City of Cockburn

BICYCLE AND WALKING NETWORK PLAN 2016-2021

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Bicycle and Walking Network Plan

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Foreword

The Bicycle and Walking Network Plan aligns with the strategic aspirations, reflects the priorities of the community and help facilitate safe, efficient, connected and sustainable movement around the City.

Without an investment in sustainable and active transport modes, congestion will increase and there will be an increase in travel times, travel delays and fuel consumption; less efficient vehicle operation; poorer air quality and increased health related issues associated with a sedentary population. As our City grows, more congestion is noticeable. We are keen to encourage greater pedestrianisation and cycling as well as other modes of transport to improve the ability of moving around our City.

Promoting cycling as a mainstream and viable transport alternative is part of the solution. The Bicycle and Walking Network Plan outlines our plan to encourage more people (particularly women and people aged from 8 to 80) to ride bicycles as part of their everyday trips. We want to take cycling from being primarily a recreational or sporting activity to being an integral part of everyday life. We want the City of Cockburn to be seen as a cycle friendly city and an example of best practice.

Walking is a key element as every trip you take requires people to be a pedestrian at some stage in the journey, though this is often overlooked. Pedestrians form the largest single road-user group and are the most vulnerable, including those using wheelchairs or mobility aids, families with prams and children. We have an aging population and the percentage of residents with disability is rising, so it is important to have connected paths with universal accessibility.

Legislation has changed recently to support the increased number of people walking and riding and allowed bicycle riders and pedestrians to legally share all paths and implemented additional laws so drivers need to take more care on the roads and give 1 or 1.5 metres space to people riding bicycles on our roads.

There are a lot of positives to cycling and walking:

- Choosing active transport is good for your waist and your wallet.
- Good for business as people on bicycles or walking tend to shop regularly and locally.
- Getting people out of cars encourages engagement with others in their local community that they see when they walk or ride.
- Cities around the world are changing as more people realise that cycling and walking is good for cities and helps reduce traffic congestion.
- Cycling in particular is a viable transport alternative for all ages, when safe connected paths are available.
- Everybody benefits when there are more people walking and riding as the extra 'eyes on the street' help with passive surveillance and looking out for one another.

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1. Introduction

1.1 Background

Whilst the Cockburn area is vast, it remains an attractive area for walking and cycling, with its quiet residential streets, coast exposure and proximity to the Principal Shared Path (PSP) network along the Kwinana Freeway. However, the local cycling network in the City of Cockburn Local Government Area has a lot more potential.

The 2010 *Bicycle Network and Footpath Plan* proposed several recommendations which Council has since implemented, including constructing missing links and the installation of signs and pavement markings.

Since this time, however, there has been considerable growth in cycling participation in WA and a change in the demographics and occupation of Cockburn. Furthermore, there has been substantial progress made in bicycle route planning at a state level as shown in the development of the *Western Australian Bicycle Network Plan*.

This new plan seeks to provide a clear strategic direction for the development of cycling in City of Cockburn. The new plan will address new priorities and incorporate contemporary best practice for the continued design and implementation of bicycle infrastructure as well as a pedestrian network across the City to accommodate the demand for those between 8 to 80 years and where they want to walk and ride. Building cities as if everyone is 30 years old and athletic is the way of the past. Designing for 8 to 80 years old requires reimagining a busy city street or intersection, and asking whether it is suitable for young and old alike. In all too many locations – signalized crossings on wide suburban arterial roads, narrow bike lanes on busy roads, over-crowded or obstructed path, etc. – the answer will be no. http://www.880cities.org/

As a tool, the network plan will contribute to the development of safe, connected and attractive cycling network, available for all, and providing not only a viable alternative transport mode, but also recreational, tourism and health opportunities for the community.

Both cycling and walking have the potential to become an integral part of the transport network. Walking is an integral part to every mode for travel and cycling is not just for the dedicated 'cyclist' commuters, but for everyday 'bike riders', who can travel short distances to destinations or, as part of multimodal transportation, to bike parking associated with public transport.

1.2 Why do we need to encourage people to become more active?

The promotion of cycling and walking is important to encourage the population to become more active. To provide a safe and connected cycling and pedestrian network is to provide infrastructure to ensure cycling and walking is a viable form of transport.

The promotion of active transport provides many benefits for individuals, the community, the economy and the environment. Cycling and walking is a viable mode of transport for that is

accessible for any age and any fitness level. Bikes are more affordable than a car to purchase and maintain. Cycling and walking provides no environmental impact. The encouragement of cycling and walking will improve the health of those who ride and walk and will make local streets and suburbs safer and more liveable.

The Australian Bicycle Council have produced their economic overview for cycling, see Figure 1.1 detailing the cost for congestion, inactivity and environmental cost through business as usual car dominated travel.

The main benefits of a connected and integrated cycle and pedestrian network can be surmised and categorised for both the individual (local community) and for the wider community. This is demonstrated in Figure 1..

Further to this, ratepayers in the City of Cockburn noted their number one issue was the localised traffic congestion within the City. Replacing car trips by walking and cycling can better manage traffic congestion, especially around schools, train stations, shopping centres and other key trip generators.

Cycling can reduce the number of trips made by cars thereby reducing congestion and freeing up road space for essential motor vehicle trips. Bicycles can move large numbers of people relatively quickly and conveniently over moderate distances. Riding a bike provides independence to people of all ages and convenient door to door access without parking hassles in busy areas. Bike parking takes up a lot less space than car parking.

Increasing walking, riding and public transport helps to increase capacity of the broader transport network and reduce congestion. Additional benefits of these modes of travel compared to private car travel include: reduced environmental impacts; improved public health and improved community well-being. The net benefit to the community of cycling is approximately $1.43 per kilometre cycled as noted in page 18 of this strategy.

Figure 1.1: Australian cycling - an economic overview

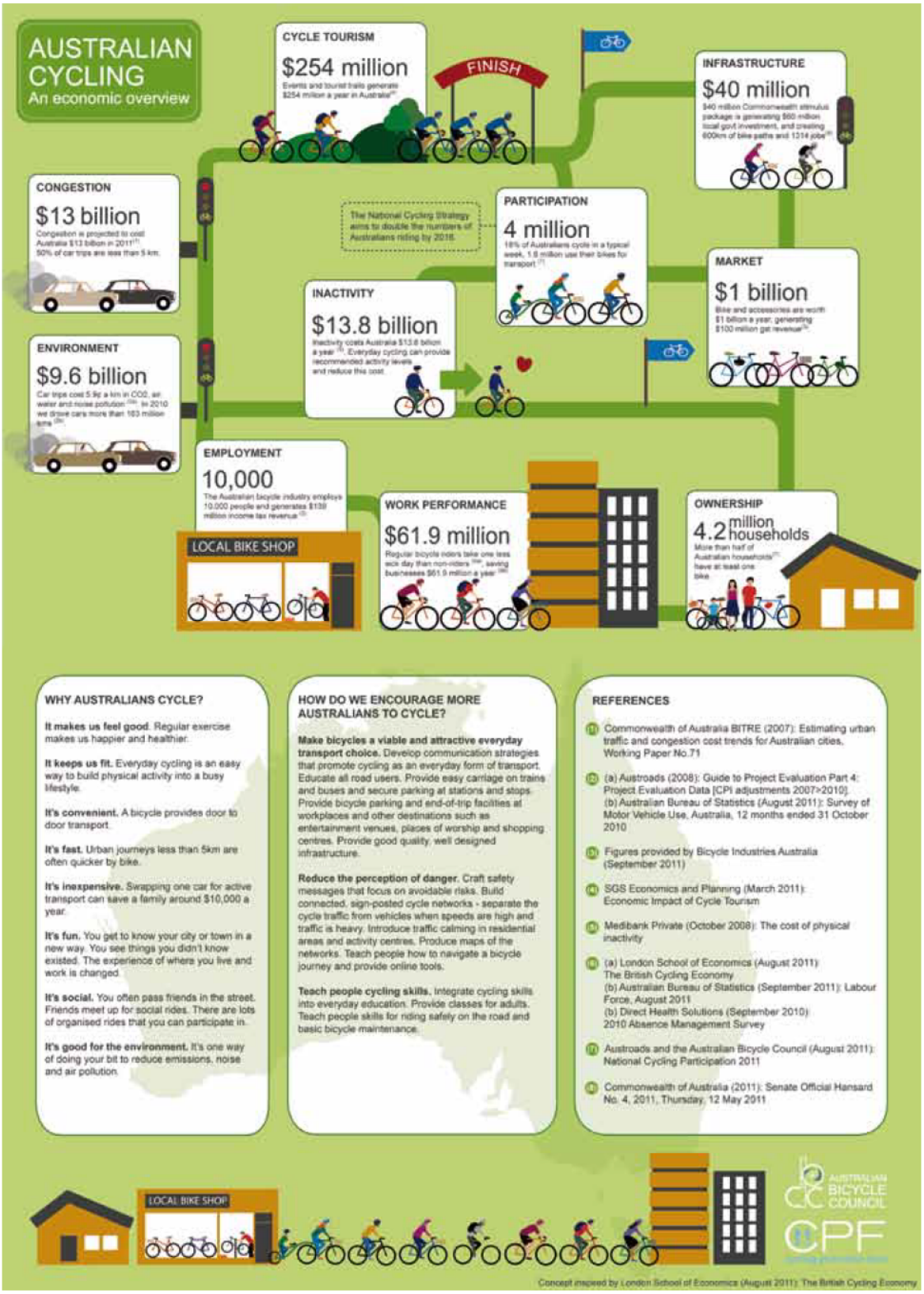


Figure 1.2: How does cycling and walking benefit you and the community?

1.3 Principle of this network plan

1.3.1 High level principles for the design of walking and cycling facilities for varying land uses within the City of Cockburn

Facilities will vary depending on adjacent land use and whether the route is through an inner-urban area or a suburb area context. Facilities will also need to match the intended user type and destination.

For instance, cycling and walking facilities linking to a school will need to be safe, convenient and easy to use – thus, off road, shared or separated facilities, bike boulevards or shared spaces will most likely be appropriate. However, for a commercial, office or transport node destination (which is more likely going to attracted commuting traffic) on-road or off-road separated facilities to allow for high speed travel will be more appropriate.

Routes are not required to follow road alignments and may be aligned through open space if the alignment provides better grades, directness or attractiveness.

Types of riders

For new subdivisions, the planning for road categories to incorporate Active Travel and have a consideration of facility requirements should influence block layouts and road reserve widths/cross-sections.

High level cycling principles were discussed with the Department of Transport and they have suggested the following:

- Providing on-road cycle facilities on high speed and/ or high volume roads:
  - Idea is to keep cyclists off these roads as much as possible providing separated or off-road paths where possible.
  - Where off-road facilities are not possible, or there is a demand for on-road cycling for high volume/high speed roads the City should provide protected bike lanes.
- Location of footpaths:
  - State Government is moving to footpaths on both sides.
  - Footpath dimensions to increase to 2m as a minimum.
  - Footpaths may need to be wider closer to schools/ activity centres – consider Shared Paths in these instances.
  - Footpaths are now de-facto Shared Paths as well with the recent change in law within WA.
- Separated mode facilities:
  - Purpose is to minimise conflict between pedestrians and cyclists.

- State Government is looking at rolling these out for the PSP network.
- One example is on the Fremantle PSP near Subiaco – very short section though (also requires pedestrians and cyclists to merge at intersections – giving way to traffic).
- Use these as appropriate.
- Better to have some off-road facility than none.

The Department of Transport have also supplied the *Perth 2050 Cycle Network* Planning Principles which suggest a four-tiered cycling hierarchy, presented in Table 1.1.

Table 1.1: Department of Transport *Perth 2050 Cycle Network* Planning Principles

	PSPs	Strategic routes	Local routes	RSPs
Colour	Blue	Pink	Red	Light Blue
Objective	To provide fast, direct commuting routes parallel to high-speed corridors such as freeways and railway lines.	To provide safe and direct connections between various strategic, secondary, district and specialised activity centres, as well as train stations.	To collect cycling traffic from local roads within suburbs and distribute it to the Strategic and PSP networks. To provide safe a direction connections to local destinations such as schools, shops and parks.	To provide recreational cycling facilities around Perth's various natural features including the Indian Ocean, the Swan-Canning River System, various lake systems and remnant bushland.
Analogous to	Freeways	Arterial Roads	Collector Roads	Tourist Routes
Density	Approx. 5km x 5km	Approx. 2.5km x 2.5km	Approx. 1.5km x 1.5km	N/A
Built Form	Shared paths of PSP standard. Wherever possible, grade separation should be provided at intersecting roads/railways.	- Shared paths of PSP standard where room permits (grade separation in not necessary). - Separated bi-directional cycle lanes, or - Bicycle boulevards	- On-road cycle lanes, - Bicycle boulevards, or - Designated quiet suburban streets, communicated using sharrows or appropriate signage.	Shared paths of PSP standard.

The colours noted in the table above refer to that documented in the *Perth Transport Plan* cycling network. Figure 1.3 illustrates the proposed cycle network as depicted in the *Perth Transport Plan*.

The Department of Transport suggest a four-tier system (Principal Shared Path Network, Strategic Network, Local Network and Recreational Shared Path Network), while the ACT planning for Active Travel guidelines suggests a two-tier system, that have further hierarchies of routes. The two tiers being

1. **On-Road Cycling Routes** (are similar to DoT Strategic Routes)
2. **Community Routes** (which encompass)
   I. **Main Community Routes** (off-Road Shared Use Routes along higher order roads) (are similar to DoT Principal Routes)
   II. **Local Community Routes** (off-Road Shared Use Routes along lower order roads / shared spaces / bike boulevards) and Access Paths (all-purpose access paths).

Further to this two-tier system are recreational paths and accessible pedestrian routes.

These routes and their interaction in relation to different suburban context are discussed in detail in ACT Government, Planning for Active Travel in the ACT, Walking and Cycling Infrastructure Guidelines 2015.

A key feature of the ACT guidelines for designing for cycling trips is that by using both 'Community Routes' and 'On-Road Cycling Routes', riders can increase their choice of possible routes for trips across the network.

Route choice is particularly important to cyclists because the availability of additional routes can often help them to overcome the challenges of difficult terrain or traffic conditions depending on the time of day. Trip purpose (recreational, commuter or with family/children) will also influence user needs and subsequently route choice.

A decision to take a particular route will depend on the riders own ability and the rider's assessment of prevailing traffic volumes and speeds (pedestrians on paths or vehicles on roads), the number and type of vehicle interaction points, surface conditions, terrain (hills) and the weather. These variables will influence a rider's choice to use sections of either 'Community Routes' or 'On-Road Cycling Routes' to complete a journey.

The road environment is not constant and as a result, people not comfortable riding on an arterial road bicycle lane during weekday peak hours may prefer this type of facility on weekends or early in the morning. This may be due to lower vehicle traffic volumes weighted against the perceived higher-risk of using a path where pedestrians have priority. Faster moving cyclists may assess the collision hazard from meandering pedestrians and dogs on paths as a higher risk than the hazards present on the road at that time. In this regard a critical aspect of the ACTs proposed two-tier system for cyclists is the provision of link paths or transitions wherever possible to allow easy interchange between 'On-Road Cycling Routes' and 'Community Routes'.

A key principle of the two-tier system is that cyclists using one type of cycling route (On-Road Cycling Routes or Community Routes) should be able to complete the majority of their journeys without needing to use the other type of route. In some arterial and major street corridors, particularly those which run through open space areas, bicycle lanes may be provided paralleling paths within the verge area. Both facilities cater for the needs of the various users of the two different route types and are highly valued by the riders who use them.

The ACT Government, Planning for Active Travel in the ACT, Walking and Cycling Infrastructure Guidelines notes that this approach is supported by the Austroads study, Cycling on Higher Speed Roads which states that 'Ideally, all high-speed roads would cater for a range of (rider) abilities with a good quality sealed shoulder or bicycle lane (for roads that are not access controlled (motorways)) and an off-road path.'

In this context, and given the WA Department of Transports proposed four-tier system, the Cockburn Cycling and Walking plan will adopt the two-tier system with the use of the DoT four-tier system when defining the different categories of community routes. In this context, off-road shared use paths, shared spaces and bike boulevards (Local Community Routes) and all-purpose access paths would form a **Community Route** and the bicycle lane or marked sealed shoulder would form an **On-Road Cycling Route**. Providing facilities on-road for cyclists also helps 'normalise' cycling as a transport mode.

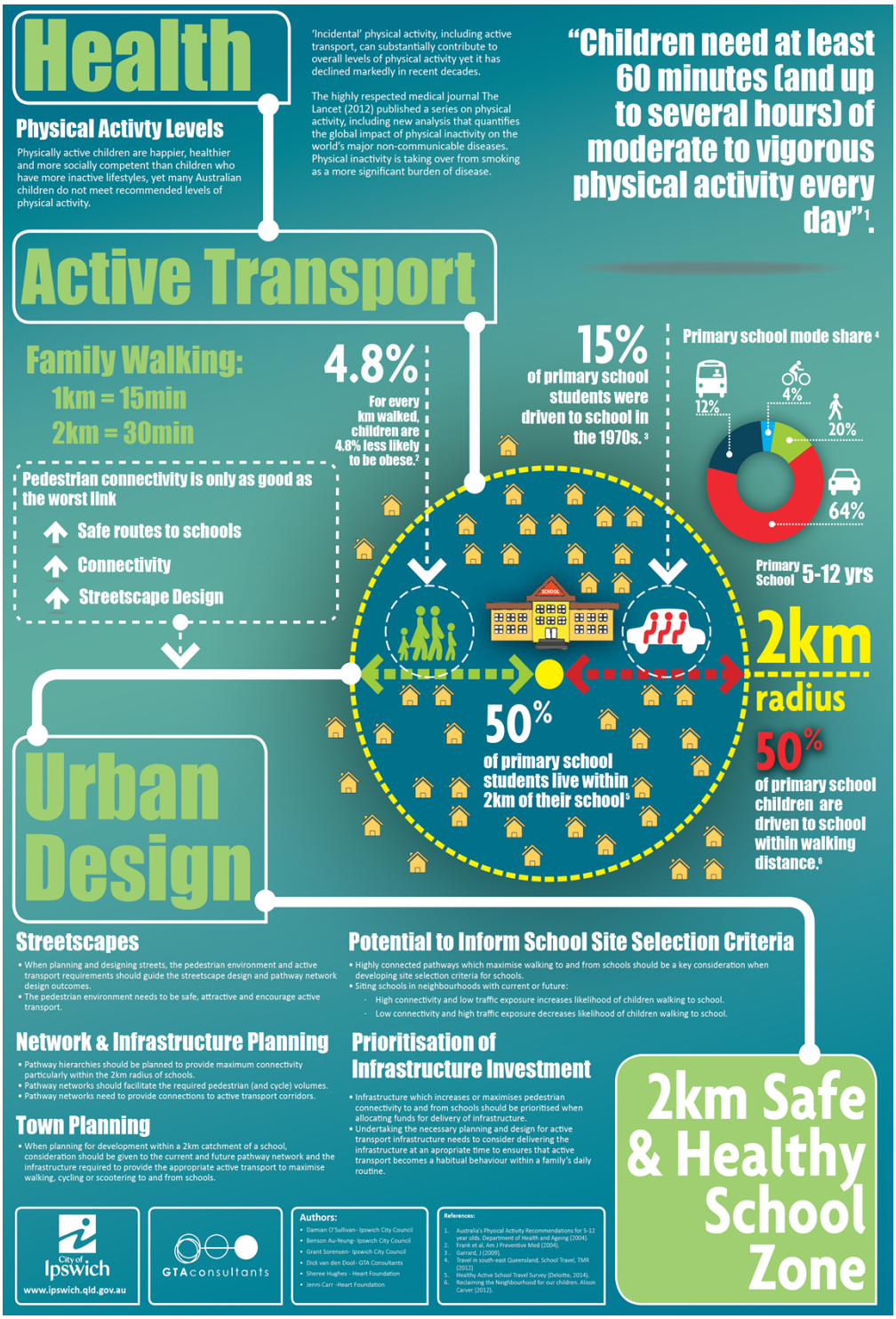
1.4 Different approaches within Australia

- Western Australia, Perth – **Safe Active** Streets

The Safe Active Streets program is an innovative program designed to make cycling safer and easier in Western Australia and largely consists of a new cycle infrastructure treatment known as Bicycle Boulevards. To ensure Safe Streets Bicycle Boulevards need to be located on local streets with low traffic volumes (less than 3,000vpd) and speeds (30kph or less), providing bike riders with safe and comfortable bike routes with priority over cars and an easy, on-street link to local destinations or major bike routes. The lower speed road creates a safer environment for pedestrians, cyclists and motorists.

- Queensland, Ipswich – 2km **Safe Healthy** School Zone

Physically active children are happier, healthier and more socially competent than children who have more inactive lifestyles, yet 50% of primary school students live within 2km walking distance of their school; half of whom are driven by their carers. For every km walked, children are 4.8% less likely to be obese. When planning for development within a 2km catchment of a school, consideration should be given to the current and future pathway network and the infrastructure required to provide the appropriate active transport to maximise walking, cycling or scootering to and from schools.



- New South Wales, Inner West, GreenWay – **Safe Green** Street

A quiet street network providing easy and safe connections to a GreenWay 'spine', improving active transport accessibility and providing for improved streetscapes, amenity, stormwater management, bushcare, community gardens and biodiversity. This concept was put forward to capture themes of a growing, linking, network which provided security and greater greenery. Implementation sometimes requires street calming measures.

- New South Wales, Blacktown – **Cool Green** Street

Streetscape adaptation provides an environmental, economic and social opportunity for government authorities. Informed by Libby Gallagher's doctoral research, this pilot project seeks to explore these opportunities, by developing streetscape designs for implementation in Blacktown focused on retrofitting existing street to adapt and address climate change, maximise cooling and alleviate the Urban Heat Island (gallagherstudio.com.au).

1.4.1 What can Cockburn take from this?

To work toward social inclusion and getting a healthier population the implementation and promotion of safe and connected active travel infrastructure utilising more green space and provides more cycling and pedestrian activity leading to a safer and healthier population.

Cool Green Safe Healthy Active Streets

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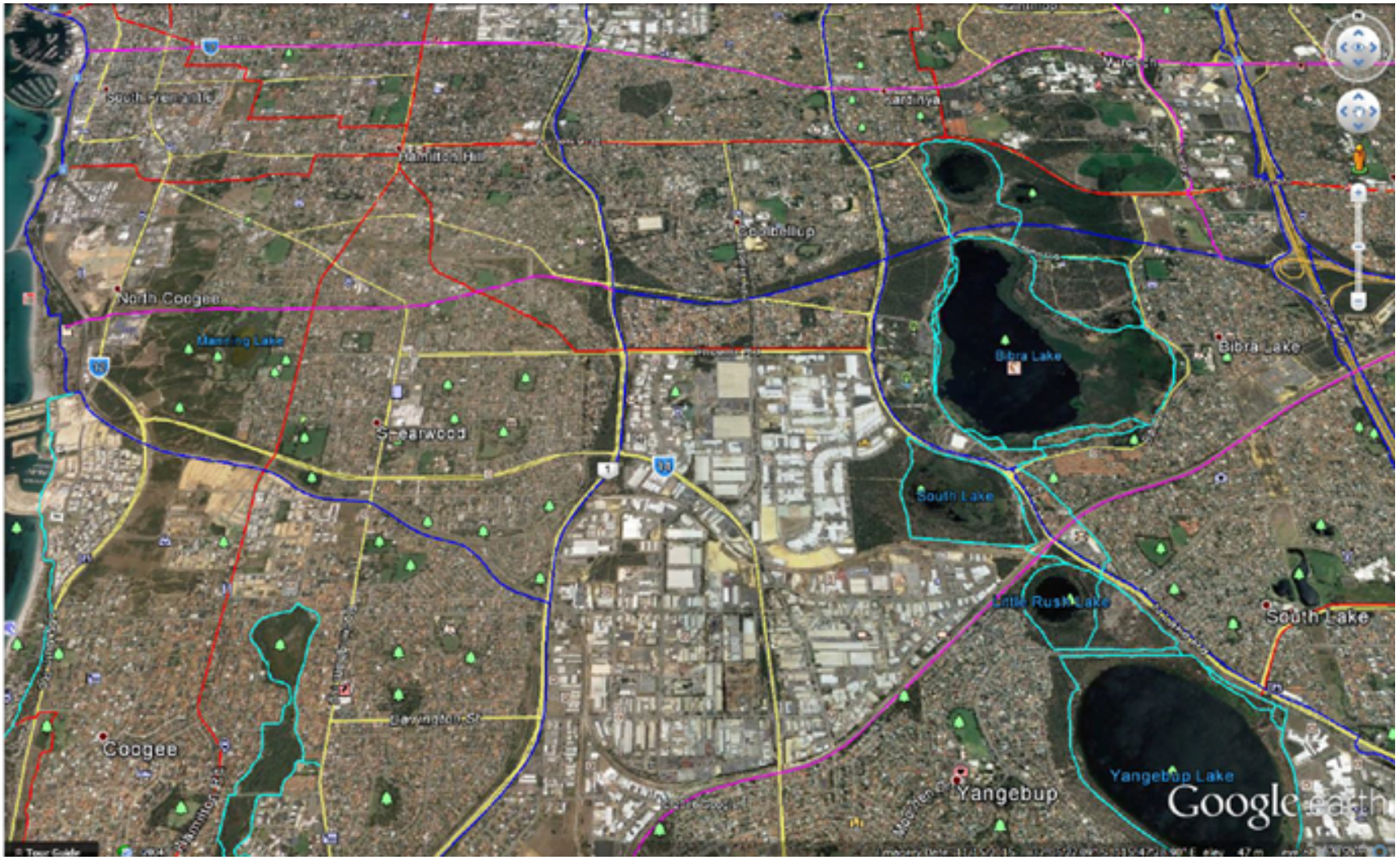
Figure 1.3: Perth Transport Plan Cycle strategy – City of Cockburn proposed network (North)



2. Vision and objectives

2.1 Strategic guidance

To ensure the Vision and Objectives for this Bicycle and Walking Network Plan (BWNP) is realistic and aligns with what the City, State and Federal Governments are trying to achieve a number of strategic documents have been reviewed with key objectives/achievements summarised within the following pages. Important documents helping to guide and shape the planning of an active travel network include the city's Integrated Transport Plan, Strategic Community Plan and Local Planning Strategy as well as the State Governments Western Australian Bicycle Network (WABN) Plan and the National Cycling Strategy. The following strategic documents have been reviewed with the relevant objectives that relate to walking and cycling highlighted.

2.1.1 City of Cockburn strategic documents

2010 City of Cockburn Bicycle Network and Footpath Plan

The following objectives were identified in the last City of Cockburn Bicycle Plan and were used to guide preparation of the 2010 bicycle and pedestrian plan:

1. **Safety for all users** is paramount, recommendations must not compromise the safety of one group over another.
2. Cycling and walking should be facilitated by a strong **interconnected network of paths** throughout the City.
3. To provide **access between key land uses throughout the City**, linking both trip origins and destinations.
4. Routes must be **legible, well signed and accessible**.
5. The provision of cyclist and pedestrian infrastructure should not only **facilitate** the use of these modes but also serve to **advertise** its importance within the City.

City of Cockburn Integrated Transport Plan (ITP) Objectives

- To have a transport system that efficiently integrates with land use, enables **multi-modal trips**, and allows flexible management of the City's road space.
- **To provide an efficient and highly connected movement network for pedestrians and cyclists that caters for and encourages healthy active transport travel for trips of any length.**
- To provide a transport system that is safe and efficient, accepting that a level of traffic congestion will always exist, and is planned to meet the long-term transport needs of a growing city.
- To have a legible, well-structured arterial road network that provides efficient routes for local vehicles and general traffic for intra-city and regional trips.
- To provide infrastructure and promote behaviour that encourages patronage of public transport in a sustainable manner and creates efficient and prioritised movement for public transport and other high occupancy vehicles.
- To raise **community awareness of transport alternatives to private cars**, and keep them regularly updated on transport issues in Cockburn.

As noted in the City's ITP a summary of the objectives of Cockburn's *Strategic Community Plan* and *Local Planning Strategy* is as follows:

City of Cockburn – Strategic Community Plan 2012 to 2022

The City's strategic community planning process seeks to engage the people of Cockburn to examine seven key focus areas. They are; Growing the City, Communities and Lifestyles, A Prosperous City, Environment and Sustainability, Infrastructure, **Moving Around**, Leading and Listening.

The required outcome of the Plan is to develop road, **pedestrian and cycleway networks to facilitate the safe movement of people** and goods while advocating improvements to the public transport system. The plan identifies five key 'wants':

- An integrated transport system which balanced environmental impacts and community needs.
- **Facilitate and promote healthy transport opportunities**.
- A safe and efficient transport system.
- A defined freight transport network.
- **Infrastructure that supports the uptake of public transport and pedestrian movement**.

City of Cockburn - Local Planning Strategy (LPS)

The City's Local Planning Strategy establishes a framework for the future planning and directions of the municipality which are then enacted through the Town Planning Scheme. Transport is a strategy under the LPS which establishes the following directions:

- Maximise development near public transport routes.
- Provide for a safe and efficient network of local and arterial roads facilitating access and the distribution of traffic through the area.
- Minimise trip lengths to maximise public convenience and minimise the impacts of private car users.
- **Encourage cycling by defining and implementing cycle networks and promoting the provision of end of trip facilities.**

The Lakes Revitalisation Strategy

The Lakes Revitalisation Strategy aims to guide the delivery of residential development across the suburbs of South Lake, Bibra Lake (East) and parts of North Lake. Key objective is to promote diverse dwelling types and enable current and future residents to make appropriate housing choices into the future. A key focus is to ensure the Lakes area is an attractive place to live and visit into the future. A summary of this follows:

- Residents in the Lakes area are highly car dependent. Public Transport use to work (5.6%), people who walk to work (1.13%) and people who drive to work (71.9%).
- The Lakes area has a relatively high number of residents above 65 years – a total of 18.64%. However, it is important to recognise this high figure is contributed to by the residents in the aged care facility in Bibra Lake.
- The suburbs of Bibra Lake and North Lake have the same median age of 39, which is significantly higher than South Lake's 33.
- An opportunity exists to build on the natural areas of Bibra Lake by improving the connection between residential areas and the lake.
- Considered of value into the future, **residents see a desire to improve traffic flows, ease congestion, reduce through traffic**.
- **Further enhancement of streets, including further street tree planting could assist in promoting further walking and cycling**.
- **Promote sustainable transport options** and easy ways to move in and around the Lakes area.

- **Deliver the Recreation Loop – connecting the Lakes area with the emerging Baldivis tramway track and Cockburn Central.**
- Secure a commitment (for example an MOU) from the State Government for an increase in public transport services if increased residential infill is secured as part of the Strategy.
- **Undertake initiatives to promote cycling and walking in and around the Lakes area.**
- Undertake road improvements to improve safety and ease congestion.
- Undertake an update of the transport assessment every 3-5 years as required.

Cockburn Central Activity Centre Structure Plan

Seven key strategic objectives needed to achieve the overarching vision and thus guide the structure plan. These include a change in how Cockburn Central is perceived and its functional requirements into the future.

- From a car and road dominated environment - to encouraging people and footfall.
- From individual development areas - to an Activity Centre with a diverse range of defined, interconnected, complimentary precincts.
- From a suburban centre - to a vibrant diverse urban centre.
- From compact cores of activity - to extended, connected spines of public activity.
- From constrained, fragmented landownership - to positive consumer and business perceptions.
- From roads that disconnect precincts, promoting district traffic over core area needs - to a **multi modal movement network that supports the functions of the activity centre**.
- From individual pockets of suburban parks - to a connected network of green and public spaces supporting diverse actives.

Three projects are currently under investigation by the Department of Transport and Public Transport Authority:

- The Thornlie Train Line Extension.
- The extension of heavy rail services from Perth to Ravenswood—West Pinjarra with a possible further extension to Bunbury.
- Bus Rapid Transit or light rail along Armadale Road.

Through the strategy there is a desire to reduce vehicle congestion, re-balance demand for car parking and **activate the street as places for pedestrians** by:

- Delivery of the North Lake Road bridge, Freeway interchange and Armadale Road deviation.
- **Rethinking Beeliar Drive as an important iconic connecting corridor**.
- **Encouraging a shift to more sustainable and active modes of transport**.
- To provide a clear and logical vehicle network in the core area.
- Encouraging traffic onto designated routes and minimising vehicle movement in locations where other modes of transport should be prioritised.
- **To provide car parking that is easy to locate and access, with minimal disruption to pedestrians, cyclists and public transport**.
- **Providing safe and convenient pedestrian access to car parks**.

The strategy will also work toward creating attractive streets characteristic of an important urban centre by:

- Providing attractive entrances to create a strong sense of arrival.
- **Create a high level of amenity for pedestrians**.
- To connect to the wider green network.

- Provide a defined edge to the core area.
- To connect key urban spaces.
- Promote the activity centre to passing trade.

Cockburn Coast Integrated Transport Plan

A comprehensive list of potential proposals for improving transport outcomes and delivering and appropriate integrated transport plan was considered by the PTG for application in the Cockburn Coast project.

Foot power

- Pedestrian priority at intersection crossings.
- Highly textured pavement material.
- Share zones.
- Car free or parking restricted areas.
- Permeable walking and cycling network, with visual and physical connectivity to other streets and places.
- Generous pedestrian crossing provisions.
- Pedestrian friendly urban design principles (e.g., limited block face lengths to less than 125 metres).

Pedal power

- Bike share program.
- Higher minimum bike storage and locker facility requirements for commercial uses.
- Bike friendly intersection designs.
- Bike boulevard grids.
- Cycle-tracks (European style bike facilities).

Trails Master Plan 2013 and Natural Areas Management Strategy

A series of recreation trails throughout the City of Cockburn serve the following purposes:

- Enable convenient and safe access to recreational assets of the City for residents, children and tourists.
- **Cater for east/west and north/south non-motorised transport corridors.**
- Provide an attraction to tourists that would educate them of the ecological, social, and cultural significance of the area to the communities of the City of Cockburn.
- Provide an opportunity for an integrated community project; i.e. community involvement in all aspects of a trail from alignment determination to design to signage and rehabilitation of the area's vegetation.
- Provide emergency vehicle access and a firebreak.
- Incorporate indigenous heritage into the trail system (especially in interpretive signage).
- Act as 'green corridors' or 'ecological linkages' throughout the urban areas of the City.
- Support the historical significance and status of various locations and sites within the City of Cockburn.

Hamilton Hill Revitalisation Strategy

The Strategy seeks to promote opportunities for the highest density development to occur surrounding neighbourhood and local centres and along the key public transport routes, both of which provide opportunities for reduced dependence on the private motor vehicle.

If a decision was made to deliver a road, it would be critical to try to manage the impact and severance this would have on a community like Hamilton Hill. This would be through design response such as:

- Make sure it is an urban standard road which provides several crossing points for local traffic so as not to sever the area in two.
- Ensure protection of local heritage places including significant trees which exist within the current reserve.
- Ensure that development can respond and be presented to the road, rather than be orientated with their back on to the road. This will be critical in maintain its urban feel as part of the area.

To complement the study area's existing path network, there are several bicycle paths and footpaths planned for the study area.

Coolbellup Revitalisation Strategy

The Coolbellup Revitalisation Strategy aims to guide the delivery of future residential development within the suburb and identify improvements and infrastructure required to support this growth. The Strategy is largely directed towards identifying appropriate increased residential densities and strategies to encourage housing choice.

A key focus is to ensure Coolbellup is an attractive place to live and visit into the future through a number of different ways, including:

- An opportunity exists to increase signage and awareness of services.
- More bus stops should be provided with shelters and the town centre bus stops in particular require upgrading.
- **Revitalisation of key streets could assist in promoting walkability and cycling in and around Coolbellup**. By making them more functional and attractive more people will want to spend more time in them.
- Key Coolbellup Streets such as Coolbellup Avenue, Waverley Road and Cordelia Avenue present opportunities to accommodate further services in the street such as car parking and landscaping including street trees.
- **The footpath and cycle path system needs to be upgraded and extended to improve accessibility within the local area.**
- There is very strong support by the community against the Roe Highway extension.

The strategy portrays some conceptual plans to establish a vision and comprehensive guide for future streetscape enhancement along the main connector streets of the suburb. Key objectives of the regeneration of these streets are to:

- Reinforce Coolbellup Avenues main street role and location for medium to high density development.
- Improve linkages and relationship between residential areas, the Coolbellup town centre and suburb entry and access points.
- **Improve pedestrian amenity, safety, and street legibility.**
- **Encourage pedestrian and cycle movement.**
- Accommodate more trees.
- Define the street environment and assist in managing vehicle speeds.
- Provide flexible options for developments to accommodate car parking.

City of Cockburn Disability Access and Inclusion Plan 2012-2017

- **Connectivity** is one of the most important aspects of an accessible transport network for people with a disability.
- Good connectivity provides **easy access to key destinations for all pedestrians**. Well designed and connected communities benefit everyone.

- **An accessible environment** is particularly relevant for people with disability but also benefits a broader range of people. More people are encouraged to use alternative modes of transport other than the car more often, resulting in a more sustainable, healthier, safer community with independent travel possible for others such as the elderly, children, families and people with disability.

