



CITY OF MELVILLE
BIKE PLAN
2012

Document Control Record

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City of Melville Bike Plan 2012



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1. Introduction

1.1. Purpose & Objective

Aurecon was appointed by the City of Melville to undertake the 2012 Melville Bike Plan. This Bike Plan sets out a strategic vision for the continued development and promotion of cycling. It culminates in an action plan framework that identifies opportunities for improvements, where expansion of the network should occur and where there are barriers associated with existing infrastructure, for the short to medium term (approximately 5 to 10 years).

In the development of the Melville Bike Plan due consideration was given to improving cycling safety and linking communities and facilities, as well as the needs of all types of cyclists, regardless of their age, gender, experience or reason for cycling.

The main objectives of the Bike Plan include:

- Evaluating cycling and its associated infrastructure in the study area, along with the existing Bike Plan.
- Consult with key stakeholders (Local Government, State Government and Local Community) regarding the future of cycling within the City of Melville.
- Planning the expansion of the bicycle network for Melville.
- Encourage and promote cycling.
- Developing a prioritised schedule of works, along with high level preliminary costing.
- Developing a maintenance schedule for the protection of new and existing assets.

1.2. Background

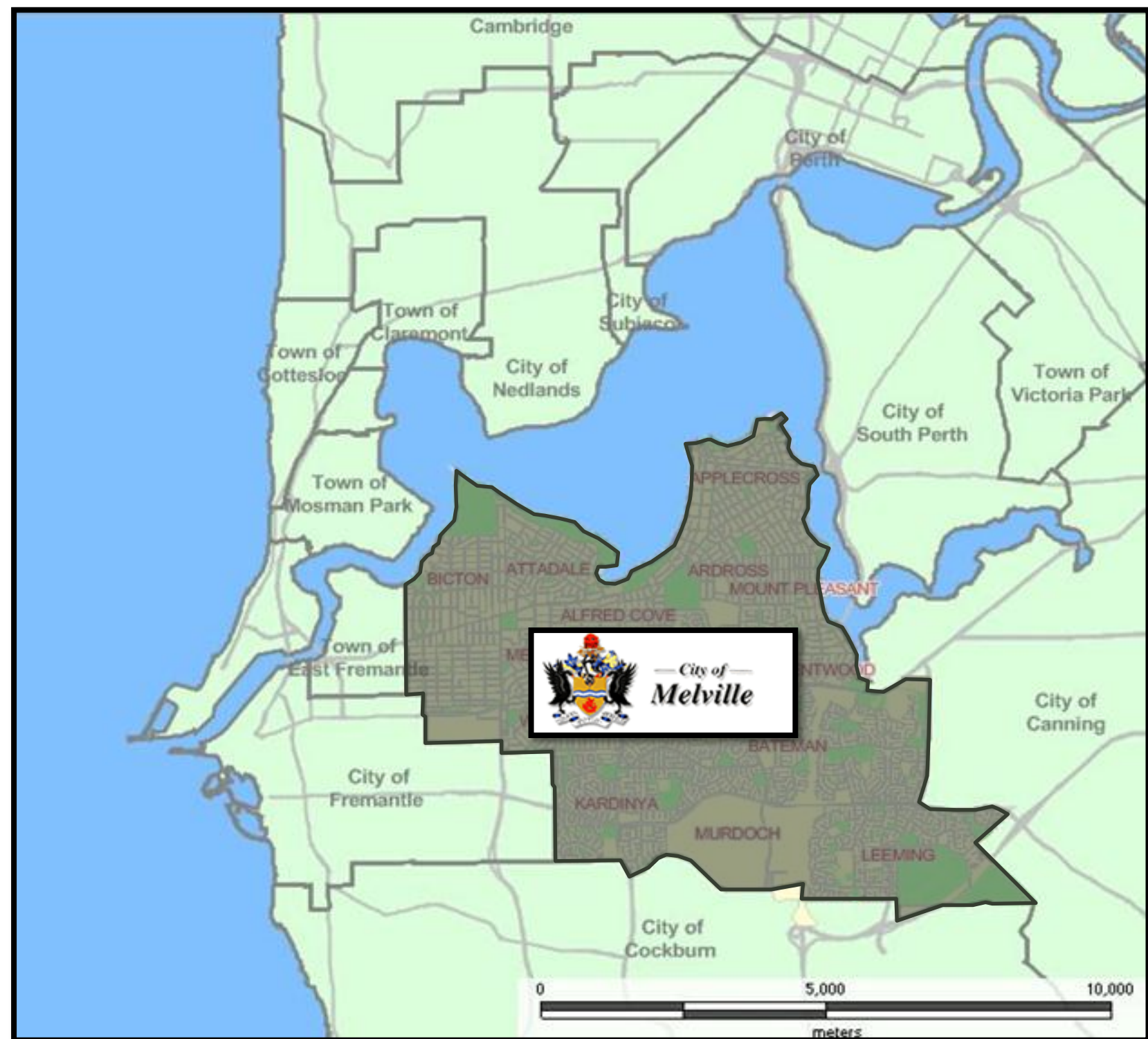
The City of Melville is one of the larger city council areas within the Perth metropolitan area. Melville is situated directly south of the Swan River abutting East Fremantle and Fremantle on the western boundary, Cockburn in the south and Canning in the east. Refer to **Figure 1-1**.

According to The City's Forecast.ID the population is currently estimated to be more than 100 000 people. The population is further distributed by gender as 53% female and 47% male, and by age group as shown in **Figure 1-2**. The demographics are indicative of the diverse population to be planned for.

In terms of employment Melville itself generates roughly 28,500 employment opportunities. About 11,500 of these opportunities are taken up by residents of Melville, while the additional 17,000 jobs are filled by workers from surrounding areas. Melville further has between 30,000 and 35,000 residents who are employed outside of Melville and thus commute on a daily basis. The longer distance (35,000) and local

(28,500) commuters plus the additional residents of school going age (16,000) provide a basis for the number of daily travellers (80,000).

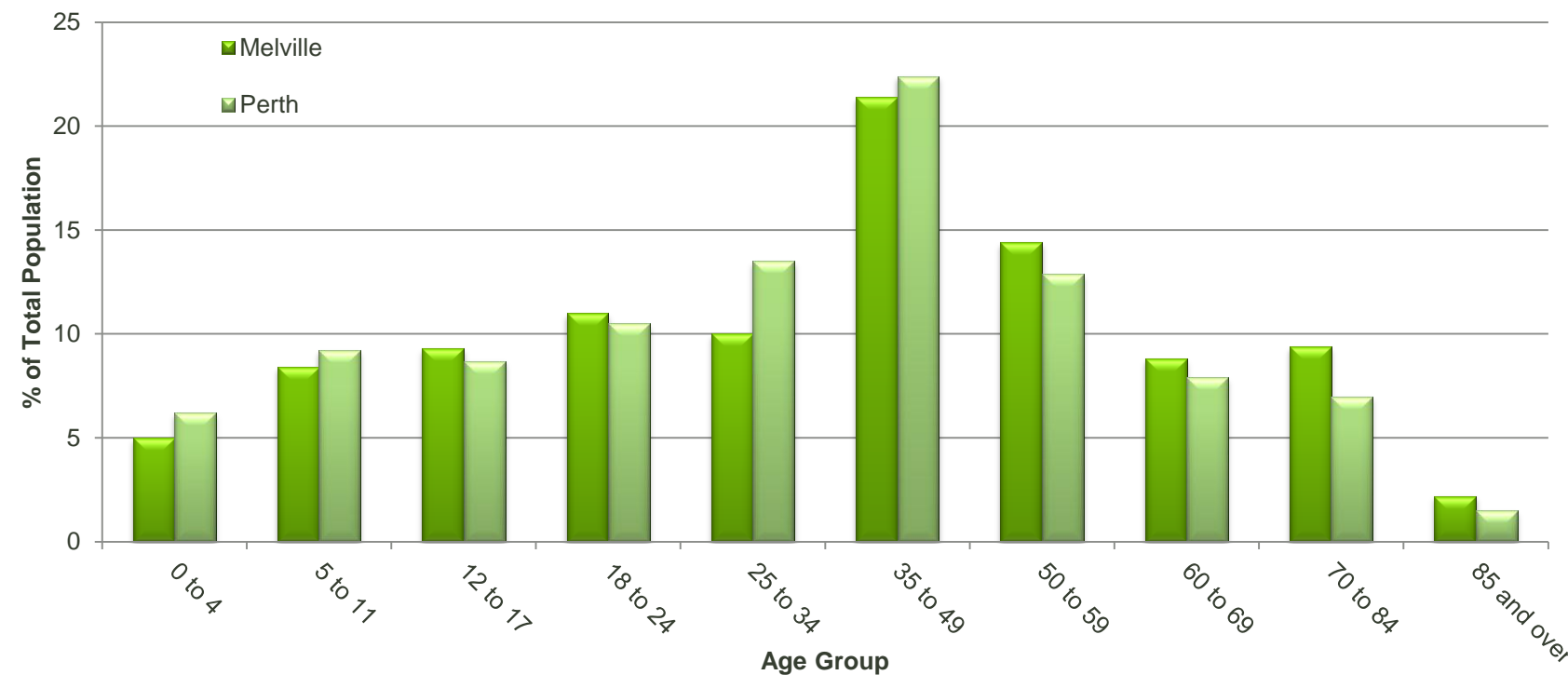
Figure 1-1: City of Melville Locality Map



Source: www.melvillecity.com.au/online maps

This Bike Plan aims to identify improvement and expansion opportunities for the bicycle network within the City of Melville.

Figure 1-2: Age Group Distribution



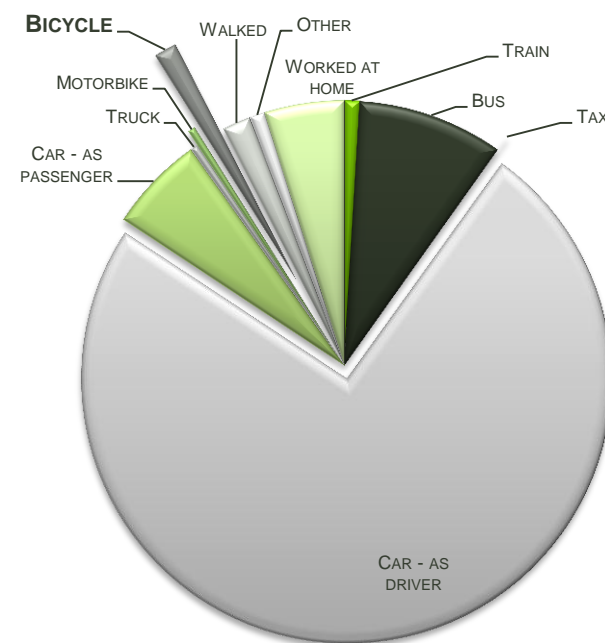
Source: City of Melville Community Profile (www.profile.id.com.au)

Keeping in mind that this number is certainly not exhaustive, as it does not include leisure trips, freight trips, deliveries or even retail and visitor trips, the approximately 80,000 daily travellers gives a general idea of the people using cars, public transport or active transport modes to make their way in, out and around the City of Melville.

The Melville Community Profile website shows that in general work trips are undertaken by the modes as shown in **Figure 1-3**. The graph shows that of those who travelled to work around **80% of trips were undertaken by car**, whether as driver or passenger. **Public transport constitutes just more than 10%**, while active transport modes represent roughly 3% of work trips. **The bicycle mode is used for less than 1.5%** of work trips. The Smarter Mobility Achieving Reduced Traffic Initiative (SMARTI) found that the group aged 35 to 49 was the most likely to adopt a new transport mode.

While less than 1.5% of work trips are undertaken by means of a bicycle, 80% of work trips are made by car.

Figure 1-3: Work Trip Mode Distribution



Source: City of Melville Community Profile (www.profile.id.com.au)

1.3. Local Bike Plan Requirements

In Western Australia the process for undertaking Bike Plans is largely guided by the WA Department of Transport/Bikewest's 'Guidelines for Preparing Bicycle Plans' of October 2010. This document states that a local government bike plan should at least include the following elements:

- Local Bicycle Route Network,
- Schedule of Works, and
- Maintenance Schedule.

However Bikewest prefers that the following elements are also included:

- Design and Standards,
- On-going process to ensure a cycle-friendly road network,
- Encouragement of Cycling, and
- A review of the existing Bike Plan.

1.4. Methodology & Scope

This Bike Plan was undertaken by Aurecon in close co-operation with and overseen by the City of Melville. The general scope of works set out by Melville includes:

- Undertaking a review of the existing bicycle network,
- Consider the locations of schools and 'safe routes to school',
- Identify major trip attractors,
- Involve more of the community and stakeholders in the development of the Bike Plan,
- Liaise with the Department of Transport and ensure the Bike Plan complements the objectives of the Perth Bicycle Network (PBN) Plan and the new Western Australian Bicycle Network Plan when it is adopted,
- Analyse crash data and improve public safety,
- Provide a program of works, with cost estimates, to be included in the City's Capital Works Program,
- Show the existing bicycle route network, the proposed bicycle route network, and recommended spot improvements,
- Prioritise any proposed works, and
- Ensure that projects are justified.

Cognisant of this scope and how it aligns with the City of Melville's overall vision statement of creating a sense of place which is safe, attractive and accessible to all. Aurecon prepared this Bike Plan considering the 8 to 80 rule of providing infrastructure that would be safe and practical to all users of an age in that range.

1.5. Classes of Cycle Users

According to Bicycle Network cyclists fall within various categories based on their reason for cycling and the intensity at which they cycle.



As have been briefly mentioned, the demographics of the City of Melville results in a diverse population that has to be accommodated as infrastructure is planned, implemented and maintained. In order to plan effectively this diversity was simplified into a manageable number of cyclist classes. As all infrastructure cannot fulfil the same function for all users in a safe and effective way, this plan sets out strategic routes and associated infrastructure and projects as per the typical cyclist class expected to use the specific infrastructure.

1.5.1. Inexperienced Cyclist

The inexperienced cyclist class aligns roughly with Bicycle Network's local trip class, and refers to those bicycle users who either rely on or enjoy cycling but are not necessarily confident or experienced enough to cycle amongst general road traffic or other cyclists, which travel at higher speeds, in a safe manner. This class tends to travel at speeds lower than 20km/h and distances less than 5km.

These cyclists typically include children and adults alike who rely on their bicycle to travel to school, friends, community facilities, shops, etc. These users prefer to cycle on footpaths (under 12's are legally allowed to cycle on footpaths) and roads which are less busy and intimidating. While they

also prefer cycle paths, potential conflict with experienced cyclists can discourage these users.



The route and infrastructure focus for inexperienced cyclists include:

- Footpaths
- Local access routes to schools
- Shared paths
- Limited interaction with major roads

1.5.2. Commuter Cyclist

The commuter cyclist class is not strictly limited to those users who cycle to work, rather it refers to skilled and athlete cyclists who uses cycling as a main mode of transport. They travel at higher speeds between 25km/h and 40km/h, typically not intimidated by or scared to travel amongst traffic. The majority of these cyclists can however be seen to travel to and from work using their bicycle. In terms of the Bicycle Network classes this class aligns with both the higher intensity classes.

Commuter cyclists prefer to use direct routes to get to their destination quickly. This type of travel in many instances aligns with the characteristics of major roads, which funnel traffic into activity centres.



The route and infrastructure focus for these cyclists include:

- On-street cycle lanes
- Separated cycle paths
- End-of-trip facilities
- Appropriate access to public transport and interchanges

1.5.3. Recreational Cyclist

The recreational cyclist class can best be described to have a range of skill and confidence levels between the inexperienced and the commuter, but this class cycles for fun. While not saying the other classes do not enjoy cycling the recreational cyclist is a weekend or after hours cyclist who enjoys cycling on scenic and meandering routes.



These users cycle for enjoyment and exercise, typically travelling at speeds in the order of 20km/h, and they enjoy longer routes of travel around parks, rivers, the ocean and land marks.

The recreational cyclist is targeted by route and cycle infrastructure such as:

- Shared paths,
- Meandering routes through parks and along rivers,
- Longer distance routes,
- Adequate information about routes (proper signage).

1.5.4. Fitness Training

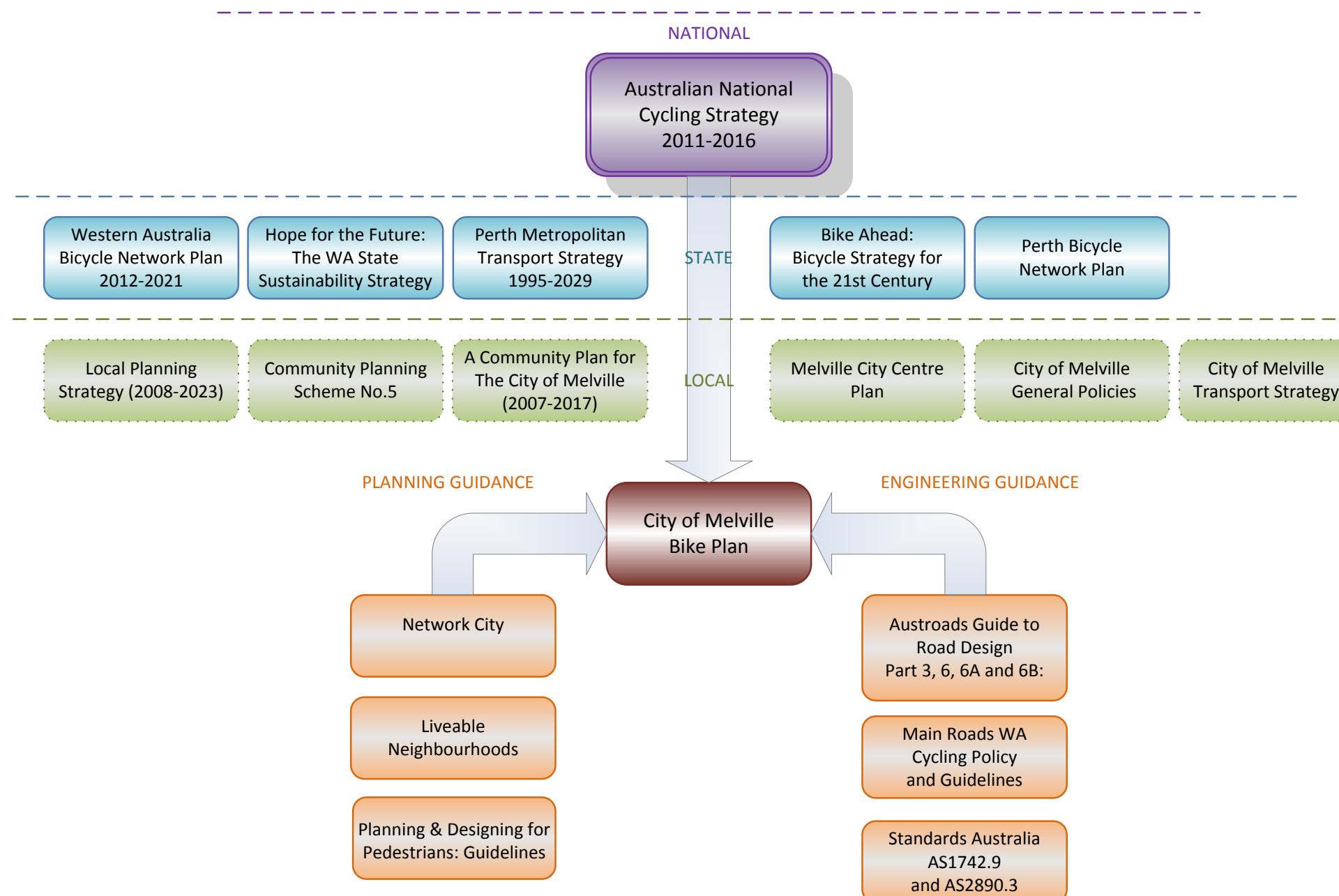
Fitness training cyclists would typically be accommodated to a satisfactory level by a combination of the facilities appropriate for commuter and recreational cyclists. This cyclist class typically travels at higher speeds in the order of 40km/h and for longer distances. They also use on-road or racing bicycles and do not go off-road, small steps, cracks, vegetation and debris on travel surfaces will deter these cyclists from using specific facilities and encourage cycling on road among general traffic.

2. Policy & Strategic Context

A range of national, state and local policies and strategies are applicable to the preparation of the Melville Bike Plan. The relationship between the policies and strategies and how they pertain to each other and the Bike Plan is diagrammatically represented in **Figure 2-1**. This section further describes how each of these influences the Melville Bike Plan in more detail.

Figure 2-1: Policies and strategies relationship

"It is critical to develop high quality networks and facilities for cyclists"
 – Australian National Cycling Strategy 2011-2016



2.1. National

On a national level the policy documents intend to promote a standardised level of planning for various levels of government.

2.1.1. Australian National Cycling Strategy 2011 – 2016

This strategy sets out a series of actions that intends to deliver its overarching vision which is to double the number of people cycling in Australia over the next five years. It focuses on areas where it is critical that all jurisdictions maintain momentum. It is critical to develop high quality networks and facilities for cyclists, as well as ensuring that all local planning and transport plans are fully integrated and address the needs of cycling. The strategy's goal is underpinned by six key priorities and objectives:

- Cycling promotion: Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity
- Infrastructure and facilities: Create a comprehensive and continuous network of safe and attractive routes to cycle and end-of-trip facilities
- Integrated planning: Consider and address cycling needs in all relevant transport and land use planning activities
- Safety: Enable people to cycle safely
- Monitoring and evaluation: Improve monitoring and evaluation of cycling programs and develop a national decision-making process for investment in cycling
- Guidance and best practice: Support the development of nationally consistent guidance for stakeholders to use and share best practice across jurisdictions

Implementation of this Bike Plan will assist the City of Melville in achieving the aims of the *Australian National Cycling Strategy 2011-2016*, with several key action points outlined below:

- States, territories and local government will continue to develop end-of-trip facilities that make it possible for people to cycle, including considering the introduction of regulations, such as planning policies and building standards, to mandate the provision of facilities
- All states, territories and local governments will ensure that all their land use planning and infrastructure strategy documents take into account active transport needs
- All jurisdictions will continue to develop and implement programs that target road safety and people's perception of the safety of cycling
- The Australian Bicycle Council will support the publication of nationally consistent guidance on how best to integrate cycling and public transport

2.2. Western Australia

2.2.1. Hope for the future: The Western Australian State Sustainability Strategy (Western Australia 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

Transport and land use decisions are so interconnected and synergistic that a more balanced, less car dependent city rapidly emerges and solves multiple urban sustainability problems.

2.2.2. Perth Metropolitan Transport Strategy 1995-2029

This strategy outlines an integrated package of measures for Perth's current transport system to become more balanced and so provide for the complex and interrelated needs of the Perth Metropolitan Region for the next 35 years. The strategy outlines ways to manage growth and modify behaviour through the focus on three major areas including:

- Better co-ordination of the components of the transport system
- Greater integration between the transport system and the land uses which it supports
- Improved efficiency in the use of transport infrastructure and services

“Overcoming car dependence is fundamental to sustainability in cities” - Hope for the future: The Western Australian State Sustainability Strategy

A number of key actions suggested in the strategy which are to be applied 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 defined 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

2.2.3. Bike Ahead: Bicycle Strategy for the 21st Century

Bike Ahead: Bicycle Strategy for the 21st Century sets out the actions needed to enable the bicycle to play its role in ensuring that the people of Perth continue to have high levels of access to goods, services and activities without sacrificing the clean air and attractive environment which most people value in Perth.

It 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 Perth Bike Plan Approach identifies a number of key points sourced from the Perth Metropolitan Region Bike Plan Main Report of 1985 that need to be considered in this Bike Plan, including:

- Cycling is primarily a transport mode, serving major trip attractors and generators, rather than purely a recreational activity
- It is neither practical nor necessary to provide segregated cycling facilities on each and every street, or even on the majority of streets
- The majority of cycling is and will continue to be on the road/street system, and cycling must be actively incorporated into the planning and design of roads and streets

- The majority of non-cyclists have never been taught to regard the cyclist as a legitimate road user nor how to share the road with cyclists
- End of trip facilities, including secure parking, which is as important for the cyclist as it is for the car driver

A number of suggested strategies to be applied to this Bike Plan are listed below:

- Encourage bicycle friendly local area traffic management (LATM or traffic calming)
- Define, protect and implement a regional cycle network
- Incorporate cycle requirements in local government planning schemes and policies

2.2.4. Perth Bicycle Network Plan (Bikewest, Main Roads WA and Department of Transport)

The Perth Bicycle Network (PBN) Plan is an “action” document which details specific engineering projects that will significantly increase safe bicycle use in the Perth metropolitan region. 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 PBN Plan outlines the network of cycling routes within Perth, including local bicycle routes, principal shared paths and recreational shared paths. It specifically addresses the following Bike Ahead strategies to ensure a focus on the essential components required to establish a regional network of cycling facilities:

- Identify, develop and signpost safe routes to defined local destinations, including schools and commuter routes
- Define, establish and maintain continuous local cycling routes
- Define, protect and implement a regional cycle network

Works recommended in this Bike Plan will feed into the PBN creating a comprehensive bicycle network for the City of Melville. Details of the existing PBN within the City are contained in Section 6.1 of this Bike Plan.

“Cycling must be actively incorporated into the planning and design of roads and streets” – Bike Ahead: Bicycle Strategy for the 21st Century

2.2.5. Draft Western Australian Bicycle Network Plan (2012 – 2021)

The Western Australian Bicycle Network Plan (WABN) aims to leave a lasting legacy for cyclists and potential cyclists. Once the draft plan is finalised and takes effect, the WABN will replace the PBN as the strategic level of planning for WA and Perth.

The WABN is focussed on achieving a number of strategic initiatives to provide a safe and sustainable cycling network to ultimately promote and encourage cycling as a mode of transport. The main initiatives include:

- Implementing a state wide network plan
- Biennial review of the plan
- Expanding the principal shared path network
- Increase Perth Bicycle Network grants
- Increase Regional Bicycle Network grants
- Investigate end-of-trip facilities within the Perth CBD
- Connecting schools through infrastructure and education
- Connecting major public transport facilities to cycling infrastructure
- Reviewing current traffic management practices
- Reviewing local bicycle routes (PBN routes)
- Developing an online journey planner, with smartphone applications
- Planning cycling facilities in large regional centres

The WABN once adopted will potentially increase the level of funding that local governments, such as Melville, will have available for cycling projects. This plan will also inform general practices and bicycle education on a state level.

A clear theme throughout the plan is that Perth has significant potential for increased cycling should infrastructure be provided and current attitudes be contested.

2.3. City of Melville

2.3.1. Local Planning Strategy 2008-2023

The City of Melville developed a draft Local Planning Strategy (LPS) – a long-term urban planning vision for the municipality that is yet to be released to the public. The LPS is a key strategic urban planning document for the City that provides broad direction for the future growth and development of the City, including strategies for cyclist facilities and infrastructure.

2.3.2. Community Planning Scheme No.5

The City of Melville's *Community Planning Scheme No.5* is the instrument for coordinating and implementing the land use, socio-economic and environmental policies of the council with its primary objective to maintain and improve the quality of life and services for the residents of the City of Melville.

The following objectives of the City are applicable to this Bike Plan:

- To allow a choice of travel mode, development on each site shall be designed to accommodate demands for both motorised and non-motorised transport access, provide car and bicycle parking and shall consider walking distance to public transport. Where development of significant employment destinations is undertaken, change-rooms and shower facilities shall be provided for commuter cyclists
- To ensure that the demand for bicycle parking is satisfied, short and long term bicycle parking for employees and residents are to be provided, particularly where existing cycle and pedestrian routes promote the use of these modes of transport

2.3.3. City of Melville Transport Strategy

The transport strategy highlights strategies for accommodating all modes of transport as well as transport concerns for the future. In terms of planning for bicycle users the strategy defines three key strategic objectives:

- Physically enhance the walking and cycling environment
- Continue to provide more facilities to support walking and cycling
- Encourage walking and cycling through information and education

2.3.4. A Community Plan for the City of Melville (2007-2017)

A *Community Plan for the City of Melville (2007-2017)* is a long-term plan that is the key strategic document for guiding the Council's business planning and service delivery whilst recognising the role of the community in determining its own future. It was developed through a series of surveys, focus groups and public forums. There is a strong focus on social, cultural and environmental well-being whilst recognising transport, accessibility and built environment strategies. A number of key actions to be applied in this Bike Plan include:

- To meet the changing population growth in the City of Melville that requires different forms of transport networks including cycle routes to connect the community
- Develop TravelSmart initiatives that include shared path network, bicycle networks and behavioural change programs

- Ensure that neighbourhood activity centres and services are maintained close to residential areas and access is enhanced so that the community can utilise shopping, employment and leisure opportunities by walking and cycling as well as by road
- Ensure footpaths and cycle ways are functional
- Plan for and maintain a network of shared use paths, footpaths and cycle ways that provide access to facilities across the City

"Access to the Melville City Centre should be provided by way of an interconnected network of streets which facilitate safe, efficient and pleasant cycling" – Melville City Centre Plan

2.3.5. Melville City Centre Plan

The *Melville City Centre Plan* outlines a number of objectives to consider for the development of the Melville City Centre including:

- To provide for access by way of an interconnected network of streets which facilitate safe, efficient and pleasant cycling
- Provision of a safe and convenient cycling and pedestrian access system to, from and within the centre

2.3.6. General Policies

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

- *Streetscape Policy (CP-032)*: The purpose of this policy is "to provide guidance and direction for the City of Melville in the provision and maintenance of the City's Streetscapes." The policy commits to ensuring the safety of all cyclists when maintaining and/or upgrading streetscapes.
- *Path Policy (CP-033)*: The purpose of this policy is "to provide guidance and direction to the City in the provision, renewal and maintenance of path and vehicle crossing assets." The policy commits to ensuring cycle route planning is prioritised during path maintenance, renewal and construction.
- *School Parking Policy (CP-035)*: The purpose of this policy is "to provide guidance and direction to the City in the orderly provision of new on-street car parking infrastructure within the road reserve, around schools, on a shared cost basis." The policy commits to ensuring that schools give priority to promoting cycling for all members of the school community, including parents, students and staff.

2.4. General Planning Guidance

The Western Australian Planning Commission's *Liveable Neighbourhoods* (2009) and *Network City* (2005) are important planning documents which also provide guidance on catering for cyclists in areas of land development.

2.5. 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 Melville will aim to achieve in implementing this Bike Plan.

*(Note: This Bike Plan makes reference to the latest editions of each publication, at the time of publishing. Given the dynamic nature of infrastructure standards the newest publications at time of reading should be referred to for best practice guidance when available – Excerpts can be found in **Appendix C**).*

2.5.1. Austroads

Austroads is the association of Australian and New Zealand road transport and traffic authorities that aims to promote improved road transport outcomes. Part 3 of the Austroads Guide to Road Design provides guidance on how to accommodate cyclists when designing a road. Part 6 of the Austroads Guide to Road Design provides guidance on the design of all features and facilities that have to be accommodated and coordinated within the road reservation outside of the road pavement, including the design of paths for safe and efficient cycling.

Technical guidance given across the Austroads guidelines 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

2.5.2. 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. The MRWA

Cycling Policy and Guidelines (2000) provides technical guidance for the provision of cyclist facilities, including details of:

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

2.5.3. 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:

- *AS1742.9 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.
- *AS2890.3 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.

2.5.4. Department of Transport WA

The WA DOT has as its key focus the strategic transport planning for WA. The DOT recently published the *Planning and Designing for Pedestrians: Guidelines*. This document while not explicitly focussed on the provision of cycling infrastructure provides a summary of the various standards applicable when providing infrastructure for pedestrians and facilities shared by pedestrians and cyclists.

3. Crash Analysis

3.1. Crash Data

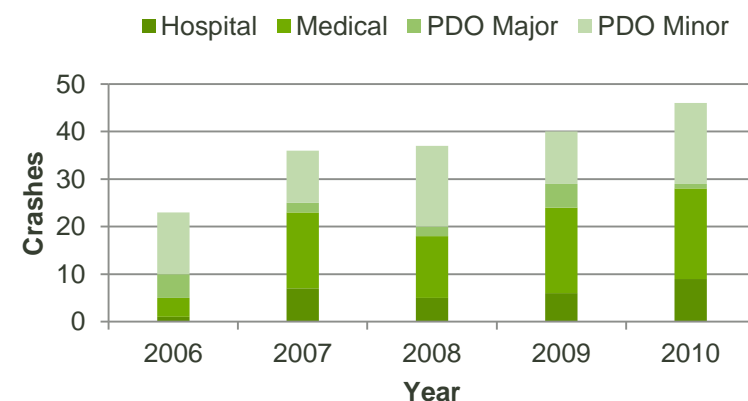
Safety is a key factor in building a successful Bike Plan. The availability and quality of existing cycle facilities is a good way of identifying the level of safety performance within a region. Historical data for crashes involving cyclists was used to measure the level of safety for the existing facilities within the City of Melville.

