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CITY OF VINCENT

CITY OF VINCENT BIKE PLAN

2013

Document Control Record

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Table of Contents

1. Introduction 1
   1.1. Purpose and Objective 1
   1.2. Background 1
   1.3. Scope 2
   1.4. Classes of Cycle Users 2
      1.4.1. Inexperienced Cyclist 2
      1.4.2. Commuter Cyclist 2
      1.4.3. Recreational Cyclist 3
      1.4.4. Fitness Training 3
2. Policy and Strategic Context 4
   2.1. National 4
      2.1.1. Australian National Cycling Strategy 2011 - 2016 4
   2.2. Western Australia 5
      2.2.1. Hope for the Future: The Western Australian State Sustainability Strategy 5
      2.2.2. Perth Metropolitan Transport Strategy 1995-2029 5
      2.2.3. Bike Ahead: Bicycle Strategy for the 21st Century 5
      2.2.4. Perth Bicycle Network Plan (Bikewest, Main Roads WA and Department of Transport) 5
      2.2.5. Draft Western Australian Bicycle Network Plan (2012 – 2021) 5
   2.3. City of Vincent 6
      2.3.1. Car Parking Strategy 2010 6
      2.3.2. Physical Activity Strategic Plan 2009 – 2013 6
      2.3.3. Strategic Community Plan 2011-2021 6
      2.3.4. Local Bicycle Network Plan 2004 6
3. Crash Analysis & Recommendations 7
   3.1. Crash Data 7
   3.2. Crash Locations & Possible Trends 7
   3.3. Recommendations 7
4. Consultation 8
   4.1. Technical Officers Workshop 8
   4.2. Community Workshop 8
   4.3. City of Vincent Online Survey 9
5. Link Assessment (CERS Audit) 10
   5.1. CERS Methodology 10
   5.2. Findings 10
6. Strategic Assessment & Recommendations 14
   6.1. Routes 14
   6.2. Recommendations 14
7. Maintenance & Renewal 18
   7.1. Maintenance Program 18
      7.1.1. Risk Assessment 18
      7.1.2. Maintenance Activities 18
   7.2. Maintenance Schedule 18
   7.3. Renewal Program 18
8. Conclusion 20

List of Figures

Figure 1-1: Locality of the City of Vincent 1
Figure 1-2: Travel Mode to Work 2
Figure 2-1: Policies and Strategies Relationship 4
Figure 2-2: Town of Vincent Local Bicycle Network Plan 2004 6
Figure 3-1: Severity of Bicycle Crashes per year 7
Figure 3-2: Roads prone to bicycle crashes 7
Figure 5-1: Audited links and corresponding performance 12
Figure 6-1: Advanced Start Area 14
Figure 6-2: Proposed markings as implemented along Terrace Road 15
Figure 6-3: Indicative Oxford Street cross section (overhead view) 15
Figure 6-4: Proposed NE1/NE4 PBN Route 16
Figure 6-5: Signalised pedestrian and cyclists crossing 16
Figure 6-6: Roundabout treatment 17
Figure 6-7: Possible Crossing Concept 17
Figure 6-8: Example of a shared space roundabout 17
Figure 6-9: Example of signage indicating a shared space area 17
Figure 8-1: Proposed Strategic Bicycle Routes 20

List of Tables

Table 4-1: Workshop Identified Spending Priorities 9
Table 5-1: CERS Assessment Parameters 10
Table 5-2: CERS Assessment Framework 11
Table 5-3: Overall Findings 13
Table 6-1: Strategic Route Characteristics 14
Table 7-1: Maintenance & Renewal - Summary of Issues & Recommendations 19

1. Introduction

1.1. Purpose and Objective

Aurecon was appointed by the City of Vincent to undertake the 2013 Bike Plan. This Bike Plan sets out an action plan for attaining immediate improvements to the cycle network and environment, as well as strategic vision for the continued development and promotion of cycling for the short to medium term.

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

The main objectives of the Bike Plan include:

- Evaluating cycling and its associated infrastructure in the study area, along with the existing Bike Plan
- Consulting with key stakeholders (Local Government, State Government and Local Community) regarding the future of cycling within the City of Vincent
- Planning the expansion of the bicycle network
- Encouraging and promoting cycling
- Developing a prioritised schedule of works
- Developing a maintenance schedule for the protection of new and existing assets

1.2. Background

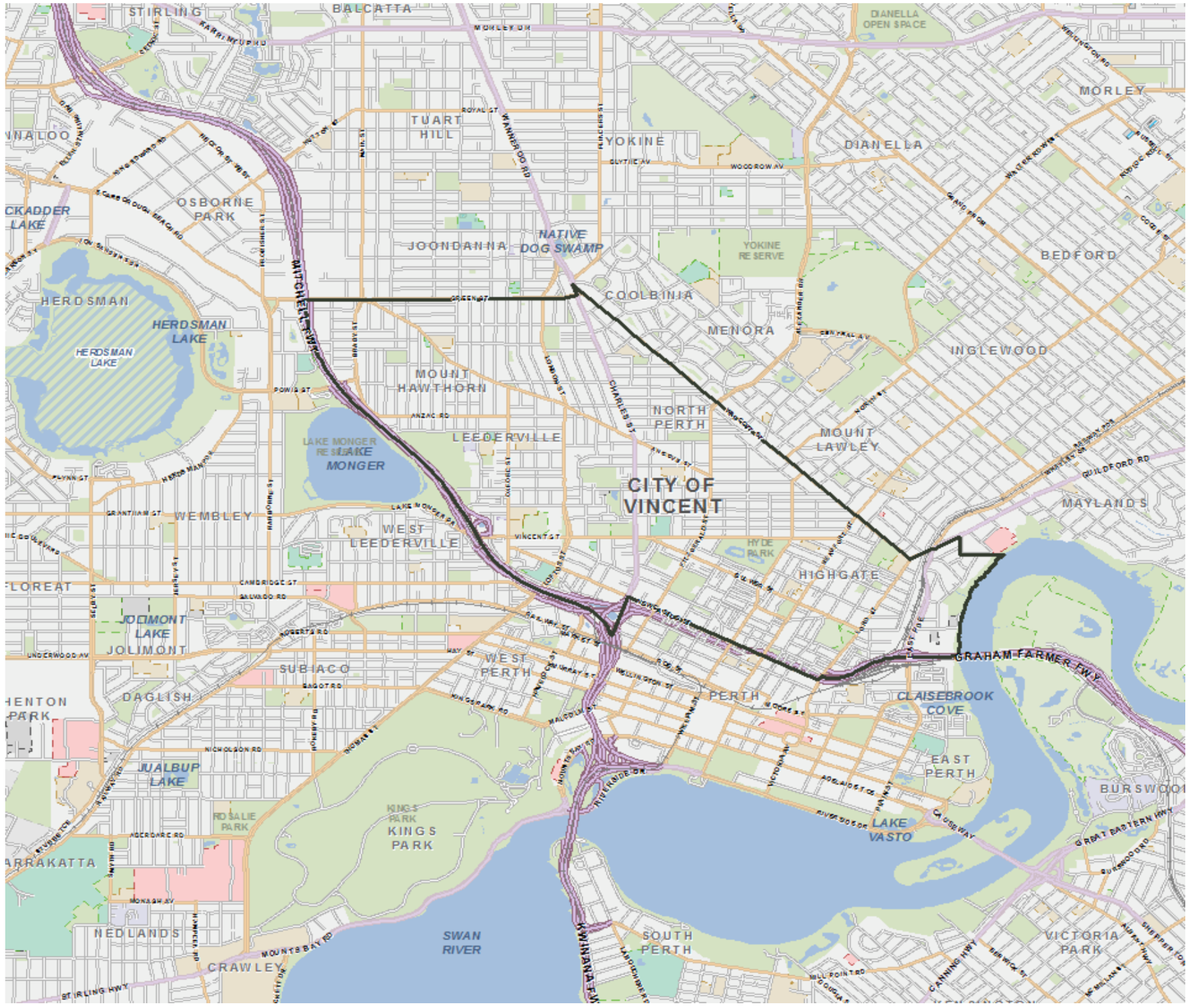
The City of Vincent is located directly north of the City of Perth. The City of Vincent also shares boundaries with the City of Bayswater, Town of Cambridge and the City of Stirling. **Figure 1-1** illustrates the locality of the City of Vincent.

Vincent is one of the smaller local government areas within the Perth metropolitan area, with a geographical size of approximately 10.4 square kilometres. According to the 2011 Census Data[1] the City of Vincent has a population of 31,549 with a median age of 34 years.

Travel modes to work statistics were obtained from the Census Data[1] and are illustrated in **Figure 1-2**. The statistics indicate that the majority (more than 70%) of work trips are made by car, either as driver or passenger. Public transport accounts for a further 12% of work trips, while active transport (walking and cycling) accounts for 14%. This is quite different from other Perth council areas. Most notably trips by car are approximately 20% less than the Perth Metro average, while trips by active transport are approximately double the Perth Metro average. This is likely the result of the City of Vincent's proximity to the Perth CBD.

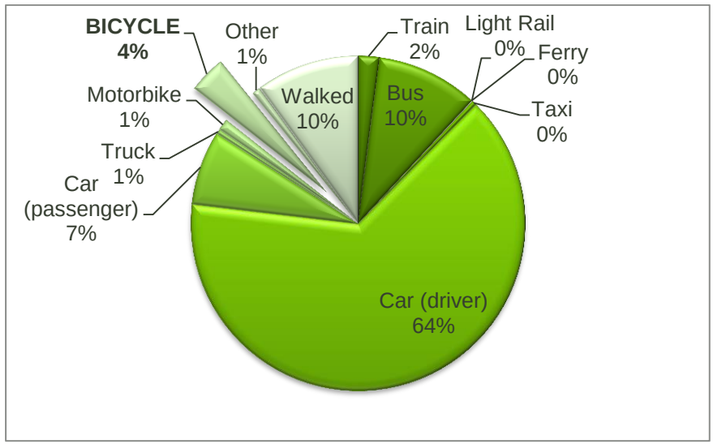
In the development of the Vincent Bike Plan due consideration was given to improving cycling safety and linking communities and facilities, as well as the needs of all types of cyclists, regardless of their age, gender, experience or reason for cycling.

Figure 1-1: Locality of the City of Vincent



[1] Australian Bureau of Statistics

Figure 1-2: Travel Mode to Work



1.3. Scope

This Bike Plan was undertaken by Aurecon in close co-operation with the City of Vincent. The general scope of works included the provision of future vision and direction with respect to bicycle infrastructure and initiatives across the municipality. This plan will include a range of recommendations, which will consider:

- Existing facilities
- Outputs of the existing bike plan
- Stakeholder inputs and requirements
- Measures which encourage cycling
- Project prioritisation

This Bike Plan also incorporates:

- Strategic policies including local and state government policies
- The existing Perth Bicycle Network and the proposed WA Bicycle Network (WABN) Plan
- Safe Routes to Schools
- Connections to various trip attractors and associated travel demands
- End-of-trip facilities

Additionally Aurecon prepared this Bike Plan considering the 8 to 80 rule of providing infrastructure that would be safe and practical to all users of an age in that range.

1.4. Classes of Cycle Users

According to Bicycle Network[2] cyclists fall within various categories based on their reason for cycling and the intensity at which they cycle.

[2] Bike Futures conference material (2012)

As all infrastructure cannot fulfil the same function for all users in a safe and effective way, this plan will set out strategic routes and associated infrastructure and projects as per the typical cyclist class expected to use the specific infrastructure.

1.4.1. Inexperienced Cyclist

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

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

Commuter cyclists prefer to use direct routes to get to their destination quickly.

The route and infrastructure focus for inexperienced cyclists include:

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

1.4.2. Commuter Cyclist

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

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

The route and infrastructure focus for these cyclists include:

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

1.4.3. Recreational Cyclist

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

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

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

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

1.4.4. Fitness Training

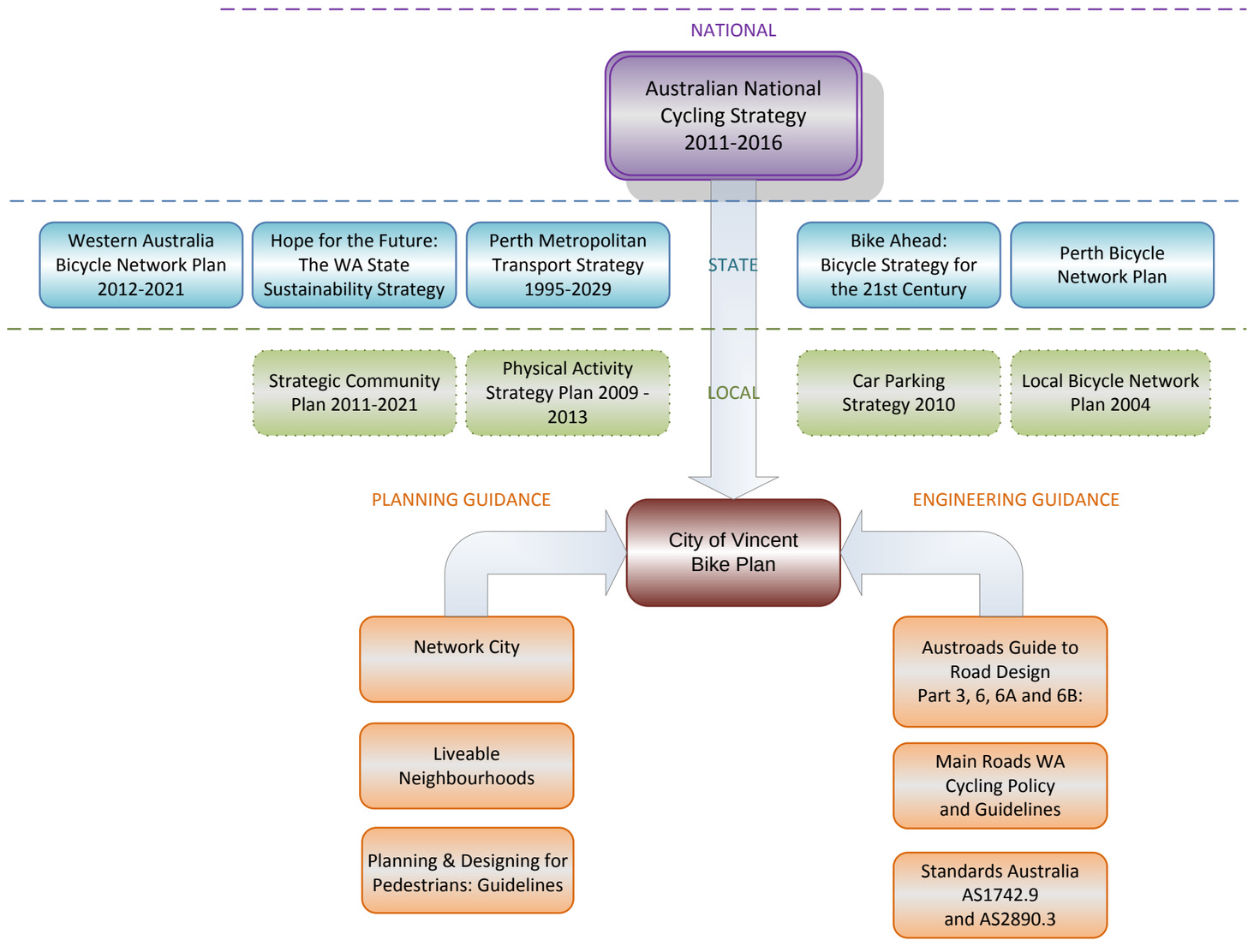
Fitness training cyclists would typically be accommodated to a satisfactory level by a combination of the facilities appropriate for commuter and recreational cyclists. This cyclist class typically travels at higher speeds in the order of 40km/h and for longer distances. They also use on-road or racing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

2. Policy and Strategic Context

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

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

Figure 2-1: Policies and Strategies Relationship



2.1. National

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

2.1.1. Australian National Cycling Strategy 2011 - 2016

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

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

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

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

2.2. Western Australia

2.2.1. Hope for the Future: The Western Australian State Sustainability Strategy

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

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

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

Action items to achieve this objective included to encourage walking and bicycle use through:

- Developing friendly environments in town centres
- Improving pedestrian and bicycle access on local streets
- Continuing the implementation of the TravelSmart Household program and complementary TravelSmart initiatives
- Providing guidelines which assist local government authorities to audit and improve the accessibility of their pedestrian and cyclist infrastructure

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

2.2.2. Perth Metropolitan Transport Strategy 1995-2029

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

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

A number of key actions suggested in the strategy which are to be applied in this Bike Plan include:

- Introduce safe cycling education programs targeted at motor vehicle users, cyclists and pedestrians
- Identify, develop and signpost safe routes to defined local destinations including schools and commuter routes
- Provide appropriate on-road and published information and traffic signalling
- Integrate bicycle use with public transport
- Define, establish and maintain continuous local cycle routes
- Educate cyclists and other road users about the rights, needs and responsibilities of cyclists
- Ensure cycle facilities serve the needs of all cycle users

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

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

It emphasises the development of a network of cycle facilities that:

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

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

- Cycling is primarily a transport mode, serving major trip attractors and generators, rather than purely a recreational activity
- It is neither practical nor necessary to provide segregated cycling facilities on each and every street, or even on the majority of streets
- The majority of cycling is and will continue to be on the road/street system, and cycling must be actively incorporated into the planning and design of roads and streets
- The majority of non-cyclists have never been taught to regard the cyclist as a legitimate road user nor how to share the road with cyclists
- End of trip facilities, including secure parking, which is as important for the cyclist as it is for the car driver

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

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

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

The Perth Bicycle Network (PBN) Plan is an "action" document which details specific engineering projects that will significantly increase safe bicycle use in the Perth metropolitan region. It is a comprehensive strategy that plans for cycling facilities in the Perth metropolitan area and identifies the necessary works that are needed at a state and regional level to complete the network identified in the PBN.

The PBN Plan outlines the network of cycling routes within Perth, including local bicycle routes, principal shared paths and recreational shared paths. It specifically addresses the following Bike Ahead strategies to ensure a focus on the essential components required to establish a regional network of cycling facilities:

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

Works recommended in this Bike Plan will feed into the PBN creating a comprehensive bicycle network for the City of Vincent.

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

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

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

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

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

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

2.3. City of Vincent

2.3.1. Car Parking Strategy 2010

The City of Vincent has a car parking strategy in place. This document highlights the need for all types of parking and associated facilities for various land uses and areas of activity.

Relevant to this Bike Plan, the *Parking Strategy* emphasises that parking should be provided for all modes of transport including bicycles. It advocates for the installation of bicycle parking and end-of-trip facilities and requires facilities that are provided to be continuously available.

2.3.2. Physical Activity Strategic Plan 2009 – 2013

The *Physical Activity Strategic Plan's* aim is to facilitate improved physical activity in the City of Vincent mainly through program delivery, the dissemination of information, creating environments that support physical activity and physical activity partnerships.

Relevant to this Bike Plan it lists a range of activities that encourages cycling as part of the City's program delivery, it identifies multiple methods for providing information to residents about physical activity and where to best participate in activities such as cycling, and identifies infrastructure required to promote cycling.

2.3.3. Strategic Community Plan 2011-2021

This document highlights the strategic objectives which the City of Vincent aims to achieve in the short to medium term. It includes natural and built environment, economic development, community development and wellbeing, as well as leadership, governance and management initiatives.

Specifically relevant to this Bike Plan are the objectives to improve transport and mitigate negative effects of traffic, through the promotion of alternative transport modes (such as cycling) and continued expansion and improvement of the strategic bicycle network.

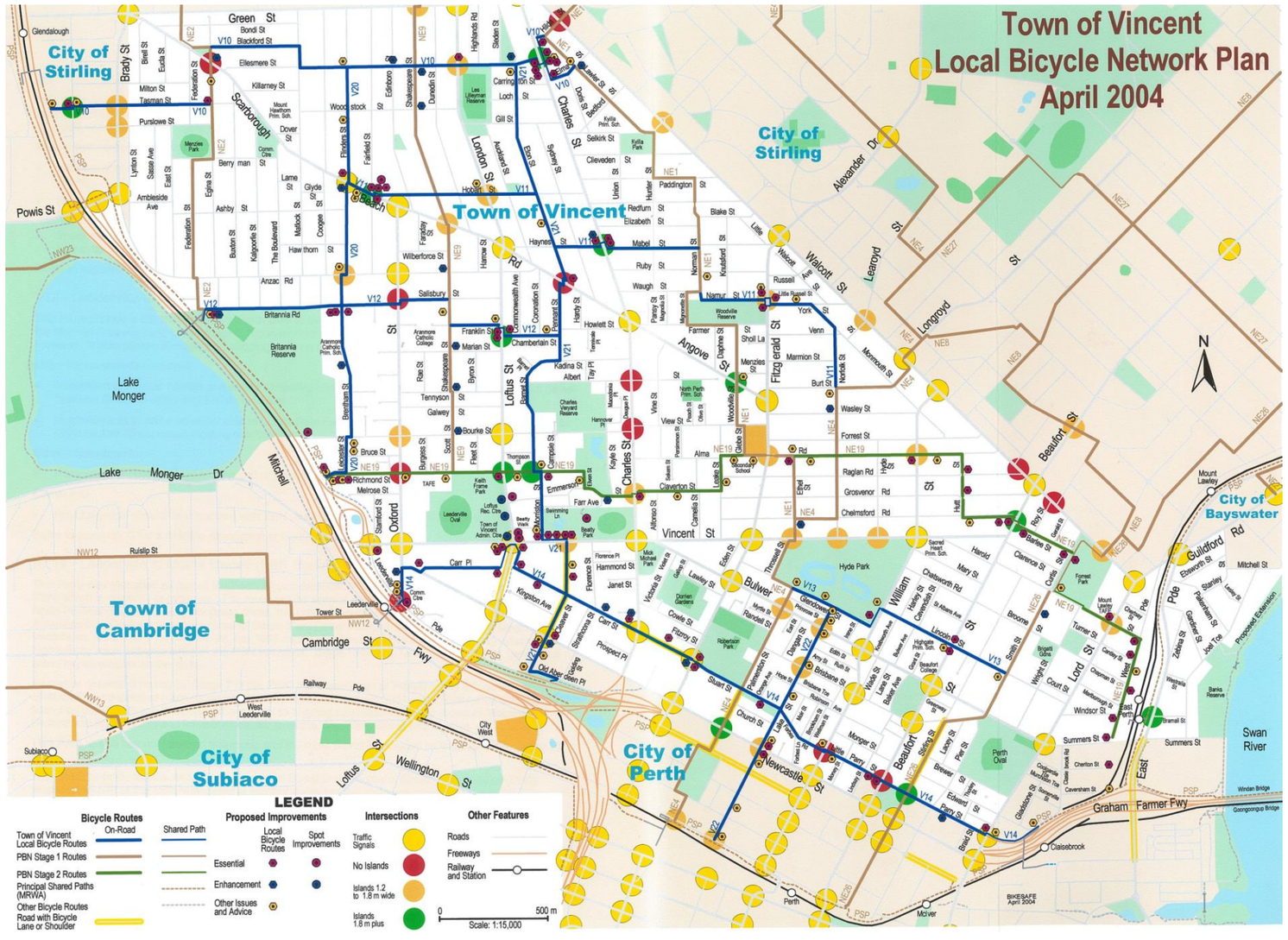
2.3.4. Local Bicycle Network Plan 2004

The current bicycle network plan highlights the bicycle network for the City of Vincent, it includes local bicycle route, PBN stage 1 routes and PBN stage 2 routes. The plan identifies essential and enhancement works recommended along routes and in specific locations.

The recommendations made in this document was assessed and where considered relevant maintained in the bike plan. The predominant focus of this document is however, to divert cyclists onto lower order less trafficked streets that do not have priority at intersections.

The 2004 Local Bicycle Network Plan features good route and location specific enhancements, but generally diverts cyclists along lower order routes. The new bike plan aims to change this to encourage cycling.

Figure 2-2: Town of Vincent Local Bicycle Network Plan 2004



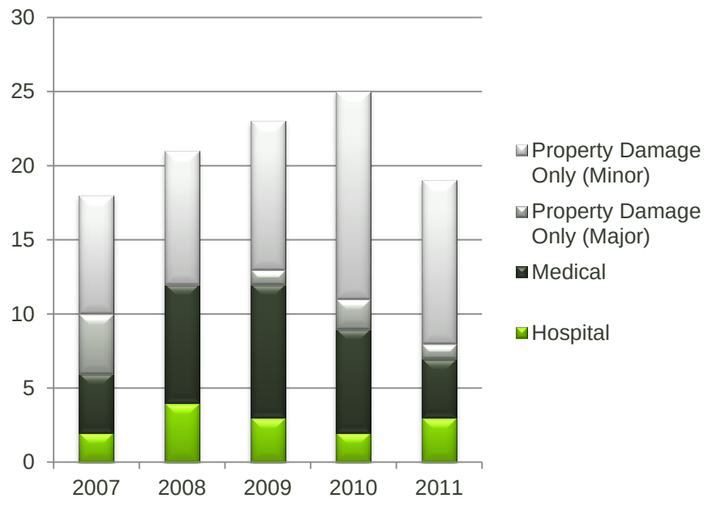
3. Crash Analysis & Recommendations

3.1. Crash Data

Safety is a key factor in building a successful Bike Plan. The availability and quality of existing cycle facilities is a good way of identifying the level of safety performance within a region. Historical data[3] for crashes involving cyclists was used to measure the level of safety for the existing facilities within the City of Vincent.

A number of crashes involving cyclists have occurred over the last five year period from 1 January 2007 to 31 December 2011. The number of crashes and severity per year is shown in **Figure 3-1**.

Figure 3-1: Severity of Bicycle Crashes per year



In summary:

- A total of 106 crashes involved bicycles
- 13.2% resulted in hospital treatment
- 30.2% resulted in medical treatment
- 7.5% resulted in major property damage only (PDO major)
- 49.1% resulted in minor property damage only (PDO minor)

The crash data shows a peak in terms of the more serious hospitalisations and crashes requiring medical attention in 2008 and 2009, but have since declined. This indicates increased awareness from road users, both cyclists and motorists, as the overall metropolitan data indicates that the number of daily cyclists was increasing during the same period.

[3] MRWA Crash Data

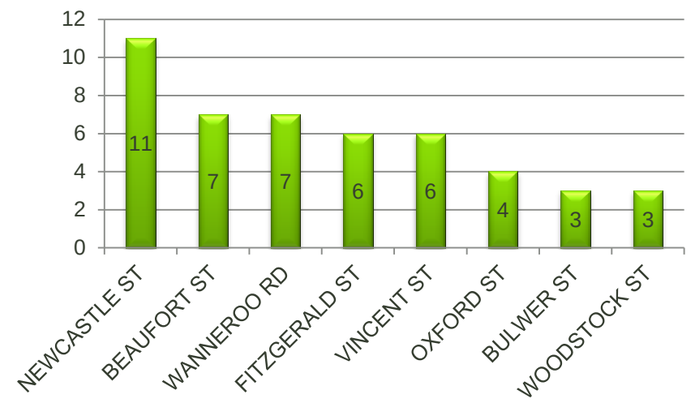
3.2. Crash Locations & Possible Trends

A number of roads where bicycle crashes have been concentrated over the last five years were identified. **Figure 3-2** shows the roads that have more than three crashes reported along them in the last five years.

Locations and routes with a high concentration of bicycle crashes are typically indicative of roads that:

- Are heavily trafficked by cars, and/or
- Are heavily trafficked by cyclists, and
- Includes elements that cause an unsafe environment, such as:
  - a high general speed limit
  - Lanes that are wide enough for drivers to think they can pass cyclists within the lane, but not wide enough to do so safely
  - poor crossing facilities

Figure 3-2: Roads prone to bicycle crashes



The most direct routes into and out of the Perth CBD were identified as the routes, where the majority of crashes have occurred in the recent past.

Newcastle Street typically accommodates east-west bicycle trips to and from the Freeway and rail line PSP's, while also having to contend with a number of key traffic and bicycle routes crossing it. This highlights the need for a safe and efficient east-west link through the City of Vincent.

Beaufort Street, Wanneroo Road/Charles Street, Fitzgerald Street and Oxford Street are busy traffic roads leading into the Perth CBD, whilst there are alternative bicycle routes, the directness and level of priority these roads experience at intersections attract commuters and thus, also commuter cyclists.

3.3. Recommendations

The crash data shows, that while there are bicycle routes along local and quiet roads cyclists are using busy and direct routes. There is also a high incidence of bicycle knock downs on these roads.

In order to reduce bicycle crashes, it needs to be acknowledged that cyclists are using busy roads that are direct and convenient. Bicycle crashes can then be addressed by either making bicycle routes more direct to attract commuter cyclists to these safer routes and/or by making busy direct roads safer for cyclists. Refer to the **Strategic Assessment & Recommendations** section of this report for a detailed assessment of the main strategic routes, taking this concern into account.

Additionally given the high number of bicycle crashes along Newcastle Street, measures to increase the awareness of drivers should be considered. At the moment many cyclists cross Newcastle Street at Palmerston Street, awareness measures should be installed at this intersection. This can take the form of bicycle warning signs, or include calming measures such as a speed table, or shared space intersections. The installation of bike lanes along Newcastle Street should also be considered.

The most direct routes into and out of the Perth CBD were identified as the routes, where the majority of crashes have occurred in the recent past.

4. Consultation

4.1. Technical Officers Workshop

On the 5th of October 2012, a stakeholder workshop was held with relevant technical officers at the City of Vincent. This included the planning, parks, and infrastructure departments.

The main points mentioned for consideration and inclusion in the Vincent Bike Plan were:

- Scarborough Beach Road Framework
- Developer contributions
- North Perth Masterplan
- Leederville Masterplan
- Provide input into Town Centres
- Access to Beatty Park
- Increasing bicycle parking
- Vincent Street/Oxford Street Intersection
- Connections to NIB Stadium
- East Parade signal crossing to access pedestrian bridge across the railway line
- Way finding signage

4.2. Community Workshop

A community consultation workshop was held on the 3rd of December 2012, at the Woodville Reserve. The workshop was well attended by approximately 25 members of the community.

Aurecon presented an overview of the work being undertaken as part of this Bike Plan. Aurecon collected information on the views of the community members in terms of positive aspects regarding cycling in Vincent, negative aspects regarding cycling in Vincent, specific issues at specific locations, and spending priorities.

The main positive aspects identified included:

- The freeway principal shared path (PSP)
- Cycle route along Charles Veryard Reserve to Beatty Park
- In general good provision of bicycle parking
- Bike lanes along Palmerston Street
- The shared path along the Swan River
- Attractive and scenic routes
- Many destinations
- Some quiet and wide roads that are easy to ride along
- Crossing guards to and from schools
- Many roads connecting to destinations
- The general topography is conducive to cycling
- The City of Vincent is close to the Perth CBD
- Most areas are family friendly
- There are many bike shops in Vincent
- Richmond Street and Claverton Street provides good access to Beatty Park
- Good bike parking at the Mezz in Leederville
- Well distributed network of routes
- Some good tree lined shady paths
- Fairly maintained paths
- Good signage along some routes
- The Oxford Street roundabout connecting to the Freeway PSP is easy to use
- The Hobart Deli has wide verges allowing enough space for cyclists and pedestrians

The main negative aspects identified included:

- Lack of bike paths/lanes along major roads
- Disjointed bicycle infrastructure
- Lack of east-west routes
- Cycle routes do not provide good enough access to schools
- Lack of secure and sheltered bike parking
- Lack of routes to get to community destinations (Beatty Park)
- Road modifications in Oxford Street, Bulwer Street and Bourke Street not conducive to safe cycling
- Crossing major roads (especially with children)
- Routes do not continue into other local government areas
- Routes are not intuitive or direct (cyclists have to ride with a map)
- General lack of awareness by cars (vehicles drive into bike lanes)
- Kerb side drains are not bicycle friendly
- Bike lanes are not swept frequently enough
- Lack of community education programs
- Lack of advance stops at intersections to provide priority for cyclists
- Poor integration of the freeway PSP with other routes
- Medians are typically too narrow for bikes to wait in the pedestrian break
- Bikes are not allowed on all forms of public transport at all times of day
- Bike lanes are often too narrow where they run beside parked cars
- Many ‘back street’ cycle routes are poorly lit
- Cycle routes are not child friendly
- There is a general lack of end-of-trip facilities
- Children under the age of 12 are allowed to ride on footpaths, yet their accompanying adults must ride on road
- Convenience for motorists seem to be a higher priority than safety for cyclists
- Existing paths are poorly maintained
- Freeway PSP is congested during peak times
- Higher density buildings have no secure bike parking
- Conflicts exist between faster experienced cyclists and less experienced slower cyclists and pedestrians
- Routes are stop-start through local streets, these routes should follow roads that have priority at intersections
- There is a lack of infrastructure suitable for children to learn
- There is a lack of separated bicycle facilities
- The traffic laws are not keeping pace with the needs of cyclists
- Not enough initiatives that promote cycling
- Cyclists have to endure harassment by motorists
- Traffic signal detectors do not always detect bicycles
- Many cyclists do not ride in accordance with the law
- TravelSmart maps do not show bike shops
- Gap between driveways/paths and the road surface is dangerous
- Traffic calming measures are not bicycle friendly
- In general there are too many cars on the roads
- Pedestrians and cyclists use earphones in the traffic, affecting their awareness
- Pedestrians don’t always keep to the left

The specific issues raised at the workshop included:

- Families should be allowed to ride their bikes in Hyde Park
- Traffic signal phasing at the intersection of Vincent Street and Loftus Street does not allow safe crossing for cyclists
- PSPs should be wider
- Bike lanes are required on:
  - Vincent Street
  - Charles Street
  - Scarborough Beach Road
  - Oxford Street
  - Loftus Street
- Parked cars along Oxford Street places cyclists in the door zone
- The Cleaver Street bike lane is obstructed by a traffic calming device
- Crossing the following major roads is difficult:
  - Angove Street
  - Charles Street
  - Vincent Street
  - Fitzgerald Street
  - Loftus Street
  - Scarborough Beach Road
- Bourke Street and View Street should be the east-west route not Richmond Street
- TravelSmart maps are arbitrary, many more routes should be marked as bicycle friendly
- The entry point to the freeway PSP at Floreat Athena Stadium car park is narrow with poor sight distance
- Traffic signal detectors are located in the centre of the lane, where vehicle oil leaks make it slippery to brake
- Getting to Glendalough Station is difficult and dangerous from Scarborough Beach Road, but using the ramp from Goody Close means you have to go through the station and down the lift to access the bike parking
- Poor access to Leederville station
- The Loftus Street bridge has a narrow turn radius to get onto and off of the freeway PSP
- There is a lack of bicycle parking at the North Perth Shopping Centre
- Salisbury Street and Mabel Street are too steep to be considered bicycle friendly routes
- Limited routes connecting into the Perth CBD
- Bike parking at IGA Leederville is exposed to turning vehicles and reversing trucks
- Commuters who ride through Hyde Park make it unsafe for people, especially the elderly
- No Vincent Bicycle User Group
- Lack of direct connection from Walcott Street to the Midland railway line PSP

Spending priorities identified by the community

Spending priorities were identified by asking each workshop attendee to assign ten dollars (hypothetically) to measures and initiatives where they would spend funds, if they were the City of Vincent. **Table 4-1** shows the combined spending priorities of the entire group.

Table 4-1: Workshop Identified Spending Priorities

Focus	Spending Priority
Bike lanes (sealed shoulders) on main roads (Fitzgerald St, Scarborough Beach Rd, Charles St, Loftus St, Oxford St)	**30%**
Bicycle training (a park with roads and road signs for training children)	**17%**
More and sheltered bike parking (Leederville, North Perth, Community Facilities)	**10%**
Connect discontinuous bicycle facilities and link paths to destinations	**8%**
Provide on-street line markings on bicycle routes	**5%**
Replace kerbside drain covers with bicycle friendly drain covers	**4%**
Resurface and maintain bike paths (i.e the PSP between Scarborough Beach Road and Leederville)	**3%**
More direct east-west bicycle routes	**3%**
More bicycle routes for commuters and to shops	**2%**
Bicycle boulevards	**2%**
Better bicycle access to Leederville Station	**2%**
Widen existing shared paths	**2%**
Install bicycle crossing signals at all major traffic signals	**2%**
Bicycle promotion like weekly car free days at key shopping centres, parks and roads (Angove St, Oxford St, Beatty Park)	**1%**
Specialised shared paths where beginners can learn	**1%**
Install safe crossings along major roads	**1%**
Develop a bike share scheme	**1%**
Remove on-street parking on main roads	**1%**
Better visibility and sight distances where shared paths meet	**1%**
Install signage making drivers aware of bicycles	**1%**
Realign bicycle routes to more direct routes	**<1%**
Improved facilities	**<1%**

4.3. City of Vincent Online Survey

The City of Vincent online survey was completed by 127 respondents. This sample included 64% male and 36% female respondents across a diverse range of age groups. In terms of reasons for cycling the respondents listed exercise, pleasure and commuting as their main reasons for cycling. Many of the same positive and negative aspects were identified in the survey as at the community workshop. Additionally the survey explicitly asked for suggestions to improve cycling in the City of Vincent. These recommendations include:

- More bike racks
- Better and more visible signage
- Bike path through and/or around Hyde Park
- Consider the needs of cyclists when doing traffic calming
- Remove parking on Oxford Street and have a cycle lane
- Set up a Bike User Group
- Separated bike lanes for streets heading to the City – especially along major roads
- More drink fountains
- Create cycle paths to major shopping centres and parks
- Driver awareness campaign
- Cycling education classes at primary schools
- More regular street sweeping of Loftus Street & bike paths
- Better lane markings on roads and traffic signal sensors
- Improve traffic light cycles and phases for cyclists
- Need a major east –west route Leederville Station to Banks Reserve
- Make sure speed bumps have a cycle gap to the road's edge
- Install STOP signs at the end of easements/laneways to reduce speeding drivers
- More cycle phasing at traffic lights or joint pedestrian/cyclist phasing
- Car free days and areas
- Community cycling events
- Seek professional advice about cycling
- More end of trip amenities
- Create cycle only freeways that provide fast, safe transit
- Promote electric bikes for the elderly
- Resurface sections of the PSP and PBN
- Publicise the path hazards reporting systems
- Give cycle lanes priority at pinch points and intersections
- Convert some street parking to cycle parking
- Modify Cleaver Street traffic calming – it cuts off the bike lane
- More advanced start areas for cyclists at traffic lights
- Consult with City of Perth on safer routes out of the city
- Consult more with cycling community on cyclist needs
- Make a direct link between Knutsford to Woodville Street, through Woodville Reserve (current route too convoluted)
- Lower speed limits to 50kmh on all major roads
- Convert verges into raised bike lanes
- Cycle path along the length of Vincent Street
- More continuous cycle paths
- A cycle hire system as per Paris Velib
- All new building developments to have bike parking spaces as requirement
- Separate bike ways along major roads, not just a painted line in 'door' zone of parked cars
- Improve surface of East Perth paths
- CoV to work with Transperth on provision of cycle storage bogeys
- Lower speeds to 30kmh in shopping areas
- Improve connection from Lake Monger to Leederville shopping area
- Bike subsidies
- Include bike path details on the CoV Intramap
- Install underpasses on Vincent Street to go under Loftus and Charles Street
- End the helmet requirement
- Use a raised kerb to define cycle lanes
- Regular monitoring of cyclist antisocial behaviour
- Install more bicycle specific road markings
- Change the overpass at Leederville Station
- Remove the cyclists dismount sign at Beatty Park – rather 10kmh or walking speed only
- Improve visibility at cycle path corners
- Use of more tactile warning devices not just white painted lines on cycle lanes
- All shopping centres should have covered bike parking
- Parking on the road adjacent to access points should be prohibited within at least 10 metres to improve sight lines
- Paint a central divider and edge markings on PSP and PBN (poorly lit at night and dangerous).
- Allow slow riding on footpaths by seniors

5. Link Assessment (CERS Audit)

The TRL Street Audit Network software package (Cycling Component - CERS) was used to undertake a link assessment.

The study area was divided into 'links', which are any complete cycle path, facility or roadway, or a section of one. In the City of Vincent 43 links were assessed.

The CERS audits were conducted according to the following parameters, with a focus on link conditions:

Table 5-1: CERS Assessment Parameters

Category	Parameters
Convenience	Continuity
	Legibility
	Directness
Accessibility / Safety	Worst Intersection Conflict Point
	Traffic Volume
	Traffic Proximity
	Traffic speed
	Link Conflict Points
Comfort	Effective width
	Surface Quality
	Maintenance
	Overall Effort
Attractiveness	Personal security
	Lighting
	Quality of Environment

5.1. CERS Methodology

The TRL Street Audit software (Cycling Component) has an embedded (proprietary) scoring system. The following steps were employed to assess each link.

Step 1 – Identify start and termination point of link

1. Use the DoT TravelSmart maps to determine individual link lengths of all bicycle routes (this includes the division of routes / corridors).
2. Check each link length logically using data collected on site for suitability.
3. Assign name and identification reference code for each link.

Step 2 – Check data availability of route

1. Traffic data – Estimate based on the road hierarchy and onsite observations.
2. Traffic speeds – Note the on-street posted speed limit and determine whether or not the traffic speed on-site is commensurate.
3. Terrain – From site visits, gather an indication of the terrain (uphill or downhill grade) along the link.

Step 3 – Intersections

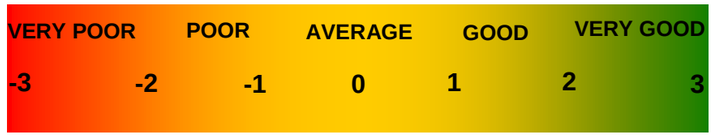
1. Once link length is established note all types of intersections along the extent of the link.
2. Highlight the worst performing intersection based on desktop assessment, onsite observation and professional judgement.

Step 4 – On site evaluation

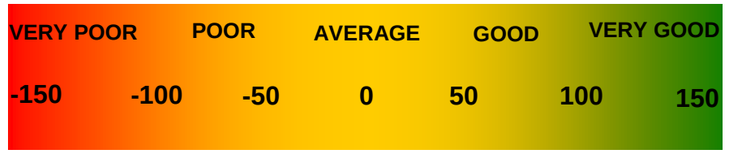
1. Undertake site visits to complete the CERS assessment, ensuring all parameter fields are completed (refer to **Table 5-2**).
2. Where necessary add comments which substantiate scoring decisions or any other relevant information and for future reference.
3. Total score for the link will be automatically assigned on completion of all parameters.
4. Add any relevant conclusions for each link for future reference.

Each parameter is scored on a range from -3 to +3, where +3 is the highest score and -3 the lowest. For a parameter to warrant a score of +3, it would need to be exemplary and of a standard identified as best practice. The scores are therefore allocated on a range from very poor to optimum with 0 representing the average:

The scoring scale is set out below:



TRL Street Audit default parameter weightings have been applied and as such total scores of -150 to 150 are possible. Any link that scores above 50 is considered good, a link that receives a score between 50 and -50 is average and a link scoring below -50 is a poor link. The scoring scale for the overall score is shown below:



5.2. Findings

The detailed findings of the CERS audit, along with the action plan for each individual link is presented in **Appendix A**, each link is described in terms of:

- Assigned link number
- Scored colour code
- Link name
- Link description
- Photo inventory
- Issues identified
- Recommendations

Figure 5-1 shows the general performance of all the audited links on the map, from where it can be seen that routes where cycling infrastructure is provided generally outperforms those where cyclists are left to mix with traffic.

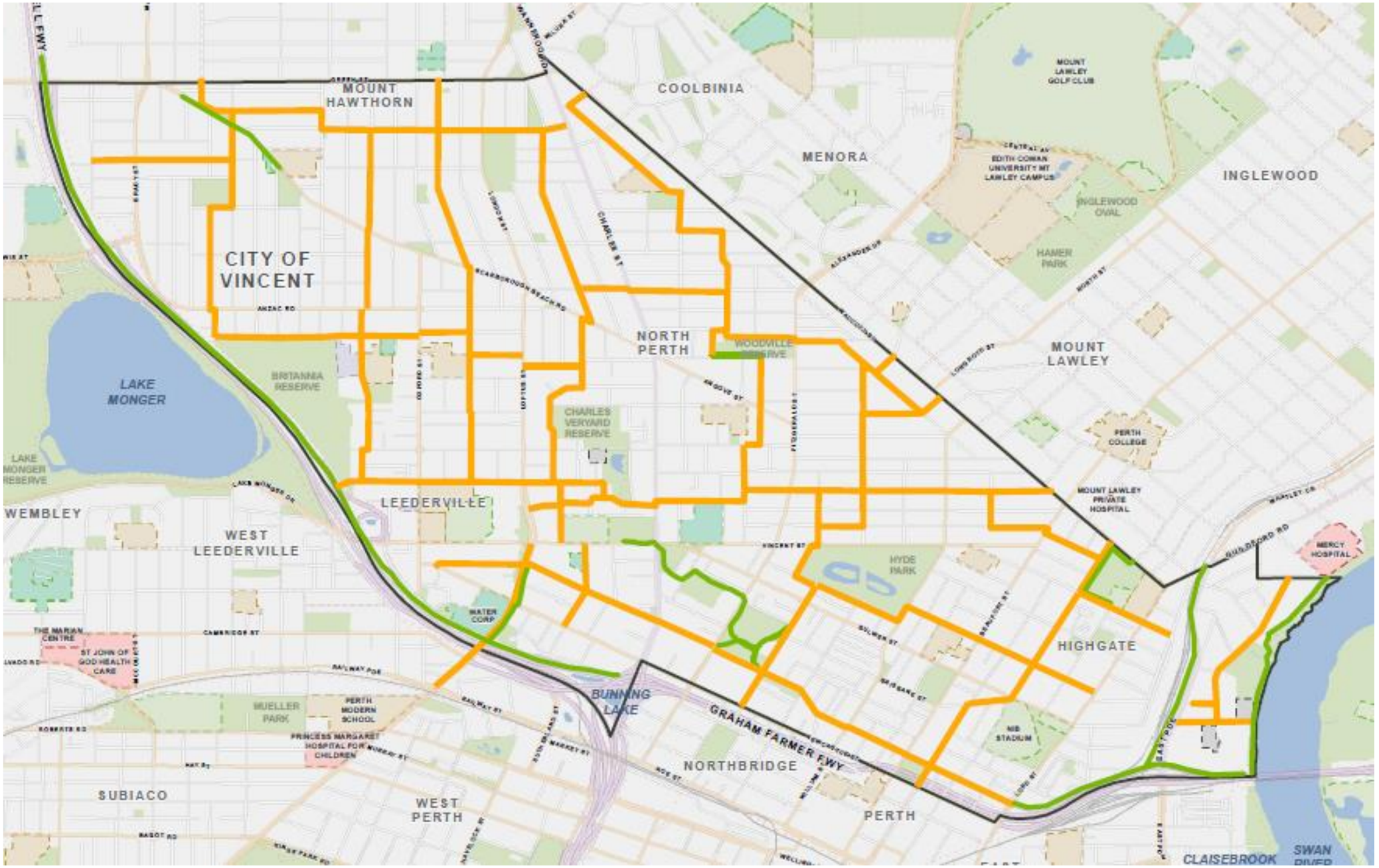
The overall performance that cycling infrastructure in Vincent achieved in terms of the various assessment parameters is summarised in **Table 5-3**, while the scoring performance of each link per assessment parameter is graphically presented in **Appendix A**.

*The project recommendations highlighted in **Appendix A** are typically intended to be included in the City of Vincent maintenance team's work packages, for when each specific link is next scheduled for maintenance.*

Table 5-2: CERS Assessment Framework

Category	Parameters	What to assess
Convenience	Continuity	Any issues that may affect the continuity if a facility were to be introduced This could include change in carriageway width, or delay to cyclists (e.g. through signalised intersections)
	Legibility	Issues that may affect a cyclist's ability to follow the route Take note of any existing cycle / traffic signs that provide directions and any landmarks
	Directness	Ascertain if the proposed link is the most direct path with no delays Use site inspections, internet based maps and photography was used to ascertain if there is an alternative route which cyclists could use Take into account intersections or other features that may result in delay
Accessibility / Safety	Worst Intersection Conflict Point	Based on the type of intersection in combination with traffic flow and the size of the intersection Those intersections with fewer potential conflict points are awarded a greater score Ascertained using provided traffic data, collision data and site inspections/ internet based maps
	Traffic Volume	Use existing data for assessment purposes Those roads with a lighter traffic flows will receive a high score
	Traffic Proximity	Based on mixture of traffic and width of traffic lane(s) in a single direction of travel A wide lane with cars only will provide a higher score than a narrow roadway which routinely accommodates buses or other large vehicles
	Traffic speed	Use recorded 85th percentile speeds or if unavailable posted speed limit signage The lower the speed of vehicular traffic the higher the score
	Link Conflict Points	Includes obstructions along the route carriageway surface Whether visibility is restricted due to roadside furniture, vegetation etc. Considers the presence and frequency of private access points (driveways etc.)
Comfort	Effective width	Assess any existing cycle lane provision Assess the entire width of the carriageway (to include possible effect of overtaking) Make note of parked cars; this will determine what measures may be required to remove parking or whether a cycle lane away from the edge of the carriageway could be introduced
	Surface Quality	Observe quality of road surface and type, i.e. cracking, potholes, cobblestones etc Observe any skid / fall hazards such as gully gratings, service chamber covers etc Observe number of reinstatements and quality.
	Maintenance	Assess current drainage facilities and whether drainage channels appear to be free from detritus and regularly swept Identify any areas where ponding of water is evident; large areas of standing water will deter cyclists and alter their path, a particular issue on signed only routes where there is no designated lane Assess quality of road markings to determine clarity – will affect vehicular paths and therefore behaviour through intersections and along routes Provides an indication of the future score of maintenance if not addressed
	Overall Effort	Make note of the gradient of the link to determine the effort cyclists would need to make to negotiate links. Especially problematic if cyclists are required to stop, e.g. at intersections, pedestrian crosswalks, and need to restart
Attractiveness	Personal security	Determine whether the area around the link has litter / graffiti or evidence of vandalism as cycling demand can be suppressed through fear of crime Make a note of the presence of any CCTV cameras in the vicinity Identify any areas of concealment adjacent to the proposed route
	Lighting	Make note of the regularity and positioning of lighting columns to determine the lighting levels during the hours of darkness Lighting should be available on cycle routes as a safety measure and to provide an additional level of personal security
	Quality of Environment	Determine the quality of the property frontages along the link, is this a route that cyclists would want to navigate? Are the frontages and fence lines etc. of good quality and well maintained? The presence of trees / vegetation will make the route more appealing to cyclists. Is regular maintenance likely to occur?

Figure 5-1: Audited links and corresponding performance



Good Average Poor

Table 5-3: Overall Findings

Category	Parameters	Overall results
Convenience	Continuity	Continuity of facilities was generally good within the audited area. Facilities along isolated links were not consistently provided and may cause some confusion for cyclists. The problematic links includes Palmerston Street, NE1 PBN Route along Woodville Reserve, and the Stuart and Parry Streets route.
	Legibility	Due to lack of consistent signage and on road or pavement markings, legibility within the study area was in general average.
	Directness	In general, the links audited within the area were the most direct way to travel between notable destinations. However some of the links (L4, L16, L17, L23, L29, and L30) could be aligned along more direct routes in their immediate vicinity.
Accessibility / Safety	Worst Intersection Conflict Point	The majority of links score poorly as they intersect with major roads, with little to no infrastructure available to facilitate safe crossing by cyclists.
	Traffic Volume	In general the main north-south roads traversing the City of Vincent carry high traffic volumes, while the east-west roads are typically quieter. The links which rate poorly based on traffic volumes include Loftus Street, Scarborough Beach Road and Carr Street.
	Traffic Proximity	Very few links within Vincent explicitly allocate space for cyclists, and in general the prevalence of on street parking causes bicycles and cars to mix. In terms of the scoring system, most links rate poor or average, with the links along Scarborough Beach Road and Tasman Road being the only good routes.
	Traffic speed	Overall the general traffic speeds along the various links audited averages at around 30 – 50km/h. A few links do however experience higher speeds (including illegal speeding) and thus score negatively in this category, those links include Loftus Street, Scarborough Beach Road, Carr Street, Cleaver Street, Palmerstone Street, Leake Street, Norfolk Street, Smith Street, and Joel Terrace.
	Link Conflict Points	In general the audited links performed well, mostly scoring good ratings, in terms of conflict points. This is mainly due to very limited obstructions and interruptions that force cyclists into the traffic. A few links rated average, with some interruptions for cyclists, while Raglan Road rated poorly because cyclists are constantly in conflict with traffic along this link.
Comfort	Effective width	The effective width of the links in general were poor due to the prevalence of on street parking, fairly narrow carriage ways of less than 10m, and limited to no space allocated for cyclists. The off-road shared paths scored well due to the appropriate space allocation for cyclists.
	Surface Quality	The surface quality in the City of Vincent is in general good. Some links do have isolated skid hazards and patchy reinstatements. Two links had specifically poor surfaces namely Summers Street and Little Parry Street.
	Maintenance	Whilst there were a couple of minor issues, such as debris on the pavement and overhanging vegetation, the audited area was generally well maintained.
	Overall Effort	The study area was generally a level environment and as such scored well.
Attractiveness	Personal security	Due to the isolated nature of specifically the off road shared paths, personal security may be an issue for some cyclists. Some areas also had graffiti and vandalism along routes which further reduced the level of personal security.
	Lighting	In general lighting along road links was good. Some of the off road shared paths had poor or no lighting. Those paths with no lighting included the shared path along the river, the shared path in Forrest Park, and the shared path along Farmer Road.
	Quality of Environment	The overall environment quality is exceptional, with the single notable exception of Summers Street. Summers Street presents as an industrial area with trucks present and poorly maintained infrastructure.

6. Strategic Assessment & Recommendations

Whenever funds become available, or when a specific route is being resurfaced the strategic assessment and its associated recommendations should be considered for implementation.

6.1. Routes

The strategic route assessment is done predominantly from the perspective of commuter cyclists as these cyclists are likely users of longer distance strategic routes.

The strategically significant routes include (not necessarily classed as bicycle routes):

- **North-South:**
  - Mitchell Freeway PSP
  - Oxford Street
  - NE9 PBN route (along Shakespeare St)
  - London/Loftus Street
  - Charles Street
  - NE1/NE4 PBN route (along Lawler St/ Norham St/ Norfolk St)
  - Fitzgerald Street
  - William Street
  - Beaufort Street
  - NE26 PBN route (along Smith St/Stirling St)
  - Lord Street
  - Midland Railway Line PSP
  - Shared Path along the river
- **East-West:**
  - Scarborough Beach Road/Angove Street
  - Richmond St/Claverton St/Raglan Rd bicycle friendly route
  - Vincent Street
  - Bulwer Street
  - Carr St/Stuart St/Parry St bicycle friendly route

Each of these strategic routes was generally found to have either one of the following sets of characteristics, with some exceptions:

- **Low safety risk for cycling but indirect:**
  - Lower traffic volumes and speeds
  - Indirect
  - Poor priority at intersections
  - Inappropriate crossings with busy roads
- **Direct but high safety risk for cycling:**
  - High traffic volumes and speeds
  - Direct
  - High level of through priority at intersections
  - Crossings with busy roads are signalised

At this point it should be noted that commuters generally have the same travel route requirements whether they travel by car or by bike. Quick, convenient and direct routes are preferred. So while safer routes are typically assigned as bicycle routes they attract less bicycle traffic because they are not quick, convenient and direct. This is also why so many commuter cyclists can be seen mixing with traffic along major arterials.

The routes listed can generally be characterised as shown in **Table 6-1**:

Table 6-1: Strategic Route Characteristics

Route (North-South)-	Characteristics
Mitchell Freeway PSP	Safe and Direct
Oxford Street	Unsafe and Direct
NE9 PBN route	Safe and Indirect
London/Loftus Street	Unsafe and Direct
Charles Street	Unsafe and Direct
NE1/NE4 PBN route	Safe and Indirect
Fitzgerald Street	Unsafe and Direct
William Street	Unsafe and Direct
Beaufort Street	Unsafe and Direct
NE26 PBN route	Safe and Direct
Lord Street	Unsafe and Direct
Midland Railway Line PSP	Safe and Direct
Shared Path along the river	Safe and Direct
Route (East-West)	**Characteristics**
Scarborough Beach Road / Angove Street	Unsafe and Direct
Richmond / Claverton / Raglan bicycle friendly route	Safe and Indirect
Vincent Street	Unsafe and Direct
Bulwer Street	Unsafe and Direct
Carr/Stuart/Parry bicycle friendly route	Unsafe and Indirect

*Safety levels, refers to safety risk (road safety assessments were not undertaken)

The vast majority of routes are not appropriate for safe commuting by cyclists that may possess varying levels of skill and experience.

6.2. Recommendations

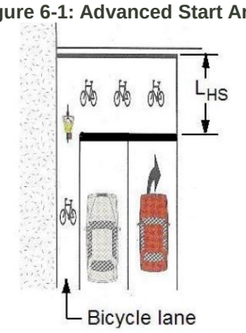
In order to achieve a better balance between safety and directness, improvements are recommended along key strategic routes. These improvements should be considered for implementation on a route by route basis in order to improve the overall route and thus gain the full benefit. It should also be noted that the Draft WABN 2012-2021 indicates that it is best practice to implement bicycle improvement projects on a route by route basis, not in isolation, and that the most challenging projects should be undertaken first as they will only become more challenging in future.

The following key routes and associated upgrades and improvements are recommended and should be considered for implementation to strengthen the strategic bicycle network in the City of Vincent:

Scarborough Beach Road / Angove Street
Scarborough Beach Road provides a direct route towards Perth CBD and will become a popular route with an improved cycling environment and better connecting routes. The route should extend to the Mitchell Freeway PSP network in liaison with the City of Stirling.

I. Continue the bike lanes between Eucla Street and Main Street. Install advanced start areas (refer to **Figure 6-1**) for cyclists at the signalised intersection with Main Street.

Figure 6-1: Advanced Start Area[4]



II. Reduce speed limit to 30km/h, change texture and sign as a shared zone the town centre between Kalgoorlie Street and Oxford Street (consider rougher texture under vehicle wheel path and smoother surface in the centre of the lane to encourage cyclists to use the centre of the lane). Install advanced start areas for cyclists at the signalised intersection with Oxford Street.

III. Reduce to a single lane per direction and introduce bike lanes in both directions between Oxford Street and Charles Street (same cross section as between Eucla Street and Kalgoorlie Street).

[4] Austroads Guide to Road Design Part 4A

Install advanced start areas for cyclists at the signalised intersections with London Street and Charles Street.

IV. Install bike lanes in both directions between Charles Street and Fitzgerald Street by indenting parking into the verge or reducing the width of the median. Install advanced start areas for cyclists at the signalised intersection with Fitzgerald Street.

V. Link from Fitzgerald Street with NE4 (Norfolk Street) via Wasley Street, by placing appropriate signage and marking as a bicycle route. Also the current pedestrian crossing across Fitzgerald Street between Wasley Street and Forrest Street can be used to safely get cyclists across Fitzgerald Street (crossing should be upgraded to a toucan crossing).

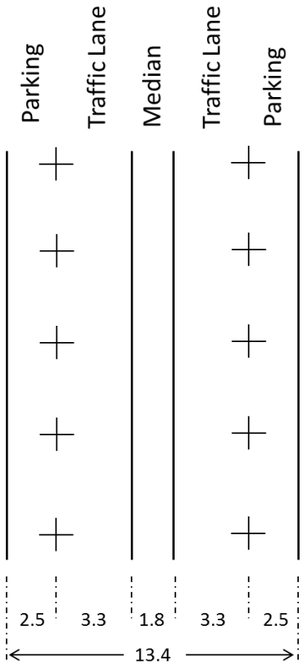
Oxford Street

Oxford Street is generally not wide enough to safely accommodate a parking lane, bike lane and traffic lane in each direction while maintaining the median. Cycling within the traffic lane is the preferred safe alternative.

I. In order to encourage cyclists to align centrally within the lane and in so doing discourage cars from passing cyclists in an unsafe manner, innovative markings (used along Terrace Road in the City of Perth, as shown in **Figure 6-2**) is recommended. The extension of parking line markings into the traffic lane has no legal standing in the Traffic Code, but should subconsciously encourage the sought central alignment of road users. It is recommended that this treatment be implemented between Scarborough Beach Road and Vincent Street. Refer to **Figure 6-3** for an indicative cross section.

Figure 6-2: Proposed markings as implemented along Terrace Road

Figure 6-3: Indicative Oxford Street cross section (overhead view)



II. Install advanced start areas at signalised intersections (Scarborough Beach Road and Vincent Street).

III. Install bike lanes through roundabout intersections or redevelop as low speed shared space intersections, where appropriate (Anzac Road, Bourke Street and Leederville Parade).

IV. Implement a low speed shared zone environment (or bicycle lanes) between Vincent Street and Leederville Parade, as part of the Leederville Town Centre enhancement.

London Street / Loftus Street

I. Install bike lanes in both directions between Green Street and Vincent Street, by reducing lane and median widths, or by widening into the verge. 1m wide advisory bike lanes can be installed along sections where the road width does not allow full bike lanes (possibly in the interim until widening works can be done).

II. Install advanced start areas for cyclists at signalised intersections (Green Street, Scarborough Beach Road, Bourke Street and Vincent Street).

Vincent and Bulwer Streets

Vincent Street and Bulwer Street are popular east-west routes through the City of Vincent. However, these routes do not provide any cycling facilities and currently present a high safety risk for use by cyclists. These routes connect to many of the key destinations (Beatty Park, Hyde Park, City of Vincent, Oxford Street, Loftus Community Centre, Volleyball WA, Leederville Station, East Perth Station and the NIB Stadium) in the City of Vincent and they also connect to other strategic cycling routes. Where Vincent Street intersects with Oxford Street the route should be diverted along Oxford Street to meet the bridge across the freeway and the freeway PSP at Leederville Parade (this will allow the route to avoid the busy freeway interchange).

I. Install a bi-directional bikeway along Vincent Street between Oxford Street and Loftus Street. This can be done by removing a less utilised lane in the eastbound direction. Install advanced start areas for cyclists at signalised intersections.

II. Between Loftus Street and Bulwer Street, upgrade the footpath on the northern side of the road to a shared path. A width of 2.5m should be the minimum and a width of 3.5m is recommended. While it is understood that the minimum will be difficult to achieve between Loftus Street and Morriston Street, this should not stop the project from proceeding. Rather this section should be widened as much as possible through narrowing the verge on the other side of the road, the traffic lanes and the median where possible. The resultant path should be upgraded and marked as a shared path. If this path does not meet the minimum width requirement it should be signed accordingly, warning of its narrow nature.

III. Kerb ramps should be flush with the edge of the road along this shared path to ensure it is appropriate for use by road on-road bicycles.

IV. Install bicycle crossings for the shared path at all intersection (signalised and unsignalised).

V. Install bike lanes in both direction along Bulwer Street between Vincent Street and Lord Street by reducing the median width and indenting parking into the verge. Install advanced start areas for cyclists at signalised intersections.

VI. Install bike lanes in both directions along Summers Street between Lord Street and the Public Transport Centre.

VII. Install advanced start areas for cyclists at signalised intersections.

At the Public Transport Centre the route can connect across the rail at the pedestrian bridge (the bridge may require an upgrade in future

depending on demand), where the route can link to the Midland railway line PSP and the river shared path.

Fitzgerald Street

The future of Fitzgerald Street is currently being determined by the planning processes underway for the Central Northern Corridor Light Rail. Currently the Department of Transport is recommending that cyclists not be accommodated along the Fitzgerald Street section of the proposed light rail route, due to limited space. It is recommended that where the light rail crosses Walcott Street into the City of Vincent, cyclists should be diverted to Norfolk Street running adjacent to Fitzgerald Street.

This highlights the need for a better developed and well signed alternate route, possibly a realignment of the PBN NE1 and NE4 route, as it will be the closest route to Fitzgerald Street for cyclists following the light rail along Alexander Drive.

It is recommended that the City of Vincent be actively involved and advocate for appropriate bicycle facilities along this diversion route, and this project could be a joint project between the City of Vincent and the Department of Transport. Appropriate signage will be important to ensure cyclists are aware of route diversions.

NE1/NE4 PBN Route

The route currently has various deviations and multiple crossings over busy roads. It is recommended that the PBN route be adjusted to follow:

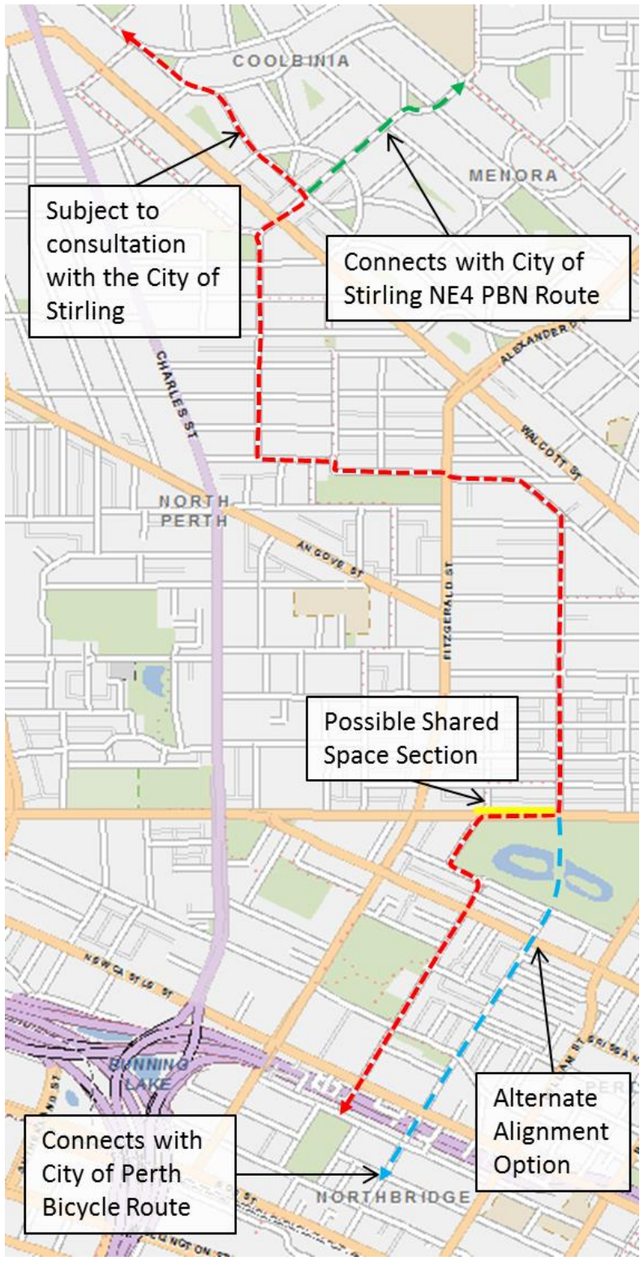
- Carnarvon Crescent (City of Stirling)
- Lanark Street (City of Stirling)
- Cross Walcott Street at Adair Parade (where it can also be extended to link up with the NE4 at Bradford Street)
- Hunter Street
- Waugh Street
- Norham Street
- Namur Street
- Crossing Fitzgerald Street into York Street
- Monmouth Street
- Norfolk Street

From Norfolk Street meet up with the NE4 PBN route. The NE4 should then be extended along Norfolk Street, turning right into Vincent Street to go around Hyde Park. The route then continues along Throssel Street, left into Glendower Street, and then right into Palmerston Street. Alternatively the route could cross Vincent Street, go through Hyde Park and continue straight along Lake Street into the City of Perth (linking up with the City of Perth integrated cycling route along Lake Street and King Street). Refer to **Figure 6-4** for the proposed alignment.

I. Install signage and realign the PBN route as described and shown in **Figure 6-4**.

II. Install on-street markings all along the route (at all unsignalised intersections) showing this route as a bicycle route (refer to **Appendix B**). This allows cyclists to easily follow the route and raises the awareness of drivers to expect cyclists.

Figure 6-4: Proposed NE1/NE4 PBN Route

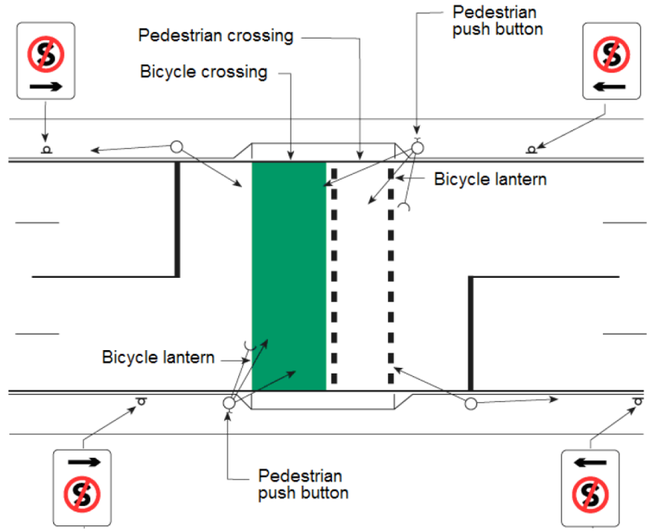


III. Install a signalised cycling (and pedestrian) crossing between Namur and York Streets across Fitzgerald Street. It is important that this crossing be considered in conjunction with the design for the possible light rail station at this location. **Figure 6-5** shows the type of crossing to be considered (note that pedestrian and cyclist area can be shared as well).

IV. Install bike lanes through roundabouts as shown in **Figure 6-6**.

V. Depending on the route alignment chosen, either redevelop Vincent Street between Throssell Street and Norfolk Street as a reduced speed shared space area (given the proximity to Hyde Park), or install a signalised cycling (and pedestrian) crossing across Vincent Street to Hyde Park. Refer to **Figure 6-7** for a possible concept.

Figure 6-5: Signalised pedestrian and cyclists crossing[5]



VI. If applicable, widen the path through the centre of Hyde Park to 5m allowing a separated pedestrian and cycling path to Lake Street.

[5] Austroads Guide to Road Design Part 4

Figure 6-6: Roundabout treatment[6]

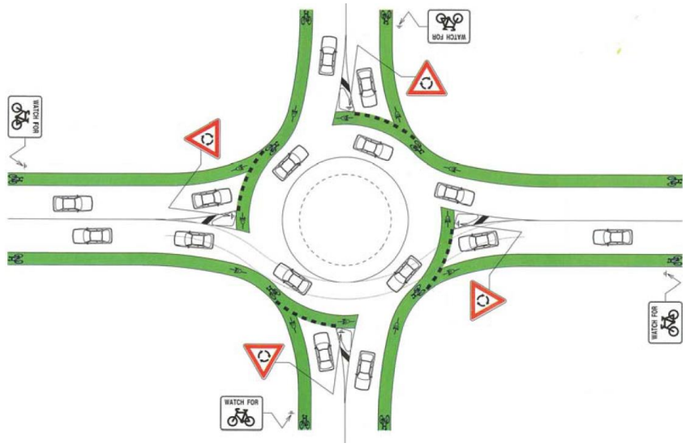
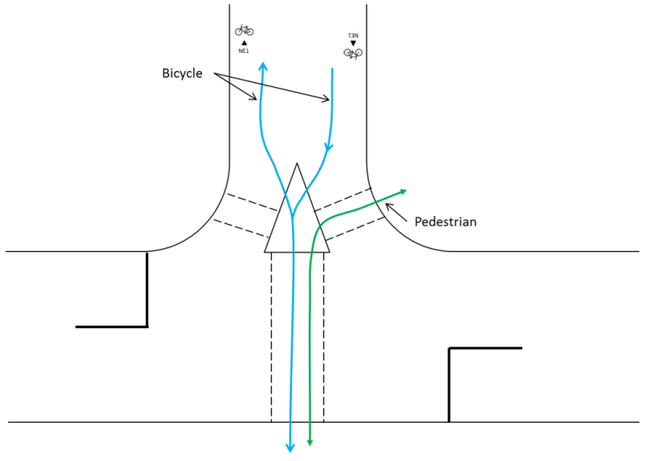


Figure 6-7: Possible Crossing Concept



VII. Depending on the route alignment chosen, either redevelop the Glendower Street / Palmerston Street roundabout as a shared space, or install a speed table shared space at the Lake Street / Bulwer Street intersection to allow a safer crossing environment for cyclists and pedestrians (given the proximity to Hyde Park).

VIII. Install a speed table and signage at the Lake Street / Newcastle Street intersection and allow cyclists to continue straight across Newcastle Street, at this intersection (while maintaining the through movement ban for cars).

[6] Austroads Guide to Road Design Part 4B

Beaufort Street

The intention is that Beaufort Street will have bus lanes in both directions in the future. As this planning continues the City of Vincent should advocate for the bus lanes to be designed and implemented as shared bus and bike lanes.

Priority list of intersections where Advanced Start Areas should be considered

1. Beaufort Street and Walcott Street
2. Scarborough Beach Road and Oxford Street
3. Scarborough Beach Road and Loftus Street
4. Scarborough Beach Road and Charles Street
5. Oxford Street and Vincent Street
6. Loftus Street and Bourke Street
7. Bulwer Street and Beaufort Street
8. Bulwer Street and Fitzgerald Street
9. Bulwer Street and William Street
10. Bulwer Street and Lord Street
11. Angove Street and Fitzgerald Street
12. Vincent Street and Charles Street
13. Vincent Street and Loftus Street

Shared Space

The concept of shared space is widely used in countries where cycling is a popular mode of transport (including the Netherlands and Denmark), and refers to low speed environments with limited line markings and kerbing to encouraging mixing instead of separation of pedestrians, cyclists and cars (refer to **Figure 6-8**).

This type of treatment is appropriate in high activity areas such as town centres and popular parks. Instead of providing expensive signalised crossings and allocating scarce space to various user groups (in accordance with space intensive standards and guidelines), shared space areas could be considered in high activity areas.

Many of the proposed strategic projects include the implementation of bicycle infrastructure through town centres. The City of Vincent should liaise with the Department of Transport to ascertain whether some of the projects could be funded jointly by the Department and City as pilot projects or projects with strategic significance.

Figure 6-8: Example of a shared space roundabout[7]

When providing a shared space area in the City of Vincent, a clear distinction between the general roadway and the shared space area should be made by using different surface textures and signing the area as shared space (refer to **Figure 6-9**). Low speed limits of 30km/h or lower should also be considered as the concept of shared space is still new in the Australian context, and a safe environment is essential.

Figure 6-9: Example of signage indicating a shared space area[7]

[7] www.flickr.com

7. Maintenance & Renewal

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

The maintenance and renewal of bicycle infrastructure should be included in and undertaken as part of the City of Vincent Transport Asset Management Plan.

Indicatively the following aspects should be considered:

7.1. Maintenance Program

7.1.1. Risk Assessment

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

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

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

User defect reporting
In addition to the regular inspections undertaken as described above, day-to-day users of bicycle facilities are also a valuable source of information on the condition of bicycle facilities. A defect report system is in place:

- Perth Metro Cycle Hazard Website:
  - www.transport.wa.gov.au/activetransport/24955.asp

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

7.1.2. Maintenance Activities

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

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

Other activities
Other maintenance activities that should be undertaken regularly include:

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

7.2. Maintenance Schedule

In order to achieve all the regularly required maintenance to an acceptable level the indicative maintenance schedule shown in **Table 7-1** is recommended as a starting point.

7.3. Renewal Program

In the long-term, renewal works will also be required. The estimated average life-span of various assets is listed in **Table 7-1** and the City of Vincent is recommended to consider these when setting forward capital works budgets.

Table 7-1: Maintenance & Renewal - Summary of Issues & Recommendations

ITEM	ISSUE	RECOMMENDATION
8.1 Maintenance Program		
8.1.1	The utilisation of bicycle and shared facilities in the City of Vincent is currently not formally monitored.	In order to effectively prioritise funding for projects the utilisation of facilities need to be monitored. The City of Vincent should consider installing permanent bicycle and pedestrian counters at the Mitchell Freeway PSP, the midland railway line PSP, the river shared path, and any improved routes. Additionally an annual counting programme should be undertaken along all higher order cycle routes (including PBN routes) to determine year on year utilisation trends.
8.1.2	Regular bicycle facility audits are required to identify intermediate concerns and hazards that arise.	The City of Vincent should maintain bicycle and pedestrian facilities as part of the City of Vincent Transport Asset Management Plan and audit all facilities on the list annually to ensure the network is well maintained and do not present unacceptable risks to users.
8.2 Maintenance Schedule		
8.2.1	A maintenance schedule is required to ensure that bicycle facilities remain clean and in a state of good repair to limit hazards and allow comfortable use.	The City of Vincent should undertake the following maintenance activities regularly where these specific issues have been identified (indicative frequency provided): ▪ **Bicycle Lane Sweeping**: monthly ▪ **Path Sweeping**: monthly ▪ **Pavement Crack Filling**: as needed ▪ **Vegetation Pruning**: every three to four months ▪ **Grass Cutting**: monthly (more frequently in summer) ▪ **Sign Cleaning**: annually ▪ **Fill Gap at service covers**: as needed ▪ **Filling Potholes**: as needed ▪ **Cleaning Benches, Bins and Drinking Fountains**: every three months ▪ **Storm Drain Cleaning**: as needed ▪ **Ad Hoc Maintenance**: as needed
8.3 Renewal Program		
8.3.1	A renewal program dictates when infrastructure maintenance and replacement should occur ensuring that the bicycle facilities remain in use and to appropriate standards.	The City of Vincent should undertake the following renewal activities regularly (indicative frequency provided): ▪ **Repainting of Pavement Markings**: every three years ▪ **Replacement of Signage and Other Installations**: every five years ▪ **Resealing of Shared Paths and Bicycle Lanes**: every fifteen years

8. Conclusion

Compared to other local governments in the Perth Metropolitan area, the City of Vincent already has a bicycle travel mode share well above the average. Also many bicycle commuters pass through the City of Vincent to and from the Perth CBD. This means that appropriate bicycle infrastructure should be considered a justified expense.

Bicycle infrastructure provision in the City of Vincent could be improved significantly. At the moment there are only a few route sections that have scored well in the CERS audit. Also these sections are in many cases isolated and disjointed. The section of Scarborough Beach Road that includes bicycle lanes is an example of excellent bicycle infrastructure, but due to its isolation and discontinuity it actually misleads the inexperienced and unaware bicycle user by leading them from a fairly safe to an overwhelming environment. In doing so, it arguably does more harm than good.

While many localised and maintenance recommendations were made throughout this report, the main objective should be to address those concerns that are barriers to bicycle travel.

In general the recommendations made in **Appendix A** are relatively small and inexpensive measures that will help to improve the cycling environment in the immediate vicinity, as well as for all those who travel along a specific link. While any improvement to the cycling environment is positive and should be made where realistic and feasible, it should be noted that these minor improvements will not result in a significant change in the overall cycling environment and accordingly, is not likely to significantly increase the bicycle travel mode share.

The strategic recommendations listed in **Section 6**, includes the significant infrastructure measures that will vastly improve the cycling environment in the City of Vincent. These strategic projects have the ability to shift many commuter cyclists to safer routes. This in turn will make more people consider cycling as a viable mode of transport. These projects have the potential to bring about significant change to the bicycle travel mode share in and around the City of Vincent.

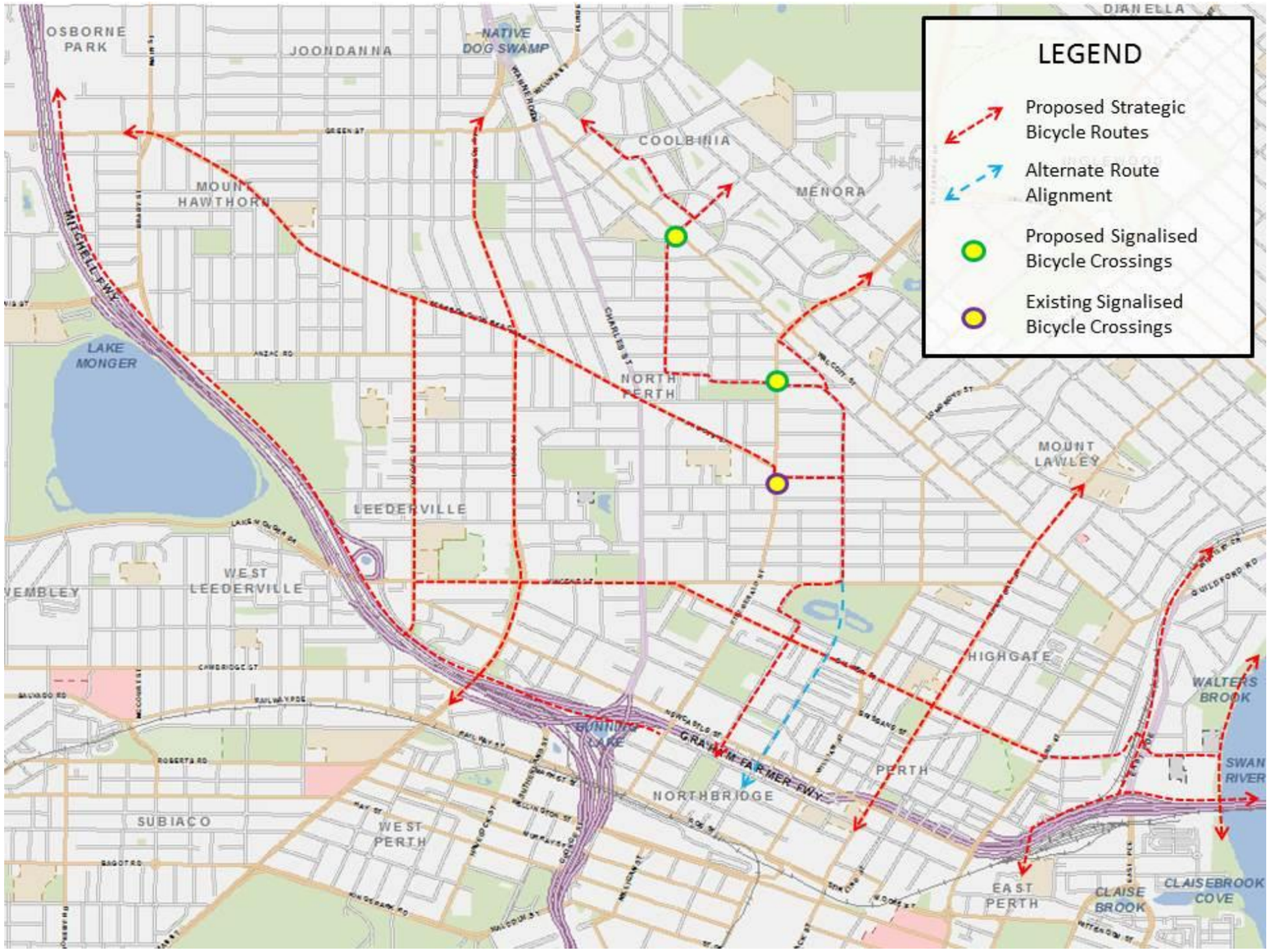
The strategic recommendations will be more costly and difficult to implement, but the achievable outcomes are much better than small localised and isolated treatments. Strategic projects should be implemented on a route by route basis in order to see the true benefits. Just as the section of exemplar bicycle facilities along Scarborough Beach Road is not doing much to improve the overall cycling environment and the number of cyclists using Scarborough Beach Road, so too will strategic projects in isolation not achieve much.

The strategic routes should be prioritised based on cost and what is considered achievable in its entirety, and should then be implemented route-by-route. Preferably prioritisation should alternate between route orientations (i.e. a north-south route followed by an east-west route etc.).

As a longer term goal the proposed City of Vincent strategic bicycle network is shown in **Figure 8-1**. These routes should be considered as strategic, like the current PBN routes, and should be complimented by safe local streets to maximise their catchments.

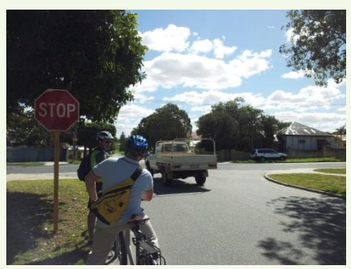
It is important that strategic route projects be implemented on a route-by-route basis to limit disjointed infrastructure sections.

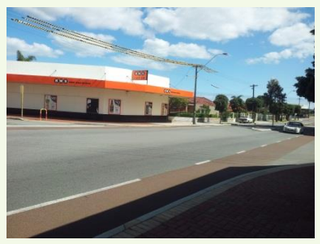
Figure 8-1: Proposed Strategic Bicycle Routes

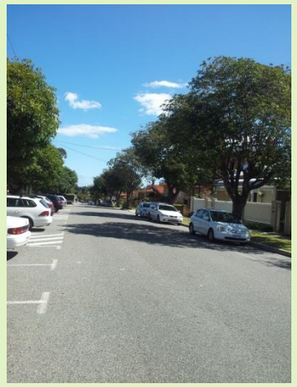


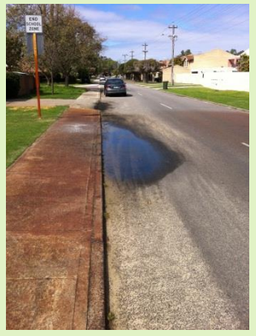
Appendix A: Detailed Link Results and Project Action Plan

Link reference & overall score	Street name	Between	Description	Photos	Issues	Recommendation
L1	Loftus Street	Vincent Street and Mitchell Freeway PSP	**On road facility (Sealed Shoulder)** Approximately 1.2m wide on road bicycle lane (sealed shoulder). The facility is for the most part continued though intersections. No signs or markings relating to this facility are provided. The carriage way along this road is generally three lanes per direction.		Loftus Street is a wide road that carries high traffic volumes, in the order of 18,000 vehicles per day. It is thus an intimidating environment for most cyclists to use. Additionally the bicycle lane that is provided for cyclists is only 1.2m wide, less than what is recommended for roads of this size. In general the bicycle lane is not appropriately signed and marked, and may cause confusion for cyclists wishing to use the facility. Some encroaching vegetation was also noted, this presents a hazard for cyclists using the already narrow facility.	• Widen the bicycle lane to the recommended 1.5m. • Clear the encroaching vegetation from the facility. • Install appropriate bicycle road markings along the facility, and complement with the installation of bicycle signage highlighting the presence of bicycles to motorists. • Install cycling way finding or directional route signage.
L2	Shared Path (along Loftus Street)	Carr Street and Leederville Parade	**Off road shared path** Approximately 3m wide, appropriately marked off road path.	 	Isolated along sections with signs of graffiti present, some surveillance provided by the property frontages, however an overall pleasant environment to cycle. In some areas vegetation is encroaching onto the path. Also a large road sign is installed over the path, with its posts obstructing the path. Along those sections where the path diverts away from the road it does not have appropriate lighting. Sections of the shared path include cracking and reinstatements that present hazards for users.	• Remove graffiti. • Clear the encroaching vegetation from the facility. • Install path lighting where the path diverts from the road. • Move the obstructing road sign from the path. • Resurface the sections with cracking and reinstatements. • Install cycling way finding or directional route signage.

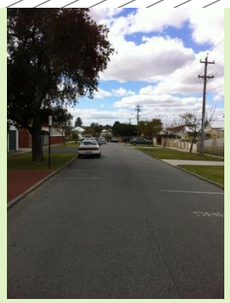
L3	Mitchell Freeway PSP	Loftus Street and Green Street	**Off road shared path** Approximately 3m wide off-road path. The path includes appropriate markings, signage and lighting along the majority of the alignment.	 	The PSP as it traverses Leederville runs along Leederville Parade where a bus stop is located within the shared path. While not a problem during the audit the presence of passengers waiting for the bus (rail replacement service) could present a conflict for cyclists. Debris accumulating along the shared path is starting to encroach onto the PSP presenting a hazard to users. As the path is resurfaced in sections, surface quality and markings are not consistently provided along the route. The path is fairly isolated for the most part with many locations allowing concealment. This along with limited surveillance and some graffiti may cause some users to experience the environment as a threat to personal security.	• Consider realigning the PSP around the bus stop (if it is considered a significant conflict hazard along the route). • Undertake cleaning works to remove the encroaching debris. • Resurface the sections of the facility which have a poor surface quality. • Line mark sections of the facility where markings are faded or are not present. • Consider the installation of CCTV surveillance. • Remove graffiti.
L4	NE2 PBN Route (Federation, Egina, Blackford, and Tyler Streets)	Britannia Street and Green Street	**Unmarked on road facility** The roads which make up the NE2 PBN Route are generally 6 – 10m wide, consist of a good surface quality and is well lit. The PBN route is generally signed at intersections, providing basic way finding.	 	In general, no specific infrastructure is provided along this route justifying its allocation as a bicycle route of strategic significance. This route presents conflicts for cyclists if cars are parked along the side of the road, forcing cyclists into the lane. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. Additionally the signage provided at intersections to delineate the PBN route is not consistently provided at all intersections, and is damaged and dirty in some locations. This route crosses Scarborough Beach Road, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross.	• Clean and repair damaged and dirty signage. • Install PBN Route markers at intersections where they are missing. • Enforce parking restrictions to allow a safer cycling environment. • Alternatively raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • Realign the route along the Scarborough Beach Road bicycle lanes, to increase directness • Innovative crossing solutions could be piloted at the intersection with Scarborough Beach Road.

L5	Tasman Street	Jugan Street and Egina Street	**Unmarked on road facility** Tasman Street is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is well lit.	 	No bicycle specific facilities, signs or markings are present along Tasman Street, justifying its allocation as a bicycle friendly route. Drainage channels and parked cars force cyclists into the roadway. Some drainage channels are blocked and could cause ponding that would further force cyclists to the centre of the road. Tasman Street intersects with Brady Street in an unsignalised intersection. This intersection is difficult to cross as a cyclist. The route ends abruptly, while it could intuitively be connected to the Mitchell Freeway PSP.	• Install signage to allow cyclists and motorists alike to identify the route as a preferred bicycle route. • Install cycling way finding or directional route signage. • Clean blocked drainage channels, and install bicycle friendly drainage grates. • The intersection with Brady Street should be treated to allow cyclists to cross easier and safely. • Extend the route along Goody Close and connect the route to the PSP.
L6	Scarborough Beach Road	Bondi Street and Braithwaite Park	**On road facility (Sealed Shoulder)** Approximately 1.5m on road bicycle lane (sealed shoulder). The facility is for the most part continued though intersections. Scarborough Beach Road along the section of the bicycle lane has a single lane per direction, with a 40 km/h speed limit. In general this facility provides a pleasant environment for cycling, along which cyclists feel safe due to the formalised separation from traffic.	 	Buses make use of Scarborough Beach Road. At the stops the buses pull into the bicycle lane, blocking them completely. The facility is only provided for a short section of Scarborough Beach Road, approximately 600m. The facility in general does not link to any routes or uses and likely has a low utilisation due to this.	• The buses stopping in the bicycle lane could be mitigated by installing indented bus bays. This may become required once the bicycle lane forms part of a larger network that carries higher volumes of cyclists. • Link the bicycle lane facility to other routes and destinations, by extending it all along Scarborough Beach Road. • Install cycling way finding or directional route signage.
L7	Blackford and Ellesmere Street	Egina Street and Charles Street	**Unmarked on road facility** The route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is well lit.		No bicycle specific facilities, signs or markings are present along the route that would justify its allocation as bicycle friendly route. In general, the line markings along this route are faded. A roundabout intersection, although not heavily trafficked, provides a less safe environment for cyclists.	• Remark faded line markings. • Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway. (especially at the roundabout) • Install cycling way finding or directional route signage.

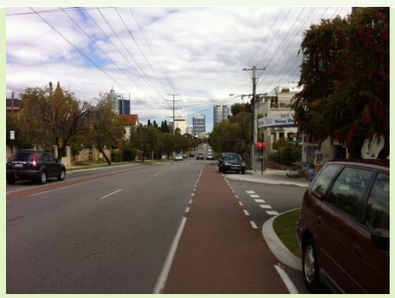
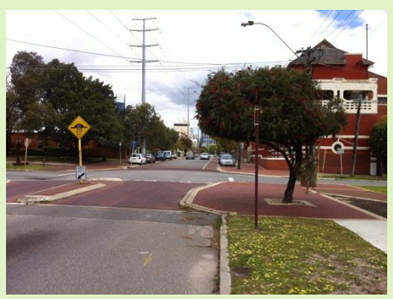
L8	NE9 PBN Route (Shakespeare and Scott Streets)	Green Street and Richmond Street	**Unmarked on road facility** The roads which make up the NE9 PBN Route are generally 6 – 10m wide, consist of a good surface quality and are well lit. The PBN route is in general signed at intersections, providing basic way finding.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route presents conflicts for cyclists if cars are parked along the side of the road, forcing cyclists into the lane. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. Additionally the signage provided at intersections to delineate the PBN route is not consistently provided at all intersections and even where provided could give more information. This route crosses Scarborough Beach Road, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross.	• Install PBN Route markers at intersections where they are missing. • Enforce parking restrictions to allow a safer cycling environment. • Alternatively raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • Realign the route along the Scarborough Beach Road if the bicycle lanes are extended on that road. • Innovative crossing solutions could be piloted at the intersection with Scarborough Beach Road.
L9	Richmond Street	Mitchell Freeway PSP and Elven Street	**Unmarked on road facility** Richmond Street is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is well lit.		No bicycle specific facilities, signs or markings are present along Richmond Street that would justify its allocation as bicycle friendly route. Richmond Street intersects with Oxford and Loftus Street in signalised intersections. These intersections are busy and difficult to cross as a cyclist, as no facilities are provided along the route or at the intersections. Additionally Richmond Street has a large number of angled parking along the section between Scott Street and Oxford Street. Angled parking presents a hazard for cyclists as motorists can have difficulty seeing approaching vehicles when reversing out of this type of parking, particularly due to their smaller size.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Install bicycle lanes at the signalised intersections. • Consider installing a bike path or bike lane in front of the angled parking bays to limit potential conflict between cyclists and cars accessing the parking.

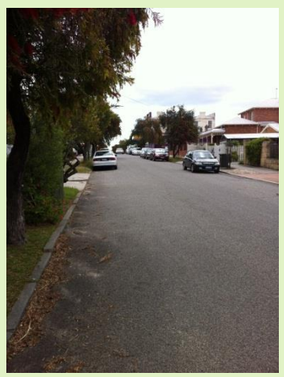
L10	Flinders Street	Ellesmere Street and Anzac Road	**Unmarked on road facility** Flinders Street is a local bicycle friendly route that is generally 6 – 10m wide, consists of a fair surface quality and is sufficiently lit. There is a medium sized retail facility on the corner of Scarborough Beach Road and Flinders Street. Providing bicycle routes which allow access to key destinations is good practice to promote cycling as a mode of transport.		No bicycle specific facilities, signs or markings are present along Flinders Street that would justify its allocation as bicycle friendly route. Flinders Street includes two roundabouts and intersects with Scarborough Beach Road in a signalised intersection. These intersections are standard size and not a significant impediment to cyclists, however traversing the roundabouts tends to be more dangerous as no facilities are provided along the route or at the intersections.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Install bicycle lanes at the roundabouts and signalised intersections.
L11	Brentham Road	Anzac Road to Richmond Street	**Unmarked on road facility** Brentham Road is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is well lit. This route provides direct bicycle access to the Aranmore Primary Catholic School.	 	No bicycle specific facilities, signs or markings are present along Brentham Road that would justify its allocation as bicycle friendly route. Brentham Road includes a roundabout at the intersection with Britannia Road. While this intersection is not particularly difficult to navigate, roundabouts become more dangerous for cyclists as traffic volumes increase, predominantly due to the limited awareness of motorists regarding the presence of bicycles. This route further includes traffic calming measures, in the form of chicanes. These measures are particularly unfriendly to bicycle users as they provide no specific space for cyclists, and force them into the traffic. The presence of ponding, debris and blockages in drainage channels further forces cyclists into the traffic.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Install bicycle lanes at the roundabout. • Retrofit traffic calming measures to include channels for bicycles. • Resurface areas prone to ponding. • Clean drainage channels.
L12	Britannia Road	Mitchell Freeway PSP and Oxford Street	**Unmarked on road facility** Britannia Road is a local bicycle friendly route that is generally in excess of 10m wide, consists of a fair surface quality and is well lit. This route provides direct bicycle access to the Mitchell Freeway PSP, Britannia Road Reserve and the land uses associated with Oxford Street.		No bicycle specific facilities, signs or markings are present along Britannia Road that would justify its allocation as bicycle friendly route. Britannia Road includes a roundabout at the intersection with Brentham Road. While this intersection is not particularly difficult to navigate, roundabouts become more dangerous for cyclists as traffic volumes increase, predominantly due to the limited awareness of motorists regarding the presence of bicycles. This route includes hazards to cyclists in the form of kerbside debris, cracking and potholes.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Install bicycle lanes at the roundabout. • Resurface damaged areas. • Clean drainage channels.

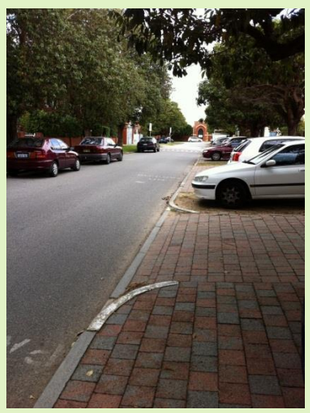
L13	Salisbury Street	Oxford Street and Shakespeare Street	**Unmarked on road facility** Salisbury Street is a local bicycle friendly route that is generally in excess of 10m wide, consists of a good surface quality and is well lit. This route provides direct bicycle access to the land uses associated with Oxford Street.	 	No bicycle specific facilities, signs or markings are present along Salisbury Street that would justify its allocation as a bicycle friendly route. Salisbury Street is highly utilised for on street parking, but due to low traffic volumes and the wide carriageway space seems to be sufficient. The gradient along this route is steeper than the average route in Vincent, however not overwhelming.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage.
L14	Franklin Street	Shakespeare Street and Loftus Street	**Unmarked on road facility** Franklin Street is a local bicycle friendly route that is generally in excess of 10m wide, consists of an average surface quality and is well lit. This route provides direct bicycle access to the St Mary's Catholic Church and the Aranmore Catholic College.	 	No bicycle specific facilities, signs or markings are present along Franklin Street that would justify its allocation as a bicycle friendly route. The carriageway surface along the route has deteriorated, showing signs of cracking. Also Franklin Street is not well maintained with signs of vandalism and graffiti that reduces the level of personal security experienced along the route. The unsignalised T-intersection with Loftus Street is not easily crossed by cyclists.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Remove graffiti and repair signs of vandalism. • Resurface the carriageway. • Consider installing a priority crossing, or piloting an innovative crossing solution.

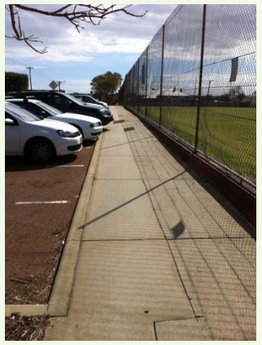
L15	Chamberlain Street	Loftus Street and Pennant Street	**Unmarked on road facility** Chamberlain Street is a local bicycle friendly route that is narrow (less than 6m wide). It consists of an average surface quality and is sufficiently lit. Due to the constrained space environment of this road and presence of on street parking the typical travel speeds along this road are low, making it an appropriate route section for mixed traffic and shared space.	 	No bicycle specific facilities, signs or markings are present along Chamberlain Street that would justify its allocation as bicycle friendly route. The carriageway surface along the route has deteriorated, showing signs of cracking. The unsignalised T-intersection with Loftus Street is not easily crossed by cyclists.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Resurface the carriageway. • Consider installing a priority crossing, or piloting an innovative crossing solution.
L16	Pennant, Barnet, Morrison, and Eton Streets	Ellesmere Street and Vincent Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of an average surface quality and is sufficiently lit. This route provides direct bicycle access to the Charles Veryard Reserve and Beatty Park.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route crosses Scarborough Beach Road, a road which accommodates high traffic volumes, at a staggered unsignalised intersection. This intersection is difficult to cross. This route includes traffic calming measures. These measures are particularly unfriendly to bicycle users as they provide no specific space for cyclists, and force them into the traffic.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Resurface the carriageway. • Consider installing a priority crossing, or piloting an innovative crossing solution at Scarborough Beach Road. • Retrofit traffic calming measures to include channels for bicycles.
L17	Emmerson and Claverton Streets	Loftus Street and Leake Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a sufficient surface quality and is sufficiently lit. This route provides direct bicycle access to the Len Fletcher Sports Pavilion.		No bicycle specific facilities, signs or markings are present along Emmerson and Claverton Street that would justify its allocation as bicycle friendly route. This route intersects with Charles Street in a large staggered unsignalised intersection. This intersection is difficult to navigate with a bicycle.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Consider installing a priority crossing, or piloting an innovative crossing solution at Charles Street.

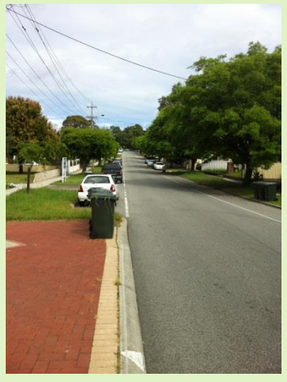
L18	Cleaver Street	Vincent Street and Newcastle Street	**On road facility (Sealed Shoulder)** Approximately 1.2m on road bicycle lanes (sealed shoulder) on an approximately 13.5m carriageway. The facility provides sufficient segregation to allow confident on road cycling. No signs, but markings relating to this facility are provided. Cleaver Street provides direct access to Beatty Park, and its associated facilities.	  	The bicycle lanes provided along Cleaver Street are isolated and not provided as part of a clear network of bicycle facilities. The facility is not continued through intersections and traffic calming measures. Cyclists are forced to merge with traffic at a few locations along this short route section. There is a lack of signage, both regulatory and directional (way-finding). While it is fairly clear that the facility is intended for cyclists, it is not clear which destinations can be accessed by using this facility.	• Connect this facility to other bicycle routes and facilities to develop a network. • Install bicycle lanes through the roundabout with Carr Street. Alternatively retrofit the roundabout to increase cyclist safety such as reducing lane width and installing signage. • Retrofit traffic calming measures to include channels for the uninterrupted continuation of the bicycle lanes.
L19	Carr Street	Newcastle Street and Fitzgerald Street	**Unmarked on road facility (bicycle lanes at intersections)** This route is a local bicycle friendly route that is generally in excess of 10m wide, consists of a good surface quality and is well lit. This route provides direct bicycle access to the deli's and eateries along Carr Street, as well as to Robertson Park. This route provides cycle channels through traffic calming measures, and bicycle lanes at the intersection with Charles Street.	 	While Carr Street is a wide road, it has a high level of activity in terms of parking vehicles, buses and higher travel speeds, making the route more dangerous for cyclists as they have no allocated space on the road way. Additionally the lack of signs, markings and infrastructure alerting users of the presence of cyclists reduces motorists' expectation that cyclists may be present. There is no way-finding signage along the route that could highlight destinations or other routes accessible from Carr Street.	• Install bicycle lanes along the remainder of Carr Street. • Install bicycle lanes through the roundabout with Cleaver Street. • Install appropriate warning signage along the route, highlighting the presence of cyclists along the road. • Install bicycle specific way-finding signage to increase legibility of the bicycle network.

L20	Shared Paths in Robertson Park and connecting parks		**Off road shared path** Approximately 3m wide off-road path. The path includes appropriate markings, signage and lighting along the majority of the alignment. This shared path network provides direct routes of access between the various parks in the vicinity, as well as a direct and safer route towards the city. This section of bicycle network presents significant opportunities for connecting to other routes and facilities to expand the bicycle network in the City of Vincent.	  	Overall the off-road shared path network connecting through Robertson Park, Dorrien Gardens, and Voleyball WA grounds to Beatty Park is of good quality. However, these facilities are poorly signed with little to no way-finding signage available to indicate the destination and routes that can be accessed from these facilities. There is no formal or priority crossing for cyclists at Fitzgerald Street. There are also no median islands or signals that can be used to assist in crossing. Some ponding and cracking of the path surface was observed, which presents hazards to cyclists that use the facilities.	• Install cycle specific way-finding signage along the routes, indicating popular destinations and linkages to other routes. • Install an appropriate priority crossing facility, to enable safer crossing of Fitzgerald Street by cyclists using the network. • Resurface the sections of path that presents hazards to cyclists.
L21	NE4 PBN Route (Palmerston Street)	Newcastle Street and Glendower Street	**On road facility (Sealed Shoulder)** Approximately 1.2m wide on road bicycle lanes (sealed shoulder) on an approximately 10m wide carriageway. The facility provides sufficient segregation to allow confident on road cycling. Limited signs and markings relating to this facility are provided. Palmerston Street provides direct access to Hyde Park, Robertson Park, Stuart Street Reserve and the mixed uses leading into Northbridge.	 	The facility along Palmerston Street is not consistently provided, as the bicycle lanes abruptly disappear between Stuart Street and Randell Street. The roundabout intersections with Brisbane Street and Glendower Street have no bicycle facilities, neither are any warning signs provided to alert motorists that the route is a strategic bicycle route and to expect bicycles on road and within the roundabouts. The unsignalised intersection with Bulwer Street is difficult to cross due to high traffic volumes along Bulwer Street. Only limited signage provided highlighting the destinations that can be accessed via this route.	• Complete the gap in the facility by continuing the bicycle lanes between Stuart and Randell Streets. • Install bicycle lanes within the roundabouts along this facility, and raise the awareness that cyclists make use of this route by installing appropriate signs and markings. • Install a priority crossing facility for cyclists at the intersection with Bulwer Street. • Install more and improved way-finding signage along this route.

L22	NE1 PBN Route (Throssell and Ethel Streets)	Glendower Street and Raglan Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides direct bicycle access to Hyde Park and the North Perth Town Centre. The route provides appropriate cycle way-finding signage.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route presents conflicts for cyclists if cars are parked along the side of the road, forcing cyclists into the lane. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. This route crosses Vincent Street, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross. Limited graffiti was observed along the route.	• Enforce parking restrictions to allow a safer cycling environment. • Alternatively raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • The route could potentially be realigned along Fitzgerald Street if appropriate facilities are provided. This will be a more direct route, with priority at intersections and provide excellent access to the North Perth Town Centre and the Perth CBD. • Innovative crossing solutions could be piloted at the intersection with Vincent Street. • Remove graffiti.
L23	NE1 PBN Route (Raglan Street)	Ethel Street and Leake Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally 6 – 10m wide, consists of an average surface quality and is sufficiently lit. This route provides direct bicycle access to the North Perth Town Centre.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route presents conflicts for cyclists due to cars parked along more than 50% of the road, forcing cyclists into the lane. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. This route crosses Fitzgerald Street, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross.	• Enforce parking restrictions to allow a safer cycling environment. • Alternatively raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • The route could potentially be realigned along Fitzgerald Street if appropriate facilities are provided. This will be a more direct route, with priority at intersections and provide excellent access to the North Perth Town Centre and the Perth CBD. • Innovative priority crossing solutions could be piloted at the intersection with Fitzgerald Street.

L24	NE1 PBN Route (Leake Street)	Raglan Street and View Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally in excess of 10m wide, consists of a good surface quality and is sufficiently lit. This route provides indirect bicycle access to the North Perth Town Centre.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. Cycle specific way-finding signage is limited and it is not always clear how to remain on the PBN Route or which destinations are accessible by following the route. This route is quite indirect and includes multiple crossing points with roads that have priority in the opposing direction. This makes this route quite tedious to travel along.	• Raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • The route could potentially be realigned along the Norfolk Road. This will be a more direct route that will attract more commuter cyclists.
L25	NE1 PBN Route (Woodville Street)	View Street and Farmer Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally less than 6m wide, consists of a good surface quality and is sufficiently lit. This route provides direct bicycle access to the North Perth Town Centre and the Woodville Reserve.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route section is delineated along a narrow road, less than 6m wide. Additionally a large section of this road includes angled parking on the verge. Firstly the width of the roadway means cyclists share the road, while the angled parking presents a risk to cyclists if motorists are not fully aware of their presence when reversing in and out of parking spaces. This route has limited priority at intersections, with vehicles and bicycles alike typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. This route crosses Angove Street, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross. Some graffiti was observed along this route which could have a negative effect on the perceived personal safety along the route. Isolated ponding was observed along this section.	• Raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • The route could potentially be realigned along Fitzgerald Street if appropriate facilities are provided. This will be a more direct route, with priority at intersections and provide excellent access to the North Perth Town Centre and the Perth CBD. • Innovative priority crossing solutions could be piloted at the intersection with Angove Street. • The graffiti along this route section should be removed. • Resurface the sections of the road where ponding occurs or install appropriate drainage facilities.

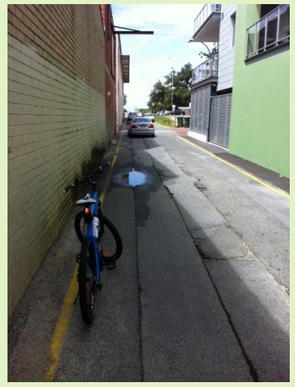
L26	NE1 PBN Route (Shared path along Farmer Street)	Woodville Street and Mignonette Street	**Off road shared path.** Off road path with a width greater than 2m. The path does not include markings, signage or lighting along the majority of the alignment. This shared path provides direct access to the Woodville Reserve.	 	This is an isolated section of shared path Signage identifying the path as a shared path is not provided, and directional or way finding signage is also lacking. No markings associated with a shared path are provided along the path. The path is slightly disjointed with bollards obstructing certain points. A section of the path is also located next to angled parking, and multiple vehicles were seen protruding onto the shared path. Sections of the shared path include cracking and reinstatements that present hazards for users. There is no lighting provided specifically for the path, although street lights are provided on the opposite side of the road, which would provide some light.	• Install shared path and way finding signage. • Mark the path with the appropriate shared path markings. • Remove the bollards obstructing the accesses to the paths or provide adequate lighting, signage and line marking to reduce the hazard to cyclists. • Install wheel stops in the parking bays to stop parked cars from overhanging the path. • Install lighting along the path.
L27	NE1 PBN Route (Norham, Hunter and Lawler Streets)	Farmer Street and Walcott Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally less than 6m wide, consists of a good quality surface and is sufficiently lit. This route provides direct bicycle access to the Woodville Reserve and Kyilla Park.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route section is delineated along a narrow road, less than 6m wide. The width of the roadway effectively means cyclists share the road. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. This route crosses Angove Street, a road which accommodates high traffic volumes, at an unsignalised intersection. This intersection is difficult to cross. Some speeding vehicles were observed along Norham Street. Some graffiti was observed along this route which could have a negative effect on the perceived personal safety along the route. Isolated ponding was also observed along this section.	• Install PBN Route markers at intersections where they are missing. • Raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • Install bicycle friendly speed calming measures to reduce speeding. • Clean drainage channels.

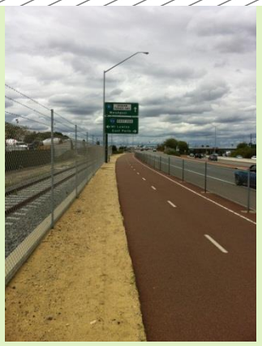
L28	Mabel and Haynes Streets	Norham Street and Eton Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit.		No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route crosses Charles Street, a road which accommodates high traffic volumes, at a staggered unsignalised intersection. This intersection is difficult to cross. Some cracking of the road surface was observed.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Consider installing a priority crossing, or piloting an innovative crossing solution at Charles Street. • Clean drainage channels.
L29	York and Namur Streets	Norham Street and Monmouth Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides direct access to Woodville reserve.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route crosses Fitzgerald Street, a road which accommodates high traffic volumes, at a staggered unsignalised intersection. This intersection is difficult to cross. Some isolated road surface reinstatements were found.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Consider installing a priority crossing, or piloting an innovative crossing solution, at Fitzgerald Street.
L30	Monmouth, Norfolk and Venn Streets	York Street and Burt Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally more than 10m wide, consists of an average surface quality and is sufficiently lit. This route provides access to PBN Route NE4.		No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. Significant cracking and reinstatements found, with some debris in drainage channels	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Clean drainage channels. • Resurface the carriageway.

L31	NE4 PBN Route (Burt and Norfolk Streets)	Walcott Street and Ethel Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally 6 – 10m wide, consists of an average surface quality and is sufficiently lit. This route provides access to Hyde Park.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. This route has limited priority at intersections, with vehicles including bicycles typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. Generally vehicles travel at speeds in excess of 50km/h, with some speeding observed. This route includes a roundabout controlled intersection at Forrest Street. This type of intersection control increases the risk to cyclists. Some graffiti was observed along this route which could have a negative effect on the perceived personal safety along the route. Isolated cracking, reinstatements and debris in drainage channels were also observed along this section.	• Install PBN Route markers at intersections where they are missing. • Raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • Install bicycle friendly speed calming measures to reduce speeding. • Resurface the sections of path that presents hazards to cyclists. • Clean drainage channels. • The graffiti along this route section should be removed.
L32	Raglan, Hutt, Chelmsford and Barlee Streets	Ethel Street and Curtis Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides direct access to PBN routes, NE1 and NE4, as well as to the North Perth Town Centre and the Beaufort Street coffee strip.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. A large section of this route section includes a high volume of parked cars. The width of the road and the number of parked cars means cyclists share the road with cars, with the added risk of being knocked down by suddenly opening car doors. This route has limited priority at intersections, with vehicles and bicycles alike typically having to give way to the intersecting road. The limited priority has a significant effect on the directness and travel time along the route. This route crosses Beaufort Street, a road which accommodates high traffic volumes, at an unsignalised and staggered intersection. This intersection is difficult to cross. Isolated ponding and surface hazards, as well as graffiti were observed along this section.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Consider parking restrictions to allow a safer cycling environment. • Install cycling way-finding or directional route signage. • Consider installing a priority crossing, or piloting an innovative crossing solution, at Charles Street. • Resurface the sections of path that presents hazards to cyclists. • The graffiti along this route section should be removed.

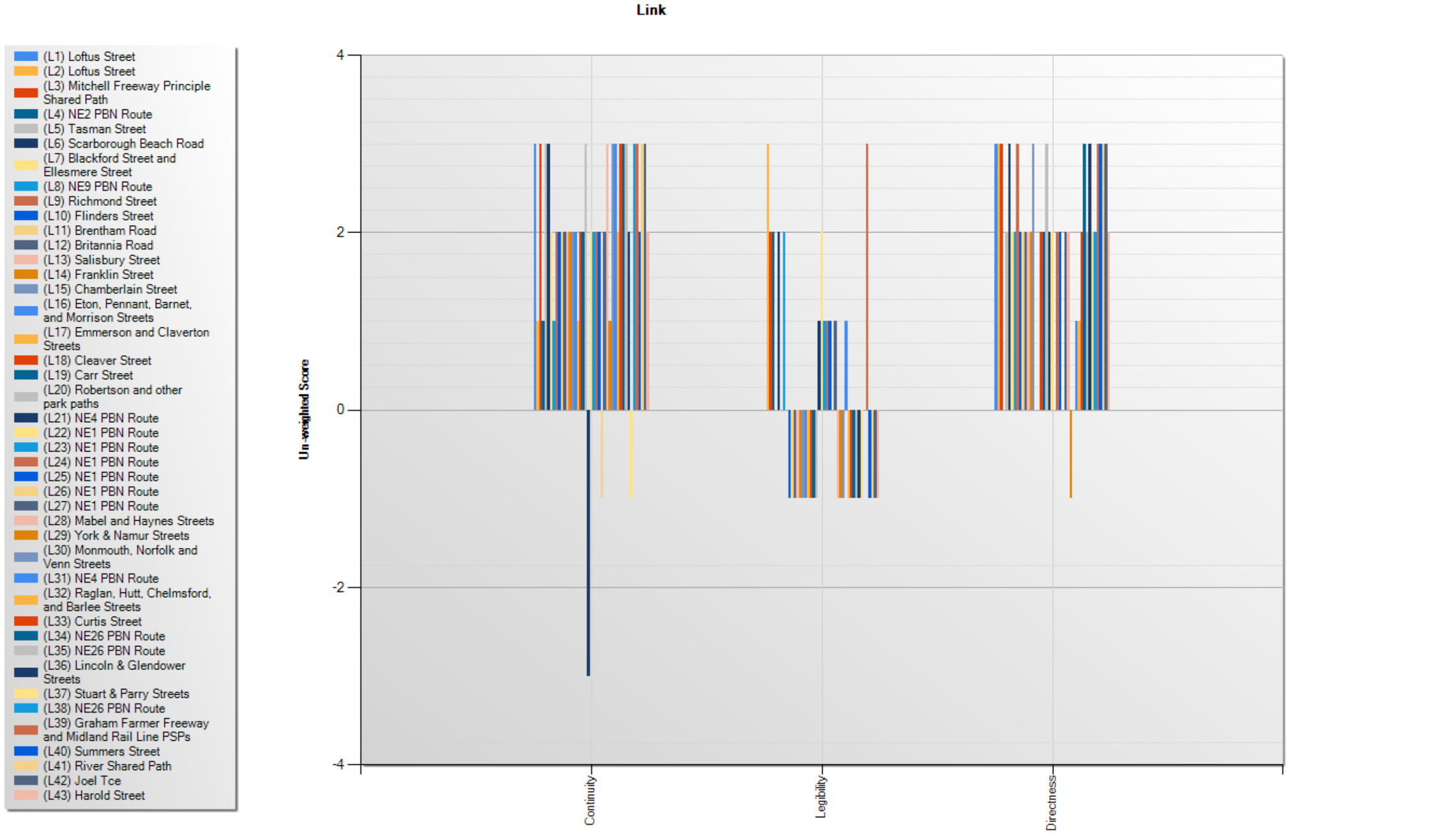
L33	Curtis Street	Walcott Street and Harold Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of an average surface quality and is sufficiently lit. This route provides direct access to Forrest Park.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route suddenly terminates against Walcott Street, which is a busy street. The road is between 6 and 10m wide, with no on street parking. The road includes a painted median which is approximately 1.5m wide. This provides less space for cyclists as it guides motorists closer to the kerb, also making motorists pass closer to cyclists. This route accommodates a major “rat run”, with vehicles going to Lord Street from Walcott Street and vice versa travelling along Curtis Street to avoid the traffic signals at Walcott and Lord. High vehicle speeds were observed on this road. Multiple reinstatements and cracking, along with protruding drain cover and debris in drainage channels presents significant hazards to cyclists.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Consider replacing the median with bike lanes. • Install cycling way finding or directional route signage. • Consider reducing or closing car access at the Curtis/Walcott intersection. • Consider installing bicycle friendly traffic calming measures. • Alternatively consider removing Curtis Road from the bicycle friendly route list. • Resurface the sections of the road that presents hazards to cyclists.
L34	NE26 PBN Route (Forrest Park)	Walcott Street and Harold Street	**Off road shared path** Off road shared path with width greater than 2m. Markings were present, although no signage or lighting was found along the majority of the alignment. This shared path is located in Forrest Park.	 	This is an isolated section of shared path Signage identifying the path as a shared path is not provided, and directional or way finding signage is also lacking. Centre line markings were observed, but no other markings associated with a shared path are provided along the path. Sections of the shared path include some cracking that presents a hazard for users. There is no lighting provided for the path. A maintenance vehicle was observed parking on the shared path, forcing people walking and cycling pass it on the grass (refer to photo).	• Install shared path and way finding signage. • Mark the path with the appropriate shared path markings. • Install lighting along the path. • Resurface sections that have cracked. • Instruct maintenance staff not to park on the path; consider physical infrastructure treatments if practice continues.

L35	NE26 PBN Route (Smith and Brisbane Street)	Harold Street and Stirling Street	**Unmarked on road facility** This route is a strategic PBN Route that is generally more than 10m wide, consists of an average surface quality and is sufficiently lit. This route provides access to Hyde Park.	 	In general no specific infrastructure is provided along this route that would justify its allocation as a bicycle route of strategic significance. Generally vehicles travel at speeds in excess of 50km/h, with some speeding observed. Formal on street parking is provided all along the route, creating the risk of parked vehicles "dooring" cyclists. Speeding and "rat running" continuing from Curtis Street was observed. This route includes multiple roundabout controlled intersections. This type of intersection control presents a threat to cyclists, especially if drivers are speeding (as drivers are inclined to do while rat running to avoid congestion) Isolated cracking and debris in drainage channels were also observed along this section.	• Install PBN Route markers at intersections where they are missing. • Raise the awareness of motorists that the road space is shared between bicycles and cars by installing signage to this effect. • Install bicycle friendly speed calming measures to reduce speeding. • Clean drainage channels. • Consider installing traffic diverter measures to limit rat running traffic, while allowing continuity of the bike route.
L36	Lincoln and Glendower Streets	Lord Street and Palmerston Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides direct access to Hyde Park and the Beaufort Street coffee strip.	   	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route suddenly terminates against Lord Street, which is a busy street. The road is between 6 and 10m wide, with a high volume of on street parking. This Increases the risk that cyclists may be knocked down by the doors of parked cars. This route crosses two busy roads, Beaufort Street and William Street, at unsignalised intersections. The crossing of Beaufort Street is blocked by a median; the median gap for pedestrians is less than 1.2m wide making it very difficult to store a bicycle there while crossing. The route does not enjoy priority, crossing two major roads presents significant delays to cyclists using this route. Build outs at traffic calming measures force cyclists into the roadway. Some cracking of the road surface was observed, however overall road surface conditions are good. Some debris was noted in the drainage channel.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Consider installing bicycle friendly traffic calming measures. • Consider installing priority crossings, or piloting innovative crossing solutions at Beaufort Street and William Street. • Clean drainage channels.

L37	Stuart and Parry Streets	Fitzgerald Street and Lord Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally less than 6m wide, consists of a poor quality surface and is sufficiently lit. This route provides direct bicycle access to the Robertson Park and the Graham Farmer Freeway PSP.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. This route crosses two busy roads, Beaufort Street and William Street, at unsignalised intersections. The route is narrow, which effectively means that cyclists are constantly in the roadway and in conflict with cars. A section of the route runs along a lane way which is heavily congested by delivery vehicles. It presents a number of hazards and safety concerns for cyclists. The road surface along this route is quite poor with numerous reinstatements, cases of ponding and debris. Some graffiti was observed along this route which could have a negative effect on the perceived personal safety along the route.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Consider installing priority crossings, or piloting innovative crossing solutions, at Beaufort Street and William Street. • Clean drainage channels. • Resurface the sections of the road that presents hazards to cyclists. • The graffiti along this route section should be removed. • Realigning this route along Newcastle Street should be considered.
L38	NE26 PBN Route (Stirling Street)	Newcastle Street and Brisbane Street	**On road facility (Sealed Shoulder)** Approximately 1.5m wide on road bicycle lanes (sealed shoulders) on a wide carriageway. The facility provides sufficient segregation to allow confident on road cycling. Limited signs and markings relating to this facility are provided.	 	A high volume of on street car parking is provided along Stirling Street, both parallel and angled parking. This presents a hazard to cyclists in terms of both “dooring” and reversing vehicles. The traffic volumes along this route are also high, presenting further concerns. The roundabout intersections with Brisbane Street and Parry Street have no bicycle facilities. There are also no warning signs provided to alert motorists that the route is a strategic bicycle route and to expect bicycles on the road and within the roundabouts. Only limited signage is provided to highlight the destinations that can be accessed via this route. The facility abruptly ends as it reaches the two roundabouts.	• Continue the bike lane facilities through the roundabout intersections, and connect to other bike facilities. • Raise the awareness that cyclists make use of this route by installing appropriate signs and markings. • Install more and improved way-finding signage along this route.

L39	Graham Farmer Freeway and Midland Rail Line PSP's	Lord Street, Guildford Street and the river	**Off road shared path** Approximately 3m wide off road path. The path includes appropriate markings, signage and lighting along the majority of the alignment.	 	The path is fairly isolated for the most part with many locations allowing concealment. This along with limited surveillance and some graffiti may cause some users to experience the environment as a threat to personal security. Some surface cracking and minimal debris was observed.	• The graffiti along this route section should be removed. • Path should be swept regularly.
L40	Summers Street	East Parade and shared path along the river	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a poor surface quality and is sufficiently lit. This route provides access to the river.		No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. A high volume of cars are parked along this route, which means that cyclists are constantly in the roadway and in conflict with cars. The road surface along this route is very poor with numerous reinstatements, cases of ponding and debris. Some graffiti was observed along this route which could have a negative effect on the perceived personal safety along the route.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Clean drainage channels. • Resurface the road. • The graffiti along this route section should be removed.
L41	Shared Path along the River	Graham Farmer Freeway PSP and the City of Vincent Boundary	**Off road shared path** Greater than 2m wide off road path. Markings are present but no signage or lighting was found along the majority of the alignment. This shared path is located along the river.		Signage identifying the path as a shared path is not provided, and directional or way finding signage is also lacking. Centre line markings were observed, but no markings associated with a shared path are provided along the path. Sections of the shared path include some cracking that presents a hazard for users. There is no lighting provided for the path. This along with concealment opportunities and some noted graffiti may cause users to feel unsafe.	• Install shared path and way finding signage. • Mark the path with the appropriate shared path markings. • Install lighting along the path. • Resurface sections that have cracked. • The graffiti along this route section should be removed.

L42	Joel Terrace	Summers Street and Mitchell Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides access to the river.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. The route does not enjoy priority, crossing two major roads presents significant delays to cyclists using this route. Median islands along this route may cause cars to pass close to cyclists. Some speeding was observed, with vehicles travelling in excess of 50km/h. The overall road surface conditions are good. Some debris was noted in the drainage channel.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Clean drainage channels. • Consider removing the median, or marking bike lanes to increase safety for cyclists. • Consider installing bicycle friendly traffic calming measure to reduce speeding.
L43	Harold Street	Public Transport Centre and Smith Street	**Unmarked on road facility** This route is a local bicycle friendly route that is generally 6 – 10m wide, consists of a good surface quality and is sufficiently lit. This route provides access to the river.	 	No bicycle specific facilities, signs or markings are present along this route that would justify its allocation as bicycle friendly route. A high volume of cars are parked along this route, which means that cyclists are constantly in the roadway and in conflict with cars. A section of the route also includes angled parking, which presents a hazard to cyclists as reversing vehicles may not see them. The surface quality is good with some isolated reinstatements, and minimal debris in drainage channels. The route crosses Lord Street, where the crossing of Lord Street is illegal due to signs and line markings only allowing a left turn. Some speeding was observed.	• Sign and mark appropriate bicycle facilities or raise awareness that cyclists and motorists share the roadway through signage. • Install cycling way finding or directional route signage. • Clean drainage channels. • Consider installing bicycle friendly traffic calming measure to reduce speeding. • Install an appropriate crossing facility, for crossing Lord Street.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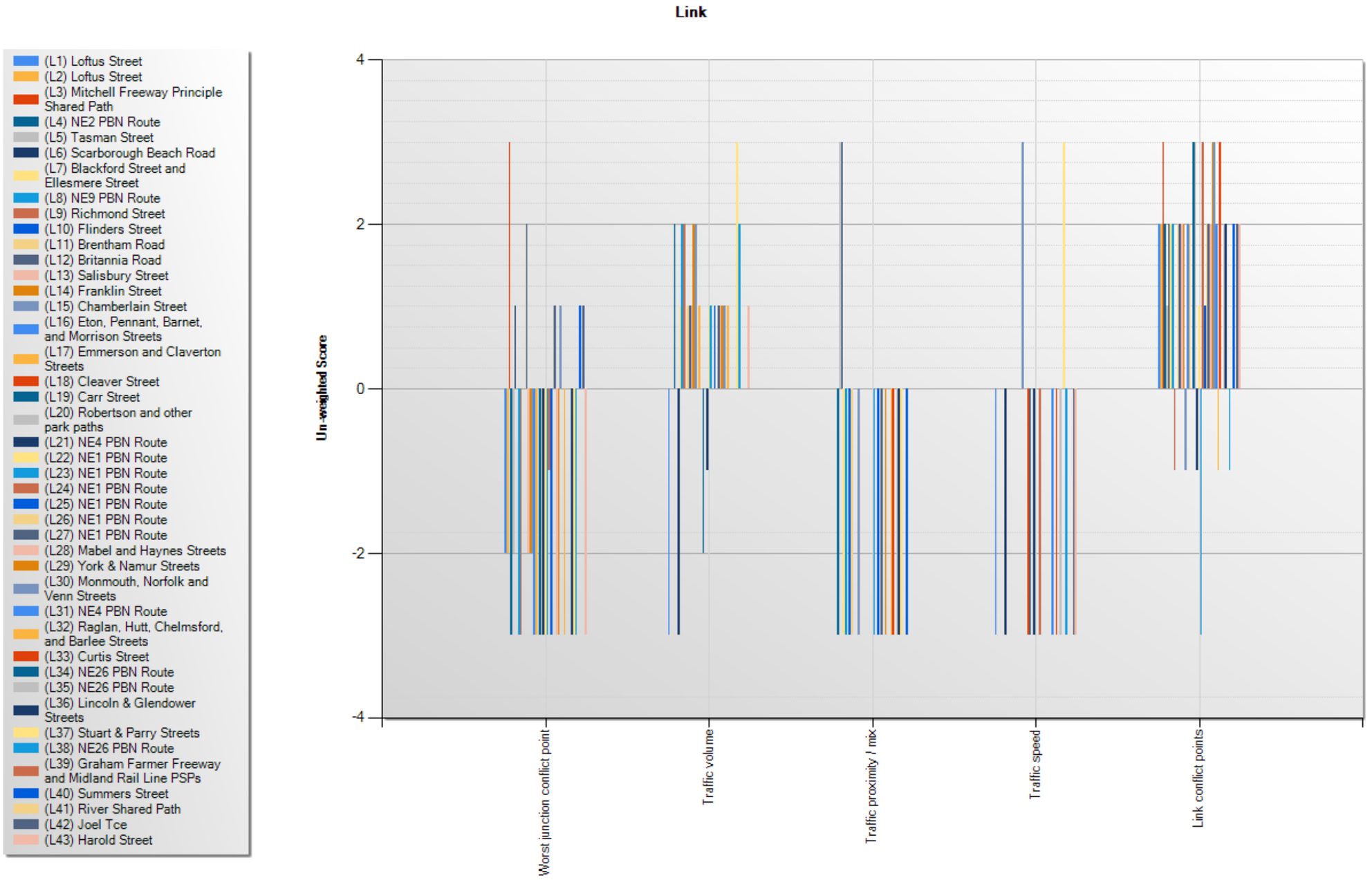
(L2) Loftus Street
(L3) Mitchell Freeway Principle Shared Path
(L4) NE2 PBN Route
(L5) Tasman Street
(L6) Scarborough Beach Road
(L7) Blackford Street and Ellesmere Street
(L8) NE9 PBN Route
(L9) Richmond Street
(L10) Flinders Street
(L11) Brentham Road
(L12) Britannia Road
(L13) Salisbury Street
(L14) Franklin Street
(L15) Chamberlain Street
(L16) Eton, Pennant, Barnet, and Morrison Streets
(L17) Emmerson and Claverton Streets
(L18) Cleaver Street
(L19) Carr Street
(L20) Robertson and other park paths
(L21) NE4 PBN Route
(L22) NE1 PBN Route
(L23) NE1 PBN Route
(L24) NE1 PBN Route
(L25) NE1 PBN Route
(L26) NE1 PBN Route
(L27) NE1 PBN Route
(L28) Mabel and Haynes Streets
(L29) York & Namur Streets
(L30) Monmouth, Norfolk and Venn Streets
(L31) NE4 PBN Route
(L32) Raglan, Hutt, Chelmsford, and Barlee Streets
(L33) Curtis Street
(L34) NE26 PBN Route
(L35) NE26 PBN Route
(L36) Lincoln & Glendower Streets
(L37) Stuart & Parry Streets
(L38) NE26 PBN Route
(L39) Graham Farmer Freeway and Midland Rail Line PSPs
(L40) Summers Street
(L41) River Shared Path
(L42) Joel Tce
(L43) Harold Street
Un-weighted Score
4
2
0
-2
-4
Continuity
Legibility
Directness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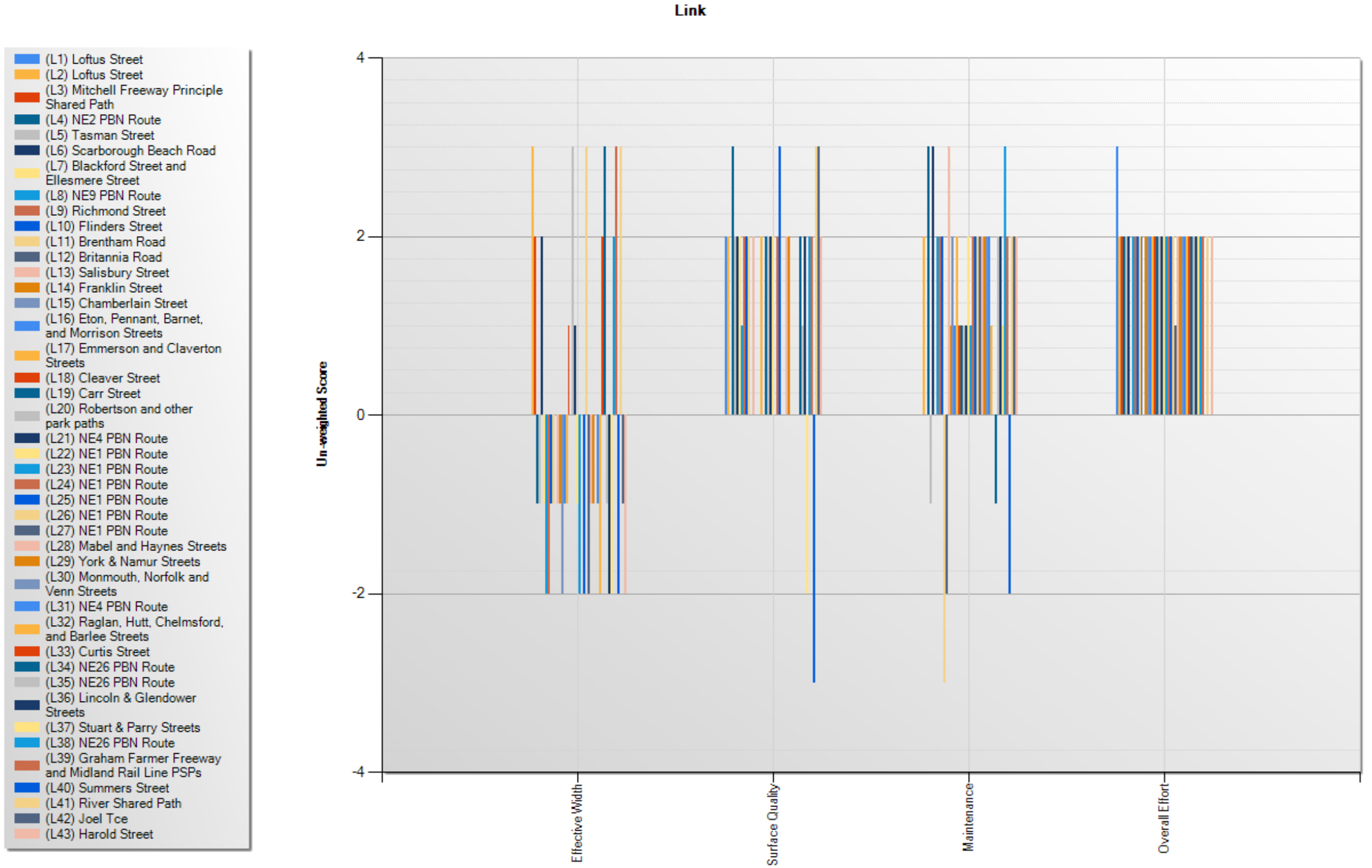
(L38) NE26 PBN Route
(L39) Graham Farmer Freeway and Midland Rail Line PSPs
(L40) Summers Street
(L41) River Shared Path
(L42) Joel Tce
(L43) Harold Street
Un-weighted Score
4
2
0
-2
-4
Worst junction conflict point
Traffic volume
Traffic proximity / mix
Traffic speed
Link conflict points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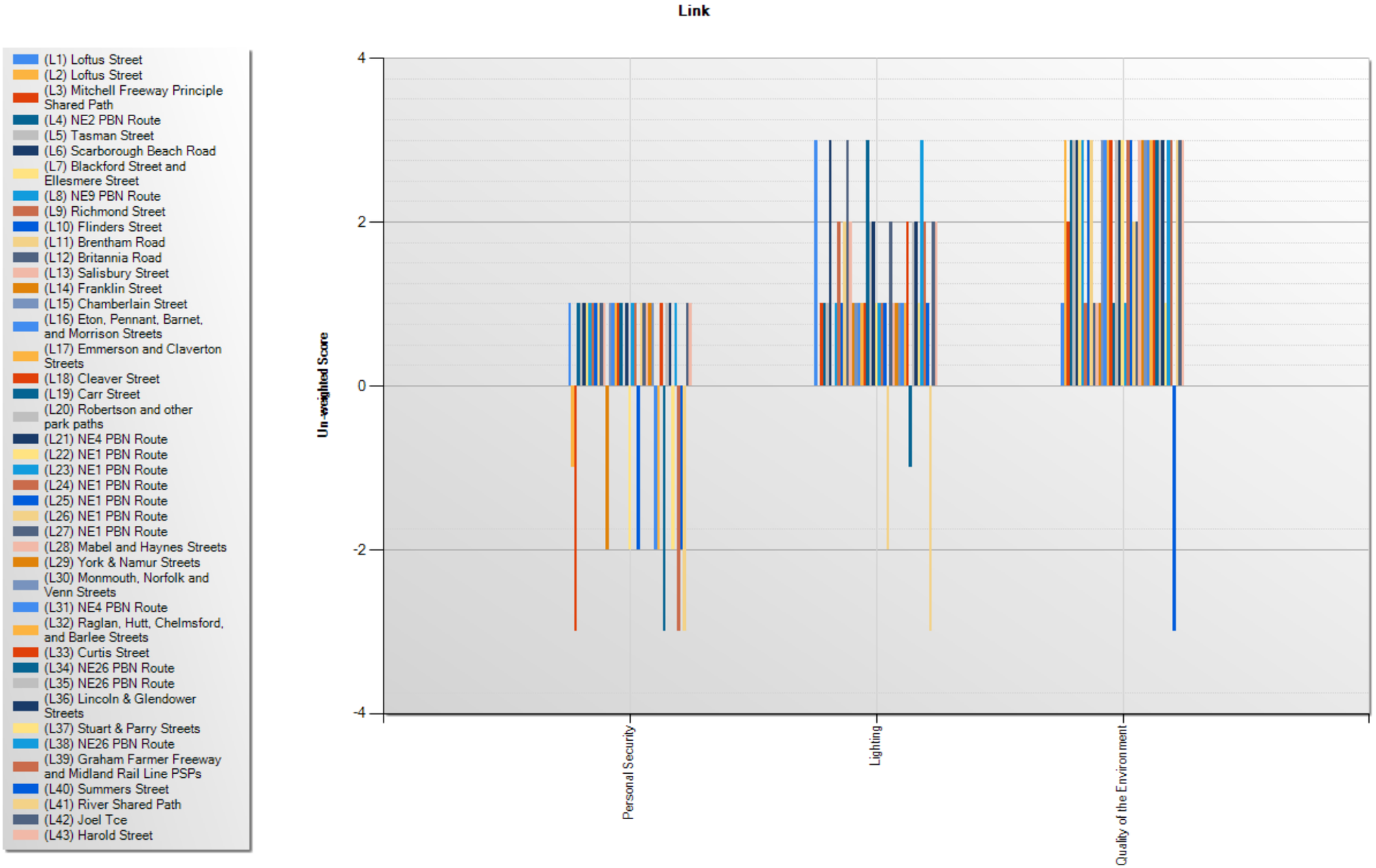
(L41) River Shared Path
(L42) Joel Tce
(L43) Harold Street
Un-weighted Score
4
2
0
-2
-4
Effective Width
Surface Quality
Maintenance
Overall Effort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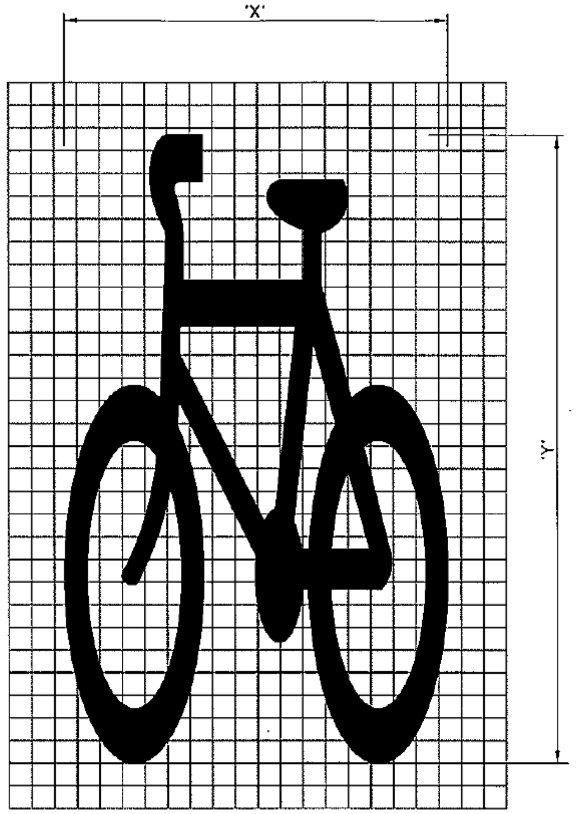
(L41) River Shared Path
(L42) Joel Tce
(L43) Harold Street
Un-weighted Score
4
2
0
-2
-4
Personal Security
Lighting
Quality of the Environment

Appendix B: MRWA Standard Drawings for Bicycle Route Markings



BICYCLE PAVEMENT SYMBOL

FACILITY	WIDTH	X	Y	LOCATION
KERB SIDE LANE	<3.7m	0.8m	1.3m	150mm FROM KERB OR EDGE OF MARKED PARKING BAY
WIDE KERB SIDE LANE	3.7-4.3m	0.8m	1.3m	150mm FROM KERB OR EDGE OF MARKED PARKING BAY
WIDE KERB SIDE LANE	>4.3m	1.1m	1.8m	150mm FROM KERB OR EDGE OF MARKED PARKING BAY
SEALED SHOULDER OR BICYCLE LANE	1.0m-1.2m	0.8m	1.3m	CENTRALLY LOCATED IN SEALED SHOULDER/BICYCLE LANE
SEALED SHOULDER OR BICYCLE LANE	>1.2m	1.1m	1.8m	CENTRALLY LOCATED IN SEALED SHOULDER/BICYCLE LANE
SHARED PATH	≥2.0m	0.49m	0.8m	CENTRALLY LOCATED WITHIN LEFT HALF OF PATH

SYMBOL SIZE/LOCATION CHART

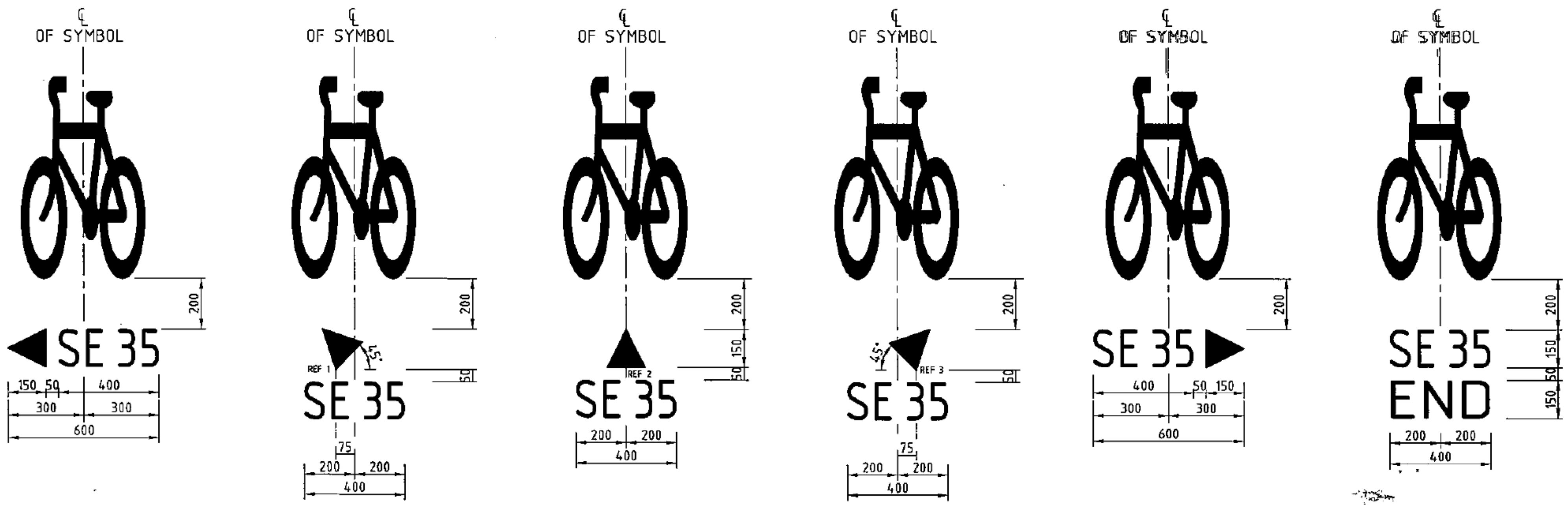
REF 1 REF 2 REF 3

150

150

DIRECTIONAL TRIANGLE DETAIL

SCALE 1:10



AMENDMENTS

No.	DESCRIPTION	APPROVED & DATE

NOTES

1. ALL PAVEMENT MARKING TO INCLUDE REFLECTIVE BEADS.
2. ALL PAVEMENT MARKINGS TO BE LONG LIFE THERMOPLASTIC MATERIAL IN ACCORDANCE WITH MRWA SPECIFICATION 604.
3. FOR BICYCLE PAVEMENT SYMBOL DETAILS EXCLUDING SYMBOLS SIZE REFER TO AS.1742.9 FIG 2.2.
4. BICYCLE PAVEMENT SYMBOLS TO BE WHITE IN COLOUR.
5. DIRECTIONAL TRIANGLES TO BE AS PER DETAIL AND WHITE IN COLOUR.
6. ROUTE LETTERS TO BE WHITE IN COLOUR, 150mm HIGH x 20mm LINE THICKNESS. (TEXT STYLE ISOCPEUR).
7. REFER TO DRAWING No. 201131-0055 FOR TYPICAL PAVEMENT MARKING CONFIGURATIONS.

METADATA

GROUND SURVEY STANDARD:
DATE OF CAPTURE:
MAPPING SURVEY STANDARD:
DATE OF CAPTURE:
MAIN ROADS PROJECT ZONE:
HEIGHT DATUM:

Government of Western Australia
mainroads WESTERN AUSTRALIA
PLANNING AND TECHNICAL SERVICES DIRECTORATE
ROAD AND TRAFFIC ENGINEERING BRANCH
Waterloo Crescent East Perth 6004
Telephone (08) 9323 4111 Fax (08) 9323 4430

Government of Western Australia
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Waterloo Crescent East Perth 6004
Telephone (08) 9323 4111 Fax (08) 9323 4430

FILE NUMBER

DESIGNED / DRAWN R.KOORENGEVEL/J.VOKE 19.4.11

VERIFIED 6.9.11

APPROVED 6/9/11

SCALES 1:20 A3

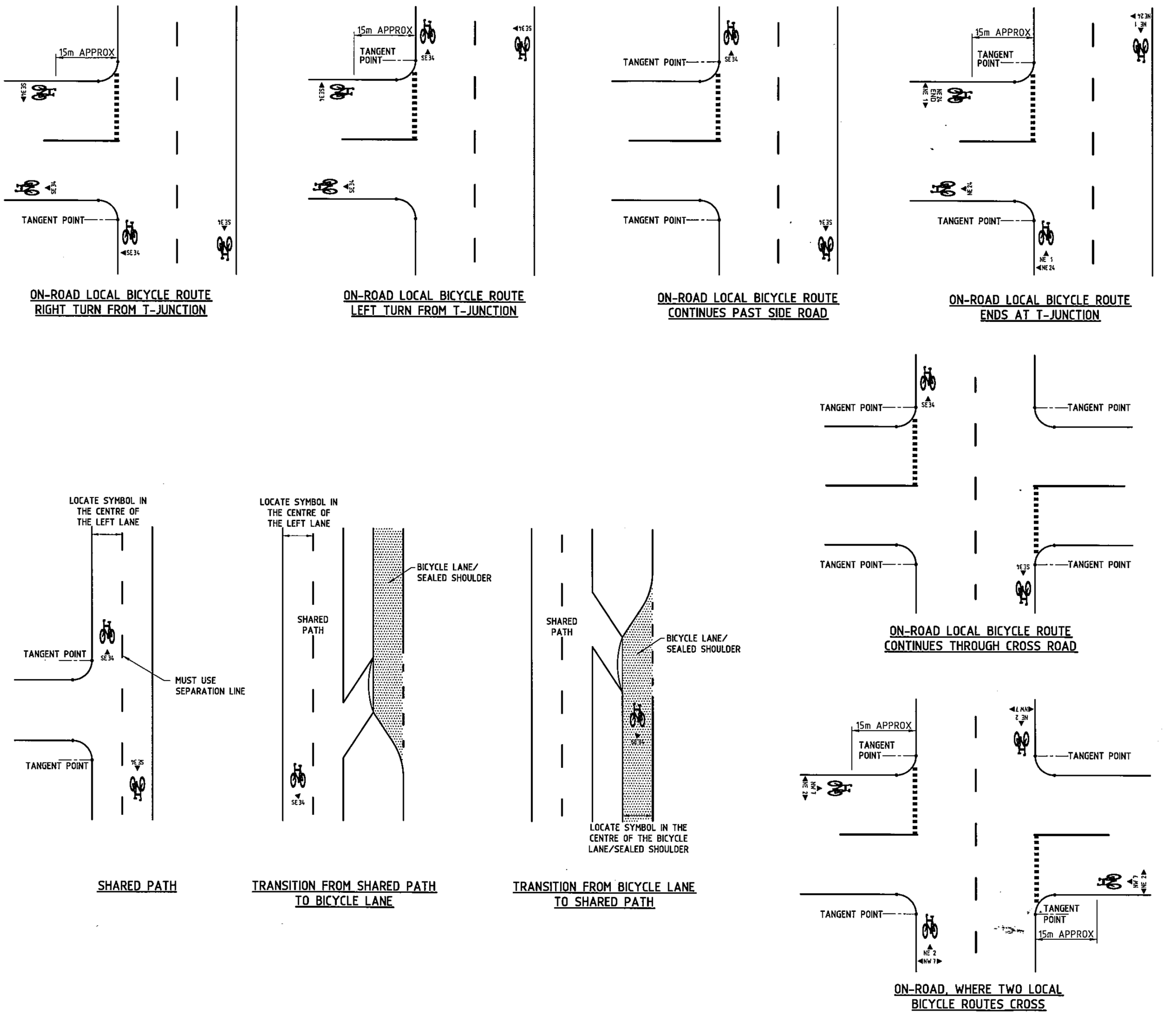
STANDARD DRAWING
LOCAL BICYCLE ROUTES

TYPICAL ROUTE PAVEMENT MARKING

LOCAL AUTHORITY

MRWA DRAWING NUMBER AMENDMENT

201131-0018



AMENDMENTS

No.	DESCRIPTION	APPROVED & DATE

NOTES

1. REFER TO DRAWING No. 201131-0018 FOR ROUTE MARKER DETAILS.
2. ROUTE MARKERS TO BE USED ONLY ON BICYCLE ROUTES AS APPROVED BY DEPARTMENT OF TRANSPORT.
3. CONFIGURATIONS SHOWN ARE INDICATIVE ONLY AND SHOULD BE VARIED TO MEET SITE SPECIFIC CONDITIONS WHERE NECESSARY.
4. ROUTE MARKERS TO BE INSTALLED AT ALL INTERSECTIONS ALONG THE ROUTE.
5. CONSECUTIVE ROUTE MARKERS SHOULD BE A MINIMUM OF 50m APART ON STRAIGHT SECTIONS OF ROAD/PATH.

METADATA

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FILE NUMBER
DESIGNED / DRAWN C.WARD/J.VOKE 24.8.11
VERIFIED 6.9.11
APPROVED 6/9/11

SCALES NOT TO SCALE
A3

STANDARD DRAWING
LOCAL BICYCLE ROUTES

TYPICAL PAVEMENT MARKING CONFIGURATIONS

LOCAL AUTHORITY
MRWA DRAWING NUMBER 201131-0055
AMENDMENT