City of Cockburn Age-Friendly Strategy 2016-2021

With a growing percentage of people 55 years and older, it is essential to plan for adequate and accessible paths, bus stops and road crossings by:

- **Improving pedestrian crossings focused on the needs of an ageing population** at activity centres.
- **Developing cycle routes appropriate for older people.**
- **Installing gopher and electric bike recharge points** in key locations.

LOCAL GOVERNMENT SUMMARY

The various local government reports have a common theme with each one noting the requirement for the City to provide a **highly connected** and **safe** network for cyclists and pedestrians, as well as promoting the provision of **end of trip facilities,** ensuring safe intersection treatment and prioritising cycling and walking in high activity areas.

2.1.2 Western Australia strategic documents

Western Australian Bicycle Network Plan

The Western Australian Bicycle Network Plan 2014-2031 (WABN Plan) has been developed to leave a legacy for all current and future cyclists. It includes new initiatives which cover a range of activities to efficiently provide a safe and sustainable cycling network which ties in with key activity and attraction areas.

The vision of the Western Australian Bicycle Network Plan 2014-2031 is to make WA a place where cycling is safe, connected, convenient and a widely-accepted form of transport.

The objectives of the WABN Plan take a whole-of government approach to cycling, while also considering public feedback on the draft Western Australian Bicycle Network Plan 2012-2021, and are complementary to the National Cycling Strategy 2011-2016.

The objectives are to:

1. Build evidence and demonstrate the benefits of cycling for the community.
2. Encourage cycling to build active and healthy communities.
3. Provide a high-quality, interconnected bicycle network.
4. Improve the level of safety for people cycling.
5. Build and enhance relationships with advocacy groups and stakeholders.

The key infrastructure actions of the WABN Plan are:

- Expansion of the Principal Shared Path (PSP) Network
- Review of Local Bicycle Routes
- Perth Bicycle Network Grants Program
- Regional Bicycle Network (RBN) Grants Program
- Central Business District Cycling Projects
- Review of Traffic Management on Local Roads
- Connecting Schools

- Connecting Stations
- Planning for Cycling Facilities in the Regions
- Development of a Bicycle Counting and Monitoring Strategy
- Development of an Online Journey Planner
- End-of-Trip Facilities

Perth Transport Plan for a population of 3.5 million and beyond

The State Government has prepared a long-term Transport Plan that sets the vision for a generational change to Perth's transport network. It provides a long-term plan for transport infrastructure and considers how we can use the transport network more efficiently as Perth's population approaches 3.5 million and beyond (nominally 2050). The plan looks at where people will live and work when as the population reaches 3.5 million and outlines a workable transport system so that people and freight can keep moving as the city grows.

The transport plan is needed to identify the transport infrastructure requirements of an additional 1.4 million people. It will also ensure that existing and growing centres of population in the Perth and Peel regions have appropriate transport options the future.

The Perth Transport Plan has a vision for the future transport network; designed to keep the city moving as it grows and help Perth to continue to be one of the most liveable cities in the world.

The Western Australian Government recognises that an integrated approach to land use and transport planning is essential to ensure Western Australia's ongoing prosperity. Integrated land use and transport planning is one of the most cost-effective ways to optimise the performance of critical infrastructure, maximise use of latent capacity within existing land reserves, and facilitate the pipeline of investment needed to build new infrastructure to accommodate future growth.

The infrastructure proposed within the transport plan is presented in Table 2.1 by mode type, with the following infrastructure proposed for the City of Cockburn:

Table 2.1: Perth Transport Plan proposals for City of Cockburn

Freight	Public Transport	Cycling	Road
Rowley Road extension	Thornlie Line Extension	Duplication of Freeway PSP	Fremantle Rockingham Controlled Access Highway (Stock Road)
Stock Road to freeway standard with grade separated intersections at Phoenix Road, Spearwood Avenue, Beeliar Drive and Russell Road.	Fremantle to Cockburn Coast Bus Priority	PSP along Roe Highway Extension	Rowley Road Extension to link to Western Trade Coast
Roe Highway Extension	Armadale to Cockburn Bus Priority	North Lake Road extension to Melville	Cockburn Road Upgrade to 4 lanes
Grade separation of North Lake Road and Freight Railway	Cockburn Coast to Rockingham Bus Priority	Key North-South and East-West Strategic Links	Armadale Road upgrade to 6-lanes with new bridge to North Lake Road
Freight railway track duplication between Cockburn Triangle and Kwinana Triangle	Cockburn Road important link between Fremantle and Western Trade Coast	Key Local connections	Rockingham Road/Patterson Road will link to Fremantle Rockingham Controlled Access Highway (FRCAH) and terminate in the north at Rowley Road.

South Metropolitan Sub-Regional Framework

The objective is to provide an efficient and effective regional movement network for people and freight that is integrated with land uses, links key employment opportunities and connects the sub-region to the greater Perth and Peel regions as well as the south-west of the State.

- A strategic link between areas north and south of the river is currently being investigated. This link connects industrial and logistics areas north and south with the existing Fremantle Port, the future Outer Harbour and Latitude 32.
- A new north-south route connecting Spearwood and Gilmore Avenues with opportunities for a lateral connection to the potential north-south route is proposed.
- Coastal Area within Cockburn Sound, between James Point and Naval Base, is the most suitable location for development of additional container port facilities.
- **Provision of a network of paths for cyclists and pedestrians offers commuters an alternative to private car trips as well as providing recreation opportunities and health benefits.**

STATE GOVERNMENT SUMMARY

The common theme through the documents released by State Government is the importance of encouraging cycling and waking to build a more active and healthy community, specifically identifying **connections to schools** and **stations** and providing the right infrastructure for the right end user. The Perth Transport Plan has identified various road proposals as well as new cycle links that have been considered as part of the long-term network. The WABN notes specific infrastructure actions to which the Cockburn cycle and walking network plan (the plan) needs to respond to.

2.1.3 National strategic documents

National Cycling Strategy 2011 - 2016

The overarching vision for this strategy is to realise a step-change in attitudes to cycling and in the numbers of riders in this country. In the short term, the goal was to double the number of people cycling during the five-year period.

Priorities and objectives:

- Cycling promotion: promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity.
- Infrastructure and facilities: **create a comprehensive network of safe and attractive routes to cycle and end-of-trip facilities.** All jurisdictions will continue to invest in developing local on-road and off-road cycling networks to key destinations in both urban and rural areas, that are consistent with national standards, and should commit to the identification of required funds in the relevant budget processes. Government will continue to develop end-of trip facilities that make it possible for people to cycle.
- Integrated planning: consider and address cycling needs in all relevant transport and land use planning activities.
- Safety: enable people to cycle safely
- Monitoring and evaluation: improve monitoring and evaluation of cycling programs and develop a national decision-making process for investment in cycling.
- Guidance and best practice: develop nationally consistent technical guidance for stakeholders to use and share best practice across jurisdictions.

Our Cities, Our Future: A National Urban Policy for a productive, sustainable and liveable future (2011)

The Australian government recognise the importance of people of all ages and abilities to have physical access to employment, education, services and social, recreational and cultural opportunities and facilities. There has been a noticeable shift to cycling as a sustainable, economical and healthy, active transport option.

As such the report recommends to monitor and report on progress toward achieving a national cycling target to double the number of cyclists by 2016, promote healthy lifestyles through cycling and walking networks, recreational facilities and high quality public spaces, plus **improve accessibility and reduce dependence on private motor vehicles.**

Walking, Riding and Access to Public Transport: Supporting active travel in Australian communities, Ministerial Statement (2013)

The primary objective of this statement is to articulate the Australian Government's interests in broadening the range of transport options in our communities: by increasing the share of people walking and riding for short trips; and improving their ability to access public transport.

Plan: Include walking and riding when planning for land use and transport

- Identify principal walking and riding routes in regional and local plans that are consistent with overall state planning and transport strategies.
- **Design networks of continuous, convenient connections.**
- enable short walking and riding trips for transport purposes.
- improve access to and within major activity, employment and education centres, focusing on 20-minute catchments (two kilometres walking, five kilometres cycling).
- improve access to public transport stops particularly 5–10-minute walking catchments.

Build: Build appropriate infrastructure for walking and cycling needs

- Create safe environments for pedestrians and bicycle riders
- Incorporate pedestrian and bicycle facilities when building infrastructure
- protect routes for walking, riding and accessing public transport so that existing connections are not severed

Encourage: Enable greater participation in walking, riding and public transport

Govern: Coordinate across agencies and levels of government

Walking, Riding and Access to Public Transport – Australian Government Ministerial Statement

The Australian Government Ministerial Statement on Walking, Riding and Access to Public Transport recognises the following benefits of these modes to private car travel:

- increased capacity in the broader transport network
- reduced congestion
- reduced environmental impacts
- improved public health
- improved community wellbeing.

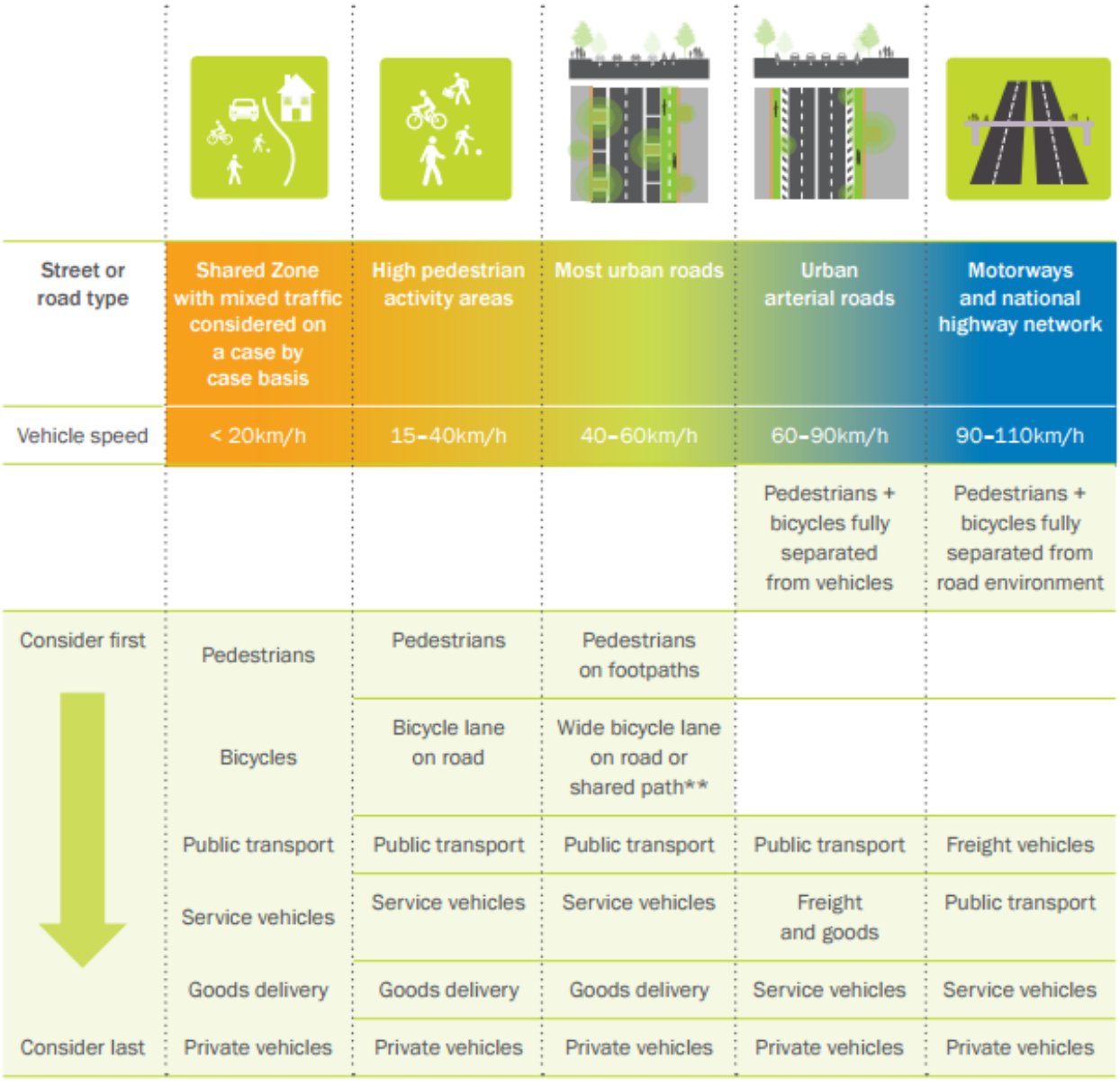
Moreover, the document reports on a study commissioned by the Queensland Government, which concluded that the net benefit to the community of cycling is approximately $1.43 per kilometre cycled. Primarily these benefits are achieved through health benefits ($1.12/km), which were partially offset by injury costs ($-0.37/km). Significant benefits also came from decongestion

($0.21/km) and vehicle operating costs ($0.35/km). Noise reduction, air quality, greenhouse gases, infrastructure provision and parking cost savings accounted for a total of ($0.13/km).

Key principles in achieving an increase in the number of people walking and cycling for shorter trips and accessing public transport include integrating planning of walking and cycling in land use planning, and building appropriate infrastructure for these modes of transport.

Guidance on how to achieve an integrated road network is provided and reproduced in Figure 2.1 which essentially indicates to consider the needs of private motor vehicles last.

Figure 2.1: Road network hierarchy integration of walking, riding and access to public transport



Source: Walking, Riding and Access to Public Transport, pg. 31

FEDERAL GOVERNMENT SUMMARY

Federally released documents require state and local governments to improve accessibility within their jurisdiction in order to **reduce the dependence on private motor vehicles** and reduce social

isolation. The **active transport networks should be continuous, convenient and connected** providing a **safe** environment for pedestrians and cyclists.

2.2 City of Cockburn Cycling and Walking Plan to 2021 – proposed vision and objectives

With the preceding strategies in mind, the proposed Vision and Objectives for this bike plan have been developed.

Vision

With the ongoing and increasing economic, environmental and health issues with the country's population this is a **'call to action'** for the City of Cockburn

'To make Active Travel safer and more accessible for people of all ages and abilities'.

Objectives

- To have an interconnected continuous and well maintained bicycle network that cyclists and pedestrians of all abilities feel comfortable using
- To be a city where walking and cycling is the first choice for transport (for all ages) for short to medium trips (1 - 5 km)
- To have a flexible cycling and pedestrian network that can provide for different users at different times of the day/days of the week
- To be a city where the community appreciates that cycling provides social, health and economic benefits along with improved environmental outcomes from reduced pollution, noise and congestion on the roads
- For council staff to continue to be a strong role model leading the way in promoting cycling and walking as realistic modes of transport for travel to work.

Key Initiatives

The following key initiatives together will work toward achieving the proposed objectives.

- Plan and deliver a connected network of 'Community Routes' that achieves:
  - a safer route to school's program
  - improved access to stations
  - connects people to shops and community facilities
  - reduces car parking issues and congestion as people change their mode of travel
- Plan and deliver a connected network of 'Community and On-Road Routes' that are flexible in nature to provide for different users at different times of day/week
- On-street bicycle parking to be increased as well as more trip end and during trip facilities
- The city to assess the possibility of additional bicycle maintenance stations at key locations within the city
- Working to reduce the number of cyclists or pedestrians killed or seriously injured within the City through improved crossing facilities and protected and off road cycle infrastructure
- The city to assess the possibility of a local planning policy that requires all developers to provide a travel plan for their development

- Develop a checklist to assist what cycling and walking infrastructure is to be provided within new developments for council use
- Increase awareness of the principles of this Cycling and Walking Network Plan within Council to assist in education of the wider community.

3. Are cycling and walking realistic modes of transport now?

3.1 What is the data telling us?

3.1.1 Perth metropolitan census

The Western Australian State Government have recently released the Perth Transport Plan. A high level 'blueprint' identifying transport infrastructure of the future when responding to forecast population growth.

The Perth Transport Plan notes that the observed transport mode share results from three household surveys conducted in Perth between 1976 and 2006 show the dominance of the car as the preferred transport option, accounting for 82% of all person trips during the 2003-06 Perth And Regions Travel Survey (PARTS). The Journey-to-Work census data provides an additional information on mode share, with a large percentage of Journey-to-Work trips occurring during peak periods. Observed mode shares during the 1991 and 2011 census again show that the car accounted for 82% of all Journey-to-Work trips, with car occupancy decreasing significantly from 1991 to more single occupant vehicles. Public transport mode share increased from 10% during 1991 to 13% by 2011 and is more than double that for all trip purposes combined. There is evidence to suggest that the number of cycling trips has increased but this has not yet been captured in a major household travel survey.

3.1.2 Cockburn census

The method of travel to work is recorded in each census. Table 3.1 shows the preferred mode of travel people make within the City of Cockburn area.

Table 3.1: Travel to work modes in City of Cockburn

Method of travel to work

export reset

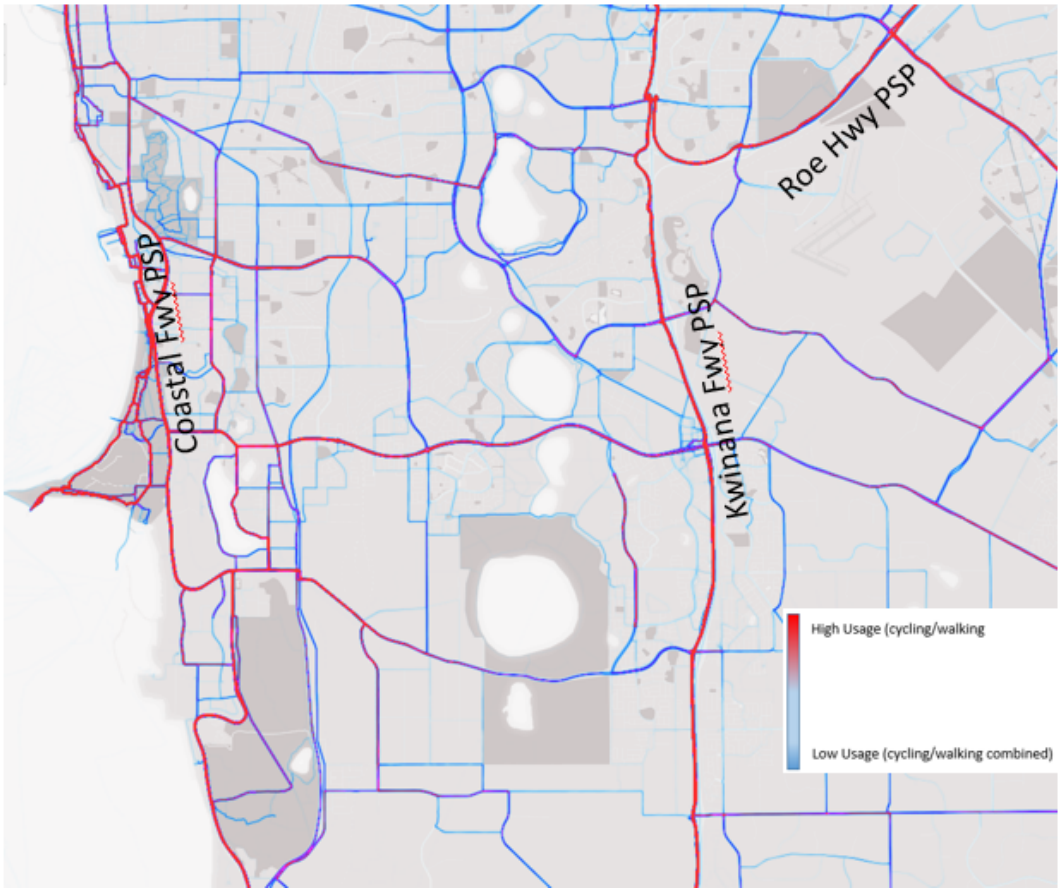
City of Cockburn - (Enumerated)	2011			2006			Change
Main method of travel	Number	%	Greater Perth %	Number	%	Greater Perth %	2006 to 2011
Train	3,432	7.6	6.7	310	0.9	4.1	+3,122
Bus	965	2.1	3.7	1,926	5.4	4.1	-961
Tram or Ferry	25	0.1	0.0	12	0.0	0.0	+13
Taxi	64	0.1	0.2	35	0.1	0.2	+29
Car - as driver	29,673	65.4	62.2	24,045	66.9	63.0	+5,628
Car - as passenger	2,326	5.1	5.3	2,246	6.3	5.8	+80
Truck	433	1.0	0.8	410	1.1	1.0	+23
Motorbike	223	0.5	0.6	196	0.5	0.6	+27
a Bicycle	288	0.6	1.1	222	0.6	1.0	+66
a Walked only	519	1.1	2.2	473	1.3	2.0	+46
Other	624	1.4	1.5	373	1.0	1.1	+251
a Worked at home	1,204	2.7	3.5	969	2.7	3.6	+235
Did not go to work	4,986	11.0	10.9	4,060	11.3	11.6	+926
Not stated	616	1.4	1.3	651	1.8	1.7	-35
Total employed persons aged 15+	45,378	100.0	100.0	35,928	100.0	100.0	+9,450

The data presented in Table 3.1 notes that the for the Cockburn local government area in 2011, the use of the car is dominant with 65.4% rising to 70.5% when car passenger is included, rising by approximately 5% since the 2006 survey (taking account of the increase in numbers of respondents between 2006 and 2011 who chose cycling or walking as their travel method.

3.1.3 Where are our existing riders, riding?

Figure 3.1 is the data collected through the application 'STRAVA' which tracks cycling routes used most by those who have STRAVA activated, while Figure 3.2 presents where the City has collected cycle count data or a *Super Tuesday* cycle count has been undertaken. Both sets of data indicate that as would be expected the cycle routes along the freeway corridor and along the Roe Highway corridor approaching the freeway (Principle Shared Paths) have the highest amounts of people cycling. This corridor also experiences a high proportion of people walking, however, the walkers tend to be more concentrated around Cockburn Central Station rather than along the entire corridor. It was noted from on-site observations that the majority of users along this route were commuter cyclists, although there was a high number of fitness/recreational cyclists noted as well.

Figure 3.1: Cockburn STRAVA Data



The Principal Shared Path (PSP) that runs parallel with the ocean connecting to Fremantle to the north also has a high proportion of cyclists and walkers. However, the user type differed from that of the freeway PSP, in that, on-site observations noted that while some cyclists appeared to be of the commuting type, the majority were recreational cyclists.

Data provided by STRAVA for the one-year period September 2015 to September 2016 is detailed below indicating the number of cyclists and pedestrians actively using the network.

- Cycling unique users 8,199
  - total commuters 5,120
  - total activities 104,334
  - total commutes 53,993
- Pedestrian unique users 2,359
  - total activities 21,245
- Total unique users 9,557
- total activities 127,741

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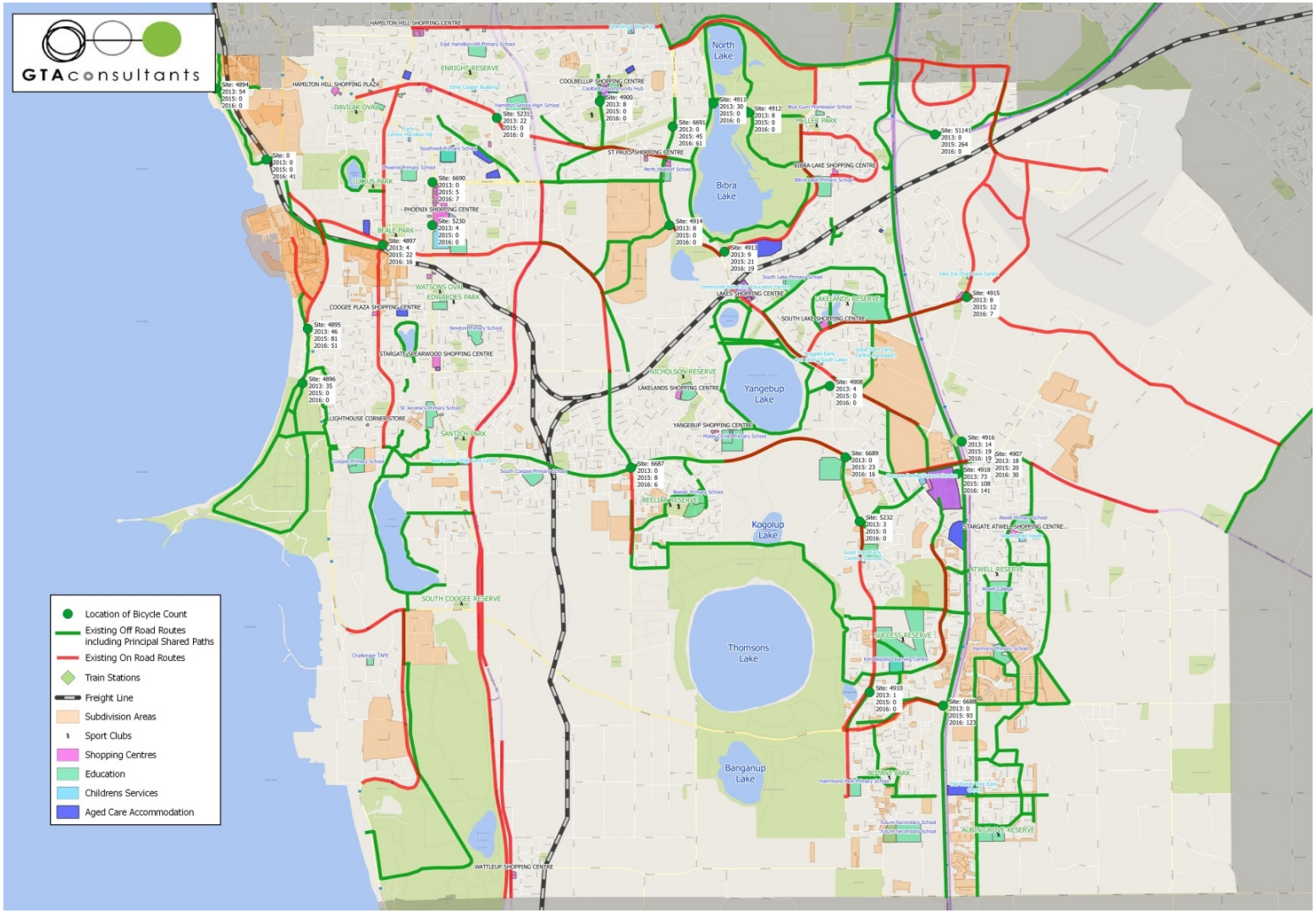
Figure 3.2: Cockburn cycle Super Tuesday count data (7-9am)



As can be seen in Figure 3.2 there are several other routes that cyclists use throughout Cockburn, all have relatively low numbers of commuter cyclists on Super Tuesday (7 -9am on first Tuesday in March) in comparison to the Principal Shared Paths. Note North Lake Road, connecting to Bibra Lake and Cockburn Central is a popular cycling route connecting to Murdoch Uni.

During on-site visits, cyclists and walkers (mostly recreational in nature) were noted as using the various lakes, reserves and parks throughout Cockburn. It is therefore essential that the City provide appropriate cycle and walking connections to these community facilities.

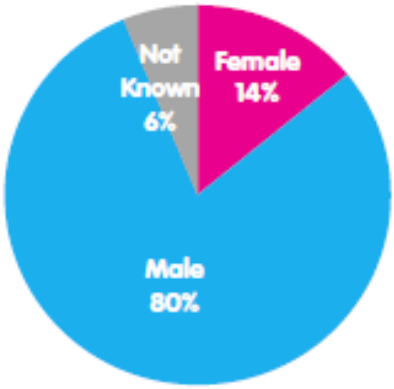
Table 3.2 taken from the *Super Tuesday 2016 report* (which is a Perth wide cycling data collection day) details further count information from the varying locations. Overall there has been an 18% increase in the number of riders noted between the 2015 and 2016 Super Tuesday count. Note, fluctuations in numbers of riders counted may also be due to changes in the path network, roadworks affecting various routes and new developments coming on line.

Table 3.2: Super Tuesday 2016 Cycle Count Data

Site ID	Street names	Total Count						Volume in 15 Minute							
		Female	Male	Not Known	2016	2015	% Growth	7:00-7:15	7:15-7:30	7:30-7:45	7:45-8:00	8:00-8:15	8:15-8:30	8:30-8:45	8:45-9:00
4895	Cockburn Rd [S], Principal Shared Paths [S], Powell Pde [W], Principal Shared Paths [NW], Cockburn Rd [N]	15	31	5	51	81	-37%	11	11	5	9	3	7	4	1
4897	Hamilton Rd [N], Spearwood Ave [E], Hamilton Rd [S], Principal Shared Paths [SW], Spearwood Ave [W]	2	14	0	16	22	-27%	3	1	4	1	3	3	1	0
4907	Armadale Rd [E], Freshwater Dr [S], Armadale Rd [W]	2	28	0	30	20	+50%	3	6	4	6	2	6	2	1
4913	Bibra Dr [NE], Bibra Dr [SW], Progress Dr [NW]	1	18	0	19	21	-10%	2	4	3	5	5	0	0	0
4915	Berrigan Dr [N], Jandakot Rd [SE], Berrigan Dr [SW], Dean Rd [NW]	0	0	7	7	12	-42%	7	0	0	0	0	0	0	0
4916	Knock Pl [E], Bridge [SW]	3	16	0	19	19	0%	2	3	3	5	1	2	2	1
4918	Path to Beeliar Dr [NE], Freeway PSP [S], PSP Underpass [N]	18	123	0	141	108	+31%	26	25	21	19	15	14	8	13
6687	Beeliar Dr [E], Spearwood Ave [S], Beeliar Dr [W], Spearwood Ave [N]	1	5	0	6	8	-25%	3	2	1	0	0	0	0	0
6688	Freeway PSP [NE], Freeway PSP [S], Russell Rd [W]	17	106	0	123	93	+32%	15	22	16	17	21	12	9	11
6689	Hammond Rd [N], Beeliar Dr [SE], Hammond Rd [S], Beeliar Dr [NW]	2	14	0	16	23	-30%	1	5	3	2	2	0	1	2
6690	Rockingham Rd [N], Phoenix Rd [E], Rockingham Rd [S], Phoenix Rd [W]	1	6	0	7	5	+40%	1	0	1	1	0	2	1	1
6691	North Lake Rd [N], Gwilliam Dr [E], North Lake Rd [S], Forrest Rd [W]	8	34	19	61	45	+36%	4	3	4	8	11	11	17	3
	Totals	70	395	31	496	457	+18%	78	82	65	73	12	57	45	33

The 'Super Tuesday' data collection also noted the gender of the riders counted. Figure 3.3 notes that across the municipality of Cockburn, there were 70 female riders counted out of a total 496 riders counted on Super Tuesday 2016. This represented 14% of bicyclists which is below the average female ridership in Western Australia (18%), and of all the surveyed areas in 2016 (23%).

Figure 3.3: Super Tuesday 2016 cycle count data - gender information



The number of female cyclists can often be used as a good indication of how safe cycling infrastructure is percieved. Research suggests that to attract female cyclists a cycle network needs to be safe (seperated from high speed/high volume traffic), direct and comfortable (well lit with passive surveillance).

3.1.4 How safe is the network?

Crash analysis has been undertaken using the latest available crash data (2011 to 2015) from the Main Roads Western Australia Crash Reporting System. For the entire City of Cockburn local government area, there have been 15,285 reported crashes within the allocated 5-year period with 44 of these crashes resulting in a fatality. A summary of the crash type commonly occurring within the City of Cockburn is presented in Table 3.3.

Table 3.3: City of Cockburn Five Year Crash Data by Crash Type

Crash Type	Total Crashes	Percentage
Rear End	8718	57%
Right Angle	2841	19%
Sideswipe Same Direction	1592	10%
Right Turn Thru	920	6%
Hit Object	773	5%
Hit Pedestrian	166	1%
Head On	146	1%
Non Collision	121	0.79%
Hit Animal	8	0.05%
Total	**15285**	**100.000%**

The assessment of the severity of crashes for the entire City of Cockburn area is presented in Figure 3.4 and notes **that less than 1% of the crashes ended in a fatality** (hence it does not show within Figure 3.4). Over three quarters of the crashes were Property Damage Only (PDO) crashes. From the recorded crashes, **only around 1% of crashes involved a pedestrian or cyclist**.

Figure 3.4: Crash severity within City of Cockburn

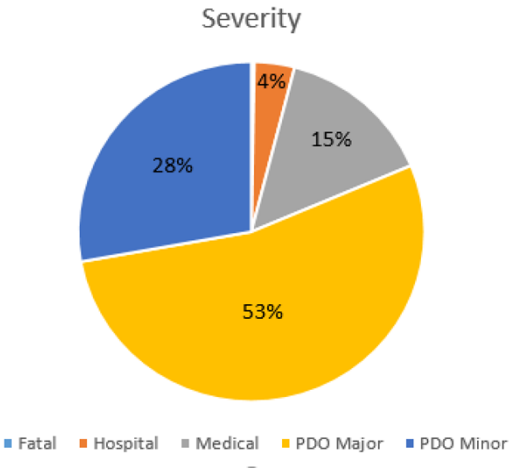


Figure 3.5 and Figure 3.7 represent the locations of the pedestrian and cycle crashes respectively.

Over the 5-year period there were 80 crashes recorded as involving pedestrians within the City of Cockburn area, of these, 6 accidents resulted in a fatality.

Table 3.4: City of Cockburn pedestrian crashes by severity and year

Severity of Crashes Involving Pedestrians						
	2011	2012	2013	2014	2015	Total
Fatality	1	1	3	1	0	6
Hospital	2	7	6	1	6	22
Medical	7	1	4	7	3	22
Property Damage	11	2	7	5	5	30
Total	**21**	**11**	**20**	**14**	**14**	**80**

The location of those crashes has been reviewed at a high level to identify whether elements of the road environment possibly contributed to the crash. The analysis has concluded that in the absence of a detailed crash investigation, there is no atypical trend in the crash pattern or elements in the road environment that are obviously contributing to causality factors. However, the location of crashes involving pedestrians can generally be separated into four areas (which typically have higher pedestrian exposure than other less populated centres):

- Rockingham Road/ Phoenix Road – approximately 13 crashes within this location **(Location 1).**
- Rockingham Road between Newton Street and Barrington Street – approximately 4 crashes within this location **(Location 2)**
- North Lake Road/ Berrigan Drive – approximately 4 crashes within this location **(Location 3)**
- Beeliar Drive/ Kwinana Fwy – approximately 7 crashes within this location **(Location 4).**

The four identified locations are represented in Figure 3.6 and Figure 3.7 could be considered for black spot funding if they meet the necessary warrants.

