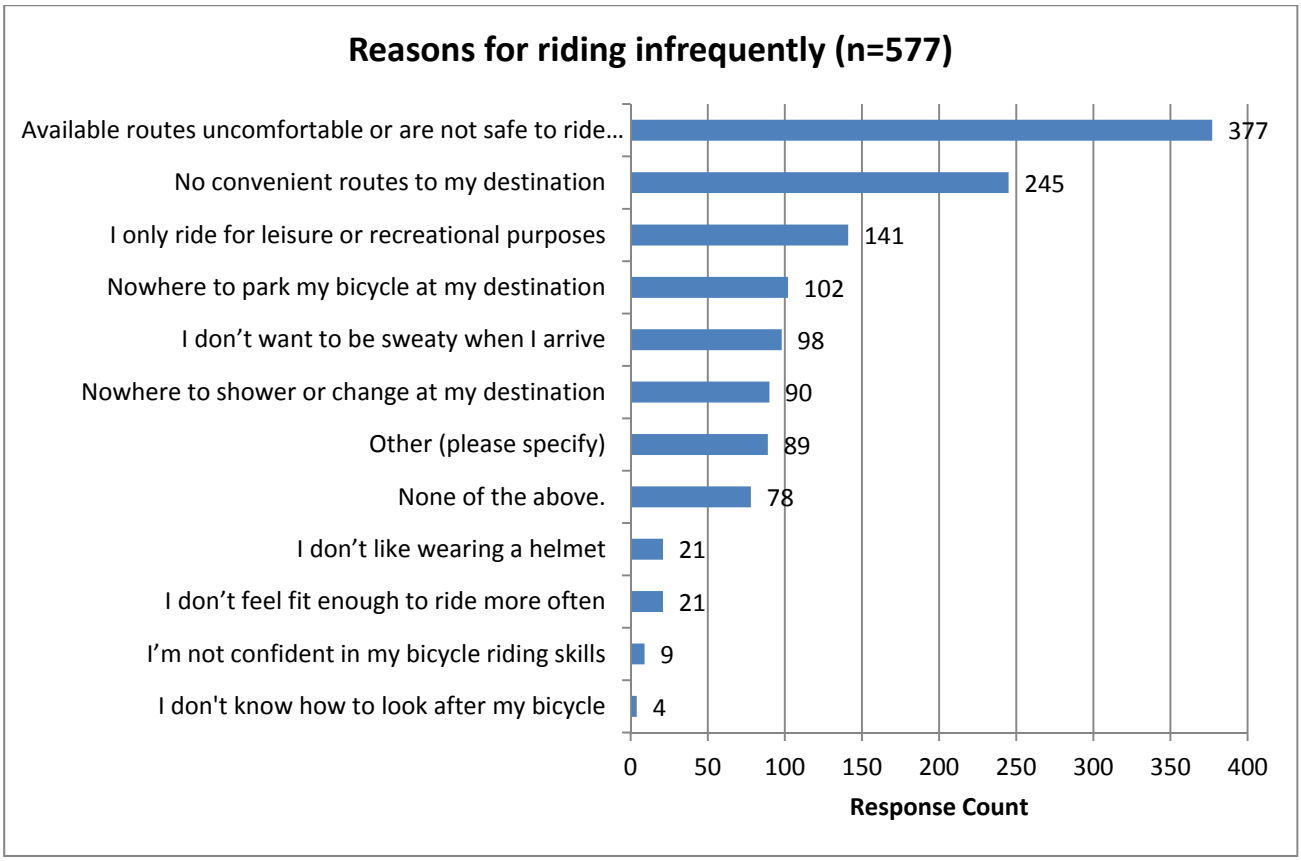
> "I commute to and from work, ride socially on weekends and partake in the occasional mountain bike race".

Therefore, whilst there are correlations between the categories identified in default options and the open-ended responses, they both indicate that the biggest majority of riders choose to ride for commuting and recreational purposes.

Question 6: Which of the following are reasons why you don't ride your bicycle more regularly for everyday local trips or for commuting to work / study? (Please select all that apply)

Figure 10 indicates main reasons why respondents do not ride their bicycles more regularly for commuting purposes. A total of 577 respondents (n=577) answered this multiple response question with the total number of responses reaching 1,275.

Figure 10 – Reasons why regular and infrequent cyclists don't ride more regularly



As indicated above, the two main reasons why cyclists did not ride for local trips or commuting purposes were because they considered the available routes as uncomfortable or unsafe to ride on (377 respondents) or because there are no convenient routes to their destination (245 respondents).

Also evident from the graph is the high number of respondents that selected 'other' as an option (n=89). The categories formed from these responses include (from most frequent to least):

- Existing paths aren't safe enough
- Too much traffic
- No/not enough bike paths
- I don't commute in wet weather
- None of the above
- Not enough time
- Drivers don't respect bicycle users
- Nowhere to store my bike at my destination
- Too far to travel by bike
- Existing paths are not well mapped out
- Too many steep inclines
- Existing paths flood during wet weather
- Don't like the safety restrictions (e.g. wearing helmets)
- Not enough lighting on existing paths

The top two reasons why these respondents did not ride their bicycles were attributed to the safety of the existing paths (27%) and the amount of traffic on the roads (14%). One respondent stated:

> "I work in the city and would happily cycle to work - however, there is no bike path from St Ives to the city and I feel the road is not safe enough".

Similarly, another respondent stated:

> "It's not that I'd ride more regularly (I already ride to work every day), it's just that I would gladly extend my daily trips if there was any safe way to ride all the way from my front door to my workplace, but there currently is NOT!"

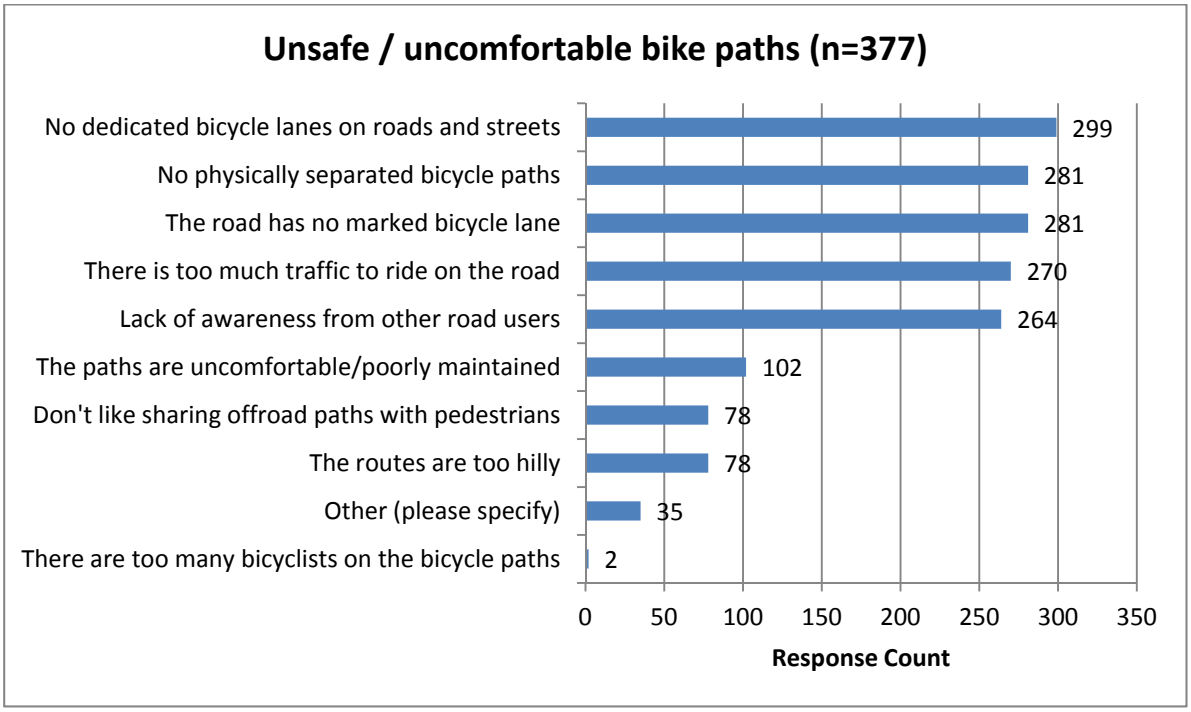
While there were a number of unique themes that emerged from the open-ended responses, the key reason identified by respondents for not riding their bicycle was due to the lack of safe bike paths to different destinations within and outside the LGA. Issues with safety were seen to be as a result of increased traffic and poor quality off road bike paths.

Question 7: If you think that the available routes are unsafe or are uncomfortable to ride on, please select the reasons why from the list below. Please select all that apply.

Figure 11 is representative of the key reasons why respondents consider existing bike paths to be unsafe or uncomfortable.

This question contained a specific type of logic that allowed only the respondents that selected "I don't think the available routes are safe or comfortable enough to ride on" as their answer to question 6, to answer this question. As such, this question contains a lower number of respondents. In total, 377 respondents (n=377) answered this multiple response question with the total number of responses reaching 1,690.

Figure 11 - Reasons why regular and infrequent cyclists considered existing paths to be unsafe/uncomfortable



As indicated in the graph, five of the options drew a similar number of responses. What this indicates is that respondents believe there are a number of different contributing factors that have made the bike paths unsafe or uncomfortable to ride on.

In comparison, the statements made by respondents that selected 'other' as an option (n=35) identified similar reasons. These were:

- Too much traffic on the roads (31%)
- Poorly planned cycle routes (e.g. no connecting paths, line markings or separate footpaths) (29%)

Other categories identified included:

- Lack of awareness or respect from motorists
- Poor road/bike path surfaces
- Hazardous items/objects on the bike paths (e.g. glass, vegetation, parked cars)
- There are too many inexperienced cyclists
- Routes are unsafe for children
- Speed limits for cars are not adequately enforced in the area (e.g. no speed cameras)

Evidently what these themes and those already provided indicate is that a number of factors have contributed to respondents feeling unsafe or uncomfortable on the existing bike networks.

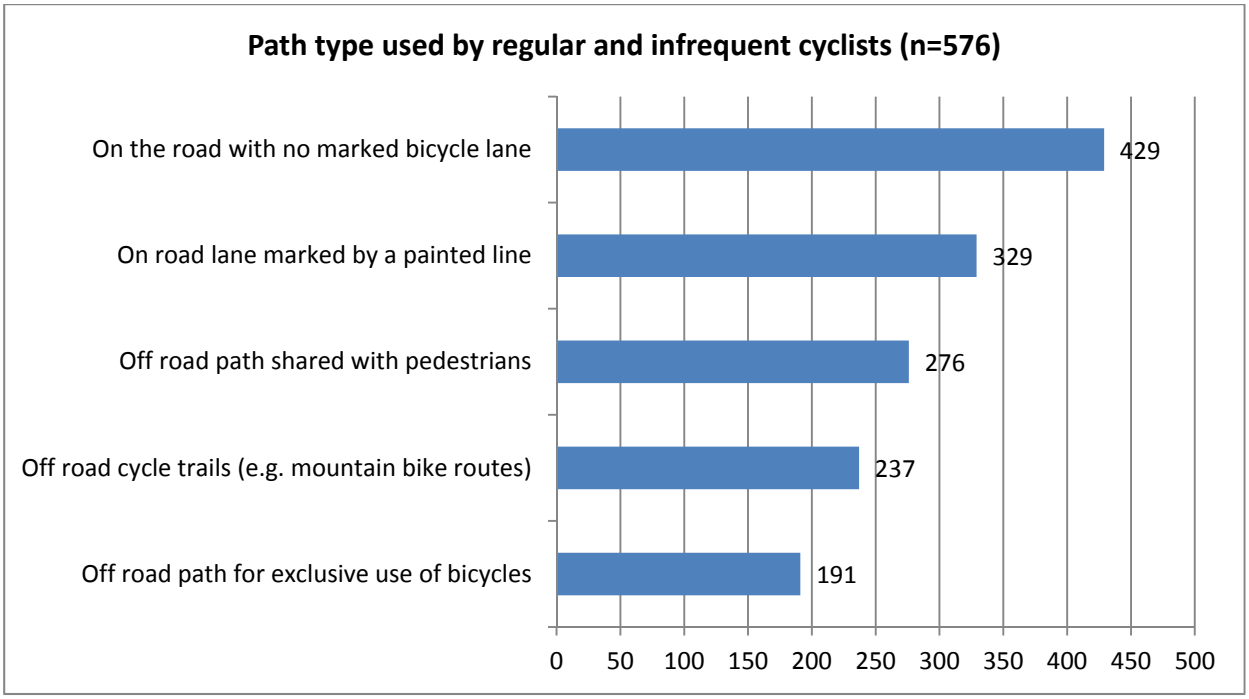
Question 8: What type of path do you usually ride your bicycle on?