A number of crashes involving cyclists have occurred over the last five year period from 1 January 2006 to 31 December 2010. The number of crashes and severity per year is shown in **Figure 3-1**. In summary:

- A total of 182 crashes involved bicycles
- 15.4% resulted in hospital treatment
- 38.5% resulted in medical treatment
- 8.2% resulted in major property damage only (PDO major)
- 37.9% resulted in minor property damage only (PDO minor)

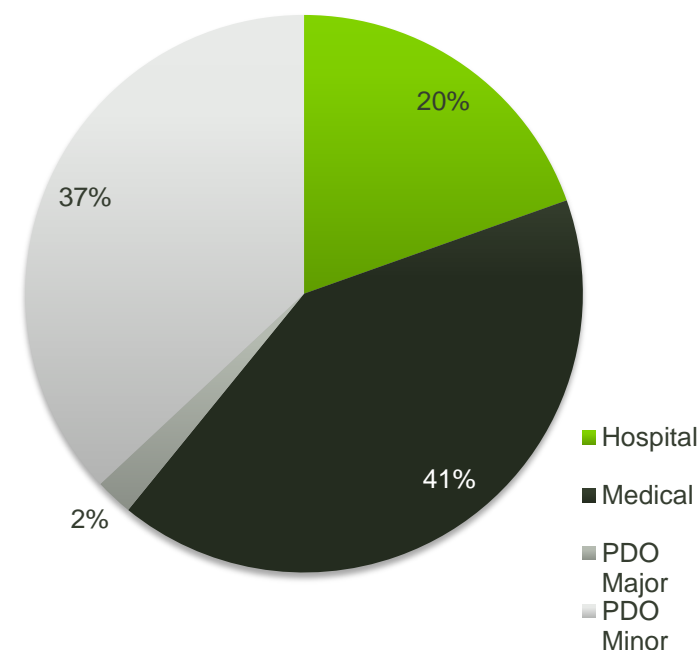
It is observed that over half of the total bicycle crashes resulted in medical and hospital treatments. Also it should be borne in mind that the crash data only contains records of reported crashes. Unreported crashes are not included but typically occur when the severity is PDO minor. Alarminglly a clear upward trend, in terms of number of crashes, can be identified. The reasons for the trend are not quite clear but an increase in cyclists, an increase in bicycle crash reporting, a general increase in traffic volumes, and non-compliance with speed limits are all likely contributing factors.

Figure 3-1: Total crashes involving bicycles



All the crashes, along with severity, which occurred from 2006 to 2010 are summarised in **Figure 3-2** and illustrated in **Figure 3-3**.

Figure 3-2: 2010 Crash Severity



3.2. Crash Locations

Not surprising, more than 60% of bicycle crashes occur at intersections. 36 of these intersection crashes occurred at roundabouts. The roads that include intersections where three or more reported crashes occurred are identified in **Table 3-1**. 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.

Alarminglly a clear upward trend, in terms of number of crashes, can be identified year on year.

The majority of midblock crashes occurred at driveways, where vehicles enter or exit a driveway and collide with a cyclist in the lane or on the path.

Additionally multiple serious crashes involving bicycles seem to be concentrated along MaCrae Road (specifically at the intersection with Ardross Street), as well as at the intersection between Preston Point Road and Point Walter Road. These and other areas where bicycle crashes are concentrated are illustrated on the map in **Figure 3-3**.

Table 3-1: Crash locations (roads with three or more crashes)

Crash locations (roads with three or more crashes)		
Location	Number of crashes	Severity
South Street*	19	3xHospital, 5xMedical, 3xPDO Major, 8xPDO Minor
Leach Highway*	14	3xHospital, 1xMedical, 1xPDO Major, 9xPDO Minor
Canning Highway*	10	4xMedical, 1xPDO Major, 5xPDO Minor
The Esplanade	9	1xHospital, 5xMedical, 3xPDO Minor
Macrae Road	7	2xHospital, 4xMedical, 1xPDO Minor
Norma Road	7	1xHospital, 1xMedical, 1xPDO Major, 4xPDO Minor
Point Walter Road	7	3xHospital, 2xMedical, 2xPDO Minor
Marmion Street	6	1xHospital, 3xMedical, 2xPDO Minor
North Lake Road	5	2xMedical, 2xPDO Major, 1xPDO Minor
Stock Road	4	1xMedical, 1xPDO Major, 2xPDO Minor
Riseley Street	4	1xHospital, 1xMedical, 1xPDO Major, 1xPDO Minor
Reynolds Road	4	1xHospital, 2xMedical, 1xPDO Minor
Kintail Road	4	1xMedical, 3xPDO Minor
Macleod Road	3	3xMedical
Wichmann Road	3	1xHospital, 2xMedical
Coogee Road	3	1xHospital, 1xMedical, 1xPDO Minor
Melville Beach Road	3	1xHospital, 1xMedical, 1xPDO Major
Bullcreek Drive	3	1xMedical, 2xPDO Minor

**Roads under the care and control of MRWA*

3.3. Crash Trends

In general the bicycle crashes in the City of Melville have tended to occur along the east-west arterials. Crashes tend to concentrate in the vicinity of shopping centres and retail strips, and may be caused by an increased number of cyclists accessing these facilities. This may be due to drivers entering and exiting the parking at retail centres not being fully aware of cyclists on the roads or shared paths, and/or the vibrant streetscapes are distracting drivers from the road.

What is however clear is that cycle facilities need to be provided at major intersections to allow safe access for cyclists, and further that facilities should be provided at shopping centres and retail areas to ensure the safety of cyclists. The severity of crashes in general is a concern as more than 60% of crashes in 2010 resulted in medical treatment (refer to **Figure 3-2**).

Legend

Cyclist Collisions

Intersection Crash Severity

- Hospital
- Medical
- PDO Major
- PDO Minor

Midblock Crash Severity

- Hospital
- Medical
- PDO Major
- PDO Minor

Surveyed Paths

Path Type

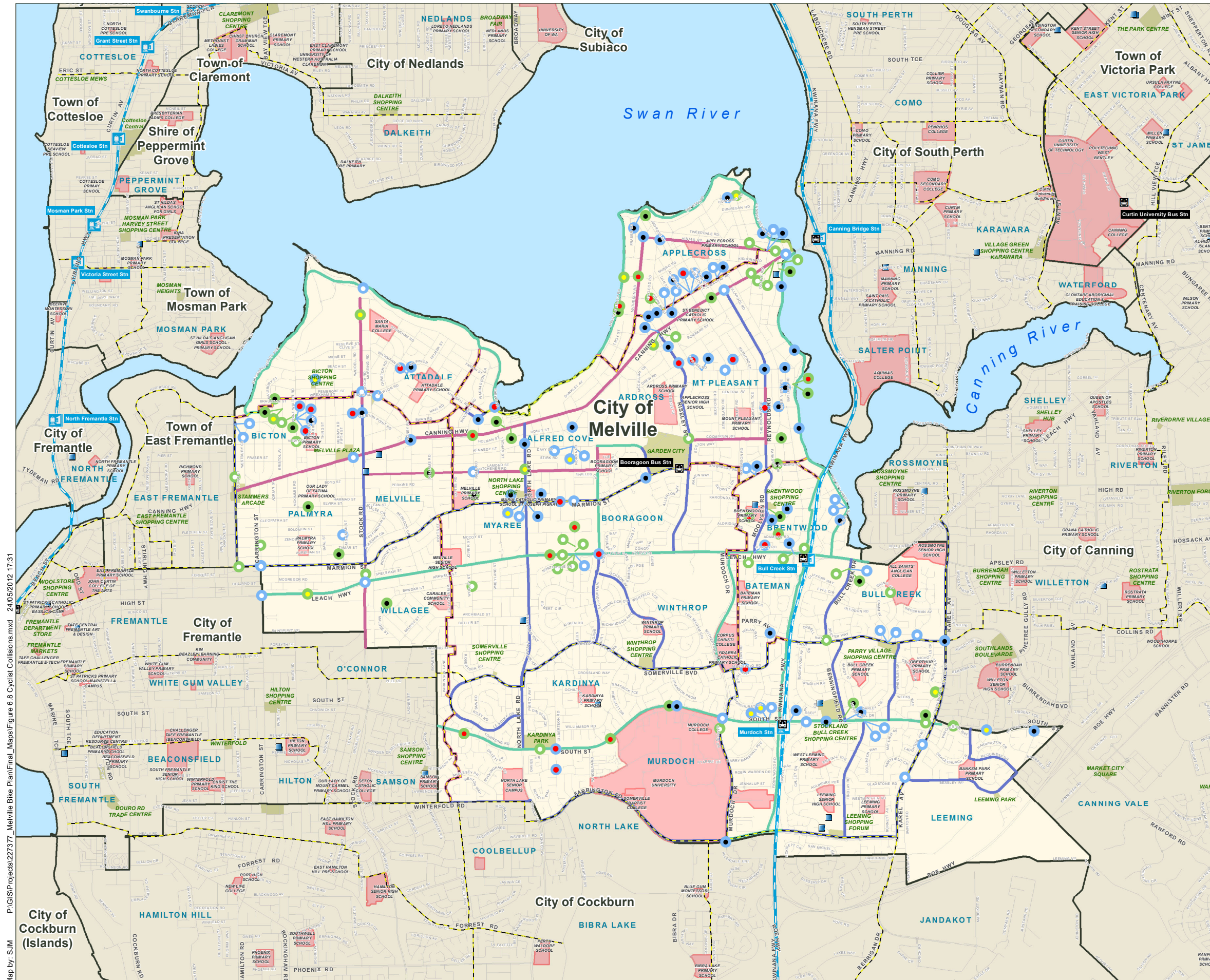
- On-Street
- Sealed Shoulder
- Separated Path
- Shared Path
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

Notes:
-Crash data sourced from Main Roads Western Australia.

All midblock crashes are subject to a distance error signifying that not enough detailed information was provided on the police crash form and the exact location of the crash could not be accurately determined.

Date: 24/05/2012

Version: 1



Map by: SJM
P:\GIS\Projects\227377_Melville Bike Plan\Final Maps\Figure 6.8 Cyclist Collisions.mxd
24/05/2012 17:31



A3 scale: 1:50,000
0 1 Kilometres

Job No: 227377

Coordinate system: MGA Zone 50

City of Melville Bike Plan
Figure 3.3 Cyclist Collisions

Table 3-2: Crash Analysis – Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
3.1 Crash Data		
3.1.1	Crash data is a good indicator of areas requiring attention to make cycling a safer activity in Melville.	The City of Melville should annually obtain crash data from MRWA and keep a record of where bicycle crashes occur, this can be used to justify safety improvement projects and to determine the successes of past safety initiatives.
3.2 Crash Locations		
3.2.1	The majority of bicycle crashes occur at intersections, with most of the midblock crashes occurring as vehicles enter or exit driveways.	<p>While there is no single measure that can ensure the safety of bike users at intersections, there are a number of initiatives that should be implemented as a point of departure including:</p> <ul style="list-style-type: none">▪ Continuing bicycle lanes through intersections, where currently they are tapered off before the intersection.▪ Installing bicycle lanes at intersections in general, this guides cyclists to the safest areas in the intersection and raises the awareness of drivers to the fact that cyclists may be present and where to expect them. This would be undertaken with the approval of MRWA.▪ Install bicycle warning signs at intersections where bicycle lanes are being incorporated and along roads where many crashes occur.▪ Advocate for increased driver education at schools.▪ Ensure appropriate lighting is provided along street and bicycle routes (especially at crossing and intersections).▪ Advocate the use of high visibility gear and clothing for cyclists.
3.3 Crash Trends		
3.3.1	A trend of bicycle crashes along shopping strips on major arterials can also be identified. These crashes are most likely the cause of vehicles exiting and entering retail land uses along the busy roads not aware of bicycles that also make use of these routes.	In order to increase the awareness that cyclists also make use of the large roads in front of shopping strips dedicated bicycle facilities such as cycle lanes can be installed. Additionally at driveways exiting these retail areas the stop line could be placed before the shared path or foot path, and signs alerting drivers to the likely presence of cyclists should be installed.

4. Stakeholder Consultation

4.1. Murdoch University

A meeting was held with a representative from the Murdoch University on the 26th of March 2012, as the University is and has the potential to be a major bicycle trip generator in the City of Melville. The meeting with the University highlighted the following issues in terms of cycling infrastructure:

- There are no safe crossings at the South Street/Murdoch Drive intersection
- There are no safe east-west routes from the train station along South Street
- The existing cycle lanes/sealed shoulders on Farrington Road are too narrow
- The shared pathways along South Street are too narrow, are not signed or maintained properly
- In general the area lacks informational signage showing directions and distances to destinations and points of interest
- Insufficient temporary signage for cyclists are provided when road works take place
- There are no signs warning motorists of cyclists along streets and at crossings
- No informational sign advising of the pedestrian underpass, on South Street

In general the Murdoch TravelSmart access audit 2012 found that walking and cycling should be a viable mode of transport for staff and students of the University, given the percentage living within 10km of the campus. However, because there is a perceived significant lack of safe cycling infrastructure leading to the University, the mode is not popular. As such the Murdoch University TravelSmart Plan recommends that dedicated cycle lanes or proper shared paths (including signs and markings) be provided along South Street and Murdoch Drive, and that informational signage be provided showing directions and distances to points of interest. This issue of improved bicycle facilities along Murdoch Drive and South Street has been the subject of a road safety audit, recommending that MRWA address the concern.

A summary of issues raised by stakeholders along with recommendations to address them is provided in **Table 4-2** at the end of the chapter.

4.2. Community Workshop

A community workshop was conducted by Aurecon and the City of Melville on Thursday the 8th of March 2012 at the Melville Recreation Centre. This workshop included a discussion on the positives, negatives and strategic issues relating to cycling in Melville. It included interactive group sessions in which the roughly 40 participants were required to list, what they believe are:

- Good practices in terms of bicycle infrastructure
- Specific infrastructural barriers to cycling
- Broad strategic concerns restricting cycling
- The best way to spend money on improving cycling in Melville

A summary of key issues raised at the community workshop along with recommendations to address them is provided in **Table 4-2** at the end of the chapter.

4.3. Saddle Survey

On the 1st March 2012, Aurecon conducted a Saddle Survey in the City of Melville. Aurecon was accompanied by Travelsmart officers from the City of Melville, the Bicycling Western Australia and local cycling enthusiasts to participate in cycling along a predetermined route through the City of Melville to investigate the different existing cycling typologies in the City. The aim of the survey was to get a better understanding of the feel and condition of the existing cycling facilities, and discuss any changes or improvements that might be required. The survey also provided a base standard for what typologies should be adopted throughout the rest of the City of Melville.

The survey comprised of a 10km cycling route through the suburbs of Booragoon, Ardross, Alfred Cove and Myaree in the City of Melville. The route consisted of 10 roads, each with mixed cycling typologies as summarised in **Table 4-1**. These roads were chosen as they represent all types of cycling facilities provided in Melville according to the TravelSmart map.

The community workshop included discussions on the positives, negatives and strategic issues pertaining to cycling in Melville. It was well attended by around 40 community members.

Table 4-1: Saddle Survey Route Typologies

Saddle Survey Route Typologies					
Street Name	Perth Bicycle Network (PBN)	Local Bicycle Friendly Street	Shared Path	Bicycle Lanes or Sealed Shoulders Either Side	No Cycling Infrastructure
Coomoora Road			●		
Reynolds Road			●	●	
Macrae Road	●				●
Ness Road	●	●			●
Leisure Path	●		●		
Burke Drive	●				●
Hislop Road	●	●			●
Canning Highway					●
North Lake Road				●	
Davy Street					●

During the saddle survey it was found that along Coomoora Road, a concern was identified whilst riding through slow points (traffic calming) at Thorman Place and Rogerson Road. Although the road lane was wide enough to accommodate cyclists with a degree of comfort, there was no cyclist priority along the road and especially through the slow points where the road lane becomes narrower. The cyclists involved felt confined as vehicles invaded the shared space through these points with little awareness for cyclists.

On the whole, the sealed shoulder/bicycle lane along Reynolds Rd accommodated cyclists very well. Observations included a vehicle parked on a property verge whilst blocking the cycle lane at the same time, and also some sewer drains and pot holes within the cycle lane that provided discomfort for some riders. At the intersection of Canning Highway it was also observed that the sealed shoulder disappears just before and after the intersection providing some confusion to cyclists as to how they should proceed, also the traffic signal cycle time at this intersection provides so little green time for Reynolds Road that an inexperienced cyclist starting from stationary position can hardly get through the intersection before the phase changes.

Macrae Road forms part of the PBN and is integral to commuter cycle travel to Canning Bridge and subsequently to Perth CBD. There are a number of roundabouts along Macrae Road which have caused a significant number of crashes involving cyclists. In response, MRWA in collaboration with the City of Melville has installed new pavement markings at the roundabouts at Tain Street and Macleod Road (see **Picture 4-1**). It is hoped that these markings will increase the awareness of motorists approaching the roundabouts to be alert to cyclists also using the road.

Picture 4-1: Cyclist awareness pavement marking on Macleod Road (approach to Macrae Road roundabout)



Macrae Road is parallel to Canning Highway and during peak periods there are many motorists using Macrae Road as a diversion route to avoid traffic congestion on Canning Highway. During peak periods Macrae Road is heavily utilised by commuter cyclists and the increased vehicle traffic increases the potential for conflict between vehicles and cyclists, especially due to the evident lack of cycle priority. However, the lack of infrastructure is not an issue for cyclists during off-peak periods due to low traffic volumes and the presence of traffic calming speed

bumps. The major issue identified, therefore, is vehicles diverting down Macrae Road to avoid traffic during the morning peak.

The leisure cycling path extending past Melville Beach Road adjacent to the Swan River provided excellent cycling infrastructure with high levels of cyclist comfort. The path included separated and shared pedestrian/cycle lanes with a large section of the route also part of the PBN.

The section of the PBN route that includes Hislop Road, Burke Drive and Lentona Road encounters a high level of conflict between cyclists and vehicles as cyclists come off the riverside shared path to access the residential areas in Alfred Cove and Bicton. Both motorists and cyclists may need to be prompted by signs and marking to increase awareness of the other mode in this vicinity.

The saddle survey was conducted along a cross section of the various types of bicycle facilities provided in Melville. Ranging from on-street to separated path facilities.

Canning Highway does not have cycling infrastructure as it is primarily used as a vehicle carrying road. However, it was observed that if cyclists do wish to use Canning Highway as a cycle route, then the road space is insufficient to provide comfortable and safe cycling. It should also be noted that Directions 2031 identified Canning Highway as a Bus Priority and Rapid Transit Route.

North Lake Road is classified as a District Distributor A which carries more than 18,000 vehicles per day. Along the section between Kitchener Road and Canning Highway, the bicycle lanes/sealed shoulder observed during the survey appeared sufficient, and provided a comfortable cycling environment seemingly respected by vehicles.

Davy Street is a local road that has no cycling infrastructure or priority for the majority of the road. Due to the observed low traffic demand, on road cycling was deemed appropriate.

Overall it was found that where infrastructure is in place, it is of good quality. The main concern however is that not enough segregation between vehicles and cyclists are provided along streets with higher traffic volumes.

A summary of issues identified during the saddle survey along with recommendations to address them is provided in **Table 4-2** at the end of the chapter.

Picture 4-2: Coomoora Road



Picture 4-3: Macrae Road



Table 4-2: Stakeholder Consultation – Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
4.1 Stakeholder		
4.1.1	No safe crossings at the South Street/Murdoch Drive intersection	Liaise or develop a partnership with MRWA to Install segregated cycle lanes on the South Street approaches of the intersection, as well as toucan crossings to complement shared paths along Murdoch Drive and South Street.
4.1.2	There are no safe east-west routes from the train station along South Street.	Liaise or develop a partnership with MRWA to install segregated 2m cycle lanes along South Street (refer to the preferred highway cross section in Appendix C)
4.1.3	The existing sealed shoulders on Farrington Road are too narrow.	Widen the sealed shoulders on Farrington Road to 2.5m (including a 0.5m separation strip) and mark the shoulders as bicycle lanes.
4.1.4	The shared pathways along South Street are too narrow, and are not signed or maintained properly.	Liaise or develop a partnership with MRWA to widen shared paths along South Street to 3.5m, and sign and mark the shared paths appropriately.
4.1.5	In general the area lacks informational signage showing directions and distances to destinations and points of interest	Install appropriate signage along all PBN and cycle friendly routes. Appropriate signage includes: <ul style="list-style-type: none"> • Route identification markers • Way finding signage to major destinations • Regulatory signs and markings.
4.1.6	Insufficient temporary signage for cyclists are provided when road works take place	Ensure that safe bicycle route detours are in place, and appropriately signed, when road works take place.
4.1.7	There are no signs warning motorists of cyclists along streets and at crossings	Install bicycle warning signs along PBN and bicycle friendly routes to alert motorists to the presence of cyclists in the area.
4.2 Workshop		
4.2.1	Some heavily utilised shared paths are not suitable for use as shared paths due to high levels of conflict.	The shared paths along The Esplanade, Canning Beach Road, Melville Beach Road, and The Strand Road should be separated to better accommodate the large number of pedestrians and cyclists that use these facilities.
4.2.2	In general routes to school are not considered safe enough by parents to allow their children to cycle to school.	Footpaths and cycle facilities should be installed in areas surrounding schools. Schools specifically mentioned as problematic include: <ul style="list-style-type: none"> ▪ Pignatelli ▪ Santa Maria ▪ Attadale ▪ Booragoon ▪ Bicton Primary
4.2.3	Many shopping centres do not offer enough secure bicycle parking.	More secure and shaded bicycle parking needs to be provided at shopping centres, those specifically mentioned include: <ul style="list-style-type: none"> ▪ Brentwood shopping strip ▪ Riseley Street shops ▪ IGA in Applecross Village ▪ Archibald Street shops ▪ Willagee
4.2.4	Bicycle route signage and pavement markings are not consistently implemented and are unclear.	Consistent signs and markings should be installed along all bicycle routes, for instance if some routes include signs at all intersections this should be consistently applied along all routes.
4.2.5	There is a lack of continuity along many cycle paths and lanes, including at intersections.	Ensure that bicycle facilities continue along routes. Where bicycle lanes taper off at a number of locations (Bullcreek Drive, Parry Avenue, Reynolds Road) the facilities should be continued, also through roundabouts and intersections.
4.2.6	Drivers, cyclists and pedestrians have poor knowledge of the road rules.	The City of Melville should advocate for road user education programmes at schools.
4.2.7	Sealed shoulders and Bicycle lanes include many obstacles for cyclists, parked cars and drainage grids force cyclists into the lane.	Drainage grids within sealed shoulders and bicycle lanes should be replaced with bicycle friendly drains. Additionally kerbside parking should be restricted along sealed shoulders and bicycle lanes.
4.2.8	Traffic calming measures used in Melville (slow points and speed humps) are not bicycle friendly.	Where possible retrofit traffic calming measures to allow unobstructed cycling through these measures. If this is not possible considering removing or replacing such measures with bicycle friendly traffic calming measures. (i.e. Winterfold Road)

ITEM	ISSUE	RECOMMENDATION
4.2.9	Cycling is not considered an appealing activity within Melville.	Increase the profile of cycling through initiatives such as bike hire stalls, family cycling events and more safe cycling infrastructure. Cafes, drinking fountains and toilets along cycle paths have also been suggested.
4.2.10	The on-road safety for cyclists in Melville is considered poor, as there are not enough bicycle lanes.	The safety of cyclists should be ensured by effectively addressing speeding, and providing separated on road cycle facilities where the speed differential between cars and bicycles are high. It was suggested that all new road infrastructure should include bicycle lanes.
4.2.11	Accesses to shopping centres are not cycle friendly.	The City of Melville should require appropriate access for cyclists and pedestrians at shopping centres. Specifically mentioned problem shopping centres include the shops along Parry Avenue and Kardinya Park.
4.2.12	Poor sight distances at bike paths under Canning Bridge and Mt Henry Bridge, as well as at the blind corner along the path in Alfred Cove.	Install mirrors or realign paths to allow increased sight distances.
4.2.13	Road space is not used effectively in many locations. Medians generally should only be considered once cycle lanes have been provided.	Assess the road space along local distributor roads to incorporate cycle lanes and speed reduction measures where possible.
4.2.14	The green phase at many traffic signals is not long enough to allow cyclists to clear the intersection.	The City of Melville should liaise with MRWA to extend green signal phases at problem intersections including: <ul style="list-style-type: none"> ▪ Coomooro Road / Almondbury Road / Riseley Road ▪ Ardross Street / Canning Highway ▪ Riseley Street / Canning Highway
4.3 Saddle Survey		
4.3.1	Traffic calming measures along Coomooro Road does not allow enough space for cyclists and motorists, causing motorists to try and pass cyclists in an unsafe manner.	Consider removing the slow point traffic calming measures, or retrofit to allow a safe cycle lane / shared path along the kerb alerting motorists to the fact that cyclists also use they road and to make room for cyclists.
4.3.2	The sealed shoulder/bicycle lane along Reynolds Road tapers off at roundabout and signalised intersection.	Where possible, ensure the continuation of sealed shoulders and bicycle lanes at intersections. At signalised intersections include bicycle lanes at the approaches, also continue bicycle lanes/sealed shoulders through roundabouts. This will increase driver awareness of cyclists at intersections and prompt them to allow space for cyclists.
4.3.3	The green time for Reynolds Road approaches at the intersection with Canning Highway is too short to allow a cyclist (starting from stationary position) to cross the intersection in the phase allowed.	Liaise with MRWA to increase the minimum green time for minor road approaches at large intersections with Canning Highway, Leach Highway and South Street.
4.3.4	The diversion of vehicles from Canning Highway to Macrae Road in order to avoid congestion in peak periods cause increased levels of conflict between vehicles and cyclists. This has resulted in many crashes, of varying severity, involving cyclists.	Wherever possible, limit the desirability and thus traffic diversion along Macrae Road. Carry out detailed assessment of cyclists crash types and consider remedial works to specifically address the predominant crashes.
4.3.5	The section of the PBN along Hislop Road, Burke Drive and Lentona Road encounters high levels of conflict between vehicles and cyclists.	Consider the installation of signs and marking along the roads and shared path to make cyclists and motorists alike more aware of the other mode in this vicinity. If problems persist the installation of bicycle friendly traffic calming measures should be considered.
4.3.6	Lack of space for safe and comfortable cycling along Canning Highway as the most direct route to the Canning Bridge and Kwinana Freeway PSP into the Perth CBD.	Liaise with MRWA to ensure that this issue is being considered as part of their plans to widen and upgrade Canning Highway. Advocate the inclusion of segregated on road cycle facilities or wide bus lanes to accommodate cyclists.

5. Cycle Mode Promotion & Encouragement

5.1. Trip Distribution Targets

As have been mentioned, currently only about 1.5% of work trips in Melville are undertaken by means of bicycle. In terms of defining a mode share target only the Australian National Cycling Strategy provides some guidance. It states that the aim should be to double the amount of people cycling. Additionally the Moving People strategy emphasises the need to maximise trips made by walking and cycling, especially those shorter than 5km.

Given the guidance from the Australian National Cycling Strategy and recognising the value of specific targets in terms of measuring planning achievements, it is recommended that the City of Melville commit itself to a goal of maximising cycle trips by setting a cycle mode share target of double the current mode share.

It is thus recommended that Melville aim to achieve at least a 3% bicycle mode share for work trips originating in the City.

In order to achieve such a target, a range of measures from physical infrastructure, to education, and promotion initiatives are required.

5.2. Current Initiatives

5.2.1. TravelSmart

TravelSmart is a Western Australian program that helps to reduce car use and promote travel alternatives that are sustainable and healthy.

The City of Melville has initiated many TravelSmart innovations towards cycling. One such TravelSmart program to be offered to City of Melville residents is “Can you change two trips per week?” which challenges residents to pick one or two travel opportunities a week, normally travelled by car, and cycle instead. Other programs include the TravelSmart to School program which includes Safe Routes to School and Millennium Kids, which highlights to motorists, the presence of school children in the area and to slow down to 40km/h.

As part of the City’s Transport Strategy, TravelSmart officers are responsible for overseeing activities associated with other sustainable transport modes, namely walking, cycling and public transport. They are further responsible for advocating for the implementation of sustainable

transport initiatives, such as those detailed in this chapter and for developing programs and relationships with other government agencies, businesses, developers and the community.

5.2.2. City of Melville TravelSmart & Roadwise Committee

The Committee reviews Travelsmart and Road Safety issues within the City. The Committee meets quarterly and provides opportunities for the Community and other stakeholders such as the WA DOT, MRWA, PTA and the WA Police to raise issues of concern that can be mutually addressed. Many of the issues raised are related to cycling and pedestrians.

5.2.3. Smarter Mobility Achieving Reduced Traffic initiative (SMARTi)

SMARTi was a pilot voluntary behavioural change program developed and first run by the City of Melville to determine the number of staff interested and able to adopt active travel modes on their commute to work 3 days per week for one year if given supporting information and incentives to do so. In the Canning Bridge Precinct, within the City of Melville, 57 staff adopted cycling for 3 days per week for one year after being offered a bike valued at \$650.

This initiative was successful and saw a 16% reduction in car commuting trips.

5.2.4. Rusty Riders

The City of Melville runs workshops to encourage women to cycle. It is designed to build riding confidence, provide advice on how to incorporate cycling into one’s lifestyle, and practical tips on comfort, safety and maintenance.

The City of Melville is also in the process of planning similar workshops targeting men over 55, while also holding workshops for City of Melville staff in regards to cycling.

5.2.5. Bikeweek Breakfast

The City of Melville hosts an annual Bikeweek Breakfast that encourages cyclists to attend a free breakfast for cyclists with merchandise giveaways and competitions. This occasion is also used to conduct travel surveys amongst the cyclist in order to determine their habits and needs so the City can improve conditions further. This is a popular event with 200 – 300 in attendance each year.

5.2.6. Events

Melville promotes cycling by being involved with or supporting:

- Triathlon events
- Bike wise events
- Bike to work days
- Bicycle skills courses
- University orientation events
- Tertiary education enrolment days

Furthermore, all major events promoted or supported by the City should actively promote all sustainable transport options including cycling. Events without Council involvement should also be encouraged to provide for and support cyclists, as evidenced by events such as “The Greatest Bike Ride” and “Around the Bridges” events.

5.3. Proposed Initiatives

There are a number of other initiatives that could be used to further promote cycling within the City of Melville. Recommendations include:

- That the City of Melville, through its TravelSmart officers, continues to work in partnership with relevant agencies, such as WA DOT and MRWA towards the education of cyclists, motorists and pedestrians, as identified in the City of Melville Transport Strategy.
- That the City of Melville undertakes strategic actions for encouragement and promotion of cycling by establishing a Bicycle Marketing Program (BMP). The BMP would include actions designed to promote cycling, improve cycling safety and provide end-of-trip facilities. The BMP would also include continued engagement with key segments of the community and tailored events, education and promotional activities.
- That the City promote initiatives such as Rider Log – Iphone application free to cyclists that collects data which can then be purchased by councils
- That the City participate in Supercount Tuesday – annual bike counts
- That the City invests in permanent counters for both pedestrians and cyclists.

There are many examples of successful initiatives run by other regions of Perth and all over Australia, some of which are outlined below.

5.3.1. TravelSmart Workplace’s Bicycle and Bananas, City of Perth

This initiative is organised by the TravelSmart Workplace program with assistance from the City of Perth. The program provides cycle training to organisations that are TravelSmart registered including theory sessions, practical on-bike skills development, guided rides, social rides with breakfasts, lunchtime basic bike maintenance and weekend hands on maintenance sessions.

This initiative could be introduced to City of Melville workplaces and schools.

5.3.2. TravelSmart Bicycle Bus at schools

This is an initiative, similar to the Walking Bus to schools programme, which is successfully being used in Queensland. The City of Melville could run a similar programme to develop and foster a cycling culture in the younger generation.

5.3.3. Cycling workshops, City of Stirling

The City of Stirling holds a number of cycling workshops designed to cater for residents, regardless of skill. A number of features of those workshops would be appropriate to enhance the existing City of Melville programs. The City of Stirling workshops include:

- Learn to Ride workshop – designed for ladies who have never learned to ride a bicycle
- Back on your Bike workshop – designed for ladies who haven't ridden a bicycle in many years
- On-road riding skills – designed for ladies who currently choose not to ride on road but would like to develop the skills and confidence to do so
- Blokes on Spokes – designed for men who have never ridden a bicycle or who haven't ridden a bicycle in many years
- Wheelie Wonderful Women – a 12 hour training/riding course for women who would like to join a social riding group but who feel that they need to improve their bicycle control skills

5.3.4. Summer Glo Fun Ride, City of Stirling

The City of Stirling held a Summer Glo fun ride to promote cycling. The initiative encouraged residents to decorate their bikes with glowing and illuminated items with prizes awarded. The idea being that if people experience cycling as a fun social activity they will be more likely to continue cycling in future for a variety of trip purposes.

5.3.5. Ride2School, Victoria

Ride2School is a behavioural change program coordinated by Bicycle Network which aims to encourage school students to cycle more often. There are five main components to this program as outlined below:

- Hand Up! Surveys, which monitor the number of students who walk and cycle to school
- Improving riding skills
- Events, such as Ride2School Day (in 2009 an estimated 40,000 Victorian students cycled to school)

- Facilities, including assistance in providing bike sheds
- School coordinator consultation

5.3.6. Promotion of Scenic Cycle Route

The City of Melville has a number of attractive scenic routes that run along the Swan River which are very popular with cyclists. An example of this is the shared path through Point Walter Reserve, along Burke Drive through Alfred Cove, and along Melville Beach Road. A proposed initiative is to promote scenic routes like these by erecting prominent and colourful signage and naming them as such, i.e. 'Swan River Scenic Ride.' There are a number of other identified benefits of promoting the scenic routes within the Melville, including:

- Promoting and making this route a visible attraction or feature of the City of Melville that will attract non-resident cyclists to use this route and the surrounding recreational parks. Local small businesses will also benefit from increased cycle traffic.
- Visible promotion of this route as a 'cycling route' will remind motorists to look out for cyclists along these roads and that patience and acceptance is needed on their part in increasing cyclist safety.
- Visibly recognising cyclists as legitimate road users will create a positive impression of the City of Melville as being an active place to live, that cater for the needs of a diverse community.
- It is an inexpensive way to promote cycling among residents and visitors.
- This can pose as a model that can be adopted by other councils along popular cycling routes in Perth. This is important in providing consistency for all infrastructure throughout Perth

5.3.7. Public Bike Hire

Picture 5-1: Bike Hire facilities in London



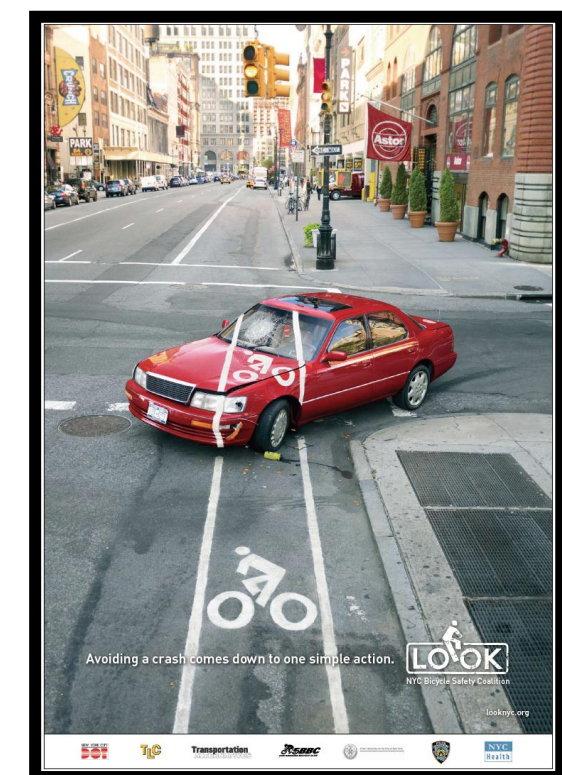
The City of Melville could follow in the footsteps of great cities like Paris, London, Istanbul and Barcelona by providing bike hire facilities at suitable locations within the City. Providing these types of facilities along with information about distances between destinations, and safe routes to ride along could significantly increase cycle opportunities for tourists and residents alike that generally have not considered cycling. While it may not be feasible to do this on a large scale, like in the European cities, small localised implementation could provide significant benefits.