Figure 3.5: City of Cockburn five-year crash locations - pedestrians

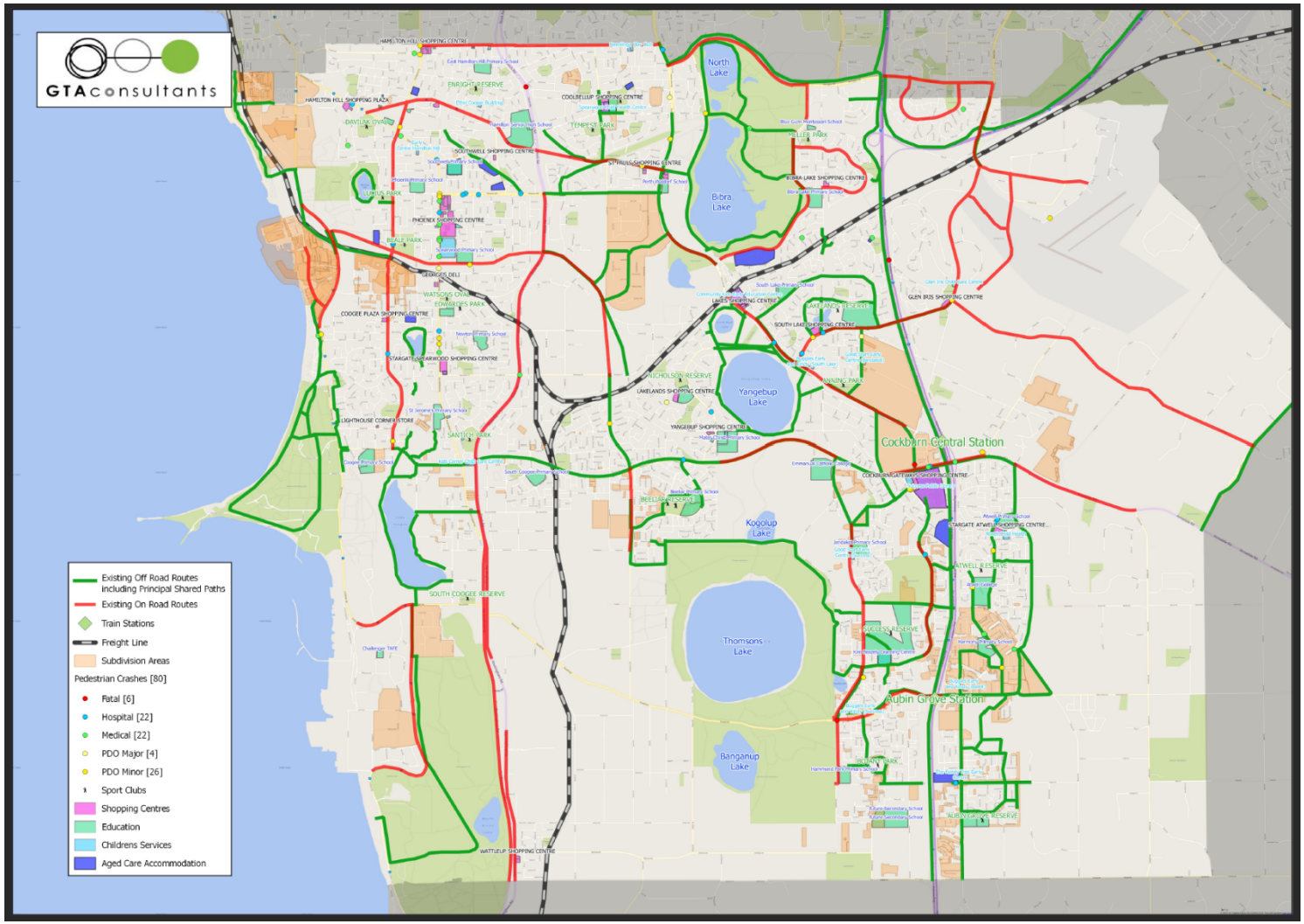


Figure 3.6: Locations of crash clusters - pedestrians

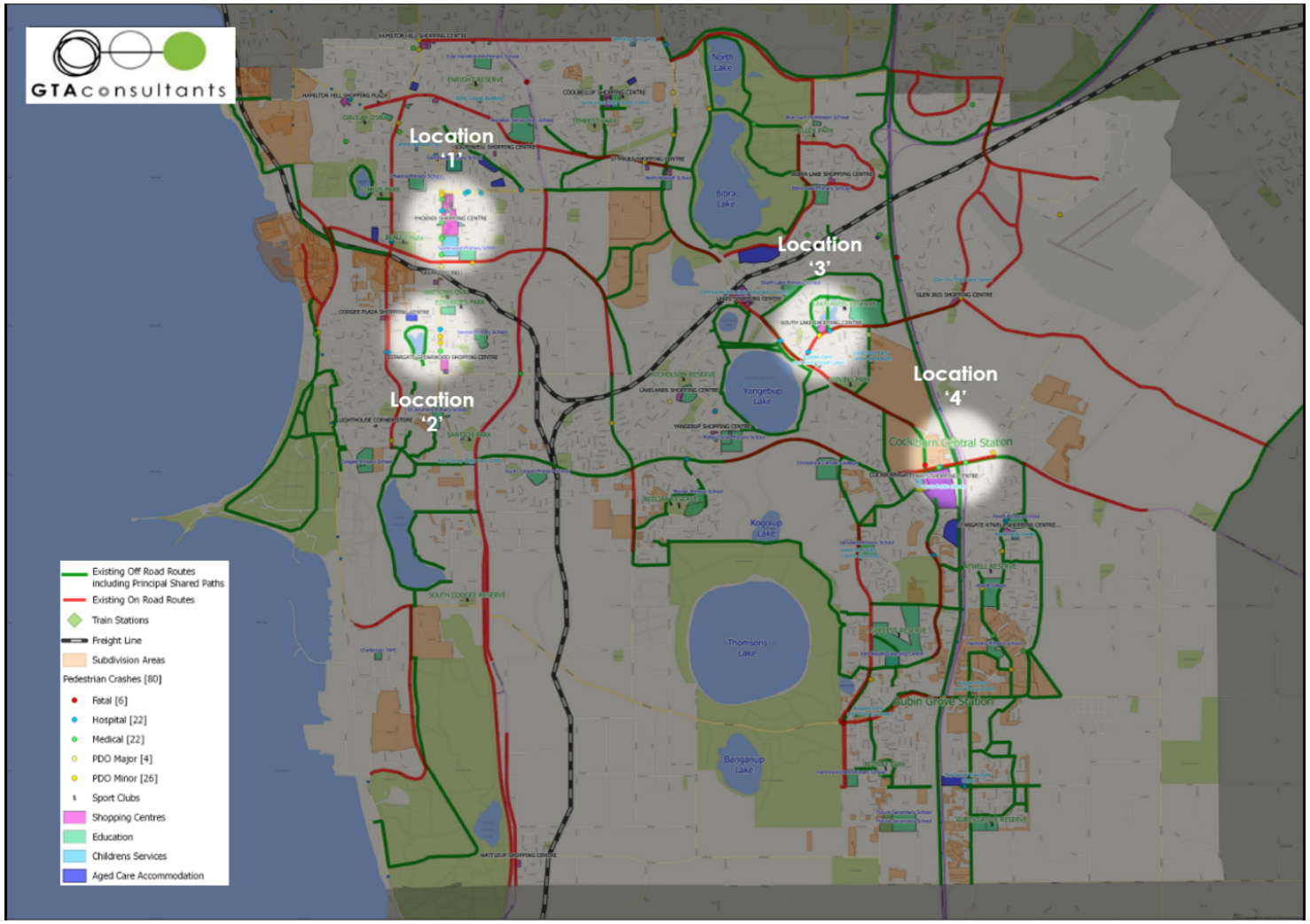
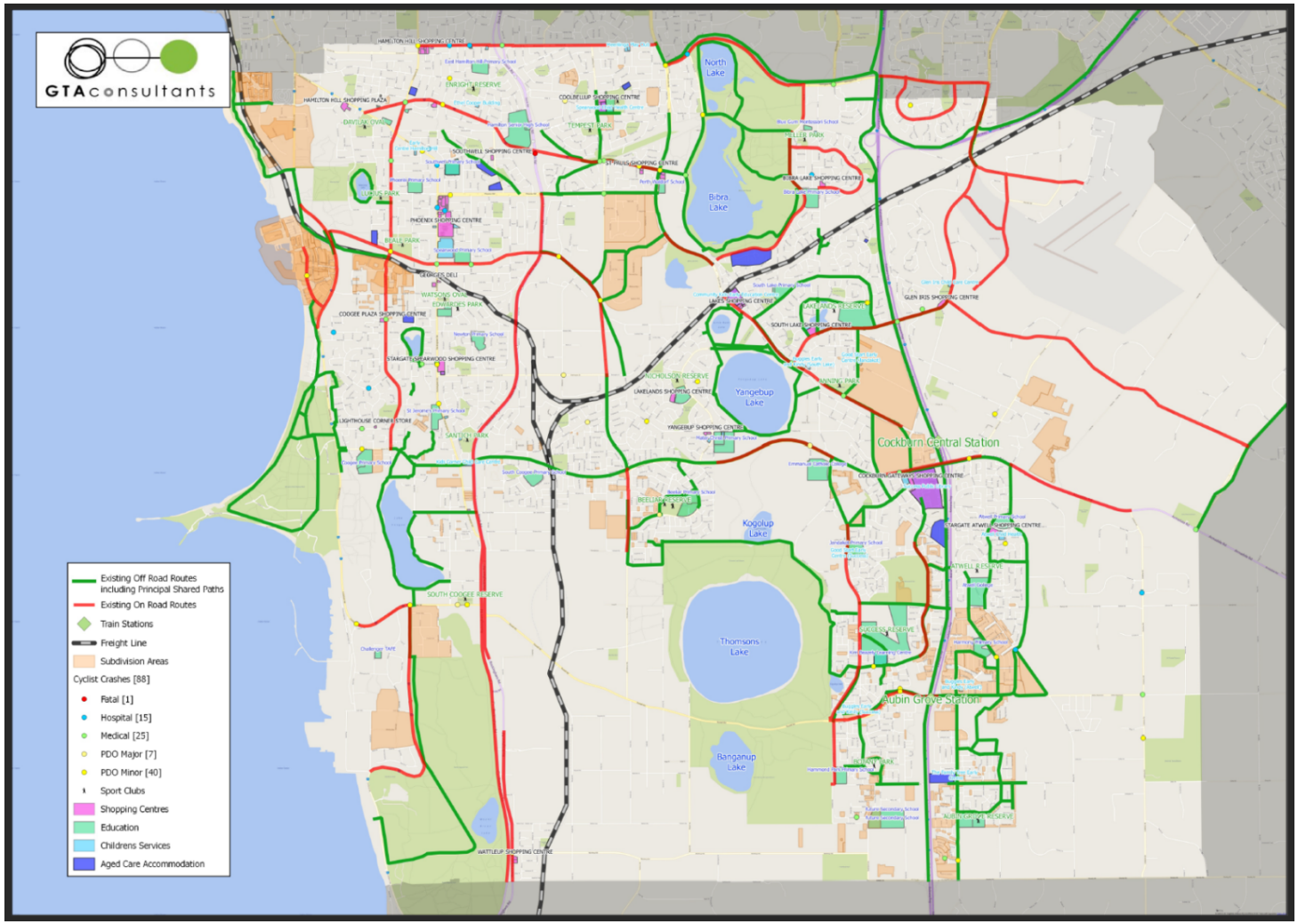


Figure 3.7: City of Cockburn five-year crash locations – cyclists



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Over the 5-year period there were 88 recorded crashes within Cockburn area involving bicycles. Of these, one accident resulted in a fatality, this occurred near the intersection of Stock Road and Forrest Road.

There is a general trend with the number of crashes involving cyclists annually over the assessed five-year period noting a slight drop in crashes involving cyclist in 2013 and again more recently in 2015.

Table 3.5: City of Cockburn cycle crashes by severity and year

Severity of Crashes Involving Cyclists						
	2011	2012	2013	2014	2015	Total
Fatality	0	0	1	0	0	1
Hospital	3	3	3	3	3	15
Medical	4	2	5	7	7	25
Property Damage	10	11	6	13	7	47
Total	**17**	**16**	**15**	**23**	**17**	**88**

The location of those crashes has been reviewed at a high level to identify whether elements of the road environment possibly contributed to the crash. The analysis has concluded that in the absence of a detailed crash investigation, there is no atypical trend in the crash pattern or elements in the road environment that are obviously contributing to causality factors. However, there are three areas where there is a small number of crashes occurring which could be considered for black spot funding if they meet the necessary warrants, these being:

- Forest Road between Sudlow Road and North Lake Road – approximately 6 crashes within this location **(Location 1).**
- Rockingham Road/ Phoenix Road – approximately 6 crashes within this location **(Location 2).**
- Rockingham Road between Newton Street and Barrington Street – approximately 3 crashes within this location **(Location 3).**
- Winterfold Road also has several crashes involving cyclists along its length but no one specific location.

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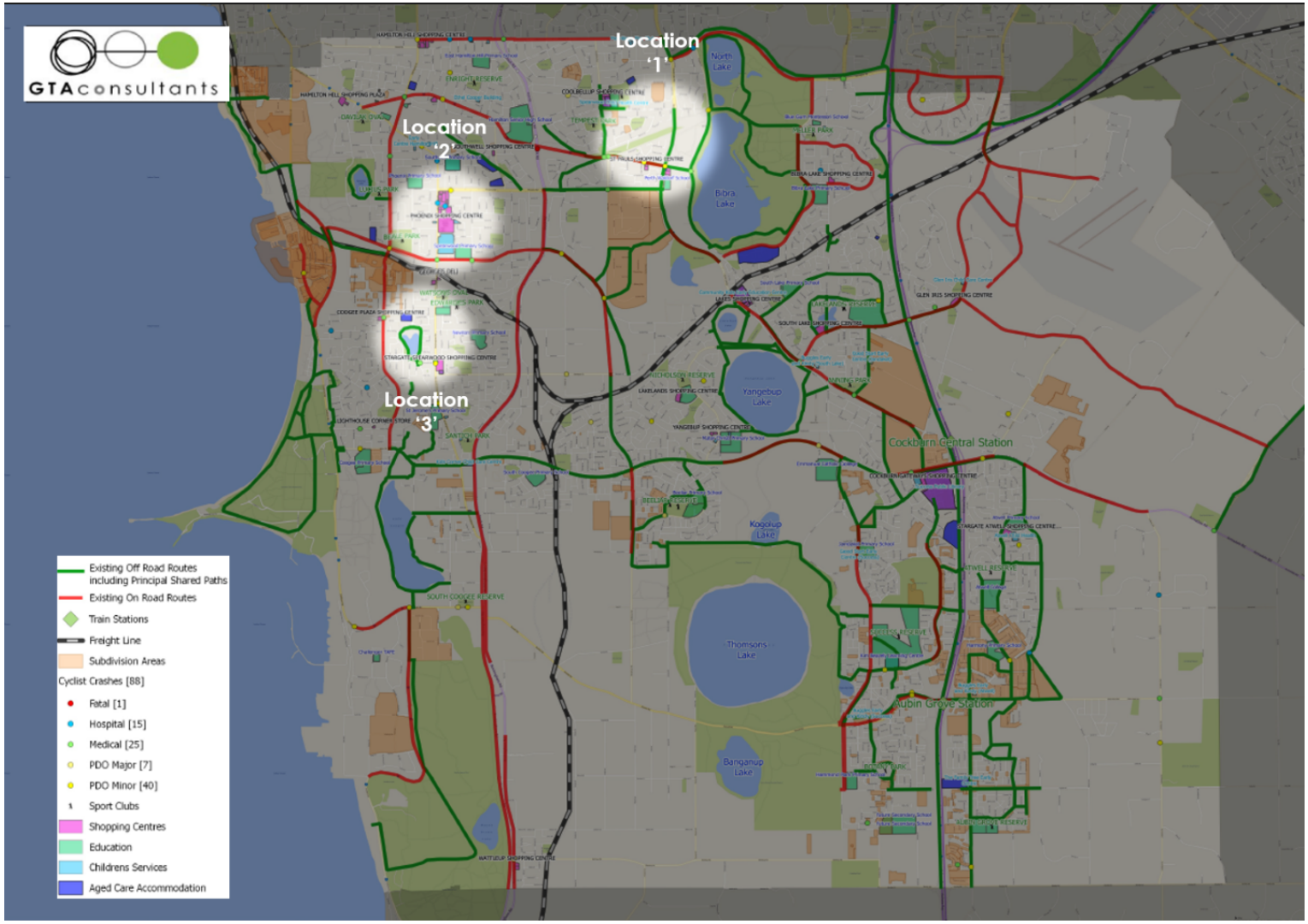
Figure 3.8: Locations of crash clusters - cyclists



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DATA SUMMARY

It is evident from the data that the number of cyclists and pedestrians currently traveling within City of Cockburn is low for overall mode share for transport within the City. Of those that do currently cycle and walk, the predominate routes are the existing shared use facilities that are separated from traffic (such as the freeway or coastal PSP's) with the predominant cyclist type being commuter or recreational. Cyclist were evident on other routes, using existing facilities, such as the shared use path along Beeliar Drive or the on-road route along Forest Road, although in lower numbers. Pedestrians were more evident in locations of high activity land uses such as shopping centres or recreational areas (predominantly the coastal area) with fewer numbers of pedestrians evident around suburban streets and local community facilities.

Crash Data Summary:

- 15,285 crash recorded (2011 to 2015)
- 44 crashes (all modes) resulted in fatality within the same time period
- Of these 44 fatal crashes, 1 included a bicycle and 6 included pedestrians

The safety of the network is paramount to ensure people can be encouraged to cycle and walk more as a viable mode of transport, for any purpose. The crash data indicates that while only around 1% of crashes within the City of Cockburn involved either a cyclists or pedestrian, over half of the pedestrian and cycle crashes resulted in someone involved in the crash requiring medical or hospital treatment or resulted in fatality (50 pedestrians or of the 80 recorded crashes involving a pedestrian and 41 cyclists out of the 88 recorded crashes involving cyclist).

Many of the crashes involving pedestrians and cyclists occurred in areas of high activity (as to be expected) as well as in areas where either no infrastructure provision is provided (such as Rockingham Road) or where there is existing on-road infrastructure and perhaps indicates where off-road infrastructure should be provided.

For further crash information and details the City must refer to Main Roads WA crash statistics.

4. Cockburn Bike Plan 2010 and Trails Master Plan 2013

4.1 What has been completed from the 2010 Bike Plan?

As noted previously, the main objectives in the 2010 City of Cockburn Bicycle Plan were to provide a safe interconnected network and linking people to where they wanted to go. Provision of infrastructure to meet these requirements would then facilitate and encourage people to use these modes of transport.

The City's TravelSmart Officer has reviewed the Cockburn Bike Plan for 2010 and provided detail of each individual cycle route and each individual footpath proposal and whether it has been or is planned to be implemented.

Of the approximate 41 footpath recommendations within the 2010 plan, only one recommendation has been fully implemented, with two of the recommended footpaths partially completed. Of the 37 cycling recommendations (which includes the non-infrastructure based projects) 10 of the recommendations have been complete, with five of the recommendations partially completed. The incomplete paths have been reviewed and included in this plan.

Several non-infrastructure measures were recommended as part of the 2010 plan including:

- School Access Plan – not completed – this strategy to consider Safer Routes to School
- On-Road markings to provide consistency for cycling infrastructure – not completed
- A Travel Smart Officer has been employed on a temporary contract – this strategy requires a full-time permanent position to lead the implementation of the City of Cockburn Bike and Walk Network Plan.
- Hazard Reporting Card system – complete
- Information and Promotion (Your Move, Bike Week etc.) – complete – this strategy will include ongoing promotional activities and requires a full-time position to lead these activities
- Cycle surveys – mostly complete – this strategy to ensure on going monitoring of users
- Town Planning Scheme Amendment – not complete – this strategy to investigate getting cycle plan adopted as council policy to ensure developers implement parts of the plan.
- Bicycle User Groups – complete but requires a Travel Smart Officer to lead the group and help it grow and support new riders in the area as well as to coordinate with neighbouring authorities to achieve benefits for the wider community within the South West Metropolitan area.

4.2 What has been completed from the Trails Masterplan 2013?

The review of the Trails Masterplan (2013) undertaken by the City notes that a number of the trails have been implemented. These include:

- Manning Stairs and lookouts and adjacent paths;
- Bird hide and boardwalk upgrades at Bibra Lake;
- Market Garden Swamp Circuit;
- Spur Trails and connection to North Lake Road completed at Little Rush Lake;

- Car Park on Fawcett Road Trail head;
- Port Coogee link;
- Tramway Trail Implementation Plan finalised;
- Banksia Eucalypt Circuit Trail;
- Maritime Trail; and
- Works to commence for the Manning Stairs west in mid-2017.

The City also noted that the majority of trails that haven't been implemented are those that are on lands managed by the Department of Parks and Wildlife. As such, the City will be required to liaise with the Department of Parks and Wildlife to agree how further trails will be delivered.

5. Cycling and walking in Cockburn today

5.1 The existing cycle network

The existing cycling network within the City of Cockburn consists of on-road and off-road facilities, aligned both in a north-south and east-west orientation.

On-road infrastructure consists of some continuous but mostly non-continuous (terminating prior to intersections) dedicated bicycle lanes some with some without cycle symbol pavement markings. Facilities are located on both arterial roads (some which are Main Roads responsibility) and local roads (Council responsibility).

Off-road infrastructure includes an abundance of high quality shared path routes such as, the Principal Shared Path along the Freeway and the coast, as well as shared paths along Beeliar Drive and North Lake Road.

In addition to this, this also benefits from a number of trails (available for both cycling and walking) throughout the various parks, reserves and recreational areas.

A common issue identified throughout the City is the early termination of on-road cycle routes prior to intersections (both roundabouts and signalised intersections). Intersections offer a high number of conflict points and it is important cyclists are protected and provided defined infrastructure into and through intersections.

There are also several existing on-road cycle lanes that are either in need of maintenance due to poor surface or faded line marking or cycle lanes that are too narrow for the volume and speed of road they are on. It was also noted that there are a number of roads identified on the Department of Transport Active Travel Maps that are defined as adequate sealed shoulders for cycling, but in reality, the sealed shoulders are poorly maintained or simply not wide enough for safe cycling.

5.2 The existing pedestrian network

While there is footpath provision within high activity areas (such as Cockburn Central or Phoenix Shopping Cente) as well as around schools, there are several residential roads that do not have a footpath on either side of the road. Further, a number of intersections also have inadequate pedestrian crossing facilities, especially facilities that are disability access compliant. There are also several barriers throughout the City that prevent the ease of movement for pedestrians or cyclists – these are illustrated in 5.4 Cycling facilities.

5.3 Planned projects

Several major cycle infrastructure projects are currently being developed or are at various stages of implementation which will further strengthen the city's cycle network. The projects include:

- Rockingham Road Phoenix Central Revitalisation Strategy - design;
- Rockingham Road between Phoenix Road and Cockburn Road – grant proposal;
- Oil Pipeline Route – grant proposal.

5.4 Cycling facilities

The existing facilities throughout the City include cycle parking provision, drinking fountains, rest areas (benches) and two bike repair stations. As part of any strategy it is critical that 'end of trip' as well as 'during trip' facilities are provided along the main if not all routes. The City of Cockburn Local Planning Strategy notes the encouragement of cycling by defining and implementing cycle networks and promoting the provision of end of trip facilities. Figure 5.2 notes the existing locations of cycling facilities identifying locations where further facilities could be provided.

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Figure 5.1: Existing barriers to cycling and pedestrian connectivity

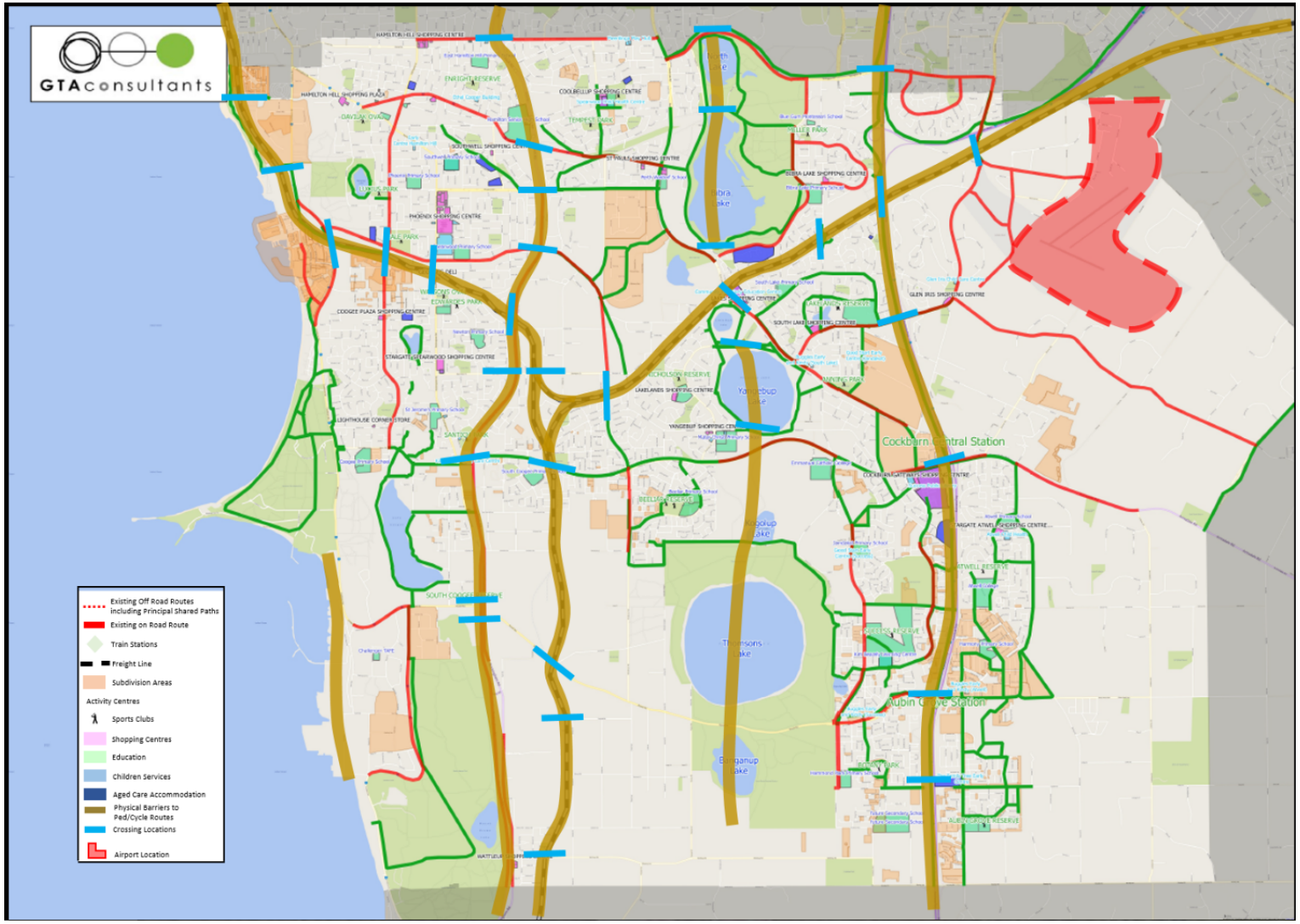
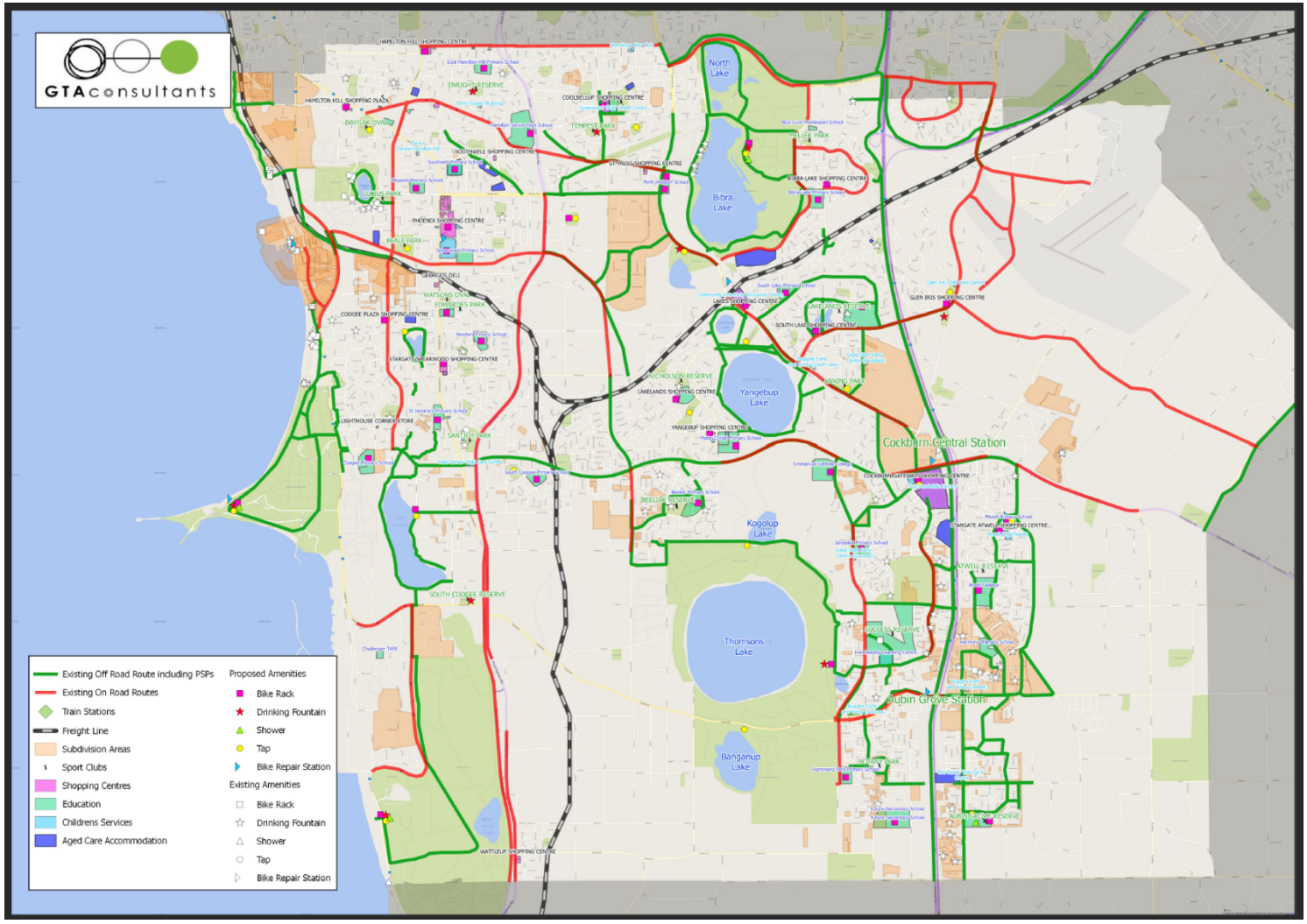


Figure 5.2: Existing and proposed cycling facilities within City of Cockburn



6. Community engagement

6.1 Purpose

As set out in the previous sections of the Cockburn Bicycle and Walking Network Plan, a real appreciation of the existing opportunities and constraints as they relate to the development of existing and new networks has been gained through desktop research and data analysis. This data provides a great insight into what may be required of the plan, but the success of the measures included within the plan will ultimately be decided upon by its current and future users.

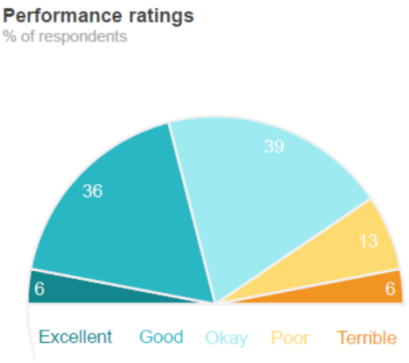
In this respect, community and stakeholder engagement with current and potential future users of the network is critical since these people use or deal with the network daily and know it more intimately than the outputs of any desktop exercise will produce. The value of community and stakeholder input cannot be overestimated and as such the consultation consisted of two key engagement streams, to ensure these inputs could be received:

- **Online engagement**, using CrowdSpot
- **Traditional engagement**, using face-to-face meetings, workshops and desktop research.

Adopting these streams has allowed a significant amount of feedback to be received, from many different people on many different subjects. All of which, has been combined with the desktop analysis to inform a data-rich network development exercise. The online engagement yielded the greatest level of feedback to inform network development.

In addition to these feedback streams specifically for the development of the long-term network, GTA also considered other sources of community feedback such as the Community Wellbeing Scorecard[1] and consultation information from the previous Bike Plan and Your Move program.

The Community Wellbeing Scorecard presents the community opinion of 'Footpaths and Cycleways' in City of Cockburn and compares it to other areas across Perth. This data illustrates that 75% of respondents scored the existing infrastructure 'good' or 'okay'. There was an equal proportion of 6% for 'excellent' and 'poor'. This level of scoring suggests infrastructure in the City of Cockburn is comparable to the national index score, but sits below the Perth average.



With respect to improving these scores, the respondents to the survey provided some specific elements they would like to see addressed such as new cycle paths and road crossings. This data has largely been represented in the online and traditional engagement streams.

[1] 2016 Community Scorecard prepared for City of Cockburn by Catalyse Pty Ltd, June 2016

6.2 Process undertaken

An overview of the engagement process for each stream is provided below, including a profile of the people / stakeholders consulted with in each.

In general, for both engagement streams, we adopted the following criteria which allowed feedback to be considered and used in a targeted fashion.

Table 6.1: City of Cockburn engagement feedback categories

Mode of Travel	Feedback Categories
Walking	**Likes** – *elements of infrastructure, networks or initiatives that respondents like* **Issues** - *elements of infrastructure, networks or initiatives that respondents believe need to be changed* **Ideas** – *any ideas that respondents have to increase / improve walking and cycling in the City of Cockburn*
Cycling	

6.2.1 Online engagement

Online engagement was undertaken by using CrowdSpot, a collaborative online mapping tool which allows anyone with access to the internet to click on a spot within the City of Cockburn and provide feedback. The CrowdSpot map was open for input between 7 April 2016 and 19 June 2016 and received input from a total of 448 unique participants yielding a total of 1,254 submissions across the feedback categories.

When interrogating the feedback received, it was evident that the people providing the feedback actively used the existing cycle and pedestrian infrastructure, providing insights that would not have been possible without this online engagement. This provided GTA with a more intimate understanding of the infrastructure and network, and a focus going into the network development stage.

A report has been prepared by CrowdSpot which summarises the online engagement process. Engagement on this platform was received from a broad cross-section of users, who seek to use the walking and cycling networks for different purposes.

Of all the respondents, 56% were female and 44% male with an age range primarily between 25 and 64 years of age. The most active age category overall (29%) was 35-44 years of age with the same age group representing the majority of males (32%) who responded. The largest majority of female respondents (29%) fell within the 55-64 years of age category.

Assessment of the respondent's profile information illustrated that 42% primarily walk and cycle for travel to work, with 18% doing so for recreation purposes. Of those who cycle, over half (58%) are 'confident but cautious' with only 25% claiming to be very confident.

The age, sex and confidence range of respondents and their varying reasons for utilising the existing network further cements that cycling in the City of Cockburn is attractive to, and of interest to many residents and reinforces the need to develop networks to accommodate different levels of experience for everyone to use should they wish to do so.

The detailed information received by respondents with respect to the feedback categories is considered in the following sections.

6.2.2 Traditional engagement

Whilst the online engagement provides a great base of information, it remains equally important to engage in conversation with the community and stakeholders through more traditional means.

This approach allows context to be given to the participants, and can prompt further feedback and valuable insights through natural conversation and prompts.

In partnership with City of Cockburn, GTA facilitated two workshops on Wednesday 14 September 2016. Separate sessions were held for key stakeholders and community with attendees grouped purposely to allow them to voice their opinions/ideas amongst peers, without the fear of repercussions:

- **Key stakeholder workshop**, to which select participants were invited from City of Cockburn, neighbouring local authorities, State Government and industry bodies / advocacy groups
- **Open community workshop**, which was open to anyone who wished to attend.

To maximise the value the sessions were held once GTA had developed a draft long term network (developed based on desktop research, online engagement and site audits) which acted as a discussion point and a basis for feedback. Both sessions were run with a similar format with Tim Judd and Dick van den Dool presenting on the plan and cycling trends and innovation respectively.

Following on from these sessions, GTA engaged directly with the following groups to discuss the plan from their perspective, and highlight any potential issues that may need to be addressed, and where potential synergies can be achieved:

- City of Cockburn Strategic Planning
- DoT Integrated Transport Planning
- City of Fremantle
- City of Melville
- City of Kwinana
- South West Group

6.3 Existing infrastructure response

During the online engagement, 263 individual points of feedback on existing cycle and pedestrian infrastructure 'likes' and 'issues' were provided. The traditional engagement sessions utilised printed maps for people to illustrate locations of issues or likes.

A series of sketch plans were used to capture the issues and likes received for both walking and cycling across both engagement streams. The maps identified certain areas within Cockburn where there is clearly more feedback received, denoting a greater level of walking and cycling activity on these areas, which cements the outputs of the demand data analysis previously discussed.

In general, feedback relating to issues highlighted are provided below and in the following graph:

- Disconnected / discontinuous routes such as a suitable link from Rockingham Road to Fremantle through the Cockburn Road intersection.
- Poor / un-kept infrastructure, for example the shared use path on Phoenix Road and North Lake Road which has sand and rubbish strewn across it.
- Lack of infrastructure such as a formal cycle route along Russell Road to provide a connection between Wattleup / Hammond Park and the coast.
- Inappropriate / unsafe infrastructure such as narrow cycle lanes on Farrington Road or cycle lanes stopping and not passing through intersections such as along Hamilton Road.

Figure 6.1: Summary of Crowd Spot cycle issues

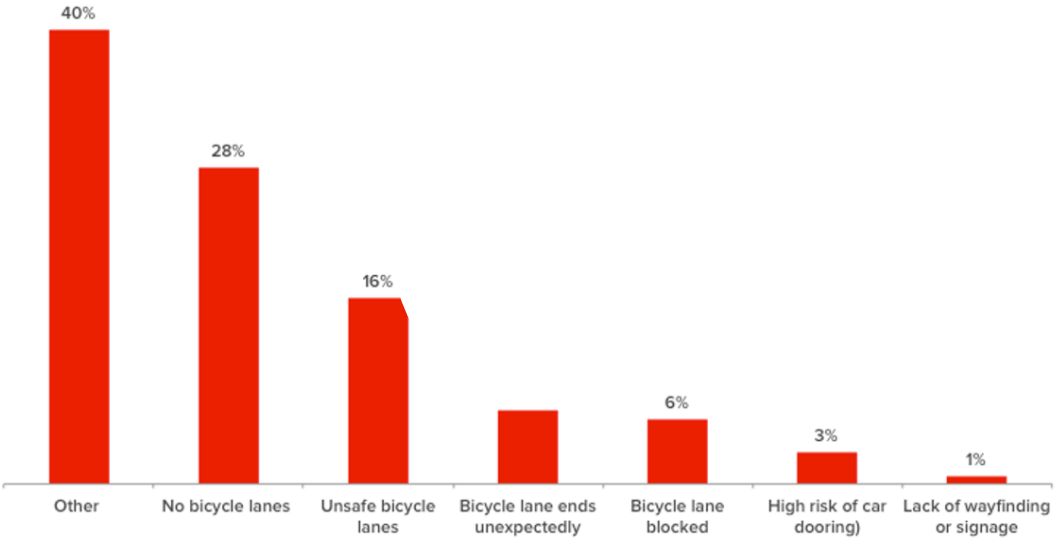
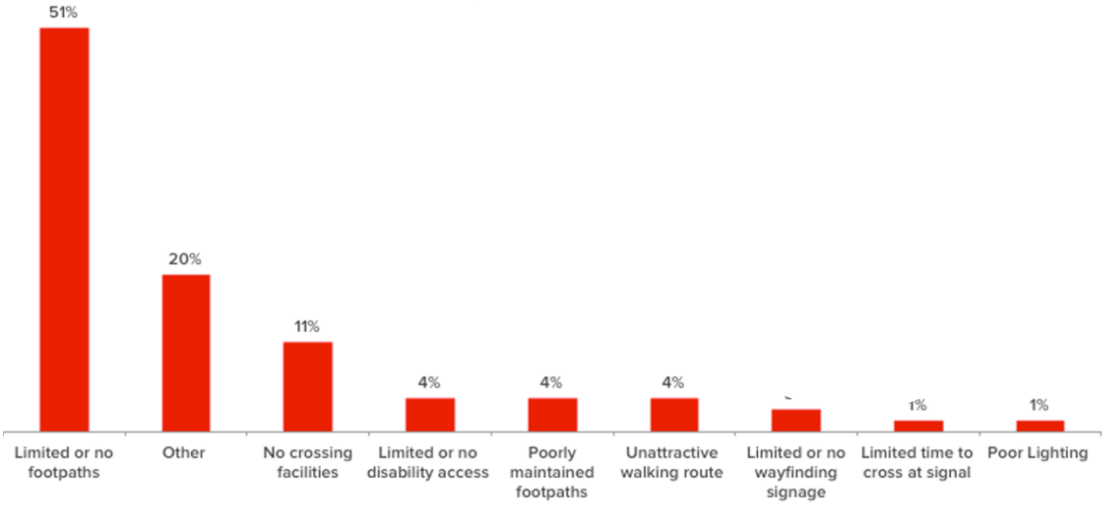


Figure 6.2: Summary of Crowd Spot pedestrian issues



Some of the data received with respect to 'issues' with existing infrastructure can be considered relevant for the City of Cockburn maintenance team to address, and so the engagement exercises have proven a useful tool to identify many minor elements that will make the network much more usable for its existing users. These smaller measures, whilst important to address, have not been considered within the priority works programme for the plan but have been collated separately to provide a list of actions for City of Cockburn.