This question was a two-part question. The first part of the question asked respondents to identify the type of path they usually ride their bicycle on from a list of options including:

- On road lane marked by a painted line
- On the road with no marked bicycle lane
- Off road path for exclusive use of bicycles
- Off road path shared with pedestrians
- Off road cycle trails (including mountain bike and recreational routes e.g. National Park)

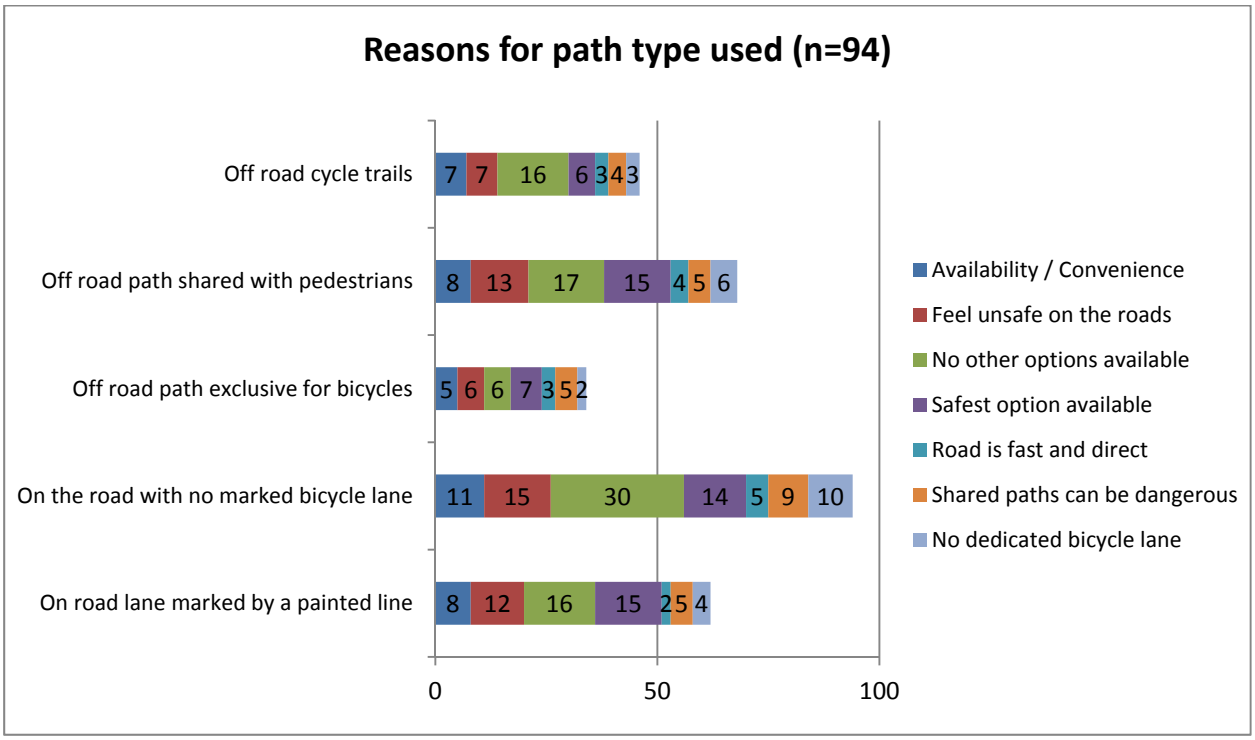
Respondents could select more than one option from the list. The second part of the question asked respondents to describe why they used this type of path (and not others). The first part of the question was answered by 576 respondents (n=576) and Figure 12 below indicates the responses received.

Figure 12 - Path type used by regular and infrequent cyclists

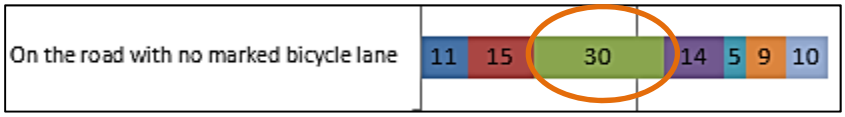


The second part of the question was answered by 94 respondents (n=94) and the comments received were categorised into a range of responses. Some respondents described more than one reason why they used a particular path and these responses were categorised into multiple options. The correlation between the type of paths used and the reasons why have been summarised in Figure 13 below.

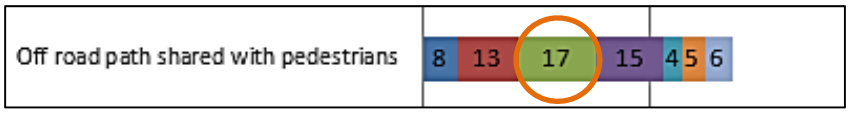
Figure 13 - Reasons for path type used



As indicated in the graph above, there are a number of reasons for why people cycle on each type of path. The most frequent path type identified was on the road with no marked bicycle lane. The most frequent reason why respondents cycled on this path was because there was 'no other option available' (as demonstrated in the figure below).



The second most frequent path type identified was the off road path shared with pedestrians. Of these respondents, 17 of them stated that they chose to use this path because there was 'no other option available' (as demonstrated in the figure below).



From these results it can be observed that a large number of respondents chose a particular path because there was no other option available. Across responses from all path types "no other options available" was the most frequent reason given for the path type choice (except off road path exclusive for bicycles where it was the second most frequent response). This highlights that respondents perceive there to be limited path options available in the existing bike network. Similarly, there are multiple categories that talk about safety as being a main reason why they choose a certain path.

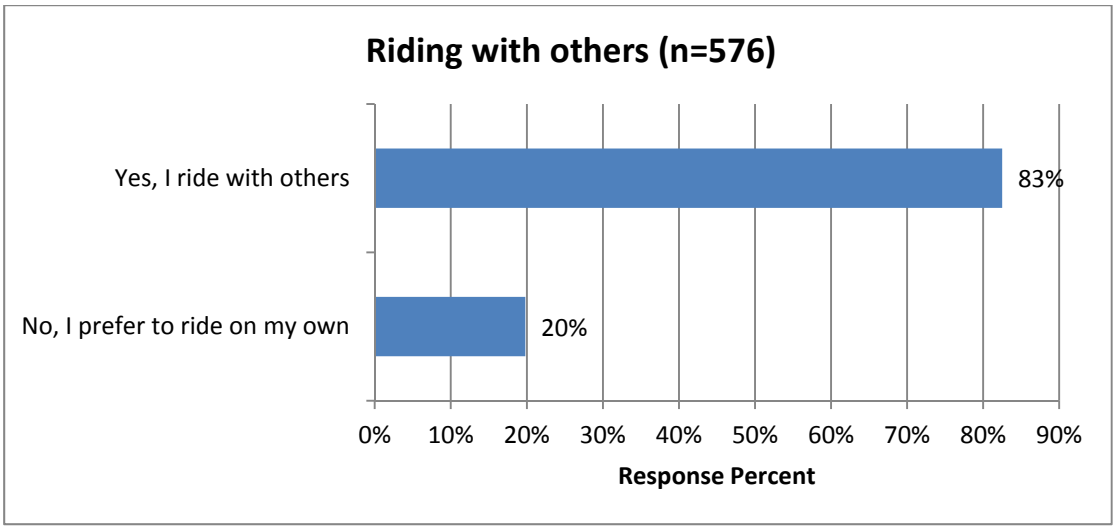
These results are useful in that they provide a clearer indication of why respondents choose to use certain paths in the Ku-ring-gai network. It is evident that a number of factors contribute to respondents using particular bicycle paths around the LGA and that their decision to use them is influenced by a range of external factors.

However, while these results are useful to know why respondents use particular paths, it is important to note that only 94 out of 576 respondents went on to answer this part of the question. As a result it is likely that a range of other reasons may not have been captured in this survey.

Question 9: Do you ever ride with other people?

Figure 14 is a representation of the number of respondents that ride with others. A total number of 576 respondents answered this question (n=576).

Figure 14 - Riding with others

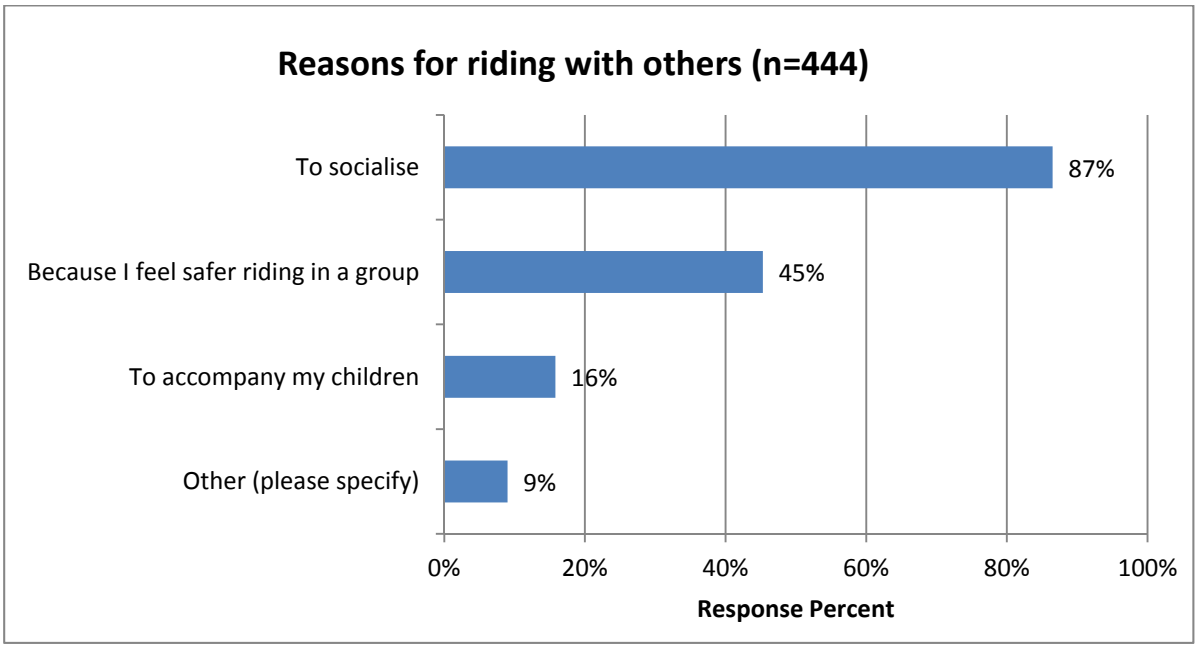


As indicated by the graph, the majority of respondents said they cycled with others (83%). This is a key indicator of the cycling behaviours of people within the Ku-ring-gai LGA and is likely to correlate with the large number of respondents who are recreational riders (61%).

Question 10: Why do you ride with others?

Figure 15 is a representation of the reasons why respondents choose to ride with others. A total number of 444 respondents (n=444) answered this 'single response' question and were given four options (as listed in the graph).

Figure 15 - Reasons for riding with others



As indicated in the graph, the two most common reasons for riding a bicycle with others were "to socialise" (87%) and "because I feel safer riding in a group" (45%). These responses align with the 61% of respondents who identified themselves as recreational cyclists.

'Other' was selected by 40 respondents (9 per cent) in answering this question and open-ended responses were provided that were then categorised into key themes. The main reason these respondents cycled with others were for 'enjoyment, motivation or companionship' (21 responses).

While 'enjoyment, motivation or companionship' is similar to the option already provided, it was the most frequent description provided by these respondents. As a single response question, this can be attributed to the limited answers already provided or a feeling that the options did not suit them.

For example, one respondent stated:

> "There are reasonably large groups of retirees who cycle every week for fitness and good company".

While this response fits into the 'socialise' category, it is likely that the respondent also wanted to categorise the reasons why they ride with others as 'fitness', which was not provided.

Similarly, another respondent stated:

> "It is unsafe to cycle on my own in Ku-ring-gai because of a lack of suitable infrastructure".

What this response indicates is that, like previous responses provided in other questions, safety is a recurring theme. In Figure 15, 45% of respondents stated that they ride with others "because I feel safer riding in a group", while this was also a common theme in the open-ended responses.

Question 11: What are your top three most common journeys by bicycle?

This question received a total number of 483 respondents (n=483) with over 400 different journeys identified by these respondents. What these results indicate is that a large number of respondents ride throughout the LGA and that multiple routes are taken in this process.

Figure 16 - Key journeys undertaken by respondents

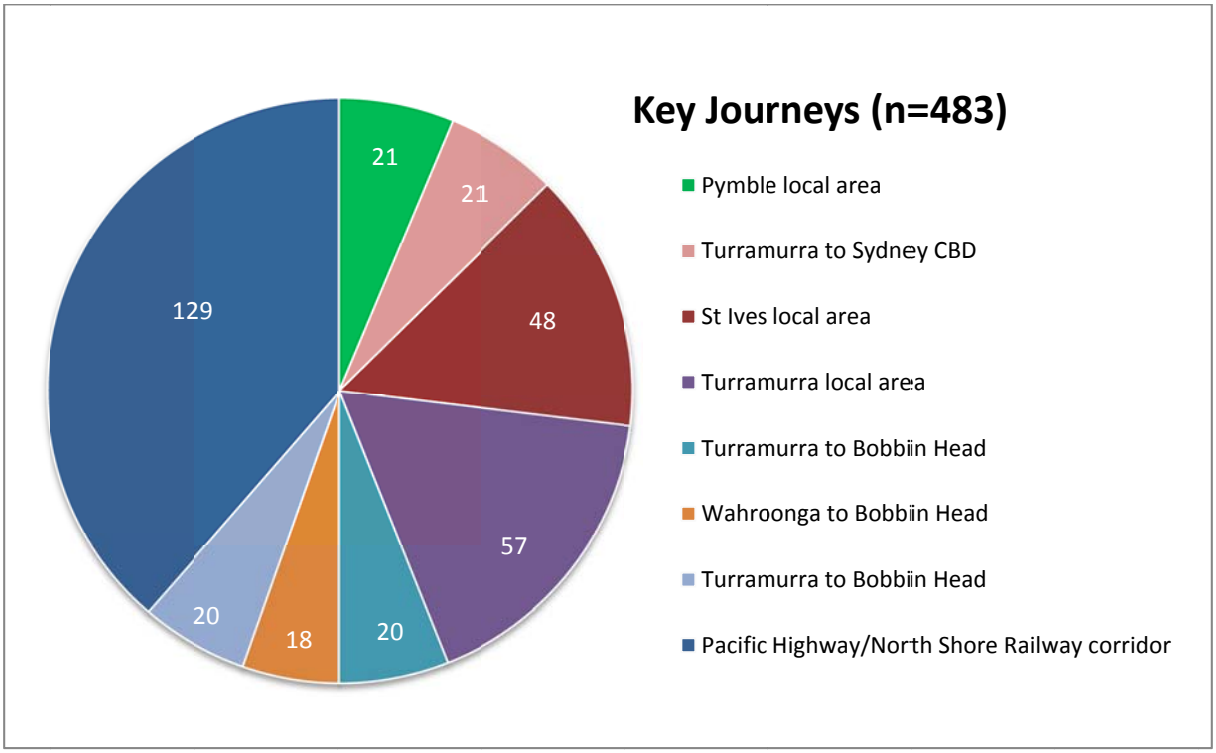


Figure 16 is a representation of the 8 most frequent journeys identified. Of these, the top three journeys identified were:

- Pacific Highway/North Shore Railway corridor (129 responses)
- St Ives local area (48 responses)
- Turramurra local area (57 responses)

It is important to note that the term 'local area' is defined as a journey that commences and concludes in the specified suburb. For example, a journey that begins at Richmond Avenue, St Ives and ends at St Ives High School.