5.3.8. Awareness Campaigns

Many accidents are the result of motorists and cyclists not being aware of each other.

A publicity campaign aimed at increasing awareness of cyclists and improving the behaviour of both motorists and cyclists would help to counter these problems and improve cyclist safety. Tools that can be used include street advertisements, billboards and advertisements on the back of vehicles. An example of a poster that has been used in the 'Look NYC' campaign to improve bicycle safety in New York City is shown in **Figure 5-1**. In addition the use of bright and conspicuous cycling attire should be promoted.

Figure 5-1: Awareness Poster used in New York



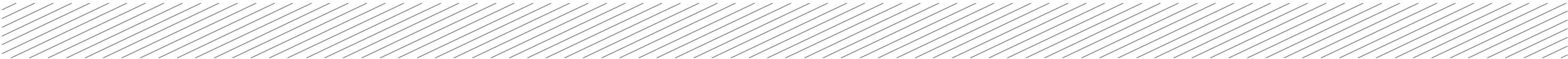


Table 5-1: Cycle Mode Promotion & Encouragement - Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
5.1 Trip Distribution Targets		
5.1.1	Currently only about 1.5% of trips in the City of Melville is being undertaken by bicycle. A significant increase to 3% is being targeted by this Bike Plan.	By continuing current encouragement initiatives, implementing new initiatives, and creating an overall safe cycling environment for all classes of bike users this can start to be achieved. In general the implementation of the various recommendations and projects in this Bike Plan should achieve this target over time.
5.2 Current Initiatives		
5.2.1	The City of Melville is already actively involved in multiple initiatives promoting cycling as a mode of travel and a way of life to its residents.	The City should continue to fund these initiatives, and work closely with other agencies such as Bicycling Western Australia, WA DOT, employers and schools to expand the catchment and effects of these initiatives within Melville.
5.3 Proposed Initiatives		
5.3.1	Many additional initiatives to those being implemented in the City of Melville are successfully being run throughout WA, Australia and the world.	The City of Melville, through its TravelSmart officers, should continuously investigate what encouragement initiatives are being run elsewhere and to what effect. Those deemed most appropriate by the TravelSmart officers should be piloted in Melville.

6. Bicycle Network & Facilities

6.1. Perth Bicycle Network (PBN)

There are number of bicycle routes in the *Perth Bicycle Network Plan* that pass through the City of Melville and are typically signed as shown in **Picture 6-1**. The PBN routes are illustrated in **Appendix A** the TravelSmart Maps for Melville.

The alignments of these routes have been in place since the inception of the *Perth Bicycle Network Plan* in 1996, and will be revisited as part of the new Western Australian Bicycle Network Plan. This review of routes will be undertaken by the Department of Transport in partnership with MRWA and local government, and will take into account practicality of routes including whether the designs are meeting the needs of cyclists and whether the required level of connectivity is being provided.

It is foreseen that the role out of Smart Roads in WA will also play a significant part in the delineation of the new bicycle network routes. The concept of Smart Roads is based on the premise that not all roads can fulfil all required functions for all modes of transport, as these functions for various modes are somewhat conflicting and will require impractical road reserves and be immensely expensive to implement. The Smart Roads concept is thus used to assign specific modes priority along certain roads. In many instances multiple complementary modes are assigned priority where appropriate.

A path that is not signed as a shared path or line marked appropriately is legally not a shared path, and cannot legally be used by cyclists above the age of 12.

Picture 6-1: PBN Route Markers



6.2. Local Bicycle Network

There are a number of local bicycle routes throughout the City of Melville, which are described as local bicycle friendly streets on the Melville TravelSmart maps (**Appendix A**). Apart from being indicated on the TravelSmart maps there is no way of identifying these routes, as they do not necessarily include any cycle infrastructure, rather it relates roughly to the traffic volumes expected on the specific roads. As such these routes tend to vary in terms of actual appropriateness for cycling and would have to be reassessed from time to time to ensure that traffic volumes remain suitable to justify continued use as a cycle friendly route. This Bike Plan is part of the reassessment process to determine how routes are to be delineated in future.

There are also a number of recreational routes consisting of existing pathways that are shared by pedestrians and cyclists but are not part of the PBN, including:

- Burke Drive shared path
- Melville Beach Road shared path
- The Esplanade shared path

However, in many cases these pathways are not to the current shared path standard and are also not signed as such. It is thus debatable whether these paths are truly part of the City's cycling infrastructure for

all cyclists, as cyclists above 12 years of age are not allowed to legally cycle on paths not signed as shared paths.

A number of roads have existing bicycle lanes/sealed shoulders along both sides of the road (Refer to **Appendix A**). These roads are popular with commuter cyclists who prefer to remain on road and make use of larger more direct routes which also tend to have a higher level of priority at intersections with side roads.

The Perth Bicycle Network will be replaced by the Western Australian Bicycle Network. The development of the WABN will take into account Smart Roads principles in which some routes will prioritise certain modes of transport above others, as it is recognised not all roads can fulfil the needs of all road users.

6.3. Infrastructure Survey

A large sample of the road infrastructure throughout Melville was surveyed in relation to its use for cycling. In general the sample exists of higher order roads, including arterials and collector/distributors as well as PBN routes. The findings of this survey are presented in various maps in terms of the different aspects of the infrastructure. These aspects include:

- Cycle Infrastructure Suitability
- Facility Type
- Line Markings and Signage
- Level of Maintenance
- Connectivity and Permeability

6.3.1. Cycle Infrastructure Suitability

The different classes of cyclists have varying characteristics and varying needs. Accordingly they require varying facilities to cater for their specific characteristics and needs on the different road types that exist. The most prominent difference in characteristics between both cyclists and roads are typical travel speeds. In terms of speed, Austroads recommends certain types of facilities for cyclists depending on the expected speed differential between cyclists and vehicles on a road. In general terms Austroads recommends that in instances where the speed differential is less than 20 km/h no provisions are required, as it is safe for cyclists to integrate with vehicles. Where the differential exceeds 20 km/h on a road, provisions are required, for example a cycle lane. Finally where the differential exceeds 40 km/h segregated facilities are required, which includes physical separation by median or barrier.

A summary of the expected speed differential and associated treatment type per cyclist class and road type is provided in **Table 6-1**.

In order to effectively accommodate the different classes of cyclist, it is recommended that different types of facilities be planned for implementation throughout the City of Melville, relating to the needs of the various classes of user and the routes along which they would typically cycle.

Table 6-1: Summary of Speed Differentials & Associated Treatments

Class of Cyclist	Type of Road	Local Access Road	Local Collector and Distributor Road	Arterial Road
	Typical speed limit	50 km/h	60 km/h	70 - 80 km/h
Inexperienced Cyclists	Average speed of cyclists	<20 km/h	<20 km/h	<20 km/h
	Expected speed differential between cyclists and vehicles	>30 km/h	>40 km/h	>50 - 60 km/h
	Austroads recommended cycle treatment	On Road Cycle Provision	Segregated Cycle Facility	Segregated Cycle Facility
Commuter & Fitness Cyclists	Average speed of cyclists	25 - 40 km/h	25 - 40 km/h	25 - 40 km/h
	Expected speed differential between cyclists and vehicles	10 - 25 km/h	20 - 35 km/h	30 - 55 km/h
	Austroads recommended cycle treatment	On Road Cycle Provision	On Road Cycle Provision	Segregated Cycle Facility
Recreational Cyclists	Average speed of cyclists	20 km/h	20 km/h	20 km/h
	Expected speed differential between cyclists and vehicles	30 km/h	40 km/h	50 - 60 km/h
	Austroads recommended cycle treatment	On Road Cycle Provision	On Road Cycle Provision	Segregated Cycle Facility

Inexperienced and Local Cyclists

Safety is a major concern for inexperienced cyclists, as such to instil confidence in these road users and encourage cycling from an early age it would be best that facilities aimed at this class of cyclist include a high level of separation from general traffic. The facilities should be located in the vicinity of schools and local shopping and activity centres. While these routes are generally not expected to run along higher order roads they would occasionally have to cross these roads.

Shared paths along collector roads and sealed shoulder or shared paths along local roads are deemed to be appropriate.

Commuter & Fitness Cyclists

Given the confidence level of commuter cyclists and the intensity and speed of commuter trips it would be best to accommodate commuter cyclists on road, with a certain degree of separation from general traffic. As such, the commuter facility class is recommended to consist of a sealed shoulder for cyclists on lower order roads and a cycle lane or shared bus and cycle lane on higher order roads in accordance with Austroads recommendations.

These facilities will allow commuter cyclists to travel at relatively high speeds, while affording them the safety of limited separation. These types of facilities should be located along main commuter routes such as the PBN network.

Recreational Cyclists

Recreational cyclists in general have a large speed differential between various types of users. Additionally, areas attractive to this type of cyclist are scenic routes, winding routes and circular routes in many instances also frequented by joggers, walkers and pets.

A class of facility most appropriate to this user type includes shared path facilities with room to pass other users. In areas of high activity separation from pedestrians are desirable and recommended.

The infrastructure surveyed was divided into three categories namely, good, fair and poor (taking into account the typical user class that will make use of the facilities). The characteristics which influence the categories include:

- Road class (Travel Speed & Traffic Volume)
- Type of cycle facility (No provision, on-road, or segregated)

The criteria used to determine the level of cycling propensity is shown in **Table 6-2**. Examples of good and fair provisions are shown in **Picture 6-2** to **Picture 6-5**.

Picture 6-2: Good cycling provision for a local road



In general higher traffic volumes, higher travel speeds and more specifically a higher speed differential between cars and cyclists requires increased segregation between general traffic and cyclists. In general it is expected that inexperienced cyclists will make use of local access roads and to a lesser extent collector/distributor roads. Commuter cyclists will be prone to highway and arterial roads which are more direct.

Accordingly typical speed differentials between the expected cycle class and the speed limit of the specific road are used to determine what type of infrastructure would be appropriate. The Cycle Infrastructure Suitability represents the comparison of the types of infrastructure that would be appropriate and that which is provided along each road. Refer to **Figure 6-1** for a map illustrating the surveyed Cycle Infrastructure Suitability throughout Melville. Roads with poor provision, in terms of what should ideally be provided, included Canning Highway, Leach Highway, South Street and Karel Avenue. Roads with good provisions included many of the local roads, while in general most roads had fair provision for cyclists.

Where the typical speed differential between cars and bicycles exceed 40km/h, bicycles and cars should be physically segregated (refer to Picture 6-4).

Picture 6-3: Fair cycling provision for a collector/distributor



Where the typical speed differential between cars and bicycles exceeds 20km/h but is less than 40km/h, bicycles can be accommodated in on road cycle facilities (refer to Picture 6-2 & 6-3).

Picture 6-4: Good provision for a major arterial



Where the typical speed differential between cars and bicycles is less than 20km/h, bicycles and cars can share the road (refer to Picture 6-5).

Picture 6-5: Low speed street appropriate for sharing road space



Table 6-2: Cycling Infrastructure Suitability Rating Criteria

Cycling Infrastructure Suitability Criteria				
Rating	Local Access Road	Collector/Distributor	Highway/Arterial	Path
Good	On-Road Provision/Path	Segregated path	Segregated Path (> 2m)	> 2m
Fair	No provision	On-Road Provision	On-Road Provision, Segregated path (< 2m)	-
Poor	-	No Provision	No provision, On-Road Provision (< 2m)	< 2m

Legend

Surveyed Paths

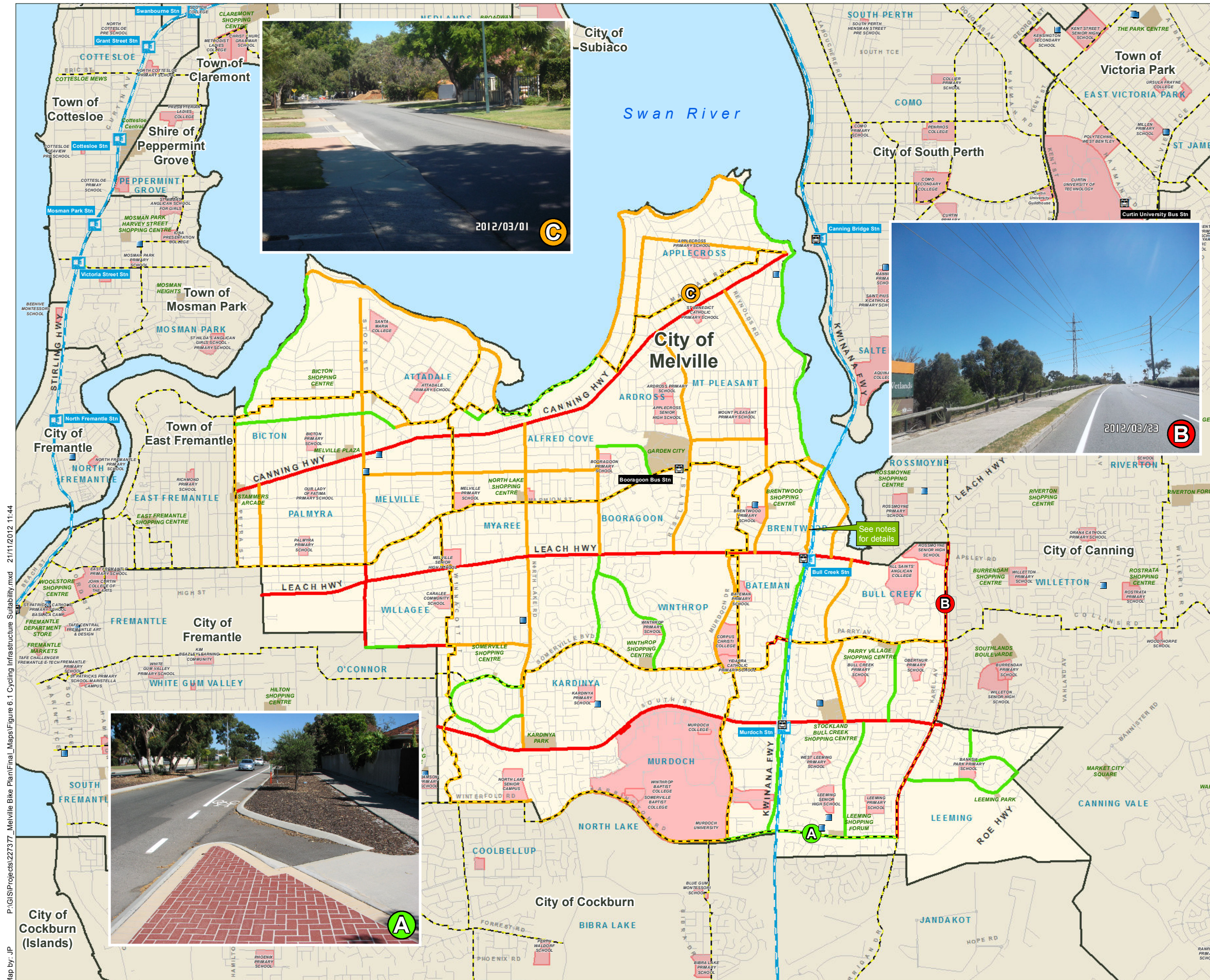
Cycling Infrastructure Suitability

- Good
- Fair
- Poor
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Railway
- Train Stations
- Bus Stations

Notes:
Work to be completed in the coming months.

Date: 21/11/2012

Version: 3



Map by: JP
P:\GIS\Projects\227377_Melville Bike Plan\Final_Maps\Figure 6.1 Cycling Infrastructure Suitability.mxd 21/11/2012 11:44



A3 scale: 1:50,000
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Job No: 227377

Coordinate system: MGA Zone 50

City of Melville Bike Plan
Figure 6.1 Cycling Infrastructure Suitability

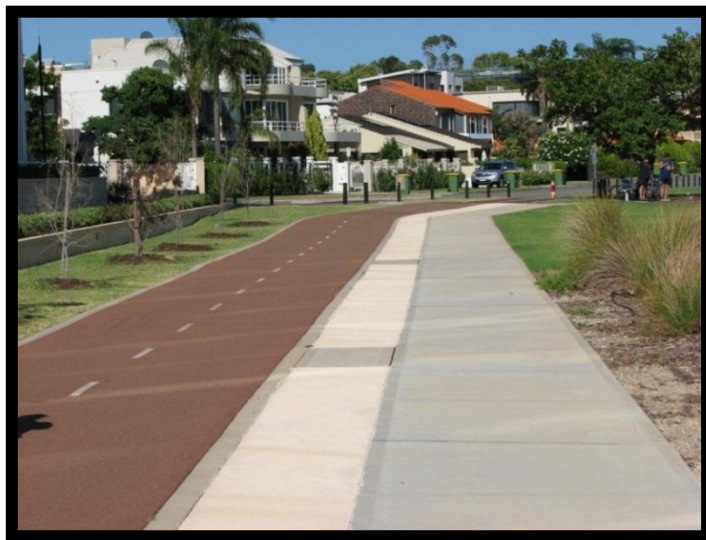
6.3.2. Facility Type

The types of cycling facilities available throughout Melville are shown in **Figure 6-2**. The map shows on-road facilities ('sealed shoulders' as in **Picture 6-9 & 6-10**) and off-road paths ('separated paths' shown in **Picture 6-6** and 'shared paths' shown in **Picture 6-7**), as well as routes which formed part of the survey but did not have any cyclist facilities ('on-street' as in **Picture 6-8**).

The majority of roads surveyed within the City of Melville accommodate bicycles with on-road facilities with the recreational facilities associated with parks and the river tending to be shared path facilities. Separation between cyclists and pedestrians only occurs along the river in Applecross and in the vicinity of the Canning Bridge and Bicton (refer to **Picture 6-4**).

The width of some of the older shared paths, specifically along Leach Highway and South Street, are of some concern. The paths may have been to standard when they were implemented, but the standards have since improved and accordingly the paths need to be widened. Those paths abutting major arterials and highways should be prioritised.

Picture 6-6: Separated path leading to Canning Bridge



The majority of roads within Melville accommodate bicycles on-road, either with or without dedicated provisions.

It has also been noted that the shared path along Burke Drive in the vicinity of the Alfred Cove Nature Reserve has been washed away and damaged by occasional flooding. The Swan River Trust has indicated that this path, when rebuilt, should be realigned around the Alfred Cove Nature Reserve.

Picture 6-7: Principle shared path along the Freeway



Picture 6-8: On road cycling on a PBN Route



Picture 6-9: Sealed shoulder with bicycle markings



Picture 6-10: Typical sealed shoulder provided in Melville



Legend

Surveyed Paths

Facility Type

- On-Street
- Sealed Shoulder
- Separated Path
- Shared Path
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

Notes:

Date: 21/11/2012

Version: 2

City of Melville Bike Plan

Figure 6.2 Facility Type



6.3.3. Line Markings & Signage

It was found that while on-road line markings for cars tend to be appropriate and in a good condition, both on-road and shared path line markings for cyclists were generally not applied as it should be. The criteria for the line markings ratings are shown in **Table 6-3**. **Figure 6-3** shows the routes in Melville that have good, fair and poor line marking implementation. **Table 6-8** at the end of the chapter summarises the routes with poor line marking that should be upgraded.

Apart from line markings there is also a definite need for appropriate signage to indicate that facilities are either intended for the exclusive use of cyclists or pedestrians, or for shared use by both. Additionally, cycle routes (especially the strategic PBN routes) should be signed along the route and at all intersections along the route. Finally, advisory and warning signs should be in place to alert vehicles to the presence of cyclists. In terms of signage, the overall implementation throughout Melville is quite poor, based upon the rating criteria shown in **Table 6-4**. While PBN routes tend to be signed, signage is not implemented consistently at all intersections along the route. The placement of PBN signs are also not done consistently and as such not easily noticed. **Figure 6-4** shows the level of signage implementation along the surveyed routes. A summary of issues relating to signage as well as appropriate recommendations is provided in **Table 6-8**.

Picture 6-11: Typical PBN Route markers



Table 6-3: Line Markings Rating Criteria

Line Markings Criteria			
Rating	Sealed Shoulder	Separated Path	Shared Path
Good	Bicycle Symbol	Bicycle and Pedestrian Symbols	Shared Path Separator Line
Fair	Some markings, either Lines or symbols but not necessarily to standard		
Poor	No markings, especially along PBN route		

Table 6-4: Signage Rating Criteria

Signage Criteria		
Rating	PBN & Recreational Paths (informational signs)	Shared Paths (regulatory signs)
Good	Signs showing routes, route markers showing distnaces (consistent)	Regulatory signs shown
Fair	Some signs showing routes but not always applied consistently	-
Poor	No Signs	No regulatory signs

Picture 6-13: Good informational and regulatory signage along the Freeway PSP

Picture 6-12: Good path markings along Melville Beach Road



Legend

Surveyed Paths

Line Marking Assessment

- Good
- Fair
- Poor
- N/A
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

Notes:
A line marking assessment was made for all roads with existing sealed shoulders and cycle paths (shared and separated). Local roads with neither on-street or off-street cycle provisions are marked as not applicable.

Date: 24/05/2012

Version: 1

City of Melville Bike Plan

Figure 6.3 Line Marking Assessment



Map by: SJM
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A3 scale: 1:50,000

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Job No: 227377

Coordinate system: MGA Zone 50

Legend

Surveyed Paths

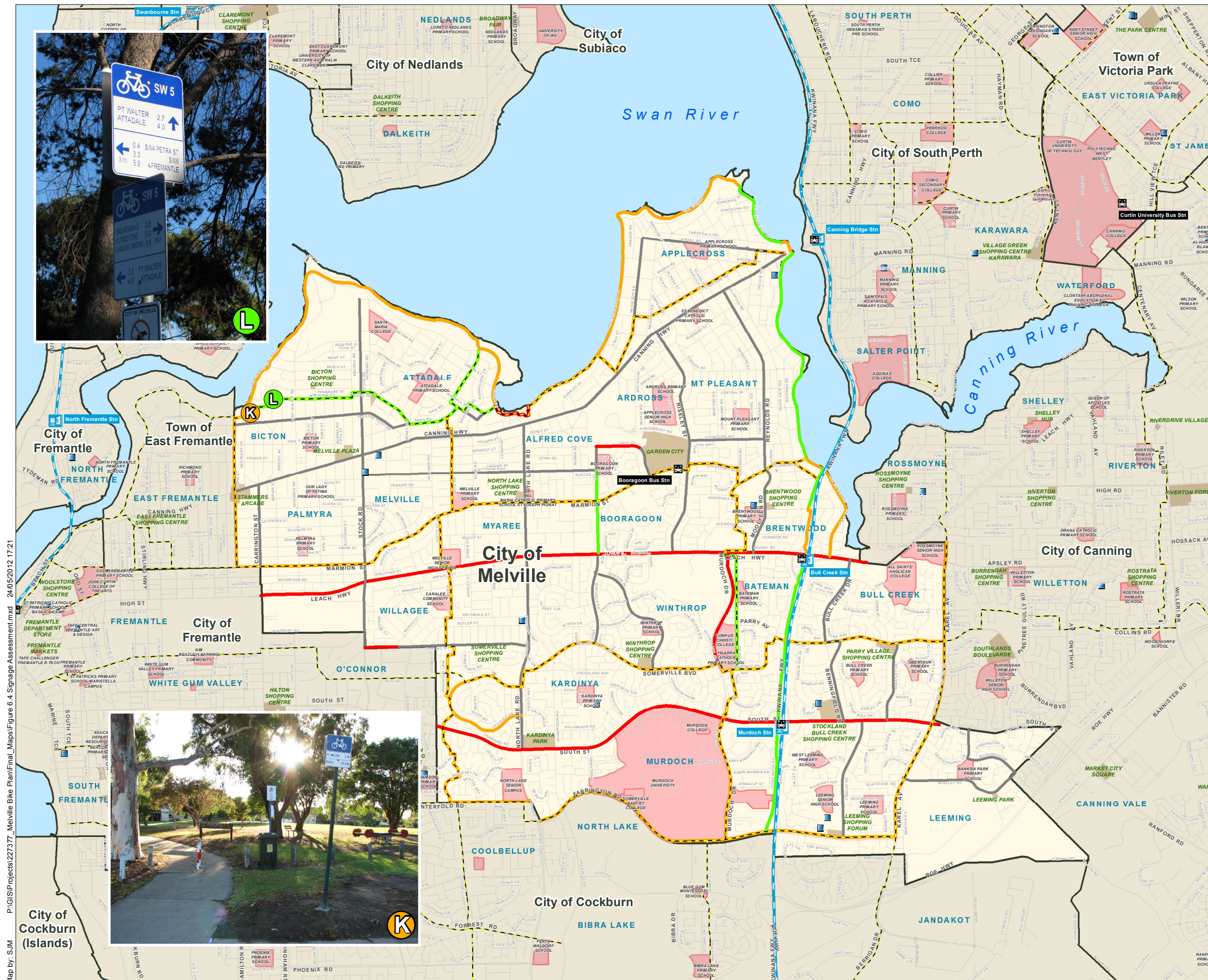
Signage Assessment

- Good
- Fair
- Poor
- N/A
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

Notes:
 -Perth Bicycle Network (PBN) routes and recreational paths were assessed on informational signage.
 -Shared paths were assessed based on regulatory signage.
 -All other path types are marked as not applicable.

Date: 24/05/2012

Version: 1



Map by: SJM
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Job No: 227377

Coordinate system: MGA Zone 50

City of Melville Bike Plan

Figure 6.4 Signage Assessment

6.3.4. Level of Maintenance

The general condition of the cycling infrastructure was found to be quite good. The condition per surveyed route is shown in **Figure 6-5**, with the criteria used for ratings shown in **Table 6-5**. It should be noted that while the general condition of infrastructure was surveyed, the intention of this plan is to provide a general assessment of the quality as opposed to highlighting specific maintenance concerns or projects.

Picture 6-14 to **Picture 6-17** shows some of the maintenance levels experienced in Melville. A summary of poorly maintained facilities and associated recommendations are provided in **Table 6-8**.

Picture 6-14: Fairly maintained section of the Freeway PSP



Apart from a few isolated instances the infrastructure in Melville was found to be well maintained.

Picture 6-15: Poorly maintained section of shared path in Campbell Park



Picture 6-16: Poorly maintained signage at Onnond Bowyer Park



Picture 6-17: The general high level of maintenance associated with infrastructure in Melville



Table 6-5: Level of Maintenance Rating Criteria

Level of Maintenance Criteria	
Good	Roads and Paths with good surfacing, free of overhanging branches and plants, clear line markings
Fair	Frequent cracking in surfaces, isolated plant overgrowth, faded line marking
Poor	Cracked or potholed surfaces, frequent overgrowth, faded line marking

Legend

Surveyed Paths

Level of Maintenance

Good

Fair

Poor

N/A

PBN Routes

Community Facility

Education Facility

Shopping Area

Roads

Railway

Train Stations

Bus Stations

Notes:

Date: 24/05/2012

Version: 1

City of Melville Bike Plan

Figure 6.5 Level of Maintenance Assessment



Map by: SJM
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A3 scale: 1:50,000

0 1 Kilometres

Job No: 227377

Coordinate system: MGA Zone 50

6.3.5. Connectivity & Permeability

Connectivity and permeability was surveyed predominantly by identifying the level of access onto cycle routes from adjacent and surrounding areas, and by identifying the ease at which road crossings along the route can take place.

The overall road network prevalent in the City of Melville is conducive to high level connectivity and permeability, with perhaps the exception of the meandering local roads of Kardinya and Winthrop.

The PBN routes were found to cut through parks and continue through cul-de-sacs, which increase the directness of routes. Refer to **Figure 6-6** for the level of connectivity associated with the surveyed routes. The rating criteria used for level of connectivity is given in **Table 6-6**. The main factor negatively influencing the connectivity and permeability of multiple routes are the barriers created by main roads and highways such as Leach Highway, Canning Highway and South Street, which can be difficult for cyclists to cross. **Figure 6-7** shows the ease at which crossings take place along the various routes, and **Table 6-7** provides the criteria used for rating ease of crossings. A summary of connectivity and permeability issues and recommendations is provided in **Table 6-8**.

It is important that cycle routes be located along roads with priority through movement and not cutting across such roads. Additionally connectivity to schools is important given that footpaths are a vital part of young cyclist development including gaining confidence to start cycling on road.

Picture 6-18: Roundabouts in general do not provide easy crossing for cyclists



Table 6-6: Connectivity Rating Criteria

Connectivity Criteria	
Good	Direct routes and many side road accesses
Fair	Some route deviations and/or few side road accesses
Poor	Meandering routes and limited side road accesses

Table 6-7: Ease of Crossing and Directness Rating Criteria

Crossings and Directness Criteria	
Good	General right of way to the route, isolated instances requiring crossing traffic is acceptable
Fair	General right of way to the route, multiple instances requiring crossing traffic
Poor	General right of way to the opposing traffic

Picture 6-19: Cyclist having trouble crossing heavy traffic on Kintail Road



Many of the PBN routes throughout Melville are not direct, and do not provide easy crossings of intersecting roads for cyclists.

Picture 6-20: Two cul-de-sacs connected by a shared path (PBN Route) – Poor connectivity cars, Good connectivity bicycles



Legend

Surveyed Paths

Connectivity Assessment

- Good
- Fair
- Poor
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

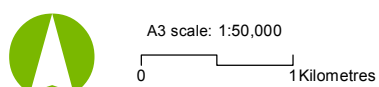
Notes:

Date: 06/09/2012

Version: 2



Map by: JP
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Job No: 227377

Coordinate system: MGA Zone 50

City of Melville Bike Plan

Figure 6.6 Connectivity Assessment

Legend

Surveyed Paths

Crossings and Directness Assessment

- Good
- Fair
- Poor
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

Notes:

The crossing and directness assessment relates to the ease that a route is travelled along based on the directness and level of priority experienced at opposing crossings.

Date: 21/11/2012

Version: 2

City of Melville Bike Plan

Figure 6.7 Crossings and Directness Assessment



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Map by: JP



A3 scale: 1:50,000

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Job No: 227377

Coordinate system: MGA Zone 50

6.4. Recommended Network

It is recommended that the City of Melville bicycle network consist of a range of routes that traverse the City and provide access to land uses and activity centres. The routes should range from many lower order routes to fewer higher order routes aimed at providing efficient through movement for commuter cyclists. The cycle network should be in line with the Smart Roads recommendations being developed as part of the WA Moving People Strategy and wherever possible the City of Melville should be actively involved in influencing the strategy as it pertains to Melville. It should further be considered that the transport network needs of cyclists, with a destination in mind, are exactly the same as motorists travelling to a destination. These needs include direct and efficient routes, for this reason the network is similar to the general traffic network.

The primary cycle network should consist of higher order and mid order routes. Higher order routes, mainly catering for commuter cyclists but which are safe enough for inexperienced cyclists should be located along:

- South Street
- Leach Highway
- Canning Highway
- Karel Avenue
- Farrington Road
- Kwinana Freeway PSP
- Murdoch Drive

These routes can either be supplied on road, segregated from traffic, or off-road as appropriate shared paths. Additionally the mid order routes are required to connect higher order routes and to allow an appropriate transition from local routes to higher order routes. The mid order routes include:

- Marmion Avenue
- North Lake Road
- Parry Avenue
- Risely Road
- Reynolds Road
- Murdoch Drive
- Stock Road
- Garling Road
- Somerville Road
- Bull Creek Drive
- Carrington Road
- Coomoorra Road
- The Esplanade
- Burke Drive

The transport network needs are the same for cyclists and motorists travelling to destinations. Both users desire direct and efficient routes.

Additionally many local routes should form part of the secondary network that provides amongst others access to schools, local community facilities, recreational networks and parks. This network is also typically suited to school children, as well as young, inexperienced and less confident cyclists. The lower order network is equally important as the mid and higher order network, in that it is where a culture of cycling develops by providing safe facilities for school children. Local routes must thus provide the safest possible environment for cyclists by including safe off-street facilities, safe crossings and intersections, safe volumes of general traffic and safe traffic speeds.

In general any of these routes should be able to form part of the PBN routes. However it is preferable that the PBN routes be allocated along routes which are direct and enjoy a certain level of priority, while not being too intimidating to less experienced cyclists. The mid to higher order routes are thus ideal. The recommended network and order of routes should be used as a guide to accommodate cyclists appropriately.

6.5. End-of-Trip Facilities

The end-of-trip facilities commonly found in Melville are bicycle parking in the form of bicycle rails (**Picture 6-21**), cages (**Picture 6-22**) or lockers (**Picture 6-23**). While Murdoch University provides shower and changing facilities, other areas of activity typically do not. City of Melville, through its Town Planning Scheme, requires developers to provide 'end of trip facilities'. The majority of local and regional shopping centres provide bicycle parking, in the form of U-rails at one or multiple entrances to the centre.