The information on 'issues' received provided an insight into what users are currently seeking from the network, and what 'quick wins' may be available.

Information on 'likes', did not necessarily provide GTA with elements to address going into the network development stage of the plan, but it provided valuable information with respect to the way infrastructure for walking and cycling is received and utilised by the end user in the City of Cockburn. This information was used when developing the network so that targeted types of infrastructure or new routes could be provided that we are confident will be what the user is seeking. Examples of existing infrastructure that respondents like include:

- Kwinana Freeway PSP (Community connections).
- The Bench that is situated along costal path near dog beach (during trip facilities).
- Bibra Lake shared use path (Recreational connections).

6.4 New infrastructure requirements

During the development of the long-term cycle and pedestrian network, consideration has been given to the 'ideas' presented by respondents and will also seek to address issues identified. There was a total of 206 'ideas' presented during the online engagement, representing 44% of all submissions received. In addition, several additional ideas were collected during the traditional engagement process.

The ideas are a real valuable input to the network development stage, as it gives focused attention as to where users are seeking additional or improved infrastructure to either make their walk or cycling trip more enjoyable. As well as encouraging them to walk or cycle more or even to start walking or cycling in the first place. The 'ideas element' of the engagement process was certainly where respondents were most enthused to provide input with the following key items identified for consideration:

- Addition of new key links, tailored to user type for example a Community Route along Healy Road as an alternative to Rockingham Road.
- Local connections to the Freeway PSP and across the main segregators in City of Cockburn such as the fright rail line and the Freeway
- Improve intersection treatments and crossings to make it easier for the more vulnerable road users to pass through safely.

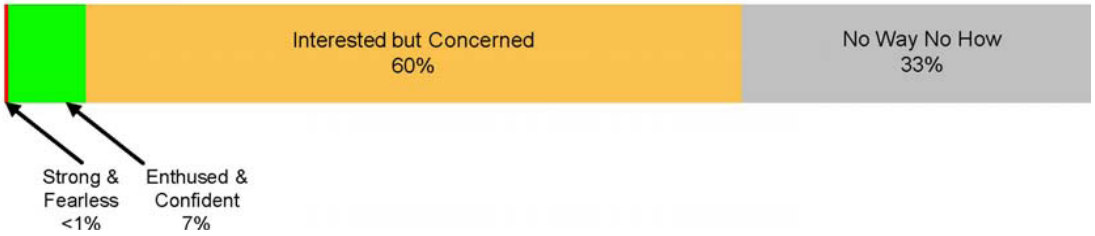
The above information is considered crucial to the development of the plan and has been carefully considered as part of the network development process.

7. A Strategy to get more people cycling and walking

7.1 Defining the user

The success of a strategy is reliant on its appeal to the City of Cockburn residents and the accessibility and safety of the infrastructure and policies it recommends. This appeal needs to be wide-ranging and consider all types of potential user and their requirements from the cycling network.

Figure 7.1: Four types of cyclists in Portland by proportion of population



The above graphic presents the results of research carried out in Portland, which groups cyclists into four distinct groups. At a high level, this suggests 67% of people are potential bicycle users. As part of this section of the plan, it is therefore essential to understand the types of cyclist and the different types of walking and cycling infrastructure they would like to use, allowing targeted infrastructure to be provided and/or prioritised for delivery.

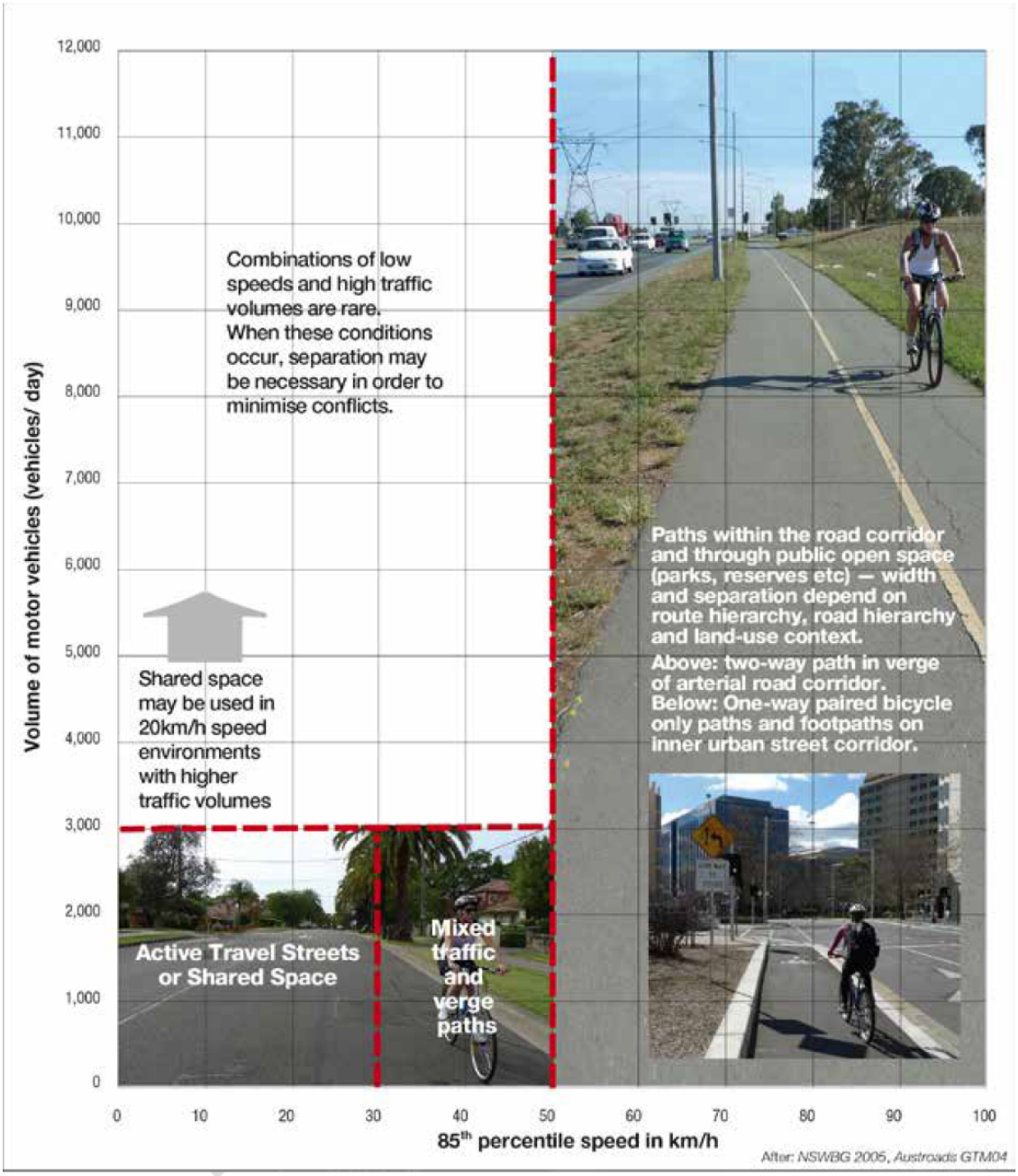
*BOURKE STREET IN SYDNEY IS A KEY ROUTE AND IS USED PRIMARILY BY COMMUTERS. WITH THIS KNOWLEDGE, GTA PLANNED AND DEISGNED A TARGETED RECONFIGURATION OF THE STREET TO ASSIST WITH THE CONVENIENT MOVEMENT OF CYCLISTS. THIS RESULTED IN A **108% INCREASE** IN THE VOLUME OF CYCLISTS USING THE ROUTE.*

On a more local level, there is recognition that the plan should cater for all types of bicycle users and to achieve this, there needs to be a commitment towards providing separation between cyclists and vehicles as well as cyclists and pedestrians where possible and as required. This will ensure the greatest level of accessibility to the network for all users. To assist in understanding how and when separation should occur Figure 7.2 and Figure 7.3 provides the acceptable thresholds upon which separation is required.

International studies and surveys have noted that the substantial majority of the population prefer to cycle fully separated from traffic, these being the 'Interested but Concerned' and likely the 'Enthused and Confident' cyclists. However, the 'Strong and Fearless' and possibly some 'Enthused and Confident' cyclist prefer to cycle on higher speed roads where space in the form of lanes and sealed shoulders.

Separation (either for vehicles and cyclists or cyclists and pedestrians) can be considered as 'physical separation' such as grade separation, or shared paths separated from road traffic, or cycle only and pedestrian only paths or, 'visual separation' through the use of signing and lining.

Figure 7.2: Separation of cyclists and motor vehicles by speed and volume



Source: Draft ACT Guidelines Figure 5.3
2015 ACT Government, Planning for Active Travel in the ACT, Walking and Cycling Infrastructure Guidelines
http://activeinfrastructure.net.au/practitioner-tool/docs/c1_d1/Planning4Active_TravelACT-D5-160229.pdf

Figure 7.3: Separation of cyclists and pedestrians by speed and volume

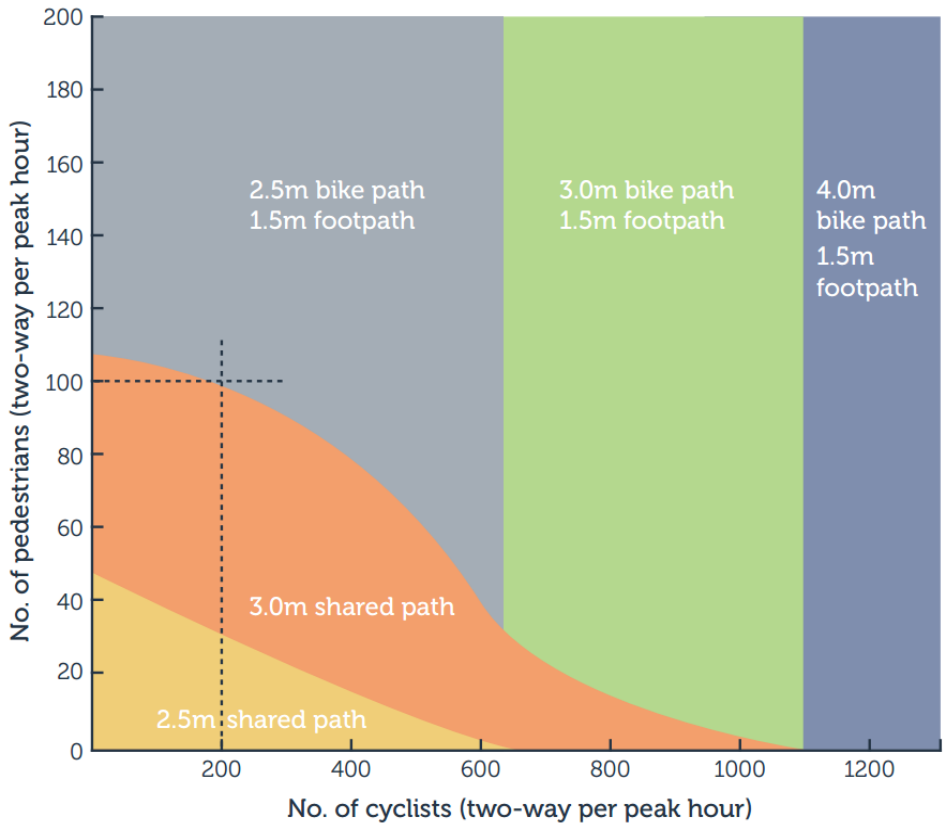


Figure 4 - Path capacity for paths with 50/50 directional.

Source: VicRoads Cycle Note 21.

7.2 Developing a new strategy

As noted by the Department of Transport for WA, since the release of the National Cycling Strategy 2011- 2016, yearly analysis of cycling participation rates across the country has occurred. The latest 2015 figures identify for WA that:

- the cycling participation rate of West Australians is higher than the Australian average (43% vs. 36%)
- males are more likely to have ridden in the past week than females (26% vs. 20%)
- of the people who cycled in the last month in Perth, 77% cycled at least once for recreation and 44% used a bicycle for transport.

RAC's 2015 survey[2] found that within WA 82% of people cycle for exercise, of which 40% do so for transport. Most of these people are cycling on shared paths with a large amount of the remaining utilising on road facilities.

These figures highlight that people ride for different reasons and purpose. This means we are increasingly catering for a segmented market in cycling across the City and have to provide for the following types of trip purposes:

[2] RAC (2015) *Cycling survey.*


Commuter Cycling (including trips to work, tertiary education and any longer distance utility trip)


Neighbourhood Cycling (including trips to local schools, shops, riding near home)


Recreational Cycling (including leisure trips and exercise)


Sports Adults

7.2.1 Five guiding principles

Each group has different needs and demands requiring tailored infrastructure solutions, dependent also on their level of confidence as a bike rider. Of utmost importance for any cycle and pedestrian network is to ensure the network adheres to the five guiding principles to network planning; Safety, Directness, Coherence, Attractiveness and Comfort.

Safety

Well-designed cycle network infrastructure improves and enhances the road safety of riders, pedestrians and motorists. Intersections should be designed to explicitly include bicycles as well as other categories of road users. Special intersection designs that include a path for bicycle riders are an important element of integrated network design. Mid-block treatments need to provide safe and easy major roadway crossings for riders and pedestrians. Public lighting and other features that improve personal safety are also crucial. Particularly for routes more likely to be used at night, or for pedestrian crossings (both formal both controlled and uncontrolled) which should have appropriate Discrimination Disability Act (DDA) compliant design. The design of cycle routes past bus stops should be designed for safe accommodation of riders, bus passengers, other pedestrians and vehicles. Where possible cyclists and buses should be segregated in their own lanes, however, at times there may be a requirement for buses and cyclist to share infrastructure. It is also important that the use of laneways by pedestrians are also well lit.

Directness

Network infrastructure should be as direct as safely practicable and based on desire lines. Long detours should be avoided as human energy is required to travel the distances. This should always be balanced against the problems of topography - a slightly longer route may work better because it contours around a hill rather than tackling it at its steepest climb. Delays due to prolonged crossing times of major barriers should be avoided with the aim to ensure that riders and walkers can maintain safe, comfortable and consistent travel throughout the length of the route. Indirect cycle routes or excessive delays may lead cyclists to choose more direct routes with greater risk. Research suggests that some cyclists are unlikely to divert to safer routes greater than 10 precent extra in length (Hudson, 1982)[3].

Coherence

A Bicycle and pedestrian network should form a connected network linking people to places via strategic and local routes. The network should be continuous and be very clear to the user where the facility leads. Intersections should provide a clear path for bicycle riders and pedestrians as

[3] Cycle Network and Route planning guide, Land Transport Safety Authority, NZ, 2004 and Hudson, M (1982) Bicycle planning: Policy and practice, The Architectural Press Ltd, London, United Kingdom.

well as for other modes. The quality of network facilities should also be consistent throughout the length of the route regardless of whether the facility uses a separated or shared road profile. Measures to ensure consistency and coherence include using same coloured surfacing and road way markings throughout (for both on road and off road cycling) and use the same signage and destination finger posts throughout. Although consideration to maintenance costs should be given as colour surfacing will need replacing frequently to keep it from looking patchy and worn. Routes should be easy to find from local streets and the network should be of such a density that there is always a choice of nearby routes available to the user.

Attractiveness

Community support exists for cycling and walking for exercise provided it is an enjoyable activity. Enjoyable cycling and walking requires attractively designed and located facilities. Bicycle network infrastructure, should be fitted into the surrounding environment so that the enjoyment of the experience is enhanced. Clear well-placed signposting should indicate major destinations, while centre lines and edge lines should indicate the serious transport intent of the off-road sections of routes. Cycle routes should also feel like socially 'safe' places to be. The community prefers well-lit pathways and open-to-view routes rather than dark and dingy alleyways. Cycling and walking routes around natural landscapes can add to the enjoyment and increase the use of the infrastructure, such as coastal area or around the lakes of Cockburn.

Comfort

The bicycle and pedestrian network must be easy to use for all types of riders and pedestrians. A smooth well maintained riding surface (free of debris) is essential both for comfort and operating safety. Depending on the speed and volume of other traffic (motor vehicles or pedestrians), some level of separation is often needed. Clearly marked bicycle facilities that allocate operating space to bicycle users and pedestrians are the most appropriate types of facilities on all but low traffic volume and low speed roads. Effective intersection treatment is critical to ensure comfortable and safe crossing for cyclists and pedestrians. Rain and wind discourage cycling. Measures to reduce their effects and make cycling and walking more enjoyable include:

- considering walls, embankments or suitable hedges next to paths, but being aware of maintaining public surveillance;
- paying attention to exposed paths near foreshores or ridges;
- providing shelter at critical destinations (this has been noted for Robb Road in – the route is sheltered from the wind and the bushes and buildings provide afternoon shade).

7.2.2 Land use type and accessibility

At the start of network development, it is important to identify the land use types existing within the project area before determining the appropriate level of accessibility. For the City of Cockburn key land use types have been mapped along with the travel distance typically conducive for cycling and walking. This was taken as:

- 3km cycle distance for railway stations
- 3km cycle distance for retail precincts (shopping centres)
- 1km distance for schools (noting High School children can cycle further than 1km, however, it was agreed that the last 1 kilometre is the critical section of a route. Often this is where there is the highest concentration of cars and vulnerable road users.

The mapping in Figure 7.4 to Figure 7.6 provide focus areas for baseline accessibility review of existing infrastructure adjacent key land uses.

The cycling and walking catchment for the two railway stations (Aubin Grove not currently operational) at 3km are shown in Figure 7.4. along with the catchment for the Murdoch Station further north along the railway line. It notes that there is a large proportion of residents within acceptable catchment that have the choice of either cycling or walking to either Cockburn Central or Aubin Grove stations. While there is some existing infrastructure within these catchments there are still gaps in the on-road network and an incomplete off-road network. The existing networks take a person close to the stations but do not deliver the 'last mile' for entry into the stations. It is also noted that the 3km radii around Murdoch railway station may also attract residents from the City of Cockburn area. A meeting with the City of Melville officers ensures that the two council areas are working together for cross boundary accessibility.

The catchment for the retail locations were also taken as 3km as shown in Figure 7.5, although it is noted that for local shopping centres, such as Coolbellup Shopping Centre, 1 to 2km is a more realistic distance for cycling or walking demand. However, a 3km radii notes that a large proportion of residents in the northern Cockburn area is within a 3km distance of more than one local shopping centre. As with the railway stations, while there some existing infrastructure within these catchments there are still gaps in the on-road network and an incomplete off-road network. There is also a lack of cycle parking facilities at some of the centres.

Further to this, improved pedestrian accessibility, particularly for the ageing population needs to be consider for the immediate surrounding road environment for each retail precinct, including through the precincts.

Catchment for schools within the City of Cockburn area have been mapped as 1km. While research does suggest 2km is an achievable measure, concentration around each school can be a first stage in a wider 'Safer Routes to School' operation.

It is evident that through a 'Safer Routes to School' program, lowering speeds around schools and improving pedestrian and cycle accessibility and safety, large areas of Cockburn will benefit from an overall improved and safer active transport network.

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Figure 7.4: City of Cockburn land use with cycling and walking catchment – railway stations

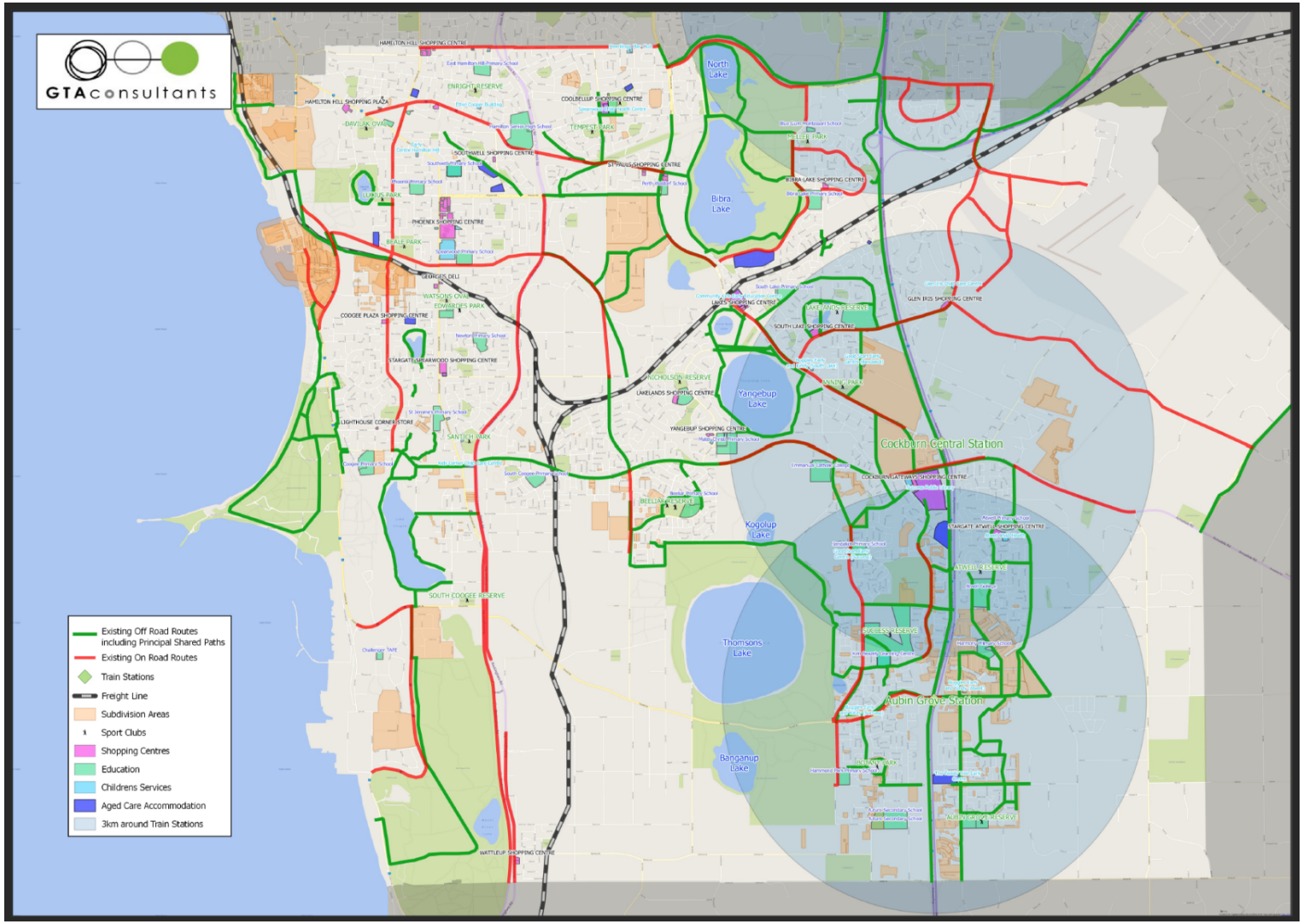


Figure 7.5: City of Cockburn land use with cycling and walking catchment – retail centres

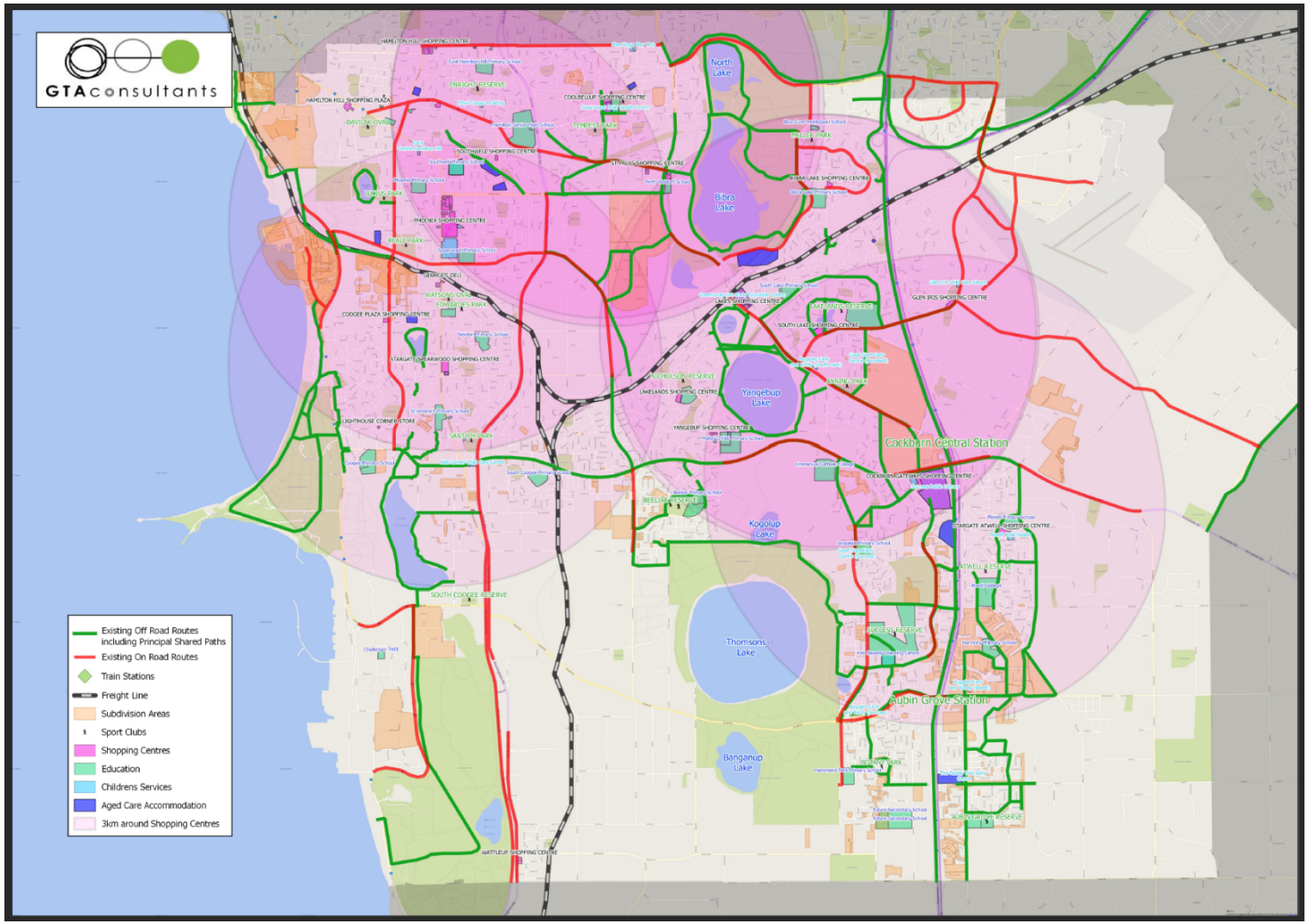
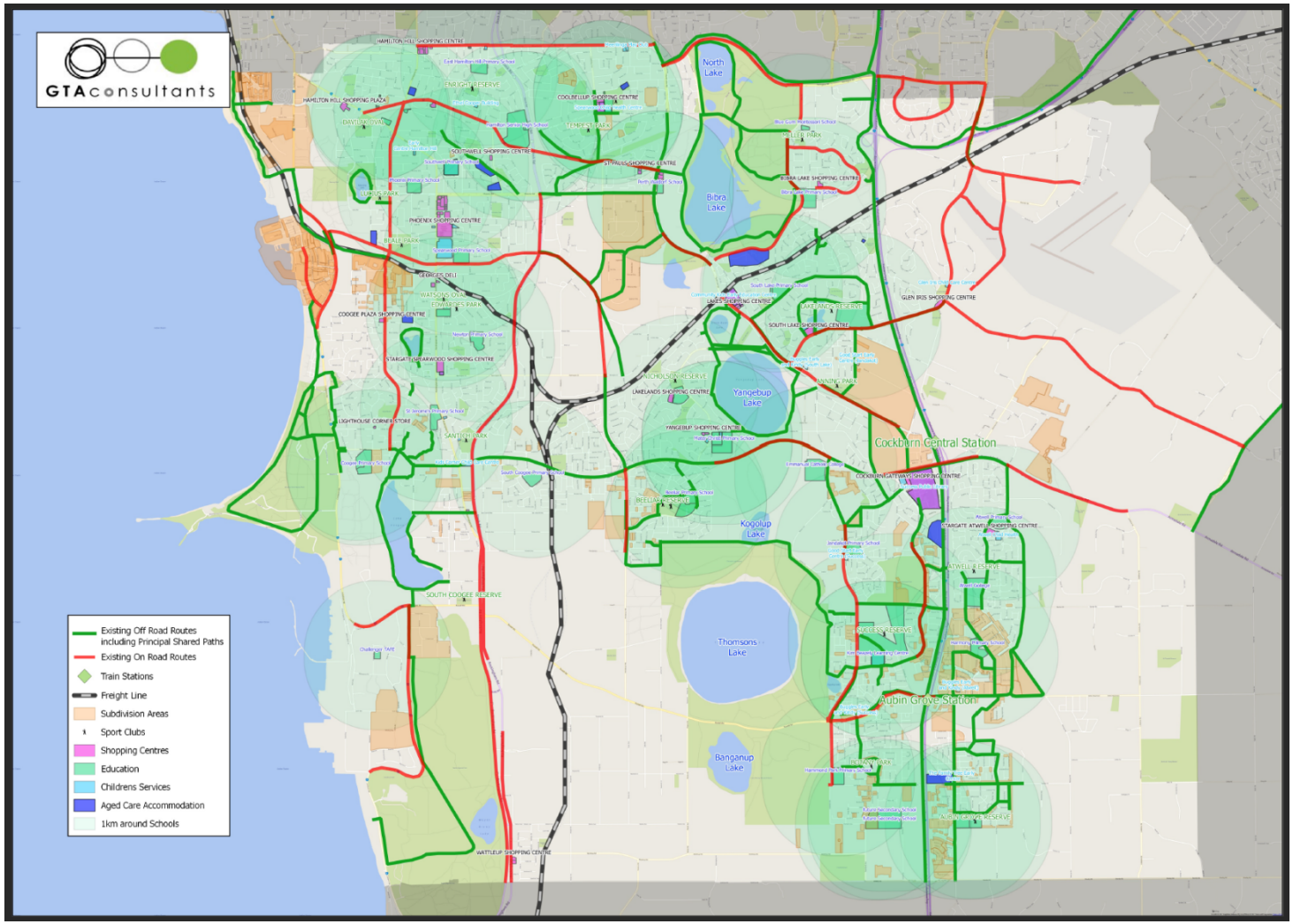


Figure 7.6: City of Cockburn land use with cycling and walking catchment – schools



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7.3 Delivering a safe and connected network

7.3.1 Fixing the existing infrastructure

When developing, a long-term cycling and walking network it is important to understand the existing network, missing links, unsafe infrastructure and any conflict areas.

The existing cycling network includes on-road cycle lanes, shared-use paths, footpaths and controlled and uncontrolled road and rail crossings.

The development of the long-term network has traditionally identified missing links and additional treatment to improve the connectivity and safety of the infrastructure. However, there are several smaller pieces of missing infrastructure or maintenance issues that have been identified via the infrastructure survey and through consultation. The issues are prioritised and dealt with on an ongoing basis, noting some of the paths identified are owned by 'others' and the City has less control over these areas.

Table 7.1: Maintenance issues identified

City of Cockburn Quadrant	Map ID	Description of Maintenance Issue	Location	Recommended Action
South West (Bike & Ped Map)	SW1	Some cracks on path	Woodman Point Recreation Reserve	Maintenance of path
	SW2	Overgrown vegetation on bike paths	from Mayor Rd to Coogee Beach	Cut back or remove vegetation
	SW3	Poor conditions (line faded)	on road Spearwood Ave, Beeliar Dr to Bluebush Ave/Mclaren Ave.	Maintenance line marking
	SW4	Poor crossings	Roundabout between Spearwood Ave and Beeliar Dr	Upgrade pedestrian/cycle crossing facilities at this roundabout
South East (Bike & Ped Map)	SE1	Poor footpaths west and north of roundabout.	Beenyup Rd, near to Tapper Rd	Maintenance needed
	SE2	No protection for path gravel section	Beenyup Rd	Seal gravel and provide kerb
	SE3	Poor crossing facilitates (link to PSP/bus)	Roundabout between Gibbs Rd and Lyon Rd	Maintenance needed
	SE4	Sand on PSP	Kwinana Freeway, south of Armadale Rd	Path needs sweeping
	SE5	Footpath maintenance, Poor intersection visibility	Murrumbidgee Dr/Condamine Approach Intersection	Investigate possibility of removing street tree on corner, or at least under prune
	SE6	Poor forward visibility	Ironbark Terrace, near to Banbar Ln	Potential STOP sign to be installed based on visibility splay – needs further investigation
	SE7	Poor Shared path	running through Banksia Eucalypt Woodland Park next to Prosperity Loop	needs sweeping and maintenance
	SE8	Shared path not consistent across driveways	Warton Road	SP extension required
	SE9	Poor lighting	Under Beeliar Dr	Investigate luminance and shadowing

City of Cockburn Quadrant	Map ID	Description of Maintenance Issue	Location	Recommended Action
North East (Bike & Ped Map)	NE1	Overhang vegetation	Berrigan Dr	Increase visibility (reduce vegetation) – Maintenance needed
	NE2	Power pole obstruction	Berrigan Dr	Investigate possibility of undergrounding power pole
	NE3	Sand	Berrigan Dr/Jandakot Rd/Dean Rd	Sweeping needed and investigate feasibility of kerbing to reduce sand blowing onto the path
	NE4	Poor intersection	North Lake Rd/Bibra Dr	Provide crossing points across roundabout (raised and set back)
	NE5	Poor conditions	North Lake Rd	Sweeping and maintenance needed
	NE6	Poor visibility to west at crossing	Berrigan Dr	Reduce road side vegetation and provide formalised crossing facility at intersection with Semple Court
North West (Bike & Ped Map)	NW1	End of path littered, Poor visibility at crossing	N Lake Rd	Increase visibility (reduce vegetation)
	NW2	Un- kept path	Progress Dr	Maintenance needed
	NW3	Poor surface	Winterfold Rd/Coolbellup Ave	resurface
	NW4	Poor link at Provincial Mews	Coolbellup Ave/Forrest Rd	Widen central refuge and remove road side vegetation
	NW5	Poorly maintained	Spearwood Ave/Miguel Rd	Sand and debris from passing trucks – sweeping required
	NW6	Unkept path along sections of Winterfold Rd	Winterfold Rd	Kerb side lane collecting debris – sweeping required
	NW7	Poor overpass, path not maintained	Stock Rd next to Hamilton School	Maintenance of bridge surface needed
	NW8	Poor intersection footpaths and cycle lanes	Rockingham Rd/Spearwood Ave	Upgrade of intersection required
	NW9	Poor surface	Clontarf Rd/Parnell Rd	resurface
	NW10	Vegetation at Bull Rd / Cockburn Road	East of rail line and Robb Rd	Increase visibility (reduce vegetation) along the side of the road
	NW11	Gravel on path at Bull Rd / Cockburn Road	East of rai line and Robb Rd	Maintenance needed – investigate feasibility of kerbing in problem areas

City of Cockburn Quadrant	Map ID	Description of Maintenance Issue	Location	Recommended Action
	NW12	Poor visibility, hard to cross	Cockburn Rd/Spearwood Ave	Increase visibility (reduce vegetation)
	NW13	Poor condition path	Phoenix Rd between Horus Bend and Selkis Rd	Maintenance of path and removal of vegetation debris
	NW14	Poor connection	between Bibra Lake and North Lake	Connection proposed as part of network plan
	NW15	Poor condition footpath	Swallow Dr	Maintenance Needed
	NW16	Poor condition footpath	Moorhen Dr	Maintenance Needed
	NW17	Poor condition footpath and no pram ramp facilities or tactile paving	Grand Pre Cres	Maintenance Needed
	NW18	Poor footpath cracked and covered in sand in parts	Cocos Dr	Upgrade and extend existing footpath, sweeping required
	NW19	Poor crossing	Carrington Rd/Healy Rd	Upgrade to pedestrian facilities required
	NW20	Poor pedestrian facilities	Carrington St/Rockingham Rd	Upgrade to pedestrian facilities required
Non-Location specific	-	The use of rails and u-rails at end of paths	Can restrict access for wheel chairs or larger bikes (such as at the end of Eacham Court onto Berrigan Drive)	Assess the need and remove or respace path end rails

The above recommended actions summarise the outcomes of the infrastructure survey and through consultation undertaken to inform this bike plan and, are high level recommendations only, further assessment maybe required.