- ***Pacific Highway/North Shore Railway corridor***

Respondents stated that they used a number of different cycling routes that travelled alongside the Pacific Highway and North Shore Railway corridor. A large number of these respondents highlighted the Sydney Central Business District as a key destination using the Pacific Highway and the roads following the North Shore line, in particular the bike path along the Sydney Harbour Bridge. What these results indicate is that, even though a number of

routes are used on their bicycle journeys, respondents are travelling along the Pacific Highway and on roads that follow the North Shore Railway corridor.

- ***St Ives local area***

Start points that were frequently mentioned in the St Ives local area included St Ives local shops and St Ives High School. From these responses key roads identified included Mona Vale Road, Richmond Avenue and Hunter Avenue.

Turramurra local area

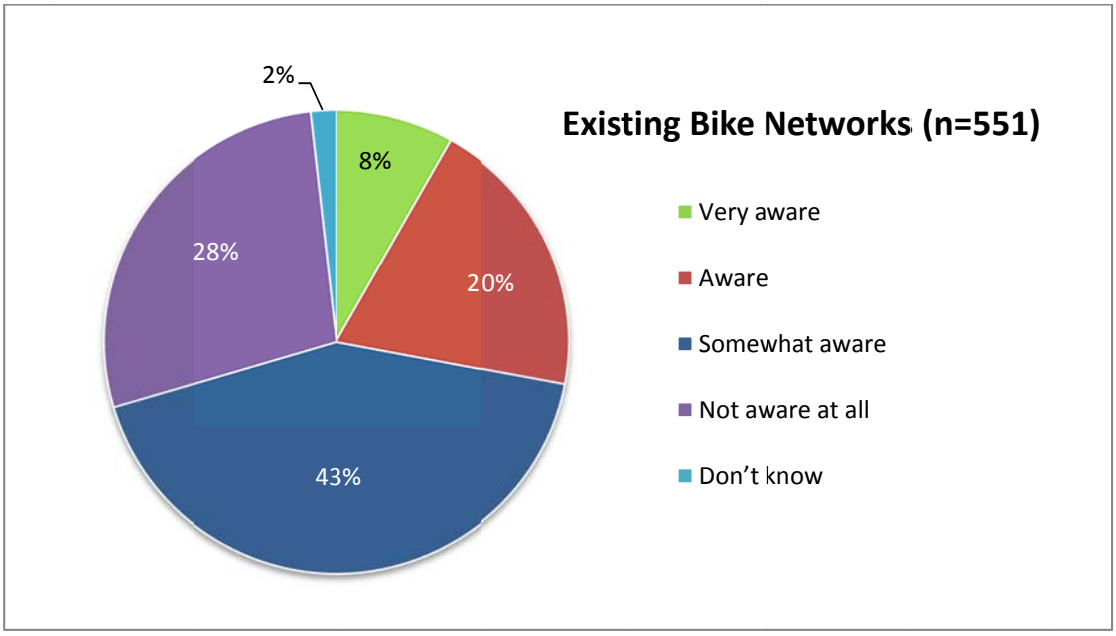
Frequently mentioned start points in the Turramurra local area included Comenarra Parkway, North Turramurra Shops and Turramurra train station. From these responses, Mona Vale Road, the Pacific Highway and Kissing Point Road were mentioned the most.

The full dataset of journeys taken will be reviewed by transport planners to identify priority routes and any connections to trip generators (e.g. shops, recreational cycling locations, national parks).

Question 12: How aware are you of the existing bicycle network in Ku-ring-gai?

Figure 17 is an indication of the number of respondents that are aware of the existing bicycle networks. A total of 551 respondents (n=551) answered this 'single response" question and were given five options (as listed in the graph).

Figure 17 - Knowledge of existing bicycle networks in Ku-ring-gai

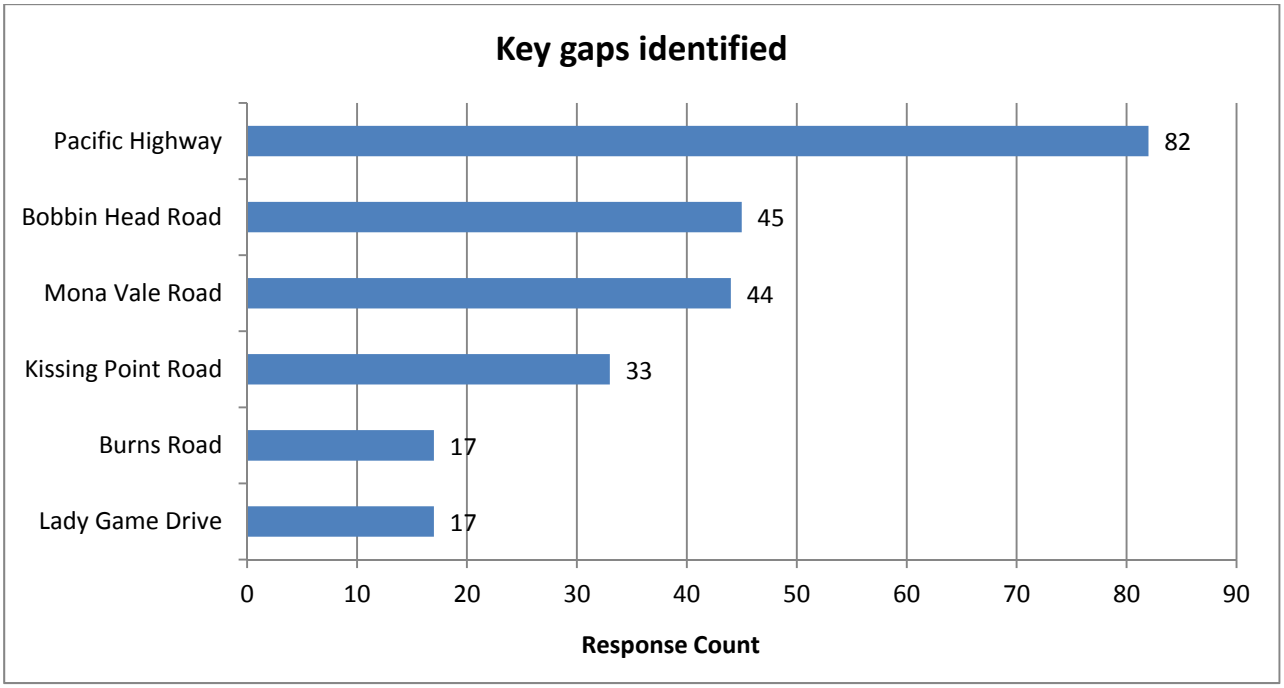


As outlined above, a large number of respondents were either 'somewhat aware' (43%) or 'not aware at all' (28%) of the existing bike networks. Whilst it is not possible to understand the full extent of the respondents awareness of the existing bike network these results indicate that there is a limited perceived awareness amongst regular and infrequent riders of the cycling networks around the LGA.

Question 13: Please identify gaps in the Ku-ring-gai bicycle network that you would like to see improved in the future (street names/cross roads/suburbs).

Figure 18 and Figure 19 represent gaps in the Ku-ring-gai bicycle network as identified by the survey respondents. A total of 329 respondents (n=329) answered this qualitative question and provided a large range of suggestions.

Figure 18 - Key gaps identified by regular and infrequent cyclists



Because respondents provided numerous roads, street and intersection names, the top 6 most frequently mentioned roads were chosen as categories. What this provided was a clearer view of the key gaps within the existing network, and a better understanding of the routes used by respondents.

As indicated in Figure 18, the most frequently mentioned road was the Pacific Highway (82 respondents). Respondents that identified this road stated a number of factors and issues relating to their experience of riding along or adjacent to the Pacific Highway, which required improvement.

One respondent stated:

> "There is no decent bike route adjacent to the Pacific Highway for travelling to/from the city".

Similarly, two other respondents stated:

> ***Respondent 1***
>
> "My wife works in Hornsby and would probably ride to work if she had a safe way to get there. She is not confident riding along the Pacific Highway… due to the amount of traffic, lack of bike paths and some aggressive motorists"
>
> ***Respondent 2***
>
> "The biggest gap is on the Pacific Highway! We need some bike lanes

so it is safer for both drivers and cyclists”

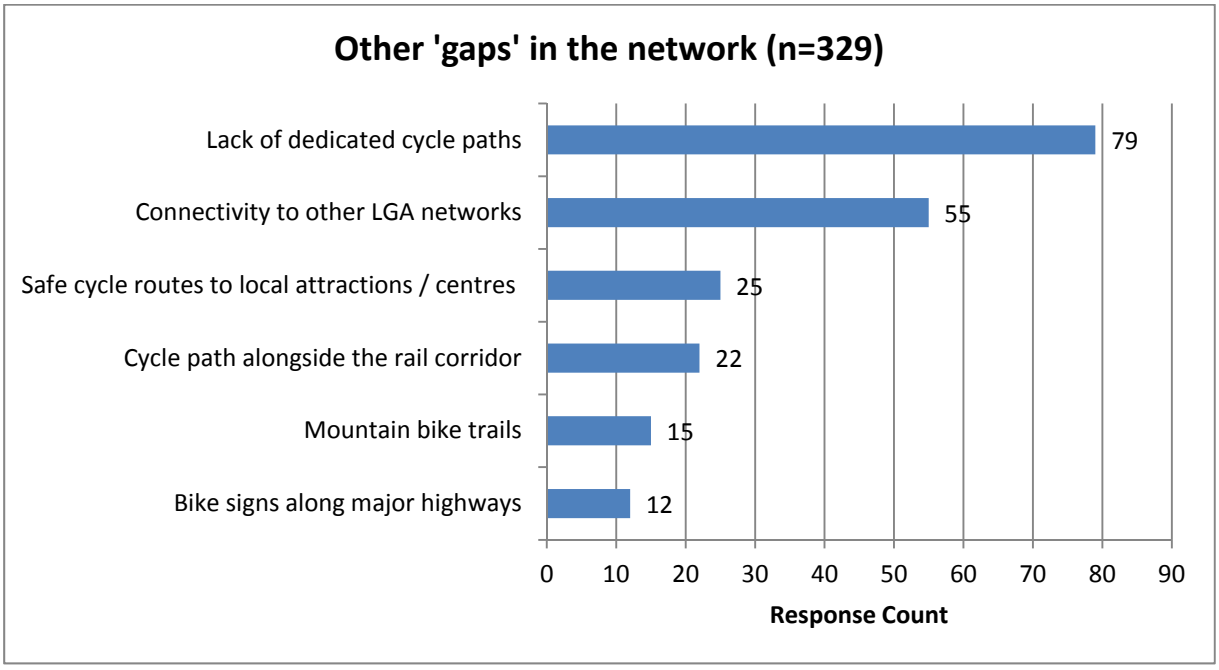
As a major road that runs through a number of LGA’s, respondents believed that the Pacific Highway was a significant gap in the Ku-ring-gai network. Other key roads mentioned included:

- Bobbin Head Road (45 respondents)
- Mona Vale Road (44 respondents)
- Kissing Point Road (33 respondents)
- Burns Road (17 respondents)
- Lady Game Drive (17 respondents)

These key roads were mentioned on numerous occasions, indicating some consensus on the key ‘gaps’ in the network amongst respondents. While this is an indicative figure only, these results can be used to identify areas where improvements are required for current and future bicycle users.

While a large number of respondents provided names of certain roads where they believed there were gaps, it was evident that some respondents interpreted the term ‘gap’ in a different manner. Figure 19 represents some suggestions and comments made on the ‘gaps’ in the Ku-ring-gai network.

Figure 19 - Suggestions for improvement



As shown above, respondents indicated that one of the biggest ‘gaps’ in the Ku-ring-gai network was the “lack of dedicated cycle paths”. One respondent that chose this option stated:

> “Ku-ring-gai has shared paths, but no dedicated cycle paths that I am aware of. They would be very welcome and a sign of commitment to cycling by the council”.

