City of Bunbury

Bicycle Plan

Prepared for City of Bunbury

April 2010
# City of Bunbury Bicycle Plan

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EXECUTIVE SUMMARY

Cardno Eppell Olsen (Cardno) has been retained by the City of Bunbury to develop a bicycle plan that maximises the efficiency and effectiveness of the existing bicycle network and enhances bicycle facilities for all users. The proposed plan has been designed to be ambitious in scope; not merely improving the existing path network but greatly expanding casual, commuter and recreational routes to create a high quality, safe and attractive environment for cycling through the City. In order to achieve this, an audit of the existing road and pedestrian path networks has been completed by performing a visual inspection of paths along the current and proposed Bicycle Network routes, and on the primary road network in the City of Bunbury. The results of this audit have been collated and are presented herein.

The audit information has been utilised to determine the scope for future upgrades to the cycle network and includes consideration for future road upgrades and strategic bicycle path planning. In addition, key local activity nodes (schools, recreation centres, parks, shopping etc.) were identified in order to determine the most suitable locations for potential cycle routes in the City.

Cyclists were disaggregated into three groups (casual, commuter and recreational) and identified as having differing needs. A cycle network was developed to meet the needs of each of these groups with regard to upgrades to the existing path network. Additional shared paths have been proposed in order to improve connectivity for casual and recreational cyclists, with reference to identified trip generators and links between residential, retail, education and employment nodes. Higher order commuter cycling links have also been proposed along major connecting routes for efficient access between communities in the City of Bunbury and access to activity centres outside the City boundaries.

A major component of the commuter bicycle network is the proposed Dalyellup-Bunbury-Eaton cycleway. This infrastructure is intended to form the main backbone for commuter cycling and to create a high quality, efficient and safe path to the Bunbury CBD from outlying residential suburbs.

A series of maps has been created which provide information on the existing and proposed future bicycle network. The majority of key activity nodes within the City are proposed to be connected by legible, off-street paths, thereby reducing the need for casual cyclists to use the road network. Those routes identified as popular for pedestrian, primarily consisting of recreational routes along the Leschenault Inlet and ocean front areas have been designated as Recreational Shared Path links (RSP). This represents a higher standard of infrastructure that is consistent with frequent use by both cyclists and pedestrians. Infrastructure improvements to the existing on-street and off-street path network have been summarised including an estimate of the costs and priorities associated with the construction of each link.
Data compiled during the infrastructure audit identified some key constraints in the existing road and path infrastructure and, where these constraints could materially impact upon the proposed bicycle network, remedial actions have been recommended. A series of upgrades has also been recommended, relating to remedial maintenance of the proposed bicycle network. This ensures a consistent, high quality experience for users, and these are highlighted in a series of maps for the required remedial maintenance works with specific information on individual links.

Promotional opportunities have been identified to increase the bicycle mode share amongst the City’s resident population. Recommendations include circulation of cycling maps to schools and businesses, education programs for cycling safety in schools, and consideration for promotional events that can be used to support cycling through the City. Policy measures have also been suggested to continue the progressive approach the City has shown through bicycle parking policies. One of these recommendations involves the inclusion of bicycle paths along higher order roads during structure planning.

The existing pedestrian path network was observed to be of a relatively high quality. While lacking critical connectivity between local neighbourhood centres, the measures required to improve the casual path network to the desired standard have been judged as relatively minor. This has allowed for a more ambitious treatment of commuter and recreational paths. Enhancements to the Ocean Drive ocean front path and along Koombana Drive are envisaged to form a coherent, high quality link that may be promoted as a tourist destination in itself. The proposed commuter cycleway is intended to converge in the Bunbury CBD with prominent public end-of-trip facilities including secure, undercover bicycle parking, lockers and showers to support cycling modes for work trips. When completed, the measures proposed will contribute towards a cycling friendly City, moving towards the goals outlined in Bunbury’s City Vision.
1. INTRODUCTION AND PROJECT INCEPTION

1.1 Project Methodology

The City of Bunbury identified the need to develop a strategic bike plan to consist of a review of existing cycling infrastructure, including local routes, Principal Shared Paths and recreational paths within the City, resulting in the development of a planning and action plan framework identifying opportunities and constraints associated with the existing infrastructure network and proposed expansion of this network in the future. The proposed framework is complemented by a detailed implementation program and associated order of magnitude cost estimates.

Cardno Eppell Olsen has undertaken the development of a Local Bicycle Plan for the City of Bunbury based upon the methodology shown in Figure 1. Through the course of the project, improved cycling infrastructure opportunities have been identified for the City. Recommendations on the preferred framework to address these infrastructure opportunities have been explored in the context of future planning. This updated Local Bike Plan would supersede the existing Bunbury Bike Plan which has been in place since 1986.

**Figure 1** Project Methodology

![Project Methodology Diagram]

The following is a brief synopsis of the steps involved in delivering the Bunbury Local Bike Plan.
1.1.1 Study Area Familiarisation and Evaluation

Cardno Eppell Olsen has been commissioned to propose cycling infrastructure and policy for the City of Bunbury, including liaison with adjoining Shires. The study area for this Bicycle Plan extends up to the boundaries with the Shires of Capel, Harvey and Dardanup, and is shown in Figure 2.

Figure 2  City of Bunbury Study Area
An accurate understanding of the operation and effectiveness of the existing bicycle network is paramount to evaluate and assess opportunities and constraints. To fully appreciate the functionality of the existing bicycle network, Cardno Eppell Olsen has conducted meetings with City of Bunbury representatives to understand key areas of concern, existing policies and to discuss broader strategies to encourage greater cycling mode split. The outcomes of these discussions have been used to inform the primary direction and focus of the study.

Key cycling generators within the study area have been identified and are displayed in Figure 37 (see page 63), with assessment of likely user types and infrastructure best suited to these cyclists discussed in Section 1.4. A comprehensive saddle survey (survey conducted by bicycle) of existing infrastructure has been undertaken, to understand provision, connections and condition. This survey has identified existing infrastructure deficiencies as well as opportunities and constraints associated with potential cycling improvements in and around the City of Bunbury. This survey has focused upon existing bicycle routes and potential future bicycle routes.

1.1.2 Stakeholder Consultation

In order to maximise community input into the proposed bike plan network, extensive stakeholder consultation has been undertaken to enable constituents to voice their concerns, ideas, identify opportunities and constraints. Consultation has been completed in three stages:

- Initiation and directions meeting with the City of Bunbury prior to network evaluation and route planning studies during the study area familiarisation and evaluation phase of this project;
- Stakeholder consultation with local government, community groups and regional representatives following initial network evaluation and route assessment tasks; and
- Direct community engagement through dissemination of a survey questionnaire distributed at local cycling activity generators.

Through this consultation process, Cardno Eppell Olsen has conducted meetings with local representatives of:

- City of Bunbury planning, engineering and executive branches;
- Main Roads WA;
- Department of Transport (BikeWest);
- South West Development Commission;
- Shires of Capel, Dardanup and Harvey;
- Bunbury Region Roadwise Committee;
- Bunbury Chamber of Commerce;
- Local bicycle user groups; and
Other interested residents.

In addition to stakeholder discussions with specific community groups, Cardno Eppell Olsen developed a questionnaire for distribution to the local community. This survey instrument has been tailored to determine community attitudes and perceptions regarding the existing infrastructure, its effectiveness and quality to assist in improving and expanding local bicycle infrastructure. The survey questionnaire has been disseminated at major local bicycle trip generators including bicycle shops, South West Fitness Centre, libraries and City offices and through local bicycle groups to capture the widest range of existing cyclists (and potential cyclists).

The survey instrument designed by Cardno Eppell Olsen and approved for distribution by the City of Bunbury is documented in Appendix A.

1.1.3 Network Planning

A review of existing cycle and planning background documentation has been undertaken including the Bunbury Integrated Land Use and Transport Vision 2030, Strategic Vision 2005 - 2020, existing Bunbury Local Bike Plan and relevant Local Government policies held by the City of Bunbury and the Shires of Capel, Dardanup and Harvey.

A series of Local Bicycle Route Network Plans has been prepared focused upon each of the representative bicycle user types, and consistent with the goals, strategies and policies indicated in background documentation. These plans include:

- Casual routes constituting primarily off-street shared paths connecting cycling activity attractors to maximise safety and connectivity within the network;
- Commuter routes between residential and commercial districts, incorporating existing popular cycling nodes and focused primarily upon on-street infrastructure; and
- As Bunbury is a popular area for recreational cyclists and the requirements of this target market are somewhat different to casual and commuter cyclists, a variety of cycling circuits, based upon existing cycling patterns and from discussions with recreational cyclists and bicycle user groups will be proposed, combined with commuter routes where applicable.

The City of Bunbury shares boundaries with the adjacent Shires of Capel, Dardanup and Harvey. In order to maximise the effectiveness of the proposed bicycle network, connections between proposed infrastructure in the City and attractors in the adjacent Shires have been considered. This will have the benefit of establishing a broader appeal for cycling in the greater Bunbury region and assist in attracting cyclists to Bunbury from nearby Shires.
Consultation throughout the network planning process has enabled local stakeholders to inform the proposed bicycle network, based upon local knowledge and existing and desired route choice.

1.1.4 Infrastructure Assessment and Prioritisation

A schedule of recommended bicycle infrastructure improvements has been developed using information derived from the questionnaire and saddle survey observations. This schedule includes specific priorities for infrastructure types and locations with an indication of potential constraints which may require additional investigation, detailed design or assessment. In addition to the network itself, end-of-trip facilities have also been considered, with existing facilities and policies assessed for sufficiency.

Deficiencies in the existing bicycle network have been identified, with a schedule of remedial actions proposed to improve the operational safety and attractiveness for bicycle infrastructure in the City. Ongoing maintenance works have been identified, with suggestions for modifications to existing regular maintenance schedules to mitigate recurring issues.

An order of magnitude cost schedule has been prepared for infrastructure upgrades, with estimates based upon industry construction unit rates sourced from existing data, in addition to detailed information provided by the City.

Priorities for implementation of works will be proposed which will incorporate a multi-criteria evaluation based upon usage characteristics, planned road pavement and footpath infrastructure improvements, costs of implementation and the condition of existing infrastructure input variables. The proposed infrastructure improvements will be prioritised through to a 5-year horizon for gradual implementation. Longer term triggers that will require future infrastructure have also been identified.

The implementation framework and action plan in Section 7 proposes the infrastructure improvements, maintenance requirements, cost estimates and priorities.

1.1.5 Cycleway Feasibility Assessment

Cardno Eppell Olsen have investigated the opportunities and constraints associated with a potential cycleway linking Bunbury with Eaton and Dalyellup. The proposed cycleway would be designed for longer-distance commuters residing in these outlying communities. By establishing a safe, efficient bicycle connection, cycling as an effective alternative transport mode will be promoted. Integration of the potential cycleway with the proposed Bunbury Local Bicycle Network is critical to maximise the effectiveness of the broader system.
As part of this feasibility assessment, alignment opportunities have been investigated, with evaluation of existing pedestrian and traffic facilities and potential on street infrastructure. A preliminary concept design of a potential cycleway has been developed and includes consideration of intersection requirements, additional road space requirement and horizontal and vertical alignment constraints. Base information regarding existing road and intersection geometries has been sourced from the City of Bunbury and Main Roads WA, where applicable.

Opportunities and constraints associated with the planning and implementation progress for this project, as well as legal agreements and partnership opportunities have been addressed in the context of land requirements, cost sharing structures and future planning implications.

Planning for a cycleway between Bunbury and Eaton is primarily influenced by the timing of the proposed Bunbury Port Expansion Project. This project will potentially sever the existing link between these two areas, currently along Estuary Drive. This expansion therefore constitutes the major trigger for the viability of any upgrades to the existing cycling infrastructure. The proposed cycleway concept has been predicated on Estuary Drive remaining for a minimum of 10 years. The severing of this link at some future time will require further investigation of cycling links.

Discussion of route alignment choices, existing constraints and triggers associated with the development of the Dalyellup-Bunbury-Eaton cycleway are included in Section 8.

1.2 Local Focus

The City of Bunbury is a Local Government area located approximately 180km south of Perth and has a population of over 57,500 residents, with some 32,000 of these located within or in close proximity to the Bunbury City Centre. The City of Bunbury has previously undertaken a number of bicycle planning initiatives, with the most recent study completed in 1986. However, substantial growth both in population and development in recent times has stimulated a detailed review of the planning instruments relating to bicycle infrastructure in the City.

Recent Australian Bureau of Statistics (ABS) census data suggests that Bunbury is experiencing significant increases in population, with projected increases of up to 70% over the next 25 years. The majority of this growth is likely to occur in the area surrounding the existing Bunbury Regional Centre which would imply that expansion of the existing bicycle infrastructure to service the surrounding areas will be critical for effective operation of a comprehensive network. It is also for this reason that effective commuter links between Bunbury, Eaton and Dalyellup - two major greenfields developments - would be highly beneficial to promote increased adoption of cycling modes as an alternative to private vehicle transport.
The City of Bunbury represents a unique element within the Regional Bicycle system, as the goals endorsed in the City Vision are closely aligned with the objectives of the Perth Bicycle Network (PBN) in the provision of large-scale, high quality and attractive bicycle links with a focus upon casual, commuter and recreational cyclists. As part of this focus, a Bicycle Plan for the City of Bunbury would progress the infrastructure in the City in a manner consistent with the City's vision, towards a comprehensive, effective and efficient network suitable for all users.

1.3 Regional Focus

Planning for a broader bicycle network would also involve providing links through to satellite developments within the City of Bunbury boundaries and to adjacent Local Government areas in order to improve the connectivity of the bicycle network across the region. A fundamental tenet of this regional focus would be an investigation of the essential infrastructure requirements associated with these connections and preliminary concept planning for a cycleway linking Bunbury to developments in Eaton and Dalyellup, including the development of appropriate and relevant concept design, review of potential responsibilities, strategic partnership opportunities and other opportunities or constraints.

In addition to the nearby suburban areas of Dalyellup and Eaton, there are a number of regional communities within 30km of the Bunbury CBD. These communities represent potential bicycle commuting nodes for which additional consideration may be required. With the expansion of the Principal Shared Path (PSP) south along the Kwinana Freeway extension, the availability of on-street cycle lanes along the new Forrest Highway and upgrades to regional connections to incorporate 1.5m sealed shoulders for use by cyclists, longer distance commuting is encouraged into regional centres. This type of activity should be encouraged through policy and infrastructure initiatives wherever feasible.

A discussion of regional cycling initiatives is included in Section 5.2.

1.4 Cyclist Categories

Bicycle mode choice is dependent upon a number of factors including population demographics, topography of the region, weather effects and available cycling infrastructure. Cycling is increasingly becoming a viable alternative to other transport modes for all purposes, with increases in commuting, recreational and other general purpose trips for all ages. However, cycling infrastructure must be provided to facilitate cycling activities by all. For this reason, infrastructure should be designed to cater for the requirements of a number of types of cyclist. For the purposes of this bicycle plan, cyclists have been categorised into three main groups.
1.4.1 Casual Cyclists

Casual cyclists predominantly consist of family groups and young / inexperienced cyclists who tend to use the off-street path network to minimise conflict with motor vehicles. It is likely that casual cyclists will not travel a great distance, but rather tend to cycle for errands and other specific tasks, as well as for fitness and recreation. The bicycle plan, in addressing the needs of casual users, provides links between typical origin / destination pairs within a limited region; for instance, from the centre of a residential community to local shops, schools and attractions. Therefore, the efficiency of available routes is not considered of primary importance, rather a comprehensive network of interlinked shared paths is preferred.

The proposed network provides sufficient connectivity for casual cyclists to reach their destinations as safely as possible. A focus on intersection legibility and wayfinding by providing infrastructure such as bicycle handrails and signage improves safety for casual riders who use the shared path network. Signage is also necessary to allow cyclists over the age of 12 to use the path. It is important to note that a comprehensive network of shared paths is not necessarily required for quiet streets within a residential neighbourhood, but rather that shared paths should be available along major routes between these neighbourhoods and local attractors.

1.4.2 Commuter Cyclists

Commuters have a different and well defined set of needs, tending to travel within the roadway, sharing the road with vehicular modes in preference on off-street cycling infrastructure. Concerns for commuter cyclists generally result from interactions with other road users. Safety is again the priority, as well as efficient and direct access to major links external to the local community. Commuters tend to be habitual riders with experience and confidence in road riding. Travel speed is generally higher than what casual cyclists achieve which makes them more suited to riding along the roadway, rather than along the pedestrian network. It is therefore expected that for quieter suburban streets and low speed urban environments, specific bicycle infrastructure is not necessary.

An example of an efficient commuter network is the Principal Shared Path (PSP) which has been constructed alongside the Kwinana Freeway extension, connecting through to on-street bicycle lanes along Forrest Highway. This link enables high speed, efficient bicycle transport along the freeway while retaining the inherent benefits of separation from traffic. The PSP continues throughout the Perth Metropolitan Area alongside major transport links such as the Kwinana, Mitchell and Graham Farmer Freeways and along the Fremantle, Armadale and Midland train lines. Intersections along these routes accommodate the needs of cyclists either through the use of grade separation, or through provision of safe crossing points where applicable.
1.4.3 Recreational Cyclists

A substantial cycling demographic, particularly in and around Bunbury, comprises recreational cyclists who ride for fitness, and as part of social riding groups. Again, these cyclists tend to be relatively confident riders capable of reaching speeds approaching the posted limit. Recreational routes are not necessarily designed to connect destinations, or to provide efficient one-way connections, but rather to present a circuit which provides picturesque or challenging components for the cyclist. Therefore, recreational routes should not be designed merely as connections, but rather as a destination in themselves.

