Bike Plan 2009
City of Joondalup

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1. Executive summary

Aurecon was appointed by the City of Joondalup in January 2008 to develop a Bike Plan with a six year time frame. The overarching goal of the Bike Plan is to promote cycling in the City of Joondalup and to increase the number of cyclists using Joondalup's bicycle network and facilities. The plan was developed on the basis of an existing plan and an existing conditions review, desk top studies, consultations with stakeholders and the community, and site surveys.

Existing network overview

The existing bicycle network in Joondalup is extensive and plays a central role in the wider Perth Bicycle Network (PBN). Shared paths are located throughout Joondalup's 22 suburbs and the path network is developed and maintained by the City. Joondalup also accommodates formal on-road cycle paths, located on both arterial and local roads.

Catering for all

It is recognised that there are a diverse range of transport infrastructure users. It is apparent that motorists, cyclists and pedestrians will have different predominant needs which have to be addressed and catered for in order to fulfill the requirements of an effective, efficient and sustainable transport network. Different types of cyclists also have various requirements of their route infrastructure.

The success of any Bike Plan is to recognise and acknowledge the competing needs of all users (both on and off-road) and to accommodate and cater for these requirements accordingly.

The following table summarises the main types of cyclists and their predominant requirements identified in this Plan.

User group	Primary requirements
Recreational cyclists	On and off road infrastructure, clearly signed and clearly linked to recreation centres. Signs to amenities and transport opportunities. Supporting facilities including water fountains, cycle parking, toilets and picnic facilities.
Commuter cyclists	On and off road infrastructure dependent on level of cyclists. Direct connections from residential areas to transit inter-connectors and employment centres. Good trip end facilities at place of work.
Utility cyclists	On and off road infrastructure with clear, identifiable routes and legible, informative signage to activity centres, shopping malls, educational facilities, community and recreation centres. Supporting facilities including cycle parking and lockers.
Novice cyclists	Off road cycling opportunities with safe negotiation of conflict locations with vehicles. Rest and stopping areas. Access to safe cycling information. Supporting facilities including water fountains, cycle parking.
Tourism cyclists	On and off road infrastructure with clear, legible signage to amenities and tourism attractions. Good connectivity and continuity of routes. Good and easily accessible information. Supporting facilities including water fountains, cycle parking, toilets, picnic facilities and cycle shops/hire.
Competitive cyclists	On-road consideration in road design. Safe training routes. Dedicated training facilities.

Education and promotion

The City of Joondalup recognises that promoting cycling is integral to raising community awareness of cycling, its benefits, improving the perception of cycling in general and attracting more people to use cycling as a mode of transport.

Bicycle awareness and education that encourages people to cycle is considered a high priority. It is recommended that Joondalup promotes new cycle routes and cycling events to promote the health, economic and environmental benefits of cycling.

Infrastructure and facilities

Reducing missing links in shared path and bicycle lane routes form a high infrastructure priority. Consultation indicates that off-road cycling routes attract recreational and novice cyclists, and therefore play a significant role in encouraging more people to ride. Accordingly, this Bike Plan recommends that off-road infrastructure be prioritised as this provides the greatest potential to attract new cyclists.

A number of high, medium and low priority on-road and off-road infrastructure development recommendations are made in this Bike Plan.

The review of safety issues on the cycling network, both on-road and off-road, also forms a high priority for infrastructure works. Improved path networks and increased signage, line marking and improved lighting can make the network safer for both cyclists and pedestrians. It is essential that supporting facilities, amenities and infrastructure is provided to encourage cycling and the use of cycling networks.

Sufficient and adequate end of trip facilities should be available for cyclists at key attractor locations and destinations. The lack of end of trip facilities, in particular secure bicycle parking, is a significant barrier to cycling. This Bike Plan recommends that bicycle parking provisions are improved.

Bicycle parking facilities at railway and bus stations often lack shelter and are located remotely from the transit station, or at the end of platforms or other inconvenient locations. Sheltered bicycle parking facilities located at station entrances are preferred and demonstrate higher utilisation rates.

Greater signage is required to indicate the location, start, end and continuity of off-road paths and on-road routes. Wayfinding signage was identified as poor at a number of locations, and was a consistent complaint raised during the consultation process.

Informal on-road routes are currently difficult to follow and require frequent orientation with a map, particularly for those not familiar with the area. Low cost way-markers would improve the legibility of routes particularly along local streets. Cost effective self adhesive markers are recommended as they provide improved route legibility and promote the cycle route to all road users.

Signs, information boards and map boards should also be placed to indicate to drivers the presence of cyclists and to advertise the route to all road users. The use of information boards and maps are also recommended at key bicycle cross-roads, railway stations and universities to inform users and to serve to advertise the immediate cycling environment to potential users.

Maintenance

Maintenance is carried out by the City and is an essential process to ensure cycling facilities are safe and usable by cyclists. This Bike Plan presents a number of actions to improve maintenance procedures and expand maintenance activities.

Monitoring and targets

Monitoring provides a powerful tool that measures the success of the Bike Plan, providing grounds for future funding and further improvements.

The monitoring program includes a list of actions to identify if the City of Joondalup is meeting the strategic objectives outlined in this Bike Plan. It is recommended that monitoring be undertaken in consultation with the relevant stakeholders and third parties.

A review of the Plan after six years is recommended to monitor progress, incorporate updates and refine the Plan and the relevant strategies accordingly.

2. Introduction

2.1 Purpose and objective

"The bicycle has an important role to play in ensuring that the people of Perth continue to have access to the good things of life without sacrificing the clean air and quality environment which distinguish Perth from many other cities." (Charlton E., Perth Bicycle Network Plan 1996)

This City of Joondalup Bike Plan 2009 (the "Bike Plan") sets out the strategic direction for cycling in the City for the next six years. It recognises that a number of short-term and long-term strategies for infrastructure, education and encouragement are required to meet the needs of cyclists as well as to increase cycling in the City.

People choose to cycle for a number of reasons, including for exercise, recreation, training and as a mode of transport between destinations. The City is located in a coastal area and has a natural environment that provides a pleasant setting for cycling. This Bike Plan covers the area within the City's boundaries including publicly accessible areas such as the Joondalup CBD, commercial precincts, parks, recreation reserves and beaches, leisure centres, Joondalup Health Campus, Edith Cowan University, Lakeside Shopping Centre and transit stations.

2.2 Local Bike Plan requirements

This Bike Plan addresses the six key elements within Bikewest's *Guidelines for Preparing Bicycle Plans* (2008). These elements are:

- Local Bicycle Route Network (Route Plan)
- Schedule of works
- Maintenance schedule
- On-going process to ensure a cycle-friendly road network
- Encouragement of cycling
- A review of the plan

2.3 Methodology and scope of work

This Bike Plan was prepared by Aurecon and overseen by the City of Joondalup.

The methodology adopted to guide development of this Bike Plan was to:

a) Identify the study area, project objective, and project outcomes (City of Joondalup).
b) Undertake a review of relevant State Government and Local Government policies and strategies.
c) Review public consultation outcomes (consultation conducted by the City of Joondalup).
d) Undertake internal stakeholder, external stakeholder and third party consultation.
e) Desktop review of current cycling facilities.
f) Review works not completed from the previous plan.
g) Develop a Maintenance Schedule.
h) Prepare an Infrastructure Works Schedule.
i) Review education and encouragement strategies developed by the City of Joondalup.
j) Recommend strategic improvements to the bicycle network.

3. Policy and strategic context

Key national, state and local policies and strategies have been considered in the preparation of this Bike Plan, which itself is a local City of Joondalup document. This section outlines the relevant documents which have provided context and guidance for development of this Bike Plan. An overview of the documents discussed in this plan is given in Figure 1.

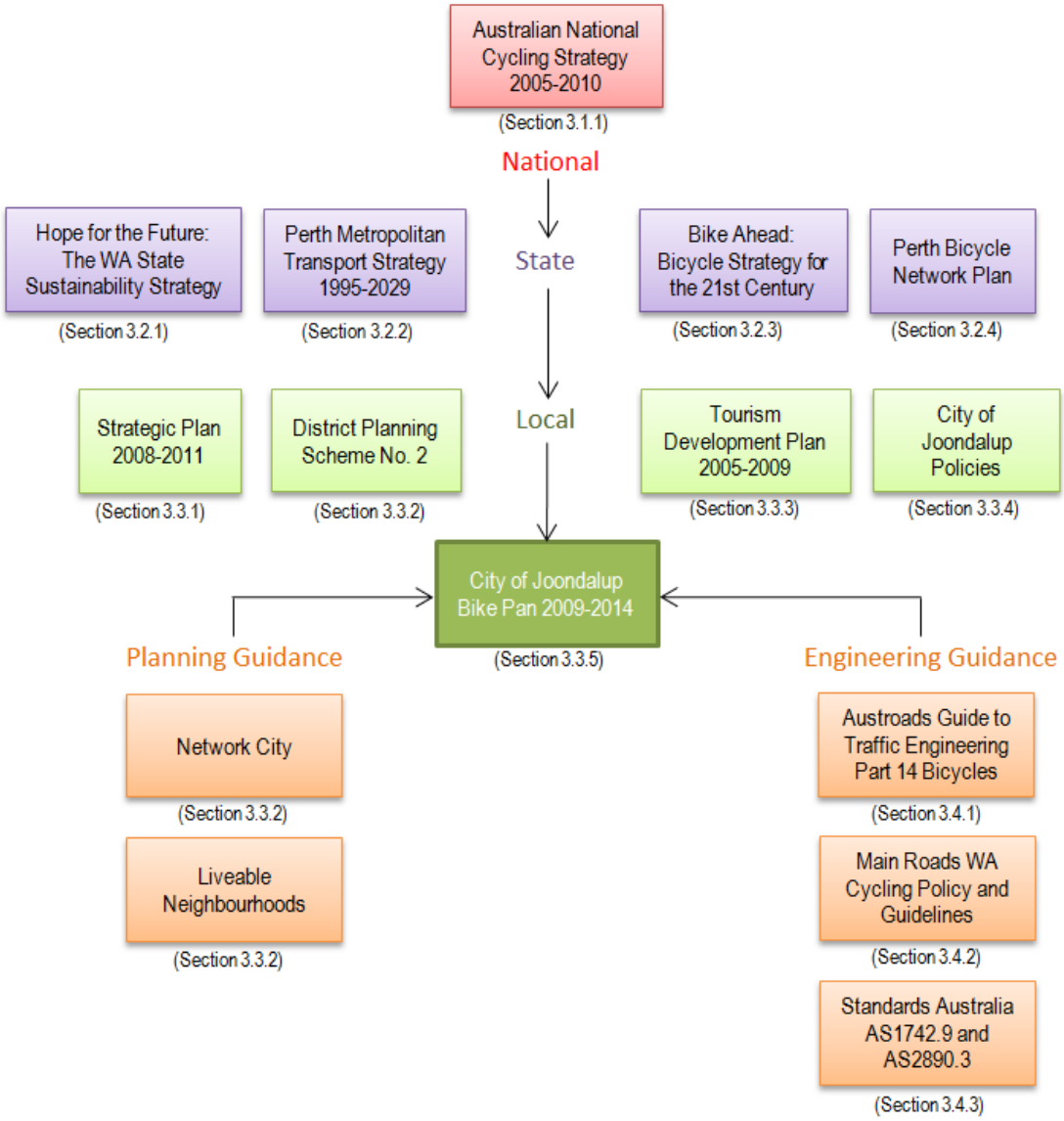

Figure 1: Context of Bike Plan

3.1 National strategies

3.1.1 The Australian National Cycling Strategy 2005-2010 (Austroads 2005)

The Australian National Cycling Strategy 2005-2010 is the overarching strategy that aims to increase participation in cycling and to improve safety for cyclists within Australia. The strategy presents a set of common goals to help focus and coordinate the efforts of federal, state and local government.

Priority areas of the strategy are:

- Improving coordination of activities relevant to increase cycling in the appropriate portfolios of Australian, state, territory and local governments
- Including cycling as an essential component in integrated transport and land use planning in all spheres of government

- Creating infrastructure and facilities that support increased cycling
- Enabling and encouraging safe cycling
- Providing leadership and developing partnerships to support and promote cycling in Australia
- Developing the skills needed to undertake actions that will increase cycling

Implementation of this Bike Plan will assist the City of Joondalup in achieving the aims of *The Australian National Cycling Strategy 2005-2010*.

3.2 State policies and strategies

3.2.1 Hope for the Future: The Western Australian State Sustainability Strategy (Western Australian State Government 2003)

Sustainability is meeting the needs of current and future generations through the integration of environmental protection, social advancement and economic prosperity.

Hope for the future: The Western Australian State Sustainability Strategy was developed by the State Government in 2003. It contains background information on the concept of sustainability as well as establishing illustrative actions for sustainability in Western Australia. Within the strategy it is recognised that overcoming car dependence is fundamental to sustainability in cities.

One chapter of the strategy focuses on "Sustainability and Settlements," with a priority area identified as "integrating land use and balanced transport." An objective of this item was to "achieve a more sustainable balance between car use and other transport options through the promotion and provision of efficient and effective public transport and non-motorised personal transport alternatives."

Action items to achieve this objective included to encourage walking and bicycle use through:
- Developing friendly environments in town centres
- Improving pedestrian and bicycle access on local streets
- Continuing the implementation of the TravelSmart Household program and complementary TravelSmart initiatives
- Providing guidelines which assist local government authorities to audit and improve the accessibility of their pedestrian and cyclist infrastructure

The strategies, Maintenance Schedule, and Infrastructure Works Schedule presented in this Bike Plan are consistent with the *State Sustainability Strategy* objective.

3.2.2 Perth Metropolitan Transport Strategy 1995-2029 (Department of Transport et al 1995)

The *Perth Metropolitan Transport Strategy 1995 – 2029* provides direction for achieving a balanced, efficient and effective transport system for the Perth Metropolitan Region into 2030. Rather than aiming to reduce the level of anticipated travel in the region, the strategy aims to alter the modal share between different transport options and hence reduce the dominance of low occupancy car use in Perth.

The *Perth Metropolitan Transport Strategy 1995 – 2029* target for metropolitan transport is to increase the percentage of all trips by bicycle from the current 5.7% to 8% by 2010 and 11.5% by 2029. Actions suggested in the strategy which are targeted in this Bike Plan include:
- Introduce safe cycling education programs targeted at motor vehicle users, cyclists and pedestrians
- Identify, develop and signpost safe routes to local destinations including schools and commuter routes
- Provide appropriate on-road and published information and traffic signalling
- Integrate bicycle use with public transport
- Define, establish and maintain continuous local cycle routes
- Educate cyclists and other road users about the rights, needs and responsibilities of cyclists

- Ensure cycle facilities serve the needs of all cycle users

3.2.3 Bike Ahead: Bicycle Strategy for the 21st Century (Bikewest 1996)

Bike Ahead: Bicycle Strategy for the 21st Century emphasises the development of a network of cycle facilities that:

- Is convenient, accessible and safe
- Is comprehensive, providing access to most destinations for most cyclists
- Establishes connectivity
- Has regional coverage

The strategy establishes actions for achieving the objectives set in *The Perth Metropolitan Transport Strategy 1995-2029.* It takes various approaches such as assuming that the majority of the cyclists are amateurs, which allows the design to cater for all levels of expertise in cycling and their various purposes for cycling.

The *Bike Ahead: Bicycle Strategy for the 21st Century* has a focus on safety, efficiency, effectiveness, environmental and social responsibility and robustness. This Bike Plan has endorsed the focus on these areas, in particular improvements to safety and the efficiency of the cycling network.

3.2.4 Perth Bicycle Network Plan (Bikewest, Main Roads WA and Department of Transport 1996)

The Perth Bicycle Network Plan (PBN) is a key document for implementing changes in cycling infrastructure in Perth. It is a comprehensive strategy that plans for cycling facilities in the Perth metropolitan area and identifies the necessary works that are needed at a state and regional level to complete the network identified in the PBN.

The Department for Planning and Infrastructure is currently reviewing the PBN Plan and readjusting the program to reflect current land use requirements and government policy.

The Perth bicycle network is one of the most extensive and advanced cycling networks in the world. The PBN Plan includes all cycling related infrastructure throughout metropolitan Perth, including on-road (bicycle lanes), off-road dedicated and shared paths and end of trip facilities (bicycle parking). The plan details the network of cycling routes within Perth, including local bicycle routes, principal shared paths and recreational shared paths.

Local bicycle routes are a series of signed on-road routes (with some off-road shared path components) that connect major trip attractors, such as schools, shopping centres and community facilities. The routes are mostly on quiet suburban streets and are suitable for cyclists of all ages and experience.

Principal shared paths (PSPs) are primarily intended to provide a high standard of access for the commuter cyclist. They are typically funded by Main Roads Western Australia if part of a freeway or major highway construction or the Public Transport Authority (PTA) if within a railway reserve.

Recreation shared path routes have been identified along the coastline, rivers and areas of public open space. Their primary purpose is to provide for cycling and walking as a leisure activity.

Works recommended in this Bike Plan will feed into the PBN creating a comprehensive bicycle network for the City of Joondalup. Details of the existing PBN within the City are contained in Section 6.2 of this Bike Plan.

3.3 Joondalup Local Government policies and strategies

3.3.1 Strategic Plan 2008-2011

The City of Joondalup's *Strategic Plan 2008-2011* articulates the highest level of direction for the City. It is an overarching framework that aims to achieve better leadership and decision making with greater community participation for the City. The following objectives of the City are applicable to this Bike Plan:

- To encourage the development of the Joondalup CBD
- To ensure the City's facilities and services are of a high quality and accessible to everyone
- To facilitate healthy lifestyles within the community

3.3.2 District Planning Scheme No. 2

District Planning Scheme No. 2 controls how land will be used within the City of Joondalup. Whilst there are no specific requirements for bicycle facilities within this planning document, it does state an objective "to encourage development which will support a safe, efficient and effective transport system."

Appropriate land use planning is vital to encourage the use of non-motorised forms of transport. The Western Australian Planning Commission's *Liveable Neighbourhoods* (2004) and *Network City* (2005) are important planning documents which also provide guidance on catering for cyclists in areas of land development.

3.3.3 Tourism Development Plan 2005-2009

The City's *Tourism Development Plan 2005-2009* provides stakeholders with an understanding of the opportunities and issues for tourism in the City, and a plan for its sustainable development and management.

The role of shared paths in positioning the City's coastal and recreational areas as tourist destinations is strongly evident within the plan. Several references to the importance of having well developed and maintained paths in these areas are made, including recommendations of:

- Continued development of shared paths and interpretive materials for the Wetlands Tourism Development Zone
- Pursue Eco Certification from Eco Tourism Australia for the coastal shared path
- The shared path, which runs along the entire coast in the City's boundaries, must continue to be developed and maintained to a high standard
- The path is to be strongly promoted as a unique coastal experience/attraction in all marketing material
- Continue, in conjunction with the Department of Environment and Conservation (DEC, formerly Conservation and Land Management, CALM) to create and maintain shared paths beside Lake Joondalup

The importance of recreational paths is reflected in this Bike Plan, with recommended actions and strategies supporting the development of the coastal and park shared path networks. The *Tourism Development Plan 2005-2009* recognises one of Joondalup's competitive strengths to be the coastline and beaches, dune environments and the coastal walk and cycle path.

3.3.4 General policies

The City of Joondalup has developed a wide range of policies to govern its operation and development. Policies applicable to this Bike Plan include:

- *Policy 1-1 Leisure*: The purpose of this policy is "to guide the provision of leisure services, facilities and programmes to assist in the achievement of the City of Joondalup's Mission, Vision and strategic objectives." Strategies to promote cycling as a leisure activity and provision of improved facilities are contained within this Bike Plan.

- *Policy 1-2 Public Participation*: The purpose of this policy is "to outline the City's commitment to actively involve the community in Council's planning, development and service delivery activities." Public consultation was undertaken in preparation for this Bike Plan.
- *Policy 7-19 Asset Management*: The purpose of this policy is "to ensure the organisation undertakes a structured and coordinated approach to asset management that will promote sustainable infrastructure for the City of Joondalup." This Bike Plan represents a strategic and methodical approach to developing cycling facilities within the City.

3.3.5 City of Joondalup Bike Plan 2009

This document, the City of Joondalup Bike Plan 2009 which addresses the period 2009-2015 inclusive, is underpinned and aligned with the policies identified and supports all of the above strategies to facilitate an increase of cycling in the City of Joondalup.

This Bike Plan establishes actions for achieving the objectives set out in the national, state and local government policies/strategies.

3.4 Industry guidelines, standards and codes

The guidelines and standards listed here provide the current basis of best practice in terms of specification of bicycle facilities locally, regionally and nationally. The intention of this Bike Plan is to reflect the standards and guidelines outlined here and to establish a set of best practice guidelines that the City of Joondalup will aim to achieve in implementing this Bike Plan.

3.4.1 Austroads

Austroads is the association of Australian and New Zealand road transport and traffic authorities that aims to promote improved road transport outcomes.

Austroads' *Guide to Traffic Engineering Practice Part 14: Bicycles* (1999) is a comprehensive document which provides guidance on the planning, design and construction of cycling facilities and is used by road authorities, engineers, planners and designers. In this industry standard, various technical aspects and guidelines required for safe and competent designs of roads and paths for bicycle travel are addressed.

The guide focuses on five fundamental design elements that need to be addressed in regard to the design of the roads and paths for cyclists. These are a space to ride, a smooth surface, speed maintenance, connectivity and information. Technical guidance given includes:

- On-road facility design
- Intersection treatments
- Path design
- Provision for cyclists at structures (bridges, tunnels, grade separated interchanges)
- Construction and maintenance
- Traffic control devices
- End of trip facilities

(Note: Austroads is in the process of replacing the Guide to Traffic Engineering series with a new series of guides. This Bike Plan makes reference to the 1999 edition, but the new publications should be referred to for best practice guidance when available.)

3.4.2 Main Roads Western Australia (MRWA)

MRWA is responsible for Western Australia's highways and main roads, which represent almost 30% of the state's total assets. Of Western Australia's 150,000km road network, MRWA controls almost 18,000km (12%) which carries around 60% of the traffic.

Through their *Cycling Policy and Guidelines* (2000), MRWA has committed to provide and maintain facilities suitable for cycling on or alongside those highways and main roads for which it is responsible.

MRWA provides technical guidance for the provision of cyclist facilities, including details of:

- Kerb crossovers
- Intersection crossings
- Grab rails
- Line marking and signage

3.4.3 Standards Australia

Standards Australia is recognised by the government as Australia's prime standards body. In relation to cyclist facilities the following Australian Standards have been developed:

- *AS 1742.9 Manual of uniform traffic control devices Part 9: Bicycle Facilities:* This standard details the requirements for the signs, pavement markings and other devices to be applied to bicycle facilities both on the road and on paths separate from the road, either for the exclusive use of bicycles or joint use with other users. It also recommends guide signs and navigational information for cyclists.
- *AS 2890.3 Parking facilities Part 3: Bicycle parking facilities:* This standard details the facilities that will provide safe, secure, convenient parking for bicycles in any location where they are likely to be left. It sets out the requirements for the layout, design and security of bicycle parking facilities, both on-street and off-street.

Section 8.8 of this Bike Plan looks at these standards in greater detail and is aimed at advising the City of Joondalup on a consistent and uniform set of standards that reflect current best practice. These could form the basis of the common minimum standard to be applied to the provision of cycling infrastructure in the City of Joondalup.

4. Background

4.1 Study area

The City of Joondalup has 22 suburbs covering an area of 96.8 square kilometres. The Joondalup City Centre is 26km from the Perth Central Business District and has been developed as a major regional centre of metropolitan Perth.

The City is bordered by the City of Stirling to the south and the City of Wanneroo to the north and east. The Yellagonga Regional Park is located along the eastern border. The Indian Ocean forms the western boundary, with a 17.5km length of coastline within the City. The City has a strong east-west and north-south transport network, dominated by the Mitchell Freeway and Joondalup train line.

The Joondalup Study Area map contained in Appendix A illustrates the study area. The major land uses within the City are illustrated on the Joondalup Scheme map, also contained within this appendix.

The City of Joondalup has a population of approximately 160,000 people (City of Joondalup 2009). The population distribution is shown in Figure 2, which also gives a comparison to the Perth Statistical Division.

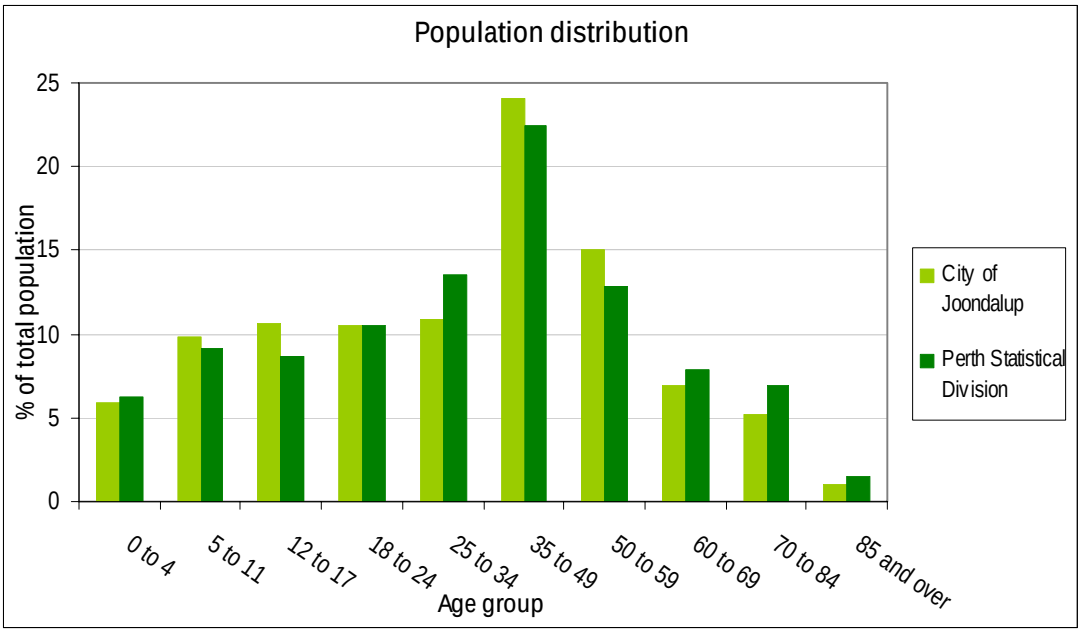

Figure 2: Demographics (ABS 2006)

4.2 Planning for cycling

The City of Joondalup first developed a Bike Plan in 1998/1999 and it was updated in 2002/2003. There have been many changes in the City since the 2002/2003 Bike Plan as well as changes to cycling standards. The need for a new Bike Plan is paramount.