Identifying maintenance issues is important and can be resolved via promoting the hazard report process to the wider cycle and pedestrian community. Some of the issues noted in Table 7.1 have been addressed but issues are ongoing and need to be addressed on a regular basis. The Travel Smart Officer for the City and the Cockburn Bicycle User Group can assist with identification of issues and monitoring responses.

7.3.2 Developing a Long-Term Network - Cycling

As discussed within this strategy when developing a long-term cycle and pedestrian network it is important to not only recognise the land use type, but to understand the intended user and thus the type of infrastructure that is required, using the planning principles that better cater for those aged 8 – 80, along with the understanding of the need to plan for those cyclists who could be potential bicycle users (the 'enthused and confident' and 'interested but concerned') and the pedestrians and vulnerable road users where a safe road environment will encourage active travel.

The intent of the long-term network development has been to ensure that land use types that attract more strategic journey types would be served by a mix of on-road and strategic off-road facilities. Land use types that serve more of a local function would be served by a mix of strategic off-road and local off-road facilities.

While we have identified an increasingly segmented market of cyclists (Commuter, Neighbourhood, Recreational and Sports), for network planning purposes the cyclist types can also be classified within their level of confidence, experience and desired travel speed. In this regard, cyclists have been considered as follows:

Table 7.2: Cyclists categories

Cyclists Type	Category	Level of Experience	Confidence	Desired Travel Speed / Traffic Speed	Preferred Infrastructure
A	Commuter / Sport	High to Medium	Strong and Fearless Adults / Enthused and Confident Adults	Travel Speed >30km/h Road Speed >50km/h	On-Road / PSP / RSP
B	Commuter / Neighbourhood / Recreational	Medium	Enthused and Confident Adults / Interested but Concerned Adults / high School Children	Travel Speed >15km/h to 30km/h Road Speed 50km/h or less	On Road (minor roads only) / shared paths / Bike Boulevards
C	Neighbourhood / Recreational	Medium to Low	Interested but concerned Adults and Younger Children	Travel Speed <15km/h Road Speed 30km/h or less	Shared Paths / Bike Boulevards / Footpaths / Shared Spaces

These cyclist **Type A**, **Type B** and **Type C**, are referenced in the remainder of this chapter when assigning suitable infrastructure. The major growth area for cycling is in the Type B and Type C categories which has been a focus for network development.

Linking people and jobs – a network of on-road routes

The on-road cycling network that exists within the City consists of several different treatments. Some routes are red, some are just lined with no colour, some only have colour at an intersection. Some cycle lanes have a cycle symbol painted in the lane denoting it as a cycle lane, some do not. Some are merely wide (or in some instances not very wide) sealed shoulders. Several of the on-road cycle lanes also terminate prior to intersections, providing no protection for the rider as they enter and travel through the intersection.

To ensure those commuters who wish to cycle can adequately access their employment (either within or outside of the City of Cockburn) it is essential that the existing on-road cycle network consists of a connected network of on-road lanes that are, at a minimum, protected from the nearest trafficable lane, and continue to and through an intersection. These routes may also be used by recreational and local cyclists during quieter times of the day for smaller local trips.

The high level principles previously noted within this plan notes that '*on-road cycle routes shouldn't be provided on high volume and high speed roads*' (but acknowledges this may not always be possible). The ACT guidelines notes a '*user should be able to select a type of infrastructure*' (in this case on-road lanes) and stay on that infrastructure for the majority of their journey without the need to switch to shared facilities. A future on-road cycle network has been developed, illustrated in Figure 7.7.

Some additional on-road routes have been suggested to ensure a more connected network. However, on high speed and/or high volume roads that already have or are proposed as part of this plan to have a separated shared use facility, it is suggested this is used instead. For areas of possible high cycle/pedestrian conflict i.e. along sections of Rockingham Road, Cockburn Road or Beeliar Drive, the on-road facility has been recommended. However, within the next five

years, the focus for the on-road cycle network should be to provide protection to ensure a safer network, as well as ensure connectivity through intersections.

The routes are indicative only and further analysis and detailed design will be required for each area.

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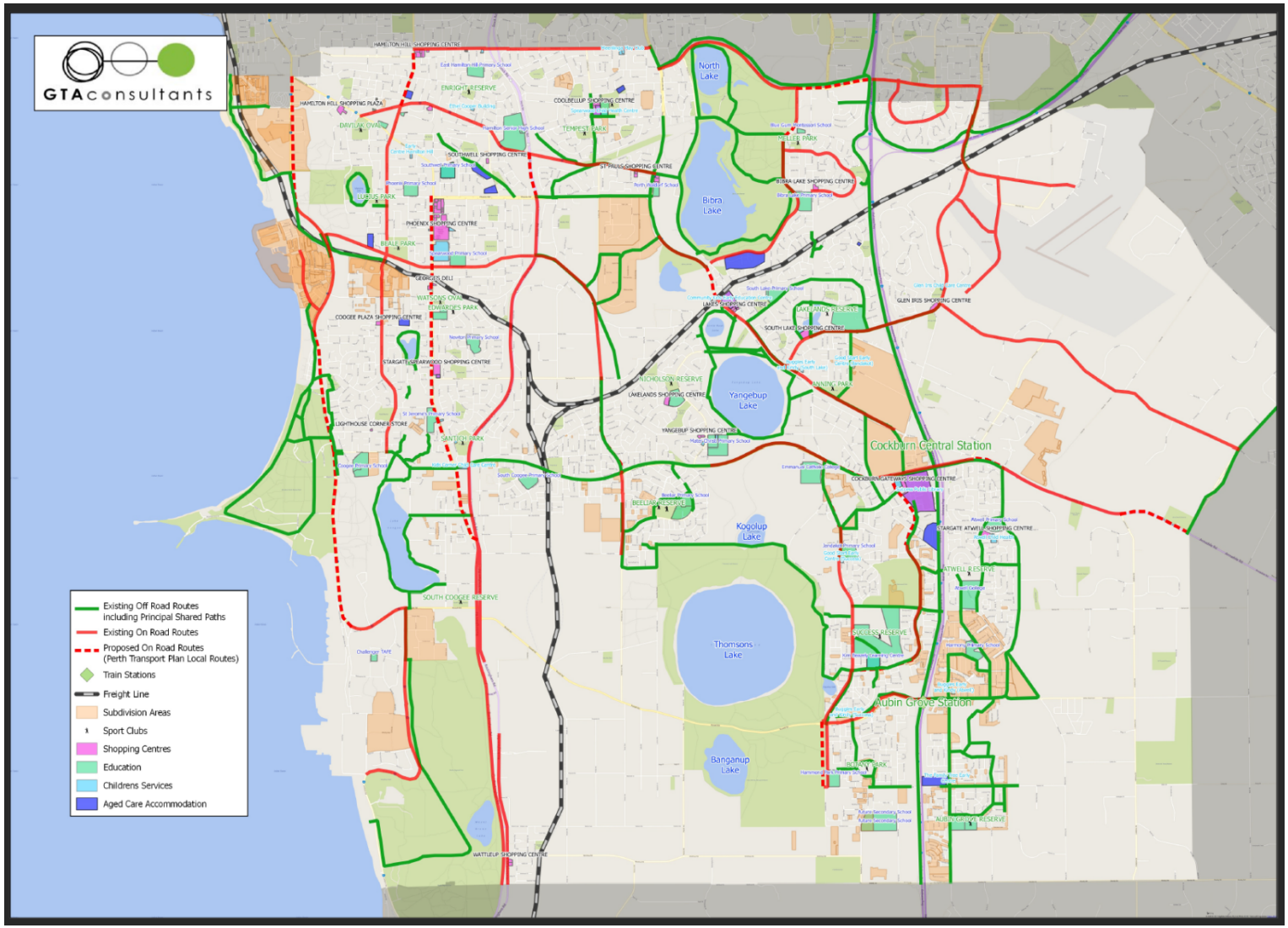
Figure 7.7: Proposed on-road cycle network



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For new on-road cycle routes it is recommended that all routes are designed to a standard of 1.5m in width, widening to 1.8m where possible, particularly on uphill sections where gradient is likely to be >5%. While it is acknowledged that *Austroads Guide to Road Design Part 6A* states that a bicycle lane can be 1.2m wide (with an absolute minimum of 1.0m for very short sections) – the City should consider using 1.5m as standard reducing to 1.2m as a minimum.

However, as noted during consultation, the safety of on-road routes needs to be improved, with many confident riders stating that a single white line, while demarcating the cycle lane, doesn't offer any protection to a cyclist.

Table 7.3 provides a description of on-road bicycle lanes.

Table 7.3: On-Road cycle lane description

Bicycle Lanes Bicycle lanes are on-road, one-way facilities which designate road space exclusively for cycling. The lanes must be legally signposted with bicycle lane signs. In built-up areas, bike-lanes often run adjacent to parked cars and a buffer zone should be incorporated to reduce the hazard of drivers opening their car doors. To increase driver awareness, bicycle pavement stencils and coloured surfacing are used.	 *Winterfold Road, Cockburn*
Cyclist Category This type of facility often attracts **TYPE A** and some of **TYPE B** and is designed for access to strategic centres and longer travel distances.	
Design Requirement 1.5m lanes 1.2m lanes as minimum 1.8m lanes where possible	

A network of on-road cycle routes that are all red in colour (such as the cycle lanes on Forrest Road and a proportion along Winterfold Road) would provide a consistent message to both the cycle users and the passing motorist as well as assisting in way finding. However, it is recommended as part of this plan, that, at a minimum, the colour green is utilised for on-road cycle routes only in areas to highlight potential conflict areas, such as the route along Winterfold Road. The cycle symbol pavement marking should also be used, noting the colouring and pavement markings do need to be maintained to ensure effectiveness.

RECOMMENDATION 1: Coloured surfacing for on-road cycling. Providing Green at conflict points as a minimum. Use the cycle symbol pavement marking on all on-road routes.

A primary objective of this plan is to ensure a safe network as well as a connected one. Therefore, it is important that, at a minimum, on-road cycle routes (both existing and new) should have some form of protection. This can be achieved in several different ways – see Table 7.4.

Table 7.4: Protected on-road cycling to general traffic

Buffered Cycle Lane – additional painted line (Kind Edward Street, Osborne Park)  Low Cost	One Way separated cycle lane Protected in sections via kerb and planting (Scarborough Beach Road, Mount Hawthorn)  Medium to High Cost *While planting trees increases the cost, the traffic is calmed, there is an increase in amenity and they provide shade/shelter*

RECOMMENDATION 2: Provide a buffer for on-road cycle routes to general traffic. As a minimum, this should be done via wider line marking buffer.

It is also important, that where possible, the 'dooring zone' between parked cars and passing cyclists is also protected.

There are many car bays throughout the City on streets. Using road diets there may be more. It is a concept that designers need to be aware of, to make sure that they do not have people riding bicycles in the dooring zone. Bike riders are often squeezed closer to cars rather than riding in the primary position in the road. This is a concept especially relevant to bike boulevards.

New on-road links recommended in this plan do not necessarily occur on roads where there is high levels of existing on-street parking. This measure is more of a policy consideration for the councils to ensure future on-street parking that also needs to accommodate for on-road cycle lanes has to have buffer zones for the doors.

Future redevelopment proposed along Rockingham Rd, Cockburn Rd, Carrington Street etc. may include on-street parking where a car door buffer would need to be considered.

On-road cycle lanes may be identified later on for other streets that currently have some level of formal or informal on-street parking.

An example of this is Winterfold Street near Letchford Street and Seaton Catholic College – see image above. The car door zone could be better avoided if there was a slightly wider buffer zone.

While there can be high cost car door avoidance measures such as kerbing and planting, this is usually not possible and can be a maintenance issue. Therefore, this plan recommends two different options for consideration during the design phase of on-road routes – see Table 7.5.

Table 7.5: Protected on-road cycling to parked vehicles

Buffered Cycle Lane – additional painted line denoting the 'Dooring Zone' (Source: NACTO)  Low Cost	Wider on-street parking bays providing a 'Dooring Zone' that doesn't protrude into the cycle lane as much (Source: NACTO)  Low Cost

RECOMMENDATION 3: Provide a buffer for on-road cycle routes to denote a 'Dooring Zone'. As a minimum, this should be done via wider line marking buffer or wider on-street parking bays.

To ensure this is achievable where road space maybe limited, a 1.5m proposed on-road cycle route can be reduced to the proposed minimum of 1.2m to allow for the additional buffering, or by slightly reducing the adjacent general traffic lane to say 3.3m. Where possible the buffering zone (to either general traffic or parked vehicles) should be a minimum of 200mm in width.

During the site surveys and consultation, several existing on-road bike lanes were noted as being too narrow and require widening. There are also a number of sealed shoulders, that while they are designated as on-road cycle routes on active travel mapping, they are currently not to standard. These include:

- Armadale Road, in the vicinity of Liddlelow Road
- Carrington Road
- Winterfold Road at Stock Road – two lanes merge into one, next to a cycle lane and a bus stop, including a transition of westbound approach from off to on-road cycling
- Beeliar Drive, in vicinity of Poletti Road and Hammond Road
- Berrigan Drive sealed shoulder
- Cockburn Road, south of Success Way
- Farrington Road between North Lake Road and Bibra Drive

- Karel Avenue
- Spearwood Avenue between Hamilton and Barrington Street
- Hamilton Road
- Hammond Road
- Winterfold Road
- Rowley Road sealed shoulder
- Stock Road sealed shoulder, widens and narrows along its length, inconsistently.

While this list identifies existing on-road lanes or sealed shoulders that may not be wide enough, expenditure on widening this should be weighed against providing new facilities to gain a wider, connected network, adding buffer zones rather than simply widening, or indeed implementing suggested Main Community Routes as a safer alternative.

Linking people and places – a network of Community Routes – (Main Community Routes)

For those less confident, or those who wish to ride at a slower speed, this plan has recommended a network of Main Community Routes that form the spine of the shared-use network. During the development of the long-term network, a key element was to **not be constrained by the existing road network**, utilise existing parks and reserves and utilise **'Lazy Assets'.** Lazy Assets being land already in the public ownership and, where possible is reserved land, such as a power line easement. Within the context of this plan, the Main Community Routes consist of:

- Principal Shared Paths
- Shared Use Paths along higher order roads (identified as strategic links within the Perth Transport Plan)
- Cycle only paths segregated from pedestrians and traffic
- Acknowledging that a network of protected on-road cycle routes maybe attractive to those less confident during off peak times with lower traffic volumes.
- A safer alternative to the traditional on-road cycle routes, as previously detailed, is the opportunity to provide a separated two-way cycle only facility still within the road reserve. This is can be achieved for new road infrastructure easier than existing. However, where traffic volumes allow, the possibility of introducing a 'road diet' reducing a four-lane road to two lanes and utilising the space within the exiting road reserve for this type of facility. See Table 7.6 Separated bicycle facility description of two-way separated facilities.

Table 7.6: Separated bicycle facility description

Two-way separated bicycle paths (in the road reserve) Two-way separated bicycle paths are located within the road reserve but are exclusive to bicycles. They are completely separate from parked cars, vehicle traffic and pedestrians. These facilities provide bi-directional travel along one side of the road and are highly desirable and safer than other on-road options. These facilities often require substantial engineering works to implement which needs to be balanced relative to competing demands for space within the road reserve, this type of facility is the preferred infrastructure type for major routes.	 *Banksia Terrace, Kensington*
Cyclist Category This type of facility often attracts **TYPE A** and **TYPE B** however some type A may still decide to ride on rad with traffic depending on intersection treatment or crowding (see Table 7.2 for cyclist category description). **Design Requirement** 3.0m width (2 x 1.5m lanes) 2.5m absolute minimum for local path access	 *Kerbed, unmarked two-way cycle path, Windelya Road, Kardinya*
Transition Areas As can be seen from the Banksia Terrace example, general traffic speed is forced to slow down considerably by a chicane build out at the point cyclists are expected to transition from road to separated facility. In this example, further treatment could be applied to slow the speed of traffic near to the school for example via Bike Boulevard treatments.	 *Banksia Terrace, Kensington*

Existing road space can sometimes be limited making it difficult to implement separated bicycle paths. However, where traffic volumes and cycle volumes allow, 'Road Diets' could be implemented to reduce the number of traffic lanes and gain space within the existing kerb line for separated facilities. While Figure 7. depicts a separated cycle lane on either side of the road, this overall concept is being recommended for a community route along Rockingham Road.

Figure 7.8: Road diet concept image

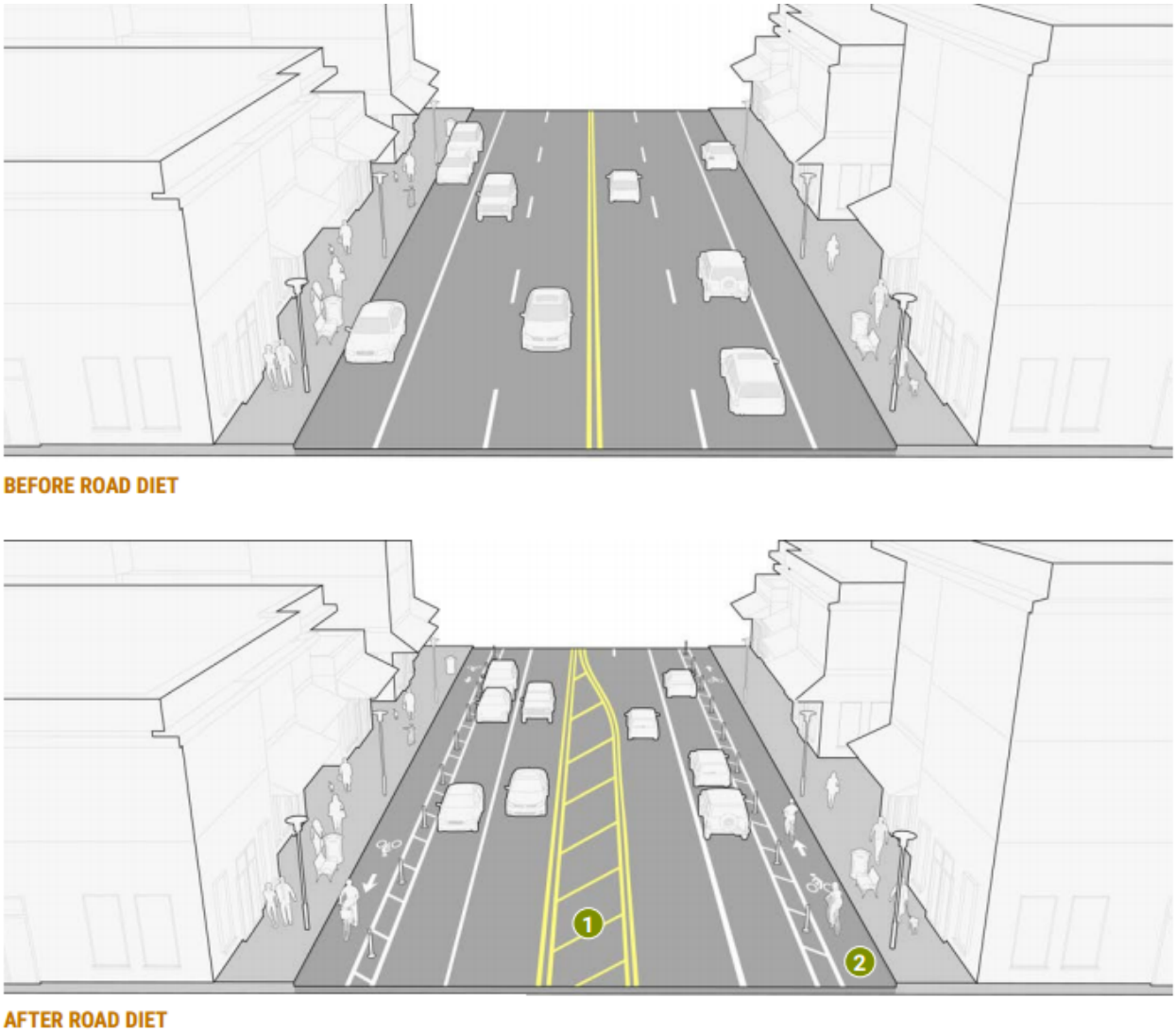


Figure 7.7 image was taken from FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation 2015 (USA) and shows a right hand drive scenario.

The off-road cycling network that exists within the City consists of designated share path facilities as well as wider footpaths. Often the existing shared path facilities do not end at a transition area or intersection such as the existing shared path along North Lake Road. To ensure users of the Main Community Routes have a safe and connected network, the infrastructure should be wide enough to accommodate passing cyclists and pedestrians, with clear visibility along the route. With the design of Main Community Routes, it is important to have continuity through intersections and well-designed transition areas that lead the user into shared spaces, onto connecting off-road routes or connecting on-road routes. A future Main Community Route network has been developed as illustrated in Table 7.7 provides a description for off-road routes that make up Main Community Routes.

Table 7.7: Main Community Route facility description

Shared paths (in or not in the road reserve) Shared paths can be located adjacent to a road or through a park or reserve. They are used by both cyclists and pedestrians with line marking and/or signage designating their legal status as a shared path and helping to encourage safe use by both user groups. Pedestrians have the right of way on shared paths. There is the potential for conflict between user types when volumes of pedestrians and cyclists are high or when the path width is narrow. This type of facility can generally be implemented wherever there is sufficient width to accommodate a 3.0m wide path. Wider paths may be required depending on the volume of cyclists and pedestrians.	 *North Lake Road, Cockburn (approximately 3.0m wide)*
Cyclist Category This type of facility often attracts TYPE B and TYPE C and to a lesser extent a portion of TYPE A depending on the on-road alternatives (see Table 7.2 for cyclist category description).	
Design Requirement 3.0m shared use path where the demand and speed for pedestrians or cyclists is low to medium 4.0m shared use path where the demand and speed for pedestrians or cyclists is medium to high (PSP standard) – grade separation where possible. 6.0m shared use path where the demand and speed for pedestrians or cyclists is high and as such, pedestrians and cyclists require separation (4.0m PSP standard cycle only / 2.0m pedestrian only) – grade separation where possible.	 Robertson Road Reserve, Joondalup (separation of cyclists and pedestrians)
Transition Areas Where required, transition areas should be designed to indicate to the different users that they are approaching a shared environment.	 Robertson Road Reserve, Joondalup(transition area)

A key element of the Community Network is to not be constrained by the existing road network, existing parks/reserves and reserved land where possible

As noted in Table 1.1 the Department of Transport's cycle network planning principles for the Principal Shard Path Network and Strategic Cycle Network (equivalent to the Main Community Routes identified within this plan) the purpose is to provide safe and direct connections between various strategic centres and areas of activity, predominantly along the freeway, railway lines (passenger and freight) and arterial roads, with strategic spacing between this 'spine' of Main Community Routes.

RECOMMENDATION 4: ensure all off road Main Community Routes continue to and, where required, through intersections and have appropriately designed transition areas.

At times, there may be a requirement for an on-road route to transition into a commuter off-road route. In this instance, while not ideal, the Department of Transport's *Shared Path Design Technical Guidelines* suggested this can be undertaken via transition ramps and road crossings illustrated in Figure 7.8. Including signage or kerbing in the design can help to guide the bike rider to the continuation of the route when the bike lane and shared path ends.

Figure 7.8: Transition from off-road to on-road

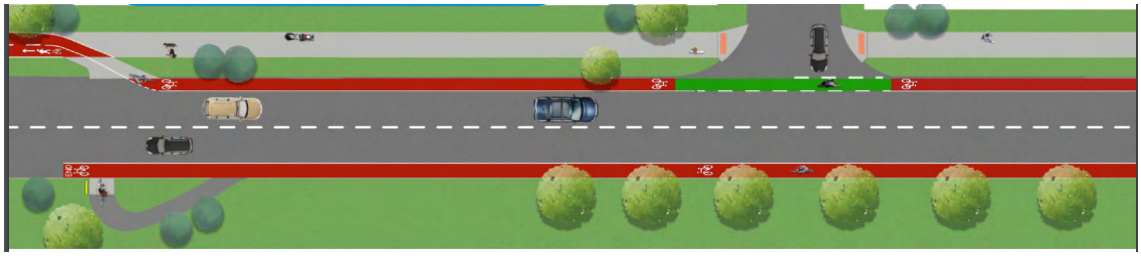
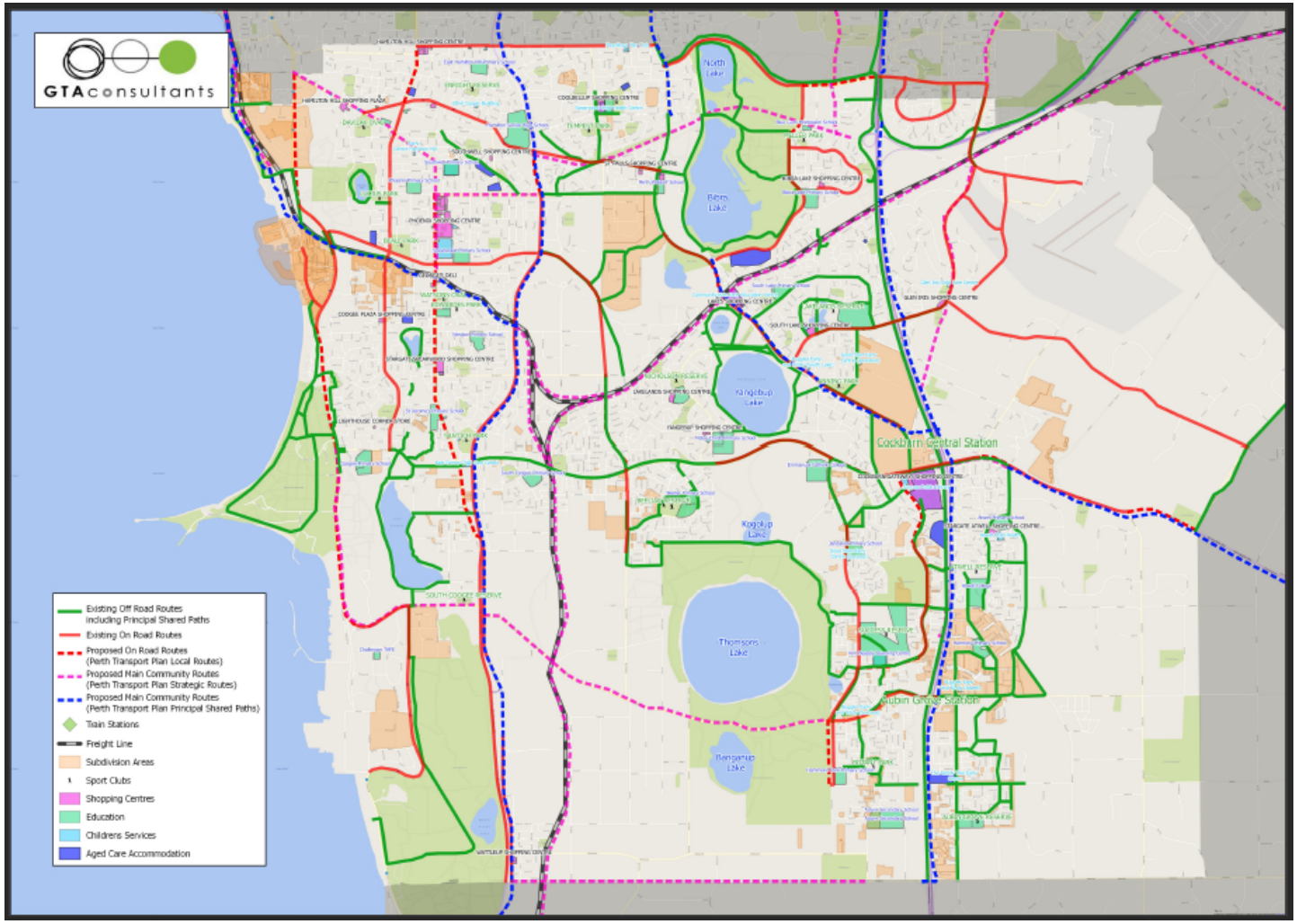


Figure 7.9: Proposed Main Community Route



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Linking People and Places – a network of Community Routes (Local Community Routes)

Local Community Routes are to provide the connection between a journey's start and end (if a local trip), or to provide a connection between a journey start or end to the Main Community Route or on-road route network.

Local Community Routes (within the context of this plan) have been planned to accommodate for the less experienced, less confident cyclists, to accommodate for shorter travel distances and to provide safer road environments for cyclists and pedestrians.

Local Community Routes will consist of:

- Shared Use Paths along lower order, local roads
- Bike Boulevards
- Shared Spaces
- Wide footpaths (to accommodate shared use).

While the city currently has wide footpaths in some locations, such as Brenchley Drive around Atwell College as well as shared paths along lower order roads such as Phoenix Road, it doesn't have any Bike Boulevards. A future Local Community Route network has been developed as illustrated in Figure 7.10.

Table 7.8 provides a description for infrastructure that make up Local Community Routes (noting shared paths have been covered in the previous section and footpaths later in this report).

Table 7.8: Local Community Route facility description

Mixed-traffic Mixed-traffic facilities are suitable for roads with low traffic volumes and speeds, such as quiet residential streets. Bicycle stencils provide awareness and promotion to all road users. Mixed traffic facilities are generally appropriate on roads with less than 3,000 vehicles per day with a maximum speed limit of 50km/h.	
Cyclist category This type of facility often attracts **TYPE A** for high volume environments and **TYPE B** in low traffic environments.	*Macrae Road, Melville*
Hybrid shared bicycle lanes and mixed-traffic Bicycle lane treatments are used in the uphill direction while in the downhill direction roads are linemarked and/or signed for mixed use by motor vehicles and bicycles. Shoulder lane treatments can also be used in the uphill direction. Given the slow speed of cyclists, the risk of dooring is low and if it did occur, there is unlikely to be a serious injury. However, rather than having cycle lanes near car door ones a buffer zone should be encouraged. Hybrid treatments are generally appropriate on roads with less than 5,000 vehicles per day with a maximum speed limit of 50km.	
Cyclist category In the uphill direction, this type of facility often attracts enthused and confident riders **TYPE B** for high volume environments and **TYPE B** in low traffic environments (noting that some extremely confident cyclists **TYPE A** may still choose the general traffic lane). In the downhill direction, this type of facility often attracts strong and fearless cyclists **TYPE A** for high volume environments. In low traffic environments mixed-traffic is suitable for enthused and confident **TYPE B** and interested but concerned riders **TYPE C**. (see Table 7.2 for cyclist category description).	*William Street, Fremantle (noting in this instance the cycle lane is a contra flow lane)*
Shared Zones Shared zones are special low speed, mixed-traffic environments which are legally controlled by signs and line markings that restrict the speed limit to 10km/h. Parking is restricted to marked spaces to afford priority to pedestrians. Typically, the road environment is designed with special pavements, speed controls and landscaping, with few or no distinguishable footpaths and preferably no kerbs. Any formally designated shared zone attracts interested and concerned, enthused and confident and strong and fearless riders.	
Cyclist Category While this type of facility would be functional to all user types, due to the speed limit it is best suited to **TYPE B cyclists. TYPE C** cyclists may be wary of using a shared zone due to the presence of cars and car parking. (see Table 7.2 for cyclist category description).	*Bay View Terrace, Claremont*

Bicycle Boulevards

Bicycle Boulevards are a well-established concept for prioritising bicycle access on local streets, although there has been little formal application in Australia to date, noting WA currently have one under construction and two in the design phase. In essence, the concept builds on the following three related principles/traffic management techniques:

i Streets for people, which recognises the link and place functions of streets.

ii Speed management, which recognises the need for slow speed environments to make streets safer and more comfortable to live in. Slow speeds also create a competitive advantage for walking and cycling for neighbourhood trips.

iii Advisory bicycle lanes (if required) semi-formally allocate road space to cyclists. General traffic is a guest. Pedestrians retain their own space on the footpath.

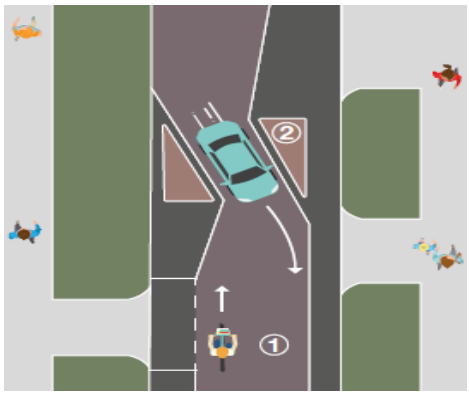
By prioritising the cyclists and lowering vehicle speeds on local roads, a suitable environment for cyclists can be provided. It is recommended that 3,000 vehicles per day and 30km/hr are the 'target' volumes and speeds for a Bicycle Boulevard, and traffic calming adopted should aim for this target. However, Bicycle Boulevards will operate effectively with up to 5,000 vehicles per day, but should be assessed on a street by street basis.

To create an environment for cyclists and motorists to share the road, measures may include:

- Reduce vehicle speeds through traffic calming. This can be achieved through a number of measures including speed cushions, median islands, kerb build-outs, slow points, streetscape modifications, landscaping and alternate paving sections of roadway.
- Reduce vehicle volumes (if required) through traffic diversion measures.
- Provide crossing improvements at intersections with major streets and arterial roads (median refuge islands, signals, kerb extensions and raised intersections).
- Way-finding signage.
- An environment that raises awareness for vehicles (and all road users) that cyclists are encouraged and it is a cyclist-friendly route.

Cyclist Category

While this type of facility would be functional to all user types, the Bike Boulevards that have been identified within this plan are best suited to **TYPE C** and **TYPE B**. (see Table 7.2 for cyclist category description).



Source: Departmentof Transport WA, example of a Bicycle Boulevard treatment

RECOMMENDATION 5: ensure all Local Community Routes have adequate crossing facilities incorporated as required at the end of each route for ease of access. Ensure low speeds are achieved.

Linking people and recreation – a network of Recreational Community Routes

A key element for this plan is the identification and planning of the key recreational routes within the City of Cockburn. While there are various parks and reserves throughout the City that have been utilised where needed, it is evident that the coastal route and the network of lakes running north-south through the City boundary is the major recreational attractor for cyclists and pedestrians.

A network of recreational routes has been planned for the City which is presented in Figure 7.11. While the networks have been planned, the City will need to undertake a detailed trails plan to ascertain the environmental specifics of each lake and understand how close to the lake a path could be. Where the paths have been proposed within the Department and Recreation land, the City should liaise with the State with respect to delivery of these routes.

Recreational Community Routes are a network of shared use facilities. The design criteria for shared facilities is the same as is required for Main Community Routes presented in Table 7.7. However, a number of considerations must be given when planning the Recreational Community Network, such as:

- topography
- ground conditions and landscape characteristics of the site
- areas that are unsuitable e.g. wet ground, ground prone to flooding
- different habitats within the site and any protected areas or designations
- heritage sites and other important features on the site
- existing road or path infrastructure
- access points, car park areas
- any existing activities that are carried out on site
- a defined but flexible route with alternative sections and access to 'trip support' options, such as public transport or car park access
- the lakes and coast will present a rewarding recreational setting (e.g. not immediately adjacent to the road network).

While the Recreational Community Network provides a network for recreational and leisure cycling as well as for tourist, they can also be used as part of the wider community route network providing a link between Main and Local Community Routes, such as the route around the southern part of Yangebup Lake. Recreational Routes are suitable for cyclist **TYPES A, B and C**.

It was requested during consultation, that any upgrades or improvements to the future network around the lakes is to NOT inhibit the Australian Time Trials Association (ATTA) Race around Bibra Lake from occurring. It was also noted that currently there are gates or fences around some of the lakes, preventing access, such as gates at the southern point of Thomson's Lake off Russell Road. U-rails also exist at Market Garden Swamp, obstructing the bridge completely and reducing the ability for many people to use the bridge. Barriers and fences restrict access. Allowing for universal access enables disability access as well as families with prams and bicycles to use the area.

RECOMMENDATION 6: the suggested routes have been identified, but need further detailed planning.