Bicycle lockers are provided at multiple locations throughout Melville, many at public transport stations (shown on TravelSmart maps refer to **Appendix A**). These facilities are generally not popular among cyclists, rather bicycle cages or basic u-rails should be provided as an alternative. Typically bicycle cages are appropriate for all day parking at public transport stations, while U-rails are appropriate for short term parking.

The Kwinana Freeway PSP traverses the City of Melville and is the single busiest commuter cycle route in Perth, accommodating in the order of 2,000 cyclists per day.

Picture 6-21: Bicycle Rail (U-Rail)



Picture 6-22: Bicycle Enclosure/Cage



Picture 6-23: Bicycle Lockers at Bus Stop



The Fiona Stanley, St. John of God Hospital and the WAIMR complexes were assessed for 'end-of-trip' facilities as part of the development application process, which required each development to produce a Travel Plan.

Suitable located bicycle rails in areas with good visibility from passers-by, CCTV surveillance and bright lighting can promote local trips to convenience stores, supermarkets, shopping malls and video stores.

In terms of end-of-trip facilities it is recommended that all activity centres, which currently do not have any facilities for cyclists, provide basic facilities in the form of U-rail type bicycle parking in convenient and well trafficked areas (such as access points).

It is further recommended that all future development in the City of Melville adhere to a predetermined standard in terms of providing bicycle parking, shower facilities and change rooms, in order to promote cycling as a mode of transport, and put Melville in line with national and global best practice sustainability measures.

6.6. Other Infrastructure

No specialist infrastructure, such as bicycle repair facilities, bicycle rental stations or bicycle information stands, was identified. One mounted TravelSmart map was found where the shared path crosses the Canning Bridge.

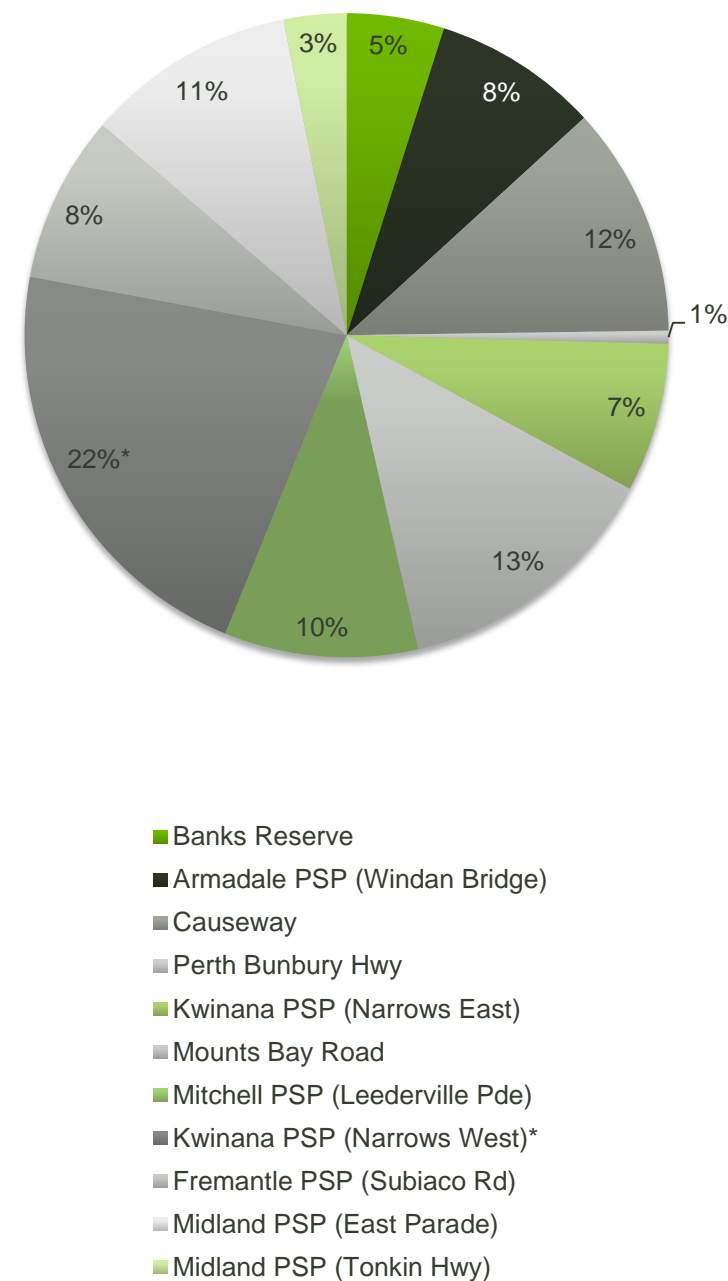
These types of specialist infrastructure are more focussed toward tourists and users unfamiliar with the area. It may be advantageous to investigate the installation of such facilities along the river recreational route, as part of a cycling encouragement initiative.

6.7. Utilisation

In general the quantitative data available to assess infrastructure and route utilisation is limited. The principle shared path which runs along the Kwinana Freeway and crosses the Narrows Bridge leading into Perth CBD, is a main cycle feeder route that throughout 2011 carried an average of 2000 cyclists per day, and overall accommodates roughly 22% of all Perth commuter cyclists. This is by far the single busiest commuter cycle route in the Perth metropolitan area, as is illustrated in **Figure 6-8**.

This route traverses the City of Melville and is also the main route into which the local and PBN routes feed commuter cyclists. A large number of cyclists join this route at the Canning Bridge.

Figure 6-8: Percentage of counted bicycle trips by location



* Closest count to the City of Melville

The City of Perth is a large employment hub with appropriate and encouraging guidelines for the provision of end-of-trip facilities. It is recommended that the City of Melville endeavour to provide a similar standard as is required in the City of Perth:

- One bicycle parking space per 500sqm of floor area for non-residential uses.
- A separate male and female shower and change room for developments that require 10 bicycle parking spaces (according to the above criterion).
- One additional male and female shower for every additional 10 bicycle parking spaces, to a maximum of five male and female showers per building.
- The change rooms must be secure and able to lock, and preferably be situated in areas that are well lit.
- A locker should be provided for every bicycle parking space provided.
- The end-of-trip facilities should be located as close as possible to the bicycle parking facilities.
- Bicycle facilities should be located:
 - On the ground floor (not require access via steps)
 - As close as possible to the main entrance
 - In areas that are in general sight
 - Out of the main pedestrian flow

Table 6-8: Bicycle Network & Facilities - Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
6.1 Perth Bicycle Network		
6.1.1	The Perth Bicycle Network routes are currently being reviewed by the Department of Transport in partnership with MRWA and local government.	The City of Melville should liaise with the Department of Transport to raise awareness of this Bike Plan and its recommendations, and advocate the inclusion of the routes delineated in this Bike Plan in the new WABN routes. The City of Melville should be actively involved in the process and not merely have the routes decided by state government agencies.
6.2 Local Bicycle Network		
6.2.1	A number of facilities considered as shared paths do not meet current shared path standards, and are not signed as shared paths. Making it illegal for cyclists above 12 years of age to use these facilities.	Upgrade substandard shared path facilities to the minimum 2.5m width (preferred 3.0m), or in the case of state roads liaise with MRWA to upgrade these facilities. Also include the appropriate shared path signage once the facilities have been upgraded. The main shared path facilities requiring upgrade includes: <ul style="list-style-type: none"> ▪ South Street (MRWA) ▪ Leach Highway (MRWA) ▪ Karel Avenue ▪ Murdoch Drive ▪ Riverside recreational path along Burke Drive and Blackwall Reach Parade
6.3 Infrastructure Survey		
6.3.1	The Cycle Infrastructure Suitability of some roads that would typically be used by cyclists is poor due to inappropriate provision or lack of cycling facilities (more detail on appropriate facilities provided in Appendix C).	Bicycle infrastructure in the form of appropriate shared path facilities or segregated on-road cycle lanes should be provided along: <ul style="list-style-type: none"> ▪ Canning Highway ▪ Leach Highway ▪ South Street ▪ Karel Avenue ▪ Reynolds Road (between Crest Avenue and Central Avenue) ▪ Stock Road (between Marmion Street and Garling Street) ▪ Garling Street (between Antill Street and Stock Road) ▪ Parry Avenue (between Marsengo Road and Geyer Place)
6.3.2.1	Some of the shared path facilities experience high instances of conflict due to heavy use by both pedestrian and cyclists, and are thus not appropriate for use as shared paths. Also as have been mentioned some of the older shared paths are not to the appropriate standards (refer 6.2.1).	The City of Melville should consider upgrading the well utilised shared paths to separated paths, including the paths along: <ul style="list-style-type: none"> ▪ The Esplanade (last stage) ▪ Canning Beach Road ▪ Strand Road ▪ Melville Beach Road and Dunkley Avenue
6.3.2.2	The shared path along Burke Drive, through the Alfred Cove Nature Reserve, has been damaged and the Swan River Trust requires that when it is rebuilt it should be realigned around the Alfred Cove Nature Reserve.	Reconstruct the Burke Drive shared path along Burke Drive by passing the Alfred Cove Nature Reserve instead of cutting through it due to flooding and dieback; alternatively a raised walkway could also be installed. Another option would also be to accommodate cyclists on road through the implementation of on road facilities, possibly in conjunction with a DOT Pilot study.
6.3.3.1	Many of the shared paths do not include the appropriate line markings.	Install separator line, and pedestrian and cyclist markings along the poorly marked shared paths, including the paths along: <ul style="list-style-type: none"> ▪ Canning Beach Road ▪ The Strand Road ▪ Melville Beach Road ▪ Burke Drive ▪ Southern section of The Esplanade ▪ Leach Highway ▪ South Street ▪ Murdoch Drive
6.3.3.2	Most of the PBN routes have no line markings indicating the appropriate use by bicycles (i.e. no on road cycle lanes, no bicycle markings)	Mark on road bicycle lanes along the following PBN routes, when they are resurfaced: <ul style="list-style-type: none"> ▪ MacCrae Road ▪ Mathieson Road ▪ Haig Road ▪ Swan Road



ITEM	ISSUE	RECOMMENDATION
		<ul style="list-style-type: none">▪ Davis Road▪ Braunton Road▪ Curtis Road▪ Potts Street▪ Winnacott Street▪ Dean Road▪ Canning Avenue▪ Davenport Road▪ Sicklemore Street▪ Rogerson Road
6.3.3.3	PBN route marker signs are not consistently installed along all PBN routes, or at intersections with PBN routes.	Install PBN route markers at all intersections along the following PBN routes: <ul style="list-style-type: none">▪ Macrae Road/Mathieson Road Route▪ Petra Street Route▪ Curtis Road/Potts Street/ Winnacott Street Route▪ Marmion Street/ Davenport Road/ Canning Avenue Route▪ Somerville Boulevard/ Marsengo Road/ Parry Avenue Route▪ Murdoch Drive Route▪ Karel Avenue Route▪ Winterfold Road/ Farrington Road Route
6.3.3.4	Regulatory signage is missing along some shared paths (making it illegal to cycle on these paths).	Install regulatory signage along the unsigned shared paths including: <ul style="list-style-type: none">▪ South Street▪ Leach Highway▪ Murdoch Drive▪ Section of shared path at Alfred Cove near The Close
6.3.4	Few shared path sections are poorly maintained, this includes cracking, vegetation overgrowth and faded line markings.	Resurface the shared path along Karel Avenue as well as the cracked section of path in Campbell Park, and prune back the vegetation along the Parry Avenue shared path, at the Bowling Club end of North Lake Road and at the blind corner along the shared path at Alfred Cove.
6.3.5.1	The Braunton Street/ Davis Road PBN Route is not direct and typically does not provide priority when travelling along the route.	The City of Melville should liaise with the Department of Transport and advocate for a new PBN commuter route along Preston Point Road as it is direct, enjoys priority at intersections and already includes provision for cyclists (sealed shoulders).
6.3.5.2	The Curtis Road/ Potts Street/ Winacott Street/ Antill Road Route is not direct and does not provide priority when travelling along the route.	The City of Melville should liaise with the Department of Transport and advocate for a new PBN commuter route along Stock Road or North Lake Road as these roads are direct and have priority at intersections. Additionally both these roads already have bicycle facilities along certain sections.
6.3.5.3	The PBN Route section along Davenport Road and Canning Avenue is not direct, does not provide priority at intersections when travelling along it, and does not include bicycle infrastructure.	The City of Melville should liaise with the Department of Transport and advocate for a new PBN commuter route along Coomoora Road as this road is direct and has priority at intersections.
6.3.5.4	The PBN Route section along Lang Street/ Sicklemore Street/ Rogerson Road is not direct and does not provide priority at intersections when travelling along the route.	The City of Melville should liaise with the Department of Transport and advocate for a new PBN commuter route along Moolyveen and Reynolds Road as this road is direct and has priority at intersections. It also already includes on road bicycle facilities.
6.3.5.5	The PBN Route along Macrae Road and Mathieson Road does not provide appropriate priority when travelling along this road due to roundabouts giving priority for cars coming from Canning Highway.	The City of Melville should consider removing the roundabouts along Macrae Road and divert heavy car traffic away from this road by diverter traffic calming measures that allow cyclists to continue straight.
6.4 Recommended Network		
6.4.1	Multiple bicycle network deficiencies have been noted throughout the findings of the infrastructure survey.	In general the Melville Bicycle Network should consist of higher order, mid order and lower order routes, as set out in Section 6.5, accommodating the needs of the various classes of bike users.
6.4.2	There are also multiple missing links and gaps in the natural bicycle network as it is currently set out.	Complete the current network in locations where gaps exist. The same infrastructure and facilities that are provided before and after the following gaps should also be provided to fill the gap: <ul style="list-style-type: none">▪ Local Bicycle Friendly Route gap at north most point of Stock Road, Bicton (Pace Street)▪ Southern section of Stock Road, Leach Highway to Farrington Road▪ Local Bicycle Friendly Route gap on Kintail Road, Applecross▪ Challenge TAFE (Duncraig Road, Applecross)



ITEM	ISSUE	RECOMMENDATION
		<ul style="list-style-type: none">▪ Applecross Primary School▪ Piney Lakes (Winthrop)▪ South Street - Murdoch University (north side)▪ North access to Garden City Shopping Centre, i.e. Riseley Street or Wireless Hill Park▪ Leach Highway▪ Canning Highway▪ Garling Street▪ Murdoch Drive▪ Parry Avenue bridge across the freeway▪ Section of the freeway PSP in Brentwood.▪ Reynolds Road between Central Avenue and Coomoora Road.
6.5 End-of-Trip Facilities		
6.5.1	Employment centres have not always had to provide end-of-trip facilities.	The practice of assessing developments to determine the kind of end-of trip facilities required has started to take place in the City of Melville. This should be formalised as part of the Town Planning Scheme to ensure developers consistently comply with the provision of such facilities.
6.6 Other Infrastructure		
6.6.1	Specialist cycling infrastructure (such as bike hire, tourist route demarcation, bicycle repair shops) is not currently available in the City of Melville	Consider installing specialist infrastructure to promote cycling along the riverside foreshore where most people currently walk and cycle. Riverside bike hire and repair shops can be a good way of promoting cycling.
6.8 Utilisation		
6.7.1	Currently there is no real utilisation data available for cycle facilities in Melville.	The City of Melville should consider installing permanent counting stations along the expected busier cycle routes to start developing a utilisation database that can inform future investment in infrastructure.

7. Strategic Projects & Prioritisation

7.1. Prioritisation

7.1.1. Primary routes

Prioritisation of Bicycle Infrastructure Proposals, published by the Australian Bicycle Council and the federal Department of Infrastructure, Transport, Regional Development and Local Government, provides guidance on the prioritisation of bicycle facilities. It also suggests a list of criteria for assessing proposed bicycle facilities. These are listed in the form of five objectives and 14 sub-objectives, which are outlined below:

- Strategic
 - completion of state networks
- Connectivity
 - schools
 - tertiary institutions
 - employment zones
 - recreational
 - tourism
 - public transport
- Economic
 - mode shift
 - impact on motor vehicles
 - economic impacts
- Safety
 - cycling safety
 - pedestrian safety issues
- People and communities
 - level of service
 - townscape/urban planning

Prioritisation of Bicycle Infrastructure Proposals further suggests that the above criteria be used as part of a multi-criteria analysis (MCA). Therefore, in order to prioritise the proposals for primary bicycle routes, the broad qualitative impact of each proposal was identified under each of the above five objectives. A score was then assessed for these objectives for each proposal, with the following weightings:

- Strategic: 40%
- Connectivity: 30%
- Economic: 5%
- Safety: 20%
- People and communities: 5%

The sum of these individual scores yields a total score for each proposal out of 10. The priority level of each proposal was then assigned using the total score as follows:

- 7.5 -10: high priority
- 5 – 7.49: medium priority
- ≤ 5: low priority

Refer to **Table 7-2** for a summary list of the prioritised proposed projects, and refer to **Figure 7-1** for a map illustrating the locations of the project, including their priority ranking.

7.2. Proposed Strategic Objectives

The summary list of proposed projects is included as **Table 7-2** and is illustrated in **Figure 7-1**. The detailed project sheets, including project justification, prioritisation ratings and indicative costs are provided in **Appendix B**. The indicative unit costs used to cost the proposed projects are listed in **Table 7-1** below.

Table 7-1: Indicative Unit Costs

Work Item	Rate (ex GST)	Unit
Line Marking	\$2.30	per metre
Bicycle Symbol	\$1.15	per metre of road
Signage	\$175.00	per sign
New concrete bicycle path (2m width)	\$100.00	per linear metre
New concrete bicycle path (2.5m width)	\$115.00	per linear metre
New concrete bicycle path (3m width)	\$150.00	per linear metre
New concrete bicycle path (3.5m width)	\$175.00	per linear metre
Replace path	\$65.00	per m2
Widen road by 1.2m for bike lane one side	\$108.00	per metre of road
Widen road by 2m for bike lane one side	\$180.00	per metre of road
Suburban Road with in situ concrete kerbs (2m width)	\$90.00	per metre
Red Asphalt 3.0m wide, with flush kerb	\$250.00 -\$300.00	per metre

Table 7-2: Prioritised Project List

No	Project	Issue & Recommendation Item Reference	Location	Description	Strategic	Connectivity	Economic	Safety	People & Communities	Weighted Total	Approx. Cost*
1	Upgrade freeway PSP missing link**	4.2.9 / 6.3.1 / 6.4.2	Brentwood	Construct the section of freeway PSP which is currently missing.	10.0	6.0	3.3	6.5	9.0	7.72	\$100,000
2	Add a PSP to the eastern side of the Kwinana Freeway**	6.3.1 / 6.4.2	Brentwood, Bateman, Bull Creek, Leeming	Construct a new 3.5m principle shared path along the eastern side of the Kwinana Freeway, between Mount Henry Bridge and Farrington Road.	10.0	6.0	3.3	6.0	9.0	7.62	\$2,000,000
3	Upgrade the shared path along Melville Beach Road	4.2.1 / 6.2.1 / 6.3.2.1	Recreational shared path along Melville Beach Road, from the South of Perth Yacht Club access road to Conon Road	Continue upgrading the shared path to the new 3.5m standard.	9.0	8.0	2.7	6.0	4.0	7.53	\$700,000
4	Address the diversion of traffic from Canning Highway onto Macrae Road	4.2.10 / 4.3.4 / 6.3.5.5	Applecross Area	The City of Melville should review the Local Area Traffic Management Plan to address the diverting traffic. Alleviating measures could include: removal or modification of roundabouts, installation of sealed shoulders/bicycle lanes, diagonal , half or full road closures at selective intersections.	8.0	5.8	4.0	9.0	9.0	7.39	\$100,000 - \$500,000
5	Upgrade South Street to include bicycle infrastructure**	4.1.1 / 4.1.2 / 4.1.4 / 6.2.1 / 6.3.1 / 6.4.2	South Street	Upgrade South Street to a wider cross section that allows 2m segregated cycle lanes and 3.5m shared paths. Also construct the missing link in the shared path on the southern side of South Street between Prescott Drive and Discovery Way.	9.0	6.4	1.7	8.5	0.0	7.30	\$2,400,000
6	Install bicycle lanes as part of the future Canning Highway upgrade**	4.2.5 / 4.2.9 / 4.2.10 / 4.3.6 / 6.3.1 / 6.4.2	Canning Highway	Install bicycle lanes along Canning Highway as it is upgraded to include bus lanes.	10.0	6.4	1.3	5.5	0.0	7.09	\$2,000,000
7	Upgrade the shared path along Burke Drive	4.2.1 / 6.2.1 / 6.3.2.2	Recreational Path along Burke Drive, from The Close along Alfred Cove Nature Reserve to the East Fremantle Boundary.	Upgrade those sections of shared path that does comply with the 3-3.5m red asphalt standard, to this standard. Includes re-routing of cyclists and pedestrians around Alfred Park Reserve due to occasional flooding of path and dieback. Also path could be reconstructed as a raised walkway or cyclists could be accomodated on road by providing appropriate on road facilities, possibly in conjunction with a DOT Pilot Study.	8.0	7.8	2.0	5.5	4.0	6.94	\$25,000 - \$700,000
8	Upgrade (or install where missing) the shared path/sealed shoulder along Karel Avenue.	4.2.5 / 4.2.9 / 6.2.1 / 6.3.1	Karel Avenue, between Keith Rd and existing shared path opposite Diamond Ct.	Upgrade the shared path to the appropriate 3.5m standard, and widen the sealed shoulder to 1.5m.	9.0	4.2	3.0	3.0	3.5	5.79	\$1,100,000
9	Address the blind corner along shared path in Alfred Cove	4.2.12 / 6.3.4	Path behind First Avenue residences in Alfred Cove	Address the sight distances associated with the blind corner and pruning vegetation on the shared path. This could initially be addressed by installing mirrors at the corner, while in the longer term it can be addressed by creating a more gentle turn as part of a boardwalk construction, or by acquiring a section of the corner property and removing the wall to allow better sight distances.	6.0	0.8	2.7	10.0	8.0	5.17	\$1,000 - \$500,000
10	Stock Road bicycle lane continuation/upgrade	4.2.5 / 4.2.9 / 6.3.1 / 6.4.2	Stock Road between Coleman Crescent and Garling Road.	Improvement/continuation of bicycle lane/sealed shoulder on Stock Road to address missing links in the network.	6.0	3.4	1.7	6.0	3.0	4.85	\$100,000
11	Upgrade Leach Highway shared path**	4.2.9 / 6.2.1 / 6.3.1 / 6.4.2	Leach Highway (especially between Riseley Street and Karel Avenue)	Upgrade shared path to 3.5m standard width.	6.0	4.8	3.0	3.0	3.5	4.77	\$1,500,000
12	Murdoch Drive shared path installation	4.1.1 / 6.2.1 / 6.3.1 / 6.4.2	West side of Murdoch Drive (between Leach Highway and South Street)	Construct a new 3.5m shared path along the western side of Murdoch Drive.	6.0	5.0	3.0	3.0	2.0	4.75	\$400,000
13	Upgrade the freeway crossing on Parry Avenue***	4.2.9 / 4.2.10 / 6.3.1 / 6.4.2	Parry Avenue between Geyer Place and Morphett Crescent.	Upgrade approximately 400m of existing footpath to standard 3.0m shared path width. Extend existing bicycle lane and upgrade median crossing at Geyer Place.	8.0	1.8	2.3	2.5	7.0	4.71	\$100,000
14	Address the lack of bicycle facilities through intersections	3.2.1 / 4.1.1 / 4.2.5 / 4.2.9 / 6.3.1	Throughout the City of Melville	Develop a strategy to prioritise and sporadically treat existing intersections to include cyclist facilities. Set an annual funding commitment to install bicycle facilities at intersections until all signalised intersections and roundabouts have been treated. Prioritisation could occur according to crash data (i.e. Preston Point Road/Point Walter Road first, MaCrae Road/Ardross Road second, etc.). Refer to rubber lane maker, rumble bars, separation kerb (www.saferoads.com.au) for enforcement options.	5.0	2.0	1.3	7.0	5.5	4.34	\$2,000,000
15	Expand the Bicton PBN Route network	4.2.9 / 6.1.1 / 6.3.5.1	PBN route in Bicton	Add an additional commuter friendly PBN route through Bicton along Preston Point Road and Swan Road.	5.0	3.4	2.0	3.0	8.0	4.12	\$7,000
16	Expand the Brentwood PBN Route network	4.2.9 / 6.1.1 / 6.3.5.3 / 6.3.5.4	PBN routes along Sicklemore Road, Rogerson Street, Davenport Road and Canning Avenue	Add an additional commuter friendly PBN route through Brentwood along Coomoora Road and Moolyeen Road/ Reynolds Road respectively. This includes the installation of bicycle lanes along 950m of Coomoora Road.	5.0	3.6	2.0	2.5	8.0	4.08	\$235,000
17	Complete the bicycle lane/sealed shoulder missing link along Reynolds Road	4.2.5 / 4.2.9 / 4.2.10 / 4.3.2 / 6.3.1 / 6.4.2	Reynolds Road	Continuation of bicyle lane/sealed shoulder on Reynolds Road between Central Avenue and Coomoora Road	5.0	3.0	2.0	4.5	3.5	4.08	\$200,000
18	Add an additional commuter friendly PBN route along North Lake Road	4.2.9 / 6.1.1 / 6.3.5.2	Along North Lake Road	Add an additional commuter friendly PBN route along North Lake Road which is wll connected and direct. This will include mainly signs and markings, but also the upgrade of substandard sections of the shared path, between Leach Highway and Farrington Road, to 3.5m.	5.0	3.8	4.0	1.0	8.0	3.94	\$700,000
19	Install footpaths along all local roads within a 1km radius of a school, community facility or shopping centre.	4.2.2 / 4.2.9 / 6.3.1 / 6.4.2	Throughout the City of Melville	Set an annual funding commitment for the sporadic installation of footpaths in the vicinity of schools, community facilities and shopping centres.	0.0	6.8	4.0	7.5	3.0	3.89	\$2,000,000
20	Garling Street bicycle lane continuation/upgrade	4.2.5 / 6.3.1 / 6.4.2	Garling Street between Antill Street and Stock Road.	Liaise with City of Fremantle and extend the existing cycle lane/sealed shoulder to Stock Road to complete missing links in the network.	4.0	1.8	1.0	3.5	3.0	3.04	\$10,000
21	Address traffic calming measures that are not bicycle friendly	4.2.8 / 4.2.9 / 4.2.10 / 4.2.13 / 4.3.1	Throughout the City of Melville	Develop a strategy and commit annual funding to remove or retrofit traffic calming measures that discourages road use by cyclists. Projects could be prioritised based on crash data and typically includes retrofitting chicanes and center island narrowing to include safe areas for cyclists. For instance the measures installed along The Esplanade (last stage), Coomoora Road and Winterfold Road.	2.0	2.0	1.3	6.5	2.5	2.89	\$100,000
22	Overall pavement marking implementation and upgrade	4.1.4 / 4.2.4 / 4.3.5 / 6.3.3.1 / 6.3.3.2	Throughout the City of Melville	Implement pavement markings to appropriately indicate cycle facilities.	2.0	2.0	1.3	6.5	1.5	2.84	\$25,000
23	Overall signage implementation and upgrade	3.2.1 / 3.3.1 / 4.1.4 / 4.1.5 / 4.1.7 / 4.2.4 / 4.3.5 / 6.3.3.3 / 6.3.3.4	Throughout the City of Melville	Implement signage to better indicate cycle facilities/PBN routes.	3.0	2.6	1.3	2.5	1.5	2.62	\$30,000
24	Review TravelSmart maps	4.2.9 / 6.4.2	Throughout the City of Melville	Investigation of cycling connectivity on the Melville TravelSmart map.	0.0	1.0	0.3	2.0	2.0	0.82	\$50,000
24	Maintenance & Renewal	4.1.4 / 6.3.4 / 8.1.1 / 8.1.2 / 8.1.3 / 8.2.1 / 8.3.1	Throughout the City of Melville	Commit annual funding to the audit, maintenance and renewal of bicycle infrastructure and paths to ensure the protection and preservation of assets. Also consider an annual bicycle count program to justify future projects and prioritisation.	N/A	N/A	N/A	N/A	N/A	N/A	\$50,000 - \$100,000

* Costs are indicative and do not include possible unknowns such as land take

** Proposed MRWA Projects

***Jurisdiction of this project needs to be discussed with MRWA

Legend

- Proposed MRWA Project
- Proposed Project
- Proposed PBN Commuter Route
- Proposed Project Area
- Proposed Project Location
- Suveyed Paths
- PBN Routes
- Community Facility
- Education Facility
- Shopping Area
- Roads
- Railway
- Train Stations
- Bus Stations

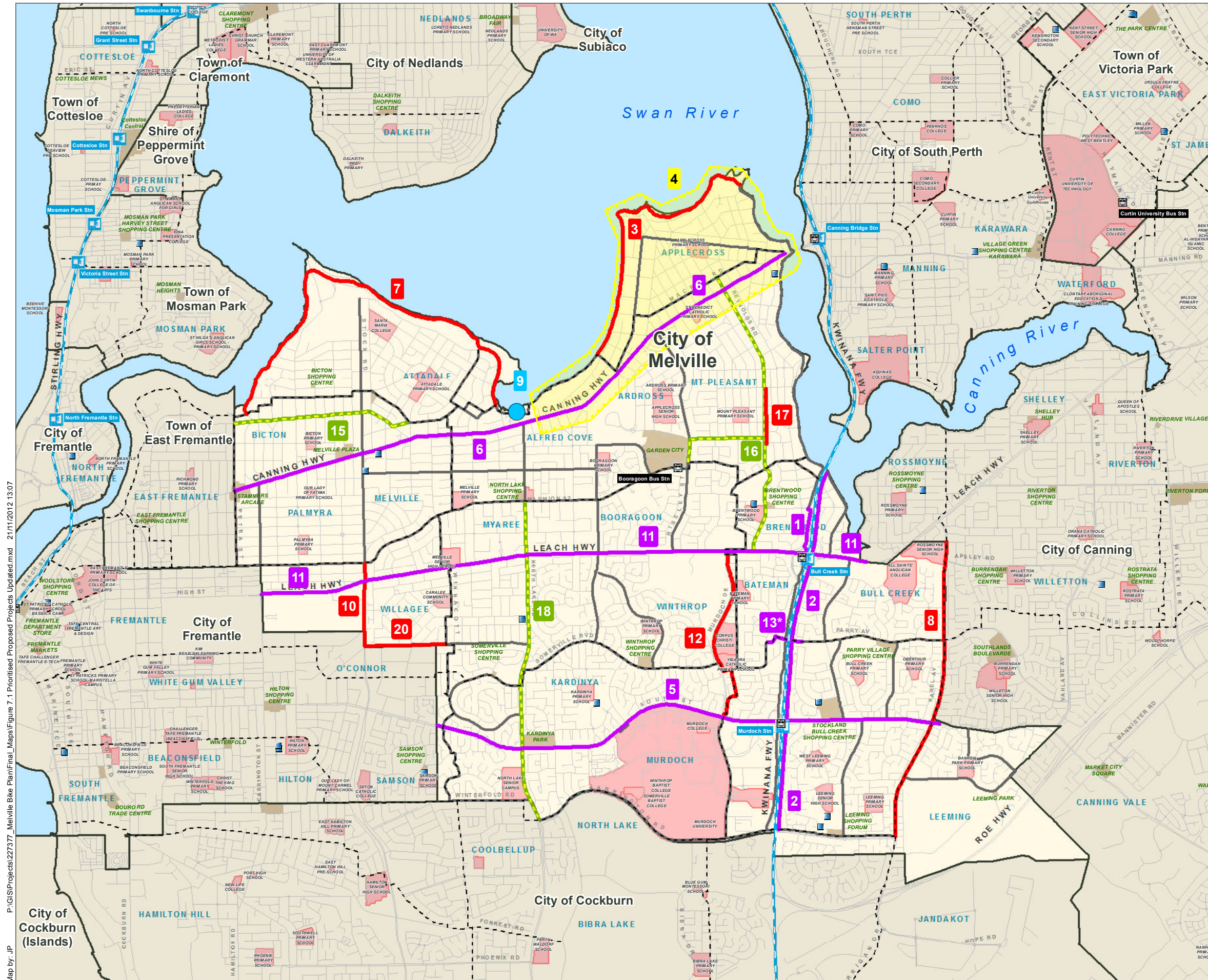
Notes:
Projects relating to the entire City of Melville are excluded from this map.

* Jurisdiction of this project needs to be discussed with MRWA

Date: 21/11/2012

Version: 3

Map by: JP P:\GIS\Projects\227377_Melville Bike Plan\Final Maps\Figure 7.1 Prioritised Proposed Projects Updated.mxd 21/11/2012 13:07



A3 scale: 1:50,000

0 1Kilometres

Job No: 227377

Coordinate system: MGA Zone 50

City of Melville Bike Plan

Figure 7.1 Prioritised Proposed Projects

8. Maintenance & Renewal

A maintenance program is essential to ensure that the most is gained from the large capital investment made in bicycle infrastructure. In addition, such a program would significantly improve cyclist safety. This is pertinent as the characteristics of bicycles mean that minor defects are likely to present a greater safety issue to cyclists when compared with motorists. This is because their narrow tyres mean that cyclists may more easily lose control as result of issues such as pavement cracking, gaps between road joints and debris build-up. Proper maintenance is also critical as liability issues may arise if a cyclist is injured due to inadequate maintenance.

8.1. Maintenance Program

8.1.1. Risk Assessment

A risk assessment program is essential to identify any defects or hazards that may pose a risk to cyclists and addressing them proactively. Such a risk assessment program should include the following elements:

Monitoring

Bicycle facilities should be monitored in order to obtain information of the volumes of cyclists using them. This allows maintenance activities to be prioritised by level of use. This data may be collected using a variety of means, such as permanent detector loop counters, temporary tube counters or manual counts.

Bicycle facilities auditing

A bicycle facilities audit program is important to keep abreast of any maintenance issues that may arise on the bicycle network. This program should ensure that each bicycle facility is physically inspected by a Council officer at least once a year. This could be undertaken in conjunction with road and/or footpath inspection programs.