This document is a review and update of the 2002/2003 Bike Plan. It aims to increase and facilitate bicycle use in the City over the next six years to 2015. It is envisaged that through strategies proposed in this Bike Plan, more people will cycle for transport, recreation and health, and do so in a safe and easy-to-use environment. Creating a more bicycle friendly environment increases accessibility options for City residents and visitors, and is in accordance with and supports the City's vision for more sustainable modes of transport.

Cycling is undertaken by a wide range of people for varied purposes. The many types of cyclists include:

- Primary school cyclists
- Secondary school and university cyclists
- Recreational cyclists
- Commuter cyclists
- Utility cyclists
- Touring cyclists
- Sports and professional cyclists

Planning of on-road and off-road facilities for all types of cyclists is important. It is evident that urban growth in the City has been extensive in the last five years and the provision of new facilities needs to recognise where development has occurred, and will occur in the future.

There is now an emphasis on the provision of on-road cycle facilities, such as sealed shoulders/bike lanes, intersection treatments, bike symbols and signs and line marking. This reflects the necessity for road infrastructure to service a range of users.

Different groups of cyclists have varied preferences for which facilities are provided (refer Figure 3). A balance for their provision must be found. Ideally, parallel facilities would be provided along the same road corridors. The route hierarchy determines the type and level of ancillary facilities that are provided to complement the cycling route.

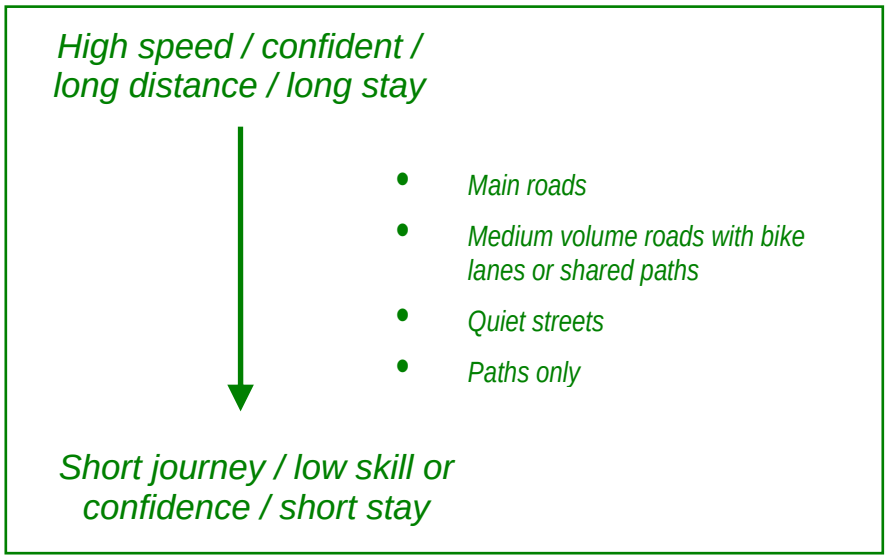

Figure 3: Provision of facilities to meet cyclist needs

There have been reported conflicts between motorists, cyclists and pedestrians which poses safety issues for all groups. It is important that on-road and off-road facilities are planned effectively to minimise conflict between these groups and promote the sharing of facilities between all user groups.

Public transport use is increasing (Public Transport Authority 2008) and it is therefore necessary to ensure that access to the railway and bus stations within the City are safe and convenient for those who wish to utilise dual-mode (bike/train and bike/bus) transport to their destinations.

Cycling to school is being promoted throughout Perth as an opportunity to incorporate physical activity into children's days. As well as being a healthy alternative to transport by car, cycling decreases the number of cars on roads around schools. It is important to promote cycling to parents as an option for transport and to provide safe routes and entries to schools for cyclists.

4.3 Community expectations

The City identified five key expectations held by the community regarding improvements to cyclist facilities (refer Section 5.1 for details of community consultation). Listed in priority order these are:

a) Safety – provide sufficient space for paths for cyclists, road lighting, safe crossings.
b) Connectivity and continuity – provide continuous links and remove significant gaps along cycling routes.
c) Information – provide good, clear signage and route marking to major trip attractors within Joondalup.
d) Facilities – provide an adequate number of end of trip facilities and maintain their condition, such as bike racks, lockers, showers and connection to public transport services.
e) General knowledge – provide basic rules to each type of road users to ensure that they are aware of the laws, regulations and their rights.

4.4 Travel data

Almost half of all trips made by City of Joondalup residents are within easy cycling distance. Although it takes only 20 minutes to cycle 5 kilometres at a leisurely pace, just 3% of these trips are made by bicycle. Walking trips make up 10% of all trips; walking and cycling for local trips also promotes a sense of community through greater knowledge of the local surrounds, local shopping and interaction with neighbours (DPI 2002).

People choose to cycle for a number of reasons, such as for exercise, recreation, training and as a mode of transport between destinations. Half of all cycling trips are made for recreation (50%). This shows that cycling is used significantly for exercise and enjoyment. If the exercise and enjoyment of cycling is combined with other daily routines (e.g. travelling to work or shopping) there are benefits to local traffic problems as well as a reduced need for separate exercise in order to maintain a good level of health (DPI 2002).

Car use accounts for 85% of all trips between one and five kilometres within the City of Joondalup. It is evident that any encouragement, of cycling in particular, to those making these short trips could have a significant impact on the number of trips made by car. Cycling trips make up only 2% of all trips by residents of the survey area. Not only is cycling a healthy way to travel, it is good for distances too far to walk, competitive with the car for time taken over short distances, and more convenient than bus or train for many trips (DPI 2002).

These statistics were findings of a local travel survey conducted in 2000 by the City of Joondalup together with the Department for Planning and Infrastructure. The findings of the survey were published in *How Joondalup Residents Travel: Findings of the 2000 City of Joondalup Travel Survey* (DPI 2002).

5. Consultation

Consultation is considered a key step towards understanding the needs and expectations of key stakeholders. To enable an informed Bike Plan to be developed and provide recommendations that are supported by those responsible for their implementation, extensive consultation with the community, City of Joondalup staff and external agencies was undertaken.

5.1 Community consultation

5.1.1 Consultation process

Community consultation for this Bike Plan was held between 4th and 28th March 2008. Hard copies of a Community Feedback Survey were mailed to over 500 randomly selected City of Joondalup residents. Hard copies of the survey were also mailed to cycling retailers to display at shop counters in the City of Joondalup.

An electronic version of the survey was available via the City of Joondalup's website and Department for Planning and Infrastructure's cycling section of their website. An email including a link to the survey was sent to cycling clubs in the City of Joondalup, the Department for Planning and Infrastructure's Cycling Unit, Edith Cowan University, Joondalup Health Campus and TAFE.

A total of 235 responses were received from community members. From the response group, 57% were male, 43% were female and 90% lived within the City of Joondalup. Respondents were grouped into their stage of cycling including non-cyclists, potential cyclists and current cyclists. This method allowed for segmentation of the issues and requirements for each specific group.

5.1.2 Non-cyclists

Non-cyclists accounted for 14% of respondents. Of these, the majority of respondents either strongly agree (43%) or agree (19%) that they don't cycle because it is not safe enough on the roads or paths for them to do so.

The majority of non-cyclists believe that they are fit enough to cycle, their ability to cycle is good and that a lengthy time taken to ride to destinations would not be a problem. Of the non- cyclists, 69% would consider cycling for recreation purposes. This supports the need for improving and maintaining recreational facilities. The most common factor that would encourage non-cyclists to take up cycling is better cycling infrastructure, including cycle lanes and paths, to create safer cycling routes.

From these results it is evident that the biggest issues preventing people from cycling are infrastructure and safety concerns. Therefore, infrastructure works and promotion of cycling should focus on safety when targeting this group to encourage cycling uptake.

5.1.3 Potential cyclists

A sizeable proportion of the community could be ready to change their behaviour towards cycling, with 21% of respondents having either thought about or planned to go cycling.

Those that have thought about or planned to go cycling think they will enjoy cycling, have concerns about their fitness and want to do something about it, and are concerned about the environment. The majority of potential cyclists said they would cycle for recreation and/or as a mode of transport to shops or a friend's house. This further supports the need for improving and maintaining recreational facilities as well as focusing on local routes around shopping areas. When asked what facilities they might use, the majority of people would 'often' or 'occasionally' cycle on a path shared with pedestrians, followed by cycling on the road.

The majority of people who are thinking about cycling would cycle by themselves or with their partner and the majority (77%) of potential cyclists said they would cycle within the City of Joondalup. Potential

cyclists would benefit from plans and infrastructure focusing on health and fitness, recreational cycling and infrastructure improvements made to shared paths.

5.1.4 Current cyclists

A large proportion of respondents (45%) have been cycling regularly for over 2 years. The majority of these current cyclists said they would stop cycling if it becomes unsafe to cycle, if there has been a lack of improvements to cycling infrastructure and if there were a lack of facilities at their destination. The majority would not stop cycling if they had too many other commitments. This group is a highly motivated group and it is important that infrastructure is improved and maintained to keep these cyclists on the paths and roads.

20% of respondents started cycling in the last 6 months or have been cycling less than 2 years. The majority of these cyclists enjoy cycling and agree that it helps with their fitness and believe it is better for the environment, but believe that there are not supporting facilities at their destination. Few respondents thought that it was convenient for them to cycle or that it has saved them money. These motivators show that education focusing on health, fitness and the environment would be effective for promoting the continuation of cycling.

Of all current cyclists:

- The majority often cycle for recreation followed by training
- The majority occasionally cycle to get to the shops or a friends house
- The majority cycle by themselves or occasionally cycle with their partner or friends
- The majority never cycle to accompany kids to school
- The majority never cycle for racing or competition
- The majority often cycle on a shared path with pedestrians
- 78% cycle within the City of Joondalup

5.1.5 Major trip attractors

The community consultation identified a number of destinations that were most visited by bicycle. These are considered the major cycling trip attractors and the top ten are listed in Table 1. These destinations, although not all located in Joondalup, are important as cyclists must pass through the City and use the City's facilities to access them.

Table 1: Major cycling trip attractors

Priority	Destination	Priority	Destination
1	Joondalup CBD (18)	8	Around Lake Joondalup (6)
2	Burns Beach (16)	9	TAFE (5)
3	Perth (12)	9	Scarborough (5)
4	Around Lake Goollelal (10)	9	Picnic Cove (5)
5	Lakeside Shopping Centre (9)	10	Fremantle (4)
6	Mullaloo Beach (8)	10	Butler (4)
7	Neil Hawkins Park (7)	10	Perth via path along freeway (4)
8	Trigg (6)		

The most frequented and used cycle facilities are those along the coastal areas followed by Joondalup CBD and lakes and parks around Joondalup. These results show a strong bias towards recreational cycling from the respondents in the City of Joondalup and therefore should be a focus for improvements, maintenance and promotion. Figure 4 shows the common destinations by theme.

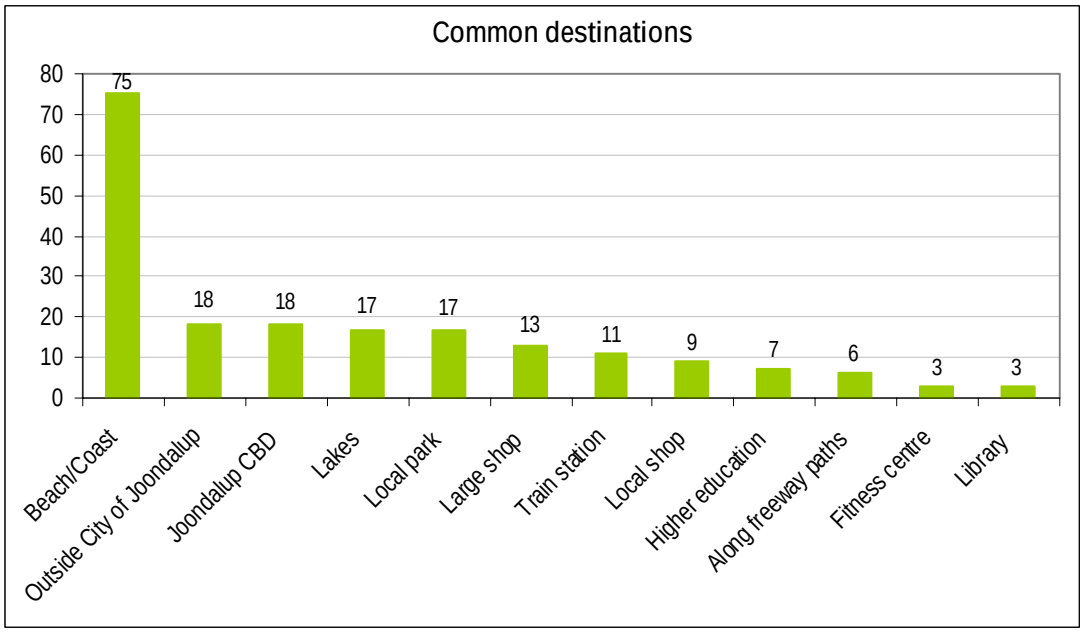

Figure 4: Common destinations by theme

5.1.6 Major potential destinations

When asked "what destinations you would like to ride to but can't?" the most common reasons for not being able to ride to a desired destination were due to missing links in the bicycle network (such as no cycle lanes or shared path), lack of safe crossing points at major intersections, too much traffic, high speed of vehicles, having to weave across roads to access paths, breaks in paths and having paths stop abruptly.

The most common destinations where these issues arose were coastal paths, freeway paths, the northern end of Lake Joondalup along Wanneroo Road where there is no shared path, the coastal area north of Burns Beach and major arterial roads which are not easy to cross or desirable to ride on. It is important to improve the routes to these destinations so that they can be more frequented by cyclists and pedestrians.

On the whole, respondents to the survey were mostly riding for recreation or thinking about riding for recreation. One reason that recreational cycling is more popular is that recreational routes along the coastline and around Yellagonga Regional Park are seen as safer as they are off-road shared paths. This would suggest that promoting recreational cycling can have benefits in increasing commuting cycling for the future.

5.1.7 Cycling in the future

The majority of all respondents thought that their cycling would increase in the future (76%). The most frequent answer for "what would encourage you to cycle more?" was if there was better infrastructure. This was followed by safer cycling routes and the promotion of cycling routes and infrastructure within the City of Joondalup. Of the respondents, 25% of people would like to be part of a cycling group for either novice, experienced or competitive cyclists. This suggests that the development of a strong strategy for promoting cycling is essential as well as linking cyclists into existing cycling clubs or forming new cycling networks.

This research indicates that cycling is going to increase in popularity in the future. The City of Joondalup can facilitate and encourage this growth by ensuring that suitable infrastructure and programs are in place.

5.2 Internal consultation with the City of Joondalup

5.2.1 Bike Plan workshop

Aurecon facilitated an internal stakeholder workshop with City of Joondalup staff on the 9th February 2009. Attendees were from a range of disciplines within the City, including recreation services, operations, transport planning, planning approvals, engineering, road safety, community development and environmental development. Five key areas in relation to cycling and this Bike Plan were identified for discussion during the workshop:

a) Cycling in Joondalup and staff perceptions
b) Planning for cyclists
c) Encouraging cycling in Joondalup
d) Safety
e) Maintaining and improving cycling infrastructure

The following major ideas and suggestions were developed:

- The bicycle network, in its present state, is of a reasonable standard and possesses great potential with the emphasis on improving existing facilities rather than providing more paths
- Safety is the big issue that needs to be addressed in the new bike plan
- Increasing the usage of cycling throughout the City and installing trip facilities such as signage, line markings and parking are the main priorities
- It is crucial to inform the community and increase awareness that a good bicycle network is in place for them to utilise; without raised awareness and promotion of existing facilities cyclist numbers will not increase
- Education of motorists, cyclists and pedestrians (including school children) of the rules, regulations and their respective rights is crucial
- Schools and children should be targeted for encouragement and promotion of cycling
- Various improvements should be carried out to the City's media to increase awareness and encourage cycling in Joondalup
- The integrity of the main north-south and east-west routes is to be a high priority
- Regular maintenance of the cycleways and hazard reporting should be improved

A full set of outcome notes from the consultation workshop are contained within Appendix B.

5.2.2 Ongoing liaison

Meetings were held with key City of Joondalup staff on a regular basis throughout development of this Bike Plan. These meetings were a forum used to discuss progress, outstanding items and the direction the plan should take.

5.3 External consultation with 3rd party agencies and stakeholders

5.3.1 Bikewest

Aurecon met with two members of Bikewest's Cycling Infrastructure team on the 18th February 2009. Bikewest is the Department for Planning and Infrastructure's cycling division, and their focus areas include the Perth Bicycle Network (PBN) and cyclist facilities. Bikewest is also responsible for the PBN Local Government Grants Program.

Aurecon provided an overview to Bikewest on their involvement in developing this Bike Plan and works completed to date. It was recognised that due to the large geographical area of the City of Joondalup and timeframes of the project, an audit of all roads and paths would not be undertaken by Aurecon as part of this Bike Plan. As an alternative, key destinations and sections of paths/PBN would be visited and the cyclist facilities investigated.

Bikewest provided general advice regarding desirable improvements to the cycling network and bike plans. These included:

- Providing end of trip facilities at community centres and public areas, based on Austroads' *Guide to Traffic Engineering Practice Part 14: Bicycles* (1999) advice on the rates for provision of facilities
- Consider providing drinking fountains and parking facilities along recreational routes
- Ensure popular destinations are accessible eg train stations
- In regard to schools, Bikewest generally focuses on routes to schools, rather than facilities provided within the school eg parking
- Advice or drawings of typical details (eg pedestrian crossing, layout of paths) would be useful to include in the plan

Issues specific to Joondalup were also discussed. The popular coastal recreational path was a key item, with Bikewest commenting that the path may not be of an adequate width to service the high volumes of pedestrians and cyclists who use it. Providing a 'parallel' on-road facility to the path is desirable for catering to higher speed cyclists. The potential for conflict between pedestrians and cyclists was noted, especially at points where pedestrians may be crossing the path to access the beach. Creating a recreational path system at Yellagonga Regional Park was also raised as a desirable improvement to Joondalup's recreational cycle network.

Bikewest identified the proposed PBN routes within the City. These are generally Local Bicycle Routes orientated in an east-west direction. The routes are nearly complete and following an audit to ensure they are complete and the installation of signage, they will be added to cycling maps and advertised to the general public. The proposed routes are shown on the Perth Bicycle Network Work Plan map contained within Appendix C. Aurecon suggested that extending the existing PBN routes northwards through newly developed areas could also be considered.

5.3.2 Public Transport Authority (PTA)

On the 6th March 2009, Aurecon and the Cycling Integration Manager of PTA discussed the Bike Plan and methods of improving integration between public transport (in particular, by train) and cycling.

Within the City of Joondalup, there are six train stations located along the Joondalup rail line, these being Currambine (most northerly station), Joondalup, Edgewater, Whitford, Greenwood and Warwick (most southerly station).

PTA advised that accessibility to the train stations is of primary importance. Barriers to accessing the stations by bicycle include the large volumes of car traffic (as spill over parking along PBN routes can occur) and the higher levels of traffic creating 'squeeze points' at the station entrances/exits. Off-road paths providing access to the stations are desirable according to PTA and their commitment to improving cycling infrastructure was demonstrated with funding applications to Infrastructure Australia including $90 million worth of PBN expansion projects (across WA). The 10 year forward plan of PTA aims for a 10% modal share of people cycling to train stations.

End of trip facilities (parking) at the train stations was discussed. PTA advised that a parking plan is being established for the stations which includes provision of bicycle parking closer to the station entrances, for example, CCTV covered U-rail parking approximately 50m from the entrances is under consideration. Bicycle lockers are not being provided on the platforms due to safety concerns regarding cyclists riding in a crowded area and the potential for storage in the lockers of dangerous goods.

PTA indicated they are willing to respond to public demand for increases in bicycle parking facilities at the train stations. This demand for increased parking could be direct from the public or via the City of Joondalup. PTA is aiming for consistency across their stations regarding parking facilities for cyclists. The issue of bicycles on trains was discussed. At present, bicycles are banned on trains from 7-9am and 4.30-6.30pm in the peak directions. This is necessary due to the capacity of the system. PTA

noted that the proportion of passengers who wish to take bicycles on trains may be low, for example, in Victoria where this is allowed only ~0.5% of total boardings are those with bicycles. Aurecon notes that there is ongoing dialogue between the local governments and PTA regarding this issue.

PTA noted the importance of marketing cycling as a mode of transport; simply providing cycling infrastructure and end of trip facilities is not enough to increase the modal share of cycling. The TravelSmart program was mentioned as a good tool for encouraging people to cycle to the train stations instead of driving, especially for shorter distance trips. The health benefits of cycling and cycling for transport being a good way for 'time-poor' workers to incorporate exercise into their day were also raised as marketing strategies. PTA and Aurecon agreed there is a need for ongoing work towards normalising the choice of cycling within the community.

Appropriate signage is important to assist those who choose to cycle. The PTA signage manual has a full complement of bicycle signage and PTA is improving their standardisation of signage. PTA indicated a willingness to fund signage for access to the train stations to help ensure consistent treatment.

PTA is looking at ways to improve the safety of cyclists at train stations. They are conducting surveys at the stations based on the Main Roads WA safety audit template. A noted safety concern is the high speeds of cars through some car parks and roads leading to the stations.

PTA indicated a strong willingness to be pro-active in communicating with the City of Joondalup regarding the integration of cycling and public transport.

5.3.3 Department of Environment and Conservation (DEC) (formally Conservation and Land Management (CALM))

DEC manages the Yellagonga Regional Park in collaboration with the City of Joondalup and City of Wanneroo. Aurecon consulted with the DEC on 10th March 2009 regarding extension of the shared path network within the park, as the community identified this as a popular route that could be extended to complete a loop around the park.

In concept, extending the shared path network was considered a good idea by DEC who indicated they support shared path construction around regional parks. Recently, 1.4km of shared path was constructed on the eastern side of the park, north of Wanneroo, and 3km of path upgrades were carried out on the western side of the park, near the Joondalup town centre.

DEC referred Aurecon to their *Yellagonga Regional Park Management Plan 2003-2013* (CALM, City of Joondalup and City of Wanneroo 2003), as this includes a recreational masterplan for walk trails and shared paths. A copy of the masterplan is provided in Appendix D and is used as a guide when suggesting new path locations and infrastructure in this Bike Plan.

As the majority of visitors to the regional park are residents of the City of Joondalup or City of Wanneroo, the local governments often fund works within the Yellagonga Regional Park.

DEC indicated a willingness to further discuss the Yellagonga Regional Park path network in more detail as required.

5.3.4 City of Stirling

The City of Stirling borders the City of Joondalup to the south, and as such, a number of north-south aligned cycling routes continue through both local government areas.

A key issue faced by both Cities is the interaction between pedestrians and cyclists on the coastal shared path. Different approaches have been adopted or explored in the past regarding minimising conflict between the user groups, including line marking, awareness campaigns and a proposal (which

was rejected) to require cyclists to dismount through the 'hotspots.' It is recommended the Cities work together to provide a consistent treatment along the coast for managing conflict between path users.

A number of local PBN routes cross the border between the City of Joondalup and City of Stirling, being NW1, NW2 and NE2. Routes NW1 and NW2 cross over Beach Rd, and have suitable crossing points. Route NE2 also requires cyclists to cross Beach Rd, but there is no crossing point provided. This should be investigated by both Cities to ensure connectivity along the routes.

The City of Stirling promotes the TravelSmart program and also a number of recreational cycling trails in the City.

5.3.5 City of Wanneroo

The City of Wanneroo's *Wanneroo Bike Plan 2008* (GHD 2008) identifies the local needs for programs and for road and path improvements within the City. In relation to connectivity with Joondalup, the community indicated a desire for a complete path around Lake Joondalup such that a circuit could be ridden.

An examination of the boundary between the local governments of Wanneroo and Joondalup identified:

- On-road bicycle lanes continue across the local government boundary along Joondalup Dr, Ocean Reef Rd and Marmion Ave.
- On-road bicycle lanes on Whitfords Ave finish at Wanneroo Rd; no off-road or on-road facilities exist between Whitfords Ave and Gnangara Rd (also a district distributor)
- Off-road path continues across the local government boundary along Hepburn Ave, and an off-road connection is made from Warwick Rd to Marangaroo Dr (also a district distributor)
- PBN local bicycle route NW4 crosses the Joondalup / Wanneroo boundary
- The coastal shared path in Joondalup finishes before the boundary

Whilst the City is not responsible for works outside its local government area, it will strive for maintaining connectivity across the Joondalup / Wanneroo boundary and liaising with the adjacent City of Wanneroo when required.

5.3.6 Bicycle groups

The Northern Districts Cycle Club (NDCC) promotes and supports cycling as a sport. On the 11th March 2009, Aurecon and a key member of the NDCC discussed the club's desired facilities and views on recreational cycling.

NDCC noted that a move towards the provision of on-road cycle lanes is occurring. The club notes the safety issues associated with this, namely the collection of rubbish and other debris in these kerb side lanes. To avoid riding through rubbish or glass a cyclist may need to swerve into the vehicle lane which poses a safety hazard. Glass in the cycle lanes can also lead to punctures which may leave a cyclist stranded along their cycling route. Regular cleaning of the on-road facilities is required.

Recreational cycling commonly occurs along the coast and NDCC views the provision of a shared path in conjunction with on-road cycle lanes as an important way to reduce conflict on the coastal path. The shared path is a popular route for those seeking a more 'passive' recreational activity, such as walking or slower speed cycling. The club noted that cyclists wishing to ride at a higher speed commonly avoid the path as it would be too dangerous to ride in that environment, instead choosing to cycle on-road. In addition to the coastline, Hillary's Boat Harbour and the city centre were noted as popular destinations for cyclists.

The issue of end of trip facilities was discussed with NDCC. The club raised the possibility of including a requirement for showers, change rooms and secure parking as part of the building approvals process.

The Joondalup Combined Community Groups Association (JCCGA) represents several groups of wheeled sports, including: hand cyclists, over 55 cyclists, mountain bike cyclists, BMX cyclists, the Northern Districts Cycle Club, the North Coast Tri Club, Skate WA, skate bowl competitors, track cyclists and criterium road cyclists. The chairperson of JCCGA was encouraged to raise the Bike Plan for discussion at the monthly meeting of the group. Feedback was provided but was outside the scope of this Bike Plan.

6. Existing cyclist facilities

The City of Joondalup's existing cyclist facilities were identified through a desktop study of maps and an aerial photo of the City (dated December 2007). These desktop studies were supplemented by a site visit by two Aurecon members of staff on 19th February 2009. This section presents an overview of the City's existing cycling facilities and routes. This section also identifies the shortcomings of the routes investigated. Section 8 of this Bike Plan presents a list of the priority shortcomings to be addressed over the six year period to 2015.