Similarly, another respondent alluded to both the lack of bicycle paths and limited connectivity with paths in other LGA's. This was the next most common response to this question. Another respondent stated:

> "There are no convenient cycle paths (on-road or dedicated) from Pymble to Lane Cove which is a more direct, and less hilly route, than the existing back streets network currently in existence from Gordon to Chatswood. Also, most cycle paths typically do not meet with other cycle paths in other suburbs. Travelling north on the Pacific Highway (on-road) is hazardous as the lanes constantly go from three to two with nowhere for a cyclist to go except into fast moving traffic".

What can be observed from these responses is that the current 'gaps' in the existing network could be addressed through the addition of dedicated bicycle paths that are connected with other LGAs and to major areas of travel (e.g. Sydney CBD).

Question 14: Have you been involved in any of the following groups, events or activities?

Question 14 asked regular and infrequent cyclists to identify if they have been involved with any cycling groups, events or activities. Respondents could select more than one option from the list provided in response to this question.

Figure 20 - Representation of cyclist involvement in groups, events or activities

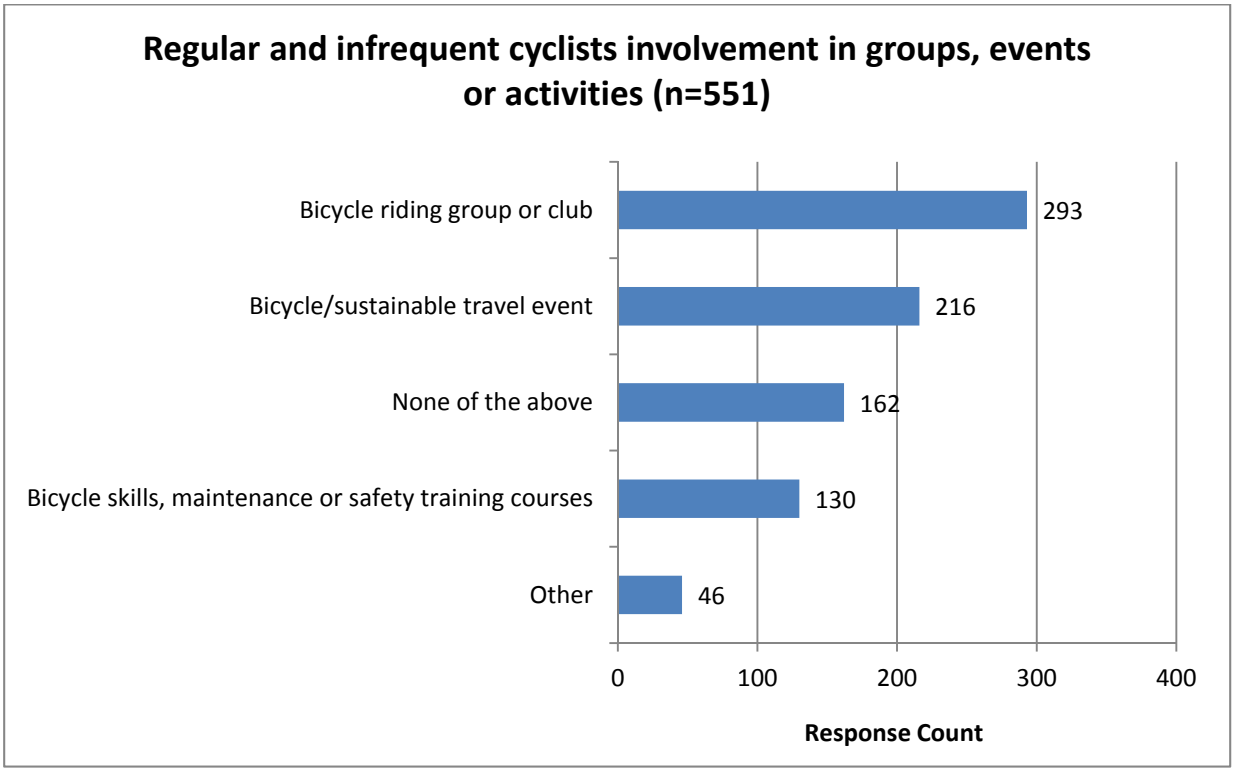


Figure 20 indicates that the most frequent option answered was involvement in a bicycle riding group or club. This response correlates to the high number of respondents who identified themselves as regular and recreational cyclists. Involvement in bicycle / sustainable travel events including the Ride to Work Day event was an option selected by nearly 40% of respondents.

46 respondents indicated that they have been involved in other types of groups, events and activities. From those who selected “Other” the top three responses given were:

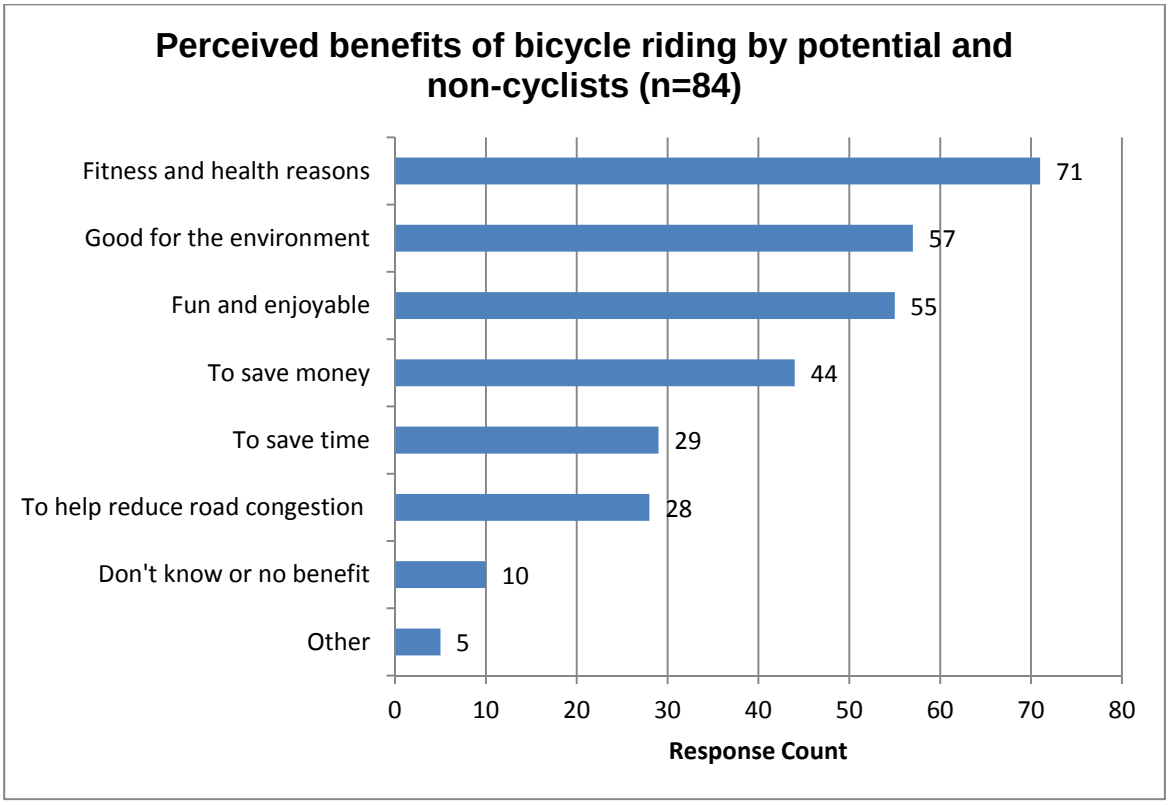
- Charity and fundraising cycling events;
- Competitive cycling events; and
- Involvement in community cycling groups e.g. Easy Riders, informal cycling groups and as an activity with other types of groups such as Scouts.

Question 15: What do you think are the benefits of bicycle riding on a regular basis?

Question 15 is where potential and non-cyclists were taken from Question 3. A total of 84 respondents answered this question (n=84) and were allowed to make multiple selections from a range of options.

Figure 21 indicates that the most frequent benefit of cycling identified by nearly 85% of potential and non-cyclists (n=71) was fitness and health reasons. Cycling being good for the environment was the benefit identified by the second highest number of respondents (n=57).

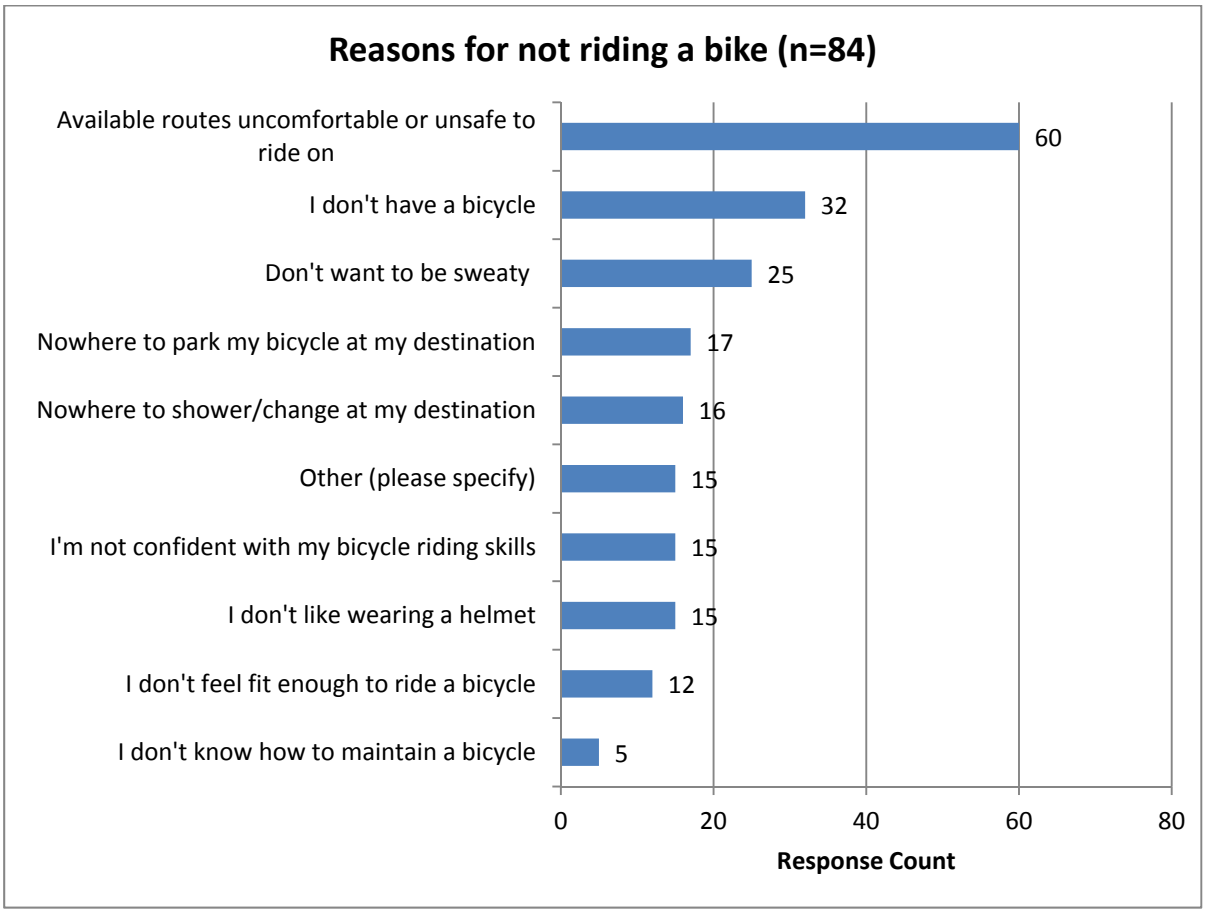
Figure 21 - Benefits of riding a bicycle



Question 16: Please indicate why you don’t ride a bicycle.

Figure 22 represents the reasons given for not riding a bicycle by potential and non-cyclist respondents. A total of 84 respondents answered this question (n=84) and were allowed to make multiple selections from a range of options.