User defect reporting

In addition to the regular inspections undertaken as described above, day-to-day users of bicycle facilities are also a valuable source of information on the condition of bicycle facilities. At the moment two such defect report systems are in place:

- Melville's Maintenance Hotline:
 - 1300 MELVIL (1300 635 845)
- Perth Metro Cycle Hazard Website:
 - www.transport.wa.gov.au/activetransport/24955.asp

Assessment and prioritisation

Any defects or areas for improvement need to be systematically addressed and possible mitigating measures prioritised. This may be done through the use of a basic risk management approach, scoring each risk by both potential consequence and likely occurrence. The most serious risks would then warrant more immediate action, but prioritisation would also need to take into account funding and resource availability.

8.1.2. Maintenance Activities

Sweeping

It is important that a build-up of debris on bicycle facilities is prevented from occurring. Bicycle lanes are particularly prone to the accumulation of debris as they fall outside the swept path of motorised vehicles. This means that the sweeping action of passing motor vehicles tends to push debris from general traffic lanes into bicycle lanes, where it collects. Shared paths can also suffer from the same problem as motor vehicles do not travel along them on a regular basis.

Regular sweeping is therefore essential to ensure that bicycle facilities remain free from a build-up of debris. On-road bicycle lanes may be swept as part of regular road sweeping operations, but it is recommended that roads with bicycle lanes be swept more often relative to other roads. Off-road shared paths also require regular sweeping.

Other activities

Other maintenance activities that should be undertaken regularly include:

- Pavement crack filling
- Trimming of overhanging vegetation to maintain sight distances and clearances
- Grass cutting to prevent encroachment onto paths, including weed management
- Repainting of pavement markings
- Sign cleaning
- Addressing gaps which may develop between service covers or drainage grates and the path or bicycle lane surface
- Addressing any potholes that may develop
- Cleaning (and re-painting as required) of benches, rubbish bins and drinking fountains
- Drain cleaning

8.2. Maintenance Schedule

In order to achieve all the regularly required maintenance to an acceptable level the indicative maintenance schedule shown in **Table 8-1** is recommended as a starting point.

8.3. Renewal Program

In the long-term, renewal works will also be required. The estimated average life-span of various assets is listed in **Table 8-1** and the City of Melville is recommended to consider these when setting forward capital works budgets.

8.4. Indicative Costs

8.4.1. Maintenance

Maintenance of on-road bicycle facilities should be undertaken in conjunction with regular road maintenance activities. As this would be taking place regardless of the existence of bicycle lanes on a road, the additional maintenance cost due to the presence of bicycle lanes is likely to be minimal.

Maintenance of off-road shared paths that run alongside a road could be integrated with regular footpath maintenance activities. Again, as footpaths need to be maintained in any case, the additional cost to maintain a shared path as opposed to a regular footpath is not likely to be large.

For off-road shared paths that do not run alongside a road, it is estimated that maintenance of these paths would cost in the order of \$5/linear metre per annum.

8.4.2. Renewal

The cost of repainting pavement markings will be similar to the cost of initially marking them. Also, the cost of replacing signage and other installations is likely to be in the same range as for their initial construction.

Picture 8-1: Proper maintenance of stormwater inlets is a crucial part of bicycle friendly streets



Table 8-1: Maintenance & Renewal - Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
8.1 Maintenance Program		
8.1.1	The utilisation of bicycle and shared facilities in the City of Melville is currently not formally monitored.	In order to effectively prioritise facilities for projects the utilisation of facilities need to be monitored. The City of Melville should consider installing permanent bicycle and pedestrian counters at Canning Bridge, The Esplanade and MaCrae Road. Additionally an annual counting programme should be undertaken along all higher order cycle routes (including PBN routes) to determine year on year utilisation trends.
8.1.2	Regular bicycle facility audits are required to identify intermediate concerns and hazards that arise.	The City of Melville should continue to maintain a bicycle and pedestrian facility asset list and audit all facilities on the list annually to ensure the network is well maintained and do not present unacceptable risks to users.
8.1.3	Facility defect and hazard reporting systems are in place, but are not well known by general facility users.	The City of Melville and MRWA should consider installing information signs making the public aware of available reporting systems. Information signs should be placed along heavily trafficked routes such as: <ul style="list-style-type: none"> ▪ Canning Bridge (CoM) ▪ Mt Henry Bridge (MRWA) ▪ Kwinana Freeway PSP (MRWA) ▪ Melville Beach Road Shared Path (CoM)
8.2 Maintenance Schedule		
8.2.1	A maintenance schedule is required to ensure that bicycle facilities remain clean and in a state of good repair to limit hazards and allow comfortable use.	The City of Melville should undertake the following maintenance activities regularly where these specific issues have been identified (indicative frequency provided): <ul style="list-style-type: none"> ▪ Bicycle Lane Sweeping: monthly ▪ Path Sweeping: monthly ▪ Pavement Crack Filling: as needed ▪ Vegetation Pruning: every three to four months ▪ Grass Cutting: monthly (more frequently in summer) ▪ Sign Cleaning: annually ▪ Fill Gap at service covers: as needed ▪ Filling Potholes: as needed ▪ Cleaning Benches, Bins and Drinking Fountains: every three months ▪ Storm Drain Cleaning: as needed ▪ Ad Hoc Maintenance: as needed
8.3 Renewal Program		
8.3.1	A renewal program dictates when infrastructural maintenance and replacement should occur ensuring that the bicycle facilities remain in use and to appropriate standards.	The City of Melville should undertake the following renewal activities regularly (indicative frequency provided): <ul style="list-style-type: none"> ▪ Repainting of Pavement Markings: every three years ▪ Replacement of Signage and Other Installations: every five years ▪ Resealing of Shared Paths and Bicycle Lanes: every fifteen years

9. Implementation

9.1. Funding

The majority of the proposed bicycle network is situated on land or along roads for which the City of Melville is responsible. In general it means that Melville would need to fund any projects recommended for those specific streets. Other major roads such as the Kwinana Freeway, Canning Highway, Leach Highway and South Street are roads under the jurisdiction of MRWA, who can be approached to undertake some of the work along those roads as and when they upgrade these facilities. It could also be beneficial to share costs with adjacent councils where projects are located on boundary roads.

The 'Cycle Instead' sponsorship program provides community-based event organisers with support to effectively plan, implement and evaluate programs that promote cycling. This funding mechanism has a limit of \$1,000 per application and could be applied to encouragement and promotion projects.

The local government grants are intended for local governments to develop cycling infrastructure through the current Perth Bicycle Network and future Western Australian Bicycle Network. It is recommended that the City of Melville apply for local government grants to assist with the implementation of key projects.

The City of Melville should consider the use of public-private partnerships to deliver projects. Relationships with shopping centres and businesses can prove invaluable in the delivery of a shared goal.

Additionally it should be expected that new developments share the costs of cycling infrastructure as is the case with other bulk services. As such developments can help provide facilities where required in their area (as a portion of contributions), or a percentage of their bulk contributions should be applied to cycling infrastructure.

9.2. Implementation Program

The implementation of the Bike Plan can best occur over a few years and it is recommended that the City of Melville firstly submit all the applicable projects to relevant grants and sponsorship programs for funding.

It would then be preferable to approach other relevant agencies such as MRWA to determine how best to implement the projects in their jurisdiction. Boundary road projects should be presented to adjacent local councils in an attempt to partner with the respective councils to

implement these specific projects. Also prospective business partnerships should be identified early in the process, to get business buy in and potentially set up public private partnerships.

Finally, once all of the proactive steps have been taken Melville should have a good idea of which projects could be funded, completely or partly, by grants and sponsorships, which projects could be funded by other agencies such as MRWA, which projects could be funded as part of a partnership with other councils or businesses, and which project will have to be funded completely by the City of Melville.

All of this information along with the priority of projects should then be taken into account in an exercise to allocate projects and stages of projects to the Forward Capital Works Program of current and future years.

10. Conclusion & Recommendations

10.1. Concluding Remarks

Compared to many other areas in Perth, the City of Melville already possesses a high standard of general cycling infrastructure. The recreational routes along the Swan and Canning rivers are mostly exemplar facilities and very popular with cyclists.

On-road cycling provisions along many of the collector distributor roads such as Riseley Street, Reynolds Road, Parry Avenue, Carrington Street and many others are the kind of facilities that cyclists like to use and feel safe using. A key objective should be to continue sealed shoulder/ cycle lane treatments through intersections. By ensuring facilities are continuous the awareness levels of cyclists and motorists can be increased. Such facilities guide cyclists to the safest areas along roads and at intersections and alerts drivers to the areas where cyclists should be expected.

PBN routes are delineated throughout Melville and are in general fairly well distributed. These routes are set out by the Department of Transport but have a tendency to be aligned with local streets, which in terms of traffic volumes is a good thing, but is problematic as they are not as direct as larger order roads and they do not enjoy priority when intersecting other roads. This means that cyclists who choose to use PBN and cycle friendly routes have to travel greater distances and experience increased delays at intersection than their car commuter counter parts. This creates two problems, first it discourages potential cyclists from becoming commuter cyclists, and it forces more experienced cyclists onto major arterials if they want to increase the efficiency of their journey. It is further also important to consistently implement the appropriate signage.

The City of Melville should wherever possible embrace the opportunity when maintenance or resurfacing work is conducted to install low cost cycle facilities such as sealed shoulders and appropriate line markings. Reducing lane widths slightly from 3.5m typically has little impact on traffic and the associated level of service, but using that space for cycle lanes significantly benefits cyclists. The inclusion of such facilities within bigger works projects does not significantly increase projects budgets, as would be the case if bicycle infrastructure works are commissioned separately.

The many roundabout controlled intersections provide a barrier to cycling as the majority of these intersections do not make sufficient provision for cyclists who wish to remain on road. According to Austroads guidelines roundabouts should not be used along PBN routes. The City of Melville should consider retrofitting the roundabouts to specifically address cycle crash types.

School children are in some respects captive bicycle users, as it is likely their only independent form of transport. It is thus essential that this experience be a positive part of every child's life, if the aim is to develop and maintain a culture of bicycle use. It is important to include footpaths along all residential streets especially those within proximity to schools, community facilities and shopping centres. This is essential infrastructure that allows child cyclists to develop the necessary confidence and gain experience to become on-road cyclists in future. It is also essential from a safety perspective.

The community, at the public participation workshop, identified many of these concerns, but also many of the positive aspects of cycling in Melville. The opportunities are there for the City of Melville to continue its legacy of being a highly sought after area, known for its respect of cyclists.

10.2. Recommendations

Leading from the concluding remarks it is recommended that the City of Melville create a safer and friendlier cycle environment by:

- Adopting a mode share target of 3% bicycle trips for work trips originating in the City
- Continue and develop further cycling promotion and encouragement initiatives
- Addressing the discontinuity of on-road bicycle provisions, by including bicycle facilities at intersections, especially roundabouts
- Realigning PBN Routes along more direct routes which enjoy a higher level of priority when intersecting other roads
- Including appropriate bicycle provisions along PBN Routes, such as sealed shoulders
- Embracing future road projects as an opportunity to include bicycle facilities
- Specifically treating problem roundabouts to better accommodate cyclists
- Completing the gaps in the footpath network, to improve the cycling environment for children

Additional to these main strategic recommendations, each chapter concludes in a summary of key identified issues and recommendations to address these issues. The main project list in chapter 7 specifically lists the key strategic projects that aim at addressing multiple issues and recurring issues.

This plan forms a good base for achieving the recommendations and it is further recommended that this plan be reviewed on at least a five yearly basis in order to ensure it remains relevant to the current needs of the community.

11. References

Australian Bureau of Statistics (2006) Census of Population and Housing

Austrorads (2011) Cycling Aspects of Austrorads Guides

Austrorads (2009) Guide to Road Design Part 3: Geometric Design

Austrorads (2009) Guide to Road Design Part 4: Intersection and Crossings – General

Austrorads (2009) Guide to Road Design Part 4B: Roundabouts

Austrorads (2009) Guide to Road Design Part 6B: Pedestrian and Cyclist Paths

Austrorads (2006) Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths.

Bicycle Network (2012) Bike Futures Conference Material

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

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

Bikewest (2008) Local Government Bicycle Plans: Guidelines for Preparing Bicycle Plans

City of Melville (2007) A Community Plan for the City of Melville (2007 – 2017)

City of Melville (1998) Bike Plan

City of Melville (2011) Community Planning Scheme No.5

City of Melville (2006) City Centre Plan

City of Melville (2008) Local Planning Strategy (2008 - 2023)

City of Melville (2011) Path Policy

City of Melville (2011) School Parking Policy

City of Melville (2010) Streetscape Policy

Department of Transport (2011) Draft Public Transport for Perth in 2031.

Department of Transport (2012) Draft Western Australian Bicycle Network Plan 2012 – 2021

Department of Transport (2011) Planning and designing for pedestrians: guidelines

Department of Transport (2009) TravelSmart Household Final Evaluation Report Murdoch Station Catchment (City of Melville 2007)

Department of Transport, Main Roads WA, Ministry for Planning, Fremantle Port Authority, Westrail and Metrobus (1995) Perth Metropolitan Transport Strategy 1995 - 2029

Main Roads WA (2000) Cycling Policy and Guidelines

Rawlinsons (2010) Rawlinsons Construction Cost Guide

Standards Australia (1993) AS 2890.3 Parking facilities Part3: Bicycle parking facilities

Standards Australia (2000) AS 1742.9 Manual of uniform traffic control devices Part 9: Bicycle Facilities

Western Australian Planning Commission (2009) Liveable Neighbourhoods

Western Australian Planning Commission (2005) Network City

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



APPENDIX A:

TravelSmart Maps



Using this TravelSmart Guide

How we travel has a huge impact on our health, our finances, the way we feel, the environment and how we integrate with our neighbourhood.

Feedback has shown that thousands of City of Melville residents use this map to find and re-discover parks, shops and recreation centres within a healthy walk or cycle of their home.

Going somewhere? What are my options....Can I:

Walk

- To the shops, café or library. Find your daily 30 minutes of physical activity, relieve stress, connect with your community, teach your children life skills like crossing roads safely and making healthy choices.
- Marked on the map are 1km circles. What parks, shops and playgrounds are within an enjoyable 12 minute stroll of your home?

Bike

Travelling by bike is a fun and healthy way to travel and the best way to feel like a ten year old again! Pedal away work stress and sleep better.

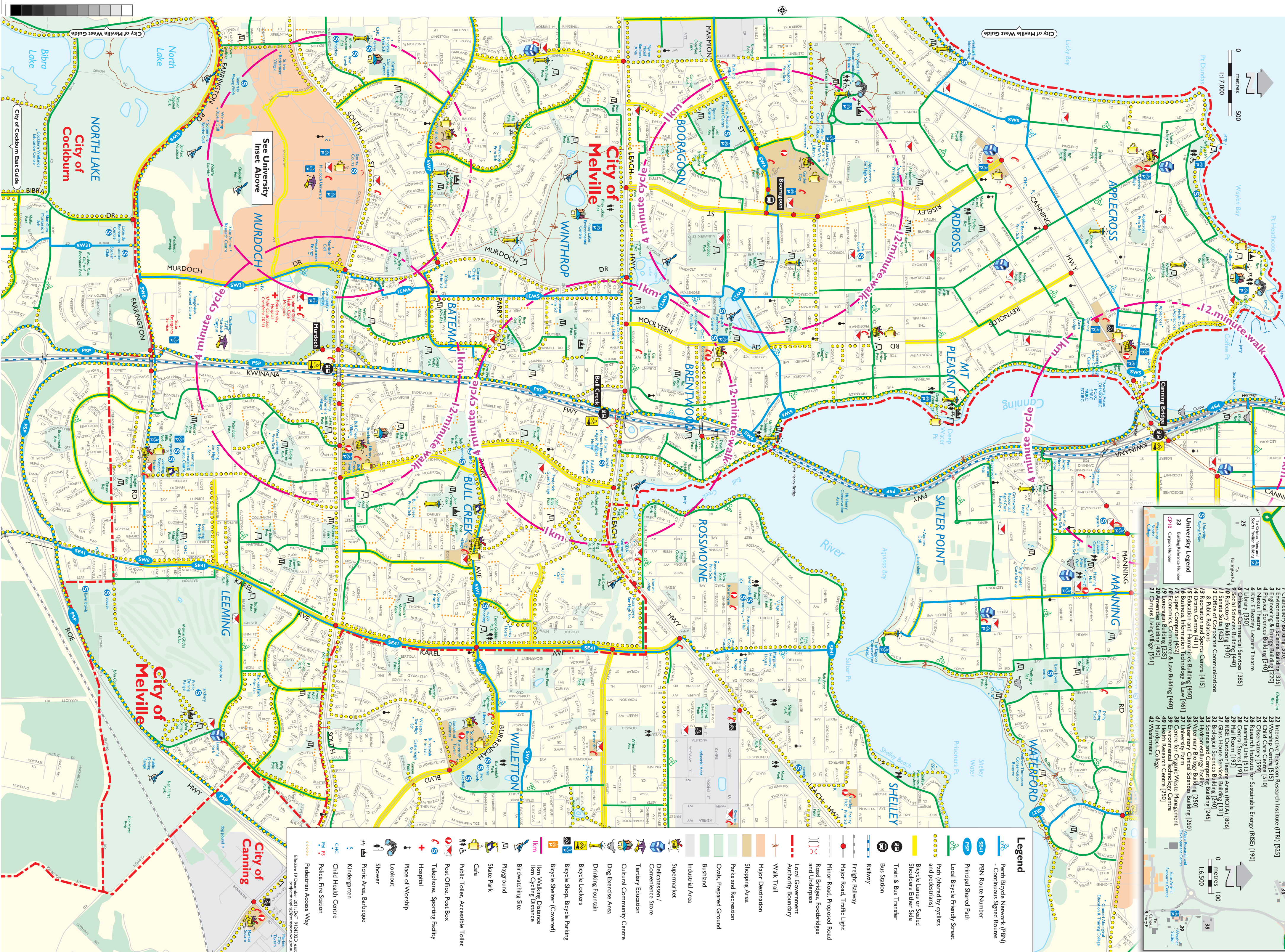
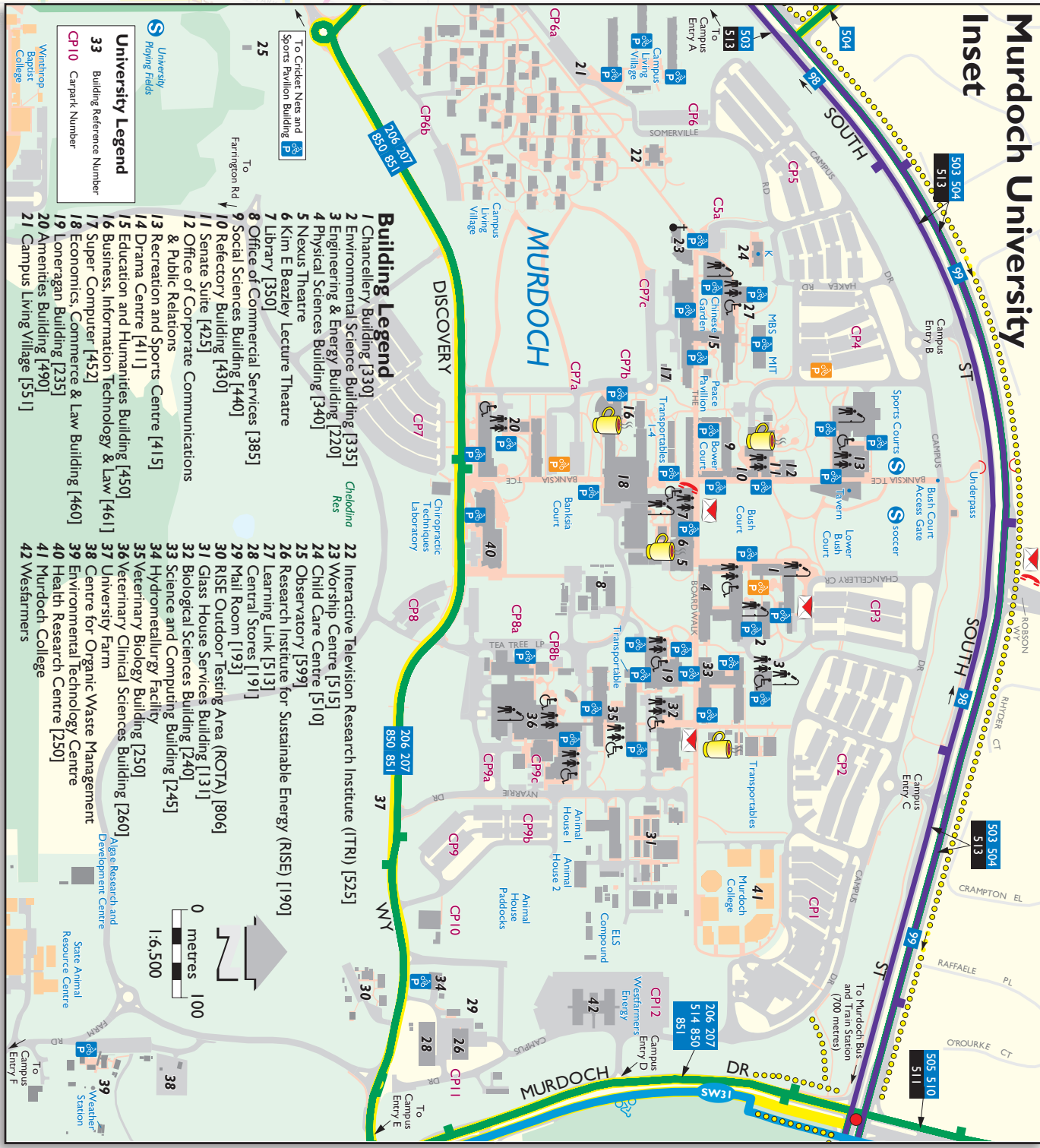
- Be Seen - wear bright colours and buy good LED lights.
- Correctly inflate your tyres - and to avoid nasty surprises, use thorn resistance inner tubes.
- Choose your route - use this map to find excellent cycling streets, often parallel to your normal driving routes.
- Shared paths along the river foreshore and train lines offer excellent cycling routes.
- You can travel with your bike on trains except on peak hour trains heading toward Perth between 7.00am - 9.00am and away from Perth between 4.30pm - 6.30pm weekdays. There is no additional charge for bikes on trains.

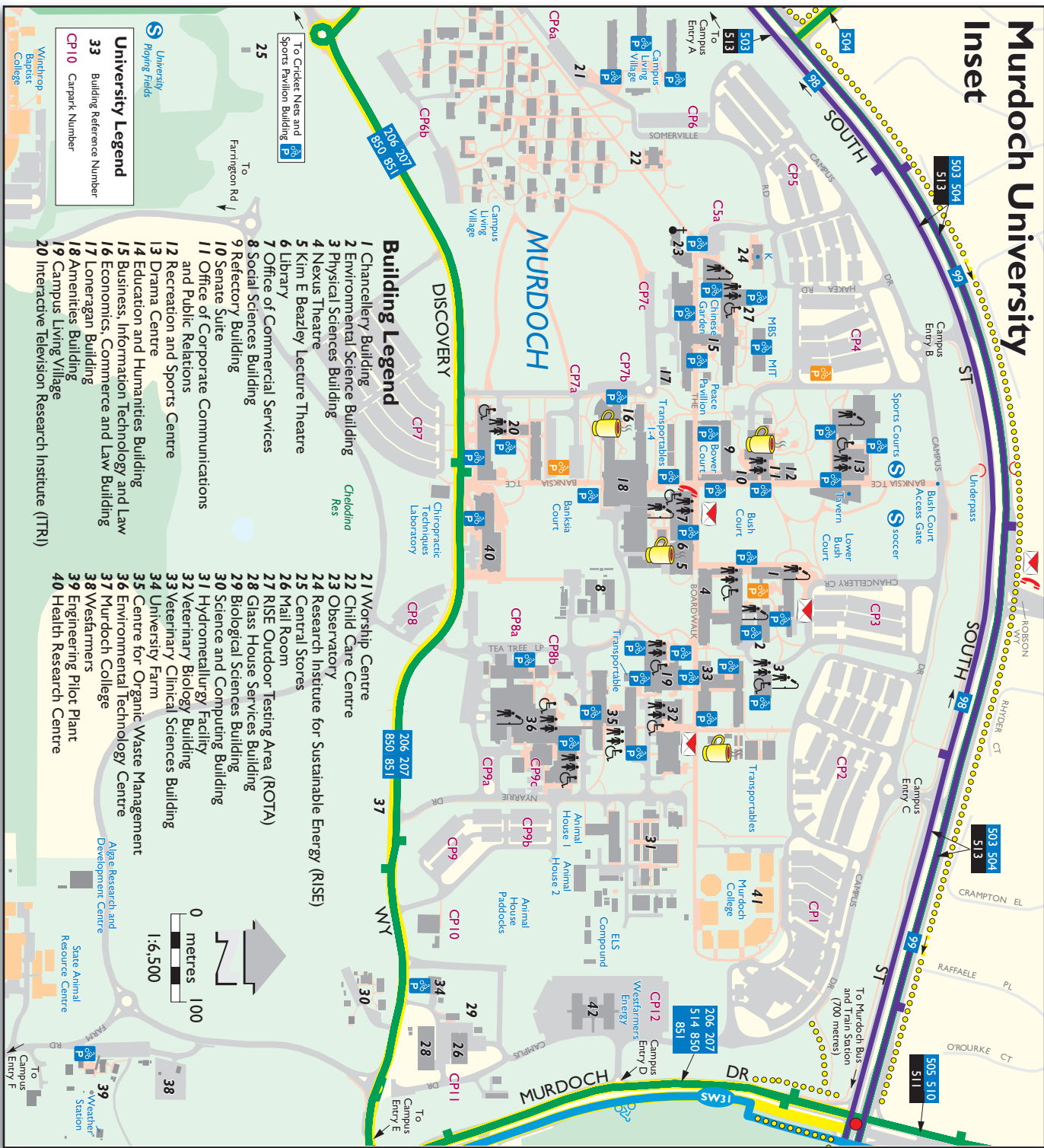
Public Transport

Is traffic congestion, paid parking and the desire to stay for a few drinks while socializing impacting on your lifestyle? Most people can benefit by replacing at least one car journey each week with public transport. Here are some tips:

- Plan your journey by visiting www.transperth.wa.gov.au or calling 13 62 13.
- Photograph your timetable with your camera phone so the information is always on-hand.
- Get a SmartRider from registered newsagents to save up to 25% off cash fares. Call 13 62 13 for your nearest seller.
- Tickets are valid for 2-3 hours to allow transfers or return trips.
- FamilyRider tickets are a cheap option for weekend and school holiday travel for families - up to seven people (two of which can be standard fare passengers) can travel on the one ticket.
- Car parking at some train stations is limited so walk, cycle or catch a bus to the station where possible.

City of Melville (East) & Murdoch University Walk & Cycle Information





Using this TravelSmart Guide

How we travel has a huge impact on our health, our finances, the way we feel, the environment and how we integrate with our neighbourhood.

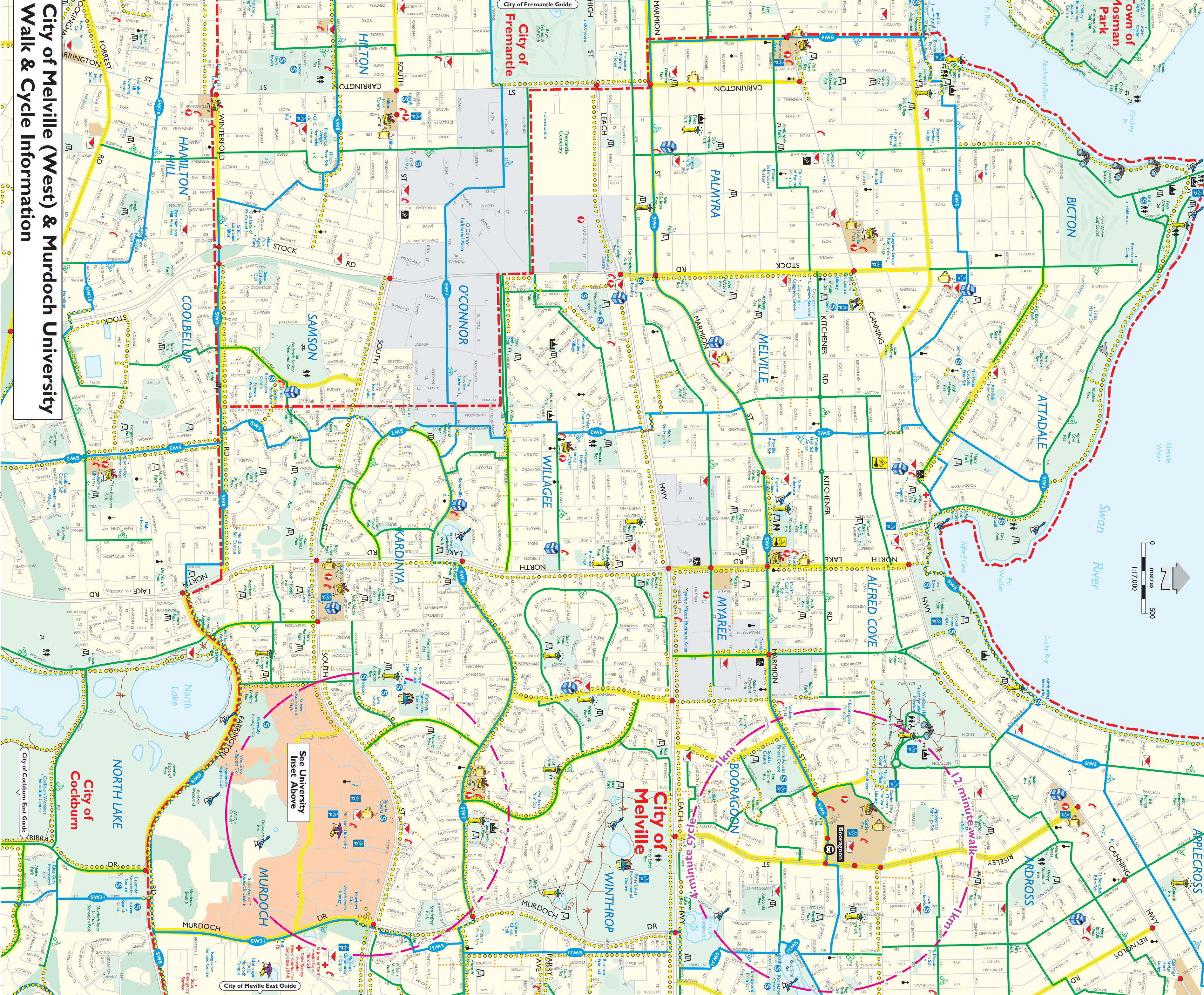
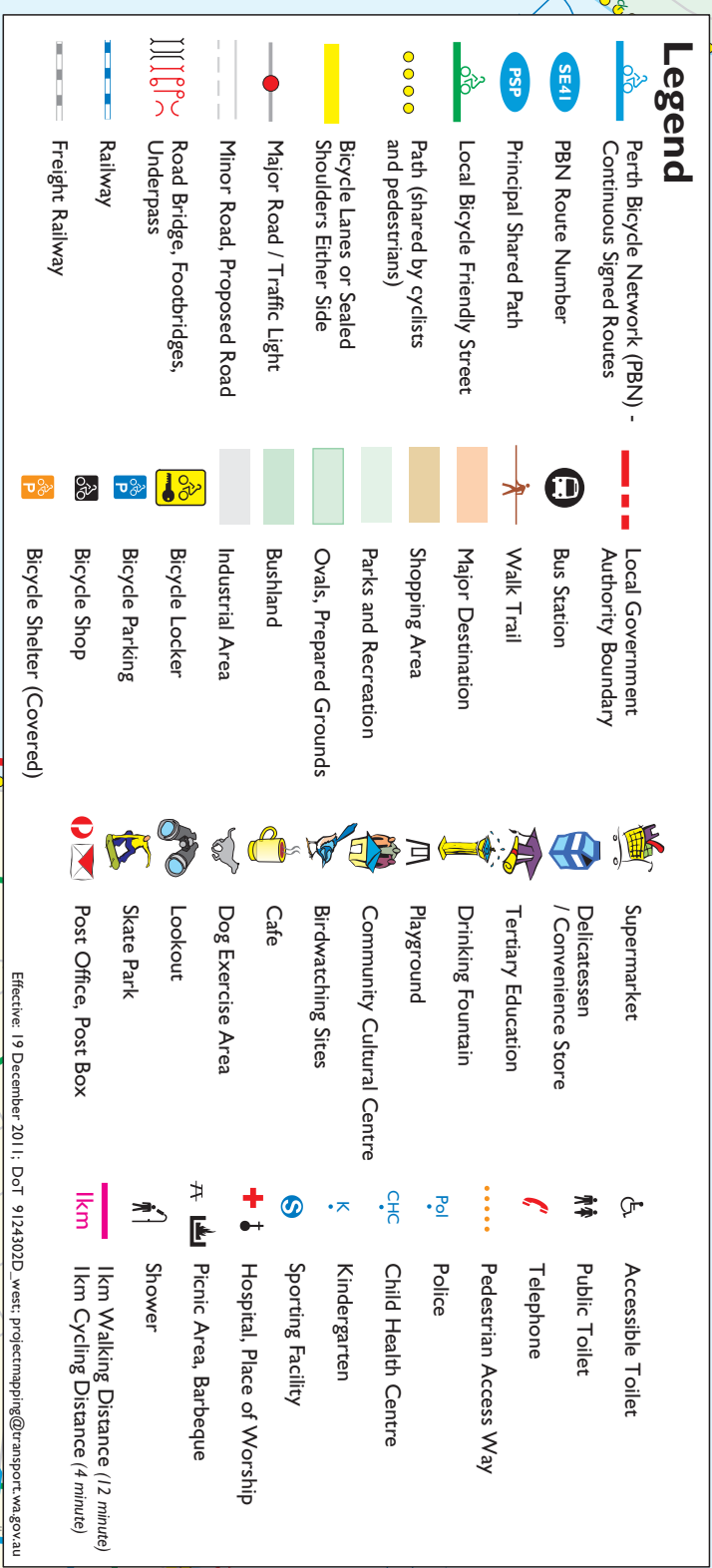
Feedback has shown that thousands of City of Melville residents use this map to find and re-discover parks, shops and recreation centres within a healthy walk or cycle of their home.