Recreational riders can also constitute casual riders accessing recreational paths with friends and family, for recreation or fitness purposes. Cycling speeds tend to be very slow, so high quality off-street paths are substantially more beneficial. Regardless of their preferred cycling speed, recreational cyclists tend not to use the same links as other demographics, preferring routes near to natural features, connecting to bike trails and locations with a scenic outlook. Tourists who access the sights of Bunbury by bicycle are an important constituent of recreational cyclists.
2. BICYCLE PLANNING AND POLICY CONTEXT

2.1 Metropolitan Transport Strategy (1996)

The *Metropolitan Transport Strategy* (MTS) is a strategic transport plan for the Perth Metropolitan Region for the years 1995 to 2029, published by the Department of Transport and others. The MTS recognises that Perth is, and will continue to be, a car-dominated city. However, the MTS is clear that current trends in car use, as opposed to other modes of transport, are either not sustainable or would incur great costs to the community if the were to continue unrestrained.

A key objective of the MTS relates to the improvement of pedestrian and cycle access ways. A further objective of the MTS is to more than double the non-commercial mode share of cycling trips to 11.5% of non-commercial trips by 2029. Current trends indicate that if no action is taken, cycling will account for only 8.0% of non-commercial trips at the end of this time. As such, prompt action is needed to achieve this stated goal. Relevant statistics from the MTS 1991, 2029 estimated and 2029 target modal split for non-commercial trips in the Perth Metropolitan Region further support the need for action.

Bunbury has evolved towards a regional centre with a relatively dense core and well defined suburban areas. As such, many of the objectives and recommendations of the *MTS* are applicable to the City of Bunbury, particularly with respect to alternative transport modes.


*Bike Ahead* is a strategy for bicycle transport within the Perth Metropolitan Region, published by the Government of Western Australia. This strategy is built on the understanding that whilst 21% of cycling trips are for recreation, cycling is utilised primarily as a transport mode. The Bike Ahead strategy is complimented by the Perth Bicycle Network Plan (PBN), which lays out infrastructure priorities for the development and maintenance of cycle routes in the Perth Metropolitan Region. The PBN is overseen by BikeWest, a cycling-focused department within PlanningWA.

The Bike Ahead strategy builds on 12 key objectives of the MTS and adds three further objectives. In 1996, these objectives were written as follows:

1. BikeWest to continue to be an advocate for cycling facilities and services and to co-ordinate cycling programs.
2. Review legislative basis for cycling and cycling facilities as a recognised transport mode.
3. Establish more effective links with road safety programs.
4. Introduce safe cycling programs targeted at motor vehicle users and pedestrians.
5. Identify, develop and signpost safe routes to defined local destinations including schools and commuter routes.
6. Encourage bicycle-friendly local area traffic management.
7. Provide appropriate on-road and published information and traffic signing.
8. Integrate bicycle use with public transport.
9. Promote design standards which encourage cycling without the need for totally separate facilities.
10. Define, establish and maintain continuous local cycling routes.
11. Define protect and implement a regional cycle network.
12. Incorporate cycle requirements in local government planning schemes and policies.
13. Educate cyclists and other road users about rights, needs and responsibilities of cyclists.
14. Ensure bicycle facilities serve the needs of all cycle users.

The proposed City of Bunbury Bike Plan is intended to mirror the objectives of the Bike Ahead Strategy and Metropolitan Transport Strategy and to outline a framework for continued maintenance and improvement of the Bunbury bicycle network and across the City boundary into adjacent shires.

2.3 Bunbury’s City Vision Strategy (2007)

The City of Bunbury’s City Vision Strategy is designed to “detail the vision and attributes for the city; the goals objectives and strategies; and the commentary, analysis and final recommendations.” Therefore, this document represents a guiding framework for the development of infrastructure and planning within the City of Bunbury, as it applies to all sectors. Cycling is included as part of a suite of recommendations to meet the objectives defined in the strategy:

- Incorporate energy conservation measures in all planning and development control processes and procedures.
- Develop, enhance and maintain a sense of community, place and local identity in existing and proposed urban areas throughout Greater Bunbury.
- Public interaction should be encouraged through improvements to pedestrian and cycle ways and facilities where people can meet.
- Establish a partnership with the Office of Crime Prevention and implement actions that will improve community safety, security and crime prevention.
- Pedestrian and cycle ways should form part of a comprehensive system for the City.
City Vision outlines several projects that may effectively promote or be enhanced by increased bicycle use. These include:

- Connection of pedestrian and cycling facilities along the Koombana Bay and Leschenault Inlet foreshores with the CBD and local cultural and environmental heritage sites.
- Downgrading Blair Street, which would improve cycling opportunity and safety along the existing connection to Koombana Drive.
- Modification of parking management strategy to incorporate a user-pays system with a transition to localised multi-deck parking. This transition would benefit park-and-cycle modes in addition to making cycling a more attractive alternative mode for commuters.
- Provision for tourist activity centres, accessed by bicycle, along the inlet and foreshore with easy connection into residential areas as well as the CBD.
- Modification of the Outer Harbour to increase bicycle and pedestrian access and to promote tourist and recreational activities along the foreshore.
- Redevelopment of Strickland Street, which would improve pedestrian and cycling access.
- Improved connections between College Grove and adjacent trip attractors, including university, TAFE and health campuses and connections across Robertson Road.
- Redesign of the Preston River to enhance the cycling and pedestrian environment and to improve connectivity to the Glen Iris and Moorlands area.
- Consideration for future pedestrian and cycle links east to Eaton prior to, and after the future port expansion which will ultimately sever the existing Estuary Drive link.
- Generalised improvement of pedestrian and bicycle facilities throughout the City of Bunbury to establish better connections to activity centres, including local schools.

2.4 City of Bunbury Strategic Plan (2007)

The City of Bunbury has developed a Strategic Plan that proposes six strategic objectives:

- Improve relationship with state, federal and other Local Government;
- Strengthen the City of Bunbury’s governance and leadership;
- Deliver major capital projects on time and on budget;
- Implement City Vision;
- Promote ecological sustainable development of the City’s built and natural environment; and
- Develop social capital.
The development of the City of Bunbury Bicycle Plan addresses these objectives through:

- Liaison with local residents and stakeholders in addition to adjacent councils and state government agencies to allow input from all levels;
- Proposed upgrade of existing bicycle infrastructure as well as construction of PSP quality commuter and recreational paths throughout Bunbury;
- Integration of the proposed bicycle network into local and state planning policies, including Bunbury’s City Vision and Neighbourhood Centres Strategy;
- Encouragement of bicycle activities for fitness and transport through policy, infrastructure and education initiatives; and
- Provision of a vision for cycling in Bunbury that will assist in the development of community cycling programs and attractions.

### 2.5 Other Local Government Policies

The City of Bunbury has developed the *Local Planning Policy: Access and Parking for Pedestrians, Bicycles and Vehicles*. This document sets out requirements for developments with regards to parking quantum for both vehicles and bicycles. The system employed aligns bicycle parking requirements to the *Town Planning Scheme No. 7* land use tables, enabling regulation based upon established planning permit procedures.

Three (3) classes are described which correspond to those in *Australian Standards AS2890.3: Bicycle Parking Facilities*. For the most part, Class 3 facilities have been determined sufficient, specifying a minimum standard of a bicycle rack for secure lockup. Many land uses are required to have additional provision for employees and residents, with Class 2 facilities constituting a locked compound with restricted access to key holders.

The development of planning policies specifying bicycle end-of-trip provisions is considered an important effort by the City to integrate cycling into everyday transport mode choice decisions.
3. BICYCLE INFRASTRUCTURE DESIGN CONTEXT

The design of bicycle infrastructure should be consistent with Main Roads WA Cycling Infrastructure Policy and Austroads’ Guide to Traffic Engineering Practice: Part 14 – Bicycles (1999) referred to as (Austroads’ Guide) in this report. These documents provide the basis for the design of the geometry and materials to be used for bicycle infrastructure to ensure safe working operation. Of particular importance to the City of Bunbury bicycle infrastructure are policies associated with the positioning and design of bollards and grab rails, signage and pathways.

All infrastructure upgrades proposed will be assumed to be compliant with both Main Roads and Austroads guidelines. Excerpts from these policies as they pertain directly to design have been included for reference.

3.1 Main Roads WA Cycling Infrastructure Policy (2000)

The following excerpts from the Main Roads WA policy reflect requirements that pertain particularly to the existing infrastructure within the City. Further to this, Austroads’ Guide represents the primary design criteria for both on-road and off-street infrastructure as well as policy and implementation guidance.

**Signage**

Traffic control signs and lines will be in accordance with Austroads Part 14, Section 9 and AS1742.98. Navigation signs will be provided at locations where guidance on the continuity of the cycle route is considered necessary in accordance with Main Roads Bicycle Directional Signage guidelines and DOT9 requirements.

Main Roads will provide bicycle pavement symbols on edgeline separated sealed shoulders in built up areas suitable for cycling in accordance with Austroads Part 14 Section 9.6 except that symbol spacing, will be at 400m intervals.

"No Through Road" signs on roads which lead to bicycle facilities will include "except for bicycles" information to show that the road is still part of a continuous bicycle route.

**Grab Rails**

Devices such as fencing and bollards may be used to discourage use of motor vehicles on shared paths but shall be positioned to minimise disruption to cyclists. Bollards should be placed on local access paths and not on the through path. Warning of the location of bollards in paths shall be given in accordance with Austroads Part 14, Section 6.7.3. Raised pavement markers shall not be used.
Removable bollards should be designed and installed to leave the path safe with nothing protruding above path level when the bollard is removed or lowered. Grab rails will only be installed on shared paths near road crossings that are frequently used by aged or disabled pedestrians and alongside median openings. They will be fabricated and positioned in accordance with Main Roads Drawing 9831-5649, which can be viewed in the Technical Standards section of the MRWA website. Grab-rails should never be installed in the centre of footpaths or shared paths.

3.2 Austroads Guidelines for Traffic Engineering Practice (1999)

Austroads’ Guide has been adopted as fundamental design criteria for the provision of on and off-street paths, signage, grab rails and other bicycle infrastructure. Through this document, an acceptable minimum standard can be maintained, to ensure safe operation for cyclists, pedestrians and vehicular traffic.

3.2.1 Shared Paths

The following provides a brief synopsis of the considerations made for proposed works and priorities:

- Main Roads WA recommends an absolute minimum shared path width of 2.0m with 500mm clearance to all obstructions, including the roadway.
- Primary focus will be on recommendations for works required to bring shared paths to this level;
- Shared paths approaching 2.0m width are considered a reduced priority, provided they are currently in good repair and without obstruction;
- For routes anticipated to have a high usage by cyclists or pedestrians, widths of path should be increased to reflect the increased opportunity for passing manoeuvres; and
- Austroads’ Guide suggests a desirable minimum width for shared paths of 2.5m and up to 3.5m wide for busy shared paths, with additional clearance to obstacles.

Proposed changes and upgrades to the commuter shared path network are described in detail in Table 3 and illustrated in Figure 40.

For the purpose of the City of Bunbury Bicycle Plan all designated casual shared paths have been assumed to be upgraded to a 2.0m minimum standard, consistent with low-speed applications. It is intended that links likely to attract higher speeds or greater volumes of cyclists will be designated as commuter or recreational paths. Recreational shared paths and commuter paths as designated should be designed to a 3.0m to 3.5m standard, consistent with the objectives of the Bicycle Plan and the guidelines.
Additional information regarding shared path widths is shown in Figure 3, an excerpt of Austroads’ Guide.

**Figure 3**  
**Shared Path Guidelines**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Overall Width of Path</th>
<th>Predominant Path Purpose</th>
</tr>
</thead>
</table>
| A        | 2.0m                  | Commuting and Local Access  
|          |                       | - Typical circumstances of use  
|          |                       | - Constrained conditions  
|          |                       | - 'Tired How'  
|          |                       | - Low use  |
| B        | 2.5m                  | Commuting and Local Access  
|          |                       | - Regular use  
|          |                       | - 20 km/h  |
| C        | 3.0m                  | Commuting  
|          |                       | - Frequent & concurrent use in both directions  
|          |                       | - 30 km/h+  |
| D        | 3.0m                  | Recreation  
|          |                       | - Regular use  
|          |                       | - 20 km/h  |
| E        | 3.5m                  | Commuting and Recreation (concurrent)  
|          |                       | - Frequent & concurrent use in both directions  
|          |                       | - 30 km/h+  |
| F        | 4.0m                  | Major Recreational Path  
|          |                       | - 20 km/h  
|          |                       | - Heavy & concurrent use in both directions  |
| G        | 4.0m                  | Major Recreational Path  
|          |                       | - Regular group rides  
|          |                       | - Heavy & concurrent use in both directions  
|          |                       | - Generally low speed due to congestion  |
3.2.2 Cycle Lanes and Sealed Shoulders

Austroads’ Guide specifies the conditions under which various on-road bicycle infrastructure treatments are recommended. Available infrastructure options include:

- Provision of wider kerbside lanes (with advisory line markings warning of cyclist use);
- Sealed shoulders; and
- Exclusive bicycle lanes, depending upon the environment.

The Austroads’ Guide states that for traffic volumes less than 3000 vehicles per day (vpd) and based upon an urban standard, no specific bicycle infrastructure is required. The recommendations made in this report regarding on-road cycling infrastructure may exceed minimum Austroads requirements in some proposed locations. The proposed bicycle plan addresses limitations in route choice allowed by the existing road network and speed or type of vehicular traffic currently using the roadway. Information regarding the specific infrastructure proposed has been presented in Table 2 (see page 67). The Austroads design widths for wide kerbside bicycle lanes are shown in Figure 4. These design guidelines also contain additional information for the provision of on-road bicycle facilities in the presence of on-street parking and other contingencies.

**Figure 4**  Wide Kerbside Lane Guidelines

Where road traffic volumes exceed 3,000 vpd or the roadway environment requires additional consideration, an exclusive on-road cycle lane is the preferred option. Figure 5 shows the design widths for exclusive on-road cycle lanes at 60km/hr and 80km/hr roadway speeds.
It should be noted that upgrades to Spencer Street have already been undertaken by the City in conjunction with BikeWest. These upgrades provide an excellent example of the efficacy of the Austroads’ Guide. The existing Spencer Street infrastructure is described in Section 5, with upgrade works described in Section 7.

### 3.2.3 Signage

Bicycle signage assists in identifying paths designed for the use of cyclists, either on-street or within the footpath infrastructure. Main Roads WA specifies three types of signage, consistent with that adopted throughout the Greater Perth region. Signage can be classified in the following manner:

- Warning;
- Regulatory; and
- Guidance.

Other signage that may be employed includes warning information, enforcing priority at path intersections and road crossing points or advising cyclists of upcoming hazards. Warning signage tends to be used sparingly, but can greatly improve the operational safety of the bicycle network.
Guidance signage provides directional information, including destination distances and directional arrows at necessary intersections. These signs aim to maximise the proportion of cycle journeys spent on the cycle network by ensuring that users are aware of available cycling infrastructure at each decision point. Guidance signs should be provided at locations where guidance on the continuity of the cycle route is considered necessary. Ideally, paths should be marked continuously across intersections with indications of path direction and possible destinations at T-junctions and terminations. Signage can provide a considerable benefit to both safety and wayfinding if managed well.

Regulatory signage is placed along shared pedestrian/cycle paths, permitting cyclists who are over the age of 12 to legally use the off-street cycle network. Both linemarking and free-standing signage is suggested.

Figure 6 through Figure 8 show examples of each type of signage, as described in Austroads’ Guidelines.
Each of these types of signage should be employed where applicable according to Austroads and Main Roads guidelines for use.
4. INFRASTRUCTURE AUDIT AND DATA COLLECTION

In order to assess the effectiveness and extent of the existing bicycle path network within the City of Bunbury, an audit was conducted of roads and footpaths currently designated as shared paths as well as prospective Local Bicycle Routes. Potential off-street shared path locations were determined based upon proximity to potential trip attractors such as schools, shopping precincts, parks and other recreational activities. The audit comprised an assessment of the quality, condition and type of riding surface from the perspective of a bicycle user, available road widths, peak traffic flows and other infrastructure considerations.

In addition to the audit information collected by Cardno, the results of previous pedestrian path audits have also been used to provide a comprehensive picture of the existing infrastructure.

The data collected from this audit provides a base from which recommendations for upgrades and improvements to the City of Bunbury bicycle network can be made. A compilation of issues raised during the infrastructure audit have been documented in Section 5.

The information gathered during the infrastructure audit has been used to determine strategies by which to improve the cycling experience of residents of and visitors to the City of Bunbury.

4.1 Local Government Initiatives

Internal Path Inspection

The City of Bunbury has a policy by which periodic path audits are undertaken to provide information regarding composition and quality measurements for footpaths and shared paths in the City. This policy greatly improves the capacity for Bunbury to plan future upgrades and maintenance of footpaths, and to recognise those paths in need of maintenance. In addition, guidelines for path inspection have been codified and represent a comprehensive document for standardisation of reporting across locations and over time.

The information obtained through the City’s path inspection initiative has been invaluable in the preparation of this Bicycle Plan.
Bicycle Parking Policy

The City of Bunbury is operating in a particularly progressive manner with respect to cycling transport and urban planning in general. Through revisions to vehicle parking policies and the inclusion of bicycle parking as part of the Town Planning Scheme requirements for development, cycling provisions can be planned for at trip destinations. The broad future plans for concentrated mixed-use centres as shown in the neighbourhood and activity centres policy provide an excellent platform for the success of cycling as an alternative mode. By clustering residential communities around activity generators, shorter trips can result – increasing the likelihood that pedestrian and cycling modes will be employed by residents.

4.2 Methodology

The design ethos for the proposed bicycle plan focuses on separate hierarchies for commuter/recreation and casual riders. The casual path network is proposed to be almost exclusively off-street and is designed for relatively slow speeds and a high degree of safety for both cyclists and other path users. The commuter/recreational network consists of two components: high speed, efficient commuter links connecting residential neighbourhoods to business precincts and high quality recreational links for use by all cyclists and designed to promote cycling for pleasure through scenic locations. Recreational links may also give ancillary benefits for tourism, dependent upon the quality and location of paths and the additional amenities and attractions adjacent to them.