6.1 Existing road network

"Cycling is a clean and efficient mode of transport that is well suited to many of the trips currently made in cars, particularly in inner urban areas" (Austroads 1999). People who cycle as a method of transport, in particular commuters and utility cyclists, desire direct, convenient and efficient cycling routes. This is often achieved by following the existing network of roads.

Austroads (1999) provides guidance on the on-road or off-road cycling facilities required for different classes of roads. These are defined by the road hierarchy system that categorises roads by their functions. The Joondalup Road Hierarchy is illustrated on the (MRWA) Functional Road Hierarchy map for the City (refer Appendix E) and consists of five different types of road as per Table 2.

Table 2: Road hierarchy

Class	Description	Desirable cyclist facilities
Primary distributor	These provide for major regional and inter-regional traffic movement and carry large volumes of generally fast moving traffic.	Off-road path or wide on-road lanes
District Distributor A	These carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors.	Off-road shared path or on-road lanes
District Distributor B	Perform a similar function to Type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property.	Off-road shared path or on-road lanes
Local Distributors	Carry traffic within a cell and link District Distributors at the boundary to access roads. Route encourages use to be limited to traffic belonging to or servicing the area.	Off-road shared path or on-road lanes
Access Roads	Local roads with limited traffic volumes	On road cycling

The Joondalup TravelSmart map (refer Appendix F) was used to identify the on-road and off-road cyclist facilities on district distributor roads within the City. The main objective was to identify missing links that reduce the connectivity of the bicycle network. The results of this study are summarised in Appendix G Table 1.

In general, cycling facilities (both on-road and off-road) along district distributor roads improve as one moves north through the City. This reflects the growing awareness over time regarding the importance of providing for cyclists, as development in Joondalup generally progressed in a northwards direction. Roads through the CBD, including Joondalup Dr, Lakeside Dr, and Grand Blvd, were noted as being cycle friendly. The east-west aligned arterial roads of Hepburn Ave and Warwick Rd were noted as having the most limited cycling facilities. Shared paths typically lacked line marking, as too did some on-road bicycle lanes.

6.2 Perth Bicycle Network (PBN)

There are six routes of the *Perth Bicycle Network Plan* (Bikewest 1996) that pass through the City of Joondalup and these are the local bicycle routes NW1, NW2, NW4, NE2, the Principal Shared Path (PSP) along the Mitchell Freeway and the Recreational Shared Path (RSP) along part of the coastline.

The Joondalup TravelSmart map (refer Appendix F) illustrates the PBN routes.

The existing standard of the local bicycle routes was identified by examining an aerial photo of the City and a one day site visit to spot locations within Joondalup. The following observations were noted:

- Local bicycle routes are predominately comprised of on-road cycling, although there are generally no dedicated bicycle lanes
- The City's road hierarchy indicates that these roads are typically access roads or access roads that have been re-classified as local distributors. Reclassification suggests that traffic volumes have increased and the bicycle friendliness of the roads may have decreased.
- Spot measurements suggest that the roads are generally not wide enough to mark bicycle lanes, unless the median is narrowed or removed
- Shared paths generally do not have line marking or signage

Local bicycle routes NW1 and NW4 were examined in detail and a list of potential shortcomings along these routes is contained in Appendix G Table 2 and Table 3. Similar issues were identified for both NW1 and NW4, and it is expected NW2 and NE2 also have these shortcomings.

During the site visit, sections of local bicycle routes NW1 and NW2 were driven. As a number of these PBN routes travel through suburban areas on relatively quiet streets, one observation stood out notably: if the cyclist did not know the route or have a map to regularly check they would likely get lost as there is very little PBN route tag/signage and of those present some are badly positioned. This observation indicates an audit of the PBN signage would be beneficial to identify where new signage is required.

A short section north of Burns Beach Road was also visited and it was noted that all that needed to be done to extend the PBN routes northwards would be to undertake a formal audit of the route, install signage and update the PBN route maps.

6.3 Yellagonga Regional Park

Yellagonga Regional Park borders both the City of Joondalup and the City of Wanneroo and is a popular destination for recreational cyclists.

Within Joondalup, the majority of the planned shared path network has been constructed. A shared path has recently been constructed between Joondalup Dr/Burns Beach Rd and Neil Hawkins Park. From Neil Hawkins Park to Lake Goollelal, the cycling route is predominately shared path with a small section of on-road cycle lanes.

The main section of the network yet to be developed is along the eastern side of Lake Goollelal, to complete a circuit around the lake. A section of shared path to the west of Wallaburnup Swamp is also required and the City advises this work is scheduled for the next 12 months.

Within Wanneroo, an initial review of the cycle network through the park indicated approximately half of the shared path had been constructed, generally beside Lake Joondalup.

Specific shortcomings of the cycling network in Yellagonga Regional Park are listed in Appendix G Table 4 (for sections of park within City of Joondalup only).

6.4 Field observations

Aurecon conducted a site visit on the 19th February 2009, during which a number of key destinations were visited and sections of the PBN driven. The destinations visited included the train stations, a sample of schools/education facilities, a sample of shopping centres and a sample of parks/recreation areas within the City.

Observations were made on the signage and access to the destinations and end of trip facilities available, as outlined in Appendix G Table 5. A photo record was taken of the observations made during the site visit and is contained in Appendix H. Generally:

- Immediate access to train stations was good
- Signage to train stations was poor
- Immediate access to education facilities was good
- Immediate access to shopping centres was good. Signage and parking at shopping centres varied from poor to good.
- Immediate access to parks and recreation areas was good. Signage and parking for parks and recreation varied from poor to good.

6.5 Review of crash data

During the consultation process safety was identified as a major barrier to cycling. An obvious driver in the level of safety performance is the availability and quality of existing facilities. A good measure for the current level of safety for the existing facilities is the historic crash data for the City.

A number of crashes have occurred in the City of Joondalup involving cyclists. The detailed MRWA five year crash data for the period 1st January 2003 to 31st December 2007 was examined to determine the frequency and severity of crashes involving bicycles and any locations within the City that appear to be areas of concern.

The following statistics are noted and are illustrated in Figure 5:

- A total of 163 crashes involved bicycles
- The crash rate over the five year period did not form a discernable pattern of either an increased rate or decreased rate
- 25.2% resulted in hospital treatment
- 31.3% resulted in medical treatment
- 6.1% resulted in major property damage only (PDO major)
- 37.4% resulted in minor property damage only (PDO minor)

From the above, it is observed that a high percentage of bicycle crashes result in a considerable level of severity (medical and hospital treatments). This reinforces that safety is perceived to be one of the barriers to cycling and is an issue that this Bike Plan will address. Unless the residents feel it is safe for them to cycle, they would not start cycling.

It is noted that the crash data only contains records of reported crashes. Unreported crashes, which are unknown in number, are not included but typically occur when the severity is PDO minor.

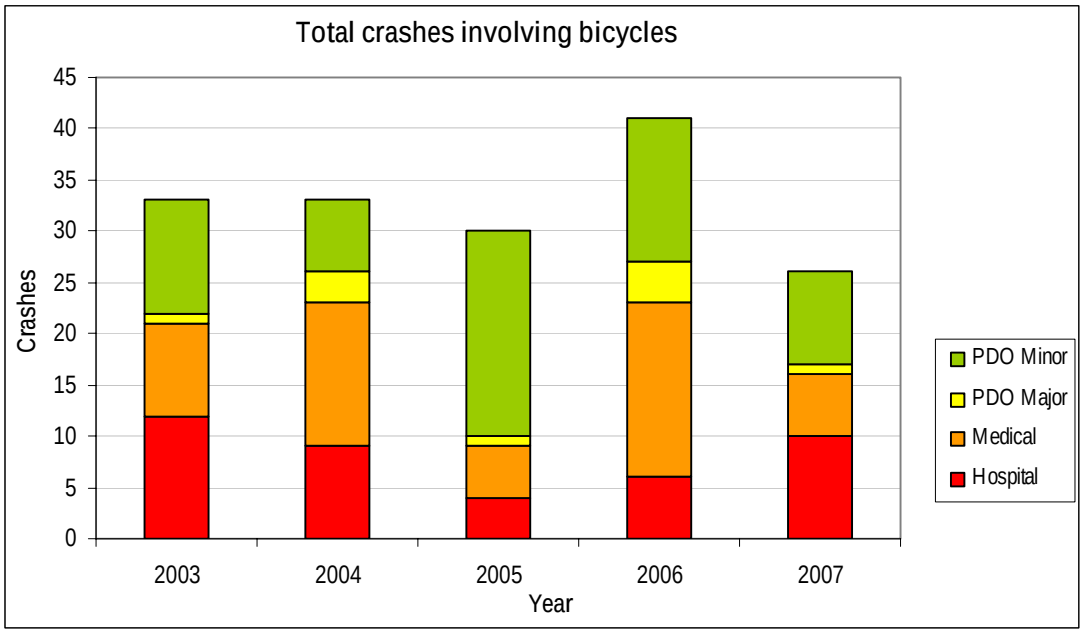

Figure 5: Crashes per year

The crash locations are widely dispersed throughout the City, as shown on the map Cycling Areas of Concern contained in Appendix I. Intersections where two or more reported crashes occurred are identified in Table 3. These locations are typically intersections of busy district distributor roads, and represent the high priority locations for funding directed towards crash investigation and safety improvement works.

Table 3: Crash locations (intersections with two or more crashes)

Location	Number of crashes	Severity
Marmion Ave & Shenton Ave	4	1xHospital, 1xMedical, 2xPDO Minor
Marmion Ave & Marina Blvd	3	2xMedical, 1xPDO Minor
Whitfords Ave & Hepburn Ave & West Coast Dr	3	1xHospital, 1xMedical, 1xPDO Minor
Barridale Dr & Hepburn Ave	2	1xPDO Major, 1xPDO Minor
Curbur Rd & Ripley Wy	2	2xPDO Major
Northbound, Hepburn Ave offramp	2	1xHospital, 1xPDO Minor
Joondalup Dr & Hodges Dr & Grand Blvd	2	1xHospital, 1xPDO Minor
Marmion Ave & Freeman Wy	2	1xHospital, 1xPDO Minor
Marmion Ave & Hepburn Ave	2	1xHospital, 1xPDO Minor
Marmion Ave & Hodges Dr	2	1xHospital, 1xPDO Minor
Marmion Ave & Kinross Dr	2	1xMedical, 1xPDO Minor
Marmion Ave & Warburton Ave	2	1xMedical, 1xPDO Minor
Shenton Ave & Delamere Ave	2	1xHospital, 1xMedical
Shenton Ave & Joondalup Dr	2	1xPDO Major, 1xPDO Minor
Tenerife Bvd & Whitfords Ave	2	2xMedical
Warwick Rd & Erindale Rd & Cockman Rd	2	1xMedical, 1xPDO Minor
Whitfords Ave & Timbercrest Ri	2	2xMedical

Crashes that occur near a popular land use facility or school are also a concern, as it is probable conflict between bicycles and other vehicles will continue to occur at that location. Table 6 in Appendix G lists schools which had a reported crash on the adjacent road network over the five year period. Also listed are popular land use areas which had two or more crashes on the adjacent road network.

6.6 Review of 2002 / 2003 Bike Plan

Historic and past plans for proposed cycling facilities were reviewed in order to assess the level of works carried out to date, to identify areas of possible shortfalls and to guide proposals for future works and improvements.

A number of recommended projects from the 2002/2003 Bike Plan were not completed over the previous five year period. The projects which were not completed and the reason for non-completion are provided in Appendix G Table 7. It is recommended the City consider these projects when choosing projects for the proposed spot improvement infrastructure works (refer Section 8.7).

6.7 Proposed future priority works

A review of the City's existing cycling facilities and the community and consultation responses (as outlined in this section of the Bike Plan) has identified a significant number of potential network infrastructure improvements which could improve and enhance the cycling facilities of the City.

Of these, a number of priority works have been identified for completion during the six year period to 2015. These works have the most potential for providing key benefits as discussed in Sections 7 and 8 of this report. The tables within Appendix G may be referred to for identifying additional projects if surplus funding is identified.

7. The 2009 Bike Plan

7.1 City vision

The vision of the City is "*a sustainable City that is committed to service delivery excellence and operates under the principles of good governance."*

The mission of the City is "*to undertake all our activities with the endeavour of meeting community expectations and achieving sustainable lifestyles*."

The following guiding principles of the City of Joondalup support this Bike Plan:

5.1 "To ensure the City's facilities and services are of a high quality and accessible to everyone.

5.2 To facilitate healthy lifestyles within the community"

7.2 Aims and objectives

The overall aim of this Bike Plan is to provide a safe and easy to use environment for cyclists and increase the number of people cycling in the City of Joondalup.

The key objectives are:

- To improve the cycling infrastructure by maintaining the already extensive network of pathways, cycle lanes and signed bicycle routes servicing major destinations and the wider bicycle network within the City and providing new infrastructure where necessary
- To expand the City's bicycle parking facilities particularly at major destinations
- To improve access to and facilities at Warwick, Greenwood, Whitfords, Edgewater, Joondalup and Currambine train stations
- To prioritise ongoing maintenance and repair of the bicycle network
- To increase bicycle safety through the enforcement of existing regulations for road and bicycle users and a reduction of speed limits or alternative measures in required areas to prevent bicycle crashes
- To increase the number of people cycling in the City of Joondalup
- To promote the health benefits of cycling, highlighting the safe and convenient routes and the City of Joondalup as a destination for cycling
- To promote cycling as an attractive, cost effective and practical alternative to car travel
- To develop and deliver bicycle education strategies targeting pedestrians, cyclists and motorists and to raise awareness of safety for all road and path users
- To build a culture among the City of Joondalup staff that cyclists are of high priority and must be considered in all aspects of planning and environmental strategies
- For City of Joondalup staff to implement the Bike Plan 2009

7.3 Opportunities and constraints

In adopting this Bike Plan, the City of Joondalup has an opportunity to:

- Increase the safety of cyclists
- Implement education and encouragement strategies which aim to increase usage of existing cyclist facilities
- Make improvements to the existing cycling network and maintenance regime
- Introduce new facilities to enhance the cycling network

This Bike Plan is a six year planning document for the years 2009 – 2015. Within this timeframe, a certain level of funding and resources are available for implementing cycling related projects. Ideally, all suggestions for increasing the number of cyclists would be carried out and all identified problems along the cycling network rectified. However, this Bike Plan must work within its timeframe and funding constraints and therefore prioritisation criteria have been established as part of this plan.

7.4 Prioritisation criteria

Based on the results of the Community Feedback Survey, the City of Joondalup internal workshop and consultation with external agencies, the following principles have been established:

- Both strategic works (in terms of planning, marketing and education) and infrastructure/maintenance works are vital when trying to increase cyclist numbers
- Safety concerns are a major barrier to people cycling and are the main reason why current cyclists would stop cycling or not start cycling
- Education of pedestrians, cyclists and motorists is important to ensure the safety of all road and path users.
- Informing the community and making them aware a good bicycle network exists for them to utilise is crucial to encouraging cycling
- Rectifying missing links or poor quality sections of the PBN routes would deliver a substantial increase in the usefulness of the routes
- Arterial and primary commuter routes should be provided with parallel facilities ie a shared path in addition to on-road cycle lanes
- Cycling for recreation can lead to people cycling for other reasons eg commuting. Cycling for recreation is an attractor for potential cyclists. Beginning cycling at an early age can lead to sustained use of cycling as a mode of transport.
- Working with other agencies would enable the City to deliver projects within areas over which they do not have direct control
- Minimum expenditure projects which deliver obvious improvements to high use areas would send a positive message to the community that the City is pro-active in improving cycling infrastructure

Projects which support the above principles are considered to have high priority and are discussed further in Sections 8, 9 and 10 of this Bike Plan.

7.5 Funding

The City of Joondalup funds cycling infrastructure as part of its Capital Works Program. Typically, $350,000 to $500,000 is allocated annually to the 'Paths' category of capital works. This category includes shared paths, new paths, path replacement and bicycle networks.

A workshop held on the 24th April 2009 between Aurecon and the City of Joondalup project staff identified that approximately 20% of annual spending will be directed towards improvements to shared paths along Marmion Avenue (the major north-south arterial road through the City) and 40% of funds towards shared paths along other arterial roads. The remaining 40% of funds will be directed towards line marking and signage, parking and end of trip facilities, spot improvements and improvements to the shared path network along local roads.

The City will explore additional funding opportunities for cycling infrastructure. This includes grants and/or through developing partnerships to achieve project outcomes.

Grant programs that support cycling infrastructure exist at both the national and state level. Nationally, the AusLink Roads to Recovery Program provides funding for the construction, maintenance and upgrade of roads, for which the definition of roads includes bicycle paths when in association with a road (located in road reserve or removed from the road reservation for safety purposes). In previous instances, local governments have used all or most of their Road to Recovery funding for cycling and walking infrastructure.

AusLink funds a second grants program, the Black Spot Program, which aims to reduce the social and economic costs of road trauma. Potential cycling projects funded by this grants program include treatments installed to provide for bicycles, for example, traffic signals for bicycles to cross a high volume road and improving lighting at locations where there are many bicycles at night.

At the State Government level, the Department for Planning and Infrastructure's PBN Local Government Grants Program supports the development of cycling facilities. Project categories considered for funding include bicycle lanes, signage, local bicycle plan development, new shared paths, paths upgrades, generic minor works and end of trip facilities. Installation of bicycle lanes is the most important aspect of implementing the PBN Plan and is therefore the highest priority category within the PBN Local Government Grants Program.

The City of Joondalup will explore the potential for developing relationships with key stakeholders for providing new or improved cycling infrastructure.

Working together or establishing formal partnerships will be important as the City of Joondalup does not have direct control over many of these areas.

A variety of potential relationships exist, such as with PTA in improving access to and around the train stations, with DEC and the City of Wanneroo in developing a complete circuit of shared paths around Yellagonga Regional Park, with ECU as a major trip attractor in the CBD, with schools to increase cycling education and the number of children cycling and with developers to increase the attraction of cycling as a mode of transport to and from their developments.

8. Infrastructure works

The consultation process and review of existing cycling facilities identified a large number of desired infrastructure projects within the City of Joondalup. By considering the opportunities and constraints presented by this Bike Plan and the prioritisation criteria specified in Section 7.4, a six year forward plan of infrastructure projects was compiled. These projects focus on improving safety, network connectivity, network continuity and information available to cyclists.

8.1 Safety

The most common factor that would encourage non-cyclists to take up cycling was better cycling infrastructure to create safer cycling routes, and the majority of current cyclists said they would stop cycling if it became unsafe. Evidently, infrastructure works to improve safety are highly desirable.

Signage and line marking can assist a cyclist to understand the network and help decrease confusion and conflict with pedestrians and motorists.

A large number of the City's shared paths are currently unsigned and non-line marked. If regulatory signage was installed, cyclists would be legally allowed to use these off-road paths. This will encourage increased cycling for those who feel unsafe cycling on-road and decrease the 'missing links' within the network for those cyclists.

In addition to safety benefits, improved wayfinding signage and line marking can be used to promote end of trip facilities and common destinations within the City.

Recommendation: That the City of Joondalup installs signage and line marking as listed in the Schedule of Infrastructure Works (Section 8.7.2).

8.2 Recreation

The most common destination of respondents of the Community Feedback Survey was the coastal area. Also attracting a large number of cyclists are the City's parks and the lake system within Yellagonga Regional Park. Responses to the survey indicated a strong bias for recreational cycling, with people mostly riding for recreation or thinking about taking up riding for recreation.

During the consultation process, it was observed that the coastal destination is very popular for both cyclists and pedestrians, which leads to a highly trafficked shared path and conflict between the different users. On-road bicycle lanes on the road adjacent to the coastal shared path would attract cyclists away from the path and reduce conflict (note some sections already have dedicated on-road facilities). Access between the coast and the suburbs often involves crossing a major road and it is important for adequate crossing points to be provided.

The shared path network within Yellagonga Regional Park is partially complete, with sections of path to the east of Lake Goollelal remaining to be constructed.

Recommendation: That the City of Joondalup continues to construct portions of the shared path network through Yellagonga Regional Park and works in conjunction with DEC to achieve this.

Recommendation: That the City of Joondalup improves the recreational cycling network by undertaking work items listed in the Schedule of Infrastructure Works (Section 8.7.2).

8.3 Perth Bicycle Network

The majority of local PBN routes within the City of Joondalup rely on on-road cycling. The routes are, in places, over 10 years old and during this time the traffic volumes on the roads has typically increased. Actions should be taken to ensure the integrity of the local PBN routes is maintained by installing on-road bicycle lanes where possible.

If the road is too narrow to allow for bicycle lanes to be installed at an adequate width, consideration should be given to developing off-road paths along that route. If the roads do not have sufficient width, consideration should also be given to installing bicycle logos only according to MRWA policy, to signify to motorists that cyclists will also be using the lane.

Portions of the local PBN routes consist of shared paths although these are generally unmarked.

Recommendation: That the City of Joondalup improves the PBN routes by undertaking work items listed in the Schedule of Infrastructure Works (Section 8.7.2).

8.4 Arterial roads

The City's arterial roads provide a high level transport network for both motorists and cyclists, providing local and regional connections between the suburbs and neighbouring local municipalities. Due to the high volumes of traffic on these roads it is important to provide dedicated cyclist facilities. A lack of dedicated cyclist facilities is most notable for the southern (typically older) suburbs.

A shared path and dedicated on-road bicycle lanes is desirable for these roads, to cater for the various types of cyclists and their needs. Recognising the limitations of this plan and the relatively high cost of road widening in order to install adequate width bicycle lanes, a continuous shared path on at least one side of arterial roads should be a minimum goal of the City over the coming six years. It is also aimed for Marmion Avenue, identified as one of the primary north-south routes through the City, to have a continuous shared path on both sides of the road.

Recommendation: That the City of Joondalup improves the shared path network along arterial roads by undertaking work items listed in the Schedule of Infrastructure Works (Section 8.7.2).

Recommendation: That the City of Joondalup considers arterial road widening for the provision of bicycle lanes within the capital works budget for road works.

8.5 Local roads

Increasing cycling at a school-age level is a key issue to be targeted within this Bike Plan. In addition, cycling as a mode of transport for local trips, such as for shopping, socialising and recreation, is to be promoted and encouraged.

Regarding localised infrastructure improvements, a workshop between Aurecon and City of Joondalup project staff identified the need for shared paths beside the local roads listed in Table 4. The list is extensive and the City of Joondalup will select priority works to be undertaken over the coming six years. Priority areas include those near a school, near a recreation facility / shopping centre and/or part of a PBN route.

Table 4: Shared paths beside local roads – City of Joondalup to select priority items

Suburb - Road	Suburb - Road
Beldon - (part) Eddystone Ave	Kallaroo - Dampier Ave
Connolly - Constellation Dr and Prendivelle Ave	Kingsley - (part) Moolanda Ct
Connolly - Diablo Wy	Kingsley - Drayton Wy
Craigie - (part) Eddystone Ave	Kingsley - Kingsley Dr
Craigie - Craigie Dr	Kingsley - New Cross Rd
Duncraig - Glengarry Dr and (part) Doveridge Dr	Mullaloo - Dampier Ave
Duncraig - Marri Rd	Ocean Reef - Venturi Dr
Edgewater - BirdlandCl	Padbury - (part) Alexander Rd
Edgewater - Treetop Ave and Outlook Dr	Padbury - (part) Warburton Ave
Greenwood - (part) Reilly Wy and Dargin Pl	Padbury - Giles Ave
Greenwood - Allenswood Rd	Sorrento - (part) Jerome Ave
Greenwood - Coolibah Dr	Warwick - Dorchester Ave
Heathridge - (part) Poseidon Rd	Woodvale - Trappers Dr
Heathridge - Caridean St	Kingsley - Kingsley Dr
Hillarys - (part) Lymburner Dr and Oliver St	Kingsley - New Cross Rd

Recommendation: That the City of Joondalup improves the shared path network along local roads by prioritising and undertaking work items listed in Table 4 in accordance with the Schedule of Infrastructure Works (Section 8.7.2).

As traffic volumes increase on access roads and local distributors, local area traffic management treatments are commonly installed to reduce traffic speeds and encourage through traffic to use higher order roads. These treatments, such as widening median strips or installing roundabouts, can be inconvenient and/or unsafe for cyclists. The design of such treatments must consider the needs of cyclists and pedestrians as well as motor vehicles.

Recommendation: That future traffic calming measures installed by the City of Joondalup consider cyclists and are convenient and safe for usage by cyclists.

Recommendation: That the City of Joondalup provide alternative routes for cyclists when construction works impact upon shared paths or on-road bicycle lanes

8.6 End of trip facilities

The City of Joondalup has investigated strategic bicycle parking locations within the Joondalup city centre. The installation of these facilities which was recommended in the 2002/2003 Bike Plan, has not occurred throughout the City and is still a relevant project as the Joondalup city centre is a major trip attractor.

Consultation and field observations by Aurecon indicated there is a lack of parking facilities at some of the popular coastal destinations, parks and retail centres. Parking at coastal locations is considered a priority over the parks, as bicycles can often be kept close to or within view of the rider when at a park.

Recommendation: That the City of Joondalup audits and installs parking facilities as required within the CBD, parks and recreational areas, commercial centres, education facilities and other civic places.

8.7 Schedule of infrastructure works

8.7.1 Indicative costs

The Bike Plan assumes an annual provision of approximately $350,000 to fund infrastructure works for cycling. The funding assumed at $350,000 includes grant funding of approximately $50,000 to $100,000, per year.

In order to cost the infrastructure projects identified, unit rates have been adopted to estimate indicative costs for projects identified in this Bike Plan. Typical rates have been sourced from recent construction projects in the Perth metropolitan area and rates advised by the City of Joondalup. The rates are for capital works only and are given in Table 5.

Table 5: Typical construction costs

Work item	Rate (ex GST)
Line marking	$2 per m
Bicycle symbol	$1 per m of road
Signage	$150 per sign
Kerb ramp	$300 per ramp
Bicycle parking	$400 per parking space
New concrete path, 2m width	$80 per linear m
New concrete path, 2.5m width	$95 per linear m
Replace path	$55 per m^2
Widen road by 2m for bike lane one side	$155 per m of road

Any opinion or estimate of costs by Aurecon is made on the basis of Aurecon's experience and qualifications and represents Aurecon's judgment as an experienced and qualified professional engineer, familiar with the construction industry. However, Aurecon has no control over the cost of labour, materials, equipment or services furnished by others or over Contractors' methods of determining prices or over competitive bidding or market conditions. Therefore, Aurecon cannot and does not guarantee that proposals, bids or actual construction costs will not vary from Aurecon's estimates. The cost estimates are given in today's dollars, with no allowance for the potential change in the cost of works over time.

8.7.2 Schedule of infrastructure works

The City of Joondalup is committed to ensuring that new bicycle infrastructure is installed to expand and improve the existing network. The City recognises that some flexibility is needed to alter project works as needed.