Figure 22 - Reasons given for not riding a bicycle



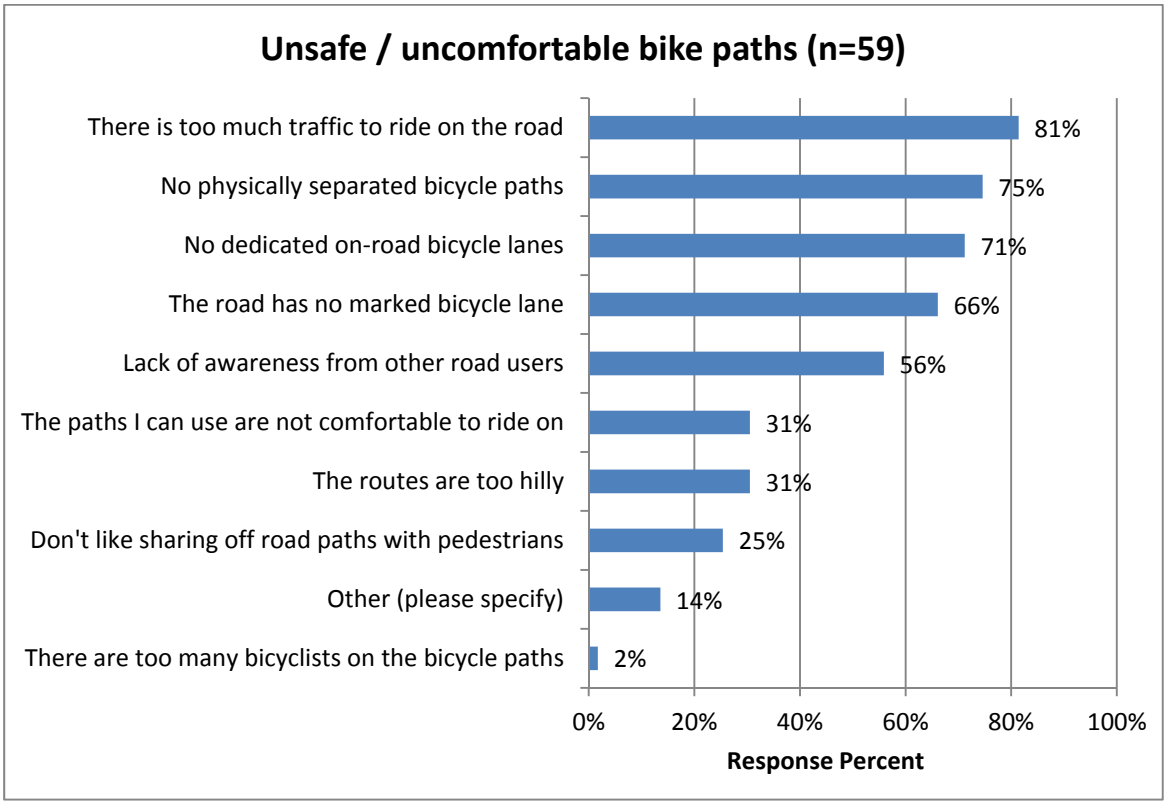
As shown on the graph, a large majority of respondents indicated safety as the main reason inhibiting them from riding their bicycle. The most frequent option selected by respondents was that the 'available routes are uncomfortable or are unsafe to ride on' and the second most common response was 'I don't have a bicycle'.

Question 17: If you think that the available routes are unsafe or uncomfortable to ride on, please select the reasons why from the list below.

Figure 23 is a representation of the reasons why potential and non-cyclists considered the existing bike paths in Ku-ring-gai to be unsafe or uncomfortable to ride on.

This question contained a specific type of logic that allowed only the respondents that selected "I think the available routes are unsafe or uncomfortable to ride on" as their answer to Question 16, to answer this question. As such, this question contains a lower number of respondents with a total of 59 respondents (n=59).

Figure 23 - Reasons why potential and non-cyclists considered existing paths to be unsafe/uncomfortable to ride on



As indicated in the graph, three of the options drew a similar number of responses. What this indicates is that respondents believe there are a number of different contributing factors that have made them feel the bike paths are unsafe or uncomfortable to ride on.

These options were:

- There is too much traffic to ride on the road (81%)
- There aren't enough (or any) physically separated bicycle paths (75%)
- There aren't enough (or any) dedicated on-road bicycle lanes (71%)

Evidently what these themes indicate is that a number of factors have contributed to respondents feeling unsafe or uncomfortable on the exiting bike paths, thus inhibiting their desire to cycle.

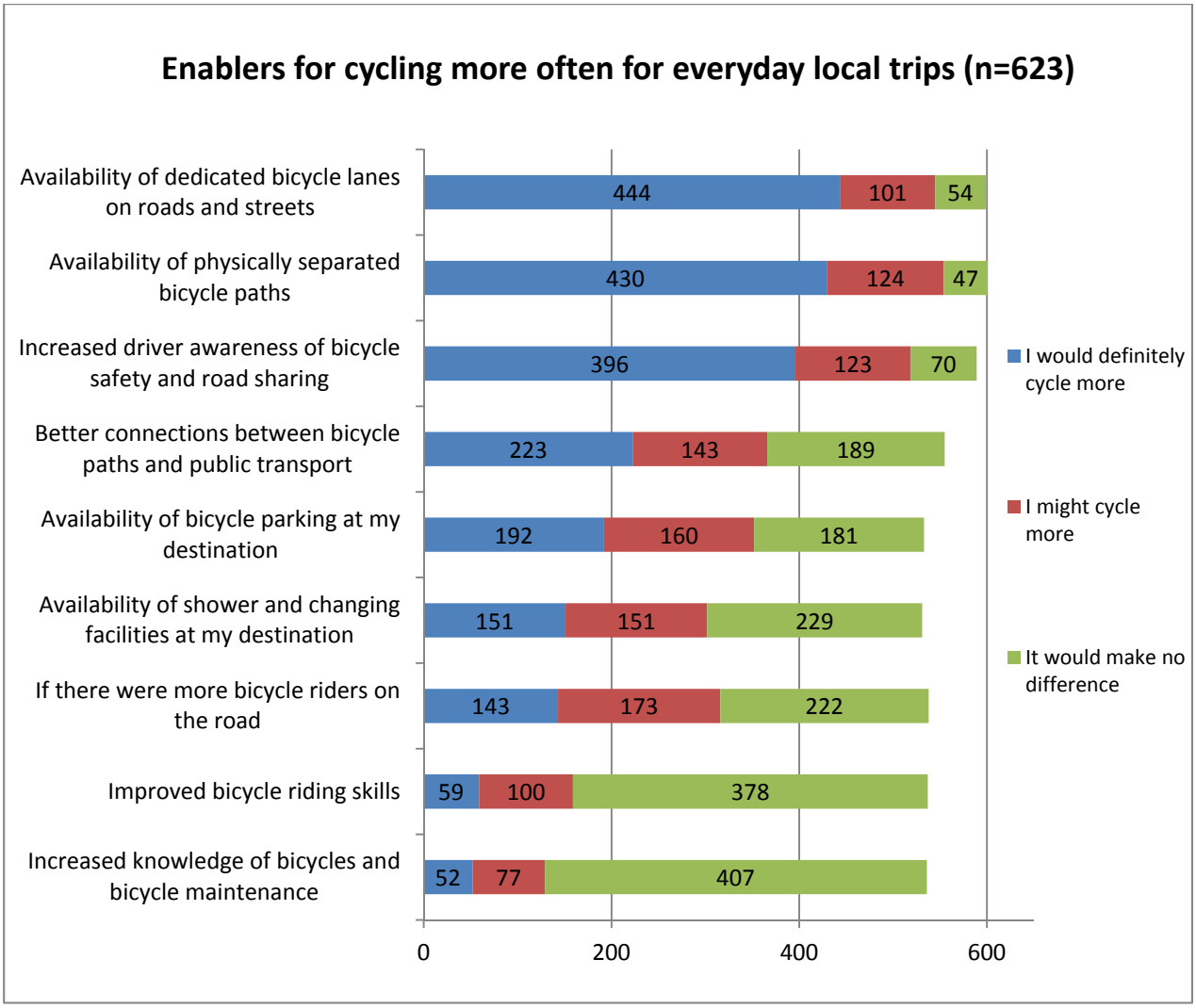
Question 18: Please indicate whether the following changes would make you more likely to cycle on a regular basis for everyday local trips or to commute to work/study.

Respondents were provided with a list of changes and they were asked to identify whether these changes would encourage greater participation in cycling. Figure 24 indicates that the availability of dedicated bicycle lanes on roads and streets would be the greatest enabler for cycling more. The availability of physically separated bicycle paths was the change identified by the second largest number of respondents as enabling them to cycle more often, followed by increased driver awareness of bicycle safety and road sharing.

Whilst fewer respondents identified improved bicycle riding skills and increased knowledge of

bicycles and bicycle maintenance as enablers for cycling, the results should be read within the context of the large number of regular cyclists who responded to this survey. It is possible that should the respondents of this survey included a more proportionate number of infrequent, potential and non-cyclists the enablers for cycling more often may have been different.

Figure 24 - Enablers for cycling more often



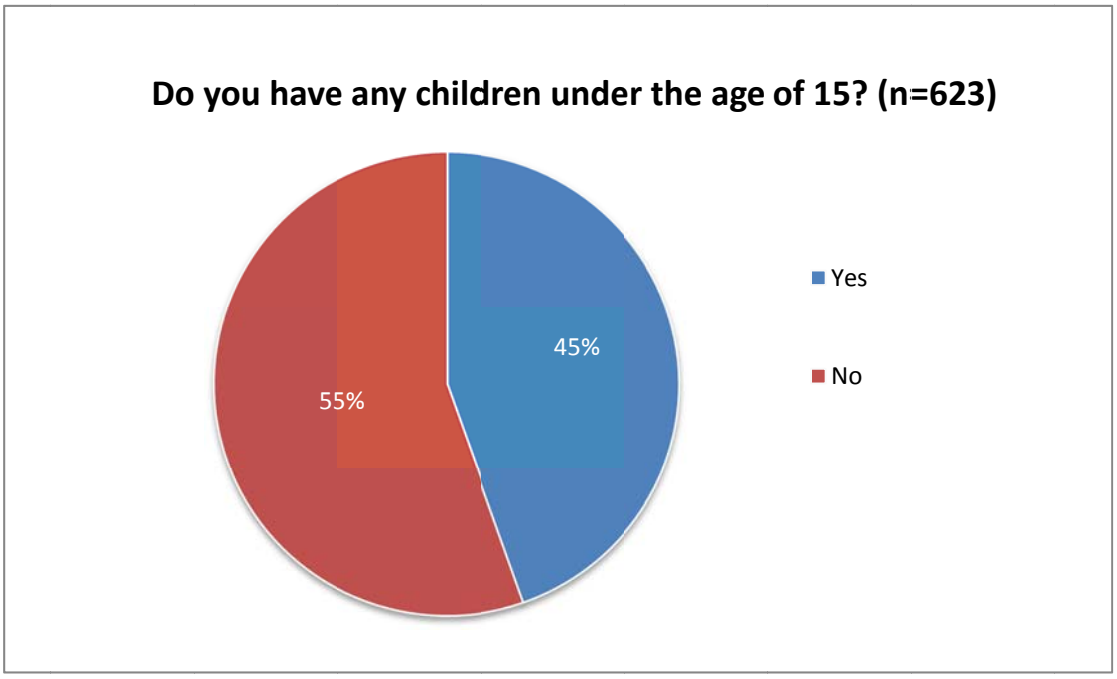
155 respondents provided details of other changes that would encourage them to ride a bicycle more regularly. A number of the comments made were similar to the options provided however more detail was often provided by respondents. The responses provided were categorised into key changes and the top five changes have been listed below:

- Dedicated, separated bike lanes, paths and corridors;
- Increased driver awareness and acceptance of cyclists;
- More off-road cycle trails, local bike programs and training circuits;
- Better road/path surface quality and maintenance; and
- Improved road safety.

Question 19: Do you have any children under the age of 15?

Figure 25 indicates that 623 respondents (n=623) answered this question. As shown, about 45% of respondents have children under the age of 15 and 55% of respondents do not.

Figure 25 - Respondents with children



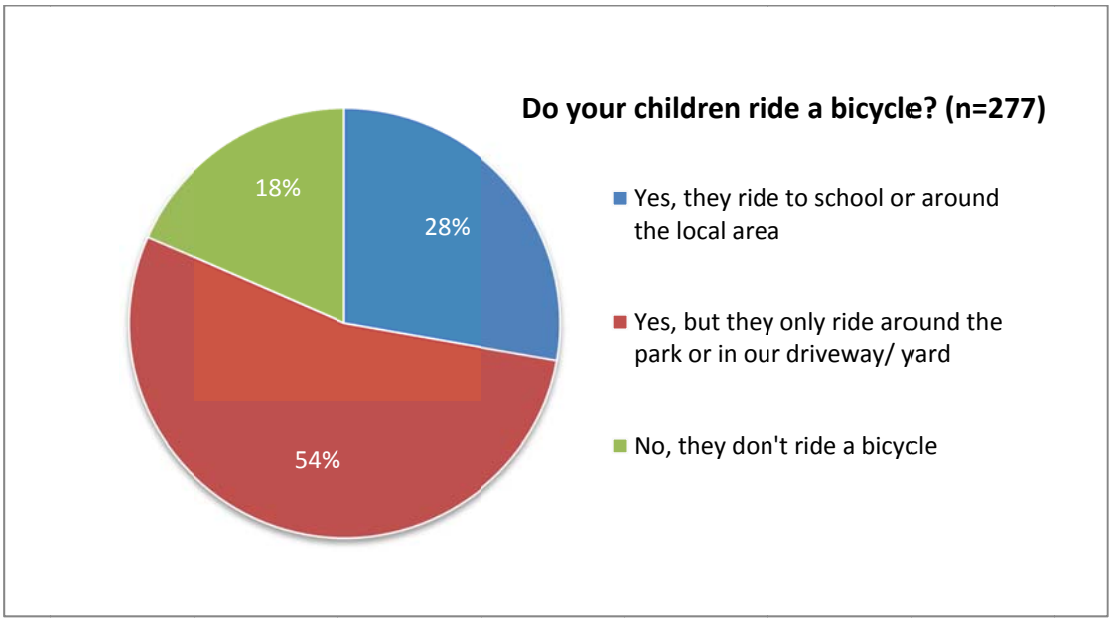
Survey Split

This question contained another filter whereby the respondents who said they did have children under the age of 15 were directed to answer Questions 20 and 21 relating to the cycling behaviour of children. If respondents did not have children under the age of 15 they were prompted to skip to Question 22.