A ‘saddle survey’ was undertaken along existing and proposed bicycle network. From this survey, the existing condition of road and path infrastructure was observed. Constraints and opportunities inherent in the geometry of the street network and existing path design were also assessed. These observations were combined with the results of the City’s path inspection audits to generate a comprehensive overview of the existing state of a potential bicycle network through Bunbury.
5. OPPORTUNITIES AND CONSTRAINTS

Bicycle usage may be broadly separated into two groups, transport and recreation. For commuters, transport generally implies a cycling route between home and work. This necessitates a high quality, efficient link that will enable the majority of residents to cycle to and from work safely and quickly. For this reason, the commuter network has been designed to bisect the residential communities south of Bunbury to Dalyellup and to provide a linkage east to the residential neighbourhood of Eaton. Destinations other than work will be accommodated either by the proposed off-street casual network, or the existing road network, for the most part. In contrast, casual riders tend to cycle to a more diverse range of trip attractors. These include such locations as schools, parks, shopping centres, sports facilities and community activities. The proposed off-street bicycle network is intended to link these through and between residential neighbourhoods to provide fine-grained, safe connections throughout Bunbury. Trip attractors have been identified in Figure 37 (see page 63), which also shows the casual and commuter/recreational path network.

5.1 Gaps

As a result of the infrastructure audit conducted on 7-9 October 2009 a number of gaps were identified. These gaps include physical deficiencies in infrastructure, damage to paths, sightline issues and missing connections. Specific issues identified with the existing infrastructure are fully described in Table 4 (page 80), with their locations shown in Figure 41 (page 79).

5.1.1 Off-Street Path Network

General observations pertaining to the existing shared path network were as follows:

- Good network of off-street paths;
- High quality concrete paths, rather than pavers which are unsuitable for cyclists;
- Most paths 2.0 metres wide;
- “Walk-It Bunbury” routes represent a great opportunity for casual cyclists;
- Great potential for a comprehensive network based upon existing infrastructure;
- Signage often confusing at ‘start’ and ‘end’ of paths;
- Wayfinding difficult as a result of grab rails, signage and red asphalt path locations; and
- Intersection design creates additional risks for cyclists in many locations.

Some of the observed deficiencies in the network may reflect changes in priority since the infrastructure was originally constructed. Commentary regarding these aspects of design is included below.
**Wayfinding and Signage**

The existing shared path signage throughout the City is largely insufficient, as implementation is erratic and in many places, confusing. Signage tends to be designed merely to inform and reinforce legal permission for use. Many signs show ‘end of shared path’ at intersection crossing points, regardless of shared path designation continuity and often conflict with line marking. An example of this is shown in Figure 9. This design format is no longer recommended for use as it is detrimental to wayfinding.

*Figure 9*  Examples of Existing Signage Deficiencies

Signage is a fundamental aspect of wayfinding, but does not represent the entirety of the concept. Other infrastructure elements also provide cyclists with path continuity and directional cues, and should not be neglected during design.
Red coloured asphalt paths are well recognised as high quality cycling paths. Therefore, the existence of a red asphalt path informs cyclists that infrastructure continues along in that direction, even in the absence of signage. Hudson Road provides an excellent example of a high quality, well used and safe path. This path runs through a very wide verge with a parallel access road on the north side. There are well established connections across to the retail precinct and trip attractors including play equipment on the south side. However, wayfinding issues exacerbated by the red colour of this path detract from its effectiveness. As shown in Figure 10, there are a number of paths that intersect at the eastern corner of the Hudson Road/Minninup Road intersection. The lack of signage at this location leaves the direction and destination of these paths ambiguous.

Figure 10  Example of Ambiguous Path Direction

Grab rails, in addition to their safety uses, also give cyclists visual cues regarding routes across intersections. The newer grab rail design, as shown in Figure 11, is a striking visual marker that is viewed as a safe crossing point. However in this case, there is no path provided on the other side. Grab rails should therefore be employed carefully, at desired crossing points along shared paths.

Figure 11  Grab Rails as Wayfinding
Grab rails

Grab rails are an important safety mechanism for cyclists as well as for prams and wheelchairs; they give cyclists something to hold when waiting at an intersection and allow them to remain astride their bicycles.

Grab rails throughout the City of Bunbury have been installed according to a specific engineering design which is detrimental to cyclists. Figure 12 shows an example of the typical intersection treatment for cyclists, at the intersection of Hastie Street and Yabini Court. This design consists of a large deflection across the intersection truncation with grab rails placed in the centre of the path. This design was previously employed to reduce the speed of cyclists on shared paths to improve crossing safety and to ensure the safety of pedestrians sharing crossing points. However, while this design does reduce conflict with other path and road users, it creates an obstruction for all cyclists. The aforementioned design has been used liberally throughout Bunbury, including at low volume, low speed intersections such as the example shown. A similar use for rails is to restrict path width on the approach to bends and grades, in an attempt to slow bicycle traffic. This type of speed restriction should not be employed due to the potential for harm to cyclists using the path.

Following the design recommendations in Austroads’ Guide, all grab rails should be placed on the left side of the approach, for those crossings deemed hazardous due to speed or traffic volumes. Grab rails in central medians should be viewed as the most critical, due to the relatively small storage space available. Grab rails may be deemed unnecessary at particular intersections along a shared path due to low traffic volumes and good visibility. If grab rails are deemed suitable, installation of high visibility units will have the greatest impact upon safety.
Path Environment: Ocean Drive / Back Beach Shared Path

An existing shared path runs along the beach adjacent to Ocean drive between Symmons Street and Hastie Street. This path represents a unique opportunity for a high quality path in the longer term; however there are some issues with the existing path that should be highlighted, both for remedial maintenance and for future planning of a recreational shared path.

A significant portion of the existing beach path has already been upgraded to a high pedestrian standard. While the features integrated have not necessarily been provided within the context of shared use, the basic infrastructure already exists for this section of path. The improvements made reflect on the potential of this path for both recreation and tourist appeal, as shown in Figure 13.

Figure 13  Quality Pedestrian Features

The length and quality of the proposed Ocean Drive cycle infrastructure implies that a significant investment will be required. Details of deficiencies in the current shared path and potential issues associated with future design are discussed further in Table 4 and Section 5.2, respectively.

5.1.2 On-Street Network

The on-street environment was assessed as part of the infrastructure audit from the perspective of commuter and recreational cyclists only, with the exception of intersection crossings. As a result, some assumptions were made regarding levels of confidence and speed for on-street routes. While it is not necessary that bicycles will travel at or near roadway speeds, it is assumed that cyclists will display a level of confidence to be comfortable with passing traffic and interactions with other vehicles at intersections. It is also assumed that cyclists will obey the road rules, within the precepts of standard practice, for the purpose of route design.
Roundabouts

Roundabouts are useful intersection design forms that modify priority in a well-understood and transparent manner. They are used in many cases for local area traffic management with a primary purpose to slow traffic in the dominant flow direction, particularly on long straight roads. In Bunbury, Victoria Street represents the pinnacle of this design concept. This has a number of flow-on effects:

- Roundabouts are difficult to navigate for on-road cyclists. They often cannot traverse the roundabout at roadway speeds, risking dangerous overtaking movements by traffic. For this reason, cyclists are recommended to ride in the centre of the lane whilst at the roundabout intersection. Vehicle drivers are often unaware of the risks of roundabout navigation by cyclists and are uncompromising in their provision of road space.
- Signalling around a roundabout is more complicated for cyclists, particularly right-turning movements where their approach may be obscured by central planting.
- There are methods by which cyclists can be protected, providing off-street paths for cyclists to navigate around the intersection, though these require a substantial amount of space and are unpopular with commuters.
- Streets with roundabouts have a greater impact upon the speed and safety of cyclists than for other road vehicles. Therefore, these streets do not provide a conducive environment for on-road cycle lanes or any type of cycle path.

Figure 14  CBD Roundabouts
Road Environment: Eelup Rotary

The Eelup Rotary constitutes the main access into Bunbury from the north, formed at the intersection of Australind Bypass, Koombana Drive, Estuary Drive and Bunbury Bypass. This large roundabout creates an artificial barrier between Bunbury and communities to the east, including Eaton, Australind and Glen Iris. The Eelup Rotary (Figure 15) has been identified by stakeholders and community members during consultation as a major detraction from the cycling environment to the east of Bunbury. The reason for this dislike is the inherent lack of safety for road cyclists using this approach. The large size of the roundabout results in high circulating speeds, which cyclists are unlikely to be able to meet. Overtaking while at the roundabout is a common occurrence, and dangerous for cyclists.

There are a number of feasible options that could be pursued for cycling infrastructure, based upon the plans for upgrade of this feature. Main Roads WA has plans to modify the existing rotary design to incorporate a more typical signalised form in the short term, transitioning to a long-term grade separated design. Either of these layouts would be significantly more beneficial to cyclists, providing opportunities to remove both on and off-road cyclists from the main vehicle flow and improve both efficiency and safety. In the event that upgrade of the Eelup Rotary does not progress within a 2-5 year timeframe, even to a transitional signalised form, modifications to the cycling provision at this location will require extensive and detailed design review. This would involve the likely separation of cyclists from traffic by providing high quality off-street connections.

Figure 15  Eelup Rotary
Main Roads

Bunbury is a regional hub for the south west. As such, it forms the nexus for a number of high-speed, high-volume roads that service the region. The majority of these roads are controlled by Main Roads Western Australia. Australind Bypass, Bunbury Bypass, South West Highway and Bussell Highway provide both an opportunity and a constraint for cyclists in the City. They are utilised currently to some extent by experienced road cyclists with relatively high-speed bicycles, in the absence of any existing cycling infrastructure. However, less seasoned cyclists are unlikely to employ these routes due to the inherent safety risks. Crossing these roads also poses some difficulty, particularly for school children.

To address part of this problem, Main Roads WA is currently upgrading the sealed shoulders along Australind Bypass to 1.5 metres. While this is not considered sufficient for designation as a cycle lane, it does provide some separation for cyclists from adjacent high-speed traffic. Observations taken along Australind Bypass suggest that debris removal will be a high priority for cyclists, with loose gravel and broken glass observed along many sections.

Figure 16  Australind Bypass Sealed Shoulders

Infrastructure Example: Spencer Street

Spencer Street has recently been upgraded in two sections between Prosser Street and Clarke Street. The road improvements have been constructed according to Austroads’ Guidelines and therefore represent a prime example for further upgrades in the City.

Spencer Street south of Minninup Road has been designed with a 1.5m cycle lane on each side of the road, transitioning to shared bicycle/parking lanes along both sides between Minninup Road and Francis Street on the East side and Prosser Street on the west side. Examples of these cross-sections are shown in Figure 17 and Figure 18.
Travelling lanes north of the termination of these exclusive cycleways remain relatively wide through to the Forrest Avenue intersection, shown in Figure 19. However, on-street parking, narrower travelling lanes and traffic volumes north of this point reduce the attractiveness of cycling.

Recommendations for further upgrade of Spencer Street are included in Section 8 as part of the Dalyellup – Bunbury – Eaton cycleway.
Road Environment: Ocean Drive

Ocean Drive is a primary north-south route that is used by both recreational and commuting cyclists. Ocean Drive runs adjacent to the beach between Hastie Street to the south and Clifton Street to the north. A substantial section of the road has been upgraded, modified to restrict the pavement width and slow traffic. This upgrade coincides with improvements to the pedestrian infrastructure along Back Beach. Figure 20 shows an example of the Ocean Drive cross-section north of Hayward Street.

The result of changes to the cross-section of Ocean Drive is to substantially diminish the quality of the cycling environment between Symmons Street and Hayward Street. Reduction of the traffic lane down to 3 metres and installation of a 1.0 metre bicycle lane means that the space available to road users is insufficient. This effect is enhanced by kerbing along both the verge and central median, restricting either party from moving away from conflict. Therefore, the road environment is not considered sufficient for cycling due to safety concerns, and cannot be recommended as part of the bicycle network.

There are significant opportunities associated with beachside cycling that are worth pursuing as part of a wider recreational cycling plan. However, the constraints of the existing road environment suggest that modification of the pedestrian footpath to a recreational shared path standard remains the most feasible option. Further discussion of the proposed beachside route along Ocean Drive is included in Section 5.2.
Road Environment: Koombana Drive

Koombana Drive is a highly trafficked route that runs east-west from Eaton to the Bunbury CBD. The existing cycling infrastructure has been predominantly designed for pedestrian use, and is not considered suitable for high-speed cycling. However, the scenic outlook south to the Leschenault Inlet and north to Koombana Bay suggest that an upgrade of existing infrastructure to a recreational shared path standard would be beneficial from a tourism and recreational viewpoint. There are two crossings over the Channel, via Koombana Drive or over the rail bridge (shown in Figure 21). The Koombana Drive crossing is superior in quality and presentation. Wayfinding is also an issue, as the ultimate destinations of the available paths in unclear. Due to the lack of connections across Koombana Drive, choice of path must be made on the western side of the bridge. It should be noted that the rail bridge crossing leads directly to the beach, but the path terminates abruptly to the east of the crossing, without warning or further direction.

Figure 21  Rail Bridge over the Channel

The major constraint to any upgrade along Koombana Drive is the existing boardwalk bridge, shown in Figure 22. This bridge has been constructed along the northern edge of the Leschenault Inlet and is an excellent pedestrian experience. It is not beneficial for cyclists, though many cyclists still use this route for recreation. Any connection along Koombana Drive must consider alternatives to the boardwalk, either through on-street cycle lanes or a parallel off-street cycle path. These opportunities are explored in Section 5.
**Road Environment: Estuary Drive**

The only existing designated cycle link between Eaton and Bunbury is located on the north side of Estuary Drive. While there are some cyclists that are comfortable using Australind Bypass for commuting purposes, the vast majority are unable or unwilling to do so. As a result, the Estuary Drive link is extremely important to cyclists in the area, even considering the relatively low quality of the existing infrastructure, as shown in Figure 23.

Given the importance of the Estuary Drive connection, upgrade for this path is of high importance. However, the feasibility of any upgrade is contingent upon future plans for the Bunbury Port Expansion Project. This expansion will eventually sever Estuary Drive and the associated bicycle path. Therefore, any works along the majority of Estuary Drive must be considered temporary in this context. Timing for the port expansion will determine the level of remedial and upgrade works undertaken along Estuary Drive. Discussion of triggers and possibilities for upgrade is included in Section 8.
5.2 Opportunities and Constraints

5.2.1 Casual Path Network

The existing high quality pedestrian network provides an excellent base upon which to expand. The majority of pedestrian paths have been constructed at a 2.0m width, which allows these paths to be easily designated as shared paths. The “Walk-It Bunbury” initiative has promoted walking circuits on high quality paths and led to improvements in off-street infrastructure that can be leveraged to create a comprehensive shared path network throughout the City.

5.2.2 Commuter Network

A network of commuter paths is proposed to cater for the demand by residents for safe, efficient links between home and work. To this end, a cycleway concept has been developed between Dalyellup, Bunbury and Eaton, which is described in detail in Section 8. This cycleway has been designed primarily on-road, beginning at its southern extent at Parade Road in Dalyellup. The proposed alignment runs north along Parade Road, through a dedicated PSP link to Spencer Street and into the Bunbury CBD. The eastern leg of the cycleway runs from Spencer Street along Stirling Street and Austral Parade to Estuary Drive. Estuary Drive is proposed to be upgraded in the short term and constitutes the only leg designed solely off-street. All other cycling infrastructure proposed as part of the cycleway has been planned on-road to maximise efficiency and minimise disruption to the existing road environment.

In addition to the proposed cycleway, some commuter connections have also been proposed. These form valuable connections between major infrastructure or trip generators sufficient to warrant high-speed links.

The red asphalt coating employed for cycling infrastructure is an important wayfinding measure that also has an important safety impact. Vehicles in adjacent travelling lanes are less likely to cross into bicycle lanes if these are clearly marked by an edgeline and red asphalt. For this reason, all bicycle lanes intended for recreational and commuter use should be coated with standard red asphalt.
Washington Avenue

Connection to the proposed recreational shared path link along Ocean Drive is proposed via Washington Avenue with on-road cycle lanes between Ocean Drive and Parade Road. These cycle lanes are proposed to continue to Bussell Highway to improve connections for road cyclists who employ this major southern link and as part of a riding circuit which includes Bussell Highway, Parade Road and Washington Avenue. The combined 5km road circuit is currently used by recreational and racing bicycle clubs in the City. Formalising this Hay Park Riding Circuit with wayfinding signage and a consistent on-road cycling environment will minimise the impact on traffic as a result of recreational riders and training events.

Blair Street / Bussell Highway

Blair Street is a major road that extends from Bussell Highway into the Bunbury CBD while Bussell Highway is the main road connecting Bunbury to developments further south. On-road bicycle lanes are proposed along both sides of Blair Street between the intersection with Spencer Street and Bussell Highway, extending south along Bussell Highway to the Washington avenue intersection. This cycleway is designed to improve the local environment for long-distance commuters and as part of the proposed Hay Park Riding Circuit. The installation of this infrastructure suggests the possibility for future expansion of bicycle provision south along sealed shoulders to regional communities such as Gelorup which house a proportion of Bunbury’s employment base.

Spencer Street / Parade Road

Spencer Street has already undergone significant upgrade, including the installation of on-road bicycle provision from its southern extent to Prosser Street, either through exclusive on-street cycle lanes or shared parking / bicycle provision as specified in Austroads’ Guidelines. The on-street cycle lane will also be extended north from Prosser Street to Stirling Street, through to the CBD.
Parade Road is currently a dual carriageway with a wide central median and will allow primary vehicular access between Bunbury and Dalyellup in the future. For this reason, the commuter network is anticipated to extend south from Spencer Street to Parade Road and further into Dalyellup. This would be provided via on-road cycle lanes along the length of Parade Road, requiring widening along the majority of the road length. The wide central median may facilitate widening of this road with minimal impact upon adjacent lots. Connection of the Parade Road link to Spencer Street is proposed via a 500m section of PSP quality path partially along existing path alignments. Continuation of the proposed cycleway into Dalyellup is proposed to continue on-street, provided there is sufficient road space for this to be feasible. The existing constructed road form exhibits similar characteristics to the newly upgraded Ocean Drive, with relatively narrow lanes and barrier kerbing along both the median and kerbside.

Additional constraints involved in the proposed infrastructure design and implementation are more thoroughly explored in Section 8.