Going somewhere? What are my options....Can I:

- Walk**
- To the shops, café or library. Find your daily 30 minutes of physical activity, relieve stress, connect with your community, teach your children life skills like crossing roads safely and making healthy choices.
 - Marked on the map are 1km circles. What parks, shops and playgrounds are within an enjoyable 12 minute stroll of your home?

- Bike**
- Travelling by bike is a fun and healthy way to travel and the best way to feel like a ten year old again! Pedal away work stress and sleep better.
- Be Seen - wear bright colours and buy good LED lights.
 - Correctly inflate your tyres - and to avoid nasty surprises, use thorn resistance inner tubes.
 - Choose your route - use this map to find excellent cycling streets, often parallel to your normal driving routes.
 - Shared paths along the river foreshore and train lines offer excellent cycling routes.
 - You can travel with your bike on trains except on peak hour trains heading toward Perth between 7.00am - 9.00am and away from Perth between 4.30pm - 6.30pm weekdays. There is no additional charge for bikes on trains.

- Public Transport**
- Is traffic congestion, paid parking and the desire to stay for a few drinks while socializing impacting on your lifestyle? Most people can benefit by replacing at least one car journey each week with public transport. Here are some tips:
- Plan your journey by visiting www.transperth.wa.gov.au or calling 13 62 13.
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 - Get a SmartRider from registered newsagents to save up to 25% off cash fares. Call 13 62 13 for your nearest seller.
 - Tickets are valid for 2-3 hours to allow transfers or return trips.
 - FamilyRider tickets are a cheap option for weekend and school holiday travel for families - up to seven people (two of which can be standard fare passengers) can travel on the one ticket.
 - Car parking at some train stations is limited so walk, cycle or catch a bus to the station where possible.





APPENDIX B:

Detailed Project Sheets

1 Upgrade freeway PSP missing link**

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The missing link of the PSP was raised as a concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will complete a missing link section of the PSP that runs along the freeway.	10	10.0	7.72	
Connectivity	Schools	This project will have limited benefit in terms of connecting schools.	2	6.0		
	Employment Zones	This project should significantly increase connectivity for commuters.	9			
	Recreational	This project will have some benefit in terms of connecting recreational facilities.	5			
	Tourism	This project should significantly increase connectivity to tourism facilities.	9			
	Public Transport	This project will have some benefit in terms of connecting to public transport.	5			
Economic	Mode Shift	The PSP network carries the largest number of commuter cyclists, as such increasing it attractiveness will have an impact on mode choice.	7	3.3		
	Impact on motor vehicles	This path is seperated from traffic lanes and would not impact motor vehicles.	0			
	Economic Impacts	Economic benefits would be limited to decreases in crashes and associated decreases in loss of productivity.	3			
Safety	Cycling Safety	The missing section requires cyclist to go on-road along a narrow local street, around a blind corner and across a road using an unmarked crossing that is not prioritised. Completing this PSP section will present a much safer environment.	8	6.5		
	Pedestrian safety issues	This project will provide some of this benefit to pedestrians, while they will still be at risk of conflict with cyclists.	5			
People and Communities	Level of Service	The discontinuity in the PSP causes significant delays for cyclists, this project will see great benefits in terms of level of service.	10	9.0		
	Townscape/Urban Planning	Completing missing links in the strategic network is in line with planning principles.	8			
Financial	Possible funding source	Main Roads Western Australia				
			Amount			
	Capital Cost	Install approximately 500m of shared path to standard 3.0m width with approximately 200m of line marking plus signage (3 signs).	\$100,000.00			

2 Add a PSP to the eastern side of the Kwinana Freeway**

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The fact that the PSP currently aligns on one side of the Freeway only was raised as a concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will complete a missing link section of the PSP that runs along the freeway.	10	10.0	7.62	
Connectivity	Schools	This project will have limited benefit in terms of connecting schools.	2	6.0		
	Employment Zones	This project should significantly increase connectivity for commuters.	9			
	Recreational	This project will have some benefit in terms of connecting recreational facilities.	5			
	Tourism	This project should significantly increase connectivity to tourism facilities.	9			
	Public Transport	This project will have some benefit in terms of connecting to public transport.	5			
Economic	Mode Shift	The PSP network carries the largest number of commuter cyclists, as such increasing it attractiveness will have an impact on mode choice.	7	3.3		
	Impact on motor vehicles	This path is seperated from traffic lanes and would not impact motor vehicles.	0			
	Economic Impacts	Economic benefits would be limited to decreases in crashes and associated decreases in loss of productivity.	3			
Safety	Cycling Safety	The missing section requires cyclist to go on-road along a narrow local street, around a blind corner and across a road using an unmarked crossing that is not prioritised. Completing this PSP section will present a much safer environment.	7	6.0		
	Pedestrian safety issues	This project will provide some of this benefit to pedestrians, while they will still be at risk of conflict with cyclists.	5			
People and Communities	Level of Service	The discontinuity in the PSP causes significant delays for cyclists, this project will see great benefits in terms of level of service.	10	9.0		
	Townscape/Urban Planning	Completing missing links in the strategic network is in line with planning principles.	8			
Financial	Possible funding source	Main Roads Western Australia				
			Amount			
	Capital Cost	Install approximately 5000m of shared path to standard 3.5m width with approximately 2000m of line marking plus signage and some grade separation.	\$2,000,000.00			

3 Upgrade the shared path along Melville Beach Road

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate width of recreational paths with large groups of cyclists or pedestrians was raised as a concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project aims to bring a strategic recreational path to standard.	9	9.0	7.53	
Connectivity	Schools	This path does not provide direct access to schools, but it has been identified as being used by many school children.	7	8.0		
	Employment Zones	This path is used as a main commuter route into the city, as an alternative to the PBN.	10			
	Recreational	The path upgrade will provide increased access to the Swan River recreational facilities.	8			
	Tourism	This route is likely one of the most heavily trafficked tourist routes in Perth.	7			
	Public Transport	The path provides access to the Canning Bridge train station.	8			
Economic	Mode Shift	This path already accommodates heavy cycle traffic. Mode shift will be limited, but some rerouting may take place.	4	2.7		
	Impact on motor vehicles	As this path will be a seperated facility the impact on motor vehicles will be limited.	0			
	Economic Impacts	This path will not provide direct access to any shopping centers, but may have limited positive effects on surrounding centres.	4			
Safety	Cycling Safety	Increased path width will allow safer operation given the popularity of the route.	7	6.0		
	Pedestrian safety issues	Increased path width will allow safer operation given the popularity of the route.	5			
People and Communities	Level of Service	Some level of service benefits may be experienced due to increased space for passing.	3	4.0		
	Townscape/Urban Planning	This path form part of the urban planning along the river.	5			
Financial	Possible funding source	City of Melville, Roads to Recovery Program/Park agencies				
			Amount			
	Capital Cost	Upgrade approximately 3500m of existing footpath to standard 3.5m width shared path and approximately 900m of line marking plus signage (2 signs).	\$700,000.00			

4 Address the diversion of traffic from Canning Highway onto Macrae Road

Objective	Sub Objective	Qualitative Impacts				
Public Consultation	Public Workshop	The 'rat running' of cars along Macrae Road during morning peak periods was raised as a significant concern for cyclist safety during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project is imperative in order to improve connectivity and crossings to the strategic bicycle network.	8	8.0	7.39	
Connectivity	Schools	Applecross and St Benedict Primary Schools are located within 800m of the route. This project will benefit these schools in terms of connectivity.	8	5.8		
	Employment Zones	This project should significantly increase the connectivity for commuters.	10			
	Recreational	This project will likely have limited benefit in terms of increasing connectivity to recreational facilities. However is in close proximity to the Swan River recreational facilities.	3			
	Tourism	This project will have limited benefit in terms of connectivity to tourism facilities.	1			
	Public Transport	This PBN route links directly to the Canning Bridge train station.	7			
Economic	Mode Shift	A traffic management plan aims to make Macrae Road a more attractive route, thus having an impact on mode choice.	9	4.0		
	Impact on motor vehicles	This project is likely to have some impact on motor vehicles.	-2			
	Economic Impacts	This project will have an impact on cycle access to local shopping centres in the area.	5			
Safety	Cycling Safety	This project will reduce traffic volumes and speeds in local streets, to increase amenity and improve safety and access for cyclists.	10	9.0		
	Pedestrian safety issues	Pedestrians will also enjoy a safer travel environment.	8			
People and Communities	Level of Service	General right of way to the opposing traffic will be rectified, thus increasing the level of service for cyclists.	8	9.0		
	Townscape/Urban Planning	Direct and more attractive connections are key principles of proper planning. Also discouraging motor vehicle movement is in line with smart roads principles.	10			
Financial	Possible funding source	Local Government Grants/City of Melville				
			Amount			
	Capital Cost	Indicative study cost.	\$100,000 - \$500,000			

5 Upgrade South Street to include bicycle infrastructure**

Objective	Sub Objective	Qualitative Impacts				
Public Consultation	Public Workshop	The inadequate width and maintenance issues of the shared path along South Street was raised as a concern during public consultation.				
	Stakeholders	A range of issues regarding inadequate cycle facilities, safe access and maintenance issues along South Street were raised as serious concerns by Murdoch University.				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project has the potential to lead to a new strategic link that will greatly enhance cycling access between the City of Melville, the Perth CBD and Fremantle.	9	9.0	7.30	
Connectivity	Schools	This project will likely have limited benefit in terms of connecting schools, but will have significant benefit to the students of Murdoch University.	7	6.4		
	Employment Zones	This project should significantly increase connectivity for commuters.	9			
	Recreational	This will have only a limited effect on the connectivity to recreational paths.	2			
	Tourism	Experienced tourist cyclists will gain significant connectivity benefits from this project.	7			
	Public Transport	This project will create direct access to the Murdoch train station.	7			
Economic	Mode Shift	The increase in directness of route for commuters, and the associated increases in mode attractiveness will likely lead to mode choice shift as well as route choice shift.	8	1.7		
	Impact on motor vehicles	This project will impact negatively on the motor vehicle capacity on South Street.	-10			
	Economic Impacts	This route will provide direct access to multiple shopping centres along South Street.	7			
Safety	Cycling Safety	The implementation of appropriate infrastructure along a road such as this will provide a great increase in safety for current users.	10	8.5		
	Pedestrian safety issues	The provision of cycling infrastructure will not affect pedestrian safety on the current footpath, apart from removing cyclist which may currently be choosing to use the specific footpath.	7			
People and Communities	Level of Service	Cyclists currently travelling along the PSP and into the Perth CBD are forced to make use of disjointed PBN routes. These routes typically has poor continuity and poor priority. The level of service increases that will be experienced by travelling along South Street will be immense.	10	0.0		
	Townscape/Urban Planning	This project goes against travel smart planning principles.	-10			
Financial	Possible funding source	Main Roads Western Australia				
			Amount			
	Capital Cost	Install 2m wide asphalt pavement on both sides of the road for bicycle lanes for the entire 7km. Upgrade 7km of path to 3.0m standard shared path with associated line marking (including bicycle symbols) and signage (2 signs).	\$2,400,000.00			

6 Install bicycle lanes as part of the future Canning Highway upgrade**

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project has the potential to lead to a new strategic link that will greatly enhance cycling access between the City of Melville, the Perth CBD and the Port of Fremantle.	10	10.0	7.09	
Connectivity	Schools	This project will likely have limited benefit in terms of connecting schools.	3	6.4		
	Employment Zones	This project should significantly increase connectivity for commuters to Perth CBD, Canning Bridge and other employment nodes along Canning Highway.	8			
	Recreational	This project should significantly increase connectivity to the Swan River recreational path.	8			
	Tourism	Experienced tourist cyclists will gain significant connectivity benefits from this project.	5			
	Public Transport	This project will create direct access to the Canning Bridge train station.	8			
Economic	Mode Shift	The increase in directness of route for commuters, and the associated increases in mode attractiveness will likely lead to mode choice shift as well as route choice shift.	7	1.3		
	Impact on motor vehicles	This project will impact negatively on the motor vehicle capacity on the Canning Highway.	-10			
	Economic Impacts	This route will provide direct access to multiple shopping centres along Canning Highway, as well as the Canning Bridge Activity Centre.	7			
Safety	Cycling Safety	The implementation of appropriate infrastructure along a road such as this will provide a great increase in safety for current users.	9	5.5		
	Pedestrian safety issues	The provision of cycling infrastructure will not affect pedestrian safety on the current footpath, apart from removing cyclist which may currently be chosing to use the specific footpath.	2			
People and Communities	Level of Service	Cyclists currently travelling across Canning Bridge and into the Perth CBD are forced to make use of the disjointed PBN route through Bicton and Applecross. This route has poor continuity and poor priority. The level of service increases that will be experienced by travelling along Canning Highway will be immense.	10	0.0		
	Townscape/Urban Planning	This project goes against general travel smart planning principles, as it will allocate space for cyclists on a major traffic corridor.	-10			
Financial	Possible funding source	Department of Planning & Main Roads Western Australia				
			Amount			
	Capital Cost	Installation of bicycle lanes along 8km of Canning Highway	\$2,000,000.00			

7 Upgrade the shared path along Burke Drive

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate width on recreational paths with large groups of cyclists or pedestrians was raised as a concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project aims to bring a strategic recreational path to standard.	8	8.0	6.94	
Connectivity	Schools	This path does not provide direct access to schools, but it has been identified as being used by many school children.	8	7.8		
	Employment Zones	This path is used as a main commuter route into the city, as an alternative to the PBN.	8			
	Recreational	The path upgrade will provide increased access to the Swan River recreational facilities.	8			
	Tourism	This route is likely one of the most heavily trafficked tourist routes in Perth.	8			
	Public Transport	The path provides access to the Canning Bridge train station.	7			
Economic	Mode Shift	This path already accomodate heavy cycle traffic. Mode shoft will be limited, but some rerouting may take place.	3	2.0		
	Impact on motor vehicles	As this path will be a seperated facility the impact on motor vehicles will be limited.	0			
	Economic Impacts	This path will not provide direct access to any shopping centers, but may have limited positive effects on surrounding centres.	3			
Safety	Cycling Safety	Increased path width will allow safer operation given the popularity of the route.	6	5.5		
	Pedestrian safety issues	Increased path width will allow safer operation given the popularity of the route.	5			
People and Communities	Level of Service	Some level of service benefits may be experienced due to increased space for passing.	3	4.0		
	Townscape/Urban Planning	This path form part of the urban planning along the river.	5			
Financial	Possible funding source	City of Melville, DOT PBN Grants				
			Amount			
	Capital Cost	Upgrade approximately 3500m of existing footpath to standard 3.5m width shared path, plus approximately 800m of line marking plus signage (2 signs).	\$25,000 - \$700,000			

8 Upgrade (or install where missing) the shared path/sealed shoulder along Karel Avenue.

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	Karel Avenue is a PBN route and as such is of strategic significance.	9	9.0	5.79	
Connectivity	Schools	There are multiple schools located in the immediate vicinity of Karel Avenue as it traverses the City of Melville. The connectivity to these schools will be greatly increased.	7	4.2		
	Employment Zones	This project will have some benefit to commuter connectivity even though it does not run along the main desire line.	5			
	Recreational	This project will have limited benefit in terms of connectivity to recreational facilities.	2			
	Tourism	This project will have limited benefit in terms of connectivity to tourism facilities.	1			
	Public Transport	This project will increase the accessibility to the Bull Creek and Murdoch train stations somewhat.	6			
Economic	Mode Shift	This path will provide increased cycle access and as such it is expected to create a shift in terms of mode choice and route choice.	6	3.0		
	Impact on motor vehicles	As this path will be a seperated facility the impact on motor vehicles will be limited.	0			
	Economic Impacts	This path will not provide direct access to any shopping centers, but may have limited positive effects on surrounding centres.	3			
Safety	Cycling Safety	Providing appropriate facilities segregated from general traffic presents significant increases to the safety of regular users.	8	3.0		
	Pedestrian safety issues	Shared paths provide a higher probability of conflict between pedestrians and cyclists than other facilities.	-2			
People and Communities	Level of Service	Cyclists using the road currently will experience a similar level of service when using the shared path.	0	3.5		
	Townscape/Urban Planning	Providing a direct link between strategic links is good planning practice.	7			
Financial	Possible funding source	City of Melville/Roads to Recovery Program				
			Amount			
	Capital Cost	Widen road to allow for 2m bicycle lane for approximately 4.5km of road (on City of Melville side). Upgrade shared path facility to 3.0m wide standard path with line marking, bicycle symbols, plus signage (2 signs).	\$1,100,000.00			

9 Address the blind corner along shared path in Alfred Cove

Objective	Sub Objective	Qualititave Impacts						
Public Consultation	Public Workshop	The blind corner in Alfred Cove was raised as a significant concern for the safety of cyclists and pedestrians during public consultation.						
	Stakeholders	N/A						
			Quantitative Assessment /10					
Strategic	Completion of State Networks	This project will address a current deficiency in the state network.	6	6.0	5.17			
Connectivity	Schools	This project will not increase the connectivity to schools.	0	0.8				
	Employment Zones	This project will not increase the connectivity to employment zones.	0					
	Recreational	As this route is a recreational route, it would make connectivty to this route more effective and efficient.	4					
	Tourism	This project will not increase the connectivity to tourism facilities.	0					
	Public Transport	This project will not increase the connectivity to public transport.	0					
Economic	Mode Shift	Due to increased safety and comfort, minor mode shift may occur	4	2.7				
	Impact on motor vehicles	This project will have no impact on motor vehicles.	0					
	Economic Impacts	The economic benefits of this project will be limited to reduced crashes and the associated productivity losses.	4					
Safety	Cycling Safety	The safety along this section of shared path will be increased significantly.	10	10.0				
	Pedestrian safety issues	Safety advantages will be equally relevant to pedestrians.	10					
People and Communities	Level of Service	Currently cyclists are required to slow down, almost to a coplete stop, to take the corner safely. This project will allow smooth conituous movement along this route.	8	8.0				
	Townscape/Urban Planning	This section of path is poorly designed and dangerous. Planning routes which cannot be used safely is considered poor practice. This project will rectify the mistake.	8					
Financial	Possible funding source	City of Melville/Roads to Recovery Program/Black Spot Program						
			Amount					
	Capital Cost	Study to investigate and implement improved facility to remove blind turn.	\$1,000 - \$500,000					

10 Stock Road bicycle lane continuation/upgrade

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	Stock Road does not form part of the PBN route, but will have some strategic significance in terms of continuing infrastructure and links that have been provided.	6	6.0	4.85	
Connectivity	Schools	This project may in general increase cycling connectivity, but connectivity to specific schools will be limited.	2	3.4		
	Employment Zones	This project will likely benefit commuter connectivity significantly as it provides direct access to the O'Connor industrial area.	7			
	Recreational	This route will provide direct access to the Swan River recreational path.	6			
	Tourism	This project is not likely to increase connectivity to tourism facilities.	1			
	Public Transport	This project is not likely to increase connectivity to public transport facilities.	1			
Economic	Mode Shift	This project will likely encourage route shift, but mode shift will likely be limited.	4	1.7		
	Impact on motor vehicles	This project will cause lane widths on Stock Road to be reduced and thus have some effect on motor vehicles.	-3			
	Economic Impacts	Stock Road is in close proximity to multiple smaller shopping centres, this project may lead to increased patronage.	4			
Safety	Cycling Safety	Currently the section of Stock Road without cycle facilities would be rather dangerous to cycle along. This project will significantly increase the safety of the environment.	8	6.0		
	Pedestrian safety issues	This project may cause cyclists currently using the footpath to use the road, and thus would decrease probability of conflict.	4			
People and Communities	Level of Service	Benefits to level of service is likely to be limited.	0	3.0		
	Townscape/Urban Planning	Providing facilities that come to an abrupt end, as those along Stock Road is poor planning, this project aims to rectify this.	6			
Financial	Possible funding source	City of Melville				
			Amount			
	Capital Cost	Widen road to allow for 1.5m bicycle lane for approximately 1km of road with line marking and bicycle symbols.	\$100,000.00			

11 Upgrade Leach Highway shared path**

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate shared path on Leach Highway was raised as a safety concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	The upgrading of a shared path along Leach Highway will be strategic in nature, but not part of the PBN routes.	6	6.0	4.77	
Connectivity	Schools	This project may in general increase cycling connectivity, but connectivity to specific schools will be fairly limited.	3	4.8		
	Employment Zones	This project will have some benefit in terms of increasing connectivity for commuters.	6			
	Recreational	This project will have limited benefit in terms of connectivity to recreational facilities.	4			
	Tourism	This project will have limited benefit in terms of connectivity to tourism facilities.	3			
	Public Transport	This path will provide direct access to the Bull Creek train station.	8			
Economic	Mode Shift	This path will provide increased cycle access and as such it is expected to create a shift in terms of mode choice and route choice.	6	3.0		
	Impact on motor vehicles	As this path will be a seperated facility the impact on motor vehicles will be limited.	0			
	Economic Impacts	This path will not provide direct access to any shopping centers, but may have limited positive effects on surrounding centres.	3			
Safety	Cycling Safety	Providing appropriate facilities segregated from general traffic presents significant increases to the safety of regular users.	8	3.0		
	Pedestrian safety issues	Shared paths provide a higher probability of conflict between pedestrians and cyclists than other facilities.	-2			
People and Communities	Level of Service	Cyclists using the road currently will experience a similar level of service when using the shared path.	0	3.5		
	Townscape/Urban Planning	Providing a direct link between strategic links is good planning practice.	7			
Financial	Possible funding source	City of Melville & Main Roads Western Australia				
			Amount			
	Capital Cost	Upgrade approximately 8km of existing footpath to standard 3.5m width shared path, plus approximately 2km of line marking	\$1,500,000.00			

12 Murdoch Drive shared path installation

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	The inadequate shared path on Murdoch Drive was raised by Murdoch University as a concern for safety and access to the campus.				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	The construction of a shared path along Murdoch Drive will be strategic in nature, but not part of the PBN routes.	6	6.0	4.75	
Connectivity	Schools	This path will provide increased connectivity to a college and a primary school directly. It will form a direct access route to the Murdoch University.	9	5.0		
	Employment Zones	This project will have some benefit in terms of increasing connectivity for commuters.	4			
	Recreational	This project will have limited benefit in terms of connectivity to recreational facilities. It will provide increased access to Piney Lakes Park.	4			
	Tourism	This project will have limited benefit in terms of connectivity to tourism facilities.	2			
	Public Transport	Given this path's proximity to both Murdoch and Bull Creek train station it will increase accessibility to these facilities.	6			
Economic	Mode Shift	This path will provide increased access, by cycling, to school children and university staff, and as such it is expected to create a shift in terms of mode choice and route choice.	7	3.0		
	Impact on motor vehicles	As this path will be a seperated facility the impact on motor vehicles will be limited.	0			
	Economic Impacts	This path will not provide direct access to any shopping centers, but may have limited positive effects on surrounding centres.	2			
Safety	Cycling Safety	Providing appropriate facilities segregated from general traffic presents significant increases to the safety of regular users.	8	3.0		
	Pedestrian safety issues	Shared paths provide a higher probability of conflict between pedestrians and cyclists than other facilities.	-2			
People and Communities	Level of Service	Cyclists using the road currently will experience a similar level of service when using the shared path.	0	2.0		
	Townscape/Urban Planning	Providing a direct link between strategic links is good planning practice.	4			
Financial	Possible funding source	City of Melville and DOT PBN Grants				
			Amount			
	Capital Cost	Upgrade/installation of approximately 2.5km of shared path to standard 3.0m width with approximately 700m of line marking.	\$400,000.00			

13 Upgrade the freeway crossing on Parry Avenue***

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will connect the PBN on both sides of the freeway in an appropriate manner.	8	8.0	4.71	
Connectivity	Schools	This project will have some benefit in terms of connecting schools.	4	1.8		
	Employment Zones	This project will have some benefit in terms of connecting employment centres.	5			
	Recreational	This project will not increase the connectivity to recreational routes.	0			
	Tourism	This project will not increase the connectivity to tourism facilities.	0			
	Public Transport	This project will not increase the connectivity to public transport.	0			
Economic	Mode Shift	Creating this crossing may encourage some mode choice changes, and will likely cause some rerouting.	4	2.3		
	Impact on motor vehicles	It is not expected that motor vehicle will be impacted.	0			
	Economic Impacts	This link has the potential to increase patronage of shopping centres directly on both sides of the freeway.	3			
Safety	Cycling Safety	On-street cycling crossing the bridge is prevalent, this is likely to decrease but will still occur.	7	2.5		
	Pedestrian safety issues	Encouraging more people to use the shared path across the bridge will increase the potential for conflict with pedestrians.	-2			
People and Communities	Level of Service	This will create a more attractive freeway crossing option which should increase the level of service for those users currently taking detours.	6	7.0		
	Townscape/Urban Planning	Completing missing links in the strategic network is in line with planning principles.	8			
Financial	Possible funding source	City of Melville and Main Roads WA				
			Amount			
	Capital Cost	Upgrade approximately 400m of existing footpath to standard 3.0m shared path width with 100m line marking. Extend existing bicycle lane by 50m. Upgrade median crossing at Geyer Place.	\$100,000.00			

14 Address the lack of bicycle facilities through intersections

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate cyclist treatments at a number of roundabouts was raised as a significant concern in regards to safety during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project aims to ensure continuity of all bicycle networks, strategic and otherwise.	5	5.0	4.34	
Connectivity	Schools	The continuity of the bicycle networks will have the effect of increased connectivity to all schools already connected to the network.	2	2.0		
	Employment Zones	The continuity of the bicycle networks will have the effect of increased connectivity to employment centres already connected to the network.	2			
	Recreational	The continuity of the bicycle networks will have the effect of increased connectivity to all recreational facilities connected to the network.	2			
	Tourism	The continuity of the bicycle networks will have the effect of increased connectivity to tourist facilities already connected to the network.	2			
	Public Transport	The continuity of the bicycle networks will have the effect of increased connectivity to public transport facilities already connected to the network.	2			
Economic	Mode Shift	The continuity of the bicycle network should have the effect of increasing the attractiveness of the mode and thus lead to some modal shift.	4	1.3		
	Impact on motor vehicles	This project will increase the number of cyclists choosing to ride through roundabouts, instead of going offraod, and thus may slightly reduce the capacity for motor vehicles.	-1			
	Economic Impacts	The continuity of the bicycle network and its associated increase in ridership may have a positive economic impact on shopping centres connected to the bicycle network.	1			
Safety	Cycling Safety	This project will significantly increase the safety of cyclists using the network. Many of the crashed involving cyclists occur at roundabouts.	9	7.0		
	Pedestrian safety issues	By affording cyclists a safer environment more cyclists will choose to cycle on road and thus decrease the level of conflict with pedestrians.	5			
People and Communities	Level of Service	Due to typical roundabout configuration cyclists currently experience delays traversing roundabouts. This project will increase the level of service along all routes including roundabouts.	8	5.5		
	Townscape/Urban Planning	The continuity of bicycle routes through roundabouts will advantage the whole bicycle network.	3			
Financial	Possible funding source	Roads to Recovery Program/Black Spot Program				
			Amount			
	Capital Cost	Annual funding commitment until all intersections have been treated	\$2,000,000.00			

15 Expand the Bicton PBN Route network

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This addition to the state network will make this section more attractive and increase patronage.	5	5.0	4.12	
Connectivity	Schools	This project will have some benefit in terms of connecting schools.	5	3.4		
	Employment Zones	This project should significantly increase connectivity for commuters.	9			
	Recreational	This project will likely have limited benefit in terms of increasing connectivity to recreational facilities.	1			
	Tourism	This project will likely have limited benefit in terms of increasing connectivity to tourism facilities.	1			
	Public Transport	This project will likely have limited benefit in terms of increasing connectivity to public transport.	1			
Economic	Mode Shift	Projects such as this one increases the overall efficiency with which cyclists can travel along the strategic network. It is expected that this increase in efficiency will make cycling more attractive and thus increase cyclist numbers.	6	2.0		
	Impact on motor vehicles	This project will not have any impact on motor vehicles as infrastructure is mostly already in place.	0			
	Economic Impacts	The addition will add direct connectivity shopping areas.	0			
Safety	Cycling Safety	This addition will allow cyclists to travel on cycle infrastructure.	6	3.0		
	Pedestrian safety issues	The addition will not create additional pedestrian conflict.	0			
People and Communities	Level of Service	The disjointed nature of the current route alignment along with the lack of priority the route enjoys at intersections causes significant delays for cyclists. The additional route will make commuter cycling much more efficient.	9	8.0		
	Townscape/Urban Planning	Direct and more attractive connections are key principles of proper planning.	7			
Financial	Possible funding source	City of Melville/DOT PBN Grants/Local Government Grants Program (Department of Planning and Infrastructure)				
			Amount			
	Capital Cost	Realignment of PBN route requires 20 new signs and pavement bicycle symbols for approximately 2500m.	\$7,000.00			

16 Expand the Brentwood PBN Route network

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This addition to the state network will make this section more attractive and increase patronage.	5	5.0	4.08	
Connectivity	Schools	This project will have some benefit in terms of connecting schools.	6	3.6		
	Employment Zones	This project should significantly increase connectivity for commuters.	9			
	Recreational	This project will likely have limited benefit in terms of increasing connectivity to recreational facilities.	1			
	Tourism	This project will likely have limited benefit in terms of increasing connectivity to tourism facilities.	1			
	Public Transport	This project will likely have limited benefit in terms of increasing connectivity to public transport.	1			
Economic	Mode Shift	Projects such as this one increases the overall efficiency with which cyclists can travel along the strategic network. It is expected that this increase in efficiency will make cycling more attractive and thus increase cyclist numbers.	6	2.0		
	Impact on motor vehicles	This project will include new bicycle lanes on Coomoora Road and have a minor negative impact on cars	-1			
	Economic Impacts	This realignment will not have significant impact on access to economic activities in its direct vicinity. It will however start to increase overall access to economic activities due to increased route efficiency.	1			
Safety	Cycling Safety	This addition will allow cyclists to travel on cycle infrastructure, as opposed to travelling on-road as is currently the case.	5	2.5		
	Pedestrian safety issues	The addition will not create additional pedestrian conflict.	0			
People and Communities	Level of Service	The disjointed nature of the current route alignment along with the lack of priority the route enjoys at intersections causes significant delays for cyclists. The additional route will make commuter cycling much more efficient.	9	8.0		
	Townscape/Urban Planning	Direct and more attractive connections are key principles of proper planning.	7			
Financial	Possible funding source	City of Melville/DOT PBN Grants/Local Government Grants Program (Department of Planning and Infrastructure)				
			Amount			
	Capital Cost	Realignment of PBN route requires 20 new signs, pavement bicycle symbols for approximately 2500m, and bicycle lanes along 950m of Coomoora Road.	\$235,000.00			

17 Complete the bicycle lane/sealed shoulder missing link along Reynolds Road

Objective	Sub Objective	Qualititave Impacts						
Public Consultation	Public Workshop	N/A						
	Stakeholders	N/A						
			Quantitative Assessment /10					
Strategic	Completion of State Networks	While this in not a strategic bicyle network link, it is one of the routes to Canning Bridge and of minor strategic significance.	5	5.0	4.08			
Connectivity	Schools	This project may in general increase cycling connectivity, but connectivity to specific schools will be fairly limited.	2	3.0				
	Employment Zones	This project will likely benefit commuter connectivity significantly as it provides access to the Canning Bridge and PSP.	6					
	Recreational	Increased connectivity to recreational facilities is likely to be limited.	1					
	Tourism	This project is not likely to increase connectivity to tourism facilities.	0					
	Public Transport	This project is likely to increase connectivity to the Canning Bridge train station and the Booragoon bus station.	6					
Economic	Mode Shift	This project will likely encourage route shift, but mode shift will likely be limited.	3	2.0				
	Impact on motor vehicles	Some lane width reductions are expected.	-1					
	Economic Impacts	This route provides direct access to a small local shopping centre, and forms part of a natural route to the Garden City Shopping Centre.	4					
Safety	Cycling Safety	The implementation of appropriate infrastructure along a road such as this will provide an increase in safety for current users.	6	4.5				
	Pedestrian safety issues	This project may cause cyclists currently using the footpath to use the road, and thus would decrease probability of conflict.	3					
People and Communities	Level of Service	Benefits to level of service is likely to be limited.	1	3.5				
	Townscape/Urban Planning	Providing facilities that come to an abrupt end is poor planning, this project aims to rectify this.	6					
Financial	Possible funding source	City of Melville/Local Government Grants Program						
			Amount					
	Capital Cost	Widen both sides of road to allow for 1.2m bicycle lanes for approximately 800m of road with line marking and bicycle symbols.	\$200,000.00					