Figure 7.10: Proposed Local Community Route

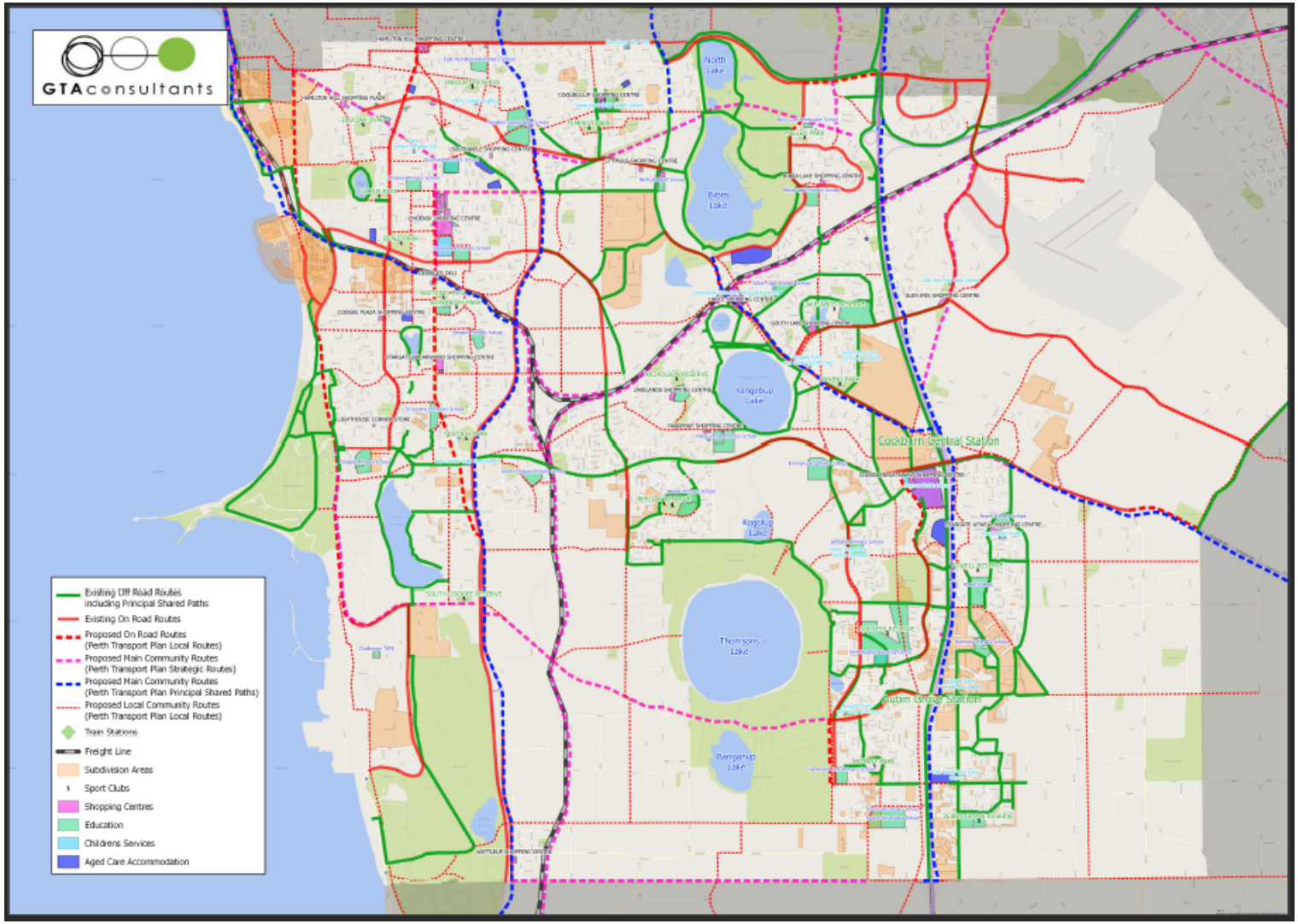
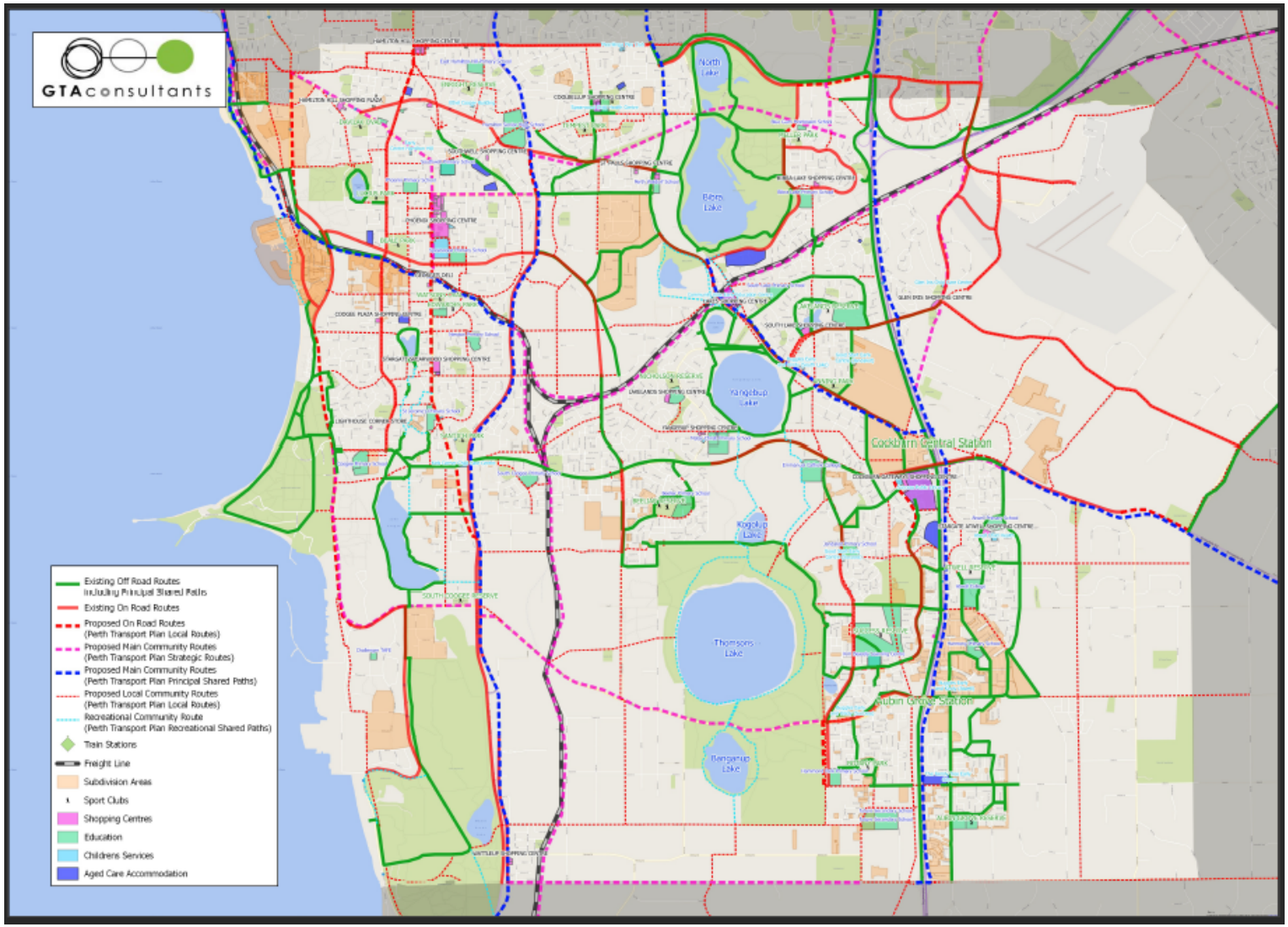


Figure 7.11: Proposed Recreational Community Route



Safer Intersection Treatments

How the varying cycle facility types are managed at intersections can be significant in whether an overall route is attractive and safe to a potential user. As such, consideration of how best to accommodate them at priority controlled intersections, roundabouts and signalised intersections for off-road and segregated facilities is outlined below.

- **Priority Controlled Intersections**

At intersections controlled through giving priority to one road over another (i.e. through a Give-Way or Stop sign) there are three recommended ways to provide for off-road / segregated facilities:

i Straight Through Crossing
ii Shared Environment
iii Bend-Out Crossing

Straight Through Crossing

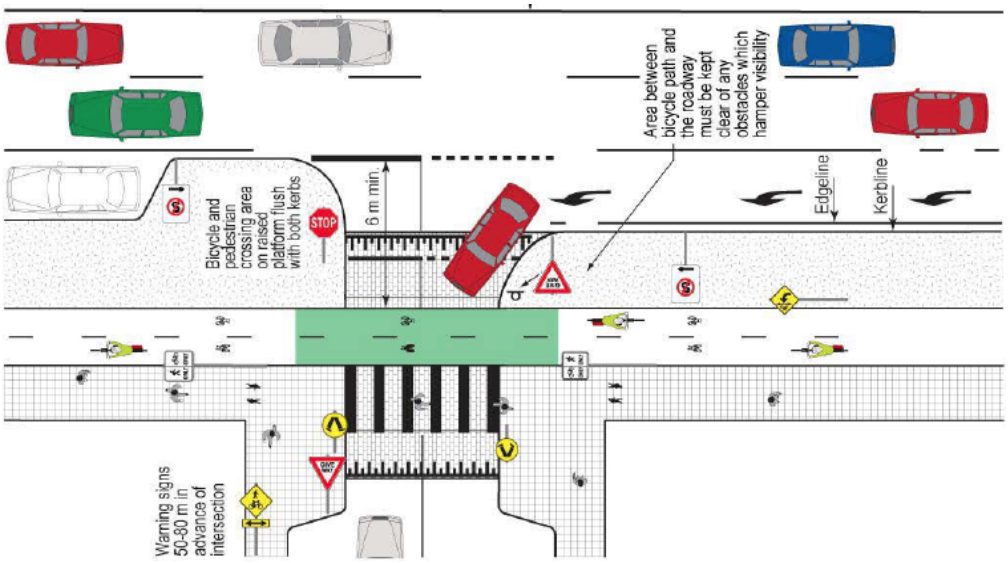
The Straight Through Crossing treatment of a segregated bicycle facility across an intersecting road that is under Give Way control has been used where the traffic volumes accessing the intersecting road are low and/or there is an inability to set-back the bicycle facility from the priority carriageway due to impacts on adjacent properties and sightlines.

Generally, the segregated bicycle facilities are on a raised table across the intersecting road with standard speed table ramps on each approach to slow vehicles crossing the segregated bicycle lanes.

Where pedestrian movements also exist across the intersecting road, the raised speed table has been widened and a marked zebra crossing provided.

An example of such a design is provided in Figure 7.11 of the Cycling Aspects of Austroads Guides (2014) and reproduced below in Figure 7.12.

Figure 7.12: Straight through crossing

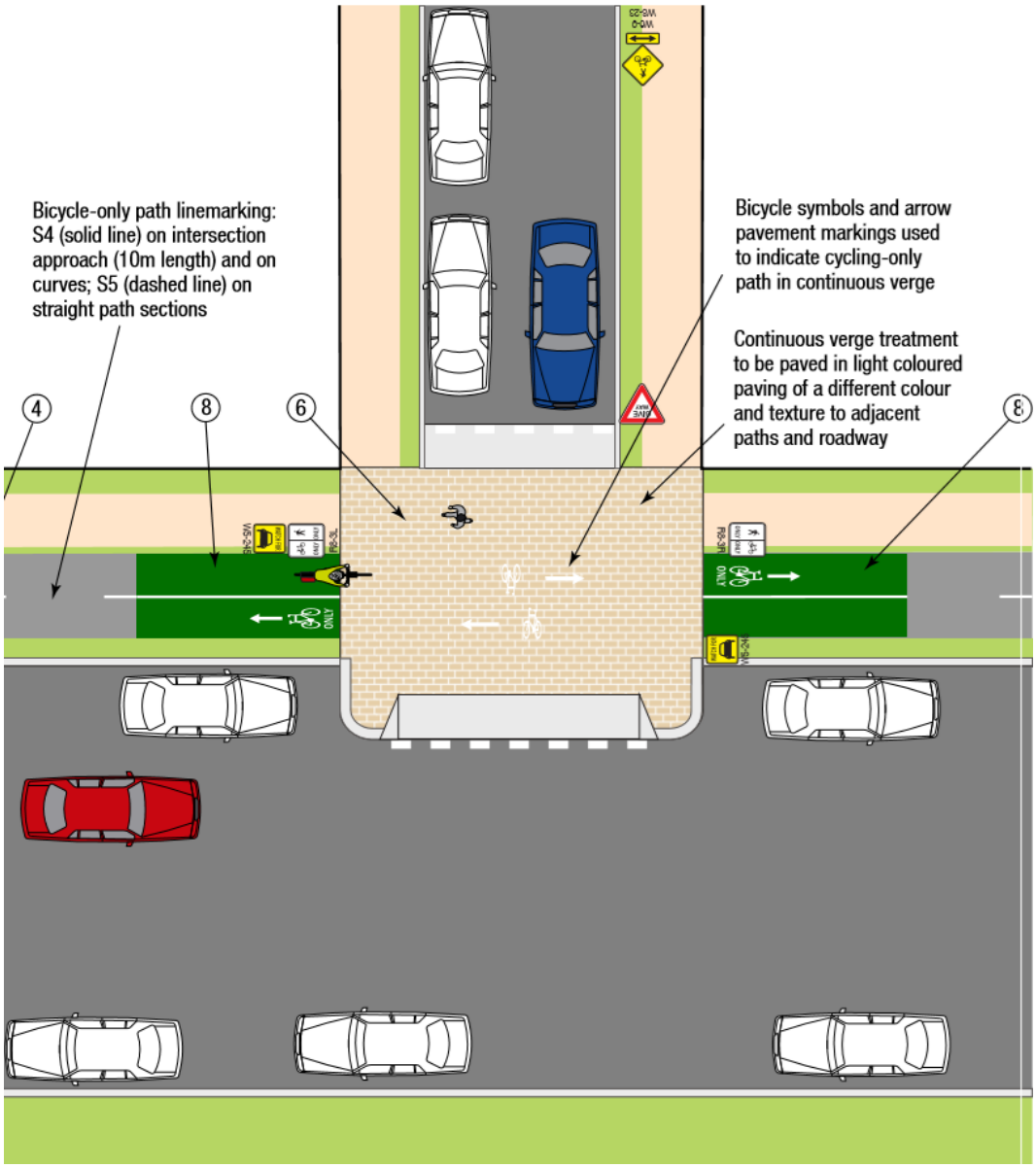


Shared Environment

The main limitation of the Straight Through Crossing treatment is ensuring that vehicles turning from the priority road into the intersecting road, across the segregated bicycle facility, give way to cyclists. This is not always clear to motorists that they should, even if 'Give Way' signage on each approach to the Straight Through Crossing treatment is provided, due to the inability to advise motorists before they turn across the bicycle facilities from the priority road. An alternative treatment to this is the introduction of shared environment that requires motorised vehicles to give way to all pedestrians and cyclists in this area, and creates an environment that is sufficiently contrasting to the typical road carriageways (i.e. use alternative pavement or markings, similar to the Shakespeare Street Bike Boulevard in Mount Hawthorne.

An example of such a design is provided in the ACT Government TMS Standard Drawings for Bicycle-Only Path Details Two-Way Path (2016). This figure is reproduced in Figure 7.13.

Figure 7.13: Shared environment intersection treatment



http://activeinfrastructure.net.au/documents.php

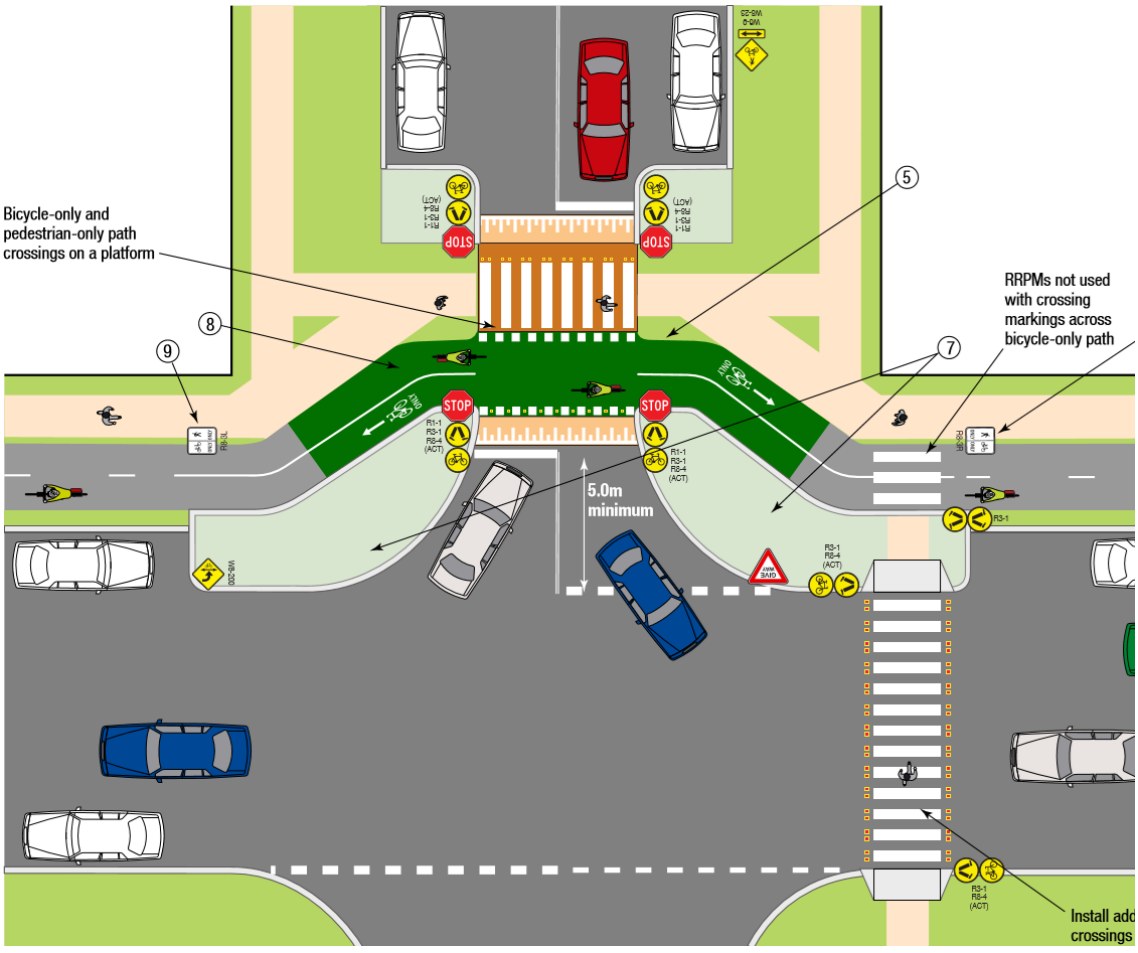
Bend Out Crossing

The Bend Out Crossing treatment of a segregated bicycle facility across an intersecting road that is under Give Way control has been used where the traffic volumes accessing the intersecting road are low, but can be higher than those where the Straight Through Crossing treatment is used, and there is an ability to set-back the bicycle facility from the priority carriageway.

The setting back of the crossing location does provide vehicles with an opportunity to access the priority roadway in two stages, as there is sufficient space (at least 6.0m) provided between the crossing and the priority road. Obviously, this is only suitable for passenger cars, with larger commercial vehicles likely to straddle the crossing while waiting for a suitable gap in the traffic stream on the priority road, or extend back out into the priority road while they wait for a suitable gap in the traffic stream on the segregated bicycle lane (and pedestrian crossing in most instances). The setback can be increased to accommodate commercial vehicles, but given the additional distance users are required to travel and potential impact on adjacent properties, this should only be considered where there is a high volume of commercial vehicles accessing the road and no other alternative to access the associated properties in the area.

An example of such a design is provided in the ACT Government TMS Standard Drawings for Bicycle-Only Path Details Two-Way Path (2016). This figure is reproduced in Figure 7.14.

Figure 7.14: Bend-out intersection treatment



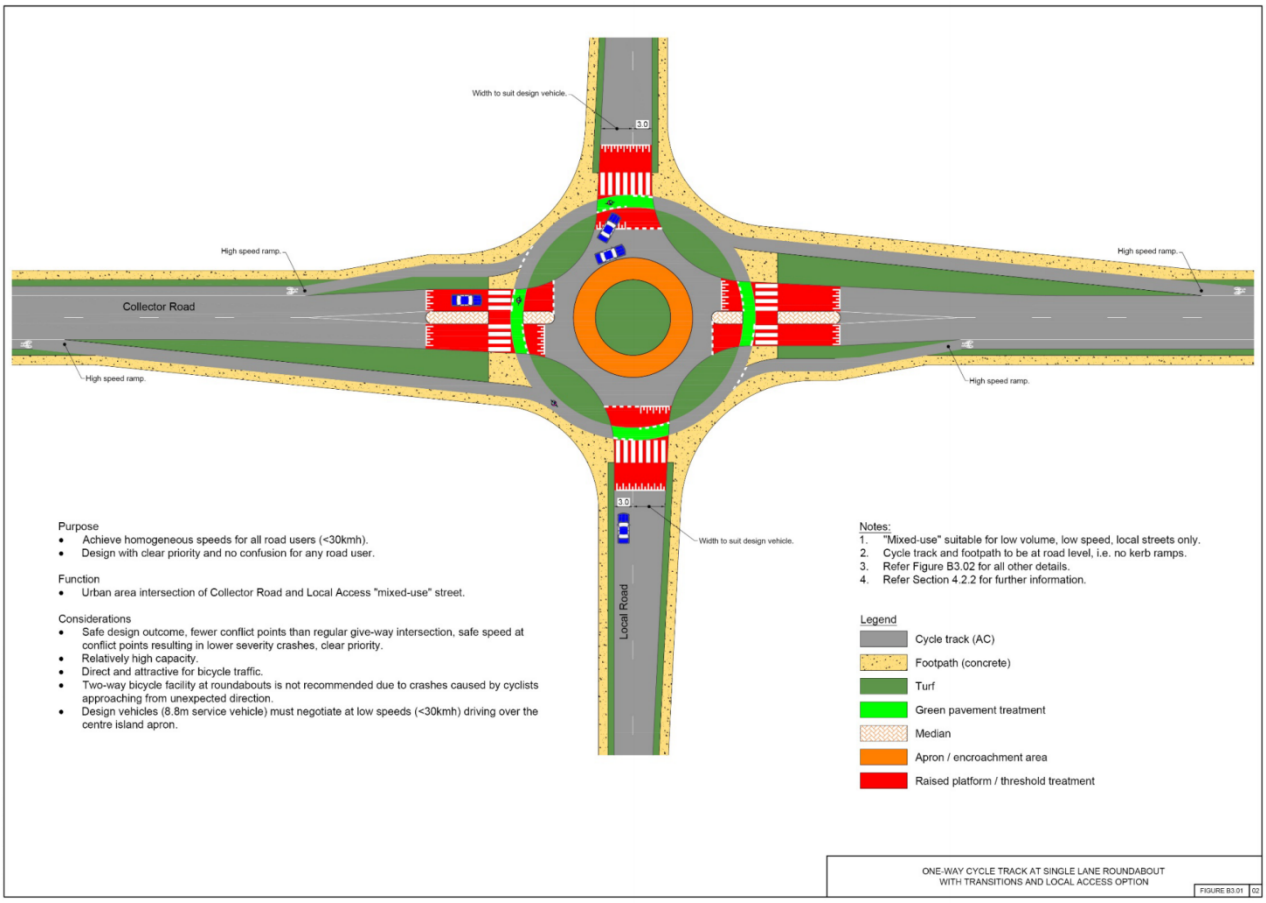
http://activeinfrastructure.net.au/documents.php

- **Roundabouts**

Roundabouts are notoriously bad for safely accommodating cyclists, especially when mixing on-road with traffic. When off-road facilities intersect roundabouts they often only provide a central refuge for one bicycle at a time to wait in between the approaching traffic flow.

For an improved arrangement for cyclists, reference is made to the Transport and Main Roads Separated Cycleway Guideline (2014), which outlines a separated and priority crossing facility on each approach, as reproduced in Figure 7.15. This roundabout requires a significantly greater road reserve than a conventional roundabout, and Planners/Consultants should not this in the Structure Plan where this treatment is proposed.

Figure 7.15: Separated bicycle facilities at roundabouts

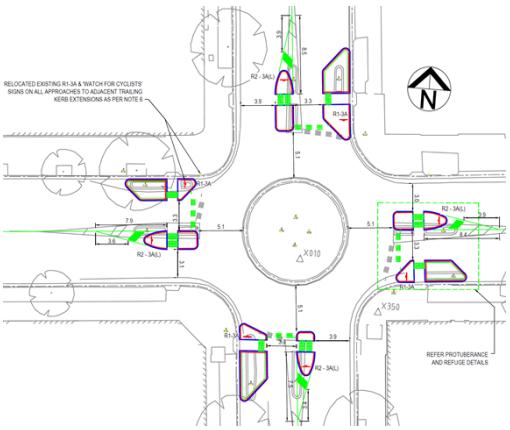


To review this in more detail please use the following link:
http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Technical-Notes/Traffic-engineering.aspx - TN128

However, this type of roundabout design is more appropriate to larger roundabouts (potentially for roundabouts such as at the Spearwood Avenue/Beeliar Drive intersection). Cockburn, has many smaller roundabouts on local streets. As previously noted, all on-road cycle facilities within the City end before the roundabouts and start again afterwards. It was also noted on site that all the roundabouts in the City are designed to a 'Tangential' design. As these designs allow for greater visibility on approach and on entry into the roundabout, they promote higher speeds. Whereas, 'Radial' designed roundabouts decrease vehicle speeds. However, by the nature of their design, they also decrease capacity. It is therefore recommended that a radial treatment is applied to all roundabouts on local roads where speed and safety is of high importance

(potentially for roundabouts such as at the Mayor Road/Rockingham Road/Beeliar Drive intersection). Figure 7.16 illustrates retrofitting to a 'Radial' roundabout design.

Figure 7.16: Radial roundabout design



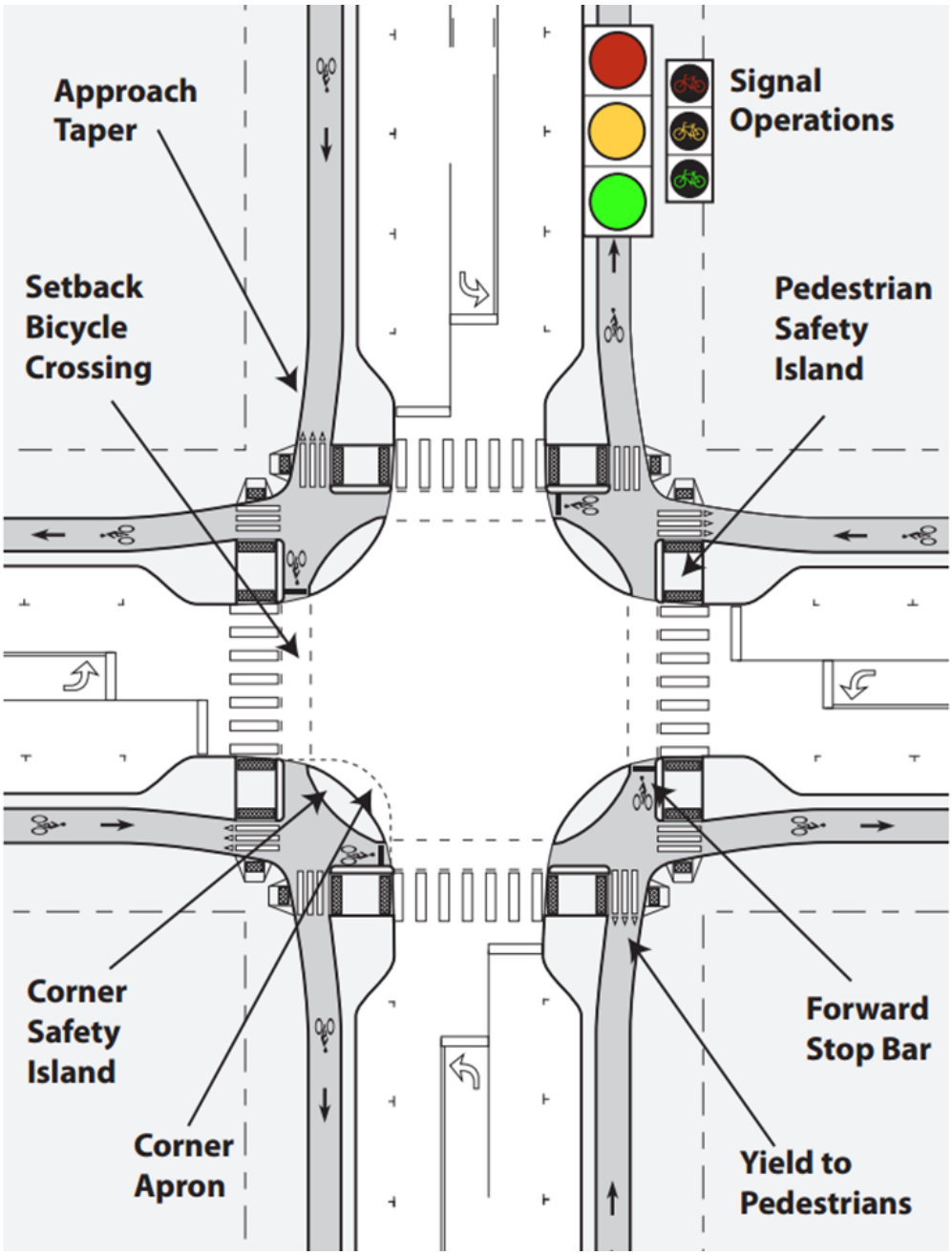
Further to the benefits of lower speed that a 'Radial' design provides, they also allow for a confident (**TYPE A**) cyclist to take the centre of the road and travel through the roundabout. Whereas, those less confident or experienced (**TYPE C**) have the opportunity to exit the on-road lane, onto a suitably designed footpath, to travel through the crossing points and then back onto the road again on the exit side of the roundabout. Radial roundabouts also narrow the crossing distance for pedestrians across the roundabout.

- Signalised Intersections

Where off-road and segregated bicycle facilities are managed within signalised intersections, they have typically been treated as per on-road bicycle lanes. At times, they are managed through turn restrictions and/or head starts. However, whenever there are free-flow conditions (i.e. cyclists that arrive during the green through phase), they end up mixing with traffic.

As such, the current best practice approaches are moving towards an arrangement that provides some level of separation by aligning the bicycle facilities with the pedestrian crossing facilities, as shown in Figure 7.17. Where low vehicle speeds are also desired, there is an ability to raise the entire intersection area.

Figure 7.17: Separated bicycle facilities at intersections

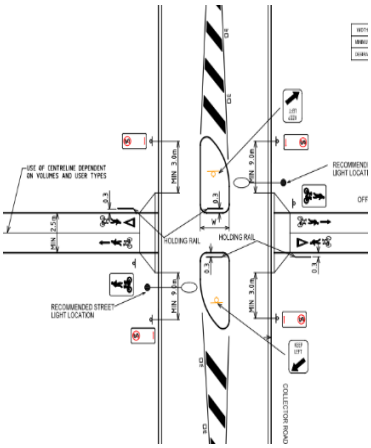


http://altaplanning.com/wp-content/uploads/Evolution-of-the-Protected-Intersection_ALTA-2015.pdf

RECOMMENDATION 7: ensure appropriate and safe intersection design is applied to all existing and new cycle routes within the City.

In addition to safe intersection treatments, it is also important that any turning manoeuvre or crossing of traffic for cyclists within the midblock situation is protected where possible. It is also important to provide priority to cyclists where possible within the street network. Table 7.9 provides the following treatments which are applicable to the City and can be incorporated where required (modified for each individual situation).

Table 7.9: Mid-block cycle treatment

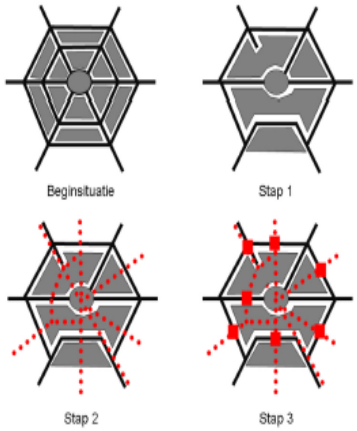
Right Turn Lane Right turn lanes assist cyclists making a right turn by providing a designated area for cyclists to wait for a gap in the oncoming traffic. Physical separation can also be included as it reduces the likelihood of a vehicle entering the bicycle turn lane (as shown on the photo to the right within the green box). Right turn lanes can generally be appropriate on roads with less than 10,000 vehicles per day and a maximum speed limit of 60km/h.	
Cyclist Category As this is an on-road facility it would attract the use of TYPE A users for high volume environments and TYPE B in low traffic environments.	Norton Street, Leichhardt
Mid-Block Road Crossing – Central Refuge & Kerb Build-Outs At mid-block road crossings where the priority movement remains with vehicles on the road, minimising the exposed road width that intersecting path users must travel over, and maximising visibility between path users and approaching vehicles along the road, is recommended. To this end, the use of central refuge islands and kerb extensions is considered appropriate. To further improve the level of service to crossing path users, the use of speed humps or cushions can be used. If the crossing facility is placed on a raised table, then it is recommended that priority movements be provided to the path users to avoid misunderstandings between approaching vehicles and path users.	
Cyclist Category This is a treatment where off-road meets an active carriageway. The protection provided provides a level of comfort to all uses. This type of facility would attract the use of all user types.	 South Perth Esplanade, South Perth

Filtered Permeability

A key design principle for planning and designing to get more people to use cycling and walking as a viable mode of transport (especially for short distances) is to reduce some of the direct travel routes for general traffic (Step 1 in graphic to the right) and allow for permeability for cyclist and walkers ahead of general traffic (Step 2 in graphic to the right). This, coupled with safe crossing facilities for cyclists and pedestrians across main traffic routes (Step 3 in graphic to the right) can make it advantageous in terms of time saved, to make short journeys by bike or by walking, rather than using the car.

The photograph to the right demonstrates a relatively low cost solution to reducing general traffic through movements while providing the priority to cyclists and pedestrians. Clearly when applying these types of treatments, it is important to understand the wider road network to ensure appropriate traffic dispersion.

Through the development of this plan it has been identified that this concept could be applied to Sussex Street and Kent Street intersection (left in/left out) or Yangebup Road and Hammond Road intersection (left in/left out) or Knock Place. Alternatively, movements for general traffic could be blocked completely to allow cyclists and pedestrian filtered permeability, as general traffic can access other routes as required.



Source – Fietsberaad Publicatie 19b - Grip op fietsongevallen met motorvoertuigen; samen werken aan een veilige fietsomgeving

Cyclist category

While this type of facility would be functional to all user types, it is a great treatment on local road, coupled with a design such as Bike Boulevards. Therefore, it would attract, TYPE C and TYPE B.

Porter St at Young St in Unley, SA

Cycle Symbols

The use of cycle symbols on the road (especially on local roads) as well as 'Sharrow' style symbols (as pictured to the right) is also a useful design measure. Sharrow markings can assist cyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a cyclists impacting the open door of a parked vehicle, as well as assist cyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane.

Sharrows also have the added benefit of alerting road users of the lateral location cyclists are likely to occupy within the road way as well as encouraging safe passing of cyclists by motorists.

Further to this, Sharrows can offer a benefit to Wayfinding. Large sharrows with the direction in km to the train station have been installed on some roads in Fremantle. 'Share the Road' signage has been found to contribute to confusion and conflict. The Delaware Department of Transportation has removed all 'Share the Road' signs in favour of signs stating that cyclist 'May Use Full Lane.

When discussing mid-block travel and Local Community Routes, the '3.1m to 3.9m road width rule' should apply. This is especially significant when assessing traffic management measures.

Almost all cars will be able to pass a cyclist, while maintaining a minimum passing distance of 1.0m, when the road width exceeds 3.9m. Larger vehicles, however, such as buses and trucks, will require additional room and should hold back from overtaking cyclists until it is safe to do so, as per the road traffic code. For high numbers of larger vehicles (such as within industrial areas) wide road widths would be required. This can then provide the opportunity to provide buffered cycle lanes.

Once the available road space reduces below 3.9m then cyclists become progressively more at risk of being 'squeezed' into the kerb by a passing vehicle until, by 3.1m, passing clearance is reduced to virtually zero, allowing cyclists to confidently take a central alignment within the road over short distances. For longer stretches of road, passing places would need to be provided.

7.3.3 End-of-Trip and Mid-Trip Facilities

In accordance with the National Cycling Strategy, the Western Australia Bicycle Network Strategy and the City's Integrated Transport Plan and policy documents, the provision of trip-end facilities is a key component of ensuring a connected network and a way of accommodating and increasing the uptake of cycling as a mode of transport and for recreation. Facilities include:

- Safe and convenient long term bicycle parking at key destinations such as residential buildings, public transport stops and stations, places of employment etc.
- Showers, lockers and supporting facilities at places of employment.
- Safe and convenient short term parking at key destinations including cafes and shopping centres.
- Drinking water, seating, weather protection at selected 'mid-trip' locations.
- Cycle repair stations at 'mid-trip' locations.

The provision of bicycle parking facilities at destinations provides the fundamental requirements to support bicycle trips. In many instances, providing quality, fit-for-purpose bicycle parking may be all that is required (e.g. for short-stay visitor parking and parking for shopping trips). However, for commuters and riders requiring secure long-term parking, additional facilities are required to ensure that these users are adequately catered for. This includes the provision of appropriate change room facilities, personal storage (lockers) and space to store clothing and towels.

The management and treatment of towels in end-of-trip facilities can have a significant impact on the attractiveness and amenity afforded by the facilities. It is important to note that some end of trip facilities, such as lockers and showers, are used by non-cyclists. These demands also need to be considered.