Recommendation: That the City of Joondalup undertakes work items as listed in the Schedule of Infrastructure Works below.

Year 2009 / 2010			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I0	West Coast Drive Shared Path Upgrade – Beach Road to The Plaza (Total project cost includes carry forwards)	Existing project	$4,250,000
Total			$4,250,000

Year 2010 / 2011			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I1	New shared path on eastern side of Marmion Ave, from Hobsons to Ocean Gate (180m)	Section 8.4; Appendix G Table 6 'Shop'	$17,100
I2	New shared path on eastern side of Marmion Ave, from Moore to Delamere (300m)	Section 8.4; Table 3	$28,500
I3	New shared path on eastern side of Marmion Ave, from Dalzell to Dorian (160m)	Section 8.4; Appendix G Table 7 row 11	$15,200
I4	New shared path on eastern side of Marmion Ave, beside Aldercress (90m)	Section 8.4; Table 3	$8,550
I5	New shared path on western side of Erindale Rd, from Centro Warwick to Beach (130m)	Section 8.4 (adjacent shops)	$12,350
I6	New shared path on southern side of Hodges Dr, from Venturi to Marmion (630m)	Section 8.4 (access to coast); Table 3 row 10	$59,850
I7	New shared path on northern side of Hepburn Ave, beside Ellison (330m)	Appendix G Table 1 row 2	$31,350
I8	New shared path on northern side of Hepburn Ave, beside Renegade (290m)	Appendix G Table 1 row 2	$27,550
I9	New shared path on northern side of Hepburn Ave, beside Cobradah (190m)	Appendix G Table 1 row 2	$18,050

I10	New shared path on northern side of Ocean Reef Road, from Trappers Drive to end of existing shared path at Edgewater Drive (500m) *	Existing project	$27,850
I11	New shared path along Burns Beach Road, from Connolly Drive to Marmion Avenue (725m)*	Existing project	$36,950
I12	Install bicycle parking and end of trip facilities at various locations in the CBD, at Sorrento/Duncraig Library, at Ocean Ridge Leisure Centre and at Sorrento/Duncraig Leisure Centre	Section 8.6; Appendix G Table 7 rows 16-19	$21,600
I13	Line marking of shared paths, bicycle symbols on roads and directional and regulatory signage on local PBN routes NW1 and NW4	Appendix G Table 2 and Table 3	$36,000
I14	Install bicycle lanes with bicycle symbols along Marmion Avenue*	Existing project	$4,050
I15	Install directional signage along coastal shared path*	Existing project	$5,700
Total			$350,650

Year 2011 / 2012			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I16	New shared path on eastern side of Marmion Ave, beside Mission Hills (220m)	Section 8.4; Table 3	$20,900
I17	New shared path on western side of Marmion Ave, from Webb to Flinders (150m)	Section 8.4; Table 3	$14,250
I18	New shared path on western side of Marmion Ave, from Whitfords to Monkhouse (500m)	Section 8.4; Table 3	$47,500
I19	New shared path on northern side of Hepburn Ave, beside Claygate (680m)	Appendix G Table 1 row 2	$64,600
I20	New shared path on southern side of Burns Beach Rd, from Connolly to Sunlander (180m)	Section 8.4	$17,100
I21	New shared path on western side of Grand Blvd, from Collier to Joondalup Dr (560m)	Table 3 row 7; Appendix G Table 6 'school & shop'	$53,200
I22	New recreational shared path connection, to complete circuit around Lake Goollelal (200m)	Appendix G Table 4 row 3	$19,000
I23	New recreational shared path beside Lakeway, to complete Lake Goollelal circuit (900m)	Appendix G Table 4 row 2	$85,500
I24	Install bicycle parking and end of trip facilities at various locations in City, as determined by City	Appendix G Table 5	$20,000
I25	Line marking of shared paths, bicycle symbols on roads and directional and regulatory signage on local PBN route NW2	Section 6.2	$22,500
Total			$364,550

Year 2012 / 2013			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I26	New shared path on western side of Marmion Ave, from Chandler to Warwick (1,160m)	Section 8.4; Table 3	$110,200
I27	New shared path on eastern side of West Coast Dr, from Hepburn to The Plaza (1,140m)	Section 8.2	$108,300
I28	New shared path on eastern side of Connolly Dr, from Currambine to Palace (500m)	Section 8.4	$47,500
I29	Line marking of shared paths, bicycle symbols on roads and directional and regulatory signage on local PBN route NE2	Section 6.2	$22,500
I30	Line marking and directional and regulatory signage on shared paths, routes as determined by City	Section 8.1	$21,500
I31	Improvements to train station access, as determined by City in conjunction with PTA	Section 5.3.2	$60,000
I32	Install bicycle parking and end of trip facilities at various locations in City, as determined by City	Appendix G Table 5	$10,000
Total			$380,000

Year 2013 / 2014			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I33	New shared path on western side of Marmion Ave, from Warwick to Finney (770m)	Section 8.4; Table 3	$73,150
I34	New shared path on northern side of Ocean Reef Rd, from Joondalup Dr to causeway (640m)	Section 8.2	$60,800
I35	New shared path on eastern side of Connolly Dr, from Burns Beach to Currambine (210m)	Section 8.4	$19,950
I36	New shared path on southern side of Ocean Reef Rd, from Gwendoline to Eddystone (290m)	Appendix G Table 6 'school'	$27,550
I37	New shared paths beside local roads, as determined by City from list in Table 4 (1,050m)	Section 8.5	$130,000
I38	Spot improvements to signage, line marking, short missing links, ramps and the like, as determined by City	Section 8.1; Appendix G Table 7; Table 3	$40,000
I39	Line marking and directional and regulatory signage on shared paths, routes as determined by City	Section 8.1	$30,000
I40	Install bicycle parking and end of trip facilities at various locations in City	Appendix G Table 5	$13,200
Total			$394,650

Year 2014 / 2015			
No.	Action	Reasons for action (reference within Plan)	Indicative cost
I41	New shared path on western side of Marmion Ave, beside Rivett (190m)	Section 8.4; Table 3	$18,050
I42	New shared path on western side of Marmion Ave, from Shenton to Prediville (970m)	Section 8.4; Table 3	$92,150
I43	New shared path on western side of Joondalup Dr, from Treetop to Harvest (350m)	Section 8.4 (schools)	$33,250
I44	New shared path on western side of Oceanside Prom, from Mair to Mullaloo (390m)	Appendix G Table 6 'Beach'	$37,050
I45	New shared path on southern side of Moore Dr, from Waabiyn to Joondalup Dr (910m)	Appendix G Table 7 row6; Section 8.4 (adjacent sports centre)	$86,450
I46	New shared path on northern side of Hepburn Ave, beside Hanley (370m)	Appendix G Table 1 row 2	$35,150
I47	New shared path on northern side of Hepburn Ave, beside Harcourt (160m)	Appendix G Table 1 row 2	$15,200
I48	New shared paths beside local roads, as determined by City from list in Table 4 (800m)	Section 8.5	$80,000
I49	Spot improvements to signage, line marking, short missing links, ramps and the like, as determined by City	Section 8.1; Appendix G Table 7; Table 3	$20,000
Total			$417,300

**The City of Joondalup has applied for partial funding for this project through the PBN local government grants 2009-2010 program. Note –all lengths are approximate only.*

A map of the infrastructure works to be undertaken over the six year period to 2015 is contained in Appendix J.

8.7.3 Beyond this Bike Plan

The provision of shared paths beside local roads identified in Table 4 will be an ongoing process for the City. Providing a shared path on both sides of arterial roads (district distributors) will also be a process which extends beyond the six year period covered by this Bike Plan. The works listed in the Schedule of Works are those expected to be completed over the six year span of this Bike Plan.
 lists the additional sections of shared paths required beyond this period.

Table 6: Beyond six years – additional shared paths along arterial roads

Road	From	To	Side of road	Approx length
Burns Beach Rd	Delgado	Marmion	North	400
Connolly Dr	North boundary of City	Selkirk	West	800
Connolly Dr	Pilgrim	Wilcannia	West	200
Connolly Dr	Moore	Shenton	West	680
Eddystone Ave	Joondlaup Dr	Ocean Reef	East	1250
Grand Blvd	McLarthy	Shenton	West	430
Hepburn Ave	Colac	Colac	South	260
Hepburn Ave	Greenwood Stn	Kingsley	South	430
Hepburn Ave	Wirilda	Wanneroo	South	2230
Hodges	Marmion	Caridean	North	870
Hodges	St Michaels	Mitchell Fwy	North	600
Hodges	Buick	Joondlaup Dr	North	200
Joondlaup Dr	Burns Beach	Lakeside	East	1430
Joondlaup Dr	Shenton	Collier	West	680
Joondlaup Dr	Hodges	Eddystone	West	1180
Lakeside Dr	Joondalup Dr	Shenton	East	1220
Lakeside Dr	Grassbird	Joondalup Dr	East	1050
Marmion Ave	Ocean Reef	Contour	West	430
Marmion Ave	Hodges	Watson	West	340
Marmion Ave	Hepburn	Chandler	West	880
Marmion Ave	Bearing	Bearing	West	400
Marmion Ave	Fenton	Hepburn	West	810
Marmion Ave	Leeway	Ocean Reef	West	1120
Marmion Ave	Centenary	Whitfords	West	1700
Marmion Ave	North boundary of City	Burns Beach	West	2350
Moore Dr	Marmion	Connolly	South	740
Northshore Dr	Clariville	St Ives	East	650
Northshore Dr	Kilarney	Whitfords	East	250
Ocean Reef Rd	Vigilant	Vigilant	East	200
Ocean Reef Rd	Southern Cross	Southern Cross	East	230
Ocean Reef Rd	Winward	Winward	North	160
Ocean Reef Rd	Ellendale	Ellendale	North	420
Ocean Reef Rd	Shenton	Oceanside Prom	West	3220
Ocean Reef Rd	Knightsbridge	Knightsbridge	South	175
Ocean Reef Rd	Contour	Contour	South	240
Ocean Reef Rd	Marmion	Monument	South	940
Ocean Reef Rd	Cowalla	Craigie	South	310
Ocean Reef Rd	Bellanger	Ellendale	South	310
Oceanside Prom	Ocean Reef	Atoll	West	500
Shenton Ave	Pontiac	Joondlaup Dr	South	180
Warwick Road	Marmion	Wanneroo	North	5600
Whitfords Ave	Duffy	Wanneroo	South	980
Whitfords Ave	Marmion	Ione	North	990
Whitfords Ave	Glenunga	Glenunga	North	80
Whitfords Ave	Fantome	Fantome	North	150
Whitfords Ave	Montreal	Montreal	North	240
Whitfords Ave	Tamblyn	Timberlane	North	350
Whitfords Ave	Duffy	Wanneroo	North	980
Total length				39,835m
Total cost (refer Table 5 for rate, assume 2.5m wide path)				$3,784,325

Aurecon identified the need for bicycle lanes to be installed at the locations listed in Table 7. Spot measurements indicated that road widening is likely to be required to provide an adequate carriageway width for bicycle lanes to be installed. Due to the relatively high cost of this process, road widening

works have not been included in this Bike Plan. However, road widening for bicycle lanes should be considered when the City's capital works budgets for road works are established.

Table 7: Required bicycle lanes – City of Joondalup to consider in road works capital works budget

Road	From	To	Side of road	Approx length
Burns Beach Rd	Delgado	Marmion	Both	400m
Connolly Dr	Meadowbrook	Shenton	Both	690m
Erindale Rd	Warwick	Beach	Both	1,270m
Hepburn Ave	Mitchell Fwy	Wanneroo	North	3,570m
Hepburn Ave	Marmion	Mitchell Fwy	Both	2,420m
Marmion Ave	Warwick	South limit of City	Both	1,800m
Moore Dr	Blue Mountain	Candlewood	Both	380m
Ocean Reef Rd	Tiller	Contour	Both	320m
Ocean Reef Rd	Boat Harbour Qys	Venturi	Both	1,160m
Total length				32,670m
Total cost (refer Table 5 for rate)				$5,063,850

8.8 Standardisation of infrastructure

Physical infrastructure influences every aspect of a cyclist's journey, including the following:

- Space provision made (whether on or off-road, dedicated or shared)
- The route of the path (including continuity and connectivity)
- The quality of the path that they cycle on
- Wayfinding and signage
- Facilities en route
- Parking
- End of trip facilities including changing rooms, showers, and lockers

This Bike Plan aims to provide a bicycle network that offers both comprehensive and high quality physical infrastructure, providing inclusive connectivity to the key activity centres and attractors for the City of Joondalup.

This will be achieved through adopting the following key principles:

- Planning and design guidelines and standards that are consistent, easy to understand and simple to apply which actively support the design, introduction and development of associated social infrastructure with a view to achieving a cohesive integration with the physical infrastructure
- Clear, direct, accessible and legible routes/paths, through improving the coverage, continuity and quality of the cycling network including signage and surface markings; while recognising the given limitations in road space and the competing needs of all road users
- The promotion and encouragement of cycling through appropriate allocation of road space and maintenance/improvement of existing paths and facilities to a recognised standard based on current best practice guidelines
- Developing an on-going review of current guidelines and appropriate standards and application of the same to ensure continuous reduction of the number and severity of crashes relating to cyclists
- Design and implementation of a safer bicycle network and encouraging consideration of cycling in all infrastructure design which will attract additional patronage and will enhance public perception of cycling in general

8.8.1 Typical design standards

For consistency the City will adopt typical design dimensions and criteria in regard to the provision of cycling infrastructure.

Appendix K of this Bike Plan addresses the issue of current standards and guidelines in more detail. It provides an indication as to the design and specification of cycling infrastructure and networks based on current best practice at a regional, national and international level.

8.8.2 Typical drawing and details

For consistency throughout the City of Joondalup, all cycling infrastructure works should be undertaken in accordance with typical drawings developed by the City. This will assist in reducing confusion and conflict between road and shared path users.

Currently the City of Joondalup has the following typical drawings that specifically cater for pedestrian and bicycle facilities:

- ES09-1 - Footpaths layouts for Distributor and Local Roads
- ES09-2 - Dual Use Pathway – Layout for Arterial Roads, Junctions and Busbays
- ES09-3 - Dual Use Pathway – Contraction joint strip
- ES09-4 - Dual Use Pathway Layout for public Access ways
- ES09-5 - Access Lane Pathways. Bollards and Reflective tape
- ES09-6 - Handrail in median island

8.8.3 Third party agencies

For consistency across Perth's public transport network, the City of Joondalup will work in conjunction with PTA when installing signage and line marking in regards to access to the train stations.

For consistency along the coastal shared path, the City of Joondalup will work in conjunction with the City of Stirling and other local governments in developing a strategy and treatment for 'conflict points' along the path ie where paths to the beach may cross the shared path.

9. Maintenance

The condition of the City's physical assets will impact upon the effectiveness and level of use of the bicycle network.

Maintenance activities are integral to protect the City's investment in its capital infrastructure and ensuring the design life of the infrastructure projects is achieved. It assists in maintaining cyclist safety and comfort when riding on the road and path network.

9.1 Maintenance activities

9.1.1 Existing

Maintenance is undertaken by the City of Joondalup's Operations unit. A representative of this unit attended the City of Joondalup internal workshop and gave an overview of the existing maintenance activities, which is summarised in Appendix B. It was reported that there is no foreseen problem if the level of hazard (maintenance required) reporting increases as there is capacity to undertake the required works.

9.1.2 Community feedback

The Community Feedback Survey asked people to list places that they cycle to within the City of Joondalup and if they had encountered any problems along the way. A significant proportion of respondents commented on problems that were related to maintenance such as:

- Overhanging bushes
- Glass on path or road
- Debris or rubbish on path or road
- Sand on path or road
- Cracked path

The main maintenance issues were overhanging vegetation and glass on the riding surface.

Discussions with a representative of the Northern Districts Cycle Club also emphasised the problem of glass and other debris on the riding surface. Glass can lead to punctures which may leave a cyclist stranded along their cycling route. If on-road, a cyclist may swerve into the vehicle lane to avoid the glass which increases the risk of conflict with motorists.

Poor quality riding surfaces and debris on the riding surface can be hazardous to cyclists and result in damage to their bicycles and falls/injuries. It also reduces the comfort of the rider. Overhanging vegetation on paths can block the sight lines of the cyclists and create 'blind corners' which increase the chance of collision with pedestrians. It also reduces the available width of the path and can create pinch points along the route.

9.1.3 Budget

The City of Joondalup budgets approximately $100,000 annually for maintenance of the cycle path network.

On-road bicycle lanes are an important part of the cycling network which the City has a program to sweep three times annually.

Maintenance associated with trimming vegetation is undertaken by the City's Natural Areas and Parks business unit. Works are reactive and budgeted for accordingly. Approximately $30,000 is budgeted.

Currently, only the Coastal dual use path has programmed vegetation pruning and maintenance. This is carried out in March and April annually. The remaining paths don't have a scheduled maintenance

program for pruning vegetation back from bicycle path networks. Maintenance issues are attended as requested from path users. Due to capacity it isn't feasible to have a program for the whole network.

9.2 Maintenance schedule

The City of Joondalup is committed to ensuring that bicycle infrastructure is maintained to an appropriate standard.

Recommendation: That the City of Joondalup undertakes maintenance actions as required to maintain the path network and provide for safe operation of the network.

10. Strategic works

Along with the purely physical plans and activities identified in relation to infrastructure (Section 8) and maintenance of existing infrastructure (Section 9) there is a growing recognition that these measures, while necessary, are not as effective as they could be if the required levels of guidance and the associated works required at a strategic level are not undertaken. This section of the Bike Plan addresses some of these issues, in particular planning and regulation, network improvements and education and encouragement strategies.

The PBN is recognised as a well developed and extensive cycling network, and the City of Joondalup's network is equally as developed. Over time there has been an increased focus on the importance of strategic approaches to increase cyclist numbers. This Bike Plan presents a variety of strategies for the City to develop and adopt over the ensuring six year period to 2015. These strategic inclusions are a noted addition to the previous Bike Plan and represent a growing awareness of their importance.

10.1 Planning and regulations

"The development of new urban areas and the renewal of existing urban areas provide excellent opportunities to facilitate bicycle transport" (Austroads 1999).

The City of Joondalup will investigate methods to establish planning controls which encourage or require the provision of cyclist facilities. The most convenient and cost effective time to consider provision of cyclist facilities is at the planning stage, and can encompass the planning of redevelopments and new road construction, housing, retail and commercial development, new schools, community facilities, other land use developments, end of trip facility requirements, street design and subdivision plans.

Recommendation: That the City of Joondalup undertakes the requisite strategic actions for planning and regulations as necessary to promote cycling.

10.2 Network consistency and improvements

The City of Joondalup has a responsibility to ensure that the designs for capital works take into consideration the needs of cyclists. A consistent approach throughout the City and standardisation of treatments will assist in reducing confusion and therefore conflict between cyclists and other road users. Liaison between the City's Infrastructure Management Services unit and Operations unit (responsible for maintenance) is also important to ensure that the new facilities are designed such that they can be adequately maintained.

Recommendation: That the City of Joondalup undertakes the requisite strategic actions for network consistency and improvements.

10.3 Education

The development of safe and confident cycling skills in children and adults, and teaching motorists, cyclists and pedestrians to share the roads and paths are imperative education strategies. Cyclists, pedestrians and motorists will be targeted with independent but integrated education strategies that raise the awareness and importance of rules and regulations, safety and common sense. This will be achieved through a mix of approaches including media, specifically targeted programs, development of resources, development of skills and evaluation.

Recommendation: That the City of Joondalup works in partnership with relevant agencies towards the education of cyclists, motorists and pedestrians.

10.3.1 Education for cyclists

The education of cyclists varies with level of riding skill from recreational cyclists to commuter and competition cyclists. There is a large portion of recreational cyclists using the City of Joondalup facilities and therefore, strong promotion among this group would be beneficial for increasing skills, confidence and use of cycling facilities within the City as well as encouraging this group to move towards commuter cycling.

10.3.2 Education for pedestrians

Education for pedestrians is important to reduce injury to both cyclists and pedestrians on shared paths. Feedback from the community survey indicated conflict between cyclists and pedestrians where pedestrians are found to be taking up the whole path, not keeping left or using earphones. It is therefore important to ensure that all shared paths are marked sufficiently and that an appropriate education campaign for pedestrians is implemented.

10.3.3 Education for motorists

Educating motorists is important for reducing conflict with cyclists on roads and reducing potential crashes. Many cyclists feel that the roads are unsafe due to lack of driver education regarding cyclists being on roads and their rights.

10.3.4 Education for young people

Cycling is an important means of building regular physical activity into children's lives and cycling education for young people in school, university or TAFE should be considered for inclusion in the educational curriculum.

10.4 Encouragement and promotion of cycling

During the development of this plan, the promotion of cycling was identified as a vital strategy towards increasing cyclist numbers. Promoting cycling as fun, convenient and healthy will be the focus of encouraging cycling in the City of Joondalup. The City will strive to remain informed of research results regarding health, environmental, economic, and social benefits of cycling and promote these to the community.

The health benefits of cycling are numerous and it is an effective way to get adequate physical exercise. However, there is concern regarding the safety of cycling. Results of the community consultation indicated the majority of non-cyclists (62%) do not cycle because they believe it is unsafe.

Promotion of cycling will also focus on communicating the facts of cycling and safety/health, which include:

- Getting children out of cars, and using active transport instead, is believed to be the single most effective way to improve physical activity rates and reduce obesity in children.
- Cycling has lower injury rates than most other forms of sport (refer Figure 6)

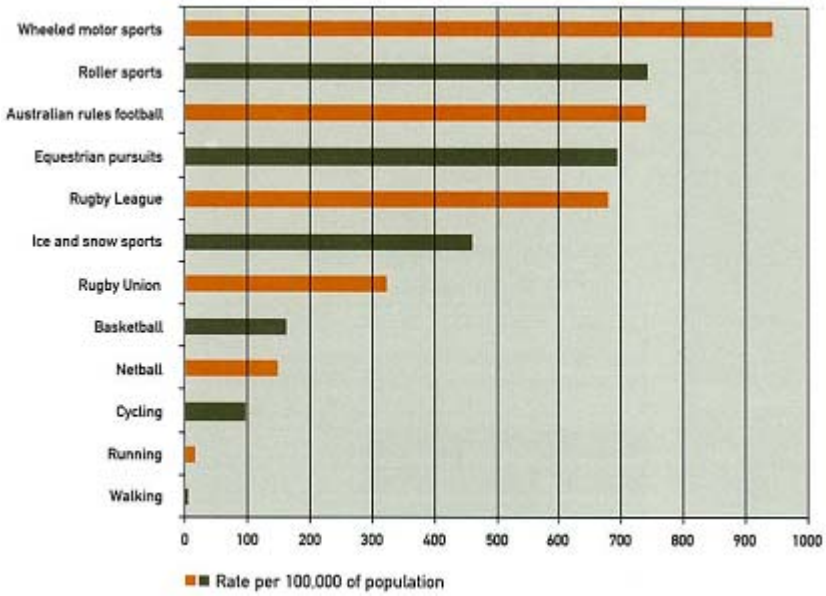

Figure 6: Hospitalisation per 100,000 participants for major sports (Cycling Promotion Fund and Bicycle Federation of Australia 2007)

Recommendation: That the City of Joondalup undertakes strategic actions for encouragement and promotion of cycling.

10.5 Tourism

Many areas within the City are tourist destinations including Hillary's Marina, coastal parks and beaches and the Joondalup city centre. The importance of cycling infrastructure to these destinations is highlighted in the City's *Tourism Development Plan 2005-2009* (refer Section 3.3.3).

Recommendation: That the City of Joondalup undertakes strategic actions for promoting cycling for tourism.

11. Management and implementation

11.1 Leadership by example

Through this Bike Plan, the City of Joondalup has committed to short-term and long-term strategies to improve cycling facilities and increase the number of cyclists in the City. To demonstrate its level of commitment to cycling, the City will lead by example by supporting cycling initiatives for its staff. Naturally, these initiatives will often also support the use of public transport and walking as alternative options to travelling by car.

Recommendation: That the City of Joondalup undertakes actions to lead by example in regard to the support, promotion and encouragement of cycling.

It is widely recognised that there exists a positive link between employees who lead a healthy lifestyle and their level of job satisfaction, lower levels of absenteeism and higher productivity. Encouraging cycling will benefit both employees and the City.

The successfulness of initiatives implemented by the City will be used as a positive example when discussing with other organisations the benefits of becoming bicycle-friendly.

11.2 Communicating the plan

All City of Joondalup employees will be provided with access to a copy of the Bike Plan and it will be placed on the City's intranet.

The plan will also be distributed to key external stakeholders including City of Wanneroo, City of Stirling, DEC, Bike West, PTA and any other relevant organisations.

11.3 Monitoring, review and evaluation mechanisms

This document will be reviewed annually by the City of Joondalup's Environmental Projects Officer, or as delegated, to monitor progress to date and evaluate the successfulness of projects and strategies implemented.

The annual review will include:

- An assessment of actions and works completed during the previous year. This will involve reviewing tasks completed from this plan, tasks completed that were not in this plan, and tasks not completed and the reason for this.
- An assessment of new projects and strategies that may not have been anticipated at the time of writing this plan, but are of importance to be completed. Gain an understanding of their timing and funding implications and review this Bike Plan to incorporate the new project or strategy.
- If required, review this Bike Plan to incorporate the effects of changes to the law, traffic code, and regulations
- Notifying BikeWest of projects completed so that their mapping and publications can be updated as necessary

The City of Joondalup's Bike Plan will be formally reviewed after six years to establish a new infrastructure, maintenance and strategic works program. This review will next occur during 2015 and will consider the successfulness of actions undertaken during 2009-2015 as measured by the assessment regime.

Recommendation: That the City of Joondalup undertakes an annual review of the Bike Plan.