18 Add an additional commuter friendly PBN route along North Lake Road

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This addition to the state network will make this section more attractive and increase patronage.	5	5.0	3.94	
Connectivity	Schools	This project will have some benefit in terms of connecting schools.	3	3.8		
	Employment Zones	This project should significantly increase connectivity for commuters.	8			
	Recreational	The additional PBN route along North Lake Rd will provide direct access to the recreational path running along the river.	5			
	Tourism	Apart from increasing connectivity to the recreational network, this project will have limited benefit to tourism connectivity.	3			
	Public Transport	The proposed alignmnet provides access to a few bus routes, however bicycles are not allowed on buses.	0			
Economic	Mode Shift	Projects such as this one increases the overall efficiency with which cyclists can travel along the strategic network. It is expected that this increase in efficiency will make cycling more attractive and thus increase cyclist numbers.	6	4.0		
	Impact on motor vehicles	This project will not have any impact on motor vehicles as infrastructure is mostly already in place.	0			
	Economic Impacts	This additional route will connect two medium size shopping centres to the PBN.	6			
Safety	Cycling Safety	This addition will allow cyclists to travel on cycle infrastructure, as opposed to travelling on-road as is currently the case.	3	1.0		
	Pedestrian safety issues	This project will increase the number of cyclists making use of a section of shared path and thus increases potential for conflict between cyclists and pedestrians.	-1			
People and Communities	Level of Service	The disjointed nature of the current route alignment along with the lack of priority the route enjoys at intersections causes significant delays for cyclists. The additional route will make commuter cycling much more efficient.	9	8.0		
	Townscape/Urban Planning	Direct and more attractive connections are key principles of proper planning.	7			
Financial	Possible funding source	City of Melville/DOT PBN Grants/Local Government Grants Program (Department of Planning and Infrastructure)				
			Amount			
	Capital Cost	Realignment of PBN route requires approximately 30 new signs. Also requires upgrade of approximately 4km of shared path facilities on North Lake Road with linemarking.	\$700,000.00			

19 Install footpaths along all local roads within a 1km radius of a school, community facility or shopping centre.

Objective	Sub Objective	Qualitative Impacts				
Public Consultation	Public Workshop	Increasing the safety and access of bicycle routes for children was raised as an important initiative during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project does not form part of the strategic network.	0	0.0	3.89	
Connectivity	Schools	Ensuring all schools have footpaths in their catchment will significantly increase connectivity to schools.	10	6.8		
	Employment Zones	Where employment zones are located close to schools they will enjoy increased connectivity.	4			
	Recreational	This project will significantly increase the access that school children have to the recreational network.	9			
	Tourism	This project will marginally increase access and connectivity to tourists and associated facilities.	3			
	Public Transport	A significant increase in access levels to public transport facilities close to schools is expected.	8			
Economic	Mode Shift	The aim of this project is to increase bicycle ridership of school children, which in turn would limit school trips by car and increase cyclist confidence and also influence future cycle mode choice.	7	4.0		
	Impact on motor vehicles	Given that school children typically cycle off-street it is expected that motor vehicles will experience no negative impacts.	0			
	Economic Impacts	It is expected that this project will increase children cycle access, and pedestrian access to local shopping centres.	5			
Safety	Cycling Safety	This project will create a much safer cycling environment for younger children.	8	7.5		
	Pedestrian safety issues	This project will create a safer pedestrian environment at a local level.	7			
People and Communities	Level of Service	It is not foreseen that this project will increase level of service for any modes.	0	3.0		
	Townscape/Urban Planning	In terms of planning it is seen as good practice to have a good footpath coverage.	6			
Financial	Possible funding source	City of Melville				
			Amount			
	Capital Cost	Annual funding until all footpaths have been installed	\$2,000,000.00			

20 Garling Street bicycle lane continuation/upgrade

Objective	Sub Objective	Qualitative Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	Garling Street does not form part of the PBN route, but will have some strategic significance in terms of continuing infrastructure and links that have been provided.	4	4.0	3.04	
Connectivity	Schools	This project may in general increase cycling connectivity, but connectivity to specific schools will be limited.	1	1.8		
	Employment Zones	This project will likely benefit commuter connectivity significantly as it provides direct access to the O'Connor industrial area.	7			
	Recreational	Increased connectivity to recreational facilities is likely to be limited.	1			
	Tourism	This project is not likely to increase connectivity to tourism facilities.	0			
	Public Transport	This project is not likely to increase connectivity to public transport facilities.	0			
Economic	Mode Shift	This project will likely encourage route shift, but mode shift will likely be limited.	2	1.0		
	Impact on motor vehicles	The excessive lane width prevalent along this specific section of Garling Street means that even the installation of a wide cycle lane will not impact negatively on motor vehicles.	0			
	Economic Impacts	This project is likely to have limited economic benefit.	1			
Safety	Cycling Safety	Given the width of the lanes the environment is fairly appropriate for on-street cycling. Formalised facilities however, is always a safer option.	4	3.5		
	Pedestrian safety issues	This project may cause cyclists currently using the footpath to use the road, and thus would decrease probability of conflict.	3			
People and Communities	Level of Service	Benefits to level of service is likely to be limited.	0	3.0		
	Townscape/Urban Planning	Providing facilities that come to an abrupt end, as those along Garling Street is poor planning, this project aims to rectify this.	6			
Financial	Possible funding source	City of Melville/City of Fremantle/Local Government Grants Program				
			Amount			
	Capital Cost	Provide line marking and bicycle symbols for 1200m (on both sides of the road).	\$10,000.00			

21 Address traffic calming measures that are not bicycle friendly

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The traffic calming measures used in Melville are not bicycle friendly				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will include routes already part of the strategic network, it will only make it mor attractive not expand or complete it.	2	2.0	2.89	
Connectivity	Schools	More attractive bicycle networks will have the effect of increased connectivity to all schools already connected to the network.	2	2.0		
	Employment Zones	More attractive bicycle networks will have the effect of increased connectivity to employment centres already connected to the network.	2			
	Recreational	More attractive bicycle networks will have the effect of increased connectivity to all recreational facilities connected to the network.	2			
	Tourism	More attractive bicycle networks will have the effect of increased connectivity to tourist facilities already connected to the network.	2			
	Public Transport	More attractive bicycle networks will have the effect of increased connectivity to public transport facilities already connected to the network.	2			
Economic	Mode Shift	An improved cycling environment will increase the attractiveness of the mode.	4	1.3		
	Impact on motor vehicles	This project will increase the number of cyclists choosing to ride on road, instead of going off road, and thus may slightly reduce the capacity for motor vehicles.	-1			
	Economic Impacts	A potential increase in ridership stemming from this project may have a positive economic impact on shopping centres connected to the bicycle network.	1			
Safety	Cycling Safety	This project will significantly increase the safety of cyclists using the network. Some of the traffic calming measures cause cyclists and cars to come into conflict with each other and could have devistating effects.	8	6.5		
	Pedestrian safety issues	By affording cyclists a safer environment more cyclists will choose to cycle on road and thus decrease the level of conflict with pedestrians.	5			
People and Communities	Level of Service	This project will not have significant benefits for the level of service for cyclists, it may increase the efficiency of journeys slightly.	1	2.5		
	Townscape/Urban Planning	A better cycling environment will advantage the whole bicycle network.	4			
Financial	Possible funding source	Roads to Recovery Program/Black Spot Program				
			Amount			
	Capital Cost	Annual funding commitment until all problem measures have been treated	\$100,000.00			

22 Overall pavement marking implementation and upgrade

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate pavement markings relating to cycle routes and infrastructure was raised as a concern during public consultation.				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will make the strategic bicycle network safer and more identifiable.	2	2.0	2.84	
Connectivity	Schools	In general would make the strategic bicycle routes more accessible to children commuting to school.	1	2.0		
	Employment Zones	In general would make the strategic bicycle routes more accessible to commuters.	1			
	Recreational	Some of the strategic cycle routes are also recreational routes and this project would make these routes more accessible. The strategic network also provides access to the recreational routes in general.	2			
	Tourism	Tourists wishing to cycle have little guidance apart from signage, thus this project will provide a significant increase in tourist cycling accessibility.	5			
	Public Transport	The overall increase in cycle accessibility will marginally increase connetcitivy to public transport, where these services are already accessible to the cycle network.	1			
Economic	Mode Shift	The increased levels of safety associated with appropriately marked signage may cause those commuters currently afraid to cycle to take up the mode.	3	1.3		
	Impact on motor vehicles	It is not foreseen that this project will have an impact on motor vehicles.	0			
	Economic Impacts	Better cycling markings can encourage cyclists to use routes that connect to local shopping centres and thus increase patronage.	1			
Safety	Cycling Safety	It is expected that this project will increase the safey associated with cycling.	6	6.5		
	Pedestrian safety issues	Proper markings on shared facilities will increase awareness of the different modes sharing the specific facilities, and thus increase safety.	7			
People and Communities	Level of Service	It is not expected that this project will have an impact on level of service.	0	1.5		
	Townscape/Urban Planning	The PBN routes have been set out according to urban planning principles, this project will promote those routes and thus the plan for the area.	3			
Financial	Possible funding source	City of Melville/Local Government Grant				
			Amount			
	Capital Cost	Annual linemarking implementation over the entire City.	\$25,000.00			

23 Overall signage implementation and upgrade

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	The inadequate signage relating to cycle routes and infrastructure was raised as a concern during public consultation.				
	Stakeholders	The inadequate signage relating to cycle routes, infrastructure and information was raised as a concern by Murdoch University.				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project aims to make the strategic cycle network more identifiable and thus more accessible.	3	3.0	2.62	
Connectivity	Schools	In general would make the strategic cycle routes more accessible to children commuting to school.	1	2.6		
	Employment Zones	In general would make the strategic cycle routes more accessible to commuters.	1			
	Recreational	Some of the strategic cycle routes are also recreational routes and this project would make these routes more accessible. The strategic network also provides access to the recreational routes in general.	3			
	Tourism	Tourists wishing to cycle have little guidance apart from signage, thus this project will provide a significant increase in tourist cycling accessibility.	7			
	Public Transport	The overall increase in cycle accessibility will marginally increase connetcivity to public transport, where these services are already accessible to the cycle network.	1			
Economic	Mode Shift	This project will increase the awareness of cycle infrastructure, and will promote cycling as a mode of transport.	2	1.3		
	Impact on motor vehicles	Better cycling signage may increase cyclist volumes. However, should not effect motor vehicles.	0			
	Economic Impacts	Better cycling signage can encourage cyclists to use routes that connect to local shopping centres and thus increase patronage.	2			
Safety	Cycling Safety	By improving bicycle network signage cyclists will be encouraged to make use of the safer bicycle friendly routes.	5	2.5		
	Pedestrian safety issues	This project may increase cyclist volumes along areas heavily trafficked by pedestrians, however will deter them form sharing pedestrian facilities not necessarily appropriate for cyclists.	0			
People and Communities	Level of Service	This project will not have any effect on the level of service experience along any cycle route.	0	1.5		
	Townscape/Urban Planning	The PBN routes have been set out according to urban planning principles, this project will promote those routes and thus the plan for the area.	3			
Financial	Possible funding source	City of Melville/Local Government Grant				
			Amount			
	Capital Cost	Annual signage implentation and upgrade over the entire City.	\$30,000.00			

24 Review TravelSmart maps

Objective	Sub Objective	Qualititave Impacts				
Public Consultation	Public Workshop	N/A				
	Stakeholders	N/A				
			Quantitative Assessment /10			
Strategic	Completion of State Networks	This project will not have an effect on strategic networks.	0	0.0	0.82	
Connectivity	Schools	No actual increase in connectivity will be experienced. Some increases in perceived connectivity is expected.	1	1.0		
	Employment Zones	No actual increase in connectivity will be experienced. Some increases in perceived connectivity is expected.	1			
	Recreational	No actual increase in connectivity will be experienced. Some increases in perceived connectivity is expected.	1			
	Tourism	No actual increase in connectivity will be experienced. Some increases in perceived connectivity is expected.	1			
	Public Transport	No actual increase in connectivity will be experienced. Some increases in perceived connectivity is expected.	1			
Economic	Mode Shift	It is not expected that this project will affect mode choice.	0	0.3		
	Impact on motor vehicles	This project will have no effect on motor vehicles.	0			
	Economic Impacts	A perceived increase in connectivity may increase access to shops slightly.	1			
Safety	Cycling Safety	No actual increase in safety will be experienced. People might be encouraged to use safer routes if perceived to be well connected.	2	2.0		
	Pedestrian safety issues	Cyclists may be inclined to use cycle facilities instead of shared facilities if routes are perceived to be well connected.	2			
People and Communities	Level of Service	No impact on level of service is expected.	0	2.0		
	Townscape/Urban Planning	From a planning perspective it is good practice to portray information and increase connectivity of established networks.	4			
Financial	Possible funding source	Cycle Instead Sponsorship Program				
			Amount			
	Capital Cost	Indicative study cost.	\$50,000.00			



APPENDIX C:

Implementation Guide

In general the recommended cross sections to be used for the various routes that make up the Melville bicycle network have been provided in **Section 7.1**. Additional guidelines for facilities associated with cycling is provided in this section, specifically if the recommended cross section is deemed inappropriate at certain locations or for the implementation of point specific treatments.

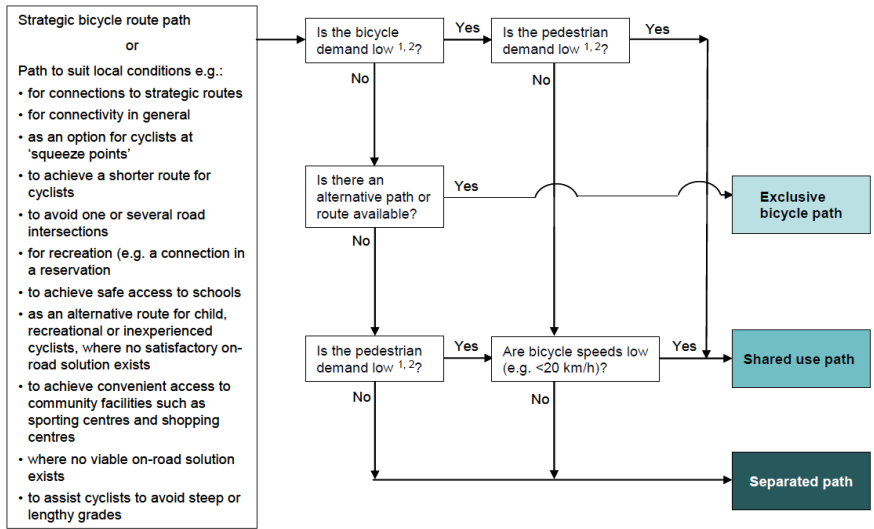
Bicycle Facility Standards

All cyclists have six basic requirements whenever they ride:

- Space to ride
- A smooth surface, free of debris
- Speed maintenance
- Appropriate sight lines to path surface
- Connectivity
- Information

A basic guide to the choice of off-road path treatment for cyclists is shown in **Figure C-1**. A decision has to be taken as to whether an on-road lane or an off-road path, or both, are required prior to this chart being applied as this guide only considers the primary factors needed to determine the type of treatment required.

Figure C-1: Guide to choice of off-road path treatment for cyclists



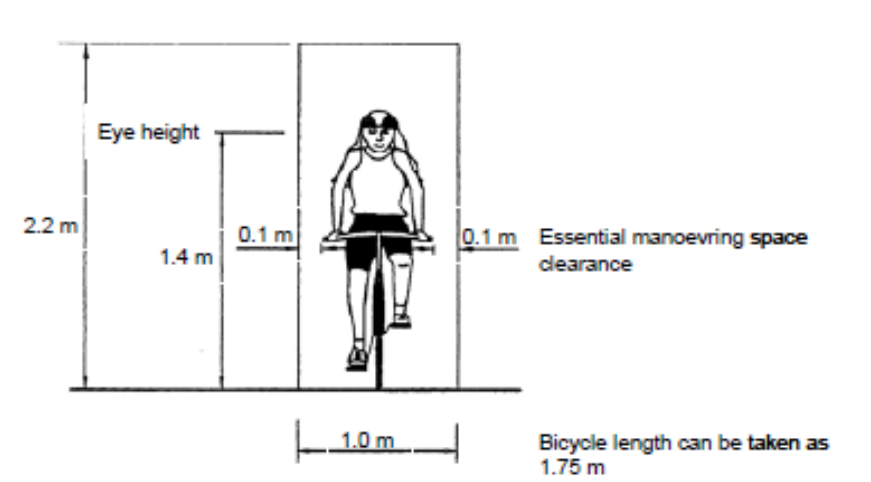
Notes:
1. The level of demand can be assessed generally on the basis of the peak periods of a typical day as follows:
a. Low demand: Infrequent use of path (say less than 10 users per hour)
b. High demand: Regular use in both directions of travel (say more than 50 users per hour).
2. These path volumes are suggested in order to limit the incidence of conflict between users, and are significantly lower than the capacity of the principal path types.

Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

Space to Ride

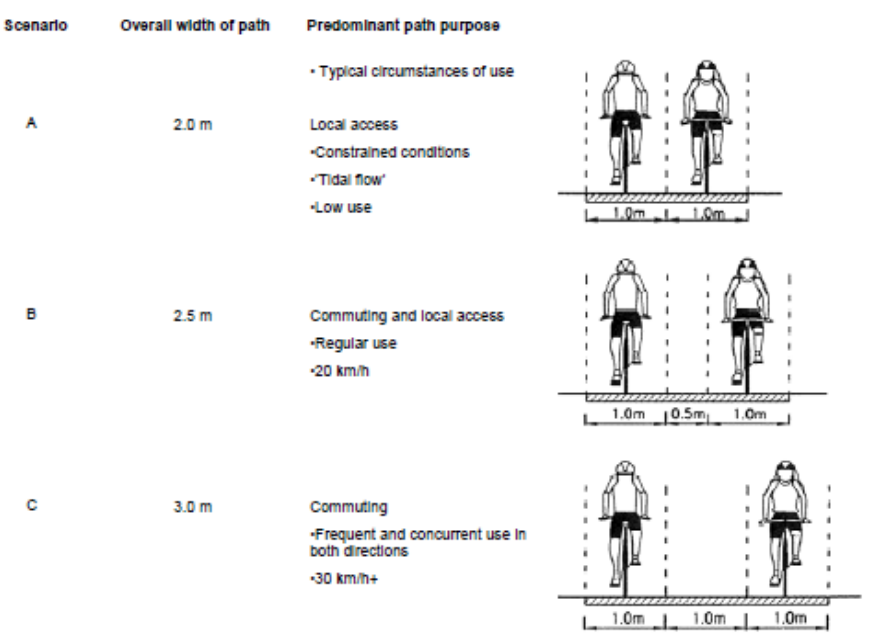
The appropriate width of cyclist facilities is defined by determining the minimum operating space required for cyclists, as shown in **Figure C-2**. Additionally **Figure C-3** to **Figure C-5** shows how this space is typically implemented on various facilities.

FigureC-2: Cyclist Operating Space



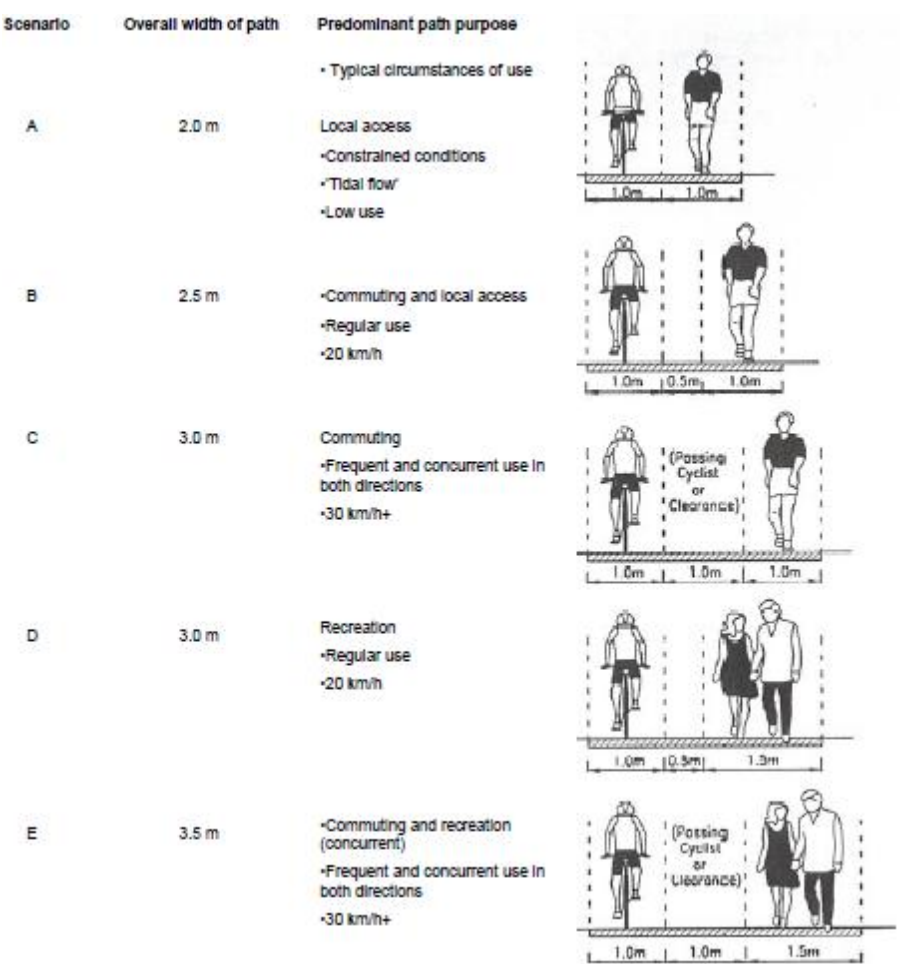
Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

Figure C-3: Indicative Bicycle Path Cross Sections



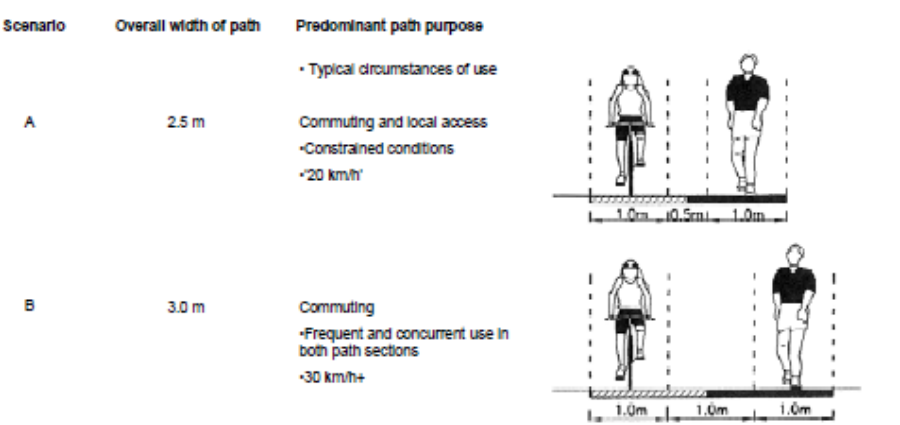
Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

FigureC-4: Indicative Shared Path Cross Sections



Source: WA Liveable Neighbourhoods, 2009

Figure C-5: Indicative Separated One-way Path Cross Sections



Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

Smooth Surface

Pavement surface is an important factor in providing a comfortable ride for cyclists. The following desirable requirements need to be taken into consideration:

- The finished surface of a new bicycle lane or path should not:
 - Deviate from a 3m straight edge by more than 5mm at any point
 - Have a rate of change in deviation in excess of 1mm in 240mm
- Sprayed sealed surfaces should have a stone size less than 14 mm due to the high pressure in many bicycle tyres
- Width of parallel groove in pavement should not exceed 12mm
- Height of step in parallel groove in pavement should not exceed 10mm

Speed Maintenance

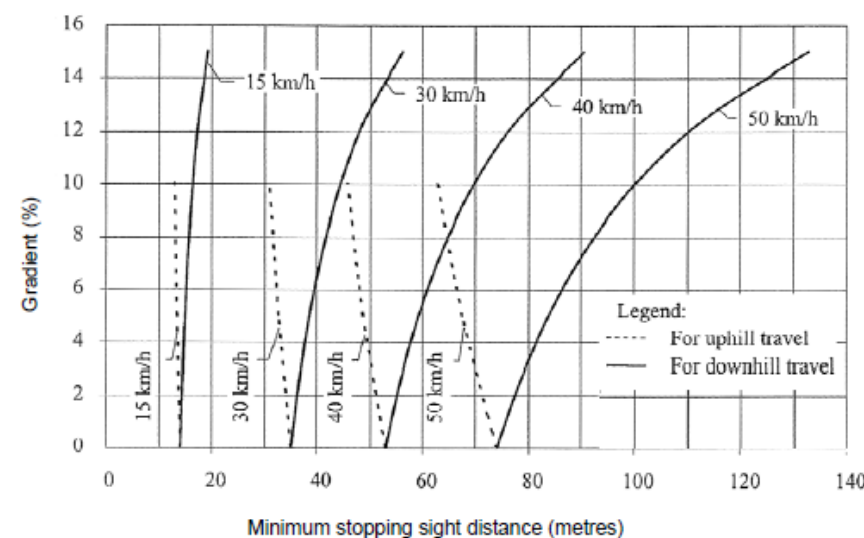
Bicycle route should be designed for continuous riding, minimising the need to slow or stop for any reason including steep gradients, rough surfaces, sharp corners, obscured sight lines, intersections, or to give way to other people because the width available is too narrow.

Whilst many cyclists typically travel at speeds between 20 and 30 km/h, a significant number of cyclists can travel at speeds in excess of 35 to 40 km/h on the flat and in excess of 50 km/h on downhill gradients. Once slowed or stopped it takes considerable time and effort to regain the desired operating speed, reducing the effectiveness of cycling as a means of transport.

Sight Lines

Paths should be designed and constructed to provide the greatest sight distance possible at any given location. Appropriate sight lines must be provided between a cyclist's eye height and pedestrians to assist in minimising conflict, and between a cyclist's eye height and the path surface so that cyclists can stop in the event that a hazard exists on the path. Stopping sight distances that should be provided to enable cyclists to stop for various combinations of bicycle operating speeds and gradients are shown in **Figure C-6**.

FigureC-6: Minimum Stopping Sight Distances for Cyclists



Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

Connectivity

Connectivity is that quality of a bicycle route or route network, describing the continuous nature of facilities or of the continuous nature of desired conditions. Bicycle routes comprising roads and paths should combine to form an effective, convenient and safe network.

A route for cyclists which starts and ends abruptly is undesirable and may be hazardous as it may lure inexperienced cyclists to a point where they are at risk, perhaps having to ride along or across busy roads to complete their intended trip.

Information

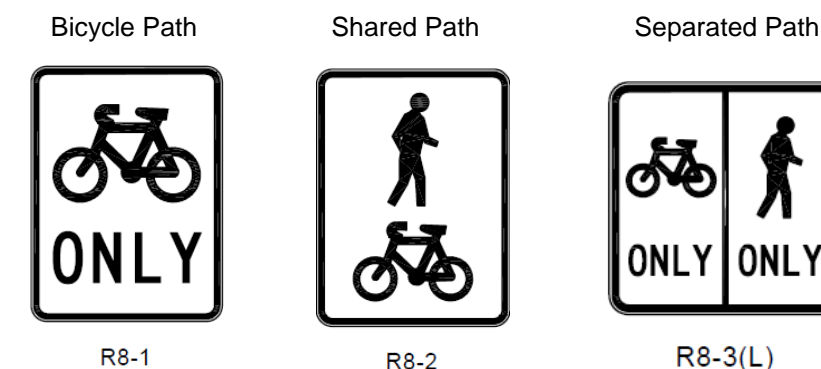
Bicycle routes must be signposted appropriately to indicate destinations and the distances to each destination (see **Figure C-7**). Maps showing the route, facilities and points of interest along it should also be easily available. Consistency of information is also very important.

FigureC-7: Bicycle Route Sign Post



The signs indicated in **Figure C-8** should be used to designate the different types of paths on a bicycle route.

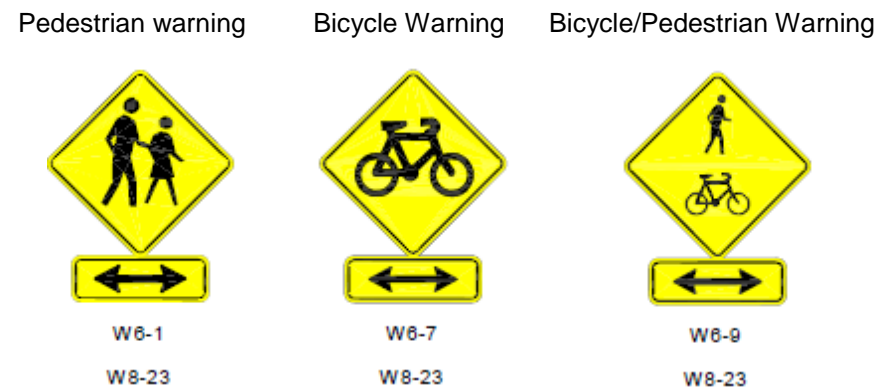
FigureC-8: Appropriate Path Type Signage



Source: AS1742.9 (2000) Manual of uniform traffic control devices, Part 9: Bicycle Facilities

Appropriate warning signs should be used where any path is about to cross a path used by bicycles alone or bicycles and pedestrians (see **Figure C-9**). They also should be used where poor sight distance, high bicycle speeds or other factors necessitate a warning for people about to cross the path.

Figure C-9: Appropriate Warning Signs

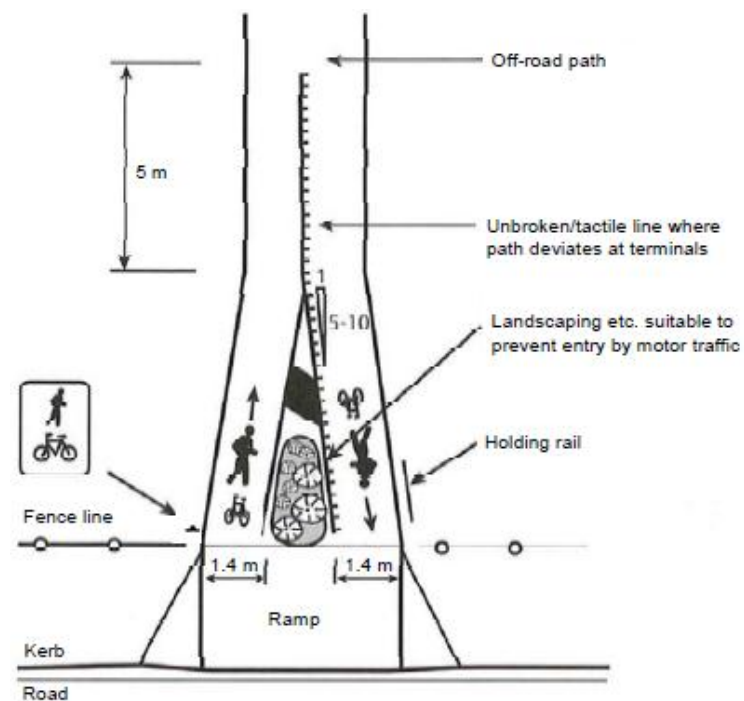


Source: AS1742.9 (2000) Manual of uniform traffic control devices, Part 9: Bicycle Facilities

Terminal Treatments

The preferred treatment to restrict access and warn cyclists to slow down is shown in **Figure C-10** which separates the entry and exit terminal.

Figure C-10: Preferred Terminal Treatment



Source: Austroads Guide to Road Design 6A: Pedestrian and Cyclist Paths

Bollards are commonly used to restrict access from motor vehicles to paths. This type of treatment can create an unacceptable risk to cyclists and should only be used where provision of the preferred treatments is

not practicable. If bollards are to be used, they must be conspicuous to cyclists and include line marking to direct cyclists away from the bollard.

Lighting

To increase both actual and perceived safety along bicycle paths, in particular off-road bicycle paths, it is recommended that adequate lighting be provided. As many bicycles are fitted with modern lighting equipment and as it may be not cost effective to provide lighting throughout the entire bicycle network, it is important to take into account the following:

- Paths near or linked to predominant night time activity (such as promenades and riverside areas) should be lit to increase amenity;
- Designated work or school commuter bicycle paths should be lit, as it becomes dark relatively early during a significant portion of the year;
- It may not be cost effective to provide lighting along a recreational path that will not be used significantly after dark.

In particular, if the level of use of a path does not justify providing lighting along its entire length, consideration should be given to providing lighting at locations of increased hazards, such as at intersections, locations with constrained geometry, challenging topography and places where there are security problems. Austroads' Guide to Road Design Part 6A provides further guidance on specific lighting levels that are appropriate for bicycle paths.

As paths may run through locations that are isolated from existing electricity networks, there is the potential to use solar powered lighting, which obviates the cost of connecting an isolated light to an electricity source.

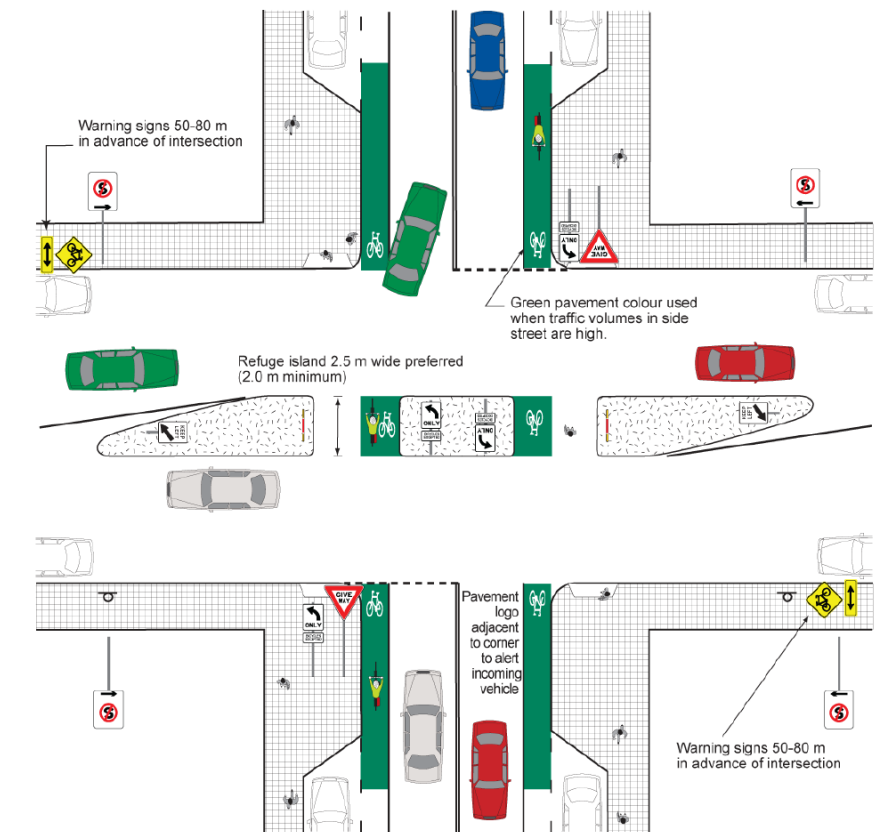
Intersections

Crossings & Minor Intersections

There are a number of treatments available to better accommodate cyclists at unsignalised intersections. The recommended specifications for these types of facilities are discussed in more detail in Austroads Guide to Road Design Part 4.