Australind Bypass

Estuary Drive currently forms the main connection between Bunbury and Eaton and is a highly utilised commuter link. However, future expansion of the Bunbury Port is planned to sever this link, requiring reassessment of alternative routes. Australind Bypass remains the only viable alternative for cyclists wishing to travel from developments to the east into Bunbury. Analysis of the future form and connection must be undertaken prior to the port expansion to ensure route continuity for cyclists. To this end, preliminary discussions between the City of Bunbury, Bunbury Port Authority, Main Roads WA and BikeWest have been conducted. Further negotiations to determine the future alignment of the bicycle path and any cost-sharing arrangements will be required in the future. Consultation with the relevant stakeholders suggests that all parties agree on the general form of a potential bicycle link, to be constructed to PSP standard – 3.5m in width.
Stirling Street / Austral Parade

The east-west cycleway corridor is proposed to be constructed along Stirling Street and Austral Parade, linking to Estuary Drive along the existing path alignment. There are some constraints associated with this alignment that will require additional consideration. The existing 3-way signalised intersection of Blair Street and Stirling Street is an ideal opportunity to improve facilities for cyclists, the truncation of Stirling Street to the east provides additional shelter and minimises traffic volumes at this location. Upgrades to the intersection will be required to ensure cyclists’ safety with a connective 3.5m path across the cul-de-sac. The primary constraint with respect to the proposed alignment is the prevalence of on-street parking on both sides of Stirling Street. The installation of bicycle lanes is consistent with on-street parking, but there may not be sufficient width to provide an on-road cycleway without modifications to existing parking. For the majority of Stirling Street this would involve embayment of parking along one or both sides, with design of bicycle lanes congruent with Austroads’ Guide. There is a possibility that parking will be reduced in some locations, depending upon the availability of adjacent land and existing services location. A review of existing parking demand along this corridor and full detailed design of any proposed cycleway should be conducted prior to finalisation.

Symmons Street

The existing cross-section of Symmons Street includes on-street parking along both sides of the road and a 2m pedestrian path on the north side. Symmons Street has been selected as a major bicycle link through the CBD due to its location and existing connection from Ocean Drive to Blair Street. To this end, bicycle facilities along this road have been proposed for upgrade to include on-road cycle lanes. This would allow safe connection between separate high quality recreational paths located along the ocean shoreline and Leschenault Inlet. Various options were considered for proposed infrastructure, including both on-road cycle lanes and a 3.5m PSP connective link, as well as retaining the existing pedestrian path and upgrading this to a shared path.

However, there are a number of constraints that limit the effectiveness of each of the proposed path treatments. The existing road width is insufficient to install on-road bicycle lanes without modifying the existing pavement cross-section, seen in Figure 24. This would likely involve removing on-street parking for some portion of Symmons Street along the north side and reallocating road space for cycle lanes to Austroads guidelines. While this is unlikely to have a significant impact upon the quantum of parking in the CBD, the local impact upon businesses along Symmons Street may limit the feasibility of this measure. Verge width east of Wittenoom Street is relatively narrow, though there may be sufficient capacity for road widening, with some impact on pedestrian amenity.
A PSP link along the north side of Symmons Street would be an effective continuation of the proposed Ocean Drive RSP and represents the ideal solution in the abstract. However, the density and type of land uses along the north side as shown in Figure 25 may preclude construction of a high-speed bicycle path which would likely result in additional pedestrian safety concerns. These conflicts could be minimised through provision of a dedicated cycle path, separate from the existing pedestrian footpath. Roundabout intersections with Wittenoom Street and Victoria Street also complicate design for any off-street infrastructure improvements.

If the removal of parking bays along Symmons Street cannot be justified by the City, alternative route design and alignment options should be pursued. Possibilities include an equivalent connection at Clifton Street, or further north to the outer harbour and down along Casuarina Drive.
5.2.3 Recreational Network

There is a large community of recreational cyclists in Bunbury. These cyclists include experienced road riders and low speed ‘occasional’ cyclists. To promote cycling as a recreational activity, a number of links are proposed to cater to each of these groups. For road cyclists, recreational loops are proposed which can be used for event training or for a scenic as well as high speed riding environment. Occasional cyclists will benefit from lower design speeds and an emphasis on quality and amenity with connections to popular recreation destinations.

Ocean Drive

The constraints associated with the Ocean Drive road environment have already been discussed in Section 5.1. These constraints limit the ability for road cyclists to utilise Ocean Drive for recreation as width constraints on travelling lanes and shoulders restrict safety. However, there is considerable potential for an off-street path network along the beach front.

The path network can be conceptually broken up into a number of sections. The first section, from Symmons Street south to Hayward Street has already undergone significant upgrade. These improvements have focused upon constructing a high quality pedestrian environment with lookout locations, benches, and beach access. However, some of these amenities which are ideal for pedestrians can be a safety hazard for cyclists. Drinking fountains and benches provide amenity and are attractive for path users, but their location should be reviewed with respect to cyclists. Figure 26 to Figure 29 show some examples of limitations in the existing environment which should be addressed in the context of a potential high quality Recreational Shared Path (RSP) along Ocean Drive.

*Figure 26 Boardwalk Crossing near Hayward Street*
Figure 27  Drinking Fountain Oriented towards Path

Figure 28  Path Restriction at Kiosk

Figure 29  Wayfinding Issues
The next section of Ocean Drive continues from Hayward Street to Hastie Street. This section has not been constructed to the same high quality as upgrades further north, but includes a very serviceable path with separation from car parks and traffic. Again there are some limitations in some aspects of the path environment, particularly with respect to crossing points west onto the proposed casual path network. A number of these issues have been specifically raised, with recommendations included in Table 4. The existing path along this section varies in width between 2 metres and 3 metres.

The existing shared path along Ocean Drive terminates just south of Hastie Street (Figure 30). However, there are many valuable connections to be made south of this location, including Hudson Road, Westwood Street and Washington Avenue, all of which have been nominated for inclusion in the Bunbury Bicycle Plan. Access along Ocean Drive is currently provided by a sporadic and poorly signed network of paths and access roads, with a significant number of gaps in infrastructure.

![End of Existing Shared Path – Hastie Street](image)

The proposed upgrade to Ocean Drive would include the construction of a coherent recreational path of approximately 3.5 metre width extending from a Symmons Street connection with the CBD to the Tuart Walk. Approximately half of this link would ideally be constructed to a very high standard, including retaining walls, lookouts, benches, drinking fountains and bicycle racks. This quality RSP would extend through the existing upgraded area from Symmons Street all the way to Hastie Street. South of this, a 3.0 metre path would provide safe connection to the Tuart Walk (access shown in Figure 31) for both cyclists and pedestrians. This proposed path would then form a consistent legible path from Dalyellup to the Bunbury CBD, running parallel to the proposed cycleway and allowing cyclists and pedestrians of all skill levels to enjoy the natural scenery of the area.
Outer Harbour Extension

The Outer Harbour represents a great opportunity both from a town planning and from a bicycle network perspective. Proposed changes to the Bunbury Port are likely to free up the Outer Harbour for alternative land uses, including and primarily tourism. Through this future development, there is the ability for cycling to be promoted to tourists and locals alike, through improvement and expansion of the existing network. By extending the recreational path network through the tourist precinct these opportunities for promotion are maximised. Therefore, an addition to the Ocean Drive ocean front path is proposed, forming a loop north along the beach side to Casuarina Drive and then south to Koombana Drive. This path would be constructed to Austroads’ Guidelines at approximately 3.5m wide. Along with improvements to Koombana Drive discussed later, this would create a single recreational link from the Leschenault Inlet west to the CBD and along the coast to Tuart Walk, a total of 11km of high quality recreational cycling with views through some of the most scenic parts of Bunbury.

Koombana Drive

As mentioned, a cycle path along Koombana Drive is an opportunity to provide a high quality tourist experience for recreational riders of all skill levels. The existing path network presents a good starting framework for cyclists, though some constraints do exist. For this reason, two routes are proposed along the Leschenault Inlet.
The first route continues alongside Koombana Road over the Channel to the existing boardwalk, returning via a link through the mangroves. This route would be designed for low-speed cycling with an emphasis on shared use for pedestrians and cyclists. The location of the Koombana Drive boardwalk and the availability of road space limit the possibilities for off-street bicycle infrastructure along this road. The feasibility of the return link will require extensive investigation with respect to cost, design alignment and environmental impact.

The second route is designed to continue on-road from the western end of the boardwalk to connect with the proposed cycleway at Austral Parade. This link is intended for more confident recreational cyclists and will form half of a loop around Leschenault Inlet, completed by the proposed Eaton – Bunbury cycleway. On-road bicycle lanes should be constructed at a minimum width of 1.5m to reflect the speed and volume of traffic along Koombana Road and may require reallocation of road space and widening of pavement on the north side. The north side of Koombana Drive already shows some hard shoulder which could be incorporated into the proposed bicycle infrastructure.

**Future Preston River Link**

The existing master plan for the Bunbury Port Expansion project shows one possibility for future bicycle infrastructure subsequent to the severing of Estuary Drive. This master plan, as shown in Appendix C, indicates an alignment along Koombana Drive and Australind Bypass to Glen Iris, then alongside the realigned Preston River to Estuary Drive.

This alignment has some additional benefits to the Australind Bypass PSP discussed previously:

- The scenic outlook along the Preston River enhances the desired focus on high quality recreational paths and can promote tourist cycling;
- Some proportion of the proposed Estuary Drive upgrades will remain untouched by the expansion, giving some offset to the cost;
- This alignment eliminates restrictions associated with Old Coast Road or the intersection of Old Coast Road and Australind Bypass.

However, connection east along Australind Bypass will be prejudiced to some extent, restricting the effectiveness of this path for future expansion to Eaton Drive and communities further east such as Australind.
5.2.4 Regional Cycling

The regional centres of Gelorup, Dardanup, Burekup and Boyanup are all located within 30 kilometres of the City as shown in Figure 32. Due to the high employment base in Bunbury, a substantial proportion of these centres rely upon Bunbury for business. Therefore, there is some value in ensuring that cycling connections exist along major road connections between nearby communities and the Bunbury CBD. To this end, Main Roads WA should be contacted to investigate the feasibility and timing to include 1.5m sealed shoulders along the main roads of South Western Highway, Bussell Highway and Old Coast Road. This process is already underway along Old Coast Road towards Forrest Highway. While the sealed shoulders are of insufficient width to allow designation as bicycle lanes, they do provide some degree of protection for cyclists using these major roads. Observations from the existing section of sealed shoulder suggest that frequent sweeping of shoulders will be required to ensure useability for cyclists. Pebble gravel and glass was seen along many sections of the road, representing a significant hazard for prospective cyclists, particularly considering the high speed and volume of adjacent traffic.

*Figure 32*  
*Map of the Bunbury Region*
5.3.1 End-of-Trip Facilities

A general lack of bicycle end-of-trip facilities has been discussed with the City of Bunbury. A comprehensive upgrade to bicycle parking at key nodes in particular would reduce security risks and increase the attractiveness of cycling as a mode of transport. Other initiatives such as employee showers at places of employment should be encouraged to increase the number of cyclists who commute into the City for work. DPI has suggested that bicycle security is optimally ensured through the installation of U-rails for short term storage of bikes at identified end-of-trip locations. Locations where long-term security is required should be provisioned with a limited number of bicycle lockers.

Primary locations for end-of-trip facilities include:

- Primary and Secondary Schools (likely to already be facilitated)
- Public Libraries
- Major shopping precincts, such as Bunbury Forum and Centrepoint
- Parks and reserves
- Recreational facilities – Hartfield Rec Centre etc.
- Cyclists ‘hotspots’ – cafes, coffee shops etc popular with cyclists
- Tourist facilities – entrance to walk trails and other popular attractions

Austroads’ Guide recommends provision for secure bicycle parking at schools is 1 for every 10 primary school students and 1 for every 20 secondary school students, with at least 10 spaces provided in an undercover lockable enclosure.

Parks and reserves should have bicycle parking rails, toilets and drinking fountains available for cyclists, where feasible.

Austroads’ Guide suggests that “…parking rails for short term [bicycle] parking should be placed individually every 20 to 30 metres throughout strip shopping centres or in small clusters near the entrances to major shopping centres.” It is important that these parking facilities do not interfere with pedestrian or particularly disabled access to the centres, and that parking rails are sufficiently removed from car parking. Where feasible, bicycle parking should be provided undercover.
Austroads Guide suggests rates for bicycle parking and other amenities such as showers that should be provided. In addition, the City of Bunbury has developed a bicycle parking strategy to be formalised as part of their Town Planning Scheme. While the levels of bicycle parking reflected in the City’s policy reflect a lower level of service than the maximum suggested in the Austroads Guide, this document represents a requirement from the city for all developments, rather than a recommendation. It is recommended that City buildings install facilities as specified in this document so as to set an example towards encouraging cycling as a viable transport option.

Prominent destinations and highly trafficked routes which border main pedestrian thoroughfares may benefit from provision of drinking fountains to offer respite for walkers and cyclists. Routes which may benefit from en-route bicycle facilities include the proposed Ocean Drive / Back Beach recreational route and potential routes along Koombana Drive and the Leschenault Inlet.

The proposed design for commuter and recreational paths includes ultimate route alignments converging near the CBD at the intersection of Stirling Street and Blair Street. It has been acknowledged that while the road riding environment within the CBD tends to be one with low vehicular speeds, the horizontal and vertical elements of design including 4-way roundabouts and on-street parallel parking create an environment that can be hostile for cyclists. For this reason, a bicycle locker/shower facility is proposed to be located at the juncture of the major north-south and east-west routes near the intersection of Stirling Street and Blair Street. This facility would ideally be constructed with the following attributes:

- Sufficient undercover, secure parking for 50-100 bicycles;
- Showers, toilets and lockers;
- Placed in a visible location to allow passive surveillance, possibly attached or adjacent to existing or future public buildings;
- Regulated access with a nominal cost, user-pays system sufficient to pay for maintenance and cleaning services;

The type of facilities envisaged reflects those installed recently in the City of Melbourne. These Parkiteer bicycle parking enclosures have the additional advantage that they are modular, built for 26 bicycles each. This modular approach may be beneficial in the short term while ridership is established. Details regarding the City of Melbourne installation have been included in Appendix B as additional information. Examples of bicycle parking hubs are shown in Figure 33.
The proposed facility will primarily serve commuters accessing the CBD from residential locations to the south and east and will provide end-of-trip services for this demographic. By constructing an alternative end-of-trip facility, the City can provide a community service to small business for which showers, lockers and bicycle parking may represent undue financial burden. This centralised bicycle parking facility also reflects the goals of the City’s Activity Centres and Neighbourhoods policy and the revised Parking policy.

5.3.2 Bicycle Safety

The consultation process identified that there was a general concern regarding cycle safety, both on-street and at road crossings. One of the objectives of this study is to encourage a greater amount of cycling within the City of Bunbury. To achieve this, bicycle infrastructure should be extended to form a safe, connected network to the most common destinations.
The various classes of cyclists have different safety needs. Commuting cyclists, likely to be travelling within the roadway or on adjoining sealed shoulders and on-street cycle lanes tend to be concerned with the quality of street pavement and provision for safe cycling in the vicinity of intersections and near traffic devices such as islands and roundabouts. Casual cyclists are likely to use the footpath and shared path network in preference to on-road cycle ways and as such are more concerned with the interface between vehicular traffic and paths.

Wayfinding signage is also extremely important for safety. Shared path designations should be apparent at every decision point to ensure that cyclists remain within the network designed to ensure safe cycling. Therefore, the extent of the network should be indicated clearly through adequate signage. Physical signage, including signposts and linemarking is not the only wayfinding tool that can be employed. The location of grab rails at intersection crossing points provides a valuable direction tool to indicate path continuity. For this reason, the installation of grab rails at pedestrian footpaths is not beneficial for cyclists, although there may be some ancillary benefit for other accessibility purposes. Red asphalt paths are also well understood to be designated shared paths. Therefore, where separate paths meet, identification of route and destination information is required to ensure legibility and wayfinding for cyclists.
For all cyclists, road crossing are of major importance, as this these are the primary interface between bicycles and vehicular traffic. For this reason, provision should be made for bicycles at all intersections along designated bicycle routes and necessary road crossings to improve safety at these locations. Consideration for cyclists should ideally be on-street where cycle lanes and sealed shoulders are located, and within the cycle path / pedestrian network for off-street casual and recreational cycling. Pram ramps at central median locations on busy roads should be avoided in preference to cut-outs and grab rails for staged crossing by cyclists. Grab-rail position should be as described in Austroads Guide, located on the left side of the path to allow cyclists to safely wait for traffic. Grab-rails in the central median may be provided both sides of the path. The requirement for central median grab-rails should be evaluated based upon the perceived risk at a given intersection with preference given to high speed, high volume road crossings.

Lighting is of concern for any sections of the main cycle network which may be used for after dark cycling. For this purpose, intersections and road crossings are the most critical locations, limiting the potential for accidents. The priority for lighting with respect to the benefits provided for cyclists require consideration of the frequency of use, proximity and volume of traffic to the cycleway, and geometry of the road – windy roads with decreased sightlines and visibility are more in need of quality illumination. Some paths are more likely to be used for after-hours cycling, particularly cycleways intended for commuter or recreational use. The proposed RSP and PSP links along Ocean Drive, Leschenault Inlet and east along Estuary Drive towards Eaton are considered most likely to benefit from improved lighting conditions.

5.3.3 Education

Education is important in the context of improving bicycle ridership within the community as well as increasing the safety of bicycle users on the road network. This includes bicycle education at local schools and further education for the wider population. Bicycle education programs generally improve the behaviour and habits of young cyclists, resulting in an overall reduction of risks. Educating residents regarding the location of bicycle infrastructure will assist in improving the general confidence of casual and recreational riders within the City. Educational campaigns tied to promotion of proposed infrastructure changes should be pursued to inform residents of their rights and responsibilities as cyclists.
Education programs would ideally be designed to address both casual and commuter cyclists, raising awareness of the designated routes, as well as the interactions between pedestrians, cars and cyclists. Many of the incidents which occur can be attributed to cyclists operating outside of a safe zone of behaviour, endangering pedestrians on shared paths and themselves in the roadway. Behaviour habits which involve significant risk often begin in the early years of independent cycling and tend to increase with experience, implying that the greatest impact of education will be achieved during this formative development period. It may also be beneficial to discuss periodic enforcement of road rules by local police at locations recognised as 'black spot' areas for cycling.
6. CONSULTATION PROCESS

Consultation has been undertaken at a number of levels, according to the consultation methodology described in Section 1. Through this process, Cardno liaised with the City of Bunbury to ensure that the recommendations ultimately presented integrate with the objectives of the City.