11.4 Contacts

If you would like to comment on this document or on cycling facilities in the City in general, please use the feedback form provided in Appendix L or contact the City of Joondalup by one of the following methods:

Mail address:
Environmental Projects Officer
City of Joondalup
PO Box 21
Joondalup WA 6919

Street address:
90 Boas Avenue
Joondalup WA 6027

Telephone:
(08) 9400 4000

Email:
info@joondalup.wa.gov.au

Internet:
www.joondalup.wa.gov.au

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Appendix A

Maps – Joondalup Study Area and Scheme Areas

Appendix B

Consultation notes

Appendix C

Map – Perth Bicycle Network Work Plan

Appendix D

Yellagonga Regional Park Recreational Masterplan

Appendix E

Map – (MRWA) Joondalup Functional Road Hierarchy

Appendix F

Joondalup TravelSmart maps

Appendix G

Review of existing cyclist facilities

Appendix H

Photo record of site visit

Appendix I

Map – Cycling Areas of Concern

Appendix J

Map – Proposed Infrastructure Works

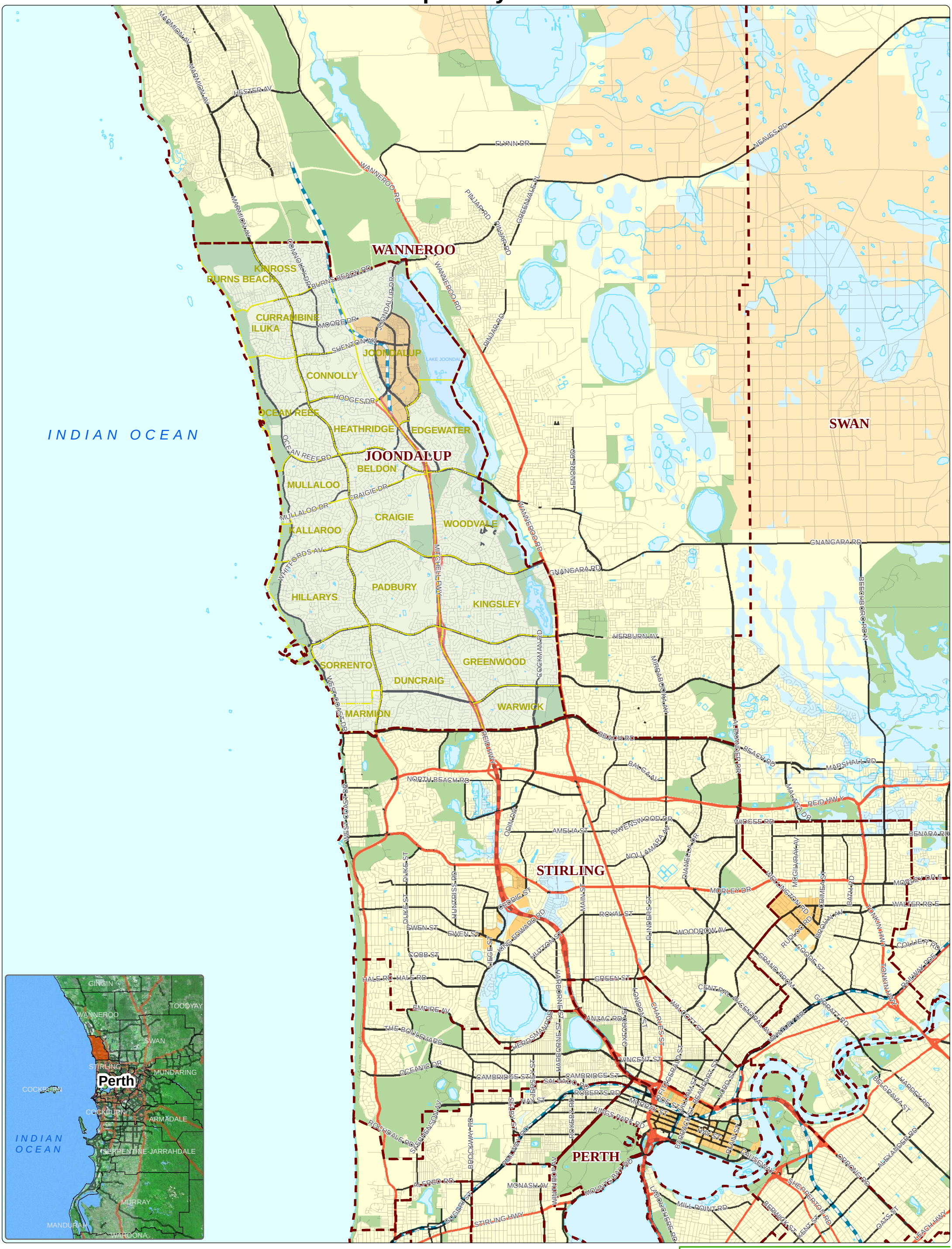
Appendix K

Proposed standards for infrastructure

Appendix L

Feedback Form

Joondalup Study Area Overview



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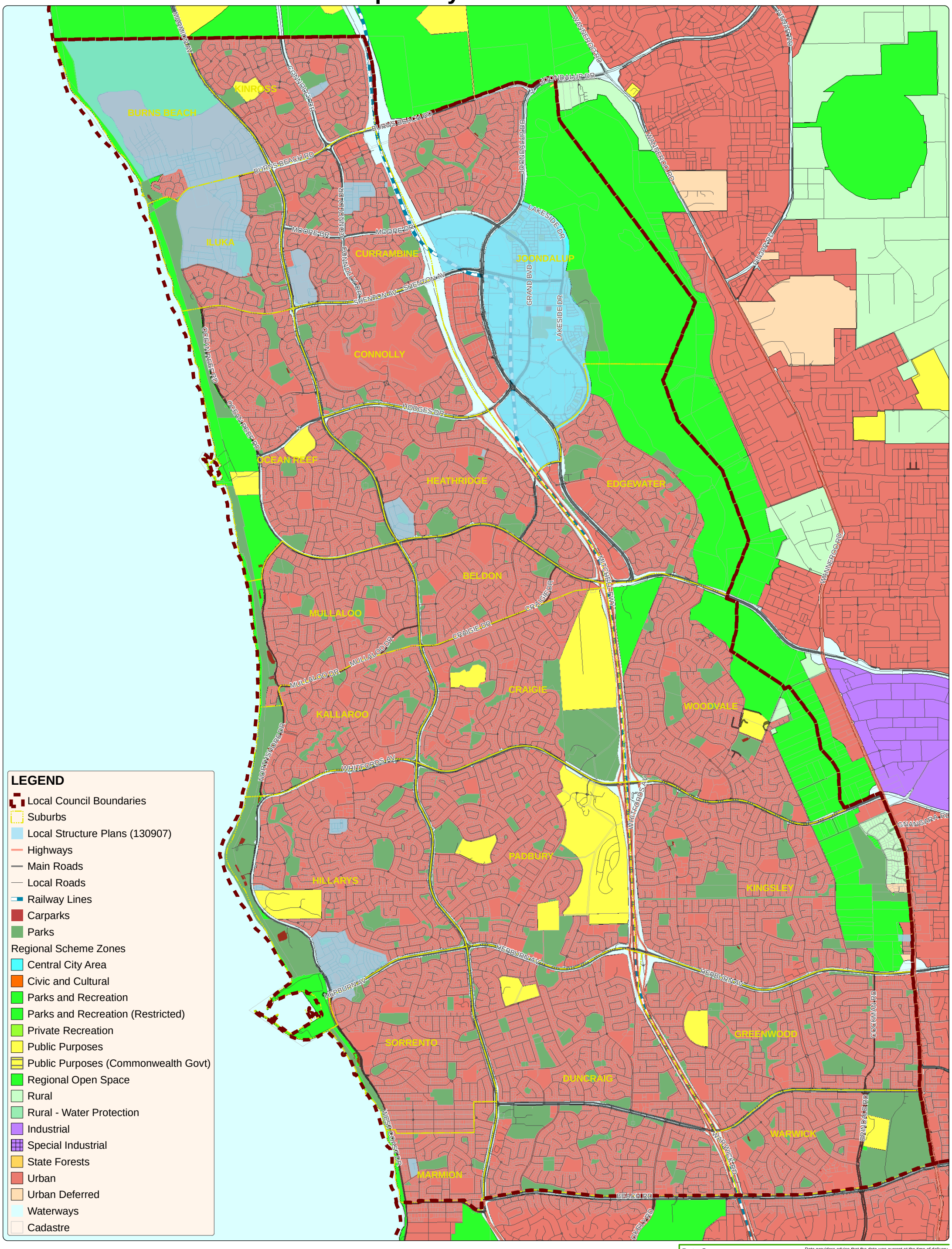
Joondalup Study Area Scheme Overview



LEGEND

- Local Council Boundaries
- Suburbs
- Local Structure Plans (130907)
- Highways
- Main Roads
- Local Roads
- Railway Lines
- Carparks
- Parks

Regional Scheme Zones

- Central City Area
- Civic and Cultural
- Parks and Recreation
- Parks and Recreation (Restricted)
- Private Recreation
- Public Purposes
- Public Purposes (Commonwealth Govt)
- Regional Open Space
- Rural
- Rural - Water Protection
- Industrial
- Special Industrial
- State Forests
- Urban
- Urban Deferred
- Waterways
- Cadastre

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Consultation notes

Joondalup Bike Plan Review – Internal Stakeholder Workshop

Location:
City of Joondalup

Date:
9 February 2009

Time:
1.30pm – 3.30pm

Topic: Cycling in Joondalup and staff perceptions

- A periodic assessment of the number of cyclists is required, in order to assess the successfulness of the Bike Plan in increasing cyclist numbers
- The network is generally in place, it now needs improvements focussing on signage and line marking
- Need more signage, especially for new users, to indicate route and path type
- City of Joondalup staff should consider cycling in their day-to-day work activities
- Planners should encourage developers to provide cyclist facilities
- Need education for road users, both motorists and cyclists
- Consider how to handle the conflict with pedestrians
- Encourage consideration amongst road users – education begins at schools

Topic: Planning for cyclists

- There is potential for developers to reduce number of car parking bays if bicycle parking numbers are increased. This approach also needs end of trip facilities such as showers to make it work.
- Bike paths to train stations and bus stations are generally okay
- Dual mode transport of train and cycling has the problem of no bikes on trains during peak times, this potentially creates a long walk at the end of the trip if bike can not be taken on train
- Schools – bike parking is generally not secure, there are safety fears from parents, look at improving signage to warn motorists of crossings, consider lollypop crossing not just at schools but along routes leading to schools
- Create awareness in developers regarding cycling early in the planning process
- City could consider helping with cost if developer does a better/higher standard eg shared path instead of footpath
- In the assessment of structure plans, include a review of proposed cycling facilities
- Subdivisions are referred to City's Infrastructure section for their comments
- Cycle plans need to take account of land uses and zonings
- Current planning scheme (DPS2) does not require provision of bike facilities

Topic: Encouraging cycling in Joondalup

- Provide printed media at libraries, health and leisure centres, etc. Have large visual displays that catch people's attention.
- Use electronic media to distribute information / promotions eg via databases of community groups, sports groups, e-news letters
- City could hold and/or sponsor events (big or small) for all ages
- Encourage City staff representation at events, to show public that the City is getting involved / setting an example eg wear City shirts/clothing
- City building has reasonable facilities for cyclists. Consider incentives for staff who commute by bicycle
- Encourage local businesses to have incentives for cyclists eg breakfast discount for cyclists
- It is generally cheaper to install on-road bike lanes (where road width allows) than retrofitting a footpath to required width for a shared path
- Retrofit to shared path standard does occur eg when replacing a concrete slab path
- Consider having a journey planner for cyclists on the City website (similar to Transperth's journey planner). This could include a map, locations, distances, travel times, and end of trip facilities that are available
- Local Governments currently lobby PTA to resolve and improve the bikes on trains issue
- Bike racks are sometimes opposed due to aesthetics. How could this attitude be changed?
- Consider creating young cyclist 'training tracks' in residential neighbourhoods. This would need careful planning to attract only younger children. It may be better to having education in schools eg Bike Ed.

Topic: Safety

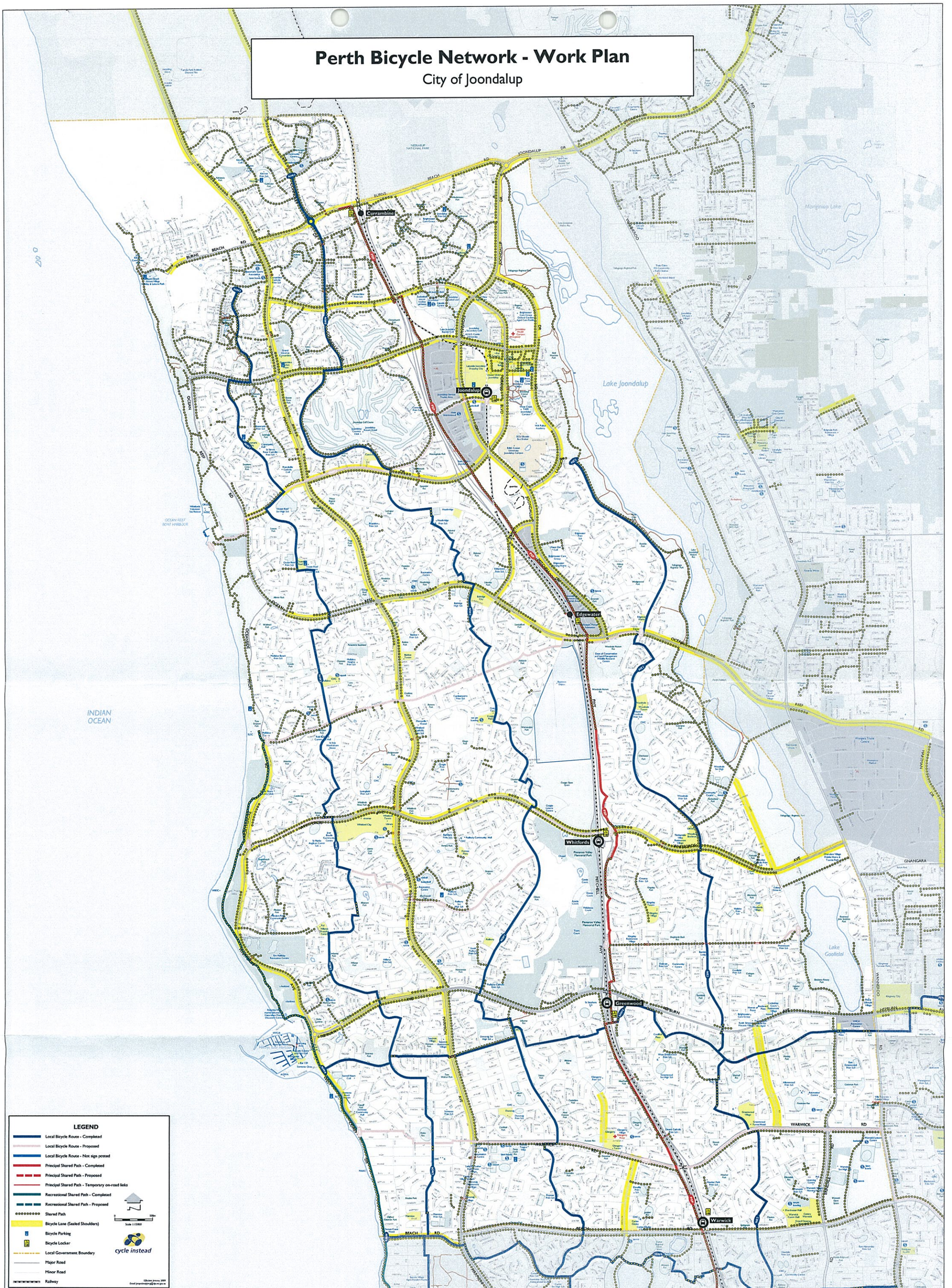
- Improve safety through the relocation/removal of bollards/rails
- Increase signage for safety purposes
- Paths going to schools could be marked with signage for children, and ensure intersections and crossings near schools are clearly marked for children. Notify Main Roads of crossings required.
- Provide on-road bike lane for roads near schools, so parents can ride with their children on the footpath
- Overhanging vegetation is problematic
- Consideration needs to be given to treatment of shared paths at intersections
- Bicycle activated signals at traffic lights and room for on-road bike lanes at traffic lights is desirable
- Glass on paths can be a deterrent to cycling, as there are personal safety risks if you stop to fix tyre
- Education needs to include parents, to increase their confidence in letting their children cycle
- Consider having a schools road safety contact/coordinator within the City
- Personal safety concerns if paths are not properly lit, as condition of path is difficult to know when dark
- Limit high fences along paths, as these block sight distances
- City could carry out a safety audit of shared paths
- Bollards and rails serve as an important factor in controlling traffic on footpaths, cycleways and intersections.

Topic: Maintaining and improving our cycling infrastructure

- Shared paths are regularly swept and frequency of this is found to be adequate (every month or so)
- Footpaths are narrower and often can not be swept by the machine as it does not fit on the paths
- Fixing minor potholes and 'spot' sweeping is carried out as needed
- Main problems are found to be overhanging vegetation and glass
- Hazards can be reported to the City's administration on 1300 369 972 who then direct the issue to appropriate department
- City should have an online reporting system for hazards. Staff think this already exists, but it may be on the intranet of difficult to find on the internet. Reporting can be done either by completing a maintenance report form on the City's website or email to info@joondalup.wa.gov.au
- There is no foreseen problem if the level of hazard reporting increases; there is capacity to do the required works
- Would like to sweep cycleways and footpaths more regularly, but a smaller machine would be needed
- On-road sweeping is done weekly in the CBD, rate of sweeping decreases as you travel further from the CBD (about once a year in the further suburbs). Increase rate of cleaning to encourage cyclists
- When roads are resurfaced, should consider doing the shoulders as well the lane ways. Both areas need maintaining for road users
- Consider pedestrians and cyclists when road works are being done
- Kerb ramps – a lip is often left between the road and the ramp, which allows for future resurfacing. However, this is not desirable for cyclists and can be fixed with asphalt infill, which is a small change that could make a big difference. It is standard practice to resurface the top of the pedestrian ramp.
- Consider improvements to signs, parking and end of trip facilities for the coastal shared path
- Retain and improve on the integrity of NS and EW routes
- It is important to consider the environment when putting in new infrastructure, but also important to encourage use of cycle facilities that are within natural areas and are pleasant for recreation.
-
- Topic: Priority items
- Actions need a combined effort by all the City's departments
- Need to be mindful of the City's budget for capital works for paths
- Safety is a priority. Can be improved through better lines and signs. This would be a 'quick win' in high use areas
- Kids and schools should be an area of focus
- Education, enforcement and encouragement strategies are generally medium to long term or ongoing
- Looking to form partnerships with schools / businesses will assist as the City does not have direct control over a lot of areas.

Perth Bicycle Network - Work Plan

City of Joondalup



Department for Planning and Infrastructure

Bikewest

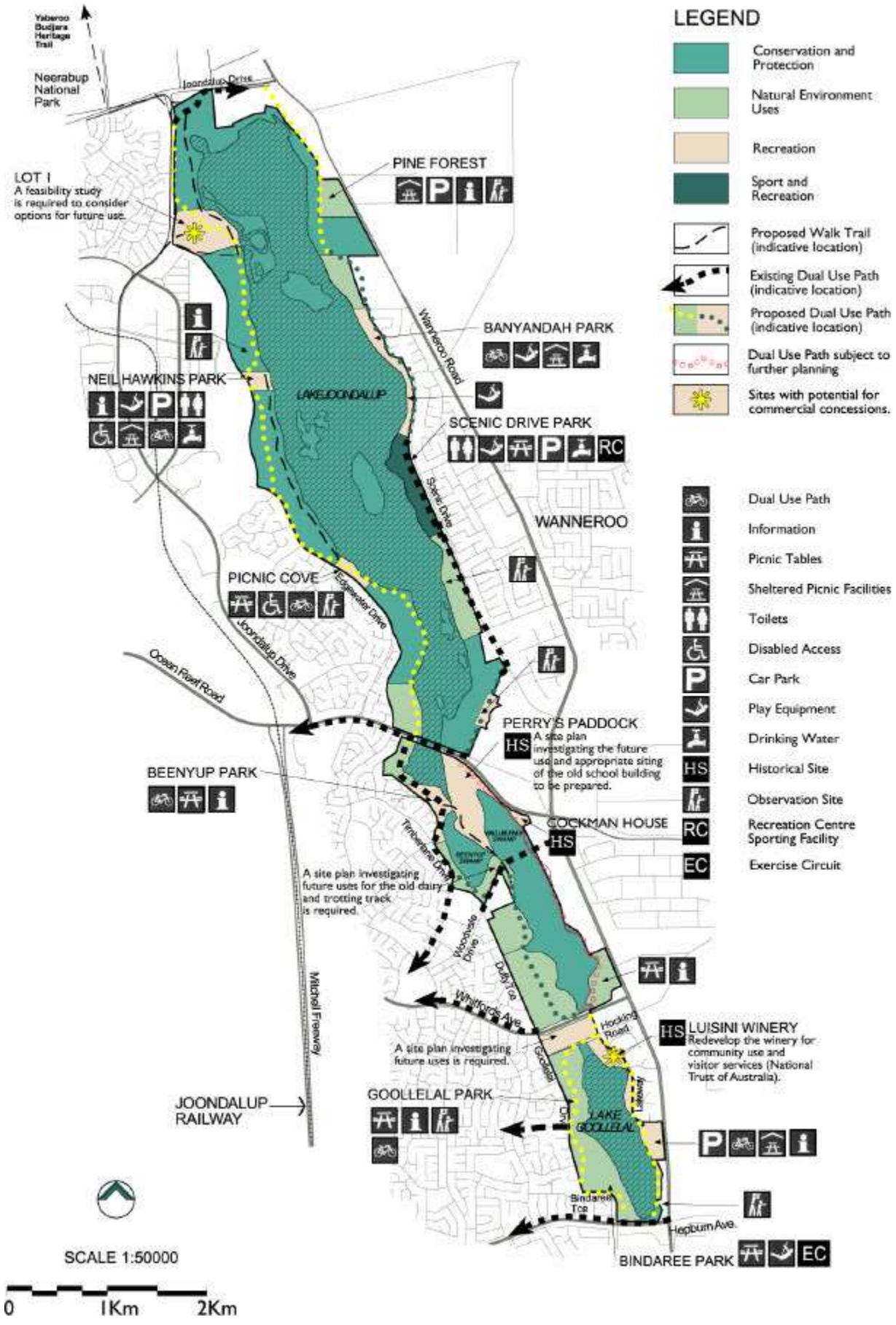


Figure 8 - Recreation Masterplan

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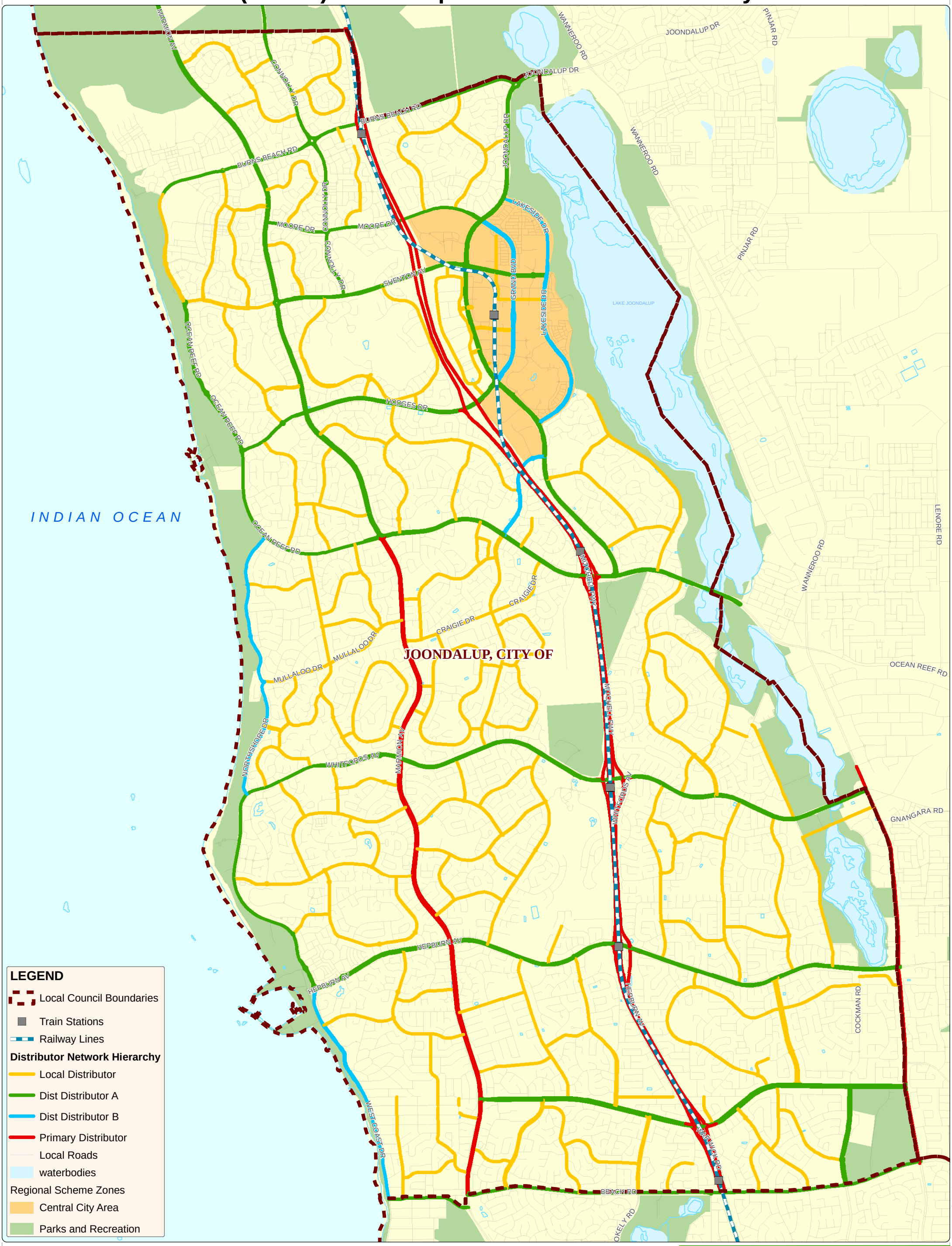
(MRWA) Joondalup Functional Road Hierarchy



LEGEND

- Local Council Boundaries
- Train Stations
- Railway Lines

Distributor Network Hierarchy

- Local Distributor
- Dist Distributor A
- Dist Distributor B
- Primary Distributor
- Local Roads
- waterbodies

Regional Scheme Zones

- Central City Area
- Parks and Recreation

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Joondalup North - Walk and Cycle Information

All parks and reserves within the City of Joondalup have been classified as Dog Exercise Areas with the exception of Heathridge Park (Ocean Reef Rd, Sail Tce), Neil Hawkins Park (Sorrento Beach, West Coast Hwy), Blue Lake Park (Bluemountain Dr), Burns Beach Foreshore (Ocean Pde), Iluka Foreshore Park (Discovery Cl), Central Park (Grand Blvd) and all beach reserves except Whitfords Beach.