Question 20: Do your children ride a bicycle?

This question was made up of two parts. The first part of the question asked whether the respondent's children ride a bike and where they ride. A total of 277 respondents (n=277) answered this question.

Figure 26 - Bicycle riding habits - children



As indicated in Figure 26, respondents were asked to choose one of three options provided with the most common response being “Yes, but they only ride around the park or in our driveway / yard” (54%).

The second part of the question asked respondents to provide more details about why they ride or don’t ride. This part of the question was answered by 126 respondents (n=126). The top 5 barriers to children cycling in Ku-ring-gai identified by respondents included:

- My children are too young (n=42)
- Cycling is too dangerous (n=40)
- Lack of safe bicycle paths in the LGA (n=40)
- It is too far to ride to school or other destinations (n=10)
- Bike riding is not encouraged at my child’s / children’s school (n=6)

Question 21: Is there anything that would help you to encourage your children to ride their bicycles more often to get to school or around the local area?

This qualitative question was answered by 205 respondents (n=205) and, in order to analyse the results, key categories were developed for the most frequent responses received.

Some respondents indicated more than one category in their response that would help them to encourage their children to ride more often to get to school or around the local area. None of the categories have been ranked but rather Figure 27 below indicates the frequency of responses received.

Figure 27 - Enablers for children to cycle

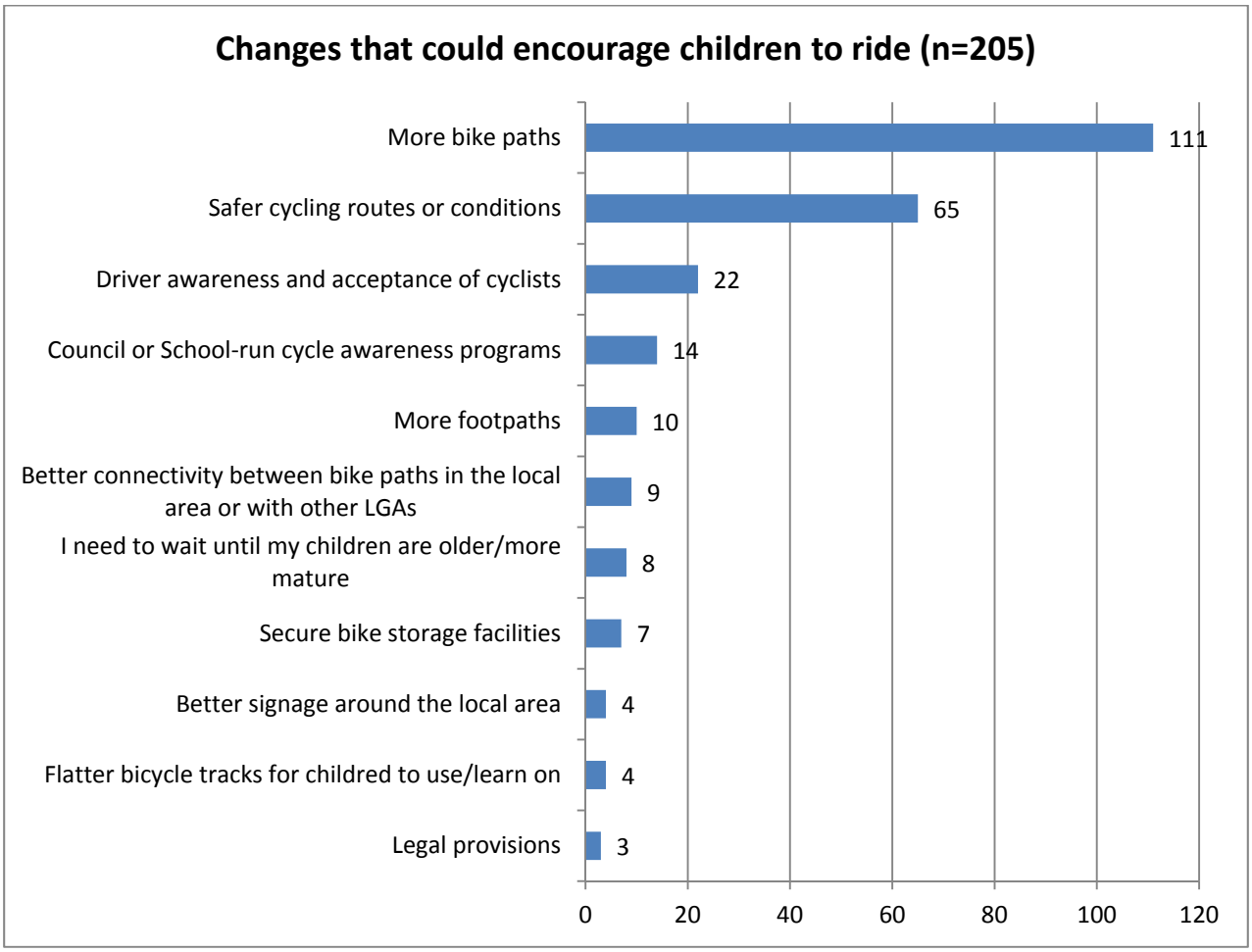


Figure 27 highlights that over half of the respondents identified that more bike paths would help parents to encourage their children to ride their bicycles more often to get to school or around the local area. Some frequently made comments received by respondents who identified more bike paths included:

- "Availability of physically separated bike paths"
- "More pathways or dedicated cycle routes for them to ride on."

The second most frequent response related to safer cycling routes or conditions which were made by 65 respondents. A number of comments included details about improved line markings for bike paths, better maintained paths, slower traffic conditions and safer crossings of main roads as the types of conditions that could be improved.

The third most frequent response made by 22 respondents was that improved driver awareness and acceptance of cyclists may help parents to encourage their children to ride their bicycles more often. Of the 22 comments made about driver awareness, key concerns raised included:

- Lack of respect and aggressive attitude by drivers towards cyclists;
- Concern about 4WD's particularly around schools; and
- Fast speed of drivers posing a safety risk.

Comments made about Council and school run awareness programs were the fourth most frequent response received. Bike riding classes at school, incentives provided

by schools for children to encourage cycling, cycle awareness programs and skills programs were some ideas identified by respondents.

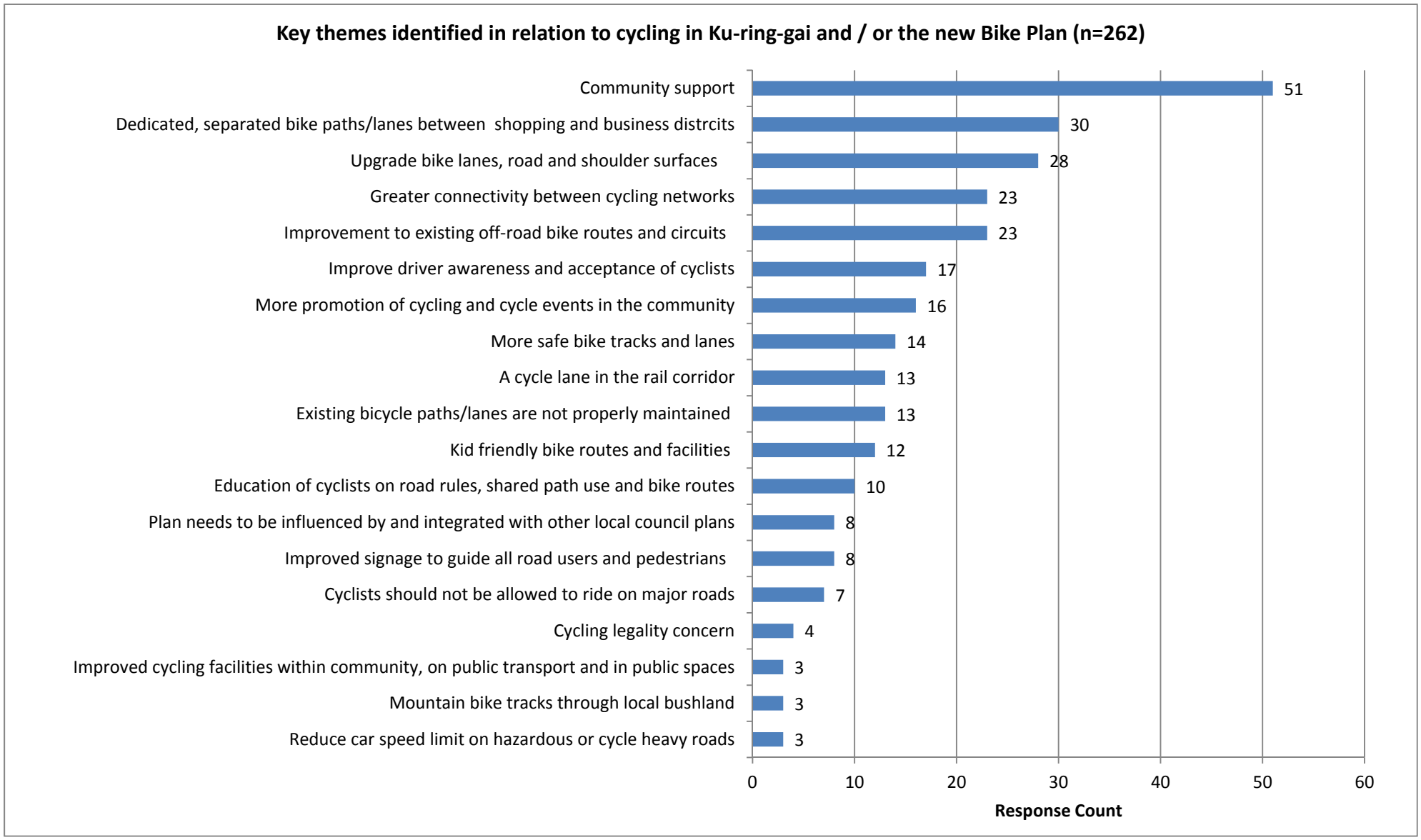
Question 22: Do you have any further comments about cycling in Ku-ring-gai or about the new Bike Plan?

This question was an optional qualitative question and was responded to by 262 respondents. The comments made were categorised for analysis into key themes. Figure 28 indicates the most frequent responses received.

Community support for the new Bike Plan was the most frequent comment made by respondents followed by the need for dedicated and separated bike paths and lanes connecting key service and recreational areas.

Maintaining and improving the safety of bike paths and lanes was the third most frequent comment made in response to this question.

Figure 28 - Key themes identified in the open-ended responses



3.4 School Survey

The school survey was completed by 29 of the 49 schools in the LGA who were invited to participate. The table below outlines the responses received by the 29 schools to questions 1 -4. Of the 29 responses received 23 related to primary aged children or younger (3-12 year olds), 10 related to secondary school aged children (12-18 year olds) and 4 of the respondents related to children across both primary and secondary school aged children.

Table 1 School Survey responses Q 1-4

School	Number of students at school	Number of staff at school	Age range of students
Abbotsleigh Junior School	500	60	5-12 years
Beaumont Road Public School	370	20	5-12 years
Brigidine College St Ives	n/a	n/a	12-18 years
Corpus Christi School	240	20	5-12 years
Gordon East Public School	321	20	2-12 years
Gordon West Public School	504	38	5-12 years
Highfields Preparatory & Kindergarten School	175	25	3-7 years
Killara High School	1532	120	12-18 years
Knox Grammar Preparatory School	700	75	5-12 years
Knox Grammar School	800	75	12-18 years
Ku-ring-gai Creative Arts High School	600	50	12-18 years
Lindfield Public School	727	46	5-12 years
Masada College	600	120	5-18 years
Newington College Preparatory School	156	20	5-12 years
Prouille Catholic School	318	30	5-12 years
Pymble Public School	590	34	5-12 years
Ravenswood School for Girls	1064	130	5-18 years
Roseville College	807	120	5-18 years
Sacred Heart Catholic School	320	20	5-12 years

School	Number of students at school	Number of staff at school	Age range of students
St Ives High School	820	72	12-18 years
St Ives North Public School	680	50	5-12 years
St Ives Park Primary School	170	10	5-12 years
St Lucys School	164	65	5-18 years
Sydney Grammar School, St Ives Preparatory School	430	40	5-12 years
Turramurra High School	1200	85	12-18 years
Turramurra Public School	479	26	5-12 years
Wahroonga Adventist Primary School	194	20	5-12 years
Wahroonga Preparatory School	180	30	4-12 years
Wahroonga Public School	685	36	5-12 years

5. Do staff ride a bike to school?

Of the 29 schools who responded to the survey, seven stated that one or more of their teachers' cycle to school.

Of these, two noted they have 3 or more teachers who use this mode of transport. These included Sydney Grammar School, St Ives Preparatory School & Turramurra High School.

6. Does the school prohibit cycling?

Four schools stated they prohibit students from cycling to and from school. Wahroonga Public School, Corpus Christi School and Lindfield Public School identified age as a key determinant in their decision to prohibit cycling.

Expanding on this, Wahroonga Public School explains that students under 10 years are asked not to ride to school without being accompanied by a parent. A decision they believed to be in line with Roads and Maritime Services recommendations.

Lindfield Public School explained cycling was only prohibited for students in Kindergarten to Year 2.

Corpus Christi School outlined a number of additional reasons pre-empting their decision to prohibit cycling. These include the schools close proximity to Mona Vale Road and the level of responsibility required to ensure students wear helmets and bikes meet Australian safety standards.

7. Does the school encourage cycling?

Of the 29 schools who responded to the survey, eight answered in the affirmative to this question.