6.1 Community Consultation

The initial phase of consultation involved individual meetings with representatives of local and state government agencies, other local business and policy stakeholders, individual residents and interest groups. These meetings enabled Cardno to obtain local information regarding the existing operation of the road and footpath infrastructure, goals and future planning information, as well as concerns and issues raised by members of each organisation and by the users of cycling infrastructure in Bunbury.

Table 1 summarises the items discussed during meetings with interested stakeholder groups.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Comments</th>
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| City of Bunbury | • Choke point at Estuary Drive over The Cut  
|                | • Support for 40km zone through central CBD to minimise conflict and improve cyclist/pedestrian safety  
| Engineering   | • Strickland Street on-road cycle lane may have issues due to truck traffic, relocate to Stirling Street  
|                | • Future Davenport link important – possibly using Dodson Road north to South Western Highway  
|                | • Future Washington Avenue realignment including 4-way signalised intersection into College Grove – support for cycle consideration  
|                | • Safety issues with Eelup Rotary  
|                | • Future connection between College Grove and University / TAFE along Somerville Drive  
| Planning       | • Support for Symmons Street connection into the CBD  
|                | • Potential conflict with Parking Policy with respect to on-street cycle lanes  
|                | • Consistent with goals of City Vision  
|                | • Consistent with Neighbourhood Centres Strategy  
|                | • Future Outer Harbour development  
|                | • Support for tourist focus along Koombana Drive and Casuarina Drive  
|                | • Potential relocation of Bunbury Train Station |
### Future Signalisation of Glen Iris Intersections with Australind Bypass
- Location of End-of-trip facilities with respect to future Bus Station
- Proposed local government policy at structure plan level to require bicycle lanes / shared paths
- Consider bicycle infrastructure out to regional centres such as Gelerup, Burekup etc.

### Executive
- Poor quality waterfront shared paths alongside the Inlet and Ocean Drive
- Potential Hay Park circuit along existing event and training route
- Damage to shared paths along reserve a result of City employees driving on paths to access bins
- Focus on promotion and profile of bicycle plan and planning process
- Vision for an ambitious bicycle plan catering to all groups, including possible tourist draw
- Hay Park internal connections inadequate
- Ocean Drive on-road cycle lanes insufficient

### BikeWest (PlanningWA)
- Collaborating with Main Roads regarding Bunbury Port Expansion and the Australind Bypass Link
- Supports policy link between road hierarchy and cycle provisions
- Suggested specific infrastructure forms for

### Main Roads Western Australia
- Supportive of bicycle route along Australind Bypass
- Grade separation at Eelup Rotary delayed due to lack of funding
- Potential intermediate stage of signalising intersection or metering roundabout - "something has to be done fairly soon"
- Ocean Drive road cross-section insufficient for cyclists and motorists
- Bunbury Port Expansion unlikely to sever Estuary drive in the next 10 years

### Roadwise (WALGA)
- Concerns regarding safety along primary road network
- Cyclist and motorist behaviour poor
- Debris and glass on roadways
- Continuity of existing path network

### South West Development Commission
- Primary involvement is in liaison with Main Roads WA regarding the primary road network and future realignment
- Impact of future bypass on traffic and opportunities for cycling
### Bicycle User Groups

- Concerned with the behaviour of motorists, particularly on main roads and at roundabouts
- Poor quality of existing on-road infrastructure and availability of recreational and training routes
- Debris, glass and other hazards in roadways diminish the cycling experience and introduce additional safety concerns

### Adjacent Local Government Areas

- Adjacent Shires supportive of Bunbury Cycle Plan
- Shire of Dardanup interface at Eaton Drive and Estuary Drive
- Map provided of Dardanup internal shared path network
- Shire of Dalyellup supports the cycleway along Parade Road and access to Tuart Walk

### 6.2 Survey Methodology

The opinions and personal experience of cyclists is considered fundamental to understanding the operating condition of the existing system. For this reason, a survey questionnaire has been designed in conjunction with the City and distributed through a range of locations.

The design ethos for the survey was to assess the operation of the existing infrastructure and to allow users to provide details of the routes currently used and individual perceptions of local opportunities and constraints in the system. To this end, a set of qualitative questions were generated, along with a map of the city area for users to identify existing routes. It should be noted that this survey has not been intended to establish a rigorous statistical basis for opinions regarding cycling in Bunbury. For the purposes of this Bicycle Plan, anecdotal observations are considered more significant to the ultimate quality and operation of the Bunbury bicycle network.

Distribution locations were selected to address a cross-section of cycling demographics, and included:

- City of Bunbury Offices;
- Local libraries;
- Bicycle shops;
- South West Sports Centre; and
- Local bicycle user groups.
6.3 Survey Results

Over 200 questionnaires were completed and returned by respondents over the survey period. This represents a very high level of interest by residents in improving the existing bicycle network. Experience in this field also suggests that there remains a large latent demand for cycling, waiting to be fulfilled through improved infrastructure, safer routes and education. Review of the survey results provides some insight into the primary demographic of respondents. Most are representative of the recreational cycling community, as shown in Figure 34. This result was anticipated as these users represent the most active and concerned demographic in the City. Therefore, a large section of the responses reference on-road cycling issues, rather than issues associated with the existing shared path network. For this reason, the survey results are not assumed to be a representative sample of the cycling population in Bunbury, but may reflect the views of an important subset of this group.

![Figure 34](image)

Cycling frequency in the City was anticipated to be high, but was even higher than expected. This confirms that the majority of respondents can be classed as avid cyclists, exhibiting a high degree of experience and able to detail specific and general faults in the existing network.
Responses from casual riders are often difficult to obtain as they tend to operate sporadically, making use of whatever local off-street infrastructure is available. Even more challenging are those residents who represent the latent demand for cycling, as they currently do not ride for safety reasons or as a result of lack of services. These groups represent the primary target audience for the cycling improvements proposed in this Plan, but for the most part remain a silent majority. Recreational and commuter cyclists will continue to ride regardless of the infrastructure, as their primary domain is on-road, but will significantly benefit through improved safety and better definition of cycling space designed specifically for them.

The following summarise the results to the survey questions asked:

**What do you like about your chosen route(s)?**

Most recreational cyclists chose their route because it was scenic, relatively safe, was less congested, had minimal contact with traffic and relatively less debris and glass. For commuters, priorities included the directness of their particular route and a quicker travel time to their destination.

Safety issues were also highlighted, with some cyclists choosing a route with designated shared path removed from the road. Most cyclists responded that they tried to avoid contact with traffic, including choosing quieter routes with fewer road crossings, roundabouts, and trucks. Some recreational and commuter cyclists chose routes based upon the quality of the road surface regardless of increased journey times. Cyclists also tried to avoid steep hills and cycled on paths/roads that were relatively less bumpy and were easy (except for those few that wanted a challenge). Some commuters suggested that end of trip facilities and bike storage were essential to their choice of mode and concluded that they may choose not to ride if these were not available.
What do you dislike about your chosen route(s)?

The most common responses were: lack of paths and path continuity, debris in roadway, overhanging vegetation and obstructions, poor quality surfaces and narrow verges, paths and shoulders making the journey dangerous. Many respondents raised concerns about existing shared paths, citing lack of etiquette shown by pedestrians and width constraints causing conflict with prams and pets. These conflicts resulted in cyclists having to transition to the road environment where drivers similarly showed a lack of consideration for cyclists.

Some recreational cyclists disliked the lack of route availability, resulting in cycling becoming boring and monotonous. Both commuter cyclists and recreational riders mentioned that some paths were poorly lit, most notably in winter. The lack of end of trip facilities and bike racks made it very difficult for many cyclists to complete their daily tasks, particularly for commuters working in the CBD and for all cyclists at shopping centres and other trip destinations.

Some crossing points were identified as unsafe, with numerous requests to improve the existing crossing conditions at locations including Bussell Highway, Eelup Rotary, Old Coast Road at Eaton, Blair Street and Spencer Street. Recommended intersection and mid-block measures included both at-grade and above-grade treatments.

Local area traffic measures were also identified with speed bumps and roundabouts listed as a significant concern for cyclist safety.

The following local issues were commonly raised by cyclists:

- Need for a link south along Ocean Drive through Tuart Forrest to Dalyellup;
- Bike lanes too narrow along Ocean Drive;
- Estuary Drive has significant debris issues including broken glass and gravel;
- Koombana Drive boardwalk;
- Lack of bicycle provision on Washington Avenue.

What improvements could be made to make your cycling trip better?

The following general improvements were suggested by respondents:

- Remove roadside debris, broken glass and overhanging vegetation;
- Improve the surface of the paths/roads;
- Provide enough width for cycle lanes, pathways and shoulders;
- Increase the number of pathways and routes available that continue to the CBD;
- Install kerbing along the inside of the cycle way to minimise vehicle conflict;
- Improve end of trip facilities, bicycle storage, drink fountains, lighting and shaded stop/rest pits;
• Provide a free air pump location in town (no service areas available anymore);
• Promote awareness to motorists and pedestrians (eg. pedestrians should stay left and listen to the bell);
• Improve sightlines at access points;
• Reduce the speed limit in some areas;
• Improve wayfinding signage showing designated cycle paths and shared paths;
• Improve school crossings near schools;
• Designate cycle paths along major roads including South Western Highway, Blair Street, Bussell Highway and Koombana Drive;
• Remove bollards or improve visibility.

Do you have any other comments or suggestions concerning bicycle infrastructure in the City of Bunbury?

Recommendations for improving cycling in general were also requested. The following constitute a shortlist of popular responses:

• Encourage people to ride to work and kids to school;
• Provide end of trip facilities and bike storage and encourage businesses to provide these facilities;
• Provide drink fountains and shaded stop/rest pits;
• Reduce speed limits where paths are not designated;
• Consider additional pram/access ramps between road and shared paths to allow cyclists to switch from shared paths to the roadway;
• Penalise cars parked in cycleways.

As part of the survey questionnaire, cyclists were asked to identify their most frequent routes. This was designed to indicate the most important routes currently employed, so that these, or equivalent parallel routes might be improved. Figure 36 shows the routes specified by respondents. Line thickness has been used to indicate popular routes. The results of this exercise have been used to refine proposed on- and off-street bicycle proposals to improve potential ridership and safety.
7. FRAMEWORK AND IMPLEMENTATION ACTION PLAN

The City of Bunbury Bicycle Plan is intended to improve the existing cycling infrastructure to a high standard suitable for the recreation and transport demand of all types of users. The involves evaluating the works required to bring the existing infrastructure up to the standard required and establishing policy to establish and maintain this network into the future.

7.1 Bicycle Route Plan

Bicycle routes have been recommended in a few specific locations, connecting residential and business communities or creating recreational routes. These routes are intended to be safe, efficient and effective routes that improve the attractiveness of cycling for commuters and recreational riders. Routes identified through stakeholder consultation and the infrastructure audit conducted by Cardno include:

- Commuting link along Parade Road and Spencer Street from Dalyellup to the Bunbury CBD;
- Commuting link along Stirling Street and Austral Parade connecting to Estuary Drive from the Bunbury CBD to Eaton;
- Recreational link along the coast, along Symonds Road and parallel to Ocean Drive from the Bunbury CBD to Tuart Walk;
- Recreational link extension from Symonds Road north to the point and back to Koombana Drive;
- Recreational link extension south along Blair Street from Parade Road to Washington Avenue;
- Recreational link along Koombana Drive to Estuary Drive;
- Potential recreational loop through mangroves on the north side of the Leschenault Inlet; and
- Potential commuting link along the Australind Bypass to replace the Estuary Drive link in the future.

The remainder of the proposed bicycle network is defined not according to route, but rather as an integrated network of interconnected shared paths, linking trip attractors such as schools, parks, recreation, retail and business centres. Through upgrades to signage and improved wayfinding, this network should substantially improve the attractiveness of cycling for casual riders. Schools represent a fundamental opportunity as part of this casual network, with the safety of students of paramount importance.

Figure 37 shows a map of primary local trip attractors in the City of Bunbury, destinations for cyclists which require additional consideration. Figure 38 shows the proposed route plan for both commuter/recreation and casual routes.
7.2 Bicycle Network Plan

The manner in which bicycle infrastructure upgrades are implemented along a given route is determined by a range of factors including the quality, suitability and location of existing infrastructure and intended cyclist demographic. The proposed bicycle network plan illustrates the location and type of bicycle infrastructure recommended for installation.

This plan attempts to minimise the cost of construction by utilising existing infrastructure, road reserves and verges where feasible. Where the existing infrastructure is unfit for purpose, upgrades and replacements have been suggested.

7.3 Works Recommendations

The implementation of the proposed network plan relies upon specific improvement works to upgrade the existing infrastructure to a standard consistent with the goals of the City of Bunbury and the Bunbury Local Bicycle Plan. Through a ‘saddle survey’ of the existing infrastructure, the following works have been recommended to provide a consistent, high quality experience for users.

For the purpose of assessment, these works have been separated into requirements for commuter/recreational routes and casual routes. This separation was chosen to reflect the different design ethos of each.

To ascertain the priority for proposed path upgrades, installation and maintenance, Cardno Eppell Olsen has referenced documentation detailing the schedule of works for future path and road infrastructure, as well as strategic planning documents for potential development in the City of Bunbury. In addition, the proposed works have been ranked according to their relative costs and benefits to the bicycle network, taking into account the existing quality of each bicycle route segment as determined by City inspection and ‘saddle survey’ observations.

7.3.1 Principal and Recreational Shared Paths

The following route network map (Figure 39) shows the proposed backbone links for recreational and commuter cycling in Bunbury. This includes the proposed Dalyellup – Bunbury – Eaton Cycleway. All on-street bicycle lanes paths should be constructed to Austroads’ Guidelines to a minimum of 1.5m in width. All off-street PSP and RSP links should be constructed to a 3.0m minimum width, with 3.5m and 4.0m sections where required by frequency and type of use. Specific requirements for links are summarised in Table 2.
### Table 2 Commuter and Recreational Infrastructure Upgrades

<table>
<thead>
<tr>
<th>Link</th>
<th>Location of Works</th>
<th>Recommended Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Link</td>
<td>Parade Road - Blair Street to Dalyellup</td>
<td>Install minimum 1.5m on-road bicycle lane - both sides</td>
<td>3200m on-road bicycle lane. See Section 8 for details</td>
<td>Part of Dalyellup - Bunbury - Eaton Cycleway</td>
<td>2011-2012</td>
<td>$1,600,000</td>
<td></td>
</tr>
<tr>
<td>South Link</td>
<td>Parade Road to Spencer Street Connection</td>
<td>Install 3.5m red asphalt connective link between Blair St and Parade Rd</td>
<td>700m high quality commuter path link parallel to existing footpath alignment and adjacent to Adam St extension. May use Blair St access road (Copenhagen style). See Section 8 for details</td>
<td>Part of Dalyellup - Bunbury - Eaton Cycleway</td>
<td>2011-2012</td>
<td>$450,000</td>
<td></td>
</tr>
<tr>
<td>South Link</td>
<td>Spencer Street - Prosser Street to Stirling Street</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>1250m on-road bicycle lane, reallocate road space and widen road. May require shared parking/bicycle provision. Substantial modifications to existing services</td>
<td>Extension of existing bicycle lanes north to proposed connection with Stirling Street - see Section 8 for details</td>
<td>2010</td>
<td>$800,000</td>
<td></td>
</tr>
<tr>
<td>South Link</td>
<td>Symmons Street - Ocean Drive to Blair Street</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>650m on-road bicycle lane. Remove parking bays north side and reallocate road space. Many challenges including existing taxi rank</td>
<td>See Section 5.2 for discussion</td>
<td>For review</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td>South Link</td>
<td>Symmons Street - Ocean Drive to Blair Street</td>
<td>Alternative: upgrade path to 3.0m red asphalt PSP - north side</td>
<td>650m high quality commuter link to CBD. Consider separation of cyclist/pedestrians</td>
<td>See Section 5.2 for discussion</td>
<td>2013</td>
<td>$150,000</td>
<td></td>
</tr>
<tr>
<td>South Link</td>
<td>Ocean Drive - Symmons Street to Hayward Street</td>
<td>Upgrade pedestrian facilities to high quality RSP along beach front</td>
<td>2000m upgraded pedestrian path to 3.5m red asphalt path. Existing concrete path may be retained where sufficient. Will require design assessment and detailed design</td>
<td>Main north-south recreation link along beach front</td>
<td>2013</td>
<td>$1,250,000</td>
<td></td>
</tr>
</tbody>
</table>