Legend

- Perth Bicycle Network (PBN) - Continuous Signed Routes
- PBN Route Number (NE2)
- Principal Shared Path (PSP)
- Local Bicycle Friendly Street
- Path (shared by cyclists and pedestrians)
- Bicycle Lanes or Sealed Shoulders Either Side
- Train Station
- Bus Transfer
- Railway, Underground
- Major Road
- Minor Road
- Proposed Road
- Road Bridges, Footbridges and Underpass
- Local Government Authority Boundary
- Traffic Light
- Walk Trail
- 1km (12 minutes) Walking Distance
- 3km (12 minutes) Riding Distance
- ECU Joondalup Campus
- Shopping Area
- Parks and Recreation
- Ovals, Prepared Ground
- Bushland
- Industrial Area
- Supermarket
- Delicatessen / Convenience Store
- Tertiary Education
- Community / Cultural Centre
- Dog Exercise Area (See note)
- Drinking Fountain
- Bicycle Lockers
- Bicycle Shop
- Bicycle Parking
- Playground
- Skate Park
- BBQ
- Accessible Toilet
- Public Toilet
- Post Office
- Post Box
- Telephone
- Sporting Facility
- Hospital
- Place of Worship
- Picnic Area
- Kindergarten
- Child Health Centre
- Police
- Fire Station

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How do you get around?

A travel survey of residents in the Perth metropolitan area found that 80% of trips were made by car, and most were by the driver on their own.

There are a range of travel alternatives available in your local area and many good reasons to use them. By walking, cycling or using public transport you can reduce your car trips and help to:

- reduce local traffic
- reduce air pollution and greenhouse gas emissions
- improve your health through physical activity
- reduce your travel costs

Wherever you are going, consider your options - that's what being TravelSmart is all about.

Public Transport

Public Transport is a quick and convenient option for many trips. When travelling on public transport, you can sit back and relax, save on car running and parking costs and avoid the hassles of driving. Try catching public transport for some of your shopping trips or to get to sporting events, concerts or other attractions.

Public Transport hints:

- To access public transport information, phone Transperth on **13 62 13** or go online to **www.transperth.wa.gov.au**. Timetables and guides for Transperth services are available at Transperth InfoCentres, Council offices and libraries. For information on wheelchair accessible Public Transport services call **13 62 13**.
- Where possible, buy a Transperth ticket at the beginning of your journey for as many zones as you will cover in your trip. It can be cheaper than buying separate tickets for bus and train journeys. Often the connection to and from train stations by bus adds no more to the cost of your trip.
- If you want to catch a bus, remember to hail it at a bus stop.

SmartRider Information:

SmartRider is Transperth's electronic ticketing system. It's a more convenient and secure way to pay for your travel on Transperth services. Your SmartRider stores value or credit, your journey details are recorded (when you tag on and tag off all Transperth buses, trains and ferries) and the appropriate fare is deducted from the stored value on your SmartRider. When you travel using your SmartRider you save 15% to 25% off cash fares every time you use public transport. You can add value to your SmartRider via; Autoload (direct debit), BPay, at Transperth InfoCentres and selected SmartRider Retail Sales Outlets, Add-Value Machines at train and bus stations, and on board buses and ferries. Cash tickets are also available. To find out more about the benefits of SmartRider or to find where your nearest SmartRider Retail Sales Outlet is located, visit the Transperth website at **www.transperth.wa.gov.au** or call the Transperth InfoLine on **13 62 13**.

TravelSmart Workplace:

TravelSmart Workplace assists businesses, government agencies and local councils to promote travel alternatives to employees and visitors. Cycling, walking, public transport, carpooling and teleworking are all TravelSmart options. Your workplace can be part of the transport solution through TravelSmart Workplace - find out how at **www.dpi.wa.gov.au/travelsmart**.

Walk or Cycle

There are many short trips where travelling on foot or bicycle is a good alternative to driving. A recent travel survey found that almost half of the car trips made by residents are 5km or less, 30% are 3km or less and some are just a few hundred metres.

This shows that walking or cycling is possible for many trips - such as going to the local shop or getting the kids to school. And it is a way of fitting healthy physical activity into your everyday life.

Walking hints:

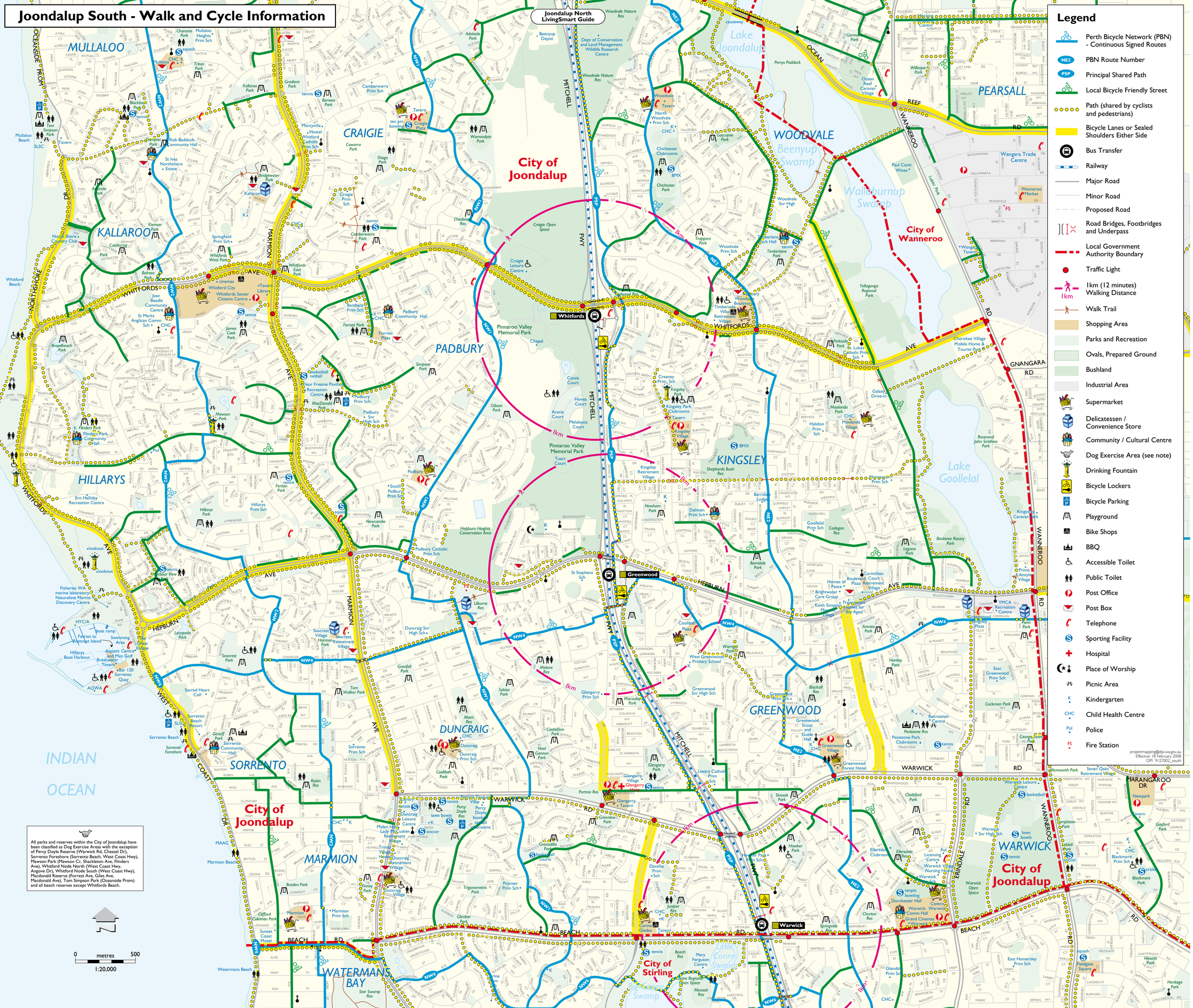
- Two trips a day will go a long way to help you 'Find 30' minutes of exercise.
- Be courteous to cyclists on shared paths by keeping left.
- For more information on great Perth walks and other useful walking information go to: **www.dpi.wa.gov.au/walking.**

Cycling hints:

- Find a convenient cycle route. Use this map or one of the Perth Bike Map Series (more comprehensive cycling maps) that can be purchased from bike shops.
- Wear a helmet and bright clothing.
- At night, use front and rear lights.
- Talk to regular cyclists for advice on local cycling conditions.
- Be courteous to walkers who use shared paths and always give way to pedestrians.
- Bikes can be carried for free on all Perth trains, however they are not permitted on trains during peak travel directions in the hours of 7:00-9:00am and 4:30-6:30pm.
- Further information about taking bikes on Perth public transport can be found on the Transperth website: **www.transperth.wa.gov.au/PassengerInfo/BikesonTransperth.**
- For further cycling information visit: **www.dpi.wa.gov.au/cycling.**

Joondalup South LivingSmart Guide

Joondalup South - Walk and Cycle Information



Legend

- Perth Bicycle Network (PBN) - Continuous Signed Routes
- PBN Route Number
- Principal Shared Path
- Local Bicycle Friendly Street
- Path (shared by cyclists and pedestrians)
- Bicycle Lanes or Sealed Shoulders Either Side
- Bus Transfer
- Railway
- Major Road
- Minor Road
- Proposed Road
- Road Bridges, Footbridges and Underpass
- Local Government Authority Boundary
- Traffic Light
- 1km (12 minutes) Walking Distance
- Walk Trail
- Shopping Area
- Parks and Recreation
- Ovals, Prepared Ground
- Bushland
- Industrial Area
- Supermarket
- Delicatessen / Convenience Store
- Community / Cultural Centre
- Dog Exercise Area (see note)
- Drinking Fountain
- Bicycle Lockers
- Bicycle Parking
- Playground
- Bike Shops
- BBQ
- Accessible Toilet
- Public Toilet
- Post Office
- Post Box
- Telephone
- Sporting Facility
- Hospital
- Place of Worship
- Picnic Area
- Kindergarten
- Child Health Centre
- Police
- Fire Station

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How do you get around?

A travel survey of residents in the Perth metropolitan area found that 80% of trips were made by car, and most were by the driver on their own.

There are a range of travel alternatives available in your local area and many good reasons to use them. By walking, cycling or using public transport you can reduce your car trips and help to:

- reduce local traffic
- reduce air pollution and greenhouse gas emissions
- improve your health through physical activity
- reduce your travel costs

Wherever you are going, consider your options - that's what being TravelSmart is all about.

Public Transport

Public Transport is a quick and convenient option for many trips. When travelling on public transport, you can sit back and relax, save on car running and parking costs and avoid the hassles of driving. Try catching public transport for some of your shopping trips or to get to sporting events, concerts or other attractions.

Public Transport hints:

- To access public transport information, phone Transperth on **13 62 13** or go online to **www.transperth.wa.gov.au**. Timetables and guides for Transperth services are available at Transperth InfoCentres, Council offices and libraries. For information on wheelchair accessible Public Transport services call **13 62 13**.
- Where possible, buy a Transperth ticket at the beginning of your journey for as many zones as you will cover in your trip. It can be cheaper than buying separate tickets for bus and train journeys. Often the connection to and from train stations by bus adds no more to the cost of your trip.
- If you want to catch a bus, remember to hail it at a bus stop.

SmartRider Information:

SmartRider is Transperth's electronic ticketing system. It's a more convenient and secure way to pay for your travel on Transperth services. Your SmartRider stores value or credit, your journey details are recorded (when you tag on and tag off all Transperth buses, trains and ferries) and the appropriate fare is deducted from the stored value on your SmartRider. When you travel using your SmartRider you save 15% to 25% off cash fares every time you use public transport. You can add value to your SmartRider via; Autoload (direct debit), BPay, at Transperth InfoCentres and selected SmartRider Retail Sales Outlets, Add-Value Machines at train and bus stations, and on board buses and ferries. Cash tickets are also available. To find out more about the benefits of SmartRider or to find where your nearest SmartRider Retail Sales Outlet is located, visit the Transperth website at **www.transperth.wa.gov.au** or call the Transperth InfoLine on **13 62 13**.

TravelSmart Workplace:

TravelSmart Workplace assists businesses, government agencies and local councils to promote travel alternatives to employees and visitors. Cycling, walking, public transport, carpooling and teleworking are all TravelSmart options. Your workplace can be part of the transport solution through TravelSmart Workplace - find out how at **www.dpi.wa.gov.au/travelsmart.**

Walk or Cycle

There are many short trips where travelling on foot or bicycle is a good alternative to driving. A recent travel survey found that almost half of the car trips made by residents are 5km or less, 30% are 3km or less and some are just a few hundred metres.

This shows that walking or cycling is possible for many trips - such as going to the local shop or getting the kids to school. And it is a way of fitting healthy physical activity into your everyday life.

Walking hints:

- Two trips a day will go a long way to help you 'Find 30' minutes of exercise.
- Be courteous to cyclists on shared paths by keeping left.
- For more information on great Perth walks and other useful walking information go to: **www.dpi.wa.gov.au/walking.**

Cycling hints:

- Find a convenient cycle route. Use this map or one of the Perth Bike Map Series (more comprehensive cycling maps) that can be purchased from bike shops.
- Wear a helmet and bright clothing.
- At night, use front and rear lights.
- Talk to regular cyclists for advice on local cycling conditions.
- Be courteous to walkers who use shared paths and always give way to pedestrians.
- Bikes can be carried for free on all Perth trains, however they are not permitted on trains during peak travel directions in the hours of 7:00-9:00am and 4:30-6:30pm.
- Further information about taking bikes on Perth public transport can be found on the Transperth website: **www.transperth.wa.gov.au/PassengerInfo/BikesonTransperth.**
- For further cycling information visit: **www.dpi.wa.gov.au/cycling.**

Existing Cyclist Facilities

Appendix G Table 1: Cycling facilities along district distributor roads

Road	Shared Paths	On-road bicycle lanes	Crossing points	Other comments
Warwick Rd	Path on southern side of road only	None		
Hepburn Ave	Average path width varies from 1.5 to 2.0 with most of the 1.5 shared paths south of the road. A number of shared path are overgrown.	Between Mitchell Fwy and Marmion Av there is no on-road cycling, but there is for the rest of the road.	Underpasses and crossover are in good condition.	This road displayed the least attractive facilities for cycling.
Ocean Reef Rd	Average path width of 2m. Path is unmarked.	Are present on road but appear to stop south of Hodges Dr to Dampier Av. Road widening/works would be required to accommodate it bike lanes.	Underpasses and crossover are in good condition.	Seldom signage on-road and on-paths.
Erindale Rd	Average path width of 2m. Path is unmarked	Bicycle lanes are not available and would require road widening to accommodate.	Crossovers are in good condition.	No on-path signage.
Whitfords Ave	Average path width of 2m. Path is unmarked. Some sections used paving block to widen path and is visibly 'uncyclable' (Endeavour Rd to Belrose Ent). John Wilkie Tarn. - the shared path is 1.5m and constructed from concrete paving blocks that are uneven and not suitable for sharing.	Is present on road but markings at most intersections could be improved.	Underpasses and crossover are in good condition.	Between Marmion Av and Gibson Av it appeared that shared paths and on-road paths stop and start (is not consistent)
Hodges Dr	Average path width of 2m. Path is unmarked.	Is present on road.	Underpasses and crossover are in good condition.	Seldom signage on-road and on-paths Shared path appear to 'jump' the road often, might consider 'straightening' it.
Shenton Ave	Average path width of 2m. Path is unmarked.	Is present on road with good road markings.	Underpasses and crossover are in good condition.	
Moore Dr				Seldom signage on-road and on-paths.
Burns Beach Rd	Average path width of 2m. Path is unmarked.	Is present on road	Underpasses and crossover are in good condition.	Seldom signage on-road and on-paths.
Marmion Ave	Average path width of 2m. Path is unmarked. South of Whitford Ave shared paths vary from 1.5m to 2m.	Is present on road but could do with better markings at most intersections. South of Ocean Reef Rd on-road lanes disappear. There are some sections and intersections where the lanes appear but are not signed and not continuous. From Banks Av to Warburton Av the north travelling road has a cycle lane but not the south travelling which has some	Underpasses and crossover are in good condition.	Specific sections of the on-road and shared cycling would need to be brought up to level to be 'consistent' along road.

Road	Shared Paths	On-road bicycle lanes	Crossing points	Other comments
		signage on-road. South of Warburton Av to Hepburn lanes are on both sides but are not well marked. Hepburn Av to Warwick Rd has a lane on the north travelling road only. South of Hepburn has none.		
Connolly Dr	Average path width of 2m. Path is unmarked.	Is present on road but markings, especially at intersections, are lacking. South of Meadowbrook Prom there is nothing and would require road works to install.	Underpasses and crossover are in good condition.	The road reserve is clearly capable of 4 lanes of traffic, bike lanes should be part of the design.
Joondalup Dr	Average path width of 2.5m with some sections 2m. Path is unmarked. Path narrows to 1m south of Pedder Pl Moore Dr and is not suitable for cycling.	Both sides have lanes but no markings.	Underpasses and crossover are in good condition. Bike Lane markings at intersections are lacking.	Except for markings and signage on the walk and cycle paths this is an excellent example of a pedestrian and cycle friendly road.
West Coast Dr	Average path width: 2m. Path is unmarked. South of The Plaza (Padbury Cir) it widens to 3m as it is the coastal cycling route (still unmarked)	Both sides have lanes but no markings. South of The Plaza (Padbury Cir) lanes stop	Crossovers are in good condition	
Northshore Dr	At Mullaloo Beach a 'diverting path' of 2m is used to connect the coastal cycling path. This could be improved. South of Merrifield Pl the coastal cycling path services both cyclists and pedestrians.	The northern and southern ends of the road do not have cycle lanes but for the rest of the road it would be easy to upgrade with markings.	Crossovers are in good condition	
Oceanside Prom	Average path width: 2m. Path is unmarked. South of Westview Bvd it drops to 1m pedestrian paths with cyclists having to divert to the coastal cycling path (no signage to indicate this)	None. Would require road widening/works.	Crossovers are in good condition	
Eddystone Ave	Average path width: 2m. Path is unmarked.	Both sides have lanes but no markings.	Crossovers are in good condition	Except for markings and signage on the walk and cycle paths this is a pedestrian and cycle friendly road.
Lakeside Dr	Average path width: 2m. Path is unmarked.	Both sides have lanes but no markings.	Crossovers are in good condition	Except for markings and signage on the walk and cycle paths this is a pedestrian and cycle friendly road.
Grand Bvd	Varies from 3m to 2m and pass amongst shops and units.	Both sides have lanes but no markings.	Crossovers are in good condition	Except for markings and signage on the walk and cycle paths this is a pedestrian and cycle friendly road.

Appendix G Table 2: NW1 shortcomings

Category	Location	Comment
Intersection	Megiddo / Poynter intersection	Lack of crossing point from Megiddo Way onto shared path on western side of Poynter Dr
Line marking	Poynter (Megiddo to Griffell) Approx 100m	No line marking of shared path, and path is near a school.
Off-road path	Poynter (Griffell to Kincraig) Approx 660m	Poynter Rd is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Existing footpath approx 1.4m wide
Line marking	Path connection (Poynter to Warwick) Approx 80m	No line marking of shared path
Line marking	Warwick Approx 170m	No line marking of shared path, this should be done as part of line marking the entire shared path along Warwick Road
Off-road path	Lilburne (Warwick to Readshaw) Approx 1,450m	Liburne Rd is a local distributor, no shared path or on-road lanes provided. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Line marking	Lilburne (Readshaw to Sullivan) Approx 260m	No line marking of shared path
Line marking	Path connection (Melissa to Hepburn) Approx 30m	No line marking of shared path
Line marking	Gibson (Hepburn to O'Leary) Approx 160m	No line marking of shared path, and path is near a school.
Off-road path	Gibson (O'Leary to Whitfords) Approx 2,550m	Gibson Ave is a local distributor, no shared path or on-road lanes provided. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Line marking	Path connection (Whitford's to Montreal) Approx 80m	No line marking of shared path
Off-road path	Path connection (Whitford's to Montreal) Approx 40m	Shared path is too narrow at approx 1.5m
Off-road path	Chadstone (Britania to Warrandyte) Approx 880m	Chadstone Rd is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Off-road path	Warrandyte (Chadstone to Eddystone) Approx 170m	Warrandyte Dr is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Line marking	Eddystone (Craigie to Priscilla) Approx 160m	No line marking of shared path
Intersection	Crossing across Ocean Reef Rd Approx 50m plus ramps	Crossing is quite close to the intersection, potential to relocate crossing further from intersection to reduce risk of collisions
Off-road path	Admiral (Balanus to Channel) Approx 65m	Admiral Rd is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Off-road path	Caridean (Ironwood to Hodges) Approx 980m	Caridean is a local distributor, no shared path or on-road lanes provided. Existing footpath is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Line marking	Path connection (Hodges to Fairway) Approx 50m	No line marking of shared path
Line marking	Fairway Approx 1,350m	No line marking of shared path
Missing link	Fairway Cir Controlled Access Points	Lack of paths and ramps to connect a cyclist in the CAP road to opposite streets

Category	Location	Comment
Line marking	Shenton Ave Approx 210m	No line marking of shared path, this should be done as part of line marking the entire shared path along Shenton Ave
Line Marking	Connolly (Shenton to Moore) Approx 860m	No line marking of shared path
Line Marking	Connolly (Moore to Palace underpass) Approx 250m	No line marking of shared path
Line marking	Connolly (underpass to Burns Beach) Approx 880m	No line marking of shared path
Line marking	Connolly (Burns Beach to Selkirk) Approx 630m	No line marking of shared path

Appendix G Table 3: NW4

Category	Location	Comment
Off-road path	St Helier (West Coat to Seacrest)	St Helier Dr is a local distributor, no shared path or on-road lanes provided. Existing footpath on both sides of road and is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Intersection	St Helier / Seacrest roundabout	No shared path provided for cyclists to get off road and avoid roundabout (footpaths only)
Off-road path	Seacrest (St Helier to Chandler link)	Seacrest Dr is a local distributor, no shared path or on-road lanes provided. Existing footpath on both sides of road and is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Off-road path	Path connection (Seacrest to Chandler)	Shared path is too narrow at approx 1.8m wide
Line marking	Path connection (Seacrest to Chandler)	No line marking of shared path
Off-road path	Readshaw	Readshaw Rd is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Traffic lanes likely too narrow to mark bicycle lanes. PBN map indicates shared path exists but spot measurements suggest it may only be 1.8m wide.
Line marking	Readshaw	No line marking of shared path
Intersection	Readshaw / Barker roundabout	No ramps provided for cyclists on shared path (north side of Readshaw) to turn southwards into Barker Dr.
Off-road path	Path connection (Ripley to Glengarry, and Ripley to PSP)	Path is only 1.8m wide
Line marking	Path connection (Ripley to Glengarry, and Ripley to PSP)	No line marking of shared path
Off-road path	Coolibah (Wahroonga to Blackall)	Coolibah Dr is a local distributor, no shared path or on-road lanes provided. Existing footpath on both sides of road and is approx 1.2 – 1.5m wide. Traffic lanes likely too narrow to mark bicycle lanes
Off-road path	Blackall	Blackall Dr is proposed to be upgraded from an access road to a local distributor. Traffic volumes may be increasing. Path or bike lanes desirable. Traffic lanes likely too narrow to mark bicycle lanes. Existing footpath on both sides of road and is approx 1.2 – 1.5m wide.
Intersection	Blackall / Allenswood roundabout	Dual lane roundabout has off-road paths as an alternative way for cyclists to negotiate intersection. Consider relocating crossings further back from roundabout so that cyclists are not re-entering road within close proximity of vehicles exiting the roundabout.
Off-road path	Path connection (Blackall to Corrigan)	Path and ramps are only 1.5-1.8m wide.
Line marking	Path connection (Blackall to Corrigan)	No line marking of shared path

Appendix G Table 4: Yellagonga Regional Park path network shortcomings

Category	Location	Comment
Missing link	West of Wallaburnup Swamp, between Woodvale Dr and Hocking Rd	Approximately 2.35km of shared path is required along the swamp. Currently, cycling facilities for this section are on-road bicycle lanes on Duffy Terrace, the cycling environment is not in keeping with the park setting. City of Joondalup advise this work is scheduled for the next 12 months.
Missing link	East of Lake Goollelal, on Lakeway Dr	Cycling is currently on-road. Approximately 900m of shared path is required.
Missing link	East of Lake Goollelal, north of Woodlake Rtt	For approximately 200m, only a walk trail exists which would need upgrading to a shared path.

Appendix G Table 5: Field observations

Land use	Destination	Comments
Train station	Currambine Station	Good signage to destination. Good immediate access to destination. Being a relatively new station access and signage are good but as you move further away signage disappears. Bicycle parking facilities are overflowing - consider providing additional.
	Joondalup Station	Poor signage to destination. Good immediate access to destination. The station is also a major bus terminal.
	Edgewater Station	Poor signage to destination. Good immediate access to destination. U-racks are overflowing and lockers seem to be in use.
	Whitford Station	Poor signage to destination. Good immediate access to destination.
	Greenwood Station	Poor signage to destination. Limited immediate access to the destination, cyclists have to detour to get to station. The security guard observed that the 'lock and leave' U-racks right next to him were barely utilised where as the bike shed at the station entrance would typically be overflowing.
	Warwick Station	Signage at the destination but not in the surrounding area. Good immediate access to destination. Once again it was very clear that the 'lock and leave' bicycle U-racks next to the security guards was almost unused but the U-racks at the station entrance were overflowing.
Education	Padbury Snr High (MacDonald Park)	Access from surrounding roads is on-road and shared paths.
	Padbury Primary (MacDonald Park)	Access from surrounding roads is on-road and shared paths.
	Lake Joondalup Baptist Collage	Good immediate access to destination.
	Curtin Uni.	Good immediate access to destination.
	West Coast College	Good immediate access to destination.
	Edith Cowan Uni.	Good immediate access to destination.
	Woodvale Primary	Poor immediate access to destination.
Shopping centres	Joondalup City Centre (Lake Joondalup)	Good signage to destination. Good immediate access to destination. Joondalup City Centre mainly has on-road cycling and generally good cycling conditions.
	Lake Joondalup Shopping Centre	A number of parking racks around the entrances. Good signage to destination. Good immediate access to destination.
	Warwick Centro	No parking facilities. Poor signage to destination. Good immediate access to destination.
	Whitford City	Parking racks provided. Racks at only two entrances was causing cyclist to use poles at entrances without racks. Poor signage to destination. Good immediate access to destination.
Parks and recreation	Beaumaris Sport Centre	No parking facilities. Poor signage to destination. Good immediate access to destination. Access to the facility is good with major paths connecting. Slight overgrowth of cycling paths.
	Burns Beach (Marmion Marine Park)	U-racks provided. Poor signage to destination. Access down Burns Beach Rd is limited to a shared path, but coastal cycling route is very good. This is a popular walk and cycle destination.
	Mullaloo Beach	No parking facilities. Poor signage to destination. Access from

Land use	Destination	Comments
		surrounding area is on-road and shared paths, and is acceptable.
	Ocean Reef Community Centre (Heathridge Park)	U-racks provided. Poor signage to destination. Access from surrounding area is on-road and shared paths, and is acceptable.
	MacDonald Park	No parking facilities. Poor signage to destination. Access from surrounding area is on-road and shared paths, and is acceptable.
	Hillarys Boat Harbour	U-racks provided. Poor signage to destination. Good immediate access to destination. This is a popular walk and cycle destination. Bicycle U-racks are located around and seem to be adequate.
	Ocean Reef Boat Harbour	No parking facilities. Poor signage to destination. Access from surrounding area is on-road and shared paths.
	Lake Joondalup Park	No parking facilities. Poor signage to destination. Good immediate access to destination. The hiking trail is also utilised by cyclists.
	Percy Doyle Reserve & Leisure Centre	U-racks provided. Poor signage to destination. Good immediate access to destination.