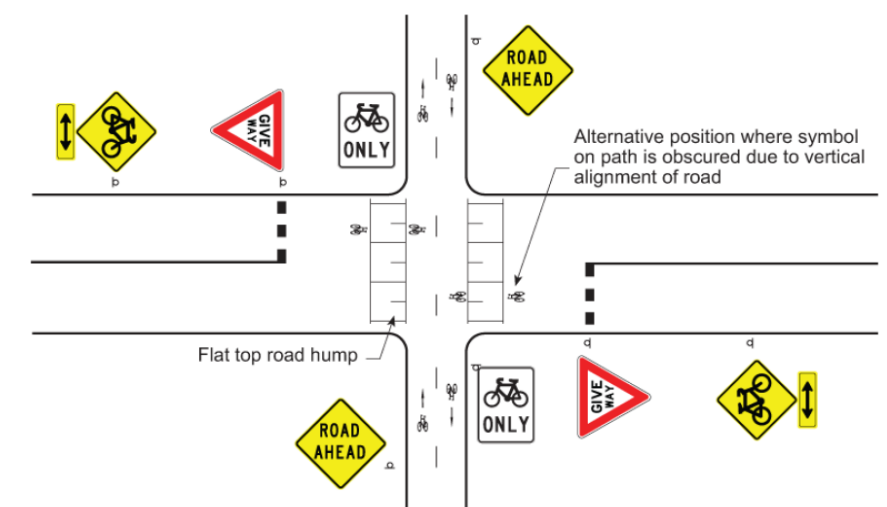
Where an intersection provides for left-in and left-out movements, cyclists and pedestrians should be allowed to travel through the intersection. Refer to **Figure C-11**. This would typically be provided as part of a local area traffic management plan, where the benefit is double, calming traffic and providing directness of route for cyclists. If turning and through volumes at this type of intersection is high it may be appropriate to remove cyclists from the intersection and provide them with a priority crossing facility adjacent to the intersection. **Figure C-12** shows a possible priority bicycle crossing on a local street. This type of treatment should be pursued where heavily trafficked commuter cyclist paths cross local streets.

Figure C-11: Bicycle and Pedestrian refuge within a left-in/left-out intersection



Source: Austroads Guide to Road Design 4: Intersections & Crossings

Figure C-12: Priority Bicycle Crossing

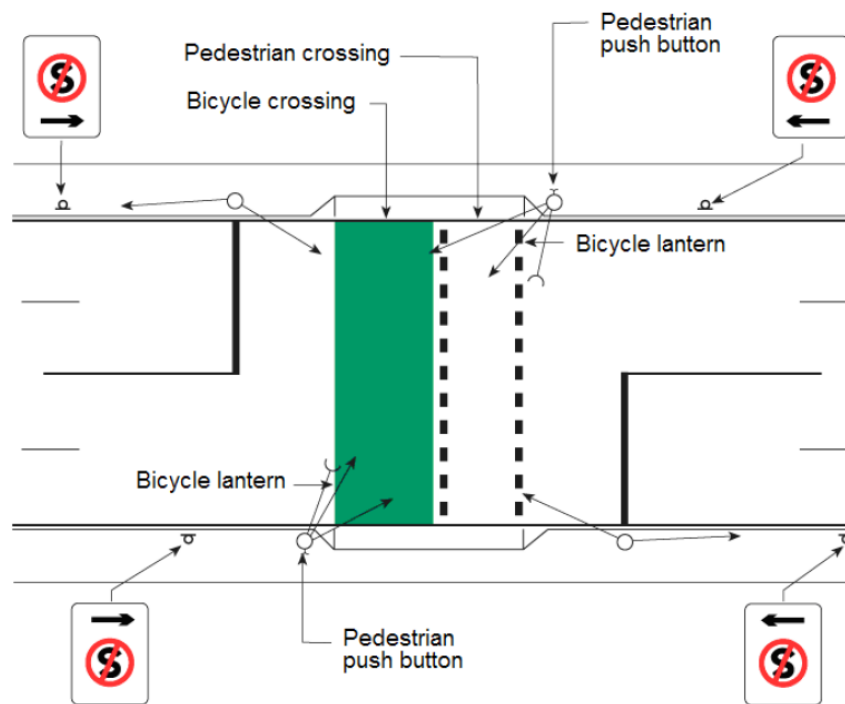


Source: Austroads Guide to Road Design 4: Intersections & Crossings

Bicycle routes intersecting more heavily trafficked roads such as arterials should include crossing which not only create a safe environment for cyclists but also allow high through volumes for the arterial road.

Figure C-13 shows an appropriate treatment for this type of crossing.

Figure C-13: Signalised Bicycle and Pedestrian Crossing



Source: Austroads Guide to Road Design 4: Intersections & Crossings

Where cycle paths intersect with side streets from major roads the crossing for bicycles should be designed to incorporate the appropriate priority for the bicycles and the cars turning into the side road. Key points to consider for this type of treatment include:

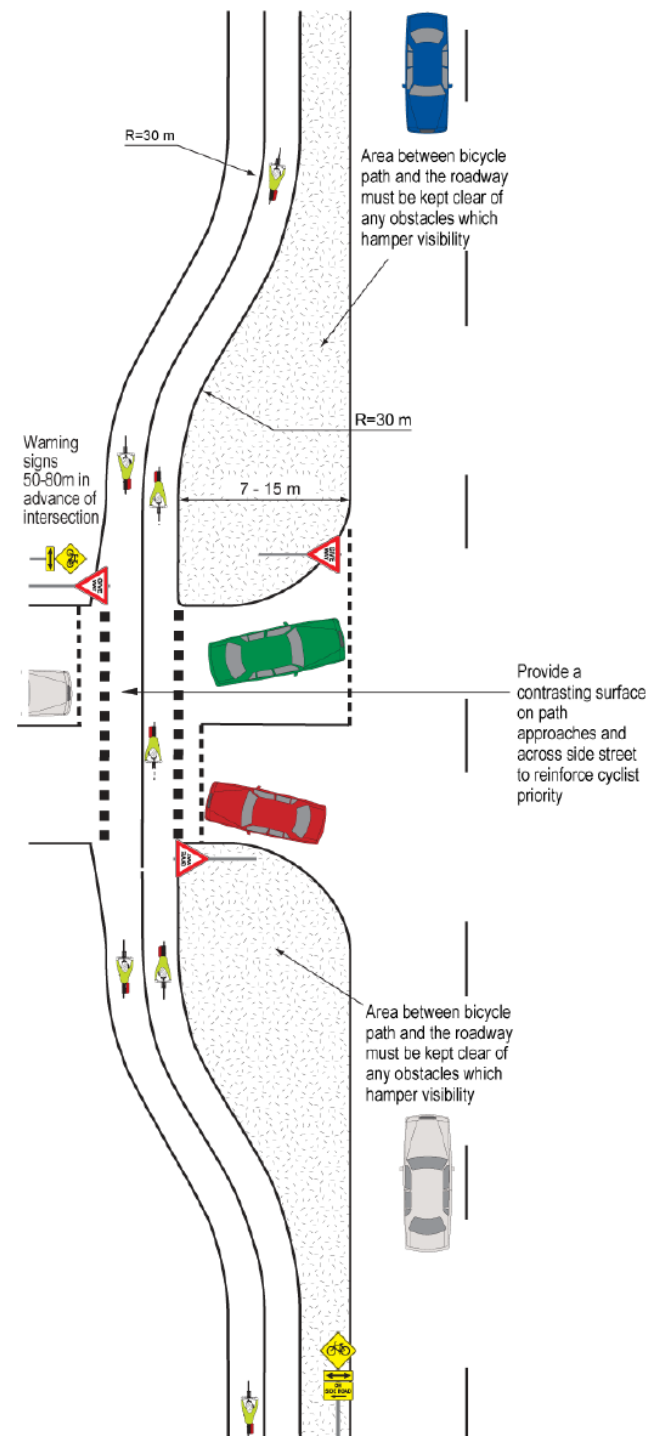
- Appropriate sight distance should be available for drivers approaching the intersection from the side road.
- Drivers turning from the major road into the side street should have clear sight lines to cyclists using the path in both directions.
- The speed of cyclists on the path should be controlled on the path approaches to the intersection.
- Appropriate warning signs for drivers and cyclists should be provided at intersections and crossings.

In general Austroads Guide to Road Design Part 4 recommends three distinct treatment types for bicycle facilities along major roads crossing minor side streets.

Bent-out treatments (Figure C-14) are used where sufficient space is available, where the bicycle path is separate from the roadway and

where the bicycle path should have priority crossing the side street. This is advantageous due to the vehicle storage space it provides between the major road and the bicycle path crossing.

Figure C-14: Bicycle Path bent-out when crossing side road

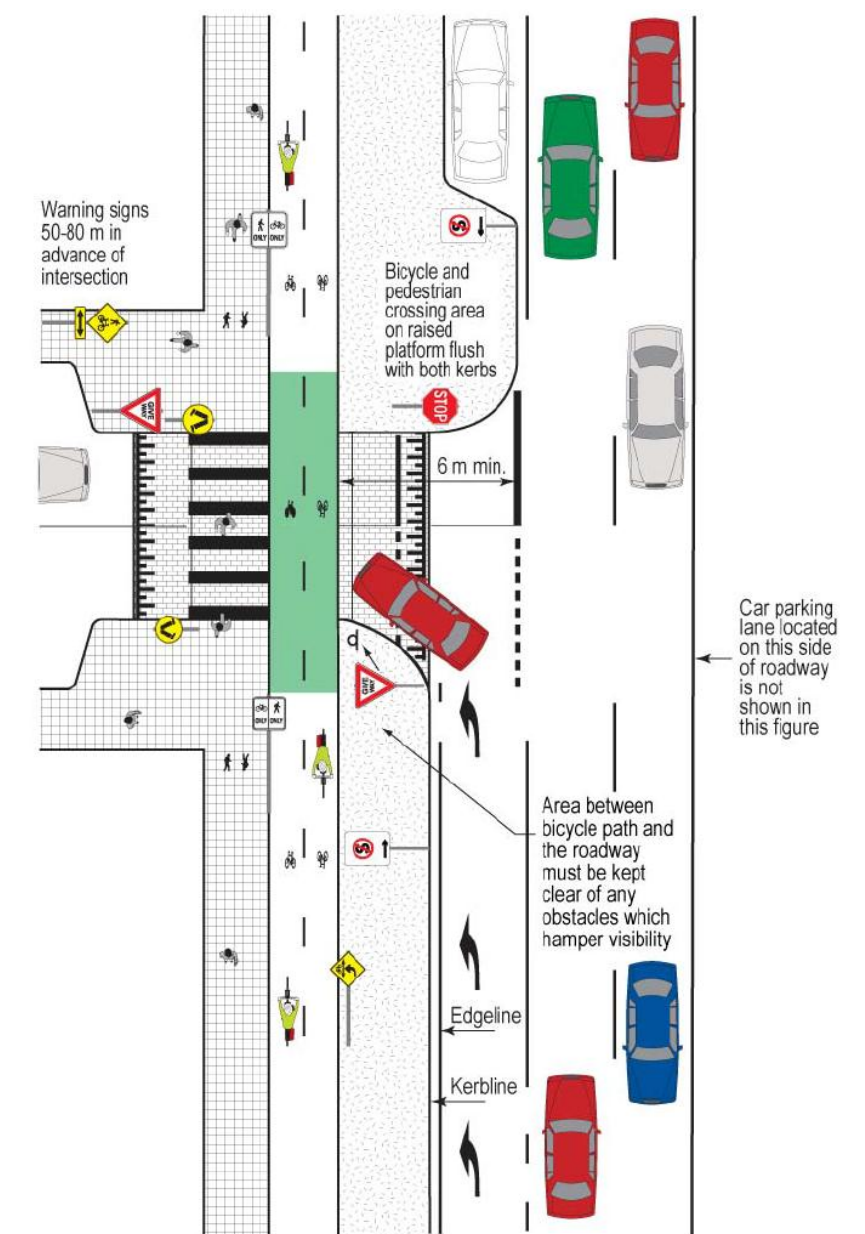


Source: Austroads Guide to Road Design 4: Intersections & Crossings

Bent-out treatments are more suitable to intersections where the speed on the major road is low (60km/h), where the side street is not frequently used by heavy vehicles and where volumes on the side street are low.

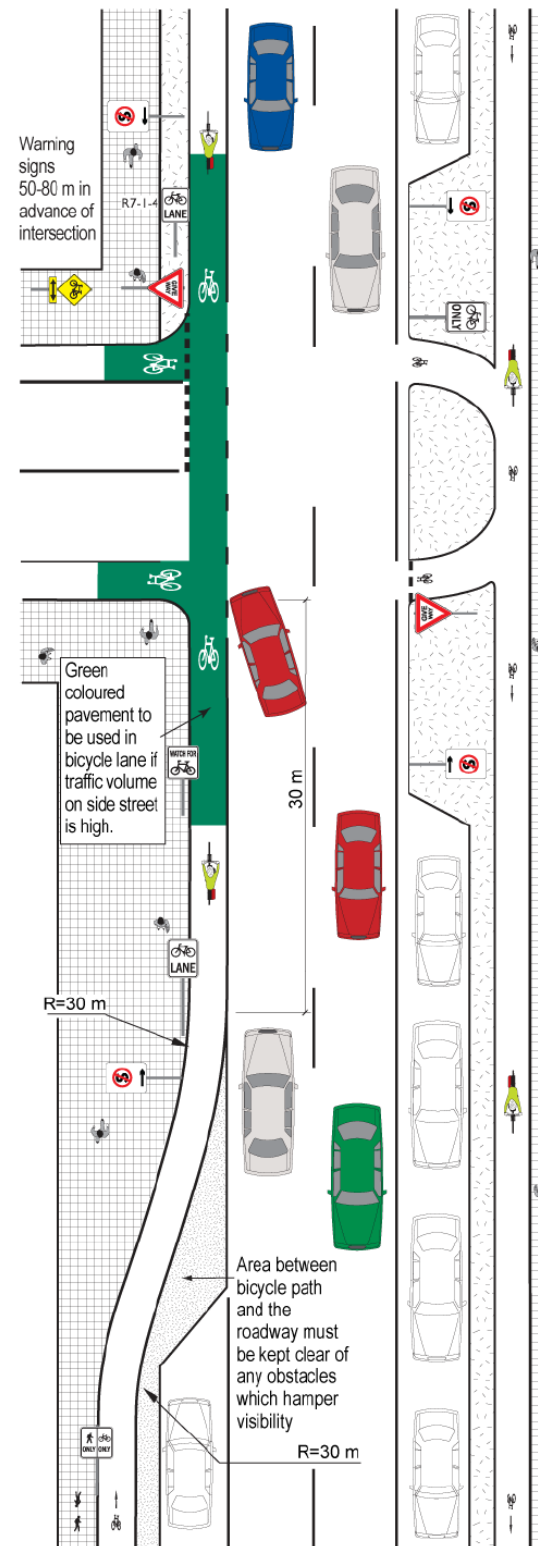
Straight crossings (Figure C-15) should typically be placed on a platform, as in **Figure C-15**, and is suitable where the side street is a residential street with low volumes, and where a high degree of visibility for the paths are preferable. Higher volume pedestrian and cycle crossings are ideally served by such a facility.

Figure C-15: Straight Side Road Crossing



Source: Austroads Guide to Road Design 4: Intersections & Crossings

Figure C-16: Bent-in Side Road Crossing (One-way only)



Source: Austroads Guide to Road Design 4: Intersections & Crossings

Bent-in treatments (Figure C-16) can only be used for one way cycle paths but are appropriate for cycle lanes and separated paths. Cycle lanes should include this treatment at the intersection, while the 'bent-in' refers to a separated path joining the road and becoming a cycle lane at the intersection.

This treatment provides priority to cyclists along with the major road, while vehicles entering from the side road will only have to give way at a single point, to both vehicles and bicycles. It also greatly increases the visibility of cyclists at the intersection.

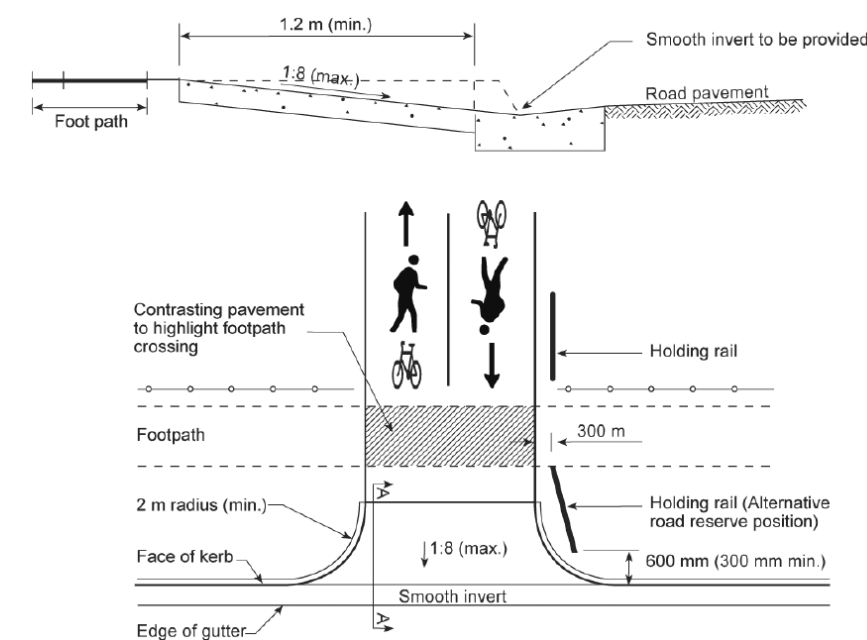
On road cycling along major roads are more suited to experienced cyclists and thus this treatment is appropriate on commuter routes.

Apart from crossing types that include a platform, all other crossings for separated paths require that the bicycle/shared path be lowered to road level by means of a kerb ramp. Kerb ramps for cycling facilities should be convenient for cyclists and thus include the following features:

- The width of the ramp should match the width of the path.
- Cyclists require a turning radius to turn directly to or from the side of the road, the three plan style kerb ramp may not be appropriate.
- Flatter 1 in 15 kerb ramps should be considered to provide more efficient and comfortable movement for cyclists, especially at crossings where cyclists have priority.

The appropriate kerb ramp features are illustrated in **Figure C-17**.

Figure C-17: Cycle Friendly Kerb Ramp



Source: Austroads Guide to Road Design 4: Intersections & Crossings

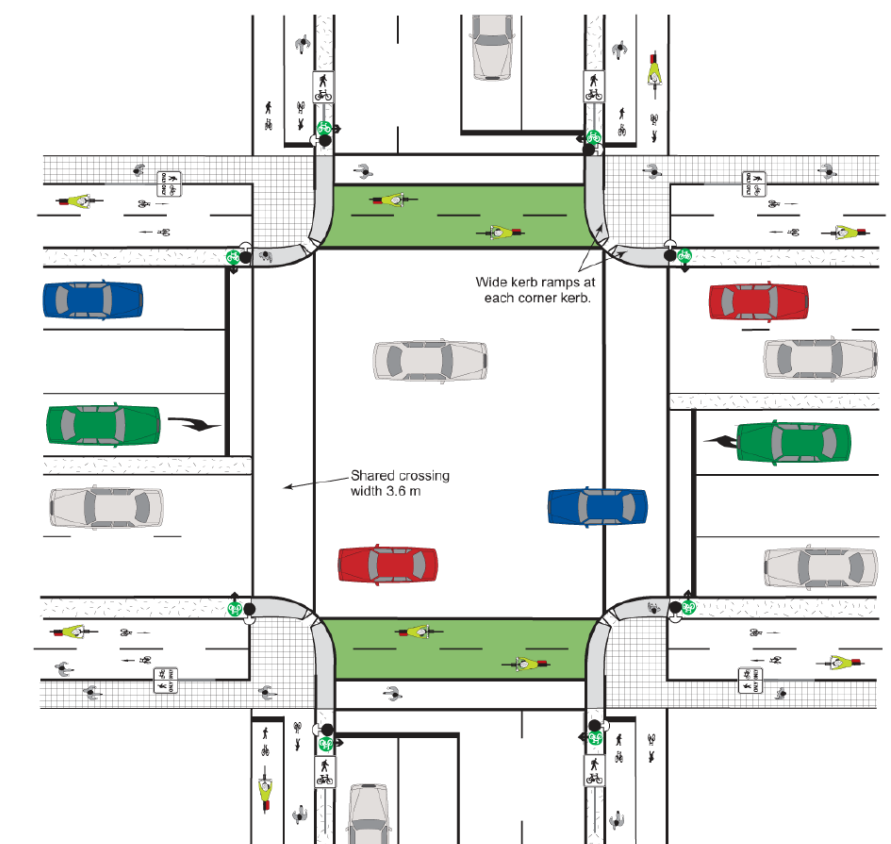
Signalised Intersections

Given that it is often necessary to accommodate various road user groups, including pedestrian and cyclists, at signalised intersections there are many intersection facilities that could be appropriate depending on the exact situation. These facilities are detailed in Austroads Guide to Road Design Part 4.

Where shared paths and separated paths are included in the intersection it is best to treat the intersection between these facilities as part of the general intersection, thus signalised with stop lines, and provide some additional space for pedestrians to take refuge along the multiple crossings created. **Figure C-18** shows an example of such an intersection.

As have been illustrated multiple times it is beneficial to colour the cycle lane differently to the asphalt as it traverses the intersection. This increases the awareness of drivers, that cyclists share the intersection.

Figure C-18: Shared & Separated Paths Intersecting at a Signalised Intersection



Source: Austroads Guide to Road Design 4: Intersections & Crossings

The specifications for accommodating cyclists at roundabouts are dealt with in Austroads Guide to Road Design Part 4b: Roundabouts. In general this document states that **roundabouts are the least appropriate type of intersection when considering the safety of cyclists**, as a high speed differential between motorists and cyclists, and a single required point of observation for vehicles increase the likeliness of drivers not noticing cyclists in the intersection. It further states that **roundabouts should not be used along routes where high volumes of cyclists are expected, such as the PBN routes leading to the Freeway PSPs.**

Figure C-19: Accommodating Cyclists outside the Roundabout

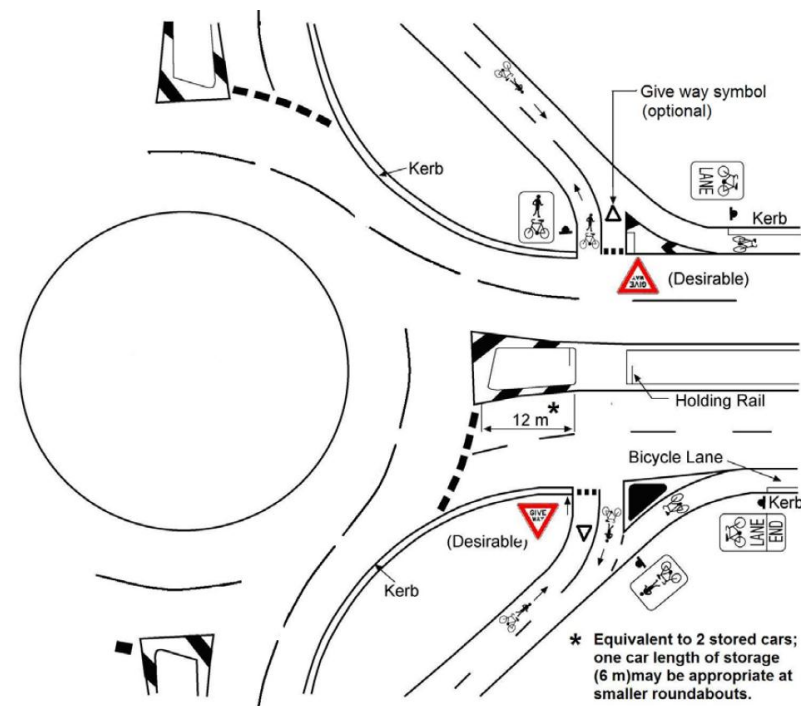


Figure C-20: Accommodating Cyclists in the Roundabout

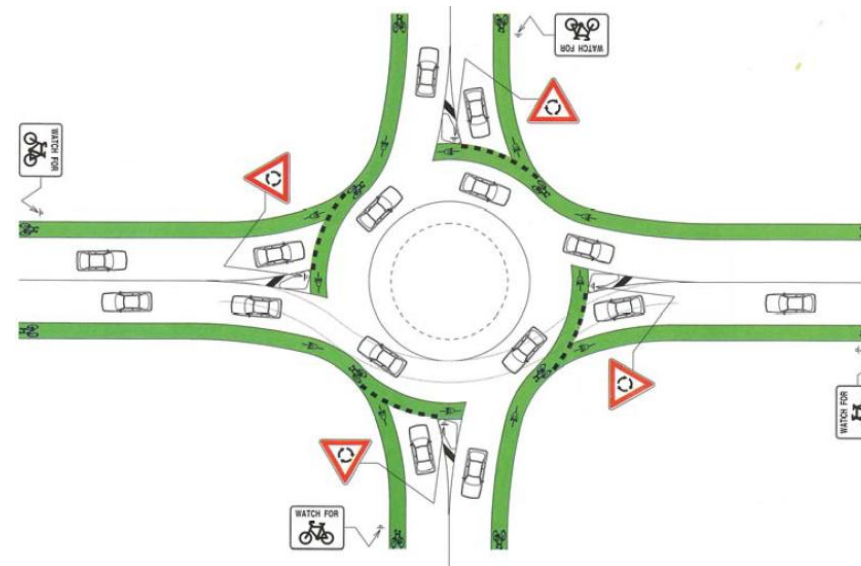
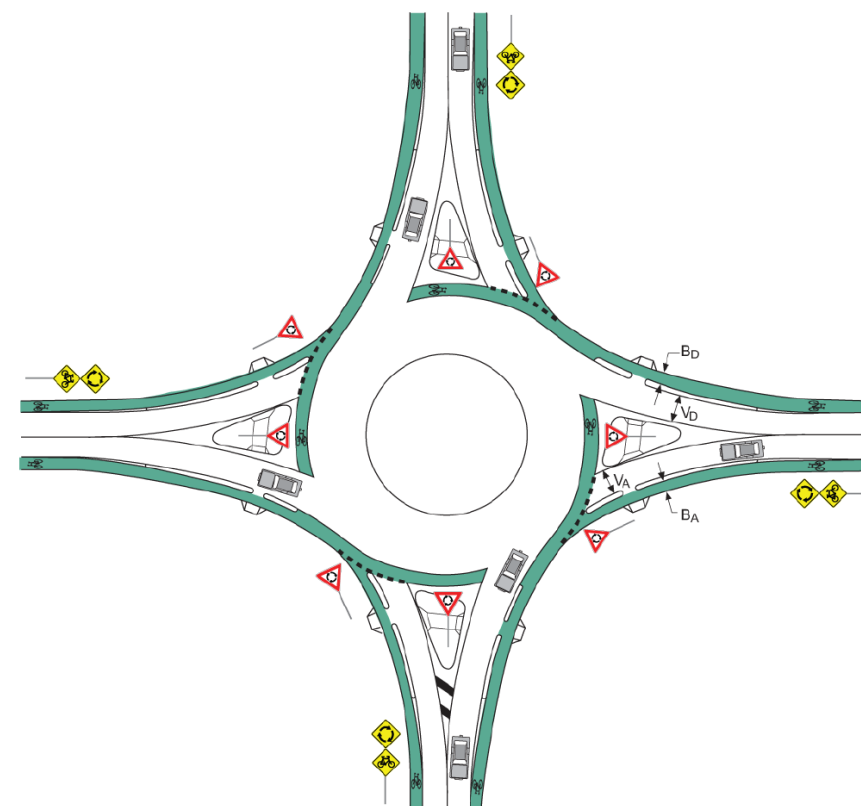


Figure C-21: Accommodating Cyclists in the Roundabout with separation



The diagram illustrates a 17.0+ foot wide road cross-section. The road is divided into several sections, each with a specific width and function:

- Verge:** The outermost section on the left.
- Shared Path:** A 3.0-foot wide section for shared use.
- Cycle Lane:** A 1.5-foot wide section for cycling.
- Traffic Lane:** A section for motor vehicles, with a width of 3 - 3.5 feet.
- Painted Median:** A 2.0-foot wide section separating the traffic lanes.
- Traffic Lane:** Another section for motor vehicles, with a width of 3 - 3.5 feet.
- Cycle Lane:** Another 1.5-foot wide section for cycling.
- Shared Path:** Another 3.0-foot wide section for shared use.
- Verge:** The outermost section on the right.

The total width of the road is indicated as 17.0+ feet at the bottom.

Larger roads of a higher order carrying higher volumes of traffic, which also travel at higher speeds, are traditionally more intimidating to inexperienced riders but are frequented by commuter cyclists and to lesser extent recreational cyclists. A safe environment for these users will not only enhance safety but will also encourage increased cycling and promote the evolution of inexperienced cyclists to commuter cyclists.

The recommended cross sections for roads typically used by commuter cyclists are given in **Figure C-24** and **Figure C-25**.

Figure C-24: Recommended Arterial Cross Section

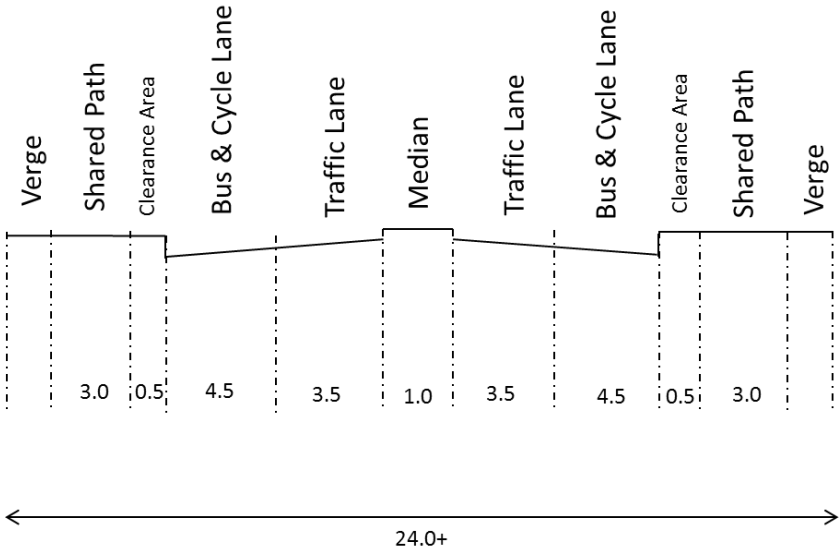
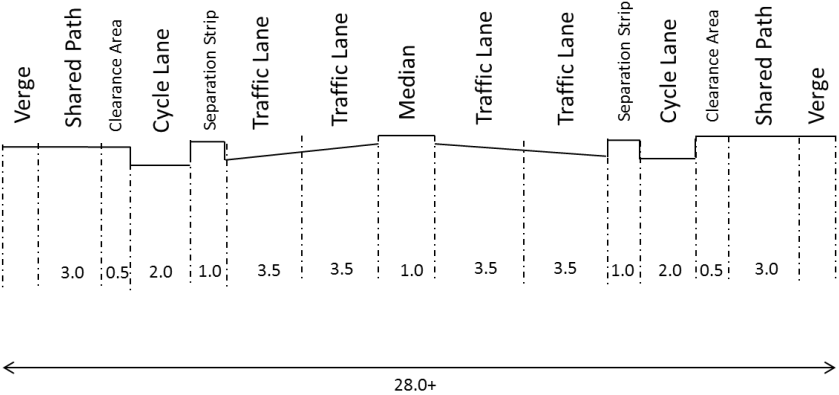


Figure C-25: Recommended Highway Cross Section



While the distinction between highways and arterials are not always clear the intention would be to implement the arterial cross section on lower speed higher order roads, or those with bus lanes. The highway cross section is more appropriate along the busy thoroughfares of Melville, including South Street, Leach Highway and Canning Highway.

In terms of recreational facilities along rivers and through parks a wide shared path (refer to **Figure C-26**) is recommended, where walker and cyclist volumes are high and where interaction between various users are problematic a separated facility is recommended (refer to **Figure C-27**).

Figure C-26: Recommended Shared Path Cross Section

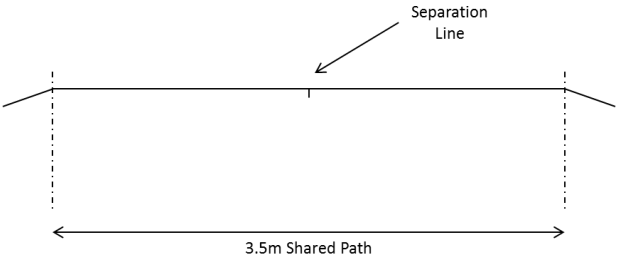
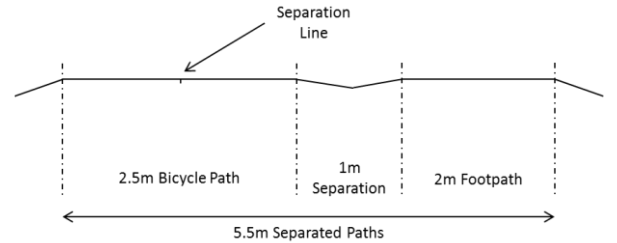


Figure C-27: Recommended High Activity Path Cross Section



In order to promote the consistent implementation of cycle infrastructure throughout the City of Melville it is recommended that all projects relating to the implementation or rehabilitation of the cycle network be constructed to one of the above recommended cross sections, whichever is most appropriate.