Innovative cycle parking design can add to the 'street scene' as well as the ability to accommodate multiple spaces for bicycle parking within one existing on-street parking bay. The following photograph taken in Leederville illustrates this. It is important that cycle routes continue right to the cycle parking facility. **Until a cyclist is walking away from their parked bike, the cycling trip has not been completed**.

The City's Integrated Transport Plan provided a recommendation for the City to advocate to the RAC to assess the feasibility of extending their breakdown cover to include cyclists. This plan supports this recommendation.

During the development of this plan, GTA have identified locations of existing end-of-trip and mid-trip facilities and identified locations that would benefit from additional facilities. This is illustrated in Figure 5.2.

RECOMMENDATION 8: Where new routes are to be provided, the City should ensure that appropriate end of trip facilities are implemented at the destination facility as a condition of the route. Where the City of Cockburn isn't the owner of the destination (such as a school or college, a retail or mixed use centre or other community facility such as a railway station) then the facility should be agreed to in principle by the owner. Further, the City should enact development policy that end of trip facilities and Travel Plans are provided as a condition of planning approval.

RECOMMENDATION 9: Speak with the RAC to assess the feasibility of extended break down cover to include cyclists.

There is also the opportunity for the City to liaise with the Public Transport Authority to assess the opportunity to include a Bus/Bike shelter within its network. When undertaking an assessment for the location of a bus/bike shelter the following parameters need to be considered:

- A direct and/or high frequency bus service
- A catchment for the bus stop greater than 400m
- A location that has high visibility from passive surveillance
- On a road that has a suitable cycling facility linking to the bus stop
- Room on the footpath to accommodate a larger bus shelter.

During the development of this plan, a possible location for a bus/bike shelter has been identified for the bus stop on Rockingham Road outside Hamilton Hill Shopping Centre. A bus/bike sheller would be well served by the proposed Main Community Route along Rockingham Road as well as the existing on-road route along Forrest Road. The Shopping Centre also benefits from having a cycle shop with a supportive and cycle friendly owner/manager. The location is served by four different bus routes.

7.3.4 Developing a long-term network – Pedestrians

An important element of this plan is ensuring that walking is also a viable alternative for short trips. The implementation of the Community Route Network as suggested by this plan will have a huge benefit to pedestrians. As the plan is developed over the long-term, a network of shared use paths, safer intersections and low speed local road environments will all benefit the pedestrian. Further, as required, where there is a high pedestrian or cyclist use, separation of cyclists and pedestrians will also be of huge benefit for pedestrians such as:

- along the freeway Principal Shared Path around Cockburn Central
- around Bibra Lake to allow for training cyclists and slower cycle and pedestrian traffic.
- Through the consultation process and on-site visits, it is evident that there are still quite a few roads within the City that do not have a footpath on either side. While a footpath on both sides of every road would provide a comprehensive network for pedestrians (and inexperienced/ young cyclists) it is recommended for the City to initially implement a policy to ensure that all roads should have a footpath on at least one side, connected at either end (and mid-block as required) by adequate crossing facilities. Appropriate design planning and design principles and criteria are provided in the Planning and Designing for Pedestrians: Guidelines, produced by the Department of Transport. While this is a comprehensive document that the City should refer to, this plan has noted a few key design criteria that should be adopted as policy. This is presented in Table 7.10 Footpath design criteria and is suggested for all new footpath implementation.

Table 7.10: Footpath design criteria

Footpath Width

Where possible, all footpaths should be a minimum of 1.8m. This allows for two pedestrians in wheelchairs to pass one another.

However, state government is moving toward a minimum standard of 2.0m where possible with wider footpaths in areas of high pedestrian use, such as around schools, retail centres or train stations.

Pedestrian green time at signals

In areas of high pedestrian demand or intersections that would experience high children or elderly people crossing the road, longer green times should be afforded to pedestrians. Average crossing time for elderly persons or children is approximately 1.0m/s to 1.2m/s.

1.8m footpath
Winterfold Street, Hamilton Hill

Continuity

Ensure all footpaths connect to another footpath as well as having appropriately designed crossing facilities, both at intersections and mid-block. The picture to the right shows where design is inadequate. Paths should be connected to other paths and pram ramps or dropped curb ramps to allow pedestrians to cross the street easily.

Disability Discrimination Act (DDA)

It is important to follow the DDA for all pedestrian infrastructure, ensuring the design incorporates disability friendly design. To enable universal accessibility, bollards and u rails should not obstruct paths.

Avoid situations like this with no connection between dropped kerb ramp and footpath

RECOMMENDATION 10: Implement a policy that ensures the City must provide a footpath on at least one side of every road. Undertake a pedestrian route audit to plan the network of paths identifying which side of the roads they should be on.

The above recommendation suggests a policy that all roads should have a path on at least one side. A number of roads have been identified that do not have paths in earlier bike plans and via the Bike and Walk Cockburn Crowdspot community consultation process. These paths need to be accessed and prioritised so that additional path infrastructure is developed to fill any missing links in the path network and to connect various key destinations.

Further to this, it was evident through the consultation exercise, that there are several pedestrian issues within the Cockburn Central areas (including getting across Beeliar Drive and connectivity through Cockburn Central itself). It is proposed that the City should work with Main Roads Western Australia to understand the feasibility and desire to down grade Beeliar Drive to a boulevard standard (once the proposed North Lake Road bridge has been constructed) as well as undertaking a pedestrian strategy for Cockburn Central.

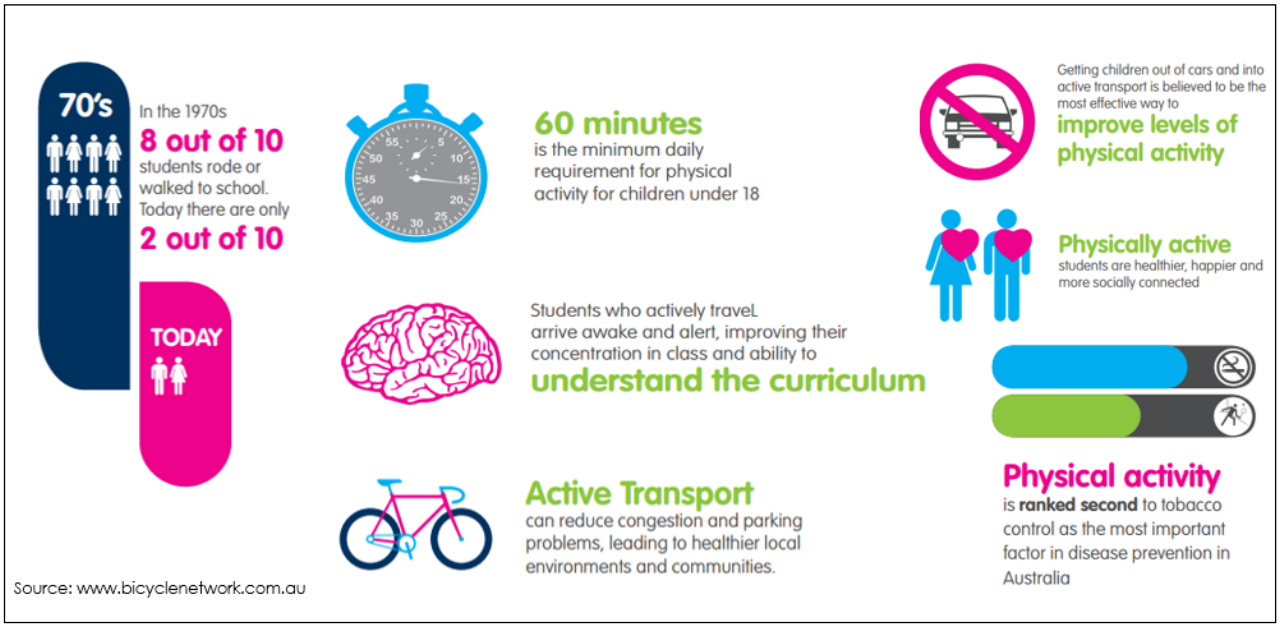
RECOMMENDATION 11: Downgrade Beeliar Drive to a 'boulevard style road environment' through Cockburn Central along with undertaking a Cockburn Central pedestrian strategy.

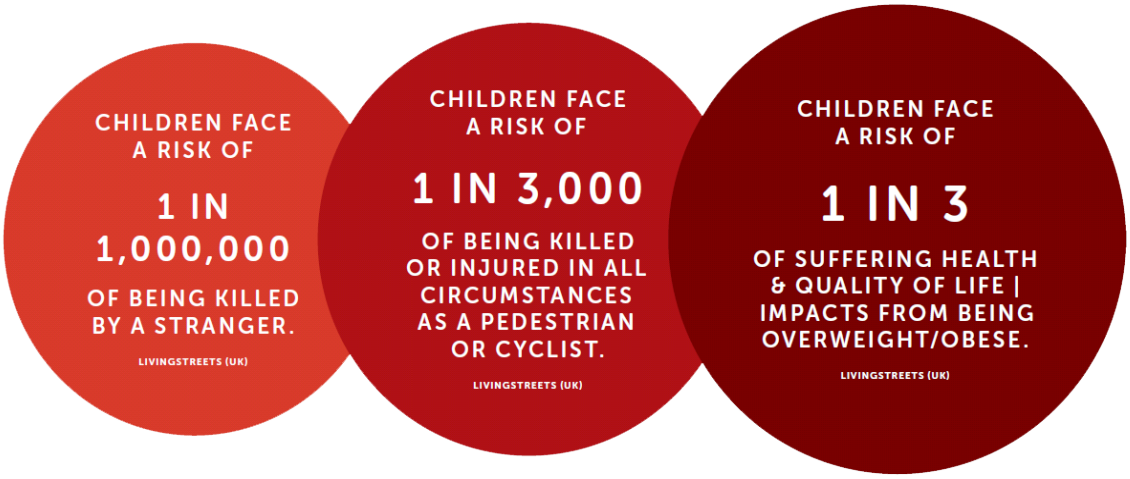
A key part of the development of this plan is to ensure the two key user groups that are most vulnerable, children and the elderly are adequately provided for. This can be undertaken through the implementation of a **Safer Routes to School** program and planning and design for **Accessible Pedestrian Routes**.

Safer Routes to School

It is widely acknowledged that increased car use decreases physical activity and increases obesity levels in adults and children. Supporting active travel in children from a young age is an opportunity to establish life long active habits. One of the best ways to achieve this and ensure a more active and healthier population is to educate the children of the benefits of active travel and encourage the children to speak with and encourage adults to also undertake active travel.

During the development of the City of Darwin Active Routes to School Tool Kit a consultation exercise noted a few 'myths' parents have around the dangers of their children walking or cycling to school. In response to this, the following information was provided.





It is therefore recommended that a pilot, Safer Routes to School study is undertaken, utilising the routes already identified as potential cycle/pedestrian routes to a school within this plan.

A Safer Routes to School assessment would include the following tasks and would require assistance and cooperation from the nominated school staff:

- Initial Survey to develop a school profile in terms of existing modes used to travel to school;
- Document existing routes used to travel to school;
- School engagement with events such as Ride to School Day, Walk on Wednesday and Hand's Up surveys;
- An audit of the main existing and planned walking and cycle routes to the school;
- Identification of potential activities based on existing infrastructure around the school – such as park and walk/scoot/ride sites; and
- Identification of future opportunities – such as school development, future catchment areas etc.

A 'Hand Up' survey has been conducted at several schools within the City, including Atwell, Aubin Grove, Bibra Lake, Jandakot, Perth Waldorf and Phoenix Primary Schools. The following

table summarises the high-level results of the surveys and indicate that more work to reduce car dependency is required at Perth Waldorf and Phoenix primary schools. While Bibra Lake Primary School already has a low car dependency and could be a good 'pilot' school to provide safer school accessibility.

Table 7.11: Primary School Hands Up Survey

Name of School	Car Dependency	Active Travel
Atwell Primary School	54%	46%
Bibra Lake Primary School	**27%**	**73%**
Jandakot Primary School	53%	47%
Perth Waldorf Primary School	72%	28%
Phoenix Primary School	67%	33%
Aubin Grove Primary School	62%	38%

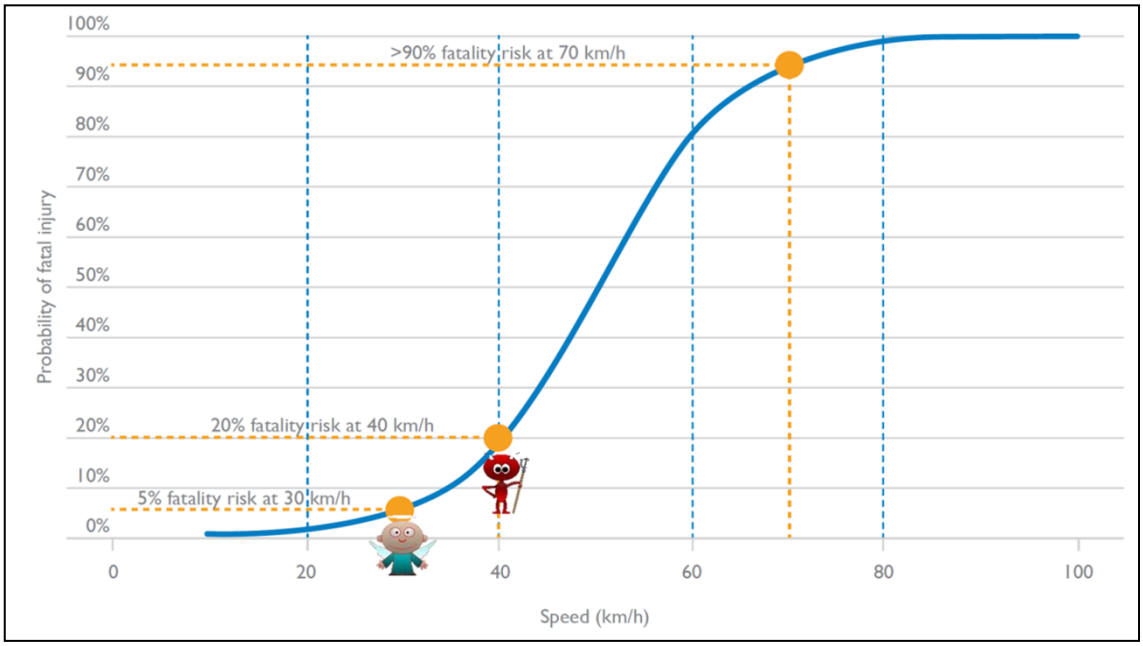
Speed Management

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

Current European initiatives are to introduce 30km/h speed limits on local streets. This reduces the speed differential between all road users and helps create 'liveable streets'. Australian and International crash research indicates a high probability of survival if pedestrians or cyclists are involved in a collision with a car travelling at 30km/h.

The graph in Figure 7.18 illustrates the relationship between bicycle/ vehicle accidents in terms of prevailing vehicle speeds and probability of survival. This shows a 5% chance of fatality at vehicle speeds of 30km/h. This chance of survivability rapidly reduces at impacts above 30km/h.

Figure 7.18: Bicycle rider probability of Fatality vs Vehicle Speed



Source: Cycling on Higher Speed Roads, Austroads, 2012

A comparison of pedestrian fatalities and injuries on local roads over time indicates a reduced representation of each in NSW, much of which can be contributed to the implementation 40km/h 'school zones' and 'high pedestrian activity areas'. However, GTA research indicates there is considerable potential for further pedestrian and bicycle safety improvement. The research explores the effects of 30km/h zones in the Randwick LGA, indicating that conversion of 80% of residential streets is feasible with minimal impact on travel times while delivering significant road safety benefits. No one would need to travel on 30km/h roads for longer than 500m.

Further to this, during consultation, it was suggested that perhaps where schools abut a local park or reserve then perhaps the 'school zone' should be extended around this also, with the posted speed limit dropping to 30km/h. It is therefore feasible, to suggest that, a 30km/h zone could be implemented around every school, perhaps starting with Bibra Lake Primary School (incorporating Safer Rotes to School) as well as schools such as Beeliar Primary School or South Coogee Primary School as these schools have reserves abutting the school which encourages use by the community for recreation outside of school pick up/drop off times.

RECOMMENDATION 12: Investigate the possibility of implementing 30km/h permanent speed limits around schools.

Accessible Pedestrian Routes

Accessible Pedestrian Routes are defined routes for visually impaired and mobility impaired people in town, group and local centres. The routes connect to destinations such as bus stops, shops, offices, parks and community facilities and provide the alignments along which Disability Discrimination Act (DDA) requirements, Tactile Ground Surface Indicators and shore lining/crossing facilities are to be provided in a consistent and systematic way and maintained to the required standards. These routes provide a benefit to all users but are designed for easier access by visually impaired and mobility impaired people.

There are a number of suburbs that currently have a large proportion of older residents in addition to those in aged care facilities and retirement villages. Unfortunately, not all the aged care facilities are located within an easy and walkable (mobility scooter distance) to a retail centre or community facility. A network of recreational routes has been planned for the City which is presented in Figure 7.11. Careful planning should be given when identifying locations for further aged care facilities. Ensuring walkable catchments ensures a healthy resident.

An Accessible Pedestrian Route, while ensuring DDA compliance, should follow the following principles:

- Safer Design for Driveways and continuous footpaths – ensuring crossing distances are minimised and priority is given to the pedestrians providing physical cues to drivers – as noted previously continuous footpaths allows for this.
- Mid-Block crossings – raised surfaces, ideally lit, or having flashing beacons in activity centres on routes identified as accessible routes.
- Raised Crossings - at unsignalised intersections and roundabouts to reduce vehicle speeds at the crossing point, enhance priority for pedestrians and make them more conspicuous to drivers via different surface colours and treatments or cross walk pavement markings and signs.
- Kerb Extensions - Kerb extensions, median refuges and tighter turn radii at intersections and roundabouts to reduce vehicle turning speeds, distance of pedestrian exposure and complexity of crossings.

- Right Turn Control - Fully controlled right turn signal phases and right turn lag signal phases to protect older pedestrians from right-turning vehicles on the departure side of the intersection.
- PUFFIN Detection - Early-start signal phases and PUFFIN pedestrian detection signals to adjust phase times and allow older pedestrians to fully clear the intersection.
- Reduced Speed Limits – this should be applicable to all local roads where there is pedestrian and cycling activity.

Source. Dool, D van den, Job, S (2014). Pedestrian Safety: can we handle the next phase? Presented at Walk21, Sydney, October 2014

VicWalks, Safer Road Design for Older Pedestrians, 2016

One of the key elements is slower speeds on local roads, which make the elderly more comfortable. It is also essential to widen the footpath and narrow the road at pedestrian crossings so that the distance to cross the road is reduced, raising crossings to a level surface so that pedestrians do not have to step up or down while crossing the road and slowing the speed limit.

People aged over 70 make up roughly one-tenth of the population but almost one-third of the pedestrian road toll. According to a recent Austroads report 'pedestrians aged 65 and over are more than twice as likely as those aged 16 to 64 to be killed when hit by a vehicle'. This is in part due to their fragility.

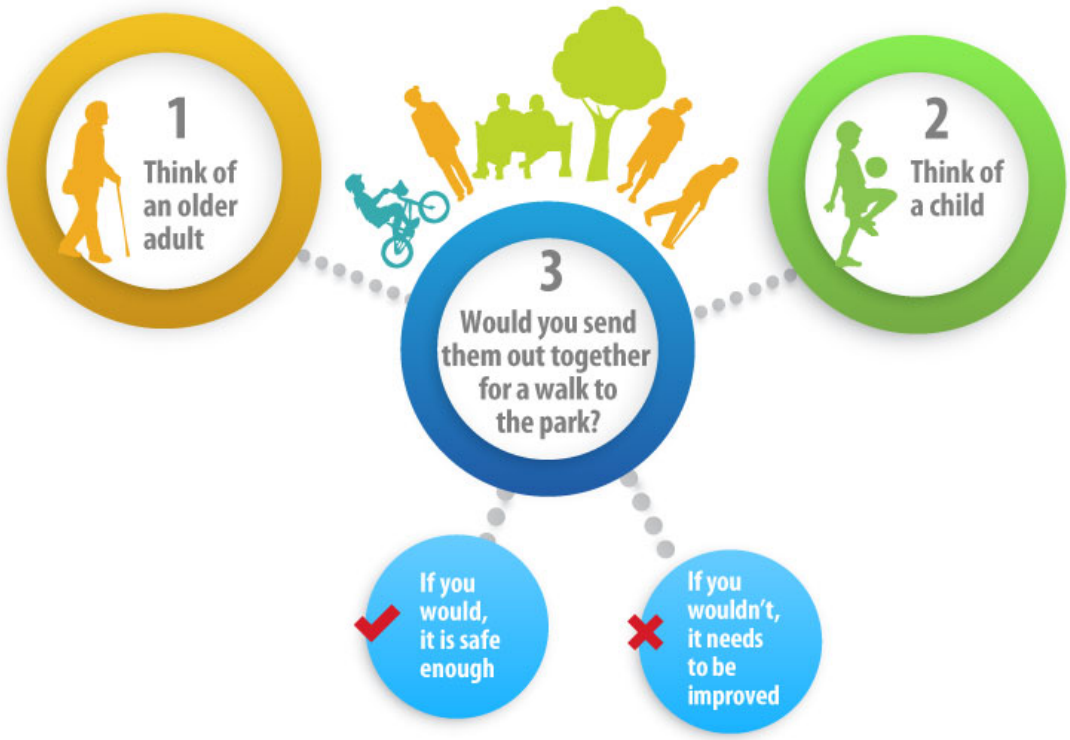
A high level Accessible Pedestrian Routes assessment is required for all aged care facilities within the City and areas where there are many older residents living or visiting.

RECOMMENDATION 13: Undertake an Accessible Pedestrian Routes assessment for the identified aged care facilities and for retirement villages and in communities where there is a large proportion of older residents.

Summary

The planning for Safer Routes to School and Accessible Pedestrian Routes should be in response to the following graphic, illustrated in Figure 7.19.

Figure 7.19: 8-80s rule



Source: www.8-80cities.org/8-80-rule

8. Behaviour change

8.1 Supporting infrastructure

When developing an active travel community, it is important to provide measures that are non-infrastructure based, but still work toward the goal of changing people's travel behaviours helping them understand there are other viable modal choices. Although people are aware of the benefits of cycling, few people actively cycle or walk as an everyday transport option. Investment in cycling and walking infrastructure needs to be supported through the active promotion of these modes.

Research also suggested that, there are two main issues with changing people's travel behaviour, these being habits and infrastructure. It is hard to break a habit if there is no alternative mode opportunity or there is free parking available or the existing infrastructure is not conducive to travel behaviour change.

Further, telling people what to do doesn't always provide the desired outcome as each person's situation and reason for using the car is different. A COM-B behaviour change principle can be considered, understanding a person's Capability, Opportunity and Motivation (COM) and working with this can lead to Behaviour (B) change. While the following identifies some generic proposals for promotion and encouragement it also provides opportunity for engagement with groups within the community to understand their capability's, opportunities for change and motivations.

8.1.1 State Government programs

The State Government discusses behaviour change within the Perth Transport Plan through travel behaviour change programs using education, information, incentives and other marketing-based approaches to persuade and assist people to decrease their need to travel, reduce dependence on private cars and increase physical activity by making voluntary changes in their travel habits and patterns. Such changes include reducing car use and increasing the share of trips by alternatives such as cycling, walking, public transport or car-pooling. Travel behaviour change programs achieve these shifts in demand by changing perceptions or attitudes to alternative travel options. Travel behaviour change programs typically target households, workplaces and schools.

In this regard the integrated travel behaviour change program Your Move Cockburn improved transport system efficiency in the local area by reducing travel demand and shifting travel times, thereby helping better manage local congestion. This program also improved public transport patronage and leverage cycling initiatives to improve infrastructure connections to destinations.

It is also noted, that the recent (August 2016) finalisation of the Western Australian Planning Commission Guidelines for Transport Impact Assessments has a greater requirement for active travel assessment and consideration of amenity.

RECOMMENDATION 14: Develop an active transport behaviour change policy and strategy.

8.1.2 Encouragement/Promotion

The encouragement and promotion of cycling should seek to appeal to all members of the community with non-cyclists encouraged to consider cycling for leisure/recreational trips as well as every day trips; whilst existing leisure/recreational cyclists should be encouraged to cycle more often for everyday trips – such as commuting and accessing local facilities.

Programs aimed at encouraging cycling and walking need to promote the benefits and enjoyment and provide a positive image of cycling and walking. A range of suggested actions may include:

- Marketing the benefits of cycling and walking in conjunction with the City's Travel Smart officer.
- Working with local schools to:
  - promote Safer Routes to School;
  - Bike and ride or 'bike bus' (where riders group together) programs encouraging parents to ride to school with their children;
  - Ride to school programs and cycle proficiency training for school children; and
  - Assistance for schools wanting to participate in training and maintenance courses.
- Working with the Department of Transport to ensure the Active Travel maps are up to date.
- Ensuring this Bicycle and Walking Network Plan remains an active document endorsed and implemented by the City.
- Supporting development that encourages and/or caters for cycling and walking within its plan and design.
- Developing cycle parking standards/end of trip facility requirements that need to be adhered to for planning approval.
- Working with State Government to ensure Travel Plans have to be provided as mandatory for all Development Applications.
- Supporting and help coordinate in conjunction with the Travel Smart officer local community events aimed at promoting cycling. It is noted that the City's Travel Smart officer already coordinates a number of different community events in this vein.
- Providing information on the safe shared use of paths through signs and brochures.
- Launch day events for new facilities. Launch day ride might include an organised ride that includes new infrastructure and linked sections of the existing network.
- Joint programs with local businesses to encourage use of cycling for short trips through incentive schemes.
- Open Street programs such as Town of Victoria park closure of certain roads to general traffic on a Sunday.
- 'Welcome Wagon' concept – this is where the City would provide a welcome pack to all new residents and to new council staff that includes information and maps of all existing alternative travel modes.
- Bicycle hire scheme – either small scale through bicycles hired out by council (e.g. 'bicycle library') or large scale incorporating several pick up and drop off points (ideally coordinated between a number of adjacent councils).

The idea of cycle tourism and 'Guide Rides' is something that was discussed during the community consultation workshops. It was noted that cycle tourism was becoming increasingly popular with overseas travellers and tourists and well as self-guided tours. In this regard, several Cycle Tour suggestions were provided, as follows:

- A 'History Tour' - linking Cockburn with Fremantle stopping in at historical significant local sites.
- Possible themed cycle and walking tours, such as:
    - A Wetlands Tour - utilising the proposed Recreational Community Routes;
    - A Coastal Tour – utilising the proposed costal route linking the Kwinana to the South and Fremantle to the North;
    - Tramways Trail which is identified in Figure 8.1;
    - A 'shopping' themed tour linking Cockburn Central with other retail centres within the region, such as Garden City or Booragoon; or
    - A longer 'loop' trail such as linking Cockburn Central north to Canning Bridge, across to Fremantle, south to Port Coogee and back to Cockburn Central (a longer tour for more experienced riders).

To enable this the City (possibly partnering with neighbouring authorities such as Fremantle) could produce maps and guides – this would enable self-guided tours, connect local routes to regional routes and partner with local companies to allow adequate rest stops and to provide branded bikes or engage with local tour guide companies to lead groups on tours using their own bikes.

RECOMMENDATION 15: Investigate the feasibility and routing options for potential cycle or walking tours

8.1.3 Cycle skills training

Education of users in respect to traffic rules and responsibilities is necessary in order to provide safer and courteous behaviour. In addition, education relating to cycle maintenance, safety precautions and practical skills in relation to other traffic is also needed.

Accordingly, the City should seek to work with Department of Transport and the Department of Education and Training to try and identify suitable children's riding skills courses and potential funding mechanism to deliver the training.

In addition, the City should also seek to work with the Department of Transport, the Australian Bicycle Council and the Department of Environment, Water, Heritage and the Arts with respect to adult cycle proficiency training. As part of this, the Amy Gillet Foundation, the Bicycle Federation of Australia and Cycling Australia came together to create AustCycle in 2008 to provide train-the-trainer and accreditation systems for both children and adult cycle training through a commercially viable cycling training sector.

Education should also be aimed at both motorists and pedestrians with respect to the needs and likely behaviour of cyclists. Pedestrians and cyclists also need guidance on safe path sharing – this is particularly true given the amount of existing and proposed shared paths throughout the City which is likely to result in an increased number of pedestrian/cycle interactions.

8.1.4 Enforcement

The Police Service enforces the Road Traffic Act and Codes that relate to cycling. The Police also help educate cyclists and motorists about the rights and responsibilities of all road users.

Whilst enforcement by police patrols may enhance user security – for instance on shared paths, such measures are often expensive to undertake unless dedicated bike mounted patrols exist. The City can address this through education and encouragement of desired behaviours addressing conflicts between cyclists and other users (predominately pedestrians) within shared environments.

Path way behaviour management can assist in this regard – Figure 8.1 illustrates suggested signage.

Figure 8.1: Suggested enforcement signage

G9-259-1
(a) *Keep Left* sign encourages all path users to travel on the left

G9-259-2
(b) *Warn When Approaching* sign encourages path users to call out or use their bells

G9-259-3
(c) *Stop Off Path* sign encourages path users to keep the path clear

G9-259-4
(d) *Control Your Dog* sign reminds dog owners of their responsibilities

RECOMMENDATION 16: Work with the Department of Transport to ensure the Active Travel guides are kept up to date and remove the sealed shoulder terminology, especially for those routes where the sealed shoulder is not an appropriate riding environment.

8.2 Monitoring and evaluating

It is important to undertake sufficient monitoring and evaluation throughout the implementation of this plan. This can be undertaken by the following means:

- Documenting the implementation of actions recommended in this and the previous bike plan;
- Annual bike counts at key locations (supplementing the permanent count sites and the Super Tuesday collection);
- Annual review of crash statistics, specifically reported bicycle crashes (via Main Roads Western Australia Data Base or the Road Safety Commission Reporting); and
- Holding and supporting various events.

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

In addition, consideration could be given to installing permanent counters as an integral part of construction of all new major facilities such as paths and separated cycleways. Counters may need to be designed to collect data for both pedestrians and cyclists, noting that pedestrian volumes often outweigh bike volumes. To promote bicycle use, consideration could be given to visual displays integrated with the counters.

Figure 8.2: Bicycle Barometer on Barrack Street, City of Perth

Figure 8.3: Bicycle Barometer in Moreland, VIC

RECOMMENDATION 17: Undertake annual crash investigation study for key hotspot cycle pedestrian crash areas to understand causality making cycling/pedestrian safer

RECOMMENDATION 18: Develop a counting and monitoring strategy for cyclist and pedestrians

8.3 Innovation – utilising technology

Leichhardt Council in NSW is at the forefront of advanced technology through the installation of the active lighting scheme in Spindlers Park and the proposed in-ground LED artwork along the GreenWay.

Active lighting refers to light that is only delivered when it is needed. Motion detectors sense when the spaces are active and automatically provide higher levels of light as required. As a person approaches the area, the lights along the path ahead will increase to full capacity and automatically dim's to save energy once the person has left that area.

Further information can be found at http://www.leichhardt.nsw.gov.au/Environment---Sustainability/Sustainability-News/Sustainability-News-Stories/copy-5-of-Local-Wetlands

Other future opportunities may include solar pavements such as that used in The Netherlands and USA.

Figure 8.4: Active lighting in Spindlers Park sign

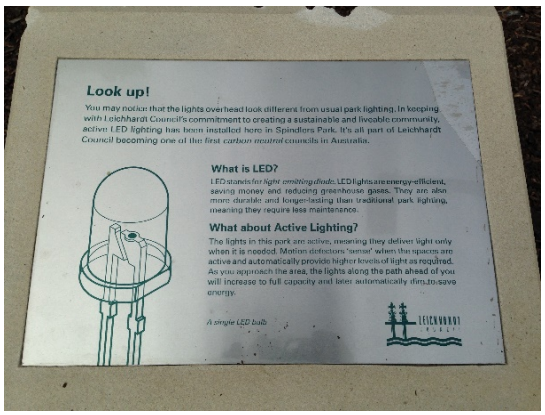


Figure 8.5: Active lighting in Spindlers Park light

Figure 8.6: Solar pavement, Krommenie, The Netherlands

Source: http://motherboard.vice.com/nl/read/in-noord-holland-komt-het-allereerste-fietspad-met-zonnepanelen-?utm_source=motherboardfb

Figure 8.7: Solar Driveway, USA

Source: https://www.youtube.com/watch?v=qlTA3rnpgzU

Figure 8.8: In-Ground LED Artwork, Eindhoven, The Netherlands

Figure 8.9: Moon Deck treatment in Gosford, New South Wales

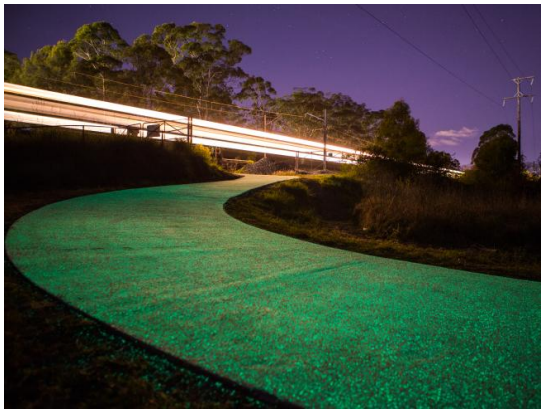


Figure 8.10: Moon Deck line marking concept plan for McTaggart Cove N. Coogee

Figure 8.11: Coastal Path at McTaggart Cove, North Coogee

Further information is available at https://www.youtube.com/watch?v=ZYpO2pJ6afM https://www.moondeck.com.au/ https://www.facebook.com/Moon-Deck-Pty-Ltd-1182065361817035/?fref=ts

During consultation, it was suggested that the use of 'mood' lighting or 'fairy' lighting could be incorporated to make a walking or cycling route more attractive. One such example was given for the coastal Principal Shared Path as it links to McTaggart Cove.

- Provision for electric bikes

As the use of Electric Bikes (E-Bikes) becomes more popular allowing riders to travel longer distances and along steeper gradients in comfort it will be increasingly important to provide charging stations to ensure riders can complete longer journeys. As such, the City will need to consider the use of E-Bikes within the south-west metropolitan area and work with neighbouring authorities and the South West Group to install an E-Bike cycle route, in much the same vein as the RAC implemented the Electric Highway through the south-west of WA.

RECOMMENDATION 19: Work with the South West Group to investigate an E-Bike Route.

8.4 Wayfinding signage

Signage is a critical part of an accessible, safe and connected cycle network. Signage improves the efficiency of the network and thus enhances the utility of cycling and walking as a transport option. Without clear and legible signage, those who are unfamiliar with the network may feel unsafe or unsure, and are less likely to cycle or walk as a transport option.

To guide the installation a bicycle network a focal point map has been developed to achieve consistency in the use of strategic locations. The destinations and trip attractors were identified through feedback gained during consultation. The key principles when undertaking a way-finding strategy include the following:

- **Focal points** – significant locations where regional routes start, finish, join or cross.
- **Destination points** – city/ town centres and localities which are located at the ends of regional bicycle routes but are not at a junction with other regional routes.
- **Key decision points** – network junctions which are intersections-only (not focal points).
- **Sub-destinations** – important local centres along a route.
- **City and town centres** – business centres of cities/ towns.
- **Local destinations** – local trip generators located at the termination of local routes.

Focal points, destination points, sub-destinations, local destinations and town centres shown on the focal points map are the destinations which will be used to guide the installation of signage across the suggested bicycle and pedestrian network.

The principal forms of signage for any Way Finding Strategy should include:

- **Intersection Fingerboards** –the primary means of indicating the route direction at key decision points. The focal point destination and one other destination are generally shown on each fingerboard, along with distances.
- **Advanced Direction Boards** –placed before an intersection to indicate the route being followed and the route choices available at the following intersection. Destinations and sub destinations are used on advanced direction boards and distances are never used (however, time based information may be applicable).
- **Reassurance Boards** –used between key decision points and on longer straight sections to reassure cyclists they are travelling towards their intended destination.

It is recommended that the City consider the following approach to the installation of new signage:

i Signage to be installed in association with all priority routes with intersection fingerboards installed at all key decision points.
ii Intersection fingerboards to be mounted on existing sign posts where possible to reduce street clutter.
iii Redundant bicycle signage to be removed/replaced.
iv The City will liaise with the Main Roads Western Australia, to ensure consistency between signage.
v The City will liaise with the City of Fremantle and Kwinana where possible to ensure routes are signed consistently and in particular the destinations used and distances are consistent.
vi New signage will be installed if required as part of any major bicycle infrastructure project conducted in the City.
vii The City will need to continually review the way finding signage (in accordance to an overall strategy) as more routes and links are implemented.

Further to the principles of wayfinding, distinguishing some of the more strategic / longer routes from the local routes can assist the user in their way finding. In this regard, it is recommended to call some of the routes by the route they cover or the destinations they link – see Figure 8.1. In this vein, strategic cycle routes can then be recongnised by their name in the same way the freeway network is known by its name (Mitchell or Kwinana) and the railway network is known by its name (Joondalup Line or Manadurah Line).