Appendix G Table 6: Crashes at intersections adjacent to popular destinations or schools

Land use	Adjacent to crash location	Crash location(s)
School	Padbury Catholic Primary	– Gibson Ave & Hepburn Ave
	Padbury Primary	– Marmion Ave & Forrest Rd
	Glengarry Primary	– Glengarry Dr & Gurdon Rd
	Catholic Primary	– Marmion Ave & Miami Beach Prom
	St Lukes Catholic Primary	– Moolanda Blvd & Whitfords Ave
	Belridge Senior	– Admiral Gr & Ocean Reef Rd
	Prendivelle Catholic College	– Marmion Ave & Hodges Dr
	Lake Joondalup Baptist College	– Shenton Ave & Joondalup Dr – Shenton Ave & Pontiac Wy
	Mater Dei College	– Settler Wy & Pioneer Dr
	ECU	– Joondlaup Dr & Hodges Dr & Grand Blvd – Lakeside Dr & Deakin Gate
Park	Blue Lake Park	– Blue Mountain Dr & Yellowstone Wy – Manyarra Tn & Blue Mountain Dr
	Lake Goollelal	– Cockman Rd & Hepburn Ave – Lakeway Dr & Kingfisher Way
	Joondalup Golf Course	– Shenton Ave & Fairway Cl – Fairway Cl & Kooralbyn Wy
Shop	Lakeside	– Joondalup Dr & Collier Ps – Winton Rd & Cord St
	Grand Cinemas	– Marmion Ave & Shenton Ave – Marmion Ave & Ocean Gate Pde – Shenton Ave & Delamere Ave
	Woodvale Boulevard	– Whitfords Ave & Trappers Dr – Woodvale Dr & Trappers Dr
Coast	Hillary's Boat Harbour	– Whitfords Ave & Hepburn Ave & West Coat Dr – St Helier Dr & West Coast Dr – Tenerife Bvd & Whitfords Ave
	Beach	– Mullaloo Dr & Northshore Dr & Oceanside Prom – Whitfords Ave & Northshore Dr – Ocean Reef Rd & Swanson Wy – The Plaza & West Coast Dr – West Coast Dr & Beach Rd West

(Note that the popular land use area or school may have been either the destination for the trip or part of the cycling route)

Appendix G Table 7: Projects remaining from 2002/2003 bike plan

Category	Location	Comment
Signage	Burns Beach to Hillarys, at major junctions along coastal path and major access points from adjacent suburbs	Install distance and directional signage indicating key destinations along coastal route and adjacent suburbs. Integrate signage with PBN routes where appropriate. Still appropriate to consider project.
Missing link	Marmion Ave, east side, near Bannister Rd	Construct new 2.5 m shared path to link the existing path on the east side of Marmion Ave to the underpass under Marmion Ave. City assessed project and no longer pursuing.
Off-road path	Whitfords Ave, south side, between Alexander Rd and Macarthur Ave	Construct new 2.1 m shared paths to replace existing 1.8 m path segments. Still appropriate to consider project.
Missing link	Camberwarra Dr, south side, 50 m south of Macedon Pl	Build 2 m long shared path (2.1 m wide) and new kerb ramp to connect existing path from Whitfords East Park to Camberwarra Dr. Still appropriate to consider project.
Off-road path	Whitfords Ave, north side, near Mayflower Cr	Upgrade existing pedestrian access way from Mayflower Cr to Whiftords Ave to 2.1 m shared path, including regrading of existing very steep section. Too difficult to achieve.
On-road bike lane	Moore Dr, btwn Blue Mountain Dr and Candlewood Bvd	Mark shoulders on road to rectify gap, approx. 380 m long, in existing shoulders. Road too narrow at 7.5m.
Line marking	Hodges Dr, intersection with Mitchell Freeway on-ramp	Install pedestrian and bicycle signals on east side of intersection to provide safe crossing of Hodges Dr. May have occurred in conjunction with freeway extension.
Missing link	Ellendale Dr, opposite Crawley Gr	Built new kerb ramp and short link path to join existing shared path which leads to and crosses Ocean Reef Rd. Still appropriate to consider project.
Intersection	Joondalup Dr, at intersection with Wedgewood Dr.	Construct 2-stage crossing on north side of intersection. Not considered a priority as light controlled crossings are close by.
On-road bike lane	Wedgewood Dr	Install bicycle lanes along full length of Wedgewood Dr. Road too narrow for lanes
Missing link	Marmion St, east side, near Dorian Loop	Install kerb ramp where path along east side of Marmion Ave ends near north side of Dorian Loop. No connection to road at present. Still appropriate to consider project.
Missing link	Intersection of Connolly Dr and Moore Dr	Build 2.1 m shared path on south-west and north-west corners of intersection to complete peripheral path around roundabout. Also extend 2.1. m path along west side of Connolly Dr to join intersection of Vanguard Pl and Grecian La. Will be undertaken as part of Connolly/Moore duplication.
Intersection	Intersection of Marmion Ave and Burns Beach Rd	Build concrete path 2.5 x 2.5 m adjacent to existing kerb ramp on north-west corner of intersection to provide safe waiting area. Will be addressed as part of other projects.
Freeway	Mitchell Freeway, east side	Construct 2.4 m shared path from Strathaven Cr to Warwick train station. Still appropriate to consider project.
Freeway	Various locations on main Mitchell Freeway Bicycle Route and connecting routes.	Install new kerb ramps, generally in place of existing mountable kerb “ramps”, remove unnecessary central grab rails, and add centre line pavement markings to bollards where bollards are essential to exclude motor vehicles. Partially complete and ongoing
End of Trip	Sorrento/Duncraig Library	Install 4 U-rails (in place of existing toast rack). Still appropriate to consider project.
End of Trip	Ocean Ridge Leisure Centre	Install 4 U-rails. Still appropriate to consider project.
End of Trip	Sorrento/Duncraig Leisure Centre	Install 2 U-rails adjacent to main entrance. Still appropriate to consider project.
End of Trip	Various locations in CBD area	Install 20 U-rails. Still appropriate to consider project.
Off-road path	Ocean Reef Rd, north side	Construct 2.1 m shared path between Edgewater Dr and existing path crossing east of Trappers Dr. Too difficult to achieve.
On-road bike lane	Road segments which are part of PBN Stage 1 route NW1	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.
On-road bike lane	Road segments which are part of PBN Stage 2 route NW2	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.

Category	Location	Comment
On-road bike lane	Road segments which are part of PBN Stage 2 route NE2	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.
On-road bike lane	Road segments which are part of PBN Stage 2 route NW4	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.
On-road bike lane	Beach Rd, West Coast Dr to Marmion Ave, part of PBN Stage 2 route NW6	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.
On-road bike lane	Flinders Ave, Whitfords Ave to Marmion Ave	Install on-road bicycle lanes. Still appropriate to consider project. Road may be too narrow for bike lanes.

Field Observations – Photo Record

19th February 2009

"Warwick Stn 2" – Bicycle parking facilities

"Warwick Stn 3" – U racks overflowing

"Warwick Stn 4" – 'Secure' parking generally unused

"Warwick Stn 5" – Directional signage at station

"Greenwood Stn 1" – Bicycle parking facilities

"Greenwood Stn 2" – Bicycle lockers

"Greenwood Stn 3" – Bicycle lockers and U racks

"Whitford Stn 2" – Bicycle lockers

"Whitford Stn 3" – Bicycle lockers

"Whitford Stn 4" – Bicycle parking against fence

"Whitford Stn 5" – Bicycle parking against fence

"Edgewater Stn 1" – Undercover U-racks

"Edgewater Stn 2" – Bicycle parking overflowing

"Edgewater Stn 3" – Bicycle lockers close to bridge

"Joondalup Stn 1" – Bicycle lockers

"Currambine Stn 1" – U-racks

"Currambine Stn 2" – U-racks overflowing

"Currambine Stn 3" – U-racks

"Currambine Stn 6" – Bicycle lockers

"Warwick Cent" – No bicycle parking facilities

"Lakeside 1" – On-road bike lane

"Lakeside 2" – Bike lane through traffic signals

"Lakeside 3" – Wide footpath, could it be shared?

"Lakeside 4" – No bicycle parking facilities at present

"Lakeside 5" – U-racks

"Lakeside 6" – Bicycle parking on fence, at entrance

"Whitford 1" – U-racks near entrance

"Whitford 2" – U-racks near entrance

"Whitford 3" – Bike chained to pole

"Whitford 4" – U-racks

"Whitford 5" – U-racks

"Whitford 6" – U-racks are close to entrance

"ECU Joondalup 1" - Entrance

"ECU Joondalup 2" – U-racks

"ECU Joondalup 3" – U-racks

"ECU Joondalup 4" – Median cut-throughs at lights

"West Coast TAFE 2" – On-road bicycle lanes

"Heathridge Park" – U-racks

"Beaumaris 1" – No line marking on path

"Percy Doyle Res" – U-racks

"Burns Beach 5" – Coastal path

"Burns Beach 6" – U-racks

"Mullaloo Beach" – Signs and lines on shared path

"Hillarys 1" – A popular destination

"Hillarys 2" – U-racks

"Hillarys 3" – U-racks near entrance

"Hillarys 4" – U-racks near entrance

"Joondalup Lake 1" – Pedestrian only paths

"Joondalup Lake 2" – Sand over path

"Joondalup Lake 3" – Shared path, no lines or signs

"Joondalup Lake 4" – Walk trails are unsealed

"Marmion turning left to Burns Beach" – Shared path

"Burns Beach Rd Joondalup 1" – Sign and ramp

"Burns Beach Rd onroad cycling" - Shoulder

"Shenton Ave 1" – Shared path, no lines

"Shenton Ave 2" – Shared path at driveway

"Shenton Ave 3" – Shared path, no lines

"Shenton Ave 4" – Shared path, no lines, bike lane

"Shenton Ave 5" – Bike lane

"Shenton Ave 6" Bike lane and shared path

"Grand Blvd 1" – Bike lanes

"Ocean Reef Rd 1" – Signage, bollard in path

"Ocean Reef Rd 2" – Shared path, no lines

"Ocean Reef Rd 3" – Good visibility

"Mullaloo Dr 1" – No bicycle facilities

"Mullaloo Dr 2" – Shared path, no lines

"Mullaloo Dr 3" – Off-road facility at roundabout

"Mullaloo Dr 4" – No provision for bicycles

"Hepburn Ave 1" – Directional signage

"Hepburn Ave 2" – Path and bike lane

"NW2 Route 1" - Signage

"NW2 Route 2" – Suburban Street

"NW2 Route 3" – Suburban Street

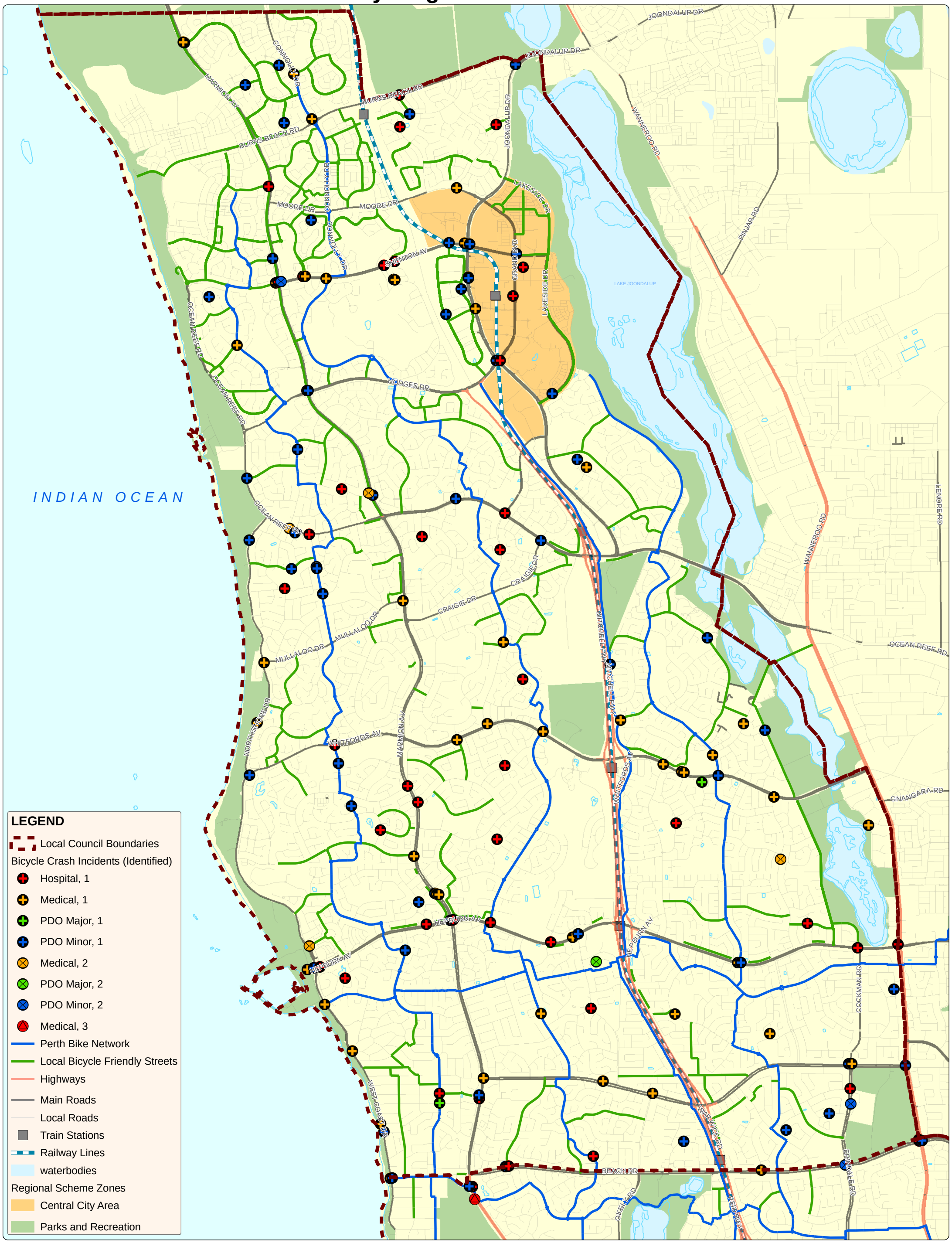
"NW2 Route 4" – Shared path (in distance)

"NW2 Route 5" – Directional signage

"NW2 Route 6" – Route tag on power pole

"NW2 Route 7" – Directional signage, U-rail barriers

Cycling Areas of Concern



LEGEND

- Local Council Boundaries

Bicycle Crash Incidents (Identified)

- Hospital, 1
- Medical, 1
- PDO Major, 1
- PDO Minor, 1
- Medical, 2
- PDO Major, 2
- PDO Minor, 2
- Medical, 3
- Perth Bike Network
- Local Bicycle Friendly Streets
- Highways
- Main Roads
- Local Roads
- Train Stations
- Railway Lines
- waterbodies

Regional Scheme Zones

- Central City Area
- Parks and Recreation

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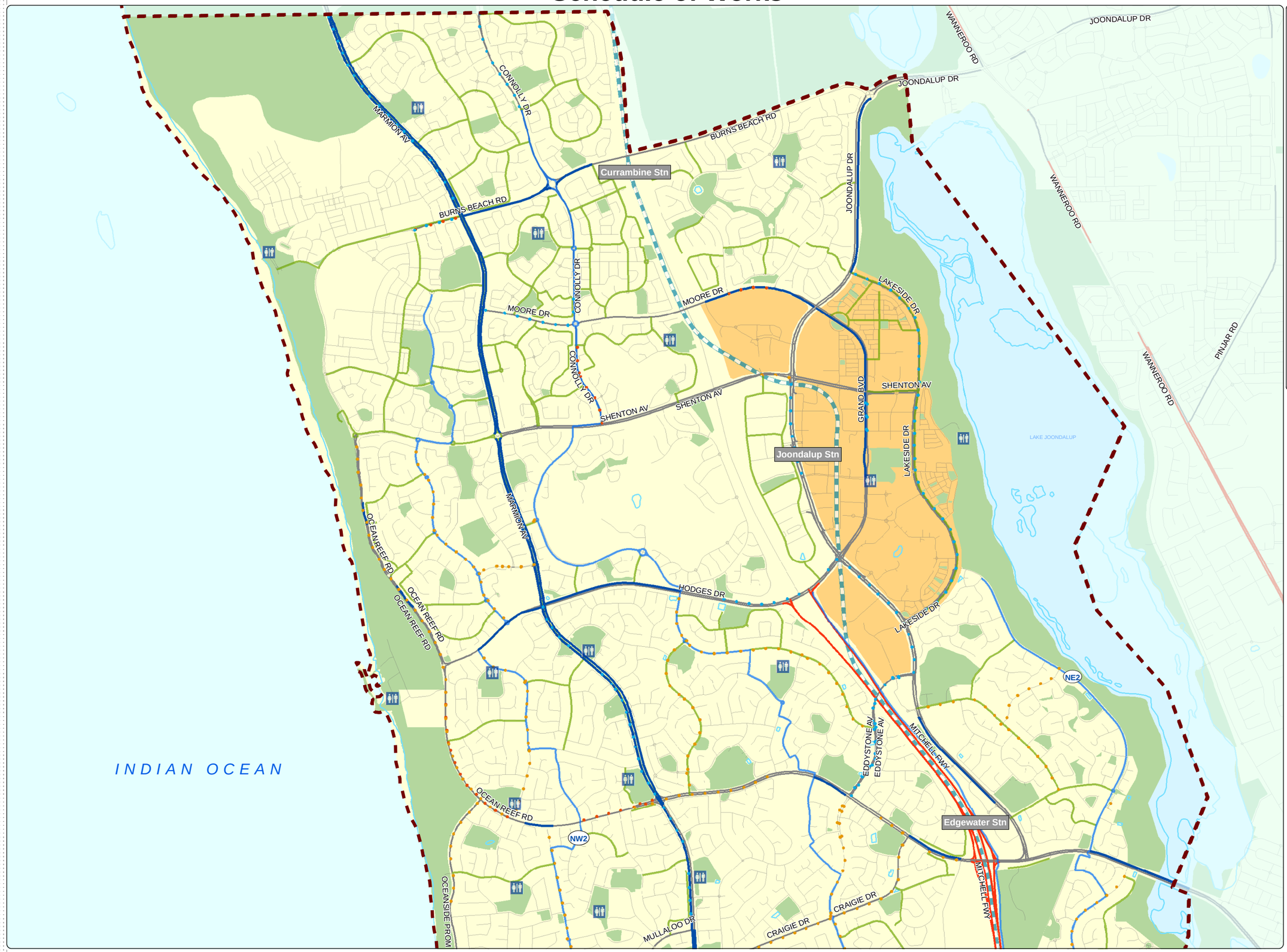
N W E S

Data Source:
City of Joondalup

Schedule of Works



Legend

- Local Council Boundaries
- Perth Bike Network
- Local Bicycle Friendly Streets
- Railway Lines
- Central City Area
- Parks and Recreation
- Train Stations
- Public Toilets

Proposed Infrastructure Works

- Arterial Rd Shared Paths
- Local Rd Shared Paths (CoJ to prioratise) (this plan and beyond 5 years)
- Aditional Shared Paths (beyond 5 years)
- Road Bike Lanes (beyond 5 years)

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N W E S

Data Source:
City of Joondalup

Schedule of Works

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Proposed cycling infrastructure guidelines

The following guidelines provide an indication as to the design and specification of best practice and state of the art bicycle paths and facilities regionally, nationally and internationally.

This section of the Bike Plan is aimed at advising the City of Joondalup and those working on behalf of, or within the bounds of the municipal authority, on issues of good practice that should be adopted within the municipality. It is intended that this information reflects the standards to which the bicycle network should aim to achieve.

The Bike Plan recognises and acknowledges that Austroads' *Guide to Traffic Engineering Practice Part 14 Bicycles* (1999) forms the overarching standard.

Austroads, along with the Western Australian Planning Commission (WAPC) document *Liveable Neighbourhoods* (October 2004) supplemented by extracts from various other recognised standards form the basis for the standards and specifications outlined in this Appendix.

The following design elements, in terms of cycling networks and facilities, are addressed in this Appendix:

- Pedestrian and cycling networks
- Function and characteristics of distributors, arterial and local streets
- Paths and lanes
- Signs and markings
- Barriers and bollards
- Lighting
- Facilities (including end of trip, lockers, shelters etc)

1. Pedestrian and cycling networks

This section looks at the requirements for providing the basic foundations in terms of quality, suitability and performance of pedestrian and cycling networks in the City of Joondalup. Both groups of users have specific needs and should be accommodated as part of the planning and design for cyclists.

In relation to network design, and more specifically to road and path engineering, all cyclists generally have five basic requirements for safety and efficiency, as follows:

- Adequate space to ride
- A smooth surface
- Speed maintenance (also often referred to as continuity)
- Connectivity
- Sufficient information

Bicycles are particularly suited for undertaking short or local trips. Trips of approximately 5 to 10 km can be considered local trips, although significantly longer distances are easily achievable and are regularly undertaken by riders of average fitness levels.

It is easy to see how cycling can play an important role in promoting a sustainable transport policy by encouraging increased usage of cycling through careful and considered design and planning of the infrastructure network of roads, paths and trails. The promotion, development, extension and improvement of pedestrian and cycling networks crosses all forms of transportation networks and this includes off road paths and all road classifications as well as public transport systems.

Network planning and initiatives should aim to serve longer distance trips, increase volume and frequency of local trips, provide convenient and safe access, provide end of trip facilities, support and facilitate good maintenance practice and promote and encourage cycling as a safe and convenient mode of transport.

1.1 Pedestrian networks

Liveable Neighbourhoods describes the requirements for pedestrians as follows:

"In recent conventional development, walking has been made difficult for many journeys because of the disconnected street system, lack of footpaths, unsafe routes and long distances to most destinations. To encourage people to walk, a place must have high pedestrian amenity and efficiency, be stimulating, legible and safe for pedestrians.

Liveable Neighbourhoods recognises the complexity of daily movement patterns and the need to make pedestrian trips as short and pleasant as possible. The primary pedestrian network is the street system, which is detailed to support pedestrian movement.

Footpaths should ideally be provided on both sides of all streets. However, for cost reasons, footpaths may be omitted from one side of lower order access streets, unless the street forms an important pedestrian link (eg to a school, centre or station)."

1.2 Cycling networks

Liveable Neighbourhoods describes the requirements for cyclists as follows:

"Good cycling conditions and encouragement of cycling should be designed into the urban fabric. This includes such measures as bike parking facilities, slower vehicle speeds and low traffic volumes, appropriate lane widths along local streets to allow cyclists to share travel lanes with cars, marked cycle lanes on busy streets and shared paths and routes parallel to arterials with less traffic.

Bicycle 'arterial' routes should be identified to efficiently serve key destinations such as schools, centres sports areas and stations. These may predominantly comprise on-street cycling on local streets, where detailed street design has provided safe and comfortable conditions for heavier cycle use. On bicycle arterial routes, bicycle head-start treatments may be required at signals."

2. Function and characteristics of distributors, arterial and local streets

Austroads Part 14 identifies the requirements for on and off road cycling facilities.

A traffic volume of 3,000 vpd (and a maximum speed limit of 50 km/h) is widely regarded as the highest level beyond which provision for cyclists should be made.

It may also be appropriate to consider a left lane traffic volume of approximately 200 to 250 vph in the case of multi lane roads, one way roads and roads that experience high or low traffic peaks.

Within transport networks, cycling facilities are typically provided as follows:

- Primary distributors – separate facilities or wide traffic lane
- Integrator arterials – on street lanes or separate shared paths
- Neighbourhood connectors - on street bike lanes or separate shared paths
- Access street – on road cycling

Typical path widths, exclusive bicycle lane widths and sealed shoulders widths as identified in Austroads Part 14 are shown in Table 1 and Table 2.

Table 1: Shared path dimensions (Austroads 1999)

	Path width (m)		
Path type	Local access path	Commuter path	Recreational path
Desirable	2.5	3.0	3.5
Acceptable range	2.0 – 2.5	2.0 – 3.5	3.0 – 4.0

Table 2: Exclusive bicycle lane and sealed shoulder dimensions (Austroads 1999)

	Lane width (m)		
Road speed (km/hr)	60	80	100
Desirable	1.5	2.0	2.5
Acceptable range	1.2 – 2.5	1.8 – 2.7	2.0 – 3.0

In the case of a wide kerbside lane it is recommended that the lane be an absolute minimum of 3.7 m for a road with a posted speed of up to 70 km/h.

The provision for cyclists (on distributors, arterials and collectors) as described in the WAPC's *Liveable Neighbourhoods*, is summarised in Table 3.

Table 3: Function and Characteristics of Distributors, Arterials, Collector and Access Streets

Route type and function	Max speed limit	Indicative volume range (vpd)	Cross section
Primary Distributors, 6 lane	80km/h	50,000	Determined by MRWA
Primary Distributors, 4 lane	80km/h	35,000	Determined by MRWA
Arterial Integrator A, four lanes outside centres	60 or 70km/h	15,000-35,000	2 x 8.2m including bike lane and 2 x 5.5m service roads with parking
Arterial Integrator A, four lanes in centres	60km/h	<25,000	2 x 10.7m in centres including combined on street parking and bike lane.
Arterial Integrator B, Two lanes outside centres	60km/h	7,000-15,000	2 x 7.5m including on-street parking and bike lane
Arterial Integrator B, Two lanes outside centres	60km/h	15,000-20,000	2 x 7.5m including bike lane. Parking requires special consideration.
Arterial Integrator B, Two lanes	40-50km/h	15,000	2 x 7.5m including on-street parking
Neighbourhood connector A, 2 lane divided. Residential	50	7000	2 x 7.1m including parking, on-street bike lane, median + shared path on verge.
Neighbourhood connector B, 2 lane undivided. Residential	50	3000	11.2m including parking, plus shared path on one verge. Separate on-street bike lane if >3,000vpd
Access Streets	40/50	3000	7-7.5m typical, shared use.