**Total** | **$2,850,000** |
<table>
<thead>
<tr>
<th>Link</th>
<th>Location of Works</th>
<th>Recommended Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coast Link</td>
<td>Ocean Drive - Hayward Street to Hastie Street</td>
<td>Install high quality 3.5m red asphalt RSP along beach front</td>
<td>2000m high quality recreational link along beach front including retaining, end-of-trip facilities, lookouts etc. Upgrade to 3.5m asphalt where possible. Will require detailed assessment and design</td>
<td>Extend main north-south recreation link along beach front</td>
<td>2013-2014</td>
<td>$ 2,100,000</td>
<td></td>
</tr>
<tr>
<td>Coast Link</td>
<td>Ocean Drive - Hastie Street to Tuart Walk</td>
<td>Install high quality 3.5m red asphalt RSP</td>
<td>2800m high quality recreational link continuing to Tuart Walk</td>
<td>Extend main north-south recreation link to Tuart Walk and on to Dalyellup</td>
<td>2014</td>
<td>$ 2,000,000</td>
<td></td>
</tr>
<tr>
<td>Coast Link</td>
<td>Ocean Drive - Symmons Street to Casuarina Drive</td>
<td>Install high quality 3.5m red asphalt RSP along beach front</td>
<td>1200m high quality recreational link along beach front including retaining, end-of-trip facilities, lookouts etc. Upgrade to 3.5m asphalt where possible. Will require detailed assessment and design</td>
<td>Alternative recreational link to tourist precinct and Outer Harbor. Complete link to Leschenault Inlet</td>
<td>2014</td>
<td>$ 750,000</td>
<td></td>
</tr>
<tr>
<td>Coast Link</td>
<td>Estuary Drive - Koombana Drive to Old Coast Road</td>
<td>Upgrade existing cycleway to 3.5m PSP standard</td>
<td>3300m high quality red asphalt PSP along existing alignment. Upgrade culvert crossings and replace majority of existing path including existing cycle connection bypassing Eelup Rotary</td>
<td>Refurbish existing popular bicycle connection to Eaton</td>
<td>2012</td>
<td>$ 780,000</td>
<td></td>
</tr>
<tr>
<td>East Link</td>
<td>Stirling Street - Spencer Street to King Road</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>1350m on-road bicycle lane, reallocate road space and widen road. May require shared parking/bicycle provision. Navigable path adjacent to Centrepoint requires investigation and detailed assessment</td>
<td>Extension of existing bicycle lanes north to proposed connection with Stirling Street - see Section 8 for details</td>
<td>2011</td>
<td>$ 140,000</td>
<td></td>
</tr>
<tr>
<td>East Link</td>
<td>Austral Parade - King Road to Estuary Drive</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>1200m on-road bicycle lane road widening required</td>
<td>Extension of existing bicycle lanes north to proposed connection with Stirling Street - see Section 8 for details</td>
<td>2011</td>
<td>$ 240,000</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2** Commuter and Recreational Infrastructure Upgrades
<table>
<thead>
<tr>
<th>Link</th>
<th>Location of Works</th>
<th>Recommended Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet Link</td>
<td>Koombana Drive - Leschenault Inlet to Estuary Drive</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>1350m on-road bicycle lane, reallocate road space and widen road.</td>
<td>On-road alternative to Koombana Drive boardwalk and connection to Estuary Drive PSP</td>
<td>2013</td>
<td>$350,000</td>
<td></td>
</tr>
<tr>
<td>Inlet Link</td>
<td>Leschenault Inlet Southern Loop - Blair Street to King Road</td>
<td>Upgrade existing path to 3.0m red asphalt RSP along foreshore</td>
<td>1300m high quality recreational path link along foreshore, connecting into existing wide shared path at Rowing Club</td>
<td>Scenic recreational path completing Leschenault Loop</td>
<td>2014</td>
<td>$800,000</td>
<td></td>
</tr>
<tr>
<td>Inlet Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong> 1,150,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casuarina Link</td>
<td>Casuarina Drive / Bonnefoi Boulevard, Koombana Drive to Port</td>
<td>Install 3.5m red asphalt RSP along Casuarina Drive</td>
<td>900m high quality red asphalt RSP along Casuarina Drive alignment. Connection to existing cycling facilities in Queens Gardens</td>
<td>Alternative recreational link to tourist precinct and Outer Harbor. Complete link areounng to Leschenault Inlet</td>
<td>2014</td>
<td>$500,000</td>
<td></td>
</tr>
<tr>
<td>Casuarina Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong> 500,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington Link</td>
<td>Washington Avenue - Ocean Drive to Bussell Highway</td>
<td>Install 1.5m on-road bicycle lane - both sides</td>
<td>2000m on-road bicycle lane, reallocate road space and widen road. Consider future high quality connections at Ocean Dr and Parade Rd. Future signals at Washington Ave / Bussell Hwy should accommodate cyclists</td>
<td>Southern connection between proposed Ocean Dr RSP, Parade Rd PSP and Bussell Hwy</td>
<td>2013</td>
<td>$500,000</td>
<td></td>
</tr>
<tr>
<td>Washington Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong> 500,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mangrove Loop</td>
<td>Leschenault Inlet Mangrove Loop</td>
<td>Investigate 3.0m RSP through mangroves</td>
<td>Environmental impact and feasibility study required for a bicycle loop through mangrove area</td>
<td>Additional scenic recreational route and creation of a minor low speed loop</td>
<td>2014</td>
<td>$30,000</td>
<td></td>
</tr>
</tbody>
</table>
7.3.2 Shared Paths

The shared path network is proposed to be constructed in a manner which maximises connections in and around the City. For this reason, the proposed path improvements have focused upon safety and wayfinding. These priorities are in addition to the central precept of a comprehensive path network that allows navigation between cycling attractors along safe, shared paths. Casual shared paths are primarily proposed to be 2.0m in width throughout the City. This corresponds to the current width of a large proportion of pedestrian and shared paths, therefore requiring minimal upgrade. In some cases, additional path width may be necessary as a result of adjacent obstructions or anticipated high usage. The casual shared path network is shown in Figure 40, with details of suggested upgrades in Table 3. Also shown on the casual path map are indications of potential future links to proposed development areas. These links are shown as nominal connections along existing roads or potential road corridors.
## Shared Path Infrastructure Upgrades

<table>
<thead>
<tr>
<th>Location of Works</th>
<th>Recommended Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signage</strong></td>
<td>Install or update all signage and linemarking</td>
<td></td>
<td>Update consistent with Austroads guidelines, particularly regulatory and guidance signage</td>
<td>Legal requirements for use and ease of wayfinding /navigation</td>
<td></td>
<td>$ 50,000</td>
</tr>
<tr>
<td><strong>Washington Avenue - Parade Rd to Bussell Highway</strong></td>
<td>Install 2.0m shared path - north side</td>
<td></td>
<td>1200m concrete shared path inc. signage</td>
<td>Complete east-west connection from Ocean Drive to Bussell Highway</td>
<td>M</td>
<td>$ 280,000</td>
</tr>
<tr>
<td><strong>Washington Avenue - Ocean Drive to Hailo Way</strong></td>
<td>Install 2.0m shared path - north side</td>
<td></td>
<td>400m concrete shared path inc. signage</td>
<td>Complete off-street connection from Ocean Drive to Bussell Highway. Duplicates section between Ocean Dr and Nalbarra Dr</td>
<td>M</td>
<td>$ 75,000</td>
</tr>
<tr>
<td><strong>Washington Avenue - Bussell Highway</strong></td>
<td>Pedestrian / cycle crossing</td>
<td></td>
<td>Path connection, pram ramps and grab rails at both sides of Bussell Highway and central median. Contingent upon timing for Washington Avenue / Bussell Highway signals</td>
<td>Enable safe crossing across Bussell Highway to/from College Grove</td>
<td>H</td>
<td>$ 10,000</td>
</tr>
<tr>
<td><strong>Hudson Road - Ocean Drive to Minninup Road</strong></td>
<td>Install 2.0m shared path - south side</td>
<td></td>
<td>1200m concrete shared path inc. signage</td>
<td>Connection is ambiguous. Access road provides a safe link but is unsigned.</td>
<td>L</td>
<td>$ 75,000</td>
</tr>
<tr>
<td><strong>Washington Avenue - Bussell Highway</strong></td>
<td>On-road linemarking and signage (less preferred option)</td>
<td></td>
<td>Use existing southern access road with linemarking signage and improved connections at Ocean Dr and Minninup Road</td>
<td>Signage for access road to provide continuity</td>
<td>H</td>
<td>$ 15,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Hudson Road / Ocean Drive</td>
<td>Intersection improvement</td>
<td></td>
<td>Extend path to Ocean Dr and provide connection to west side.</td>
<td>Improve path continuity</td>
<td>B</td>
<td>$5,000</td>
</tr>
<tr>
<td>Stockley Road - Ocean Drive to Upper Esplanade</td>
<td>Install 2.0m shared path - north side</td>
<td></td>
<td>150m concrete shared path inc. signage</td>
<td>Improve connectivity to Ocean Drive / Back Beach</td>
<td>M</td>
<td>$35,000</td>
</tr>
<tr>
<td>Stockley Road - Picton Crescent to Spencer Street</td>
<td>Replace slabbed path with 2.0m shared path - north side</td>
<td></td>
<td>500m concrete shared path inc. signage</td>
<td>Improve cycling experience / safety</td>
<td>B</td>
<td>$110,000</td>
</tr>
<tr>
<td>Minninup Road - Premier Street to Spencer Street</td>
<td>Replace 1.2-1.5m concrete path - east side</td>
<td></td>
<td>330m concrete shared path inc. signage</td>
<td>Improve cycling experience / safety</td>
<td>M</td>
<td>$70,000</td>
</tr>
<tr>
<td>Spencer Street - Prosser Street to Stockley Road</td>
<td>Conduct obstruction review and relocate street furniture</td>
<td></td>
<td>450m brick paved path - west side. Linemarking and signage</td>
<td>Critical link north-south for shared path network, existing quality infrastructure with obstructions to be relocated</td>
<td>H</td>
<td>$10,000</td>
</tr>
</tbody>
</table>
### Table 3
Shared Path Infrastructure Upgrades

<table>
<thead>
<tr>
<th>Location of Works</th>
<th>Recommended Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parade Road - Hudson Road to Knight Road</td>
<td>Replace 1.2m concrete path - east side</td>
<td></td>
<td>450m concrete shared path inc. signage</td>
<td>Complete casual north-south link parallel to proposed cycleway</td>
<td>H</td>
<td>$120,000</td>
</tr>
<tr>
<td>Leschenault Inlet - Car Park</td>
<td>Install 3.0m path - north side</td>
<td></td>
<td>90m red asphalt shared path inc. linemarking and signage</td>
<td>Improve experience along foreshore area</td>
<td>L</td>
<td>$6,000</td>
</tr>
<tr>
<td>Strickland Street - Pennant Road to Forum Entrance</td>
<td>Install and/or upgrade slabbed path to 2.0m concrete path - south side</td>
<td></td>
<td>620m concrete shared path with connection into Bunbury Forum and across Strickland Street near White Street inc. linemarking and signage</td>
<td>Complete connection east to Eelup Rotary and rectify Forum access</td>
<td>H</td>
<td>$150,000</td>
</tr>
<tr>
<td>Strickland Street / Blair Street</td>
<td>Intersection improvement</td>
<td></td>
<td>Improve signalised intersection crossings inc. grab rails across southern and eastern legs. Install signage and improved bicycle connection east/west (bicycles only signage). Modify signals with bicycle lamp.</td>
<td>Improve safety and provide alternative east-west connection to Blair Street / Stirling Street</td>
<td>H</td>
<td>$30,000</td>
</tr>
<tr>
<td>Strickland Street - Forrest Ave to Douglas Street</td>
<td>Install 2.0m shared path - south side</td>
<td></td>
<td>200m concrete shared path inc. linemarking and signage</td>
<td>Complete connection to Forrest Ave</td>
<td>M</td>
<td>$40,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------------------------------------</td>
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<td>----------------------------------------------------------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td>Sandridge Road - before Blair Street to Picton Road</td>
<td>Install 2.0m shared path - north side</td>
<td></td>
<td>800m concrete shared path inc. linemarking and signage. Tie into existing pedestrian facilities at intersections</td>
<td>Provide safe connection along major road to King St and Picton Rd</td>
<td>M</td>
<td>$ 70,000</td>
</tr>
<tr>
<td>Ecclestone Street - Nuytsia Avenue to Brittain Road</td>
<td>Replace path with 2.0m shared path - east side</td>
<td></td>
<td>700m concrete shared path inc. linemarking and signage</td>
<td>Improve connection south to Bunbury Hospital / ECU / TAFE</td>
<td>H</td>
<td>$ 150,000</td>
</tr>
<tr>
<td>Nielsen Grove - Brittain Road to Underwood Street</td>
<td>Install 2.0m shared path - west side</td>
<td></td>
<td>240m concrete shared path connection. Improve bicycle connection across eastern leg of roundabout. Remove grab rails at Underwood St / Nielsen Gr</td>
<td>Simplify connection along Ecclestone St</td>
<td>M</td>
<td>$ 50,000</td>
</tr>
<tr>
<td>Underwood St / Robertson Dr</td>
<td>Intersection creation - 300m shared path from Underwood to TAFE on north side of road</td>
<td></td>
<td>Create safe at-grade (or grade separated) connection across Robertson Dr. May require feasibility study and detailed design. Extend path to ECU internal drive network. Install wayfinding signage to the north and west</td>
<td>Improve access to Hospital / Uni / TAFE. TCS are planned for this intersection</td>
<td>M</td>
<td>$ 80,000</td>
</tr>
<tr>
<td>ROW Access - Eulalia Street to Underwood St</td>
<td>Upgrade to 2.5m shared path</td>
<td></td>
<td>Utilise ROW for shared use. Clear brush and improve fencing if required. Linemarking and directional signage to/from Hospital etc</td>
<td>Improve access to Hospital / Uni / TAFE</td>
<td>H</td>
<td>$ 20,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
</tr>
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</tr>
<tr>
<td>Sweeny Street - Blair Street to Eulalia Street</td>
<td>Install 2.0m shared path - south side</td>
<td>520m concrete shared path inc. linemarking and signage</td>
<td>Complete east-west connection to main Underwood St crossing of Robertson Dr</td>
<td>H</td>
<td>$115,000</td>
<td></td>
</tr>
<tr>
<td>Forrest Avenue - Wilkes Street to Richter Road</td>
<td>Install 2.0m shared path - north side</td>
<td>520m concrete shared path inc. linemarking and signage. Connect path to existing path crossing rail line east of cemetary</td>
<td>Connection parallel to railway line. Northern link to Davenport industrial area</td>
<td>L</td>
<td>$110,000</td>
<td></td>
</tr>
<tr>
<td>Bunbury Bypass - Roager Place to Bovell Street</td>
<td>Install 2.0m shared path - west side</td>
<td>1900m concrete shared path inc. signage and linemarking. Intersection safety assessment at Bovell St / Bunbury By</td>
<td>Complete link to Davenport industrial area</td>
<td>L</td>
<td>$400,000</td>
<td></td>
</tr>
<tr>
<td>Rodsted Street / Robertson Drive</td>
<td>Intersection design / safety review</td>
<td>Consider intersection for future Robertson Dr crossing into Moorlands precinct. Potential site for grade separation.</td>
<td>Link to Moorlands. Awaiting development on Moorlands site</td>
<td>L</td>
<td>$25,000</td>
<td></td>
</tr>
<tr>
<td>Hay Park - Internal Path Network</td>
<td>Realign and install 2.0m shared paths</td>
<td>1800m concrete shared path north-south, 1200m concrete shared path east-west. Realign internal shared path network to form coherent legible east-west and north-south off-street paths with clear direction.</td>
<td>Link east across to Health / Education precinct, south to Washington Road, west to Hudson Road and north to Parade Road commuter path</td>
<td>M</td>
<td>$500,000</td>
<td></td>
</tr>
</tbody>
</table>
7.4 Maintenance Requirements

There are two types of maintenance required to ensure satisfactory operation of the proposed bicycle network. Remedial maintenance measures are proposed in Table 4, and are required to bring the existing paths and roadways up to the desired standard. In addition to these upgrades, some ongoing maintenance will be necessary to keep the level of service for cycling infrastructure at a high level. The following describes some of the considerations that will be required to ensure effective operation into the future:

- Keep paths along Ocean Drive and Koombana Drive clear of sand drifts. Monitor and assess the requirements for sweeping and retaining as the proposed beachside infrastructure works progress;
- The cycling experience along many existing roadways is diminished by the prevalence of debris including pebble gravel and glass which can represent a significant hazard to road cyclists. These areas must be identified and cleaned frequently to retain the integrity of the proposed cycle paths. Based upon the comments made by residents, a considerable increase in the frequency of road sweeping should be undertaken, particularly along the designated on-road cycle lanes;
- Main regional connections including South Western Highway, Australind and Bunbury Bypasses and Bussell Highway are popular with commuting and recreational cyclists. The upgrade of these roads to include 1.5m sealed shoulders will assist in improving safety for these riders, but this must be accompanied by frequent edge sweeping to remove debris from the shoulder;
- End-of-trip facilities along recreational paths, in the CBD and at local government buildings should be periodically assessed for security and safety with ongoing improvement at those locations considered insufficient;
- Additional surveillance of cyclist and motorist behaviour should be undertaken by local police during the initial rollout of infrastructure and periodically over time. This enforcement drive should focus on recognised ‘hotspots’ of poor behaviour, along major recreational and commuter links and adjacent to schools. This campaign should be aimed at educating all road users to observe safe behaviour;
- An annual audit of cycle paths should be conducted, extending the existing path audit. This assessment should include path condition, obstructions and identification of other hazards that may require remedial maintenance or an increase in ongoing measures.