RECOMMENDATION 20: Implement Behaviour Change Initiatives and Way Finding Signage Strategy including around Railway Stations

Figure 8.12: Wayfinding focal point map

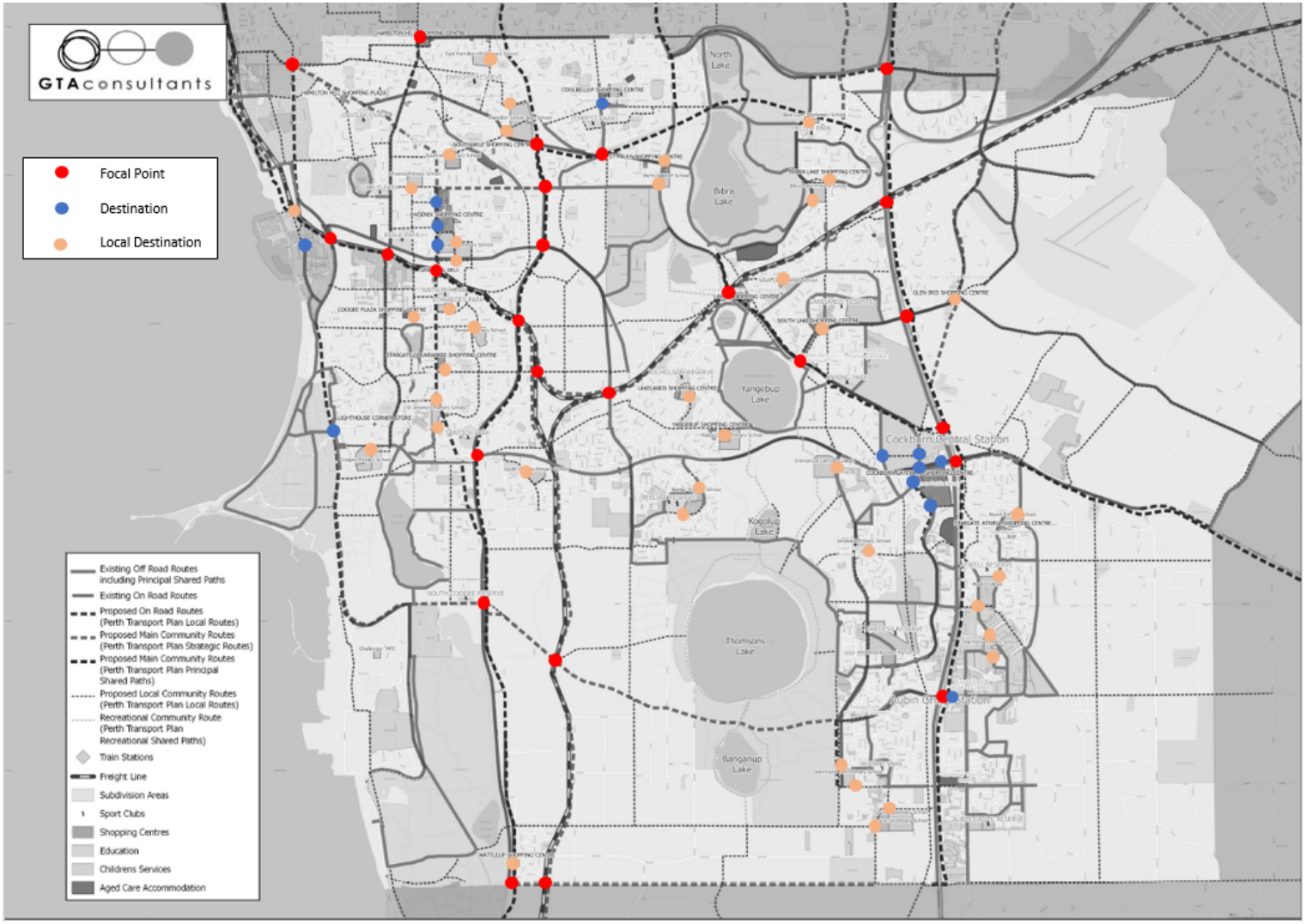
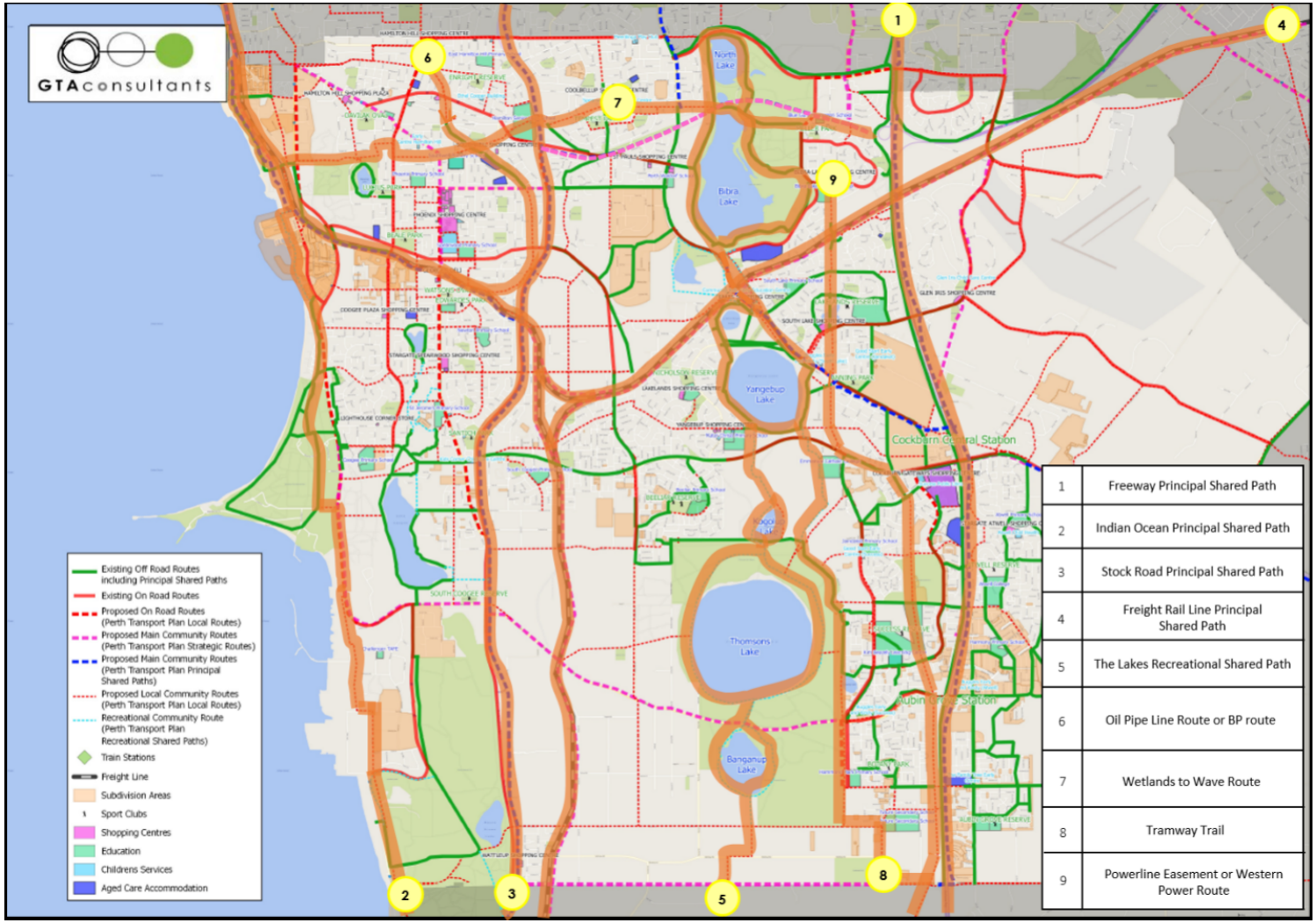


Figure 8.13: Proposed 'named' strategic routes



8.5 Non active-travel behaviour change mechanisms

While this plan provides cycle and walking infrastructure proposals as well as non-infrastructure based active travel promotion, there are also mechanisms the City can utilise to further encourage the use of active and public transport travel. These may include:

- Car Exclusion Zones around schools (nominally a 200m but can be more) – this could be incorporated with a Safer Routes to School program as well as utilising any nearby public car parks for parents to park and walk. Bibra Lake Primary School with their higher level of active travel use and Phoenix Primary School with the proposed area wide Bicycle Boulevard are two locations that may be suitable for a car exclusion area demonstration project. An example of a school exclusion zone can be found in New South Wales, on Brabyn Street, Denistone East.
- City wide Car Parking Strategy to incorporate managed and paid parking (providing a financial incentive for active travel over car use). It is noted that the City is progressing this in early 2017.
- Develop a New Development checklist for the City to use to ensure a Development Application is tracked and each council department gets to assess the proposal for active travel infrastructure and ensure it is appropriately delivered. A draft checklist has been designed for the City and will be further developed by the City.
- More street trees to provide a consistent canopy of shade and to cool the streets down. Trees planted within the road side verge is preferred. However, trees planted within the road carriageway will also cool the streets down and provide shade.

RECOMMENDATION 21: Further develop the draft Development Application active travel checklist to ensure it is applicable to the City's needs

9. Five year implementation

9.1 Making it happen

Table 9.1 below outlines the cycling budget committed to by the City over a ten-year period.

The plan takes into consideration the City of Cockburn's Natural Areas Management Strategy and Living Biodiversity Ecological Corridors Plan shown in Figure 9.1: Linking biodiversity in the City of Cockburn

The network plan in Figure 9.2 provides a proposed long term network for pedestrian and cycle planning highlighting some of the major project initiatives.

To assist with implementation priorities a five-year implementation plan is shown in Figure 9.3 and details are outlined in section 9.2, highlighting the key routes to be implemented over the next five years and beyond.

Table 9.1: City of Cockburn cycle funding profile

Year	Funding
2015/16	$100,000
2016/17	$750,000
2017/18	$750,000
2018/19	$750,000
2019/20	$750,000
2020/21	$750,000
2021/22	$750,000
2022/23	$750,000
2023/24	$750,000
2024/25	$750,000
10 Year Total	**$6,850,000**

Figure 9.1: Linking biodiversity in the City of Cockburn

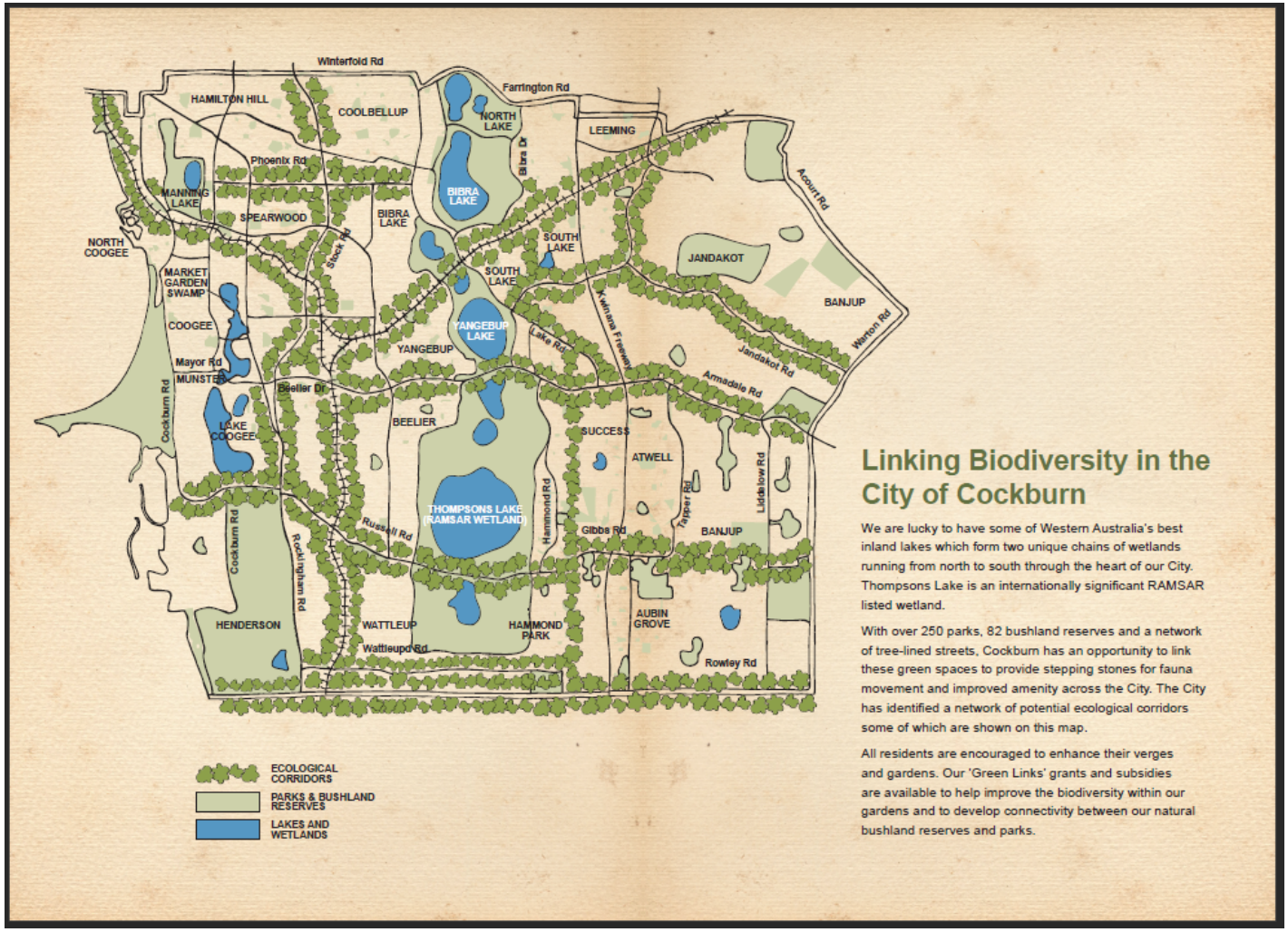
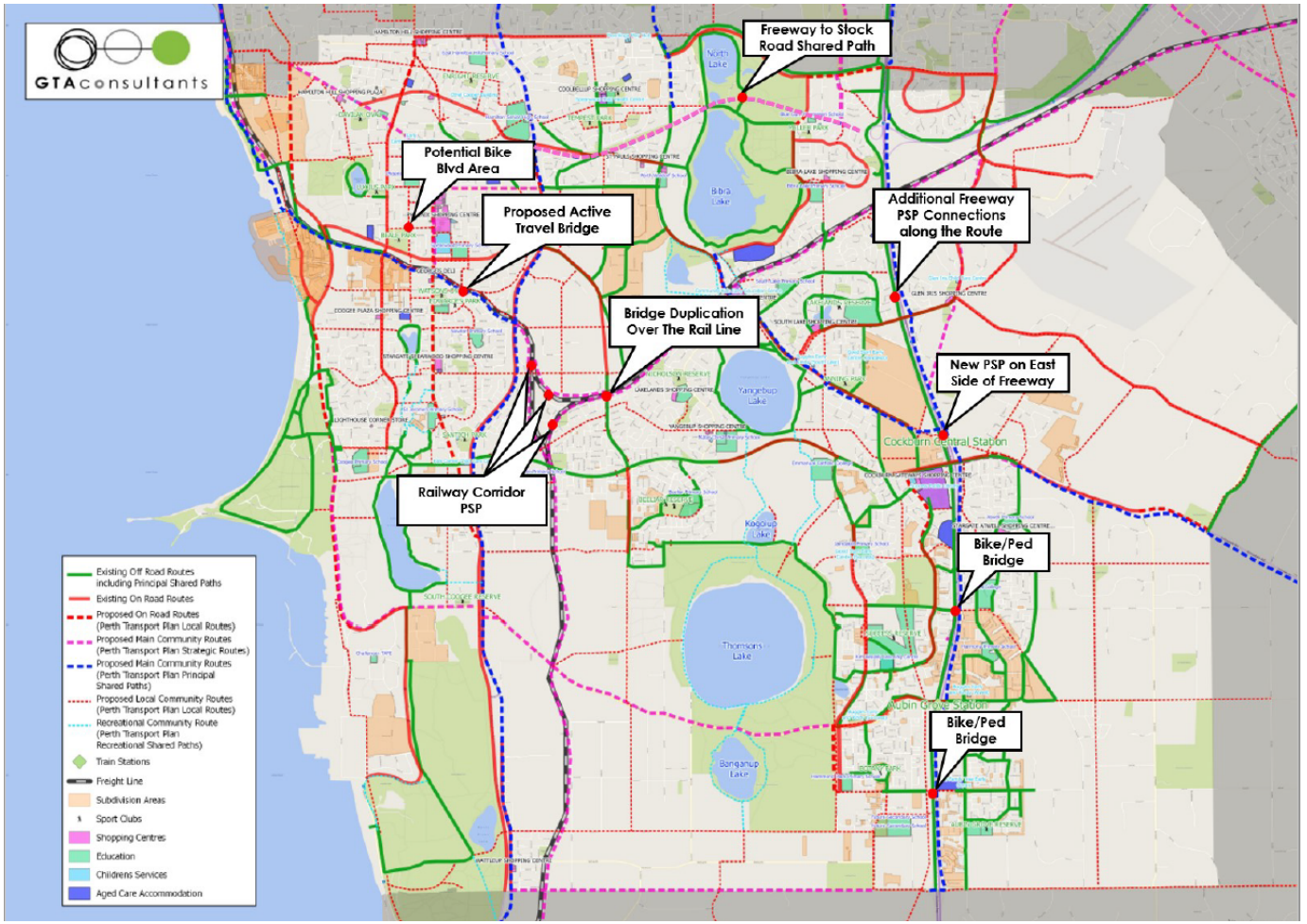


Figure 9.2: Long Term Network Plan with key major projects noted



9.2 Implementing priorities

While it would be ideal to install all the proposed on-road and community network at the same time, the available funding does not allow for this. Moreover, constructing one at a time would be the most likely arrangement, especially given the level of traffic impact the associated construction works will have along each alignment.

Priority for implementation has been based on the following considerations:

- Highest number of potential user types that will be serviced by the route
- Priority routes identified during public consultation
- Feasibility in implementing the route, namely with approvals and impacts on other authorities and stakeholders; and
- Cost to install the route.

The priority routes that are recommended to be implemented are presented in Figure 9.3.

9.2.1 Proposed Principal Routes

Through the long-term network planning and consultation process, the following new Principal Routes are the Main Community Routes identified for delivery within the available budget:

- Freeway to Stock Road – 4.0m shared path – to be provided through the previous Roe Highway extension corridor (it is uncertain at this time if this is to be State Government funded).
- Russell Road (13,000vpd) – 4.0m shared path on the northern side between Hammond Road and Rockingham Road.
- Armadale Road (28,000vpd) – 3.0m shared path on the southern side between Tapper Road and Warton Road.
- Berrigan Drive (14,000vpd) – 4.0m shared path on the western side between Karel Avenue and Jandakot Road.
- Rockingham Road (14,000vpd) 'Road Diet' incorporating a 3.0m two-way separated bicycle lane on the eastern side between Phoenix Road and Cockburn Road.

9.2.2 Proposed On Road Strategic Routes

Through the long-term network planning and consultation process, the following new on-road Strategic Routes have been identified for delivery (noting approximate average weekday traffic volumes):

- Rockingham Road (15,000vpd) between Phoenix Road and Spearwood Avenue.
- North Lake Road (27,000vpd) between Bibra Drive and the entrance to the Lakes Shopping Centre (both directions).
- Armadale Road (40,000vpd)* between Freshwater Drive and east of Tapper Road (both directions).
- Armadale Road (28,000vpd)* between Liddelow Road and Warton Road (both sides).
- Beeliar Drive (27,000vpd) between Poletti Road and Lake Ridge Drive (both sides).
- Frankland Avenue between Russell Road and Gaebler Road (northbound only). *this plan has also noted that the existing on-road cycle lanes on Armadale Road in the vicinity of Liddelow Road require widening.

9.2.3 Proposed Local Community Routes

Through the long-term network planning and consultation process, the following new Local Community Routes have been identified for delivery within the available budget:

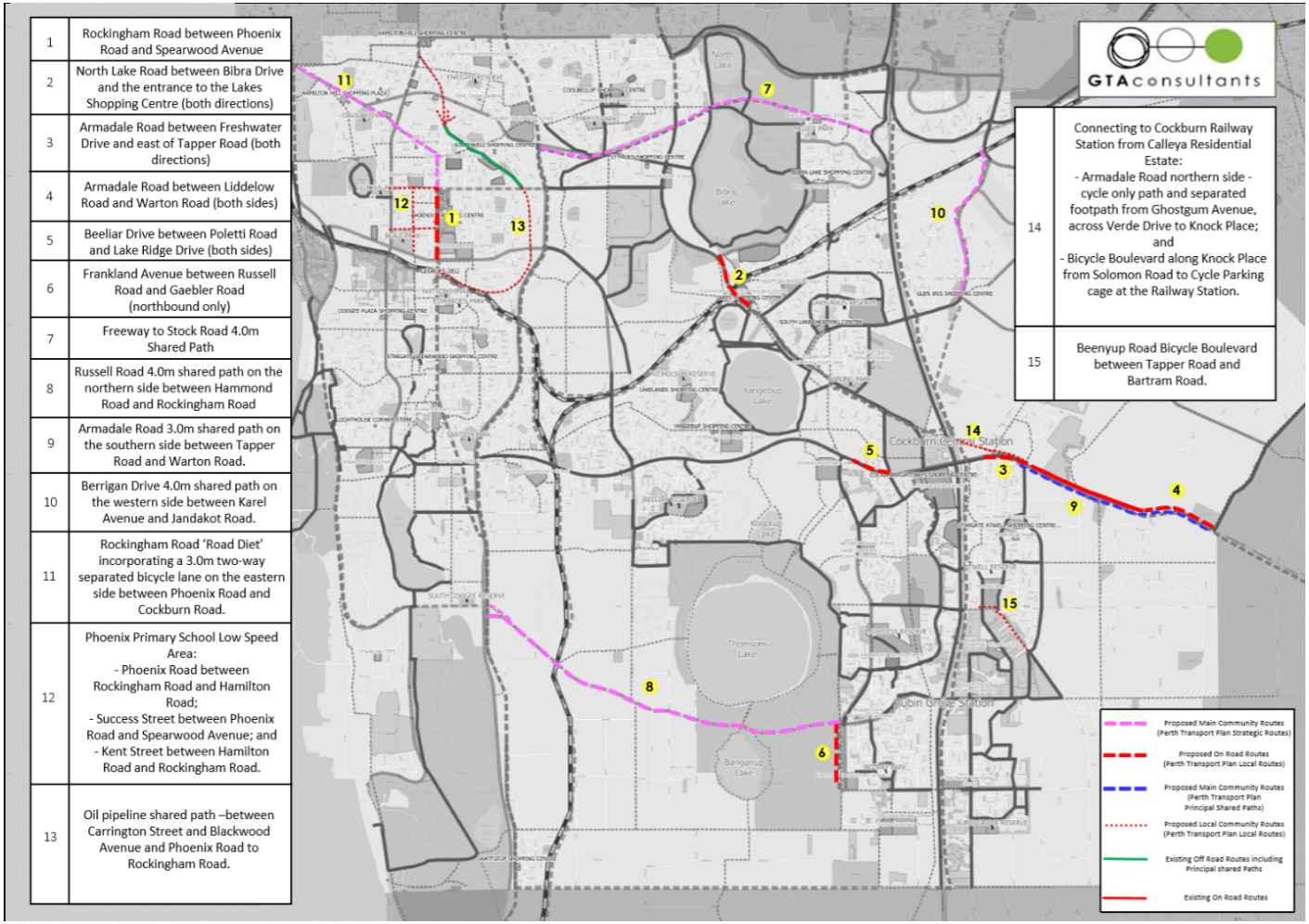
- Phoenix Primary School Low Speed Area consisting of a network of Bicycle Boulevards along:
  - Phoenix Road (5,000vpd) between Rockingham Road and Hamilton Road and into Manning park;
  - Sussex Street (850vpd) between Phoenix Road and Spearwood Avenue;
  - Kent Street (1,400vpd) between Hamilton Road and Rockingham Road.
- Oil pipeline shared path – 3.0m between Carrington Street and Blackwood Avenue and Phoenix Road to Rockingham Road. Land Ownership or lease agreements to be explored.
- Connecting to Cockburn Railway Station from Calleya Residential Estate, along:
  - Armadale Road northern side - 4.0m cycle only path and 2.0m separated footpath from Ghostgum Avenue, across Verde Drive to Knock Place
  - Bicycle Boulevard along Knock Place from Solomon Road to Cycle Parking cage at the Railway Station.
- Beenyup Road (1,600vpd) Bicycle Boulevard between Tapper Road and Bartram Road.

9.2.4 New connections / links

The plan has also identified a number of important small missing links or connections that provide for a safer journey and better access to nearby routes. The key connections/links identified a small often only a few meters long and include:

- connection from Sylvan Crescent to Roe Highway Principal Shared Path;
- from Bangalow Place to Principal Shared Path along Kwinana Freeway;
- from Tulipwood Place to Principal Shared Path along Kwinana Freeway; and
- Link to Kwinana Freeway Principal Shared Path from Lyon Road and Gibbs Road (note this should be included as part of the Aubin Grove Station works).

Figure 9.3: Priority route implementation



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9.2.5 Priority routes and estimated costings

For each of the identified routes with proposed facilities the broad level construction costings[4] have been prepared using the standard construction rates provided by the City of Cockburn.

The associated broad level construction costings and with a 40% contingency to reflect the preliminary stage of the project is provided in Table 9.2. It has been assumed that the City and/or State Government via grants, will fund the priority routes. However, where possible, alternative funding should be considered by the City (as noted in section 9.3).

Table 9.2: Cost estimates

Proposed Routes	Proposed Concept and specifics	Cost Estimate	Cost Estimate (40% Contingency)
On-Road Priority[5] (Perth Transport Plan Strategic Routes)			
Rockingham Road (Phoenix to Spearwood)	Buffered (1.5m/1.8m) on-road cycle lanes. High volume, need to reduce speed, high pedestrian volumes requires cycle / pedestrian separation	Funding committed by the City	-
North Lake Road (Bibra Dr to Lakes Shopping Centre entrance)	Buffered (1.5m/1.8m) on-road cycle lanes connecting from existing lanes north of Bibra Drive, through roundabout to existing lanes south of shopping centre entrance (both directions).	$114,750	$160,650
Armadale Road (Freshwater Dr to Tapper Rd)	Buffered (1.5m/1.8m) on-road cycle lanes connecting from existing lanes at Freshwater Drive through to existing lanes east of Tapper Road (both directions).	$94,500	$132,300
Armadale Road (Liddelow Rd and Warton Rd)	Upgrading existing sealed shoulder to buffered (1.5m/1.8m) on-road cycle lane from existing lanes at Liddelow Rd through to existing lanes at Warton Road. Noting only sections need upgrading (both directions).	$137,025	$191,835
Beeliar Drive (Poletti Rd and Lake Ridge Dr)	Buffered (1.5m/1.8m) on-road cycle from existing lanes west of Lake Ridge Drive through to existing lanes east of Poletti Road (both directions).	$62,100	$86,950
Frankland Avenue (Russell Rd and Gaebler Rd)	Northbound only buffered (1.5m/1.8m) on-road cycling from Frankland Avenue to Gaebler Road)	$60,075	$84,105
Main Community Routes (Perth Transport Plan Principal Routes)			
Freeway to Stock Road	4.0m shared path between Kwinana Freeway and Stock Road	$900.000	$1,260,000
Russell Road (Hammond Rd and Rockingham, Rd)	4.0m shared path (continuous across all side roads and driveways) on the northern side to link into future Local Community Road along Russell Road west of Rockingham Road as well as future Local community facility east of Hammond Road potentially utilising local subdivision roads. Note 4.0m allows for future separation with pedestrians and high speed cycling as subdivision occurs).	$981,000	$1,373,400
Armadale Road (Tapper Rd and Warton Rd)	3.0m shared path (continuous across all side roads and driveways) on the southern side connecting into existing shared path west of Tapper Road and the City boundary.	$384,750	$538,650

[4] Broad level or initial feasibility planning construction cost estimates prepared by GTA Consultants must not be relied upon for quoting, budgeting or construction purposes. More detailed estimates can only be prepared from detailed civil engineering design drawings and require the services of a qualified quantity surveyor. $45/m2 rate (Box out and pour new path with standard grey concrete) is considered as per advice from the Council.

[5] 1.5m wide on-road cycle lanes are assumed for the purpose of undertaking the broad level construction costings

Proposed Routes	Proposed Concept and specifics	Cost Estimate	Cost Estimate (40% Contingency)
Berrigan Drive (Karel Ave and Jandakot Rd)	4.0m shared path linking into existing shared path on the western side at Karel Avenue roundabout to the existing shared path on the north-western side at the Jandakot Road Roundabout. Note 4.0m allows for future separation with pedestrians and high speed cycling as subdivision occurs).	$369,000	$516,600
Rockingham Road (Phoenix Rd and Cockburn Rd)	3.0m separated two-way cycle route. Implement a road diet reducing Rockingham Road from two lanes to one lane in both directions while allowing protected right turn lanes at major side roads and at intersections. Transition across Cockburn Road will require upgrade to the Rockingham Road / Cockburn Road intersection to allow for all movement pedestrian/cycle crossing. Transition into Rockingham Road proposed on-road routes south of Phoenix Road.	$384,750	$538,650
Local Community Routes			
Phoenix Primary School Low Speed Area	Bicycle Boulevard Concepts on ○ Phoenix Road between Rockingham and Hamilton. Due to higher volumes (mostly school traffic) and high pedestrian movement outside of the school, appropriate transition will be required. ○ Success Street between Phoenix Road and Spearwood Avenue Street ensuring appropriate intersection treatment at Phoenix Road. ○ Kent Street between Hamilton Road and Rockingham Road creating a left in/left out only intersection treatment at Kent and Success Street providing filtered permeability for cyclists. Further the intersection treatment with the proposed Rockingham Road upgrade will need to be considered.	$500,000	$700,000
Oil Pipeline (Carrington St and Blackwood Ave and from Phoenix Rd to Rockingham Rd)	3.0m shared path linking from Carrington Road at the Hamilton Hill Shopping Centre through to Blackwood Avenue utilising the exiting Oil Pipeline Easement and connecting into the existing shared path south of Blackwood Avenue. Connecting from the existing shared path north of Phoenix to Rockingham Road. Intersection treatments for safe transition across all roads.	$830,000	$1,162,000
Connecting to Cockburn Station from Calleya Residential Estate.	○ 4.0m cycle only path and 2.0m separated footpath from Ghostgum Avenue, across Verde Drive to Knock Place on the northern side of Armadale Road continuous across side roads. ○ Bicycle Boulevard along Knock Place from Solomon Road to Cycle Parking cage at the Railway Station. The transition from shared path to Bicycle Boulevard will need to be carefully considered and incorporated into the MRWA North Lake Road deviation proposal.	$708,750	$992,250
Beenyup Road (Tapper Rd and Bartram Rd)	A bicycle boulevard connecting from the existing shared path on Beenyup Road south of Tapper Road and the existing shared use wide footpath on Tapper Road to the existing shared use wide footpath on Bartram. To link appropriately to Atwell College entry points the City will need to work with the college.	$300,000	$420,000
Total		**$5,826,700**	**$8,157,390**

Table 9.2 indicates that that total construction cost estimate for the proposed routes is in the order of $6m to $8m.

In terms of preparing detailed civil designs for these routes, they are typically in the order of 7% to 10% of the construction costs. However, these costs do not consider costs associated with any transport analysis to inform intersection layouts and gain support for their implementation. As such, it is recommended that a cost near to 10% be adopted, which equates to a fee in the order of $600,000 to $800,000.

The cost estimates indicate that the priority routes to be delivered within the five-year bike plan period could be delivered using the funding the City have allocated to implementing cycling infrastructure for the next 10 years. However, should the City wish to deliver the priority routes within the five-year period other funding opportunities will need to be investigated.

9.3 Other funding opportunities

It is possible for the City of Cockburn to add to their cycling budget by receiving funding through other parties. These may include and would require further exploration by the City.

State Government grants – PBN and Black Spot

On an annual basis, the Department of Transport offer grant funding to local government authorities who wish to gain funding to implement cycling and pedestrian infrastructure.

Main Roads WA also offer grant funding to local government authorities through their Black Spot program (either via Crash qualification statistics or Road Safety Audit identification).

The Lotterywest Trails Grant Program (partnered with the Department of Sport and Recreation) also provides funding opportunities to implement the Trails Master Plan recommendations.

Further funding opportunities may arise related to the Perth and Peel Mountain Bike Plan, The Manning Park Master Plan and the Manning Park Mountain Bike Concept Plan. All of these documents have concepts for mountain biking and end trail facilities. Mountain biking is popular in Manning Park evidenced via Strava data. Any future development of the park for mountain biking will increase the number of local people riding to the park.

The Road Safety Commission Community Grants Program provides funding for road safety based projects and can include pedestrian and cycle safety improvement projects.

Reinstatement Works

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

Private Development

A development approval condition for new developments to fund local walking and cycling infrastructure nearby. If a development is occurring (such as a shopping centre), bicycle parking facilities and safe bicycle routes around and to the site can be integrated into the plans encourage cycling for short trips. This could also be achieved through mandatory Travel Plans.

Business Improvement Districts

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

Advertising

Revenue from business and clubs in the local area can provide funding for advertising within the City. These advertisements could be cycling related and provide bicycle maps, wayfinding information and encouragement. Bike share facilities or bike parking facilities could be provided via advertising sponsorship.

Asset Owner Funding

As previously noted, the development of this plan has not been constrained by the existing road network and as such, has sort to identify and utilise 'Lazy Assets'. For example, some routes have been identified that follow an existing Oil Pipeline corridor or an existing Power Line easement. As such, negotiations with the existing asset owner would need to be undertaken. A possibility exists that the asset owner could allow the use of the land as well as contribute toward the construction of the route and in return the route could be named after the asset owner such as the BP route or Western Power Route and included on wayfinding signage.

Cycle Infrastructure provided as part of every project.

Main Roads WA have existing policy that requires cycling infrastructure to be provided within every new road project build. The City could consider a similar policy that requires pedestrian and cycling infrastructure to be provided within every major project.

RECOMMENDATION 22: Develop policy to include pedestrian and cycle infrastructure as part of major projects or road upgrades

10. Conclusion

Based on the analysis and discussions presented within this report by implementing the long-term network the City will see an increase in the number of people cycling and walking as part of their everyday localised trips, resulting in a mode shift similar to that envisioned within the Perth Transport Plan. The key routes proposed to be implemented within the five-year timeframe of this plan and the long-term council budget is presented in Figure 9.3.

Implementation of several the recommendations within this plan will also ensure a safer cycling and pedestrian network for the community.

10.1 Recommendations

The recommendations provided within this plan are presented in Table 10.1 and categorised by recommendation type (while keeping the original reference number attached):

Table 10.1: Key cycling and walking network plan recommendations

Recommendations	
Infrastructure Recommendations	
1	Coloured surfacing for on-road cycling. Providing Green at conflict points as a minimum. Use the cycle symbol pavement marking on all on-road routes.
2	Provide a buffer for on-road cycle routes to general traffic. As a minimum, this should be done via a wider line marking buffer.
3	Provide a buffer for on-road cycle routes to denote a 'Dooring Zone'. As a minimum, this should be done via a wider line marking buffer or wider on-street parking bays.
4	Ensure all off road Principal and Strategic Routes continue to and, where required, through intersections and have appropriately designed transition areas.
5	Ensure all Local Community Routes have adequate crossing facilities incorporated as required at the end of each route for ease of access. Ensure low speeds are achieved.
7	Ensure appropriate and safe intersection design is applied to all existing and new cycle routes within the City.
Planning and Policy Recommendations	
6	The suggested recreational routes have been identified, but need further detailed planning.

Recommendations	
8	Where new routes are to be provided then the City should ensure that appropriate end of trip facilities are implemented at the destination facility as a condition of the route. Where the City of Cockburn isn't the owner of the destination (such as a school or college, a retail or mixed use centre or other community facility (such as a railway station) then the facility should be agreed to in principle. Further, the City should enact development policy that end of trip facilities and Travel Plans are provided as a condition of planning approval.
9	Speak with the RAC to assess the feasibility of extended break down cover to include cyclists.
10	Implement a policy that ensures the City must provide a footpath on at least one side of every road. Undertake a pedestrian route audit to plan the network of paths identifying which side of the roads they should be on.
14	Develop an active transport behaviour change policy and strategy.
18	Develop a counting and monitoring strategy for cyclist and pedestrians
20	Implement Behaviour Change Initiatives and Wayfinding Signage Strategy including around Railway Stations.
22	Develop policy to include pedestrian and cycle infrastructure as part of major projects or road upgrades
Complimentary Recommendations	
11	Downgrade Beeliar Drive to a 'boulevard' slower speed road environment through Cockburn Central along with undertaking a Cockburn Central pedestrian strategy.
12	Investigate the possibility of implementing 30km/h permanent speed limits around schools.
13	Undertake an Accessible Pedestrian Routes assessment for the identified aged care facilities and for retirement villages and in communities where there is a large proportion of older residents.
15	Investigate the feasibility and routing options for potential cycle or walking tours.
16	Work with the Department of Transport to ensure the Active Travel guides are kept up to date and remove the sealed shoulder terminology, especially for those routes where the sealed shoulder is not an appropriate riding environment.
17	Undertake annual crash investigation study for key hotspot cycle pedestrian crash areas to understand causality making cycling/pedestrian safer.
19	Work with the South West Group to investigate an E-Bike Route.
21	Further develop the draft Development Application active travel checklist to ensure it is applicable to the City's needs.

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