The most common methods of encouragement were through the provision of bike racks and participation in school based cycling programs.

Killara High School and Wahroonga Public School provide bike racks for the use of the students. Abbotsleigh Junior School, St Lucys School, Wahroonga Adventist Primary School and St Ives Primary School participate in school based safe cycling programs, such as the Outdoor Education Program, through attendance at CARES and bike safety programs.

Abbotsleigh Junior School noted they also participate in the Roads and Maritime Services Ride to School initiative.

Of the 21 schools who answered in the negative, three commented that they neither encourage nor discourage cycling amongst their students. Moreover, one school saw cycling as a non-issue for their school due to the young age of the students and the high proportion of students who arrive at school by car.

8. Does the school have bike parking facilities?

17 schools have bike parking facilities. Bike racks are the most common form of facility; however two schools stated they have a holding space for bikes but not physical bike rack.

Two additional schools have bike parking facilities in planning.

9. Does the school have any other end of trip facilities?

15 of the 28 respondents to this question stated they have end of trip facilities for cyclists.

Six of these schools have shower and/or bathroom facilities for the use of staff only.

Three schools noted that shower facilities for students are only available in the physical education change rooms. Four schools stated they have lockers available for student use.

Killara High School stated that while students have requested showers, supervision for this facility is problematic.

10. Do you think there are dangerous routes or intersections for students and staff to cycle to school?

27 respondents believe there are dangerous routes and/or intersections for students and staff cycling to and from school.

Pacific Highway and Mona Vale Road were mentioned 16 times, collectively, in response to this question. Over half of the responding schools mentioned the Pacific Highway, Mona Vale Road and/or Link Road in their comments.

Three schools commented that the roads outside or near their school are particularly dangerous routes for cyclists. The dangers associated with crossing intersections and roundabouts are identified as a key concern for schools.

Wahroonga Adventist Primary School identified a lack of designated bike lanes and on-road shoulders as a particular safety concern for students and staff cycling to and from school.

11. How many students cycle to and from school?

24 schools responded to this question. Of these, 15 counted five or fewer students who cycle to school. 11 of these schools identified three or fewer students who ride a bike to school.

Turramurra High School, Turramurra Public School, St Ives North Public School, Wahroonga Public School and Killara High School counted between 10 - 15 student cyclists.

12. Reasons why students do not cycle to and from school?

The main reasons nominated for this question related to the high traffic volumes and dangerous routes to and from school.

Additional comments covered a range of concerns including the difficulties in carrying sporting gear and musical instruments on a bike, steep terrain and distance, age and associated safety concerns.

Eight schools stated that parents prefer to drop their kids off at school. Catching public transport or within walking distance to school were other comments made about why students do not ride to school.

13. Do you have any other comments about cycling to and from school or about the new Bike Plan for Ku-ring-gai?

Six schools responded to this question providing further comments regarding staff and student cycling and the new Bike Plan for Ku-ring-gai.

Comments related to the desire for greater promotion of the Ride to School initiative throughout the year, support for the Bike Plan and the implementation of more bike paths.

Corpus Christi School stated that cyclists 12 years and under required purpose built bike tracks to safely travel to and from school. Ravenswood School for Girls voiced their support for bike paths, particularly on busy roads.

Gordon West School supported the Bike Plan and bike paths, but consider the local area too dangerous for student cycling.

Wahroonga Preparatory School explained that due to the dangerous road conditions around their local area, and the young age of their students, Council revenue would be better spent making the area safer for pedestrians before bikes.

4. Summary of Key Findings

The key findings of the consultation activities have been summarise below:

- The desire for more dedicated bicycle lanes and paths;
- Improved safety conditions for cyclists and drivers including better maintained paths and road markings, warning signs and imposed speed limits around popular cycling areas;
- Of the schools who responded to the survey, it was observed that only a small proportion of students cycle to school with 15 students being the greatest number of cyclists identified by a school;
- Safety was the greatest concern for schools, with 27 out of the 29 schools indicating that they perceived there to be dangerous routes or intersections for students and staff cycling to school. The high volume of traffic on the road was also a significant safety concern;
- Better connectivity of cycling routes within the Ku-ring-gai network and with other bicycle networks adjacent to Ku-ring-gai;
- The existing routes were considered unsafe or uncomfortable to ride on and this was identified as a significant barrier to cyclists riding more regularly for everyday local trips or for commuting to work / study;
- Better cycling conditions along main roads and following the North Shore rail line was a key gap identified in the cycling network;
- Improving driver awareness of cyclists was a common outcome across all consultation activities.

A large number of respondents indicated that they would prefer more dedicated bicycle paths around the Ku-ring-gai LGA. An interesting point to note about this key finding was that respondents identified as being either potential or non-cyclists stated that new bike paths and improved safety conditions could encourage them to cycle more. Similarly, infrequent cyclists stated that the implementation of dedicated cycle paths to key attractions or centres would influence their cycling behaviour.

Safety was a key issue identified by respondents living and cycling in the Ku-ring-gai area. The main safety concerns were in relation to the number of cars on the road and the lack of facilities or signs that would alleviate existing safety issues. Frequent cyclists stated that the installation of bicycle-only lanes along main highways and local roads as well as the maintenance of existing paths would help to improve current safety conditions. Similarly, the installation of signs that warn of cyclists in the area would also improve conditions.

A large number of respondents to the community survey identified that they cycle along roads running parallel or within a corridor along the North Shore rail line. In addition a large proportion of respondents identified the Pacific Highway as a key gap in the Ku-ring-gai cycling network that needs to be a priority in the new Bike Plan.

5. Conclusions and next steps

The consultation activities undertaken have allowed the project team to better understand the cycling behaviours of the Ku-ring-gai community, the current enablers and barriers to cycling, gaps in the existing bike network and opportunities for improving cycling conditions, facilities and connectivity.

A range of barriers and enablers for current and potential cyclists in Ku-ring-gai have been identified. Participants in the consultation activities have indicated a strong desire for more dedicated bike paths and safer cycling routes and conditions within the LGA. Unsafe and uncomfortable routes were the barrier identified most frequently by regular, infrequent, potential and non-cyclists. Too much traffic on the road and not enough dedicated cycleways were the key reasons identified by all respondents for why the available routes were considered uncomfortable or unsafe.

It is interesting to note that the availability of more dedicated bicycle lanes was the change mentioned by the greatest number of respondents to the community survey that would encourage more people to cycle more often. The availability of physically separated bike paths was the second most frequently selected enabler to cycling more often.

The safety of bike routes was the greatest concern for schools that participated in the consultation activities. Large volumes of traffic, unsafe intersections and roundabouts, hilly terrain and the lack of dedicated bike paths were identified as the key concerns by schools.

The findings from consultation activities also highlighted that cyclists ride throughout the LGA taking a large number of routes. Over 400 different journeys were identified by the community survey respondents. One of the key findings was that 129 of these journeys had origins and destinations that were within a corridor that ran parallel to the Pacific Highway.

The findings from these consultation activities will help inform the preparation of the new Bike Plan for Ku-ring-gai. A draft of the new Bike Plan will be placed on public exhibition later this year and the community will have an opportunity to provide comments and feedback on this plan to ensure it is meeting the current and future cycling needs.

Appendix A

Bicycle User Groups Workshop Agenda

AGENDA

Time	Item	By	Duration
1745	**Participants arrive for a 1800 start**		
1800-1830	**INTRODUCTION**		**30 min**
	Introductions	**Jon**	**5-10 Min**
	Methodology Overview + Progress Update	**Matt**	**15 Min**
	Workshop Purpose + Agenda	**Matt**	**5-10 Min**
1830-1850	**GROUP EXERCISE 1**		**20 min**
	Brainstorm Goals for the Plan	**Jon**	**15 Min**
	Prioritise Goals	**Jon**	**5 Min**
1900-1915	**BREAK**		**15 min**
1915-2000	**GROUP EXERCISE 2**		**45**
	Identifying Missing Links	**Nick**	**30 Min**
	Prioritising Missing Links	**Nick**	**15 Min**

Appendix B

Key Stakeholder Workshop Agenda

AGENDA

Time	Item	By	Duration
1000 - 1030	**INTRODUCTION**		**30 min**
	Introductions	**Jon**	**5-10 Min**
	Methodology Overview + Progress Update	**Matt**	**15 Min**
	Workshop Purpose + Agenda	**Matt**	**5-10 Min**
1030-1050	**GROUP EXERCISE 1**		**20 min**
	Each participant to provide an overview of other bike plans (from other LGAs), identify current cycling conditions and facilities and any other involvement in bicycle planning.	**Jon**	**20 Min**
1110-1120	**BREAK**		**10 min**
1120-1200	**GROUP EXERCISE 2**		**40**
	Identify key regional connections	**Nick**	**20 Min**
	Identify key opportunities, constraints and priorities	**Nick**	**20 Min**

Appendix C

New Bike Plan Poster

Have your say on cycling in Ku-ring-gai

We are preparing a new bike plan and want your input

WIN Chance to win movie tickets!

How? Take our survey

1. **ONLINE:** www.kmc.nsw.gov.au/bikeplan

2. **PICK UP A SURVEY FROM:** Ku-ring-gai Council, your local library, Turramurra Cyclery, St Ives Cyclery, The Bicycle Shop Roseville Chase, Ku-ring-gai Art Centre and Ku-ring-gai Wildflower Garden.

- What are your experiences of cycling in Ku-ring-gai?
- Tell us what could be improved
- We want to hear from everyone - riders and non-riders

Survey closes Wednesday 7 March, 2012

Enquiries: Joseph Piccoli 9424 0962 or visit www.kmc.nsw.gov.au/bikeplan

Ku-ring-gai Council

Appendix D

Community Survey

Have your say on cycling in Ku-ring-gai

- What are your experiences of cycling in Ku-ring-gai?
- Tell us what could be improved
- We want to hear from everyone - riders and non-riders

Survey closes Wednesday 7 March, 2012

Enquiries: Joseph Piccoli 9424 0962 or
visit www.kmc.nsw.gov.au/bikeplan

Ku·ring·gai Council
SERVIENDO GUBERNO

Ku-ring-gai Bike Plan Survey

Ku-ring-gai Council is preparing a new Bike Plan and would like your input whether you are a cyclist or not, to ensure the new Plan addresses the existing and future needs of the community. Your feedback will allow us to understand cyclist behaviours and will also provide us with information to identify opportunities for improving the cycle route network in Ku-ring-gai.

Please complete this survey by **Wednesday 7 March, 2012.**

If you have any questions about the Ku-ring-gai Bike Plan or this survey, please call Joseph Piccoli, Strategic Transport Engineer at Ku-ring-gai Council on 02 9424 0962.

1. Age:

- ☐ 17 and under
- ☐ 18 to 24
- ☐ 25 to 34
- ☐ 35 to 49
- ☐ 50 to 59
- ☐ 60 to 69
- ☐ 70 and over

2. Gender:

- ☐ Male
- ☐ Female

3. Which of the following statements best describes you?

- ☐ I own a bicycle anduse it most weekdays
- ☐ I own a bicycle and use it at least once a month
- ☐ I own a bicycle and use it less than once a month
- ☐ I own a bicycle but I don't use it* ***Please go to Question 15***
- ☐ I don't own a bicycle but would be interested in cycling (assuming conditions for cycling improved)* ***Please go to Question 15***
- ☐ I don't own a bicycle and would not be interested in cycling even if conditions for cycling improved. * ***Please go to Question 15***

Other, please specify.

4. Why do you ride your bicycle? (Please select all that apply)

- ☐ To save time as it is quicker to ride my bicycle than to use other modes of transport
- ☐ To save money on petrol, car or transport costs
- ☐ Because it is fun and enjoyable
- ☐ Because it is convenient or practical (e.g. all my trips are to places where there are bicycle parking facilities)
- ☐ For fitness and health reasons
- ☐ Because it helps reduce road congestion (less motorised traffic)
- ☐ Because it is good for the environment

Other, please specify.

5. What type of cycling do you take part in most often?

- ☐ Recreational (riding for fun, fitness or leisure)
- ☐ Commuter (travel to / from work)
- ☐ Commuter (travel to / from school, university, college, TAFE or other education provider)
- ☐ Sport (racing or serious mountain biking)

Other, please specify.

6. Which of the following are reasons why you don't ride your bicycle more regularly for everyday local trips or for commuting to work or study? (Please select all that apply)

- ☐ I only ride my bicycle for leisure or recreational purposes or as a sporting activity
- ☐ I don't like wearing a helmet
- ☐ I'm not confident in my bicycle riding skills
- ☐ I am not confident I know how to look after my bicycle
- ☐ I don't feel fit enough to ride more often
- ☐ I don't want to be sweaty when I get to my destination
- ☐ There aren't any convenient routes for me to get to my destination
- ☐ I don't think the available routes are safe or comfortable enough to ride on **** Please go to Question 7***
- ☐ There is nowhere for me to take a shower or change at the end of my trip
- ☐ There is nowhere to park my bicycle at my destination
- ☐ None of the above

Other, please specify.

Skip to Question 8 unless you answered that you think the available routes are unsafe or uncomfortable in response to Question 6 above.