Requirements for remedial maintenance in addition to proposed infrastructure upgrades are shown in context in Figure 41. Details regarding remedial maintenance on existing paths are provided in Table 4.
<table>
<thead>
<tr>
<th>Location of Works</th>
<th>Recommended Remedial Works</th>
<th>Existing Scenario</th>
<th>Description</th>
<th>Justification</th>
<th>Priority</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab rails</td>
<td>Replacement of grab rails</td>
<td></td>
<td>Remove all grab rails currently located in the centre of designated bike paths. Replace those grabrails that cross major roads or driveways on the left side of the approach</td>
<td>Improvements to safety and wayfinding</td>
<td>TBA</td>
<td>$20,000</td>
</tr>
<tr>
<td>Washington Avenue / Lockwood Crescent</td>
<td>Intersection improvement</td>
<td>Clear brush at inside of truncation. Remove 2x existing grabrails.</td>
<td>Eastbound approach has significant downgrade, sightlines obscured, grab rail in the centre of pram ramp on both sides.</td>
<td>2010</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Washington Avenue / Parade Road</td>
<td>Grab rail upgrade</td>
<td>Remove 9x grab rails at intersection and replace with new grab rails at the left side of path.</td>
<td>Existing location of grabrails unsafe, some approaches have no rails</td>
<td>2010</td>
<td>$4,000</td>
<td></td>
</tr>
<tr>
<td>Westwood Avenue @ Withers Primary School</td>
<td>Crossover upgrade</td>
<td>Repair bitumen at entry and exit to Withers Primary</td>
<td>Improve cycling experience</td>
<td>2010</td>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td>Hudson Road / Minninup Road</td>
<td>Wayfinding improvement</td>
<td>Install signage directing cyclists along designated shared paths</td>
<td>Lack of signage reduces effectiveness of existing infrastructure</td>
<td>2010</td>
<td>$2,000</td>
<td></td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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<tr>
<td>Hudson Road / Parade Road</td>
<td>Intersection improvement</td>
<td></td>
<td>Install grabrails for connection across to Hay Park</td>
<td>Improve safety</td>
<td>2010</td>
<td>$ 500</td>
</tr>
<tr>
<td>Hudson Road</td>
<td>Grab rail upgrade</td>
<td></td>
<td>Remove all grabrails across driveways. Replace all grabrails across Hudson Road</td>
<td>Remove safety hazard and improve safety</td>
<td>2010</td>
<td>$ 4,000</td>
</tr>
<tr>
<td>Ocean Drive / Westwood Avenue</td>
<td>Intersection improvement</td>
<td></td>
<td>Connect existing shared path across Ocean Dr to proposed PSP link. Grab rails required</td>
<td>Sightline issue for cyclists crossing Westwood Ave.</td>
<td>2012</td>
<td>$ 3,000</td>
</tr>
<tr>
<td>Knight Street</td>
<td>Signage update</td>
<td></td>
<td>Replace path starts/ends signs with standard shared path signage</td>
<td>Promote continuity of shared path. Discuss relocation of bicycle parking at Adam Road Primary to the Knight Street side as Adam road infrastructure is relatively poor</td>
<td>2010</td>
<td>$ 1,500</td>
</tr>
<tr>
<td>Hastie Street</td>
<td>Grab rail upgrade</td>
<td></td>
<td>Remove all grabrails across minor street intersections.</td>
<td>Grab rails at minor intersections unnecessary. Many grabrails in centre of path causing hazard</td>
<td>2010</td>
<td>$ 2,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
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<tr>
<td>Hastie Street</td>
<td>Crossing improvement</td>
<td></td>
<td>Install pram ramp connection on south side of road</td>
<td>Existing lack of pedestrian / cycle connection</td>
<td>2010</td>
<td>$2,500</td>
</tr>
<tr>
<td>Timperley Road</td>
<td>Crossing improvement</td>
<td></td>
<td>Install grab rails at Timperley Rd crossing</td>
<td>Improve safety</td>
<td>2010</td>
<td>$500</td>
</tr>
<tr>
<td>Timperley Road</td>
<td>Upgrade boardwalk surface</td>
<td></td>
<td>Replace wooden boardwalk with asphalt or concrete</td>
<td>Improve cycling experience</td>
<td>2010</td>
<td>$6,000</td>
</tr>
<tr>
<td>Timperley Road near Blair Street</td>
<td>Encroachment</td>
<td></td>
<td>Trim verge to reduce encroachment</td>
<td>Restore path width</td>
<td>2010</td>
<td>$-</td>
</tr>
<tr>
<td>Stockley Road / Ocean Drive</td>
<td>Signage improvement</td>
<td></td>
<td>Add wayfinding signage to beach access</td>
<td>Improve connectivity</td>
<td>2010</td>
<td>$500</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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<tr>
<td>Minninup Road near Hillcrest Avenue</td>
<td>Crossing improvement</td>
<td></td>
<td>Complete pram ramp and crossing point opposite grab rail location</td>
<td>Improve connectivity</td>
<td>2010</td>
<td>$800</td>
</tr>
<tr>
<td>Minninup Road / Clarke Street</td>
<td>Grab rail upgrade</td>
<td></td>
<td>Remove grab rail</td>
<td>Improve safety</td>
<td>2010</td>
<td>$200</td>
</tr>
<tr>
<td>Minninup Road / Hakea Crescent Connection</td>
<td>Signage improvement</td>
<td></td>
<td>Improve signage direction to/from Minninup Forum</td>
<td>Improve wayfinding</td>
<td>2010</td>
<td>$300</td>
</tr>
<tr>
<td>Minninup Road / Mangles Street</td>
<td>Grab rail upgrade</td>
<td></td>
<td>Remove grab rail at intersection and replace with new grab rails at the left side of path.</td>
<td>Improve safety</td>
<td>2010</td>
<td>$500</td>
</tr>
<tr>
<td>Minninup Road / Mangles Street</td>
<td>Intersection investigation</td>
<td></td>
<td>Investigate alternatives to existing intersection form</td>
<td>Poor sightlines and navigation issues reduce safety for both road cyclists and casual riders on shared paths</td>
<td>2010</td>
<td>$10,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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<tr>
<td>Minninup Road near Mangles Street</td>
<td>Bus shelter modification</td>
<td>Move bus sign and tactile markings close to shelter and modify path to a straighter alignment at bus shelter</td>
<td>Weave required around sign and shelter reduces safety, particularly considering likely queuing for bus</td>
<td>2010</td>
<td>$5,000</td>
<td></td>
</tr>
<tr>
<td>Minninup Road / Prince Phillip Drive</td>
<td>Intersection improvement</td>
<td>Complete path linkages or remove grab rails</td>
<td>Grab rails provide visual wayfinding cues which lead to non-existent paths</td>
<td>2010</td>
<td>$10,000</td>
<td></td>
</tr>
<tr>
<td>Minninup Road / Spencer Street</td>
<td>Intersection improvement</td>
<td>Improve signage and install grab rails across Minninup Rd and Spencer St</td>
<td>Improve safety and connection to on-road cycle lanes</td>
<td>2010</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Parade Road / Adam Road</td>
<td>Intersection Improvement</td>
<td>Improve wayfinding signage and install grab rails</td>
<td>Better connection to Blair St and Timperley Rd</td>
<td>2010</td>
<td>$600</td>
<td></td>
</tr>
<tr>
<td>Koombana Drive</td>
<td>Bollard removal</td>
<td>Remove 2x bollards under bridge</td>
<td>Bollards constitute mid path obstruction and may be hazardous</td>
<td>2010</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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</tr>
<tr>
<td>Koombana Drive / Lyons Cove</td>
<td>Bollard removal</td>
<td>Remove bollard in centre of path</td>
<td>Bollard design creates safety hazard, particularly at night</td>
<td>2010</td>
<td>$ 200</td>
<td></td>
</tr>
<tr>
<td>Koombana Drive</td>
<td>Signage improvement</td>
<td>Install directional signage and shared path linemarking</td>
<td>Path choice creates wayfinding issues</td>
<td>2010</td>
<td>$ 800</td>
<td></td>
</tr>
<tr>
<td>Cobblestone Drive</td>
<td>Path connection</td>
<td>Complete connection to path along Leschenault Inlet or improve wayfinding and boardwalk surface through POS</td>
<td>Path terminates abruptly, no designated path or wayfinding signage</td>
<td>2010</td>
<td>$ 15,000</td>
<td></td>
</tr>
<tr>
<td>Austral Parade / King Road</td>
<td>Intersection improvement</td>
<td>Remove obstructions and ensure 2.0m connection to King Road cycle lanes</td>
<td>Path terminates at Hotel, wayfinding is difficult. On path obstructions create minor hazard</td>
<td>2010</td>
<td>$ 2,000</td>
<td></td>
</tr>
<tr>
<td>Strickland Street / King Road</td>
<td>Intersection improvement</td>
<td>Improve signage and install grab rails at all approaches. Replace splitter island ramps with cut-outs.</td>
<td>Intersection form relatively poor for cyclists. Requires handrails for safety. Private driveway provides a shortcut.</td>
<td>2010</td>
<td>$ 7,000</td>
<td></td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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</tr>
<tr>
<td>Strickland Street near Pennant Way</td>
<td>Bus shelter relocation</td>
<td>Move bus shelter towards road out of path alignment</td>
<td>Obstruction for casual cyclists</td>
<td>2010</td>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td>Strickland Street near King Road</td>
<td>Encroachment</td>
<td>Trim verge to reduce encroachment</td>
<td>Restore path width</td>
<td>2010</td>
<td>$-</td>
<td></td>
</tr>
<tr>
<td>Sweeny Street / ECU Access</td>
<td>Intersection improvement</td>
<td>Replace grab rail on left side of path. Improve wayfinding and path designation signage. Conduct safety evaluation of crossing point.</td>
<td>Improve safety for student crossing</td>
<td>2010</td>
<td>$25,000</td>
<td></td>
</tr>
<tr>
<td>Flynn Street near Rodsted Street</td>
<td>Obstruction removal</td>
<td>Trim vegetation</td>
<td>Remove overhead obstruction</td>
<td>2010</td>
<td>$-</td>
<td></td>
</tr>
<tr>
<td>Bruce Street / Bunning Boulevard</td>
<td>Grab rail installation</td>
<td>Install 2x grab rails</td>
<td>Improve safety for student use</td>
<td>2010</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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<tr>
<td>Flynn Street / Petherick Street</td>
<td>Grab rail installation</td>
<td></td>
<td>Install 2x grab rails</td>
<td>Improve safety for student use</td>
<td>2010</td>
<td>$ 500</td>
</tr>
<tr>
<td>Brittain Road / Car Park Roundabout</td>
<td>Grab rail installation</td>
<td></td>
<td>Install 6x grab rails across southern leg and eastern leg</td>
<td>Improve crossing safety</td>
<td>2010</td>
<td>$ 1,000</td>
</tr>
<tr>
<td>Brittain Road near Blair Street</td>
<td>Path hazard</td>
<td></td>
<td>Clear gravel on path. Maintain periodic maintenance</td>
<td>Improve safety</td>
<td>2010</td>
<td>$ -</td>
</tr>
<tr>
<td>Forrest Avenue - Wisby Street to Wilkes Street</td>
<td>Signage upgrade</td>
<td></td>
<td>350m signage and linemarking along Forrest Ave access road</td>
<td>Wayfinding applications</td>
<td>2012</td>
<td>$ 1,500</td>
</tr>
<tr>
<td>Milligan Street near Brittain Street</td>
<td>Bus shelter modification</td>
<td></td>
<td>Move bus shelter towards road out of path aligment</td>
<td>Remove obstruction and improve safety</td>
<td>2010</td>
<td>$ 3,000</td>
</tr>
<tr>
<td>Location of Works</td>
<td>Recommended Remedial Works</td>
<td>Existing Scenario</td>
<td>Description</td>
<td>Justification</td>
<td>Priority</td>
<td>Cost Estimate</td>
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<tr>
<td>Milligan Street / Doolan Street</td>
<td>Grab rail removal</td>
<td></td>
<td>Remove grab rails</td>
<td>Remove obstruction and improve safety</td>
<td>2010</td>
<td>$ 500</td>
</tr>
<tr>
<td>Nuytsia Avenue / Blair Street</td>
<td>Grab rail replacement</td>
<td></td>
<td>Replace 2x grab rails and relocate on left side of path</td>
<td>Improve crossing safety</td>
<td>2010</td>
<td>$ 500</td>
</tr>
<tr>
<td>Anchorage Cove</td>
<td>Wayfinding improvement</td>
<td></td>
<td>Improve wayfinding signage and improve connection to Koombana Drive path</td>
<td>Poor connection to Koombana Drive across train line</td>
<td>2010</td>
<td>$ 5,000</td>
</tr>
<tr>
<td>Anchorage Cove</td>
<td>Remove path obstructions</td>
<td></td>
<td>Evaluate path obstructions and remove/relocate/realign. Obstructions include bollard, gazebo and sand drifts, among others</td>
<td>Obstructions pose safety concern for cyclists and pedestrians</td>
<td>2010</td>
<td>$ 15,000</td>
</tr>
<tr>
<td>Hay Park</td>
<td>Speed bump replacement</td>
<td></td>
<td>Remove speed bumps or replace with platforms</td>
<td>Existing speed bumps are extremely poor for cycling.</td>
<td>2010</td>
<td>$ 20,000</td>
</tr>
</tbody>
</table>
7.5 Cycling Promotion

There are a number of initiatives that can be employed to promote cycling in Bunbury. Fundamental to this effort are the infrastructure improvements proposed as part of this Bicycle Plan; it is difficult to increase cycling ridership if the network has significant discontinuities or is considered “unsafe”.

Once the Bicycle Plan is approved, maps detailing the extent and type of paths should be made available to residents, similar to the effort undertaken for the “Walk-It Bunbury” promotion. An increased awareness of safe, well signposted bicycle routes will unlock some of the latent demand in the area. Maps should also be distributed concurrent with educational drives, through schools and community events. These can be promoted through potential giveaways – vouchers, bicycles, safety gear which may be partially sponsored by BikeWest, City of Bunbury and local bicycle retail stores.

A number of events are already held in and around Bunbury for the active recreational cycling community. Future events could be tied to the opening of specific bicycle routes as they occur. This will tend to enforce a completion timeframe for infrastructure improvements and will actively promote recreational cycling outside the existing bicycle user groups. Other events should be used to promote the casual and scenic nature of the proposed bicycle network with Cycle to School and Cycle to Work days organized to coincide with local shared path improvements. The organisation of Cycle to School initiatives should include parents and teachers and follow educational programs to ensure children understand safe cycling.

Local recreation facilities by should be promoted by organising bicycle tours for recreational riders, combining these with tourist attractions within and beyond the City. Information regarding the improved bicycle infrastructure should be disseminated not only to local facilities, but to adjoining Local Government Areas. The City of Bunbury has an opportunity to create a successful cycling tourism initiative in concert with upgrades to the cycling infrastructure. The Swan Valley cycling tourism campaign provides an example of how a coordinated system of promotion and infrastructure improvements can increase the acceptance of cycling as a viable alternative mode of transport and additional tourism opportunities in a region.

It is recommended that the City engage in yearly or bi-yearly marketing and research week to promote the concept of bicycle usage. This initiative could be undertaken in conjunction with existing cycling events. If there is sufficient interest this could be incorporated into a Regional Bicycle Week.

It is recommended that BikeWest, the Department of Sport and Recreation, Department of Education and Training and local bicycle user groups be advised of the initiative and that synergies between these groups are encouraged.
7.6 Policy Initiatives

Additional policy initiatives that may benefit the community have been considered as part of the Bicycle Plan and as a result of consultation with state and local government agencies.

Implementation of the proposed bicycle parking policies as retrofit works for existing government facilities will act as an example for private business and an incentive for City employees and visitors to the CBD to switch to cycling modes.

Consideration could be made to modify the requirements for development to:

- Incorporate bicycle lanes into the design of roads at a District Distributor level or greater;
- Upgrade the standard for Neighbourhood Connector roads to incorporate shared paths; and
- More generally to require consideration for cycling infrastructure within future developments to connect into and extend the proposed bicycle network.

By establishing this planning framework for future developments, the bicycle network can expand to meet the requirements of a developing community.
8. CYCLEWAY CONCEPT DESIGN – EATON TO DALYELLUP

8.1 Vision

Over the last 20 years, residential communities have developed throughout the Greater Bunbury Area. These communities represent a great opportunity for the improvement of cycling infrastructure and the promotion of cycling transport modes. While the majority of residents external to the central Bunbury region currently utilise private vehicle modes of transport, a significant proportion already cycle for employment, recreation, shopping and education purposes.

To support mode shift towards cycling, a cycleway concept has been developed, linking the Shires of Capel, Dardanup and Harvey to the City of Bunbury. This cycleway is designed to link the communities of Dalyellup and Eaton to the Bunbury CBD and to provide an attractive, safe and efficient alternative to private vehicle modes while significantly improving the existing infrastructure.

The cycleway concept design has been predicated on an on-street solution, providing maximum opportunities for commuter cyclists to access this route while maintaining efficiency and safety.

8.2 Potential Route Alignment Options

For the purposes of design, the north-south link between Bunbury and Dalyellup has been evaluated independently of the east-west connection between Bunbury and Eaton. Each of these routes have different constraints, opportunities and requirements.

8.2.1 Dalyellup - Bunbury

Three primary route alignments were considered in the evaluation phase of this project:

- Ocean Drive;
- Parade Road – Spencer Street; and
- Blair Street.

Of these Blair Street was initially dismissed due to the high volume of traffic and considerable constraints associated with any potential on-street solution. This route is also less direct, due to the poor direct connection to Dalyellup and the existing Blair Street alignment. The advantages of future extension along Bussell highway to developments further afield were not considered sufficient to outweigh these constraints.
Ocean Drive is a scenic route with existing bicycle provision and is already popular with cyclists. Review of the current on-street infrastructure suggested that while the majority of this road could be modified to a suitable cross-section, the newly developed back beach cross-section is inconsistent with the goals of the cycleway concept. Therefore, as stated previously, recommendations for this roadway consist of removal of the cycling designation on-street and construction of a high-quality RSP along the beach, between Bunbury and Tuart Walk.

The remaining alignment option, connecting Parade Road to Spender Street, was chosen for a number of reasons:

- This route forms a central spine through South Bunbury to the CBD, with relatively efficient connections from East Bunbury;
- Good connection into Dalyellup via a high quality, newly developed roadway cross-section with potential provision for bicycles;
- Low vehicle volumes along the southern section of Parade Road and absence of existing development reduce design constraints;
- The dual carriageway cross-section on Parade Road, with wide verges and central median suggest sufficient available road reserve width for the implementation of on-street cycle lanes;
- The road layout near Carey Park Racecourse, while complicated for vehicular traffic, creates an opportunity for a short PSP link connection between Parade Road and Spencer Street; and
- Spencer Street has been previously upgraded to Austroads’ Guide for bicycles. Further improvement of this road for cycling is consistent with the goals of both the City and the WAPC and will maximise the use of the existing bicycle infrastructure.

Spencer Street does include some significant constraints near to the Bunbury CBD. These constraints are discussed specifically in Section 8.4.