3. Paths and lanes

This section looks at the design requirements, performance and suitability of pathway types and lanes for the City of Joondalup.

3.1 Bicycle path design criteria

The two main criteria considered critical in terms of cycling paths and lane design are:

- Typical bicycle envelope (clearance requirements)
- Design speed and traffic volumes (shared or segregated link criteria)

The basic bicycle design envelope and clearances provides a summary of cyclist requirements. The 1 m wide envelope allows for inexperienced riders 'wobble'. The bicycle envelope is shown in Figure 1.

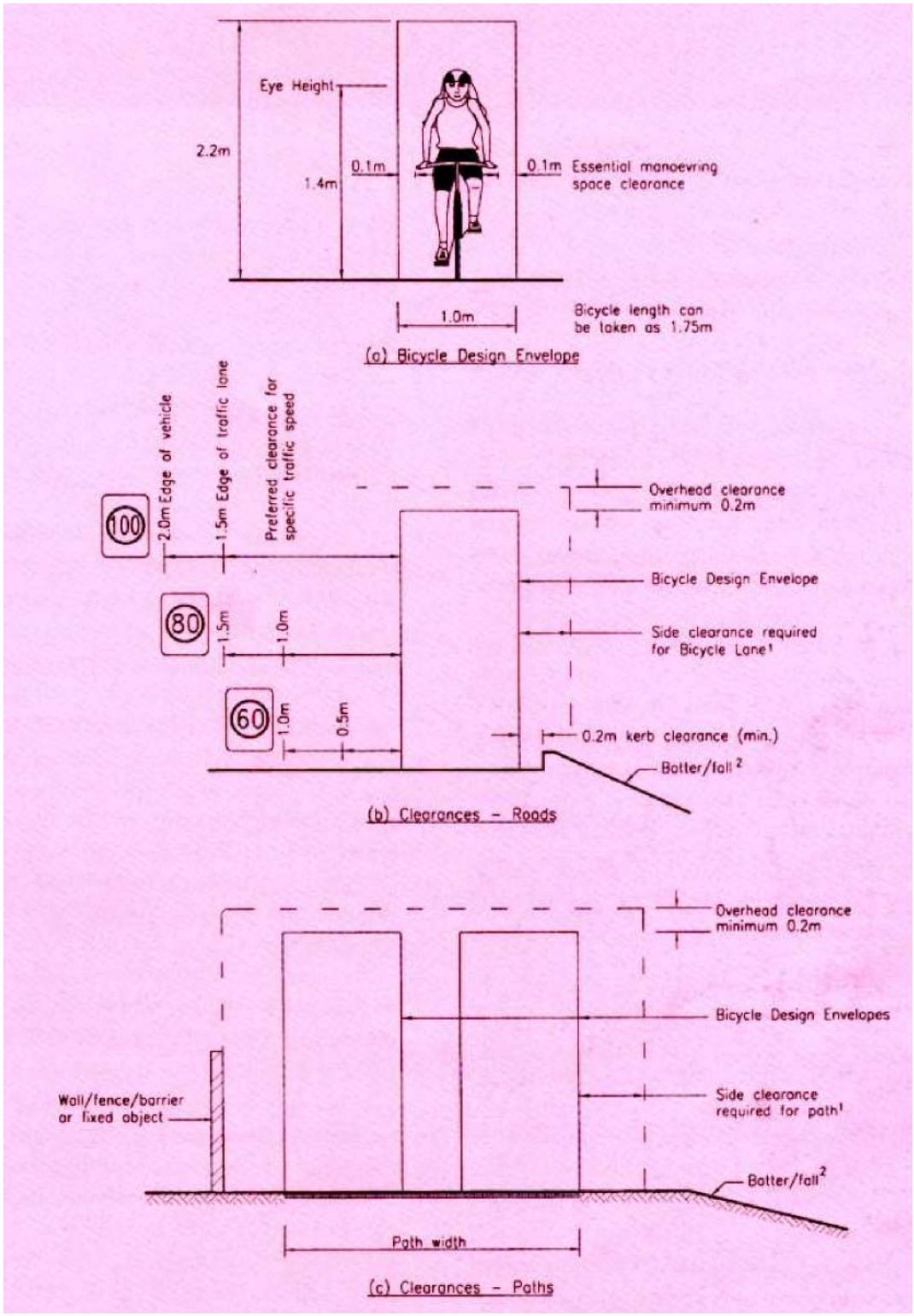

Figure 1 - Bicycle envelope (Austroads 1999)

When considering the provision of bicycle facilities, as a minimum the bicycle envelope requirements should be adhered to.

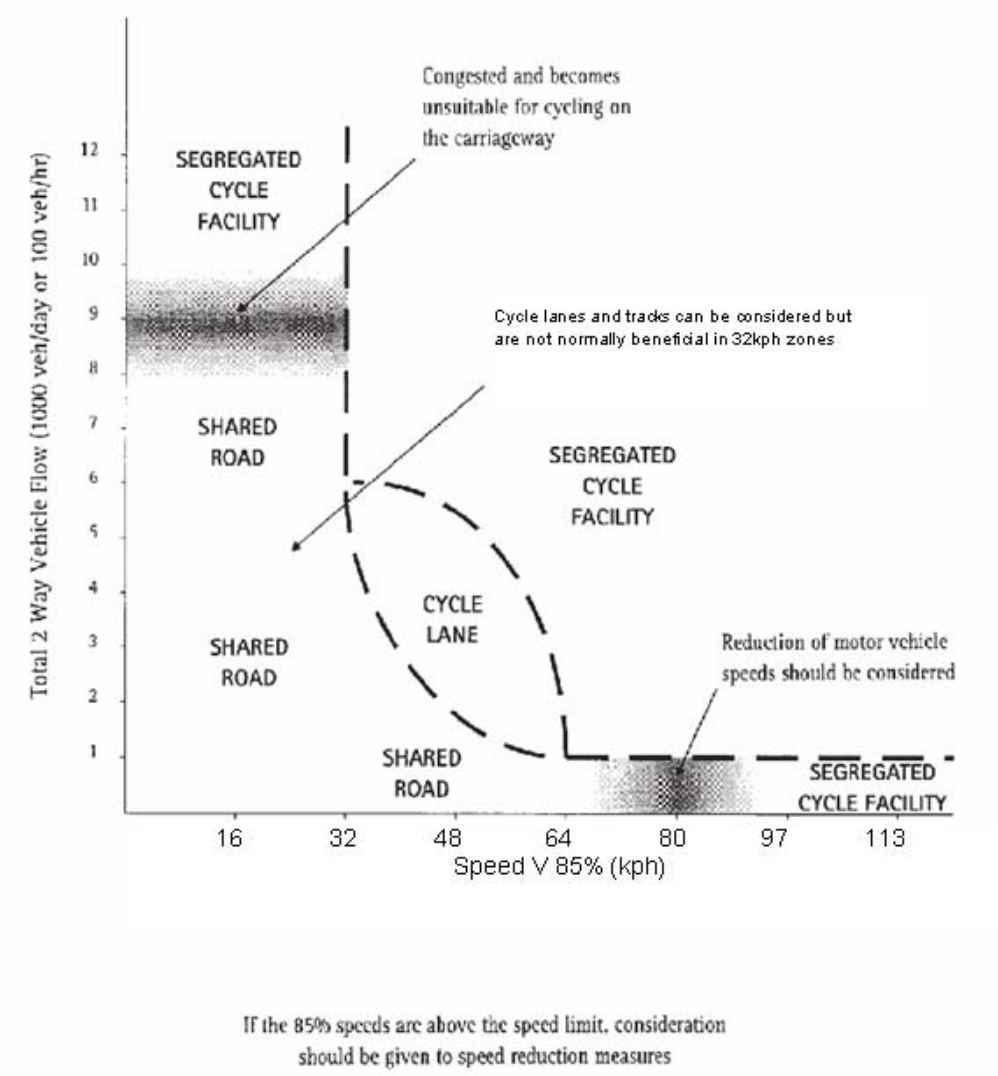

Figure 2 – Bicycle Link Criteria (UK Sustrans)

Figure 2 has been extracted from UK Sustrans (the UK's leading sustainable transport charity) guidelines. The graph reflects the needs of the inexperienced cyclist who will benefit from segregation earlier than the experienced cyclist. The graph is used as a first step in the assessment of the need for segregation.

To summarise the design requirements of a route to cater for the inexperienced cyclist:

- On roads with vehicular speeds below 32 km/h (this is the 85%ile, ie. only 15% of motorists will exceed this speed), road space can be shared with motorists
- Roads with traffic speeds 64 -80 km/h (85%ile), require segregated cycle facilities or a reduction in traffic speeds
- Roads with traffic volumes over 9,000 vpd require two-way require segregated facilities
- Arterial corridors within City of Joondalup experience high traffic flows, which make corridors inappropriate for use by inexperienced cyclists unless segregation occurs.

3.2 On and off road lanes and paths

The majority of cycling for daily activities will be on local streets and paths. On busier streets close to universities and schools, wider paths designed for use by pedestrians, cyclists, and other small wheeled vehicle users are considered appropriate.

Long distance commuter cycling and recreational cycling may justify provision of specially-designed shared paths

or cycle-only paths, usually in accordance with a regional structure plan, and relevant design and construction standards.

3.2.1 On road lanes

On-road cycle lanes are often introduced to roadways with all or a combination of the following properties:

- Sufficient road width (including space for parked cars if required)
- Significant cycling demand (warrants for creation of a route where drivers will expect and be aware of cyclists)
- Roads are trafficked with above 1,000 vpd, and a shared-carriageway is inappropriate and a dedicated, segregated path is not warranted
- Roads with fewer intersections are ideal (increased safety due to reduce the likelihood of collisions)

On-road lanes are commonly used to connect residential areas with off-road routes, as commuter routes to key attractors and city centres. On road lane provision within shopping centres are best avoided, unless sufficient separation or distance can be achieved between the cycle lanes and the car doors.

On-road lanes require confidence and experience on behalf of the cyclist, with the majority of cyclists preferring an alternative route given a choice.

For on-road lanes, best practice should operate with no kinks in the lanes and at an adequate width (as defined by Austroads).

Austroads' *Guide to Traffic Engineering Practice Part 14 Bicycles* (1999) suggests that introducing a bicycle lane can increase the safety for cyclists by separating users from motorists. The lanes are commonly defined by a dashed (advisory) or solid white (mandatory) line.

Conflict commonly occurs at left turn junctions but is best avoided by the presence of both bicycle only and vehicle only turning lanes.

There should be a bicycle pavement logo on both approach and departure sides of a minor intersection, with continuity lane lines across the intersection. The cycle lane width should be between 1.5 m and 2.0 m.

Effective use of coloured surfacing should also be made. Coloured surfacing can be of value at high conflict locations to reinforce the presence of cyclists particularly at intersections. Coloured surfacing can also be applied to the centre of T-intersections providing cyclists with a clear refuge when turning right for example.

3.2.2 On-road shared carriageway

Austroads indicates that roads with less than 3,000 vpd can generally accommodate a shared arrangement between cyclists and motorists.

Where the speed difference between motorists and cyclists is less than 20 km/h full integration can be accommodated. Where speed differences exceed 40 km/h segregation is desired.

Where roads are lightly trafficked (below 1,000 vpd) and speeds can be maintained below 50 km/h, UK guidelines indicate that roads can be safely shared between cyclists and motorists.

By applying suitable measures, there is an opportunity to enhance and formalise residential and access street environments as a formal on-road shared route.

Measures that can be implemented to foster an on-road shared carriageway include:

- Appropriate traffic calming (to ensure that low speeds are maintained)
- Provision of formal pedestrian/cycling crossings (in particular on heavy vehicular routes that intersect with the route)
- Wayfinding signs and continuity markers to improve clarity and legibility of route

- Marking to carriageway surface and on signs to improve awareness of motorists and all other users

3.2.3 Wide shoulder lanes

A wide shoulder (or kerbside) lane is an on-road bicycle lane that is wide enough to allow a cyclist and overtaking vehicle to occupy the same lane. Many of the lanes are marked with bicycle symbols near to the kerb, although the lane does not always offer cycling continuity along a route, and intermittent lane markings are common.

Wide kerbside lanes are often busy thoroughfares, and / or often shared as bus lanes operating with no-parking 'Clearways' during the peak periods.

As with regular on-road cycle lanes, the wide kerbside lanes are generally used by confident cyclists, although the additional width can reduce the stress levels of other cyclists using the cycle lanes.

Austroads suggests the following acceptable parameters for a wide kerbside lane are as follows:

- 3.7 m absolute minimum width
- 4.0 m desirable minimum width
- 4.2 m desirable width (60 km/h road)
- 4.5 m desirable width (80 km/h road).

The Bike Plan encompases the lane widths suggested by Austroads are adopted for wide kerbside lanes, and also highlights the importance of the following appropriate signage and lane marking for wide shoulder lanes:

- Lane markings to be provided 15 m before and after each intersecting street
- Lane markings to be at intervals not exceeding 200 m
- Additional markings required around curves, on crests and opposite 'T' intersections
- No bicycle lane signage should be installed on wide kerbside lanes, as the lanes are a shared surface, not a separate bicycle facilities

3.2.4 Footpaths and shared paths in streets

A number of requirements are documented in Liveable Neighbourhoods in relation to footpaths and shared paths, including the following:

- Arterial roads and neighbourhood connector streets must have footpaths or shared paths on both sides and constructed to an approved construction standard
- Access streets must have a footpath or shared path on one side
- A footpath or shared path may be required on both sides where pedestrian activity is high, ie where the path forms part of a pedestrian link, eg near schools, shops, stations, etc.
- Footpaths in streets should be 1.5 m minimum wide, and be widened to 2 m minimum in the vicinity of schools, shops and other activity centres. Footpaths 1.5 m wide are offset a minimum of 0.3 m from the property boundary, or are built at 1.8 m wide if abutting the property boundary. Pram crossings are required at all intersections and should have a maximum grade of 1:10.

Footpaths should be separated from the street pavement, and usually located against or close to the property boundary. Footpaths may only be located abutting kerbs where site constraints preclude alternative siting, and where vehicle volumes are low.

If footpaths abut kerbs, verges may need to be widened to accommodate trees in locations clear of services. Pedestrian crossings of integrator arterials should be provided at-grade wherever practical. Grade separated pedestrian crossings should only be used at freeways or other high speed distributor roads or where topography can be used to advantage and adjacent development gives good passive surveillance.

Footpaths should be designed and located taking into account pedestrian amenity, sun and shade, street lighting, postal deliveries and likely use patterns. Footpath construction must be continuous across driveways.

Shared zones for pedestrians, cyclists and vehicles should be designed and detailed to enable pedestrians and

vehicles to share the same pavement with a sense of equal priority. Reference to road traffic regulations is required before using shared zones.

3.3 Off-road shared paths

The purpose of a shared path is to offer both cyclists and pedestrians a formal pathway, without the safety risks of sharing the roads with motor vehicles. Off-road paths should provide a pleasant and continuous route for cyclists and pedestrians, with minimal road crossings and interruptions.

Off-road shared paths are often used for recreational cycling, given that they regularly do not provide the most direct route between locations, and seldom provide direct connections with popular commuter destinations eg city centre, retail centres and workplaces.

Given their recreational nature, off-road paths are frequently included as part of trails and strategic routes.

The guide in relation to Bicycle Paths, as recognised by the Bike Plan, is Austroads' *Guide to Traffic Engineering Practice Part 14 Bicycles* (1999). The guide also details standards with respect to path curvature for given design speeds, and for visibility requirements for cyclists navigating a path.

This document states that the desirable widths of (shared) paths should be as follows:

- Local – 2.5 m
- Commuter – 3.0 m
- Recreational – 3.5 m

The risk of conflict on shared paths can be reduced through centre line marking, appropriate design width, signage, visibility and maintenance.

The following should be considered for the design of shared paths:

- Clearance to obstacles – 0.3 m absolute minimum to "smooth" fences/walls
- Clearance to dangerous obstacles – 0..5 m to 1.0 m
- Minimum vertical clearance – 2.4 m from cycling surface / pathway

3.4 Transport networks for users with disabilities

Access to and ease of use of the movement network for users with disabilities is an important emphasis of Liveable Neighbourhoods. The needs of disabled users should be considered during design.

Liveable Neighbourhoods provides for these users in several ways:

- Journeys can be carried out on the street network rather than through a separate open space network which is often poorly maintained and lacking surveillance
- Footpaths are required for most streets, often on both sides of the street, making journeys simpler and safer
- footpath widths standardised at 1.5 m minimum, and kerb ramp design suited to people with disabilities in accord with MRWA design details
- Access to public transport is easier, more direct and closer
- Public transport should be more efficient and therefore more frequent

4. Bicycle infrastructure

Austroads Part 14 documents requirements for facilities including the requirement for long and short term parking facilities at major attractors, shower facilities in commercial and industrial buildings and ramps and handrails. There is a need to ensure that associated bicycle infrastructure facilities including pram ramps and handrails comply with current standards.

4.1 Bicycle parking

The location of bicycle parking should be publicised and identified by appropriate signage

The City will incorporate the requirements of Austroads' *Guide to Traffic Engineering Practice Part 14 Bicycles* into the Town Planning Scheme in respect of development applications. This identifies the number of bicycle parking spaces that should be provided for a number of land uses.

The lack of secure parking facilities for bicycles is a barrier to potential cyclists and should be addressed at all key facilities and amenities. Particular attention should be given to those located adjacent to bicycle routes. It is recommended that as a minimum, the following amenities have secure bicycle parking facilities:

- Schools
- Stations
- Recreational opportunities
- Community facilities
- Retail outlets

The City's website should detail cycling parking within the City, listing the location and type of bicycle parking facilities, and that the City produces a 'Bicycle Parking Handbook' (similar to that produced by VicRoads) – which outlines a set of parking guidelines that help employers and building operators to provide secure and convenient cycling.

The handbook can be downloaded from http://www.vicroads.vic.gov.au/Home/BicyclesPedestrians/DevelopingBicycleNetworks/ParkingAndEndOfTripFacilities.htm.

The utilisation of bicycle parking will be monitored, potentially identifying any growth in cycling, vandalism and the need to expand facilities.

At schools and universities bicycle parking facilities should be in a prominent location which allows casual surveillance, and under a shelter. Open or see through ends of the stands allows visibility of bicycles from all sides.

Figure 3 - Examples of bicycle parking

Consultation identified that parking facilities at train stations often lacked shelters and were inconveniently located, which were considered to be areas with minimum surveillance. A preference was noted for bicycle parking facilities to be located in the station entrance, which is considered to be more easily accessible and secure since casual surveillance is possible.

4.2 Bicycle racks

Bicycle racks shall be provided at these locations as follows:

- On district and regional roads - bicycle racks required where retail businesses face a footpath
- On local streets - bicycle racks required where retail businesses face a footpath
- Neighbourhood shopping centres – bicycle racks required near building entrances
- Business commercial centres – bicycle racks required near the building entrance

The City is to undertake regular monitoring of the locations of bicycle racks to determine requirements, maintenance and usage.

4.3 End of trip facilities

Whilst the provision of a bicycle network is instrumental in encouraging more cycling trips, this needs to be supported with adequate end of trip facilities for cyclists at key destination points.

Trip end facilities include the following:
- Bicycle parking – provision and location
- Showers – particularly at workplaces
- Lockers/ safe storage
- Toilets
- Water fountains – en-route, often in parks

Part 3 of the Australian Standard for Bicycle Parking facilities (AS2890.3 – 1993) prescribes requirements for the layout, design and security of bicycle parking facilities.

All new developments should consider the need for shower and changeroom facilities.

5. Signs and markings

Poor signage, especially wayfinding, was highlighted as a particular problem. This was observed both during the site visits and raised during the consultation process.

It was suggested that the existing signage was lacking in quantity, clarity, continuity, legibility and consistency, particularly at intersections and at entry points to the shared pathways.

Austroads provides recommendations relating to the type, location and design of signage for on and off-road paths.

5.1 Wayfinding

Typically, for wayfinding, the information should aim to direct cyclists to the off-road network and surrounding road network, inform cyclists as to the pathway that they are riding on, provide distances for key destinations at regular intervals, and provide cyclists with the names of intersecting paths and roads. It is advised that signage be placed in the following locations:
- At intersections with other routes and paths
- Intersections with roads (local and access in particular)
- At bridges and underpasses

Signage should be placed routinely along mid-block locations of off-road paths to reassure cyclists and assist their route choices.

Some of the measures that can be taken to improve wayfinding and signs and markings in general include the following:
- Integrated information boards illustrating local amenities and public transport
- Wayfindign signage should be provided in public and recreational facilities like parks and also at all pathway and trail intersections

- The route and directions to facilities and amenities and public transport should be clear and legible
- Self adhesive continuity markers and wayfinding signage should be used to assist wayfinding at all decision points and along the route
- Advanced directional and warning signage should be used in conjunction with standard road signs and markings to assist wayfinding

5.2 Naming convention

Cycle paths should be given names or numbers along the entire length of the route for ease of navigation.

The numbering of bicycle routes provides cyclists with an easy method to interpret a geographical reference point. A bicycle route may run across a number of municipalities and will need to be co-ordinated with all relevant Councils to ensure continuity and consistency.

The PBN naming convention system is used throughout the City for the PBN routes.

5.3 Surface markings

The application of self adhesive markers can improve route legibility, particularly through local streets. The markers also offer the opportunity to provide directions to nearby railway stations, or to provide a temporary sign where more permanent signs are vandalised. Self adhesive markers need to be manufactured with suitable materials that don't easily degrade and are not easily removed.

Markers that improve the legibility of a route are not restricted to signs or posts but can also be marked on path surfaces.

Figure 4 - Wayfinding surface markings

It is recommended to install these surface markings at intersections on off-road trails in City of Joondalup, and as intermittent route reminder markings at mid-block locations.

6. Barriers and bollards

Bicycle barriers and bollards are typically used to control, regulate and deny access to other users. The design of an access barrier leading onto an off-road pathway should strive to provide easy access to cyclists and wheelchairs, whilst deterring cars and motorcycles from entering the path.

The issue of what barriers to provide, with particular reference to moveable barriers, is an important issue and has particular relevance to cyclists and pedestrians.

The national Austroads guidelines do not recommend the use of bollards in the centre of paths as they are not safe for cyclists. The guidelines state that a safe access barrier should be tall, wide, painted in a contrasting colour, wrapped in reflective tape (reflective tape shall be to AS 1743-2001, illuminated correctly, leave 1.4m clearance minimum), be preceded by tactile marking and a painted line. Austroads recommends that bollards

should not be used at intersections.

The VicRoads guidelines (Cyclenotes 16 and 17) provide recommended best practices for provision of design treatments for on-road and off-road paths. The on-road guidance suggests a variety of road crossing types, and lists conditions for inclusion of 'stop' and 'give way' signage. Given that unclear signage is susceptible to become a hazard to cyclists, the Cyclenotes advise that they should only be used at locations where the intersection is not clear, or when a safety risk is present for cyclists.

The off-road pathway VicRoads recommendations are in Cyclenotes 17, including guidelines for the use of terminal treatments such as bollards and barriers. The purpose of terminal treatments is clearly subject to two reasons; to inform cyclists that a road is approaching, or to prevent motorists from accessing the off-road paths. It is advised that measures to prevent unauthorised vehicular off-road access should only be implemented following the identification of a recognised, repeated problem.

The Cyclenotes recommend the following:

- Opening widths for terminal treatments to be no more than 1.6 m if used for vehicular access prevention
- Opening widths for terminal treatments to be no more than 1.4 m if used to inform cyclists of the approaching road
- Staggered treatments are recommended if warning cyclists to slow down before reaching the road
- Bollards and U'-Rails (for paths >4.0 m in width) are recommended if the access barrier intends to prevent vehicle access.

The following guidelines will be followed for the installation of bollards:

- Place bollards in the centre of lanes to allow two way cycle flows
- Introduce surface/line markings on approach to guide cyclists around the bollards
- High visibility bollards – including reflective materials
- Limit height of bollard to reduce risk of interference with bicycle handlebars
- Employ removable bollards when vehicular access is required

Sustrans (UK) recommends that the impact of an access barrier be minimised, considering that heavy and regular use of the access point by cyclists and pedestrians is an effective deterrent of unauthorised use.

Sustrans identifies three types of access barrier - bollards, chicane and barrier.

6.1 Bollards

Bollards was highlighted by Sustrans as the preferred option, providing that sufficient space is available for implementation.

Bollards offer easy access for cyclists and wheelchairs, with a removal central bollard allowing vehicular access for maintenance. This option is beneficial to two way cyclists given the lane separation and cyclists are not required to dismount.

However, it fails to prevent motorbikes from entering through the access, and the central bollard can be an obstacle unless adequately visible.

6.2 Chicanes

The use of Chicanes, implemented by means of a combination of variable paths widths and physical obstructions is able to prevent all motor vehicles entering through the access point, but does become a hindrance to bicycle flows.

Cyclists are required to dismount, severely reduce speed, and should give way to oncoming cyclists.

Maintenance access is also difficult, and wheelchair access is limited.

6.3 Barrier (with wheelchair bypass)

These offer a similar level of access to cyclists as the chicane, but also provide an additional gap to improve wheelchair access. The barrier prevents all motor vehicles from entering through the access point, which renders maintenance access difficult. As with the chicanes, the access point is a hindrance to cycling continuity and requires cyclists to slow down, or even dismount and give way to oncoming traffic.

7. Lighting

7.1 Public lighting

Bicycle paths must reveal necessary visual information, such as the road itself, the course of the road ahead, kerbs, footpaths, property lines, road furniture and surface imperfections, together with the path.

According to Australian Standards (AS1 158.1.1 2005 Lighting for Roads and Public Spaces – Part 3.1: Pedestrian Area (Category V) Lighting Performance and Design Requirements), bicycle paths with mixed vehicle and pedestrian traffic should comply with lighting sub-category V4 or V5 depending on the traffic volume. This lighting sub-category is the same that is applied to the majority of minor roads.

Photovoltaic lighting presents a flexible opportunity to locate new lighting at locations where the provision of a power supply is costly, and the use of solar power is a viable alternative.

7.2 Personal lighting

The use of personal lighting is an important issue that should be addressed through education and awareness programs.

Feedback form

City of Joondalup Bike Plan 2009-2014

We welcome your feedback at any time.

Have you experienced any barriers to cycling within the City of Joondalup, or feel there is an area that needs our attention?

Area/barrier	Reason

Is there an initiative that you would like to praise us on?

Initiative	Why you think it is a good initiative

Other comments?

To help us analyse your comments, please tick which categories best describe your interest in the Bike Plan and our cycling facilities.

Current cyclist			City of Joondalup employee	
Person considering cycling			Resident of the City	
Non-cyclist			Workplace is within the City	
Other (please specify)				

If you are happy to be contacted in future consultations or regarding your comments, please provide your name and contact details.