7. If you think that the available routes are unsafe or are uncomfortable to ride on, please select the reasons why from the list below. (Please select all that apply)

- ☐ The routes are too hilly
- ☐ The road has no marked bicycle lane
- ☐ The paths I can use are not comfortable to ride on (e.g. poorly maintained)
- ☐ There aren't enough (or any) physically separated bicycle paths
- ☐ There aren't enough (or any) dedicated bicycle lanes on roads and streets
- ☐ I do not feel comfortable sharing the available off-road with pedestrians
- ☐ There is too much traffic to ride on the road
- ☐ There are too many cyclists on the bicycle paths
- ☐ There is a lack of awareness of bicycle safety and road sharing amongst other road users

Other, please specify.

8. What type of path do you usually ride your bicycle on? (Please tick all the options that apply)

- ☐ On road lane marked by a painted line
- ☐ On the road with no marked bicycle lane
- ☐ Off road path for exclusive use of bicycles
- ☐ Off road path shared with pedestrians
- ☐ Off road cycle trails (including mountain bike and recreational routes e.g. National Park)

Please describe why you use this type of path (and not others).

9. Do you ever ride with other people?

- ☐ No, I prefer to ride on my own**** Please go to Question 11***
- ☐ Yes, I ride with others

10. Why do you ride with others?

☐ To accompany my children because they are not able to ride unsupervised
☐ To socialise
☐ Because I feel safer riding in a group

Other, please specify.

11. What are your top three most common journeys by bicycle? (Please provide start and end point)

1. Start Point

End Point (via what streets/paths)

2. Start Point

End Point (via what streets/paths)

3. Start Point

End Point (via what streets/paths)

12. How aware are you of the existing bicycle network in Ku-ring-gai?

☐ Very aware
☐ Aware
☐ Somewhat aware
☐ Not aware at all
☐ Don't know

13. Please identify gaps in the Ku-ring-gai bicycle network that you would like to see improved in the future (street names/cross roads/suburbs)?

14. Have you been involved in any of the following groups, events or activities?

☐ Bicycle riding group or club*** *Please go to Question 18***
☐ Bicycle skills, maintenance or safety related training course*** *Please go to Question 18***
☐ Ride to Work Day or other bicycle riding or sustainable travel event*** *Please go to Question 18***
☐ None of the above*** *Please go to Question 18***

Other, please specify.

15. What do you think are the benefits of bicycle riding on a regular basis? (Please select all that apply)

- ☐ Saves time – it is quicker to ride to some destinations than to use other modes
- ☐ Saves money on petrol, car or transport costs
- ☐ It is good for the environment
- ☐ It is good for fitness and health
- ☐ It is fun and enjoyable
- ☐ Reduces road congestion (less motorised traffic)
- ☐ I don't know or don't think there are any benefits

Other, please specify.

16. Please indicate why you don't ride a bicycle. (Please select all that apply)

- ☐ I don't have a bicycle
- ☐ I don't like wearing a helmet
- ☐ I'm not confident in my bicycle riding skills
- ☐ I don't know how to maintain a bicycle
- ☐ I don't feel fit enough to ride a bicycle
- ☐ I don't want to be sweaty when I get to my destination
- ☐ I don't think the available routes are safe or comfortable enough to ride on**** Please go to Question 17***
- ☐ There is nowhere for me to take a shower or change at the end of my trip
- ☐ There is nowhere to park my bicycle when I get to my destination

Other, please specify.

Skip to Question 18 unless you answered that you think the available routes are unsafe or uncomfortable in response to Question 16 above.

17. If you think that the available routes are unsafe or are uncomfortable to ride on, please select the reasons why from the list below. (Please select all that apply)

- ☐ The routes are too hilly
- ☐ The road has no marked bicycle lane
- ☐ The paths I can use are not comfortable to ride on (e.g. poorly maintained)
- ☐ There aren't enough (or any) physically separated bicycle paths
- ☐ There aren't enough (or any) dedicated bicycle lanes on roads and streets
- ☐ I do not feel comfortable sharing the available off-road with pedestrians
- ☐ There is too much traffic to ride on the road
- ☐ There are too many cyclists on the bicycle paths
- ☐ There is a lack of awareness of bicycle safety and road sharing amongst other road users

Other, please specify.

18. Please indicate whether the following changes would make you more likely to cycle on a regular basis for everyday local trips or to commute to work/study: (Please provide an answer for each option)

	I would definitely cycle more	I might cycle more	It would make no difference
Increased knowledge of bicycles and bicycle maintenance	☐	☐	☐
Improved bicycle riding skills	☐	☐	☐
Availability of physically separated bicycle paths	☐	☐	☐
Availability of dedicated bicycle lanes on roads and streets	☐	☐	☐
Better connections between bicycle paths and public transport	☐	☐	☐
I do not feel comfortable sharing the available off-road with pedestrians	☐	☐	☐
Availability of shower and changing facilities at my destination	☐	☐	☐
Availability of bicycle parking at my destination	☐	☐	☐
If there were more bicycle riders on the road	☐	☐	☐
Increased driver awareness of bicycle safety and road sharing	☐	☐	☐

Is there anything else that would encourage you to ride your bicycle on a regular basis?

19. Do you have any children under the age of 15?

☐ Yes

☐ No **** Please go to Question 22***

20. Do your children ride a bicycle?

☐ Yes, they ride to school or around the local area

☐ Yes, but they only ride around the park or in our driveway / yard

☐ No, they don't ride a bicycle

Please provide details as to why (e.g. they don't know how to ride a bicycle yet, it is too far for them to ride to school so they only ride in the park):

21. Is there anything that would help you to encourage your children to ride their bicycles more often to get to school or around the local area?

22. Do you have any further comments about cycling in Ku-ring-gai or about the new Bike Plan?

23. If you would like to go in the running to win a pair of movie tickets or to be kept informed about the progress of the Ku-ring-gai Bike Plan, please provide your contact details below.

Name: _____

Bike group, organisation or other group represented: _____

Address 1: _____

Address 2: _____

Suburb: _____

State: Postcode _____

Phone: _____

Email: _____

Thank you for taking the time to complete this survey. We will keep you informed of the progress of the new Bike Plan for Ku-ring-gai and will inform you if you have won of a pair of movie tickets.

Appendix E

School Survey

Have your say on cycling to school

We are currently preparing a new Bike Plan for Ku-ring-gai and as part of the development of this Plan we would like to understand more about cycling behaviour and trips to and from school by both staff and students. We would like to encourage your school to participate in this survey and would be grateful if staff could ask students to answer Questions 11 and 12 on a designated day and time so that the response is as accurate as possible.

Please return your completed survey by **Wednesday 7 March, 2012**.

If you have any questions about the Ku-ring-gai Bike Plan or would like to speak to someone in person about the project, please call Joseph Piccoli, Strategic Transport Engineer at Ku-ring-gai Council on 02 9424 0962.

1. Name of School:

2. Number of students currently enrolled at school:

3. Number of staff:

4. Age range of students:

- ☐ 5-12
- ☐ 12-18
- ☐ Other (please specify)

5. Do staff ride bikes to school?

- ☐ Yes. *Approximately how many?*
- ☐ No.

6. Does the school prohibit cycling?

- ☐ Yes. *Please outline for what reasons:*
- ☐ No.

7. Does the school encourage cycling?

- ☐ Yes. *Please outline the reasons why cycling is encouraged and whether or not your school has any cycling programs to promote cycling to school:*
- ☐ No.

8. Does the school have bike parking facilities?

☐	Yes. *Please indicate how many spaces and who these spaces are for (staff or students or both.)*
☐	No.

9. Does the school have any other end of trip facilities (eg. Showers, lockers etc.)?

☐	Yes. *Please specify the end of trip facilities available at your school?*
☐	No.

10. Do you think there are dangerous routes or intersections for students and staff cycling to school? If so, please specify.

☐	Yes. *Please specify routes, intersections or roads.*
☐	No.

11. How many students cycle to and from school? (Approximately)

12. What are the reasons for why students do not cycle to and from school?

☐	Don't own bikes
☐	Students are not confident bike riders
☐	Dangerous routes to and from school
☐	Lack of bike parking facilities
☐	Lack of end of trip facilities such as showers and lockers
☐	There is too much traffic to ride on the road
☐	Other (please specify):

13. Do you have any other comments about cycling to and from school or about the new Bike Plan for Ku-ring-gai?

Thank you for completing this survey. Your feedback will assist us with the development of the new Bike Plan.

GHD

133 Castlereagh St Sydney NSW 2000

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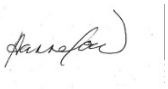
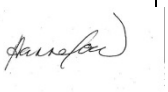
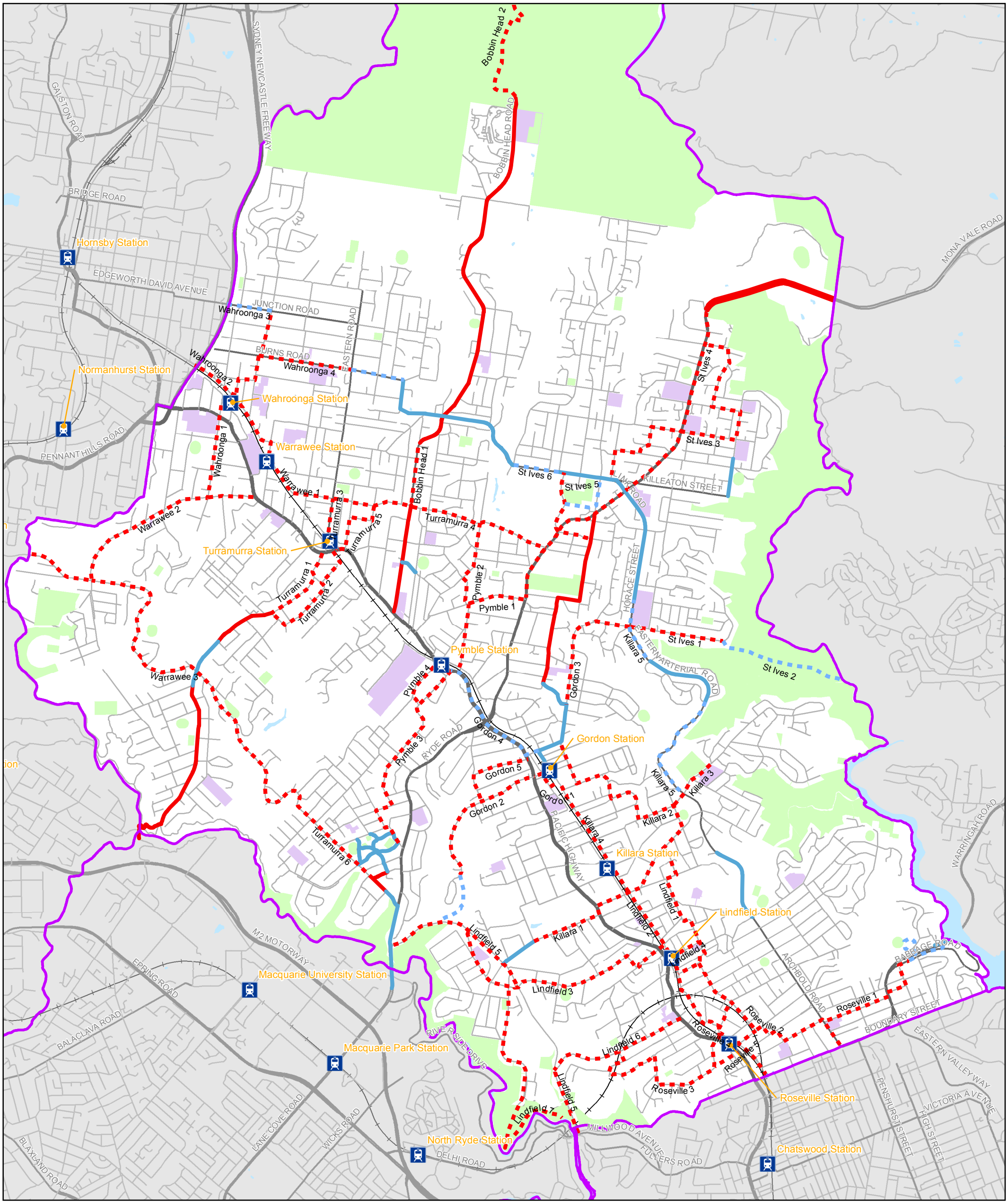
T: 2 9239 7100 F: 2 9239 7199 E: sydmail@ghd.com.au

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	S.Olivier	Jill Hannaford		Jill Hannaford		23.03.12

Appendix B

Proposed Bicycle Network



LEGEND

- On Road (Proposed)
- Off Road (Proposed)
- On Road Cycleway
- Off Road Cycleway
- Parks
- Schools
- Waterways
- Highways
- Major Roads
- Secondary Roads
- Other Roads
- Commuter Rail Station
- Railway

1:40,000 (at A3)

0 250 500 1,000 1,500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

Ku-ring-gai Council
Ku-ring-gai Bike Plan

Job Number	21-21240
Revision	A
Date	19 Nov 2012

Proposed Cycle Network

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Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Data Source: NSW LPMA: Roads, Railway, 2012; Ku-ring-gai Council, 2012. Created by: sjduce

GHD

133 Castlereagh St Sydney NSW 2000

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T: 2 9239 7100 F: 2 9239 7199 E: sydmail@ghd.com.au

Document Status

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		Name	Signature	Name	Signature	Date
0	M. Dudley	N. Buchanan		N. Buchanan		12/04/12
1	M. Dudley	N. Buchanan		N. Buchanan		16/07/12
2	M. Dudley	S. Konstas		S. Konstas		23/11/12