**8.2.2 Bunbury - Eaton**

The only existing alignment for cycling infrastructure is located along Estuary Drive, between Koombana Drive and Old Coast Road. This path constitutes a combination of off-street bitumen and kerbside on-street shoulders and has significantly degraded since it was installed. Connections from the Bunbury CBD to Estuary Drive are provided along the northern and southern foreshore to the Leschenault Inlet. Each of these existing links includes significant gaps which have been highlighted during on-site investigations and community feedback surveys.
Koombana Drive is currently the most popular route for cyclists commuting between Eaton and Bunbury. However, the majority of Koombana Drive has no dedicated cycling provision, with a narrow kerbside shoulder along a segment of this link and a wide, winding pedestrian path connection from traffic bridge at The Cut to the boardwalk footbridge. This route is not considered ideal for a commuting connection, primarily due to the volume of traffic and the difficulties associated with completing on-road cycle lanes adjacent to the boardwalk. An alternative RSP is proposed along this alignment for use by casual recreational riders.

The most direct route from the Estuary Drive cycleway to the Bunbury CBD is along Austral Parade/Stirling Street. This road runs east-west and connects directly, via a short PSP, to the existing Estuary Drive cycling infrastructure. This road has been designated as the preferred alignment for the completion of the cycleway link between Bunbury and Eaton. The proposed alignment will duplicate, to some extent, the existing off-street path that runs along the southern foreshore. However, an on-street alignment is substantially more attractive to commuters and will promote a higher utilisation of designated infrastructure.

8.3 Triggers for Development

The primary influence for the Bunbury-Eaton alignment is the proposed future expansion of the Bunbury Port. This is scheduled to be undertaken systematically and will significantly impact upon any proposed alignment. As part of the Port expansion, the existing Estuary Drive link will be severed and the only current cycling facility removed. At this point, an alternative alignment will be required, potentially following a diverted Preston River alignment.

It is envisioned that this stage of expansion will take place in approximately 10+ years. This timeframe is sufficient to justify the cost of upgrading the existing cycling infrastructure along Eaton Drive. If this link is likely to be severed in the near future, before 2020, then the economic benefit of the proposed cycleway may not be realised.

8.4 Implementation

The following describes specific issues for the proposed cycleway concept. These issues must be addressed if a consistent, efficient and safe cycleway is to be maintained. Many of these will require specific investigation to isolate design infrastructure alternatives prior to ultimate detailed design.

In addition to the specific requirements for each section of cycleway, consistent signage will be required to designate the cycleway. The signage model suggested by Austroads’ Guide which includes direction, destination and distance information would be ideal for this purpose. Red asphalt colouring for both on-street and off-street paths will greatly assist wayfinding.
8.4.1 Parade Road – Dalyellup to Spencer Street

Parade Road represents an ideal alignment for on-street cycling infrastructure from Dalyellup to Bunbury. Implementation of on-street cycle lanes is straightforward for the majority of the section of the proposed cycleway.

Parade Road in the Shire of Dalyellup was under development at the time of this study. The cross-section at this point is a single carriageway with a wide central median and 4.5-5m pavement width in each direction. This is sufficient to allow a 1.0m cycle lane in the near term with capacity for pavement widening for a full 1.5m cycle lane in the future.

The road cross-section between Dalyellup and Washington Street is an undivided single carriageway with soft shoulders. Road widening will be required to accommodate 1.5m cycle lanes in each direction. Semi-mountable kerbing along both sides of Parade Road in this section will ensure better operation for cyclists, minimising ongoing maintenance by reducing strewn debris.

North of Washington Avenue, Parade Road widens to a dual divided carriageway cross section with wide verges and a wide 7.0m central median. The high volume of traffic along this section of Parade Road, combined with the 70km posted speed limit, suggests that a wider cycle lane would be beneficial between Washington Avenue and Ann Way.
A 1.8m-2.0m cycle lane along Parade Road would require pavement widening along both sides of Parade Road for a distance of 1600m.

1.5m on-street cycle lanes and/or 3.0m PSP would connect Parade Road at Ann Way to Spencer Street at Goldsmith Street. This section of the cycleway would retain as much of the existing alignment as possible, to minimise costs.

**Figure 44 Ann Way – Start of PSP Link**

8.4.2 Spencer Street – Parade Road to Stirling Street

The majority of the cycle way between Goldsmith Street and Prosser Street has been constructed recently by the City, in coordination with BikeWest. The high standard of the existing on-street cycle lanes, upgraded to Austroads guidelines suggests that substantial additional works will not be required. A short extension of the existing bicycle lanes south of Goldsmith Street will be necessary to connect the existing cycle lanes to the proposed PSP link adjacent to Bussell Highway.

North of Prosser Street, no cycling infrastructure is provided. To maximise the effectiveness of the existing infrastructure and create a continuous cycleway into Bunbury, the remainder of Spencer Street through to Stirling Street should be upgraded to include on-street cycle lanes. This will necessarily require widening of existing pavement in some locations, though reallocation of road space is a viable option where Spencer Street remains a single carriageway. North of Forrest Avenue, a shared bicycle/parking lane may be required, consistent with the upgraded section of Spencer Street South of Francis Street.

Complications occur when considering the potential provision of on-street cycle lanes near locations such as the Forrest Avenue signalised intersection where there are significant constraints due to the relative proximity of the retail land uses and the existing intersection geometry. Specific detailed feasibility assessments should be conducted at this location, and also the Stirling Street / Spencer Street intersection.
8.4.3 Stirling Street – Town Centre

The City of Bunbury CBD, while generally a low speed environment, has a significant level of constraint with respect to the availability of pavement for on-street cycle lanes. However, a consistent, high quality network is considered paramount to the effective operation of the cycleway concept. Therefore, further investigation should be undertaken in the vicinity of the Bunbury Centrepoint Shopping Centre between Spencer Street and Charles Street. A minimum 1.0m cycle provision along both sides of this road is essential for use, though a 1.2-1.5m cycle lane is the preferred option. Of particular concern is the interaction between through traffic, parking, pedestrians and cyclists in this area.

The signalised intersection of Stirling Street and Blair Street will also require modification, with the addition of a westbound connection across the cul-de-sac and bicycle lamps to streamline crossing. On-street cycle lanes may transition to the verge to allow ease of crossing.

8.4.4 Stirling Street - Blair Street to Koombana Drive

Stirling Street east of Blair Street represents a primarily residential neighbourhood. This street is narrow, with no central median and parking along both sides. To facilitate on-street cycling provision along this section of Stirling Street, alternative parking arrangements will need to be investigated. This will involve the removal of available parking along the north or south side, with reallocation of existing road space for 1.5m cycle lanes. This would likely be designed with dedicated cycle lanes on one side and shared parking/bicycle provision on the other. Unfortunately, the available verge width, electricity poles and other road furniture along the verge preclude widening the road pavement to any extent. There may be some capacity to indent parking along one side to maximise the retention of parking for residents.

Figure 45 Stirling Street east of Blair Street
East of Albert Road, Stirling Street runs along the foreshore public open space. This provides an opportunity to widen the road pavement if required. A high quality connection across to King Road will assist in maximising the effectiveness of the existing southbound cycle lanes on King Road. Road widening of up to 2m may be necessary for much of Stirling Street and Austral Parade.

8.4.5 Estuary Drive – Stirling Street to Old Coast Road

From Koombana Drive, proposed infrastructure improvements primarily involve upgrade of the existing path to Austroads standards. These modifications would require construction of a 3.0m red asphalt path along the existing alignment. At some points, there are constraints that will impact upon the delivery of this network link. These constraints are highlighted below:

- Intersection of Austral parade and Koombana Drive will require upgrade to improve cycling safety. This will likely include improved connections off-street with sufficient median storage to the north and south sides of the intersection. Ultimately, if signalisation occurs, provision for cyclists should be integrated into any upgrade.
- The existing off-street shared path connecting Koombana Drive to Estuary Drive will need to be widened to 3.0m.
- Near the Preston River bridge, the existing path transitions to a roadside shoulder. This should be widened to 3.0m on the north side and separated from the road by either a barrier or an additional 1.0 minimum of verge, this cross-section should be continued east, where required.
- The existing path alignment runs north to Venezia Boulevard and the east along Pratt Road. This minimises conflicts with traffic but does not represent an efficient path into Eaton. An alternative 3.0m PSP should be constructed along Estuary Drive to Hamilton Road, with high quality connections allowing on-road cycling by commuters directly into Eaton. Future extension to the cycleway network east through Eaton would be beneficial to the operation of the commuter system.

A concept plan has been developed based upon a preferred alignment and is shown in Figure 46. This plan should assist the City in the formulation of specific requirements for upgrade and provide a basis for future detailed design.
10. SUMMARY AND CONCLUSIONS

Cardno Eppell Olsen has been retained by the City of Bunbury to develop a bicycle plan that maximises the efficiency and effectiveness of the existing bicycle network and enhances bicycle facilities for all users. The proposed plan has been designed to be ambitious in scope; not merely improving the existing path network but greatly expanding casual, commuter and recreational routes to create a high quality, safe and attractive environment for cycling through the City.

In order to achieve the prescribed goals, an audit of the existing road and pedestrian path networks has been completed by performing a visual inspection of paths along the current and proposed Bicycle Network routes, and on the primary road network in the City of Bunbury. The main findings from this audit were as follows:

- The existing shared path network is of generally high quality and forms an effective base for the proposed casual path system;
- Existing shared path facilities are often not continuous, with substantial gaps throughout the City;
- On-road cycling facilities tend to be of relatively poor quality due to the rural road design and lack of cycling infrastructure, with some isolated exceptions;
- The main commuting routes for Bunbury CBD employees are of relatively low quality with a number of safety constraints; and
- Many of the existing intersection road crossings require modification to ensure effectiveness and safety.

The proposed bicycle network is based upon two interconnected systems of pathways, consisting of off-street shared paths for casual and young cyclists, and primarily on-street cycle lanes for commuting cyclists.

The casual cycling network is proposed to consist of an interconnected system of 2 metre wide shared paths linking schools, shops, recreation and residential areas. The focus for casual cyclists is consistent and safe connections across intersections and other conflict points while providing the maximum coverage for the City.

The proposed commuter network has been designed for high speed connections along a central backbone, running from Dalyellup to Bunbury to Eaton. Recreational links have also been proposed to further promote sustainability and support community development goals while potentially attracting additional tourism to the area.
The following describes some of the proposed infrastructure works and policy recommendations deemed critical to the future operation of the Bunbury Bicycle Network:

- Discontinue on-street cycling along Ocean Drive near Back Beach;
- Extend Spencer Street on-street cycling provision through the CBD to Stirling Street;
- Create efficient (PSP) Principal Shared Path connection between southern end of Spencer Street and Parade Road;
- Install on-street cycle lanes along both sides of Parade Road into Dalyellup;
- Connect the beachfront shared path with the CBD along Symmons Street;
- Upgrade Stirling Street to include on-street cycle lanes;
- Upgrade Blair Street/Stirling Street intersection to allow bicycle movements;
- Upgrade both width and quality of Estuary Drive cycleway to improve amenity and safety;
- Eliminate gaps in the shared path network, particularly in central locations such as Sandridge Road, Strickland Street and Minninup Road;
- Improve bicycle infrastructure within Hay Park;
- Provide connections to developing regions including Davenport, Moorlands and Glen Iris;
- Support cycling through bicycle parking requirements at new developments and use public buildings as a showcase for high quality end-of-trip facilities;
- Create a cycling hub to support small businesses in the Bunbury CBD. Consider a central location with showers, lockers and secure parking facilities;
- Educate cyclists and road users regarding cycling options and especially safety around cyclists.

The proposed bicycle plan provides information on recommended works, guidelines for implementation and the potential benefits of cycling as part of a sustainable transport initiative. Undertaking the proposed works will assist in fulfilling some of the goals of Bunbury’s City Vision, creating a healthy and safe community while providing opportunities for growth and development in the region.
Appendix A

Survey Questionnaire
How often do you ride a bicycle?
- Never
- Once a month
- Once a fortnight
- Once a week
- 2-3 times per week
- Practically every day

What is the principal purpose of your bicycle trip(s)? (Please check one)
- Education
- Work
- Recreation
- Shopping
- Other _____________________________

What do you like about your chosen route(s)?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

What do you dislike about your chosen route(s)?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

Why do you prefer this route over other alternatives?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

What improvements could be made to make your cycling trip better?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

Do you have any other comments or suggestions concerning bicycle infrastructure in the City of Bunbury?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

How old are you?
- 0-12 years
- 13-17 years
- 18-25 years
- 25-35 years
- 35-45 years
- 45-55 years
- 55+ years

A map of Bunbury has been included on the back of this survey. Please take this opportunity to describe your primary cycling route(s) (eg. home to work, home to school, recreational riding route etc).

Completed surveys can be deposited at the City of Bunbury council offices or local Public Library, sent via fax to 9388 3831 or by mail to Cardno Eppell Olsen, 2 Bagot Rd, Subiaco 6008.
Please mark your primary cycling route(s) on the provided map. You may wish to circle road crossing points or put an X at the location of existing issues. Feel free to label the map in any way you wish.

This information will assist us in improving service along your preferred route.
Appendix B

Bicycle Parking Options
Welcome to Urban Racks newly launched Urban Parkiteer Secure Bicycle Parking Facility; a new product that will enable education, municipal and transportation authorities to deliver a fully managed large scale "end of trip" biking program for its citizens.

Each unit is designed to hold up to 50 bikes and is fully controlled and managed by our proprietary Access Control Interface using electronic key fobs, ensuring the best protection for the rider and their bicycle.

ABOUT US

The Urban Parkiteer is a product of Urban Racks, a BC owned and operated company, which specializes in manufacturing and distribution of bike racks, bike shelters and bike lockers.

Our Bicycle Parking Systems are supplied to businesses, government, municipalities, educational institutions, non-profit organizations, retail stores, property management, and strata groups looking for cost effective bicycle parking solutions for their employees, customers and tenants.

We maintain a strong inventory to ensure that we can serve our clients quickly and efficiently from our Surrey, BC warehouse.

EMAIL - info@urbanracks.com
With a 15 year track record, Urban Rack Bicycle Parking Systems are favored by cyclists across North America.
The Green Pod

The Green Pod is a high quality end of trip facility for cyclists that can be integrated into indoor and outdoor applications.

The Green Pod is the size of a car park and comes in two configurations:
1) 1 Shower, 1 Change Room, 10 Bicycles, 10 Lockers.
2) 2 Showers, 2 Change Rooms, 28 Lockers, 0 bicycles

The Pod has been designed to operate on 12V DC system that can be powered by solar panels on the roof. The Pod consist of a solar hot water system, electronic locking system, LED lighting activated by motion sensors, a grey water treatment unit that discharges grey water into green areas, timed showers and a self cleaning mechanism.

The Pod utilizes an innovative self cleaning system which ensures users enjoy a high standard of sanitation without the cost of daily cleaning.

• High Quality
• Sustainable Construction
• Encourages sustainable lifestyles
• Flexibility to meet demand increases
• Low establishment and operational costs
Bicycle Cages

Fully enclosed steel mesh cages provide good visibility and excellent security and are supplied in vertical storage format to minimise the area required.

Cages can provide a secure alternative to lockers where there is concern that lockers may be used for illegal storage of goods. They also serve as an alternative in basement locations where fire or sprinkler regulations may prohibit the installation of metal sheet clad lockers.

Leda bicycle cages are manufactured using a tubular steel frame clad with 50mm x 50mm x 4mm galvanised steel mesh.

All cages include:
• Secure 3-way locking
• Individual keying system
• Wheel rail – provides easy central location of bicycles
• Standard cages include one side panel and one door panel so that the last cage includes a closure panel.

Options
• Back and roof mesh panels
• Metal roof and flashings
• Master keying system

Advantages
• Provide good security (Class 1)
• Individual cage has unique keying system
• Modular system tailored to suit application
• Only casual surveillance required
• Best suited for medium to long term parking

Applications
• Residential apartments
• Educational facilities
• Railway stations
• Bus terminals
• Workplaces

Note: Cages are commonly installed in car parks and against walls so back and roof panels are optional and need to be specified if required.
**Modular Cages MBL**

**MBL16S**  
Standard Unit  
Side Panel x 1 + Front Gate  
**MBL16C**  
Closure Unit  
Side Panels x 2 + Front Gate

**Material**  
25mm x 25mm x 1.6mm galvanised RHS  
50mm x 50mm x 4mm galvanised steel mesh

**Finish**  
Galvanised or powder coated in a range of colours

**Inclusions**  
V heel rail  
Vandal-proof lock  
3-way locking

**Options**  
Back panel & roof panel

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**V Shaped Cages VBL**

**VBL16S**  
Standard Unit  
Side Panel x 1 + Front Gate  
**VBL16C**  
Closure Unit  
Side Panels x 2 + Front Gate

**Material**  
25mm x 25mm x 1.6mm galvanised RHS  
50mm x 50mm x 4mm galvanised steel mesh

**Finish**  
Galvanised or powder coated in a range of colours

**Inclusions**  
V heel rail  
Vandal-proof lock  
3-way locking

**Options**  
Metal roof with flashings

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Note: Cages are normally installed in car parks and against walls, so back and roof panels are optional and need to be specified if required.
Appendix C

Structure Plans
NOTES:
1. Residential subdivision and development above R20 density must be subject to a detailed area plan.
2. Land within the 500m buffer to the Alkaff is excluded from residential and other sensitive land uses.
3. Land within 150m Water Treatment Plant buffer is excluded from residential and other sensitive land uses.
4. Subdivision and development is subject to the Structure Plan being endorsed by the WAPC.
5. Provision of drainage basins within Regional Open Space or in the Relief Floodway will require approval of the relevant state government agencies.
6. Vegetated areas may require clearing permits. It is the proponent's responsibility to check with the DEC in this regard.
7. Proposed access roads are indicative only and can be varied at subdivision design stage.
8. Setbacks to wetlands (EPF or otherwise) must be negotiated with and approved by the DEC prior to any subdivision approvals being granted.
9. Land within 30m setback area of the Relief Floodway can only be developed if the Relief Floodway is rescinded.
10. The Gateway Commercial Precinct zoning is subject to a scheme amendment to a general commercial zone or a special use zone equivalent to accommodate non-centre based activities.
11. The Neighbourhood Centre zoning is subject to a scheme amendment to accommodate shopping and mixed use. Retail floorspace is limited to a maximum of 4,500